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Instrument Manual

Transmitter in Field Housing PR 5230

Instrument Manual for PR 5230	9499 050 52301 Release: 3.00	Edition 8	14.12.2012

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1 Safety Information

1.1 Electrical Protective Class

This instrument has been built and tested in compliance with the safety regulations for measuring and control instrumentation for protective class I (protective earth connection) according to IEC 1010/EN61010 or VDE 0411. The instrument was in perfect condition with regard to safety features when it left the factory. To maintain this condition and to ensure safe operation, the operator must follow the instructions and observe the warnings in this manual.

1.2 Intended Use

The instrument is intended for use as an indicator for weighing functions. Product operation, commissioning and maintenance must be performed by trained and qualified personnel who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

The instrument reflects the state of the art. The manufacturer does not accept any liability for damage caused by other system components or due to incorrect use of the product.

1.3 Initial Inspection

Check the content of the consignment for completeness and inspect it visually for signs of damage that may have occurred during transport. If there are grounds for rejection of the goods, a claim must be filed with the carrier immediately and the Sartorius sales or service organization must be notified.

1.4 Before Commissioning

Visual inspection!

Before commissioning and after and storage or transport, inspect the instrument visually for signs of mechanical damage.

1.4.1 Installation

The instrument housing meets IP 66. Mount the instrument with the cable entry glands pointing downwards. To ensure proper cooling of the instrument, make sure air circulation around the instrument is not blocked. Avoid exposing the instrument to excessive heat; e.g., from direct sunlight. Ambient conditions must be taken into account at all times.

With outdoor mounting, make sure that adequate weather protection is provided (for temperatures, see Chapter 16.4.1).

1.4.2 Opening the Instrument

Danger! High Voltage!

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

Disconnect the instrument from the supply voltage. Any time covers or parts are removed; live parts or terminals may be exposed. Capacitors in the unit may still be charged also after disconnecting the unit from all voltage sources.

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

1.4.3 Connection of a protective earth conductor to PR 5230

1.4.3.1 Version 230 V AC

The instrument must be connected to protective earth via a protective earth conductor (PE) in the power connector.

The power cable contains a protective earth conductor which must not be interrupted inside or outside the instrument. The PE conductor is connected to the housing inside the instrument.

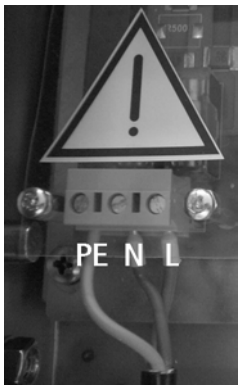
1.4.3.2 Version 24 V DC

The instrument must be connected to the protective earth conductor. The connection can be established via the housing side wall.

1.4.4 Power Connection PR 5230

The instrument does not have a power switch and is ready for operation immediately after connecting the supply voltage.

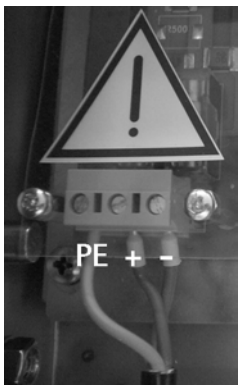
1.4.4.1 Version 230 V AC



Safe interruption of both supply voltage conductors must be provided for, either by disconnecting the power connector or using a separate switch.

The instrument is equipped with a wide range power supply and covers AC systems with a frequency of 50 Hz/60 Hz and a voltage range of 100 V AC to 240 V AC +10 %/-15 % automatically (without manual selection). The power supply is protected against short circuits.

1.4.4.2 Version 24 V DC



This version is designed for 24 V direct current.

The supply is done with a 3-pin connector (PE/+/-). The instrument is protected against wrong polarity.

The instrument is primary protected by internal fuses in the + and – conductor.

1.4.5 Failure and Excessive Stress

If there is any reason to assume that safe operation of the instrument 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 instrument is physically damaged.
- The instrument does not function.
- The instrument has been subjected to stresses beyond the tolerance limits (e.g., during storage or transport).

1.4.6 Important Note

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

1.4.7 Maintenance and Repair

Maintenance work must be carried out only by a trained technician aware of the involved hazards, whereby the relevant precautions must be taken in account.

1.4.7.1 Static Sensitive Components

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

1.4.7.2 Replacing of Fuses in PR 5230 with Option Y2/WE1

Caution!

In PR 5230 with option Y2/WE1 the replacing of fuses are not allowed!

1.4.7.3 Replacing of Fuses in PR 5230 without Option Y2/WE1

Only the fuses specified in Chapter 16.3 are permissible!

2 Transmitter in Field Housing

The instrument is equipped with a 128 x 64 pixel display for weight values with max. 6 digits and additional status indication.

2.1 Overview of the Instrument

- Accuracy 10,000 e (Class III) for the weighing electronics
- High-speed conversion with response times from 5 msec
- Weight indication with status by monochrome 128 x 64 pixel display
- 3 function keys in the housing, function configurable
- Wall-mounted stainless steel housing, with IP 66 protection
- LAN adaptor with 10/100 Mbit/sec for data transfer, calibration, parameterization
- RS-232 interface, built-in; for connecting e.g. a printer or a remote indicator
- RS-485 interface, built-in; for connecting e.g. PC
- Expansion possible by addition of following plug-in circuit boards (3 slots):
  - Analog output board PR 5230/06
  - Load cell junction board PR 5230/22
  - Interfaces PR 1721/4x
- 3 opto-decoupled outputs (optional)
- 3 configurable relay outputs with change-over contact
- 3 configurable optocoupler inputs, potential-free internal supply possible (optional)
- Galvanically isolated interfaces (except RS-232)
- Wide range power supply for 100 to 240 V AC, protection class I (protective earth)
- Version PR 5230 for 24 V direct current
- Version PR 5230 with intrinsically safe load cell supply (optional)
- Plug-in connections inside the instrument for load cells, inputs/outputs, LAN adaptor, serial interfaces
- Calibration using PC tool (Browser/VNC)
- Calibration using weights, by entering mV/V values, or directly, using load cell data ("smart calibration")
- Software configuration of the interface cards, e.g. for remote display or printer
- Analog test for the weighing electronics

Communication Protocols

For the internal RS-232 or RS-485:

- Remote display protocol
- Printer
- J-Bus/ModBus (Slave)
- SMA protocol
- xBPI protocol
- Asycom protocol

Fieldbus Slave (accessories):

- PR 1721/41 ProfiBus-DP
- PR 1721/42 InterBus-S
- PR 1721/44 DeviceNet
- PR 1721/45 CC-Link
- PR 1721/46 ProfiNet I/O
- PR 1721/47 EtherNet-IP

For the internal LAN:

- ModBus-TCP
- Ethernet-TCP/IP
- OPC

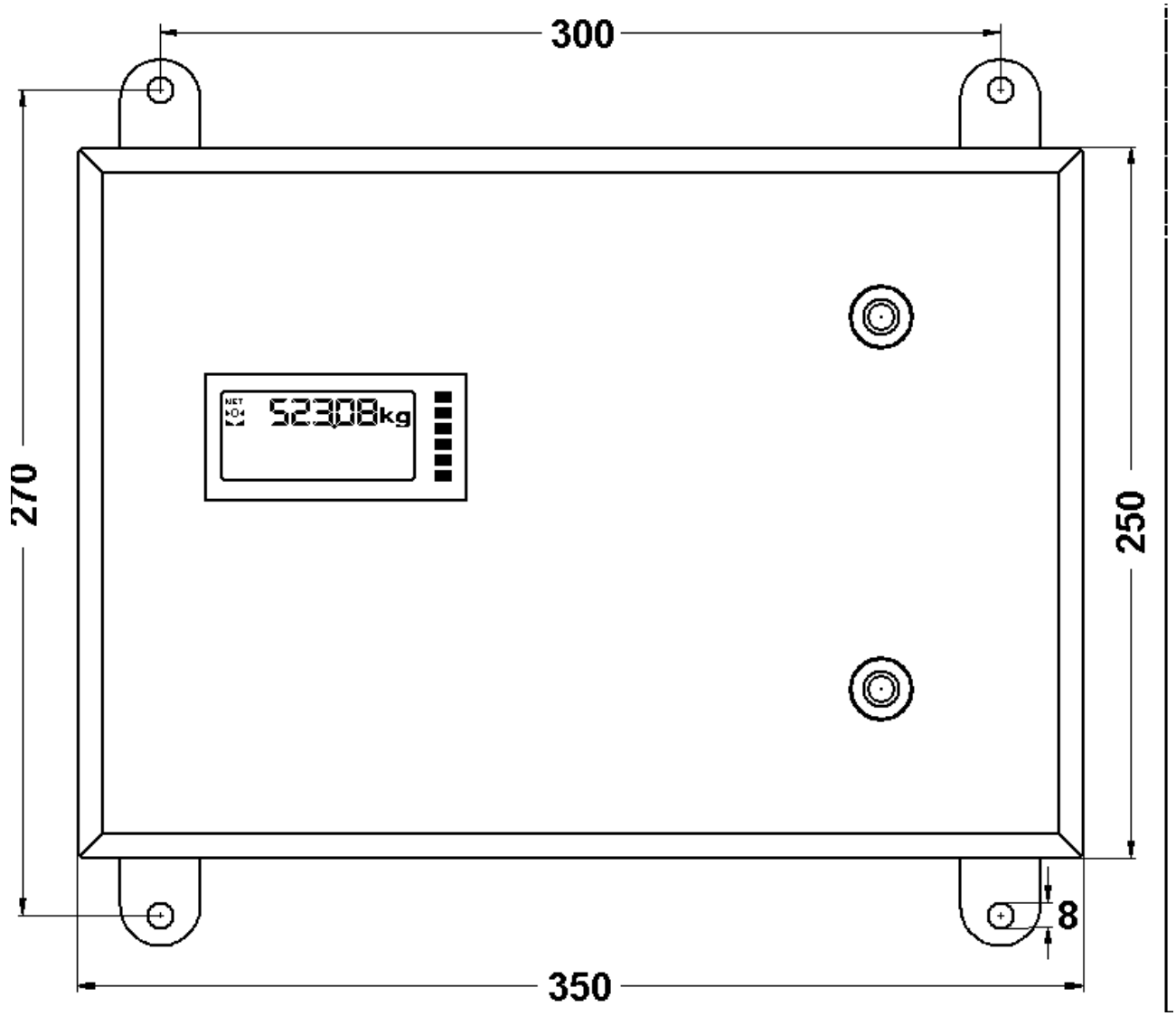
2.2 Housing

The transmitter is installed in a stainless steel field housing with protection type IP66. It is intended for wall mounting. The door is left-hinged and opens towards the front. The environmental conditions specified for the instrument must be observed (see Chapter 16.4.1). The housing is mounted using 4 screws. When the housing is closed, no controls are visible from outside.

The 128 x 64 pixel display and 6 additional status indicator LEDs are visible through a glass pane in the housing door.

Housing Dimensions

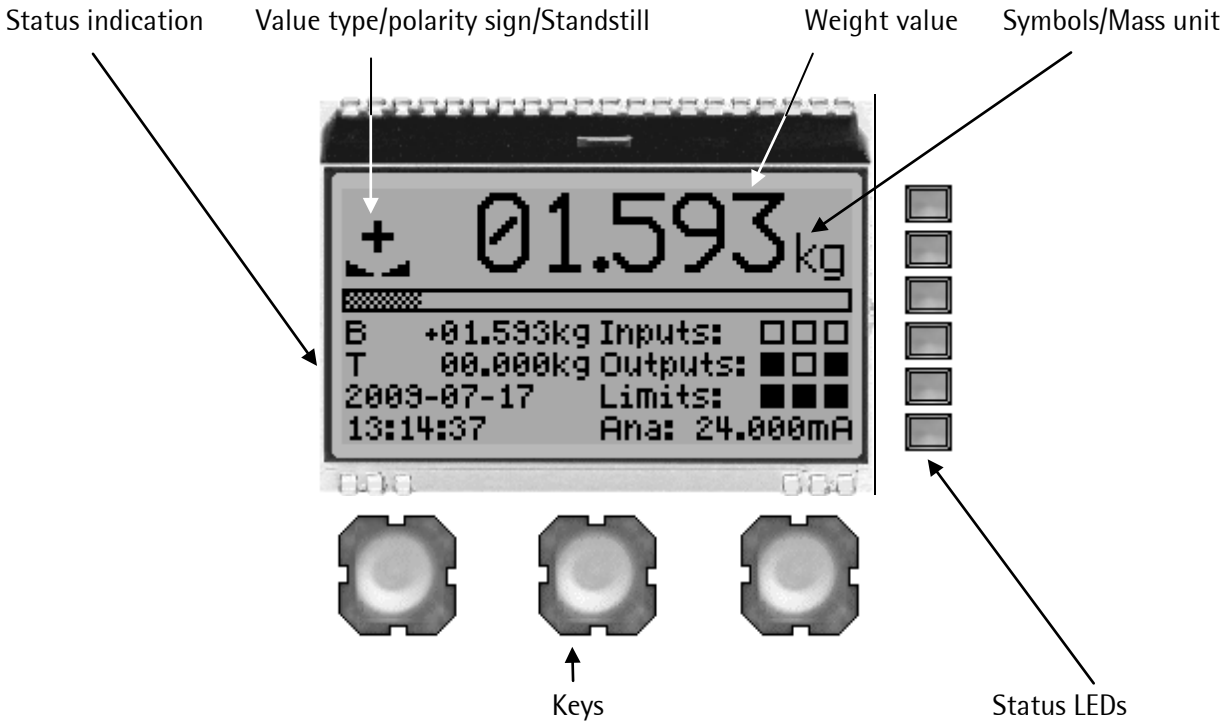
Height = approx. 120 mm



2.3 Display and Controls

2.3.1 Display

The display permits indication of 6-digit weight values (digit height 18 mm) with decimal point.
Possible units of mass are mg, g, kg, t, lb or oz.



Value type		Polarity sign/Standstill		Symbols		Mass unit
B	Gross weight (Brutto)	+	Positive value		Warning	mg
G	Gross weight at NTEP or NSC mode	–	Negative value			g
NET	Net weight (Net = Gross – Tare)		The weight value is between ¼ d and ½ d.	R1	Range 1	kg
				R2	Range 2	t
				R3	Range 3	lb
T	Tare weight	+0+	The weight value is within ±¼ d of zero.			oz
PT	Fixtare					
	Not tared		Standstill			
TST	Test value					

Note: In W&M mode an invalid weight is shown without mass unit.

2.3.1.1 Status Indication

For status indication, max. 5 lines can be configured by selecting from a menu (see Chapter 5.6.7).

Selection	Width	Height	Example	Description
Empty	½ Display	1 Line		Empty line
Gross/Net/Tare	½ Display	1 Line	B +123.45kg	Gross/Net/Tare
			B E:Sense	Error, see Chapter 15.1
Gross	½ Display	1 Line	B +123.45kg	Gross
Net	½ Display	1 Line	NET +123.45kg	Net
Tare	½ Display	1 Line	T +123.45kg	Tare
Bargraph	1 Display	1 Line		Shows the weight in proportion to nominal capacity.
Fieldbus LEDs	½ Display	1 Line	--- red --- grn	See Chapter 4.4.
Fieldbus Inputs	1 Display	1 Line	FB-Inp: 01.23.45.67.89.AB.CD.EF	Fieldbus Inputs
Fieldbus Outputs	1 Display	1 Line	FB-Out: 01.23.45.67.89.AB.CD.EF	Fieldbus Outputs
Digital inputs	½ Display	1 Line	Inputs: ■□■	Digital inputs: 1, 2, 3
Digital outputs	½ Display	1 Line	Outputs: ■□■	Digital outputs: 1, 2, 3
Digital I/O	½ Display	1 Line	I: ■□■ O: ■□■	Digital in-/outputs: 1, 2, 3
Analog output	½ Display	1 Line	Ana: 12.345mA	Analog output
Limits	½ Display	1 Line	Limits: ■□■	Limits: 1, 2, 3
Date	½ Display	1 Line	2009-12-31	Date
Time	½ Display	1 Line	10:37:34	Time
Hostname	½ Display	1 Line	HOPPER1	Device name in the network
Hostname (long)	1 Display	1 Line	Small Material Hopper	Device name (long)
IP-Address	½ Display	1 Line	192.168.1.1	Network address
			---.---.---.---	No network
			??.??.??.??	Search DHCP server
IP-Address (long)	1 Display	1 Line	172.200.280.255	Network address (long)
Gross (2 lines high)	1 Display	2 Lines	B +123.45 kg	Gross (2 lines high)
Net (2 lines high)	1 Display	2 Lines	NET +123.45 kg	Net (2 lines high)
Tare (2 lines high)	1 Display	2 Lines	T +123.45 kg	Tare (2 lines high)

2.3.2 Status LEDs

The instrument has 6 green LEDs for display of the operating or error status.

2.3.2.1 Hardware, Bus Connection (Fieldbus plug-in cards), Network, Power supply

	Hardware error E:HardE	Bus connection provided	Bus connection not provided	Power on	Network active
	flashing 1 Hz				
		lit	flashing 1 Hz		
					flashing acc.
				lit	

2.3.2.2 Weight Status Indicator

	Standstill	Center zero	Below zero or above MAX
	lit		
		lit	
			lit

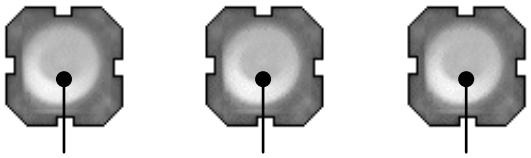
Note: The weight error status sees in Chapter 15.2.

2.3.3 Buttons

Danger! High Voltage!

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

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



The 3 buttons are accessible only when the housing door is open. The following functions can be performed:

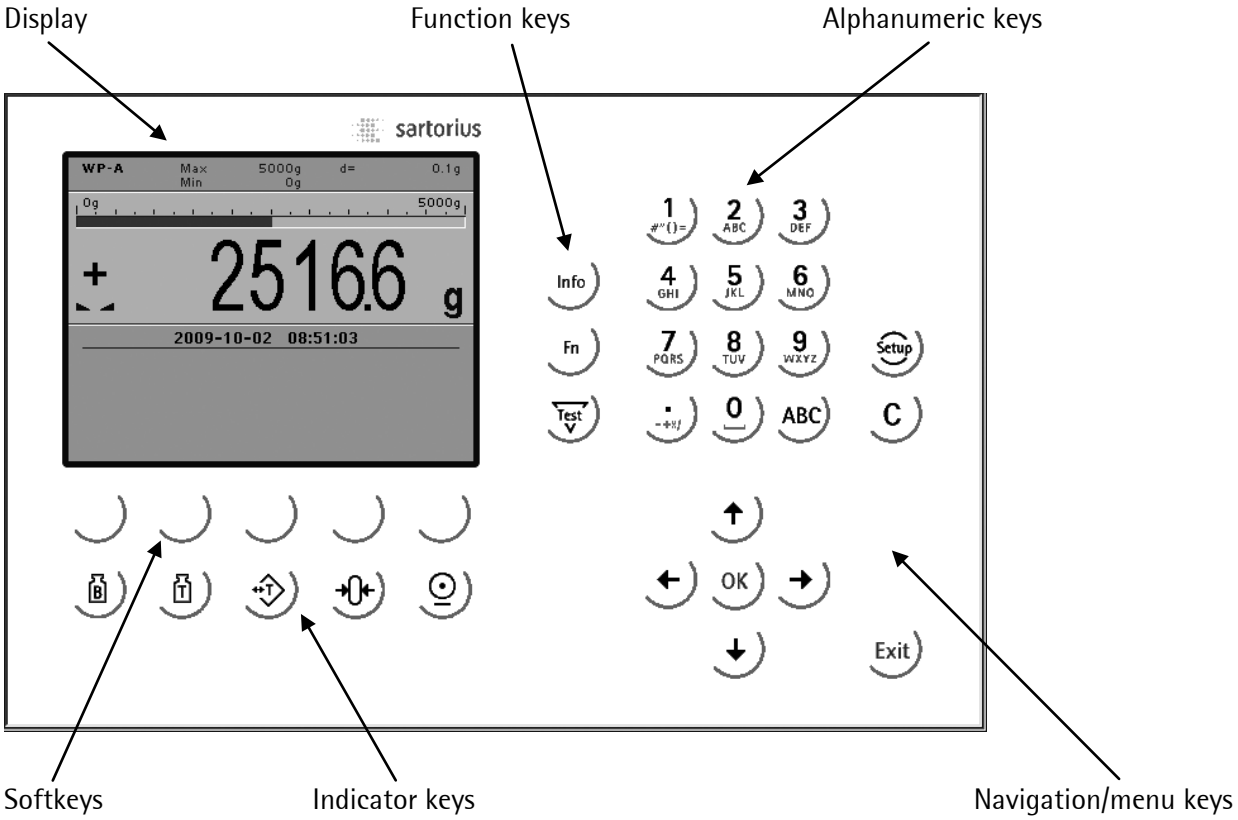
- zero setting (1)
- taring (2)
- test measurement (3)
- display of software version and board number by simultaneous actuation of push-buttons (1) and (3)
- Updating a Software with ‚FlashIt!32' (see Chapter 12.2) by pressing the keys (1) and (3) simultaneously and pressing key (2) three times.

Adjustment or parameter entry is

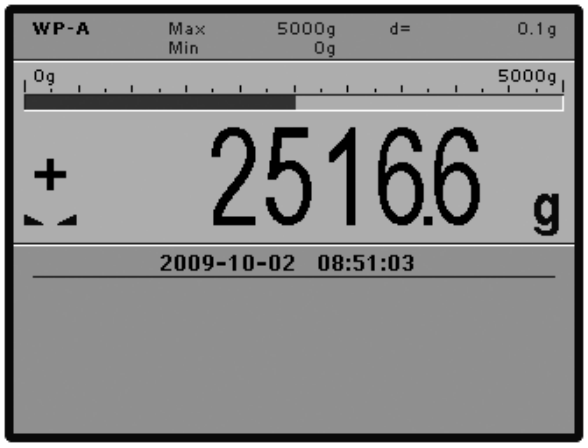
- not possible using the push-buttons.
- only possible using a Notebook/PC via Internet browser (see Chapter 5.3.5) and VNC (see Chapter 5.3.4).

2.3.4 Operating via VNC

2.3.4.1 Operator Interface



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



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

lb and oz units are not permitted for use in legal metrology in the EU and EEC.

The weight readout shows the current weight on a bar graph that indicates proportion of the maximum capacity (Max), with 0 on the left and 100 % on the right.

2.3.4.2 Status Symbols

The following status symbols can be shown:

Symbol	Description
B	Gross weight (Brutto)
G	Gross weight in NTEP or NSC mode
NET	Net weight (Net = gross – Tare)
T, **PT**	Tare weight, fixtare
TST	The display shows the test value without mass unit
+	Positive value
–	Negative value
→0←	The weight value is within ±¼ d of zero
◣ ◢	The weight value is stable.
⚠	Value not permissible in legal metrology (e.g., 10-fold resolution).
R1	Range 1
R2	Range 2
R3	Range 3

2.3.4.3 Keys

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

Indicator key	Description
	Display gross weight
	Display tare weight
	Taring; the current gross weight is stored in the tare memory, provided that: - weight value is stable. - instrument is not in error status (function dependent on configuration).
	Sets gross weight to zero, provided that (function dependent on configuration): - weight value is stable. - weight is within zero setting range
	Start printing.

Navigation key	Description
	Cursor moves to the right. Selection
	Cursor moves to the left. Selection
	Scroll up in the menu.
	Scroll down in the menu.

Menu key	Description
	Softkey: select function
	Backspace/delete
	Exit from current menu; continue operation on next higher level.
	Enter/confirm

Function key	Description
Info	Information on version number, fitted hardware,10-fold resolution
Fn	Without function
Test	Test
Setup	Open the setup menu
ABC	Toggle to alphabetic input mode. During configuration, you can switch between the mass units by pressing this key.

2.3.4.4 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 are not available on the active menu level, or not with the active access privileges.

When operating steps involving softkeys are described in this manual, the softkey labels are shown in square brackets, rather than in graphics of the softkeys.

Setup	Config	Calib	Param	

2.3.4.5 Selection Using the Navigation Keys (VNC)

Press ↓ to scroll down, or ↑ to scroll up in a menu.

Press OK to select a menu item. To select the desired setting for the selected menu item, press ←/→.

Press Exit to exit the menu and continue the operation on the next higher level.

An arrow ▸ in front of a menu item indicates that there are menu sublevels. The menu item selected by pressing ↓/↑ is shown inversely.

Info
▸ Show version
▸ Show status
▸ Show HW-slots

Press OK to select an item.

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

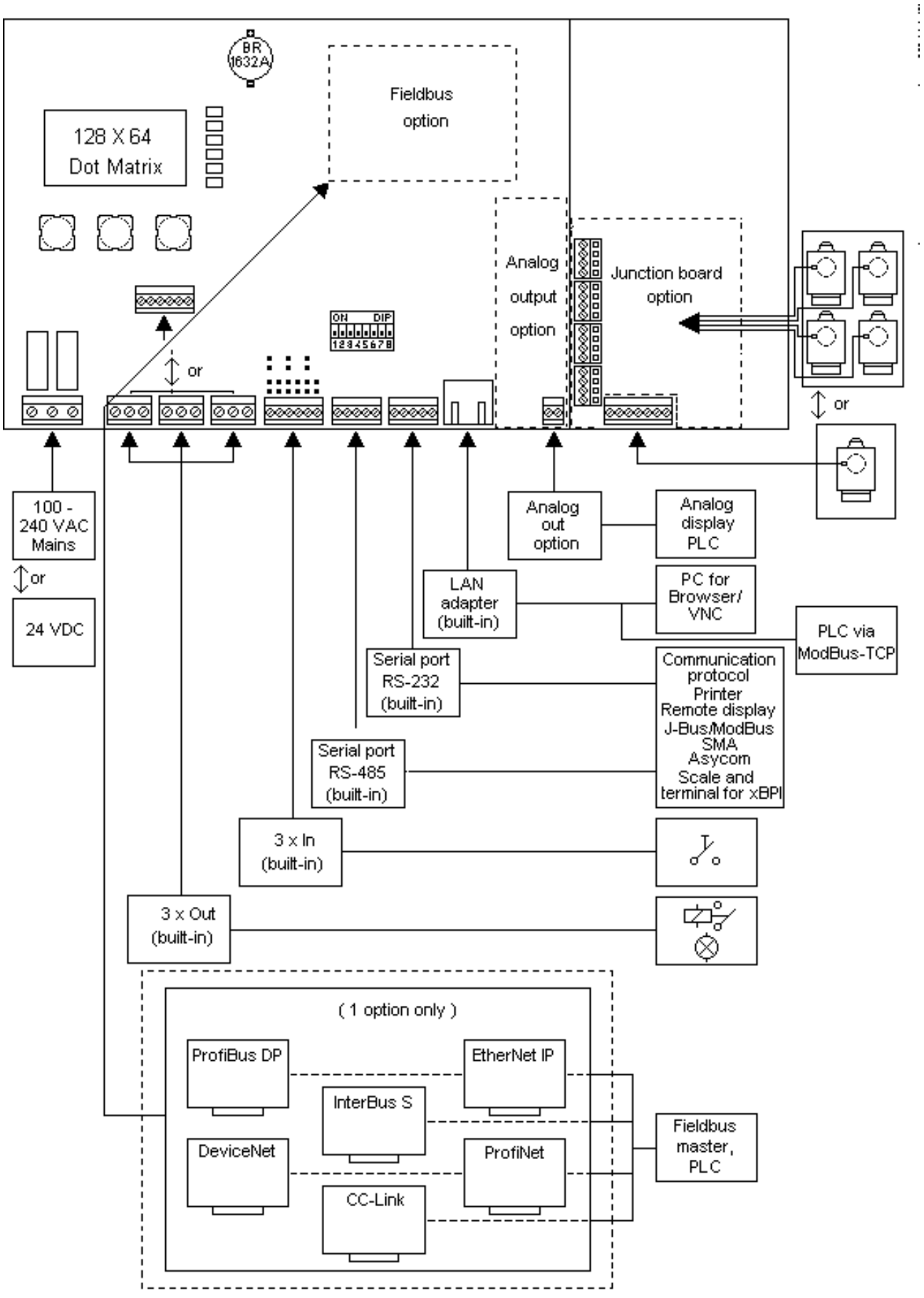
Weighingpoint/WP A/Calibration		
Measuretime	⇵	160 ms
Digital filter		off
External supply		above 8V
Test mode		absolute
W & M		none
Standstill time		0.50 s

Availability of additional settings options selectable with ←/→ is indicated by preceding double arrows ⇵.

Weighingpoint/WP A/Calibration		
Measuretime	⇵	640 ms

Press ←/→ to select the measuring time.

2.4 Overview of Connections



2.4.1 Plug-in Cards/Junction Board

On the main board, the PR 5230 can be fitted with 1 fieldbus card and 1 analog output board.
The load cell junction board is connected to the weighing electronics board by a flat cables plug.

Product	Function	Position
PR 5230/06 Analog output	Analog output 16 bits, 0/4 - 20 mA	Analog output
PR 5230/22 Load cell junction board	Junction board for 2...4 load cells	Junction board
PR 1721/41 ProfiBus-DP	ProfiBus-DP Slave acc. IEC 61158 with max. 12 Mbit/s	Fieldbus
PR 1721/42 InterBus-S	InterBus-S Slave with max. 500 kbit/s	Fieldbus
PR 1721/44 DeviceNet	DeviceNet Slave with max. 500 kbit/s	Fieldbus
PR 1721/45 CC-Link	CC-Link with 156 kbit/s...10 Mbit/s	Fieldbus
PR 1721/46 ProfiNet I/O	ProfiNet I/O with 10 / 100 Mbit/s	Fieldbus
PR 1721/47 EtherNet-IP	EtherNet-IP with 10 / 100 Mbit/s	Fieldbus

For product details, see Chapter 4.2 and 4.3.

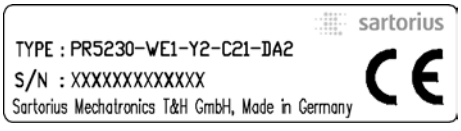
3 Options

Designation		Code no.	Description	Chapter
Analog/digital converter	Standard	none		
		W1	Weighing electronics board	**Fehler! Verweisquelle konnte nicht gefunden werden.**
	EX	WE1	Weighing electronics board with intrinsically safe load cell supply for operation of load cells/platforms in Zones 1 and 21	3.2
power supply	Standard	L0	Version 230 V	1.4.4.1
		L8	Version 24 V	1.4.4.2
IP protection		I66	IP66	
Digital input		DE1	Digital input, passive (external supply)	4.2.6.1
		DE2	Digital input aktive (internal 12 V supply)	4.2.6.2
Digital output		DA1	Digital output relay	4.2.8
		DA2	Digital output Optocoupler	4.2.7
EX Zone	Standard	none		
		Y2	Approval ATEX/EU, Zone 2/22	3.1
Interface Slot 1	Standard	none		
		C11	Analog output 16 bits, 0/4 - 20 mA	4.4.2
Interface Slot 2	Standard	none		
		C21	ProfiBus-DP	4.4.4
		C22	InterBus-S	4.4.5
		C24	DeviceNet	4.4.6
		C25	CC-Link	4.4.7
		C26	ProfiNet I/O	4.4.8
		C27	EtherNet-IP	4.4.9
Interface Slot 3	Standard	none		
		C31	Load cell junction board	4.4.3
Connecting cable for network	Standard	none		
		M39*	Ethernet socket, RJ-45 plug, IP67	4.4.10
		M40*	Ethernet cable, 7m long, metric cable gland, RJ-45 plug, industry version	4.4.11

* For the Builtin Ethernet interface only!

Instrument Option

The marking (e.g. PR 5230-WE1- Y2-C21-DA2) of the instrument option is located on a label inside the door of the instrument.



3.1 Option Y2

3.1.1 Safety Instructions

Caution!

It is essential to observe the safety instruction in Chapter 18.4!

3.1.2 Description

PR 5230 with option Y2 is only suitable for using within Ex areas Zone 2 and 22 (non conductive dust) according European directive 94/9/EG and related harmonized European standards (see also Chapter 18.4).

The Ex design for Zone 2/22 see Chapter 18.4.

3.1.3 Marking

II 3G Ex nA nC IIC T4
II 3D Ex tD A22 IP6X T80°C
SAG 09ATEX004X

See also Chapter 18.4.

3.1.4 Outputs

With option Y2 are following outputs possible:

- Opto-decoupled outputs (option DA2): Technical Data see Chapter 16.5.8.2.
- Relays (option DA1): Only external circuits with voltages up to 60 V AC or 75 V DC are allowed to be connected to the relays, see Safety Instruction in Chapter 18.4.

3.1.5 In Connection with Option W1

Connected load cells or weighing platforms must be certified for use in Ex areas Zone 2 or Zone 22 and for load cell supply voltages of more than 13.2 V DC.

When use

- in Zone 2 observe gas group and temperature class.
- in Zone 22 observe the allowed surface temperature.

3.1.6 In Connection with Option WE1

The combination Y2 and WE1 is also possible; see Ex design for Zone 2/22 and Zone 1/21 in Chapter 18.4.

3.1.7 Installation

The installation must be performed by qualified personnel in compliance with the applicable laws, regulations, ordinances and standards. In particular, the standards EN 60079-14 (gas) and EN 61241-14 (dust) must be taken into account.

All cables to and from PR 5230 have to be installed firmly.

It is only allowed to connect instruments (not sparking during operation) to power circuits in Zone 2 which are suitable for Zone 2 and the local conditions at the operating location.

Not used cable glands must be closed with ATEX approved screwings in order to secure IP65 protection.

Danger!

Working at the switched on unit may be dangerous to life!

- **Disconnect the instrument from the supply voltage.**
- **When removing covers or parts by means of tools, live parts or terminals may be exposed.**
- **Capacitors in the unit may still be charged also after disconnecting the unit from all voltage sources.**

3.1.8 Repairs/Cleaning/Maintenance

Warning!

In the Ex atmosphere it's not permissible to mount/loose plug connectors or to change fuses!

Any modifications to the instrument (except by persons authorized by Sartorius) cause loss of conformity for use in Zone 2 and 22 hazardous areas and invalidate all guarantee claims. Similary, the instrument may only be opened by qualified and authorized persons.

Repairs are subject to inspection and must be carried out at Sartorius. In case of defect or malfunction, please contact your local Sartorius dealer or service center for repair. When returning the instrument for repair, please include a precise and complete description of the problem.

Instruments used in Zone 22 remove dust regulary. Dust layers >5 mm are not permitted.

Maintenance work may be carried out only by a trained technician with expert knowledge of the hazards involved and the required precautions.

3.1.9 Environmental Conditions

Use the transmitter only within the temperature range of -10 °C...+40 °C. Avoid the inadmissible exposure of heat, cold, direct sunlight, UV radiation or vibration. Install the instrument in that way, that air circulation is possible and heat sources are sufficient far away.

3.2 Option WE1

3.2.1 Safety Instructions

Caution!

It is essential to observe the safety instruction in Chapter 18.4!

3.2.2 Description

The option WE1 is used for an intrinsically safe interface of load cells or weighing platforms situated in a hazardous (Ex) area Zone 1 and 21 with PR 5230 installed in a safe area according European directive 94/9/EG and related harmonized European standards (see also Chapter 18.4).

The unit is designed for weighing applications requiring intrinsically safe interfacing. This is achieved by use of double provided current and voltage limiters in the supply circuit and voltage limiters in the analogue elektonic (weighing electronics board) of the PR 5230 with option WE1.

The PR 5230 with option WE1 provides the intrinsically safe interfacing of:

- 1 voltage output for the supply of load cells or weighing platforms situated in Zone 1 or 21,
- 1 measuring voltage input from Zone 1 or 21 and
- 1 sense voltage input from Zone 1 or 21.

3.2.3 Marking

II (2) G [Ex ib] IIC
II (2) D [Ex ib D]
KEMA 10 ATEX 0065 X

See also Chapter 18.4.

3.2.4 Display

After switching on the instrument the following information is short-time displayed:

3.2.5 In Connection with Option Y2

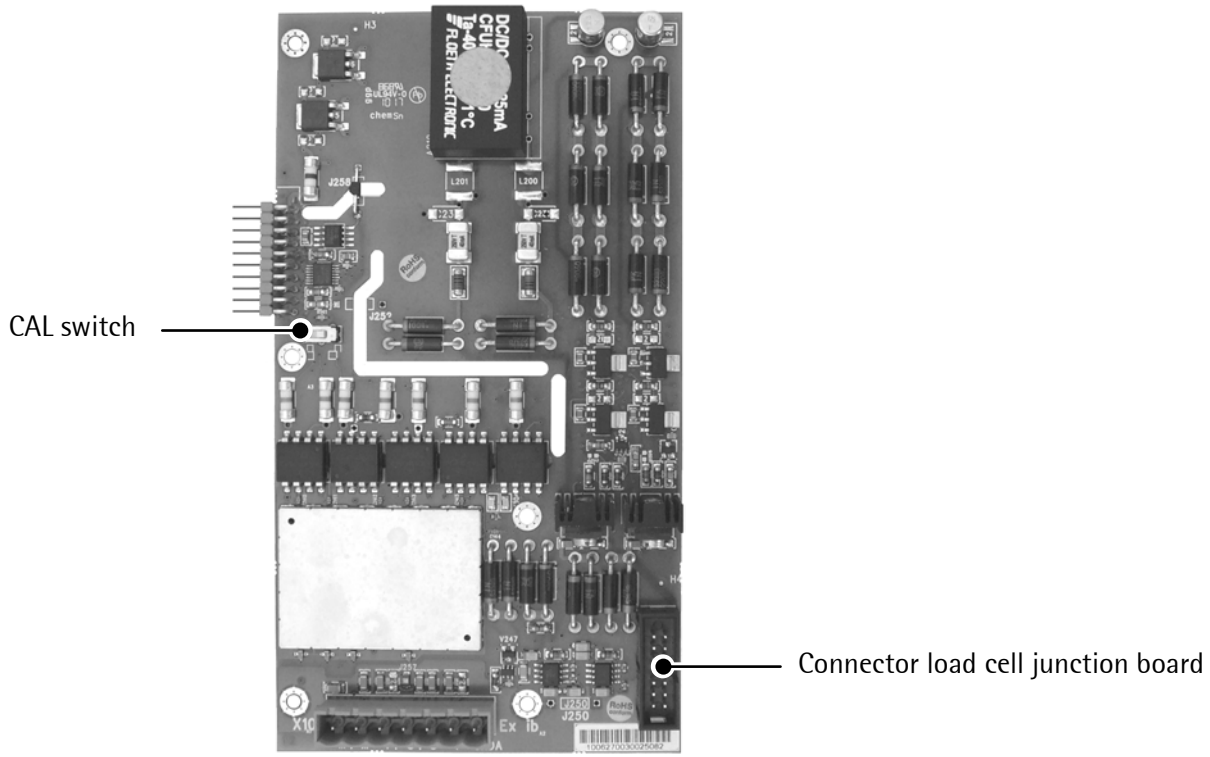
The combination WE1 and Y2 is also possible; see Ex design for Zone 2/22 and Zone 1/21 in Chapter 18.4.

3.2.6 Weighing Electronics Board for Zone 1 and 21

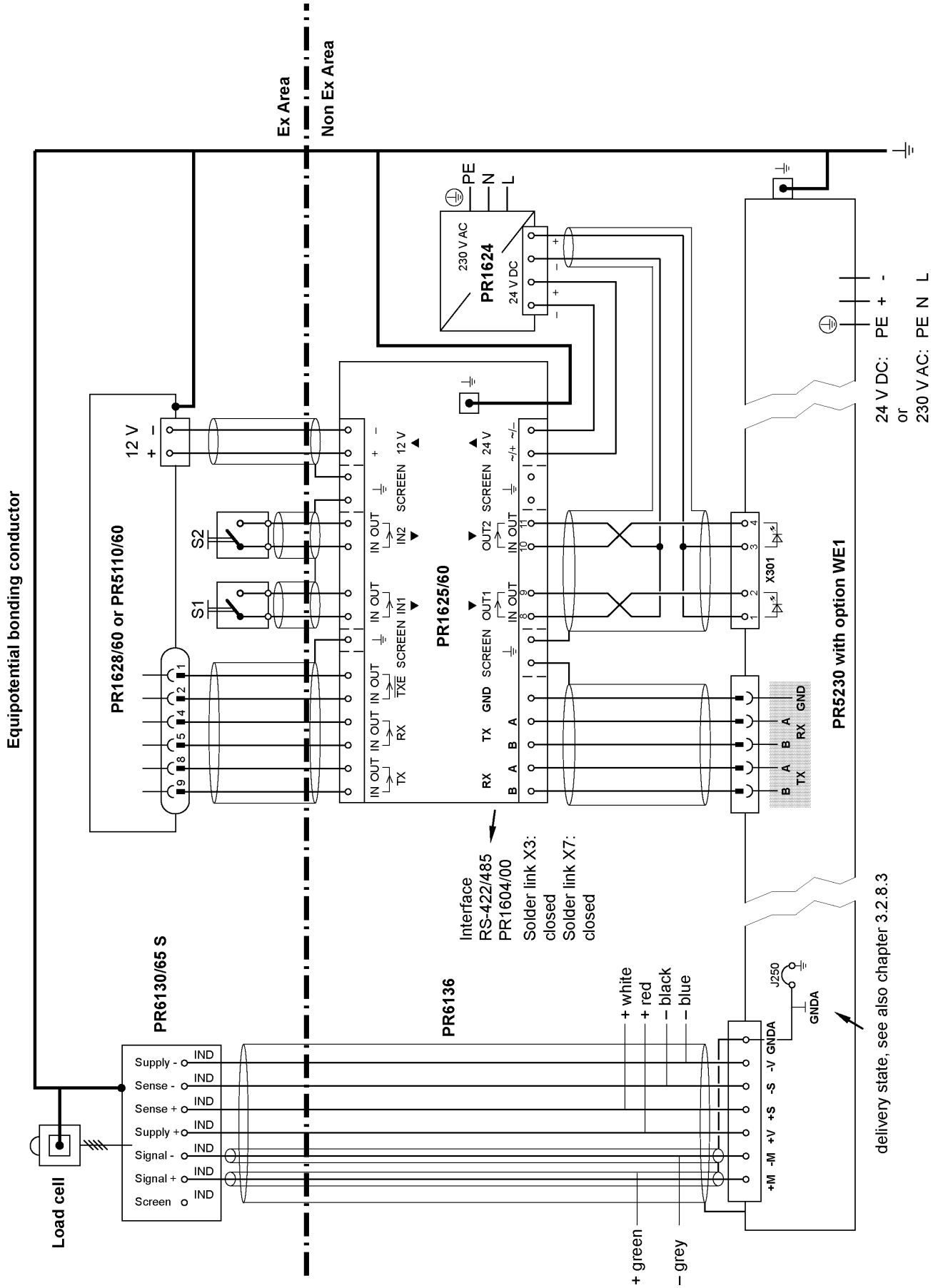
Two weighing electronics board versions are available:

- Standard (W1), see Chapter 4.2.3
- With intrinsically safe load cell supply for operation of load cells/platforms in Zones 1 and 21 (WE1)

The load cell junction board (see Chapter 4.4.3) is connected to the weighing electronics board via a ribbon cable (also permitted for WE1) for direct connection of up to four load cells.



3.2.7 Connection within the Ex Area



3.2.8 Installation

3.2.8.1 General

The installation must be performed by qualified personnel in compliance with the applicable laws, regulations, ordinances and standards. In particular, the standards EN 60079-14 (gas) and EN 61241-14 (dust) must be taken into account.

All cables to and from PR 5230 have to be installed firmly.

Not used cable glands must be closed with ATEX approved screwings in order to secure IP65 protection.

Danger!

Working at the switched on unit may be dangerous to life!

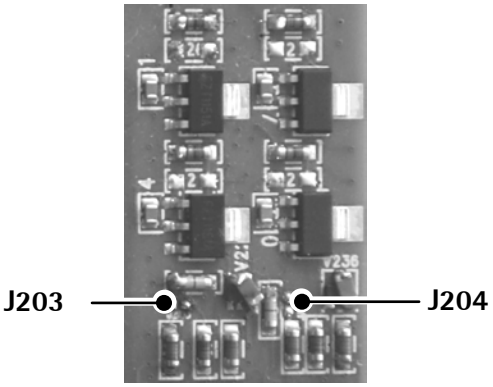
- **Disconnect the instrument from the supply voltage.**
- **When removing covers or parts by means of tools, live parts or terminals may be exposed.**
- **Capacitors in the unit may still be charged also after disconnecting the unit from all voltage sources.**

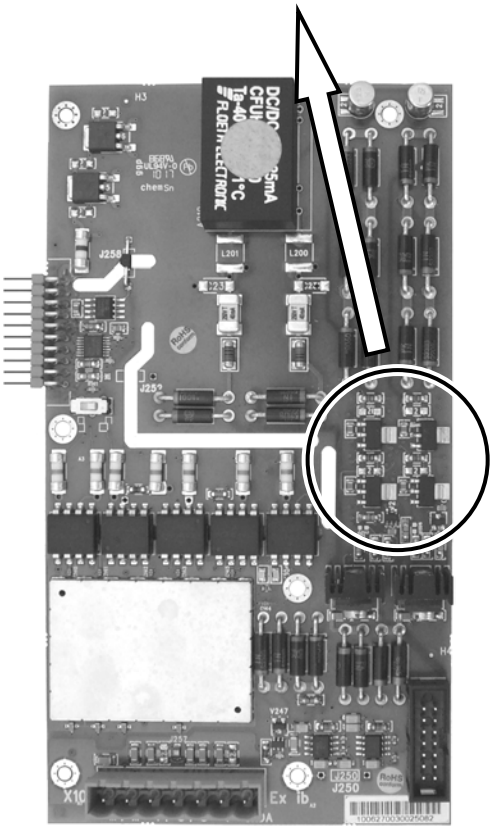
3.2.8.2 Reduction in the Load Cell Supply Voltage

The solder links ‚J203' and ‚J204' are situated on the weighing electronics board.
The load cell supply voltage can be changed by closing the solder links.

Load Cell Supply Voltage		
	open	12 V DC nominal, if R_{LC} ≥150 Ω
	closed	7,2 V DC nominal, if 80 Ω ≤R_{LC} <150 Ω

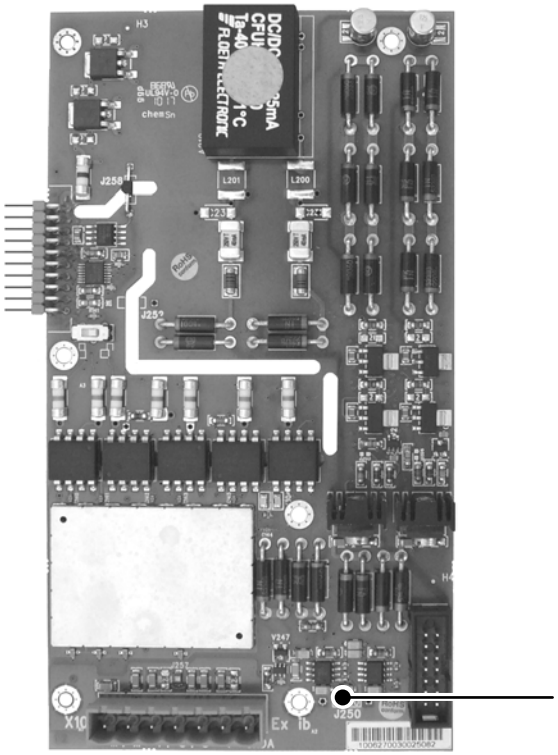
J203	Solder links	
		open (delivery state)
		closed
J204		open (delivery state)
		closed





3.2.8.3 Potential-free Load Cell Supply Voltage

The instrument with option WE1 will be delivered with an intrinsically safe circuit which is galvanically connected with the equipotential bonding (PA).



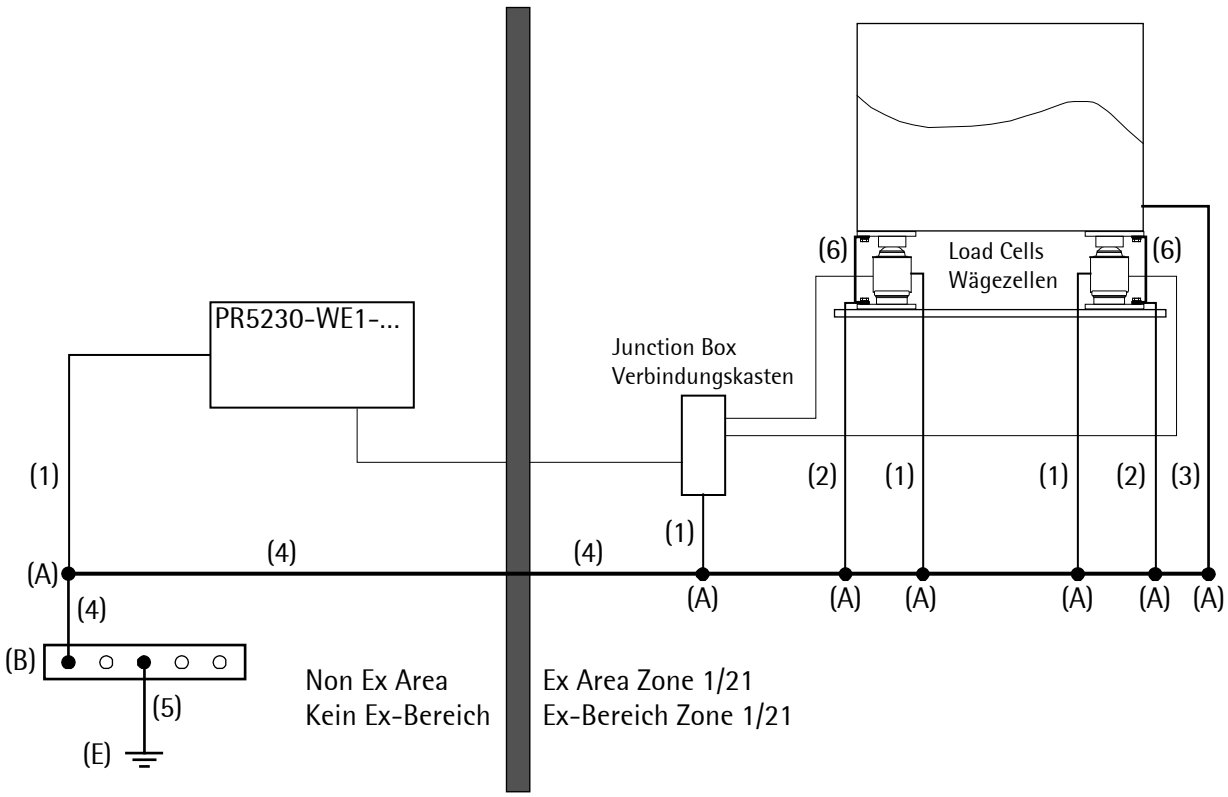
At distances >50 m a potential-free load cell supply voltage is required. This is done as follows:

- Cut the jumper **J250** on the weighing electronics board.
- Turn the remaining wire leads upward and cut them just above the board. Make sure that both contacts have a minimum distance of 2 mm and don't touch other potentials.

If the jumper **J250** is open, the intrinsically safe circuit is isolated from the housing (PA) at a minimum test voltage of 500 V.

3.2.8.4 Potential Equalization

Possible compensatory currents between several conducting plant sections will be avoid by installing a potential equalization in the ex areas.



Pos.	Component	Cross-section
(1)	Conductor for additional potential equalization	≥ 4.0 mm² Cu
(2)	Conductor for potential equalization	≥ 6.0 mm² Cu
(3)	Conductor for potential equalization	≥10.0 mm² Cu
(4)	Main conductor for potential equalization	≥10.0 mm² Cu
(5)	Earthing conductor	≥10.0 mm² Cu
(6)	Load cell by-pass	≥10.0 mm² Cu

(A)	Sub potential equalization terminal
(B)	Main potential equalization terminal
(E)	To earth electrode

3.2.8.5 Screenings

Danger!

Incorrect connection of the connecting cable screens may have consequences of severe damage for personal and plant!

At distances >50 m the screen may only be connected at one end:

- **Connect the connecting cable screen to PR 5230, see Chapter 4.2.4.**
- **Open the jumper J250 on the weighing electronics board, see Chapter 3.2.8.3.**
- **Load cells with cable screen connected to the housing and using the junction box PR 6130/64 Sa:**
  - **Connect the connecting cable screen, see Installation Manual.**
  - **Open the link above the Sense terminal block on the board of the junction, see Installation Manual.**
- **Load cells with cable screen connected to the housing and using the junction box PR 6130/65 S:**
  - **Don't connect the connecting cable screen, see also Chapter 3.2.7.**

3.2.9 Repairs/Cleaning/Maintenance

Warning!

In PR 5230 with option WE1 it's not permissible to mount/loose plug connectors or to change fuses!

Repairs are subject to inspection and must be carried out at Sartorius. In case of defect or malfunction, please contact your local Sartorius dealer or service center for repair. When returning the instrument for repair, please include a precise and complete description of the problem.

Maintenance work may be carried out only by a trained technician with expert knowledge of the hazards involved and the required precautions.

3.2.10 Technical Data

Note: Further technical data of PR 5230 see Chapter 15.

3.2.10.1 General Data

Accuracy	<10000 e (Klasse III) according to OIML R76/EN 45501
Connection for the non Ex area	via 4mm^2 screw terminals
Connection for the Ex area	via 4mm^2 screw terminals
Intrinsically safe output	Protection class Ex ib IIC
Potential equalization	Via screw terminal PE, see Chapter 3.2.8.4

3.2.10.2 Power Connection 230 V AC

Supply voltage	100...230 V AC ±10 %
Power consumption	16 VA
Frequency	50...60 Hz ±2 Hz

3.2.10.3 Power Connection 24 V DC

Supply voltage	24 V DC ±10 %
Power consumption	12 W

3.2.10.4 Output Parameter (intrinsically safe) for the Connection of Load Cells/Junction Box/Weighing Platforms

The connection will be done via 7-pin plug (marked with ‚X100' and ‚Exib') on the weighing electronics board.

Uo	21.0 V between the lines
Io	143 mA
Po	1.55 W
Co	188 nF between the lines
Lo	0.12 mH

3.2.10.5 Load Cells

Supply voltage	±6 V DC (nominal)/≤96 mA	Max. 4 load cells of 650 Ω each, connected in parallel (= 162.5 Ω)
	±3.6 V DC (nominal)/≤96 mA	Max. 8 load cells of 650 Ω each, connected in parallel (= 81.3 Ω) or 4 load cells of 350 Ω each, connected in parallel (= 87.5 Ω)
Tolerance range	±5.8...±6.2 V DC; ±3.4...±3.8 V DC	
Max. current	≤100 mA short circuit	
Measuring voltage V_{meas}	Max. 36 mV (differential)	
Sense voltage V_{sense}	±6 V nominal (with ref. to ground)	
	±3.6 V nominal (with ref. to ground)	

3.2.10.6 Connection Cable

Length of the connection cable between junction box and PR 5230

Type	PR 6135, PR 6135A	Max. 200 m – length of the load cell cable

Length of the connection cable between weighing platform and PR 5230

Type	LiYCY	Max. 200 m

3.2.10.7 Environmental Conditions

Use the transmitter only within the temperature range of -10 °C...+40 °C. Avoid the inadmissible exposure of heat, cold, direct sunlight, UV radiation or vibration. Install the instrument in that way, that air circulation is possible and heat sources are sufficient far away.

4 Installing the Instrument and Plug-in Cards

Before starting work, please read Chapter 1 and follow all instructions!

Further procedures:

- Check the consignment: unpack the components specific to the application.
- Safety check: inspect all components for damage.
- Make sure the on-site installation is correct and complete including cables, e.g. power cable fuse protection, load cells, junction box, data cable, console/cabinet, etc.
- If necessary, mount the plug-in cards (instrument must be disconnected from all voltage sources).
- Follow the instructions for installation of the unit relating to application, safety, ventilation, sealing and environmental influences!
- Connect the cable from junction box or platform/load cell.
- If applicable: connect other data cables, power cable, etc.
- Connect the instrument power cable.
- Check the installation.

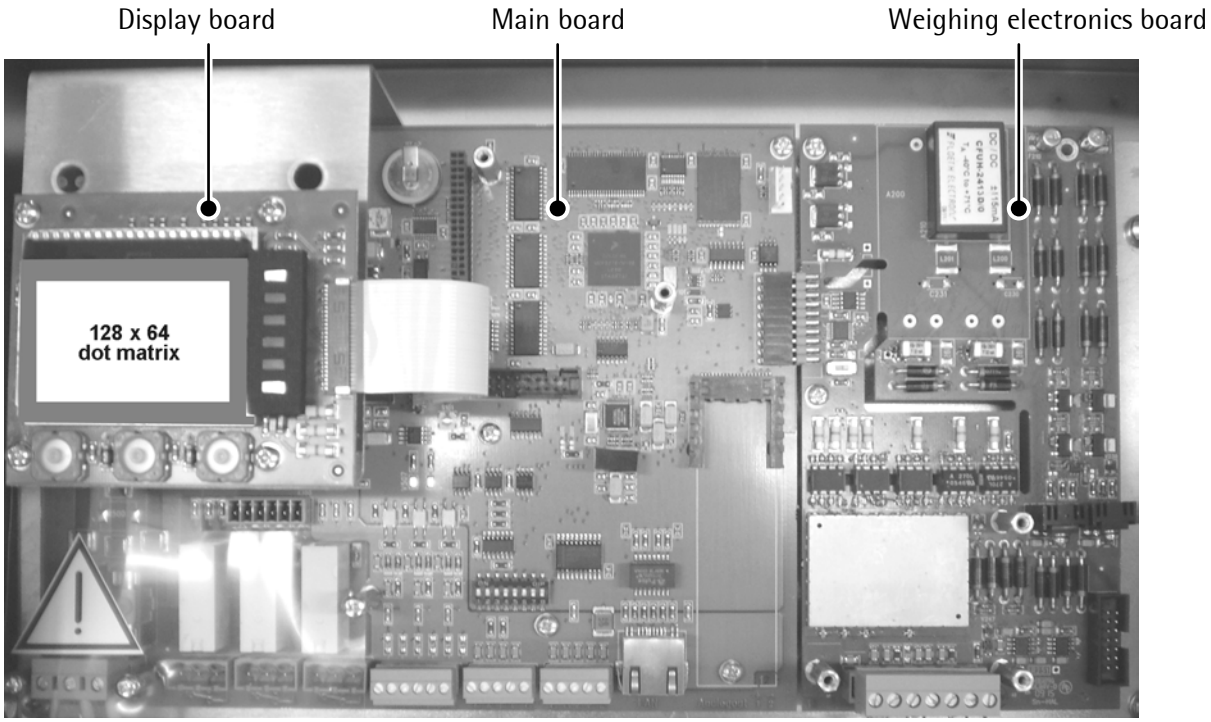
4.1 Mechanical Preparation

Have all required parts, technical documents and tools at hand for mounting. Secure the cable at the place of installation; e.g., using cable ties. Remove the insulation from the cable ends, keep the strands short and fit them with ferrules

4.2 Hardware Construction

The main electronics circuitry is accommodated on the following PCBs:

- Main board
- Display board
- Weighing electronics board

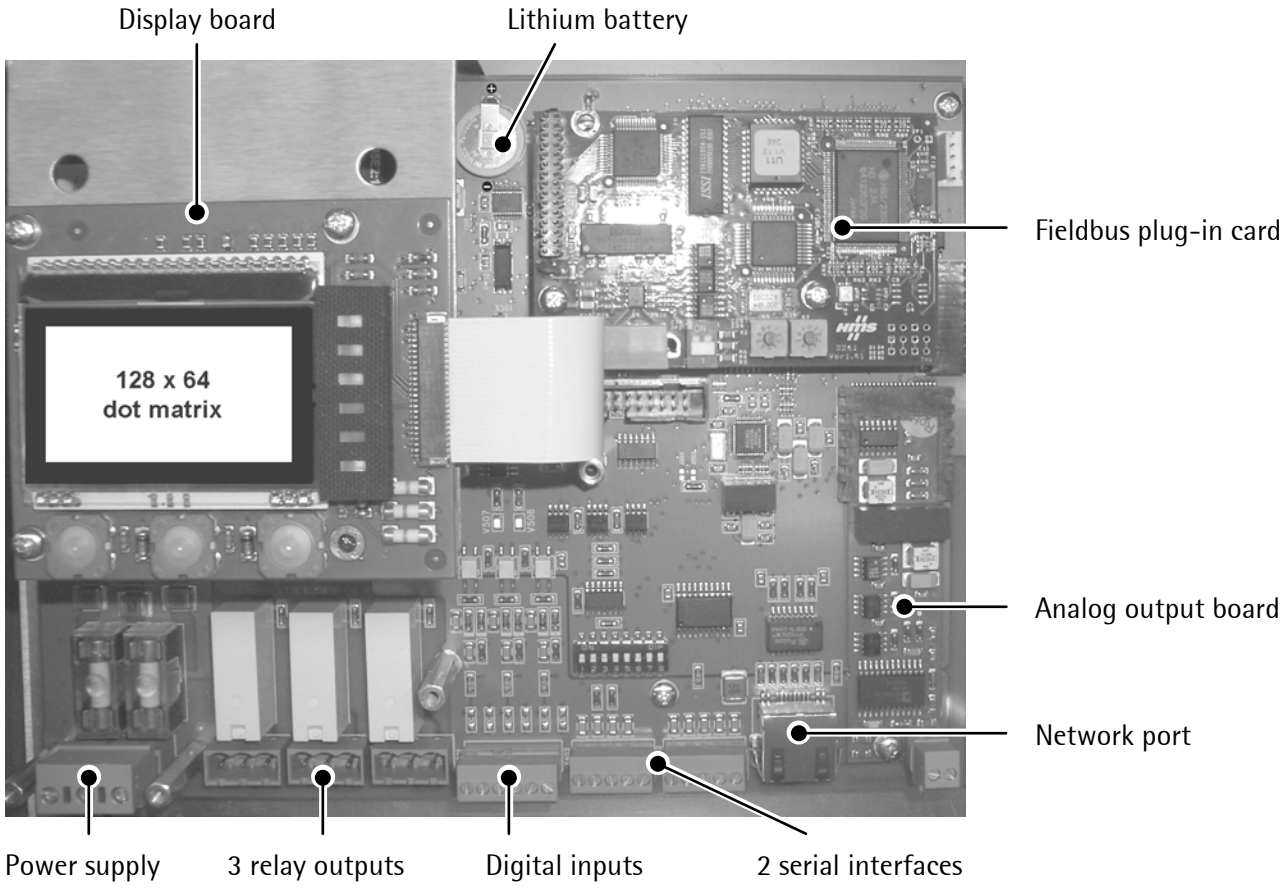


4.2.1 Main Board

The main board provides the sockets for the

- Analog output board (accessories)
- Fieldbus plug-in card (accessories)

The lithium battery is always activated and energizes the calendar/clock module



4.2.2 Display Board

The display board is connected to the main board by a flat cables plug, see also Chapter 3.2.6.

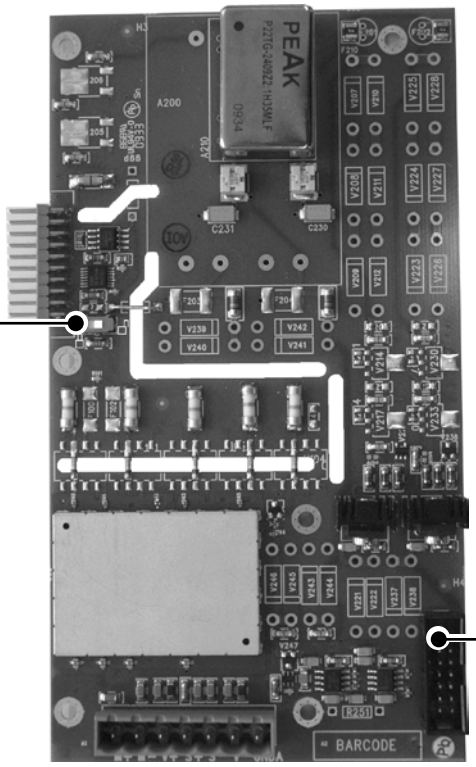
4.2.3 Weighing Electronics Board

The weighing electronics board is connected to the main board by a plug.

Two weighing electronics board versions are available:

- Standard (W1)
- With intrinsically safe load cell supply for operation of load cells/platforms in Zones 1 and 21 (WE1), see Chapter 3.2.6

The load cell junction board (see Chapter 4.4.3) is connected to the weighing electronics board via a ribbon cable for direct connection of up to four load cells.



Note: The weighing electronics board (W1) is also available as a spare, see Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**.

4.2.4 Cable Gland and Connection

The cables have to be fed into the instrument via glands to ensure the increase. Cable diameters of 9...13 mm for the cable gland M20x1.5 (4x) and 5...9 mm for the cable gland M16x1.5 (10x) are suitable. The conductors are connected to screw terminals inside the instrument. Max. conductor cross-section 2.5 mm^2.

The connections are made via plug-in screw terminals. The conductors taken to the terminals shall be as short as possible. The conductors of each cable must be tied together with a cable strap shortly before the terminal block.

Caution!

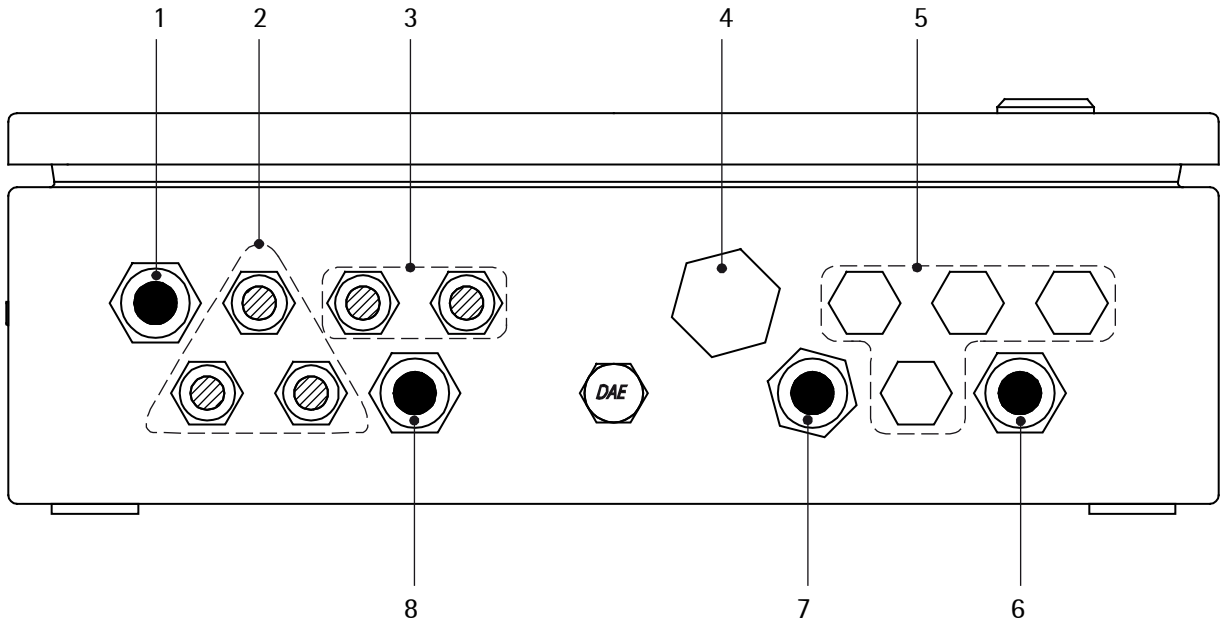
For protection during transport and installation, the cable glands are fitted with a polyethylene cover.

For full IP protection, operation with the dust protection cover fitted is not permissible!

If a cable gland is not used, it must be sealed with a supplied blind plug.

Cabling

In principle, the cables can be taken through all cable glands corresponding to the cable diameters. The following figure shows a cabling proposal.



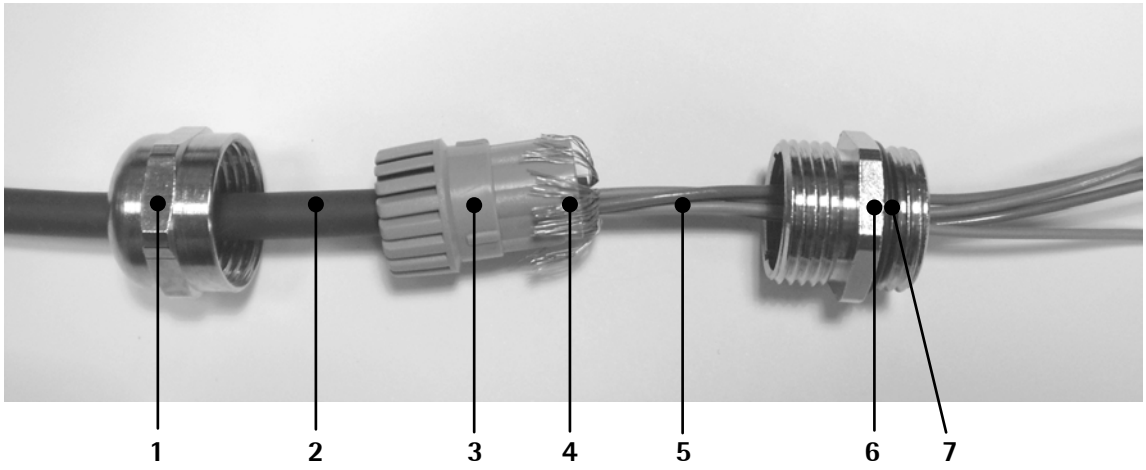
Legend

Pos.	Description
1	Power supply: 230 V AC or 24 V DC
2	Digital outputs: Relays/Optocoupler
3	Serial interfaces
4	Ethernet socket (option/accessory)
5	1...4 load cells
6	1 load cell or junction box or fieldbus cards
7	Analog output or fieldbus cards
8	Digital input: internal/external

Mounting the Cable

Caution!

The connection of the cable screen of the fieldbus cards: essential see according Chapter 4.4.4 ...4.4.9!



Caution!

The cable screen (4) must be connected in the metal sleeve (6) of the cable gland.

Don't take the screen (4) into the unit!

Before, during and after installation, make sure that the sealing ring is seated correctly.

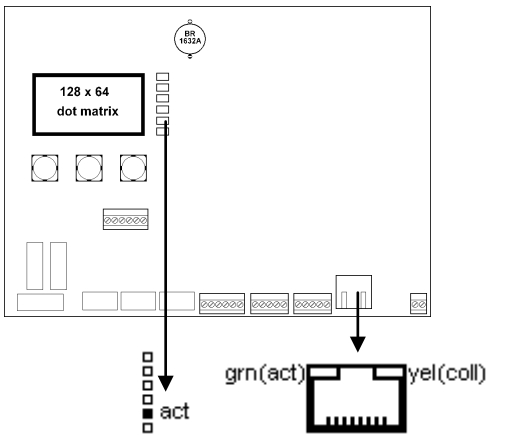
- Remove the (screw) cap (1).
- Slide cap (1) and plastic cone (3) over the cable (2).
- Take the cable (5) through the metal sleeve (6).
- Fold the cable screen (4) over the lower part of the plastic cone (3) (approx. 10 mm).
- Connect the cable conductors.
- Tighten the (screw) cap (1).
- Tighten metal sleeve (6) inclusive o-ring (7) by lock nut (inside the housing).

Caution!

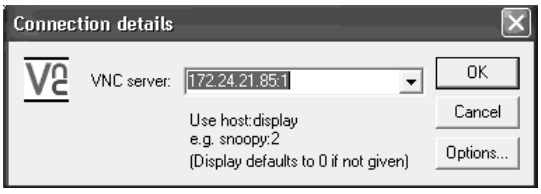
Regularly check the cable gland for tightness and re-tighten it, if necessary.

4.2.5 Network Port

The network port is built in as standard equipment. The port contains powerful TCP/IP connection circuitry with transfer rates of 10 or 100 Mbit/sec. Function checking is possible via the LED to the right of the display (act) or via the LED in the RJ 45 socket when the housing is open.



Transfer rate	10 Mbit/sec, 100 Mbit/sec, full/half duplex, auto-detection
Connection method	Point to point
Cable	Pre-fabricated cable with M20 cable gland
Cable impedance	150 Ω
Electrical isolation	Yes
Cable length	Max. 7 m
Connection	RJ-45 socket inside the housing

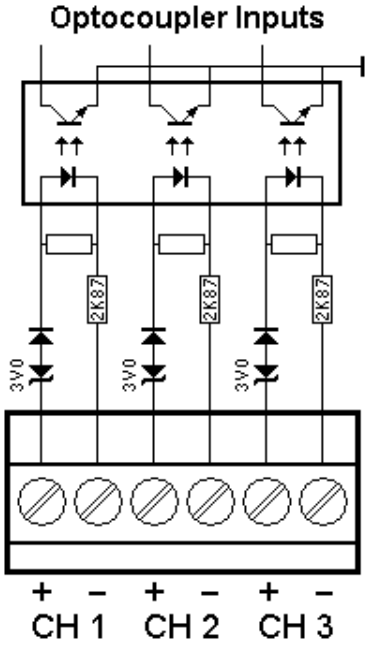


Remote operation of the PR 5230 from the Notebook/PC is possible; install VNC program Release 3.3.7* on the Notebook/PC. For setting the network address, see Chapter 5.3.3.

* Sartorius guarantees the functionality only if this version is used!

4.2.6 Optocoupler Inputs

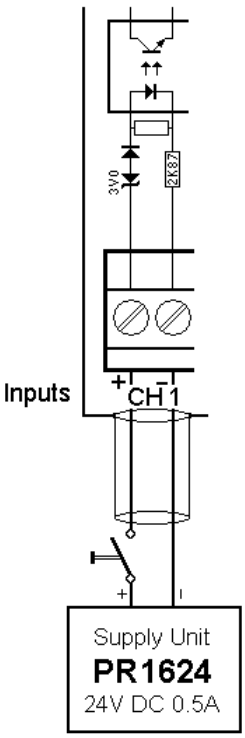
The main board has 3 digital inputs for process control, electrically isolated by optocouplers, each bipolar potential-free.



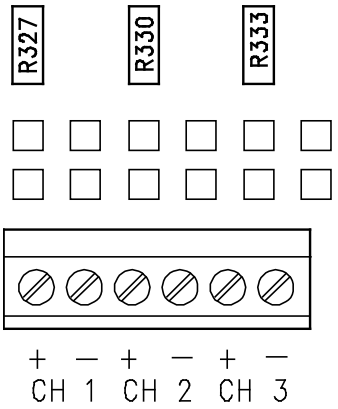
Number of inputs	3 (CH 1, CH 2, CH 3)
Input signal	Logic 0: 0 ... 5 V DC or open Logic 1: 10 ... 28 V DC Internal 12 V DC supply or external supply required.
Input current	<11 mA @ 24 V < 5 mA @ 12 V Protected against incorrect polarity.
Electrical isolation	Via optocoupler, internal supply is potential-free.
Connection	Plug-in 6-pin screw terminal block, conductor cross-section max. 1.5 mm²
Cable	Shielded, max. 50 m. The cable screen must be connected in the sleeve of the cable gland!

4.2.6.1 Connecting Example: Contact Input „External Supply“

Connecting



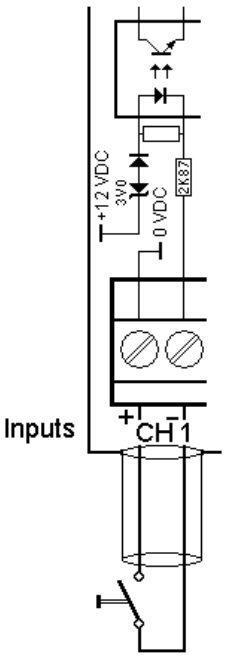
Component layout on the main board



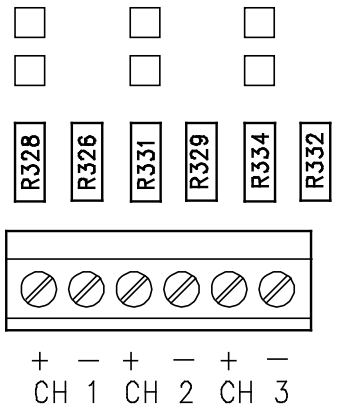
Note: Resistors R327, R330 and R333 are 0 Ω links.

4.2.6.2 Connecting Example: Contact Input „Internal 12 V DC Supply" (Option)

Connecting



Component layout on the main board



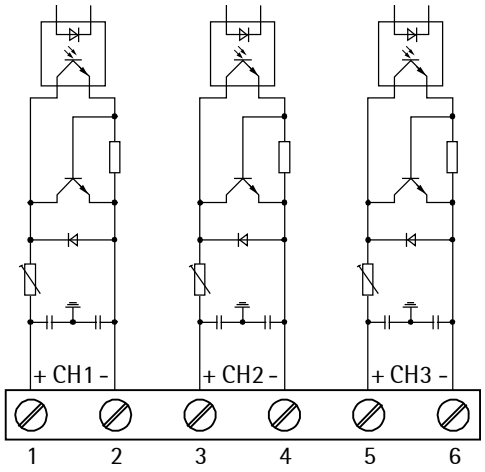
Note: Resistors R326, R328, R329, R331, R332 and R334 are 0 Ω links.

4.2.7 Opto-decoupled Outputs (optional)

This option can be used within Ex areas Zone 2 and Zone 22, see also Chapter 3.1.

The main board is provided with 3 opto-decoupled outputs.

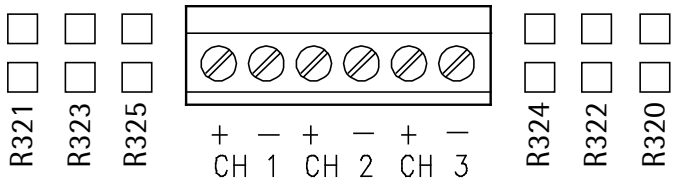
The digital outputs are passive. An external power supply is required.



Number of outputs	3 (CH 1, CH 2, CH 3)
Output signal	Max. 24 V +10 %; external supply
Output current	Max. 40 mA
Voltage drop	3.2 V @ I_{max}
Connection	Plug-in 6-pin screw terminal block, conductor cross-section max. 1.5 mm²
Cable	Shielded, max. 50 m. The cable screen must be connected in the sleeve of the cable gland!

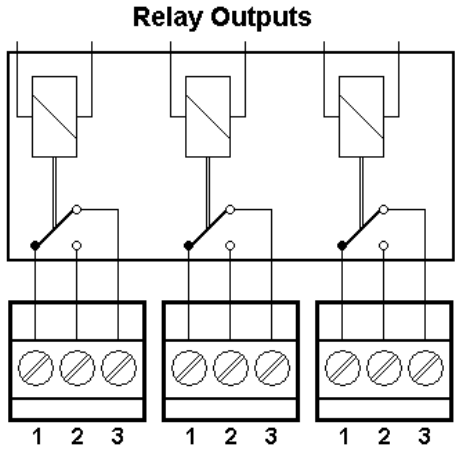
Component layout on the main board

In this option the jumper R320 ...R325 are **not** fitted on the main board.



4.2.8 Relay Outputs

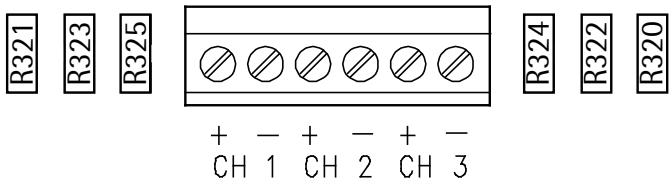
The main board has 3 digital outputs for process control, electrically isolated by optocouplers, each bipolar potential-free.



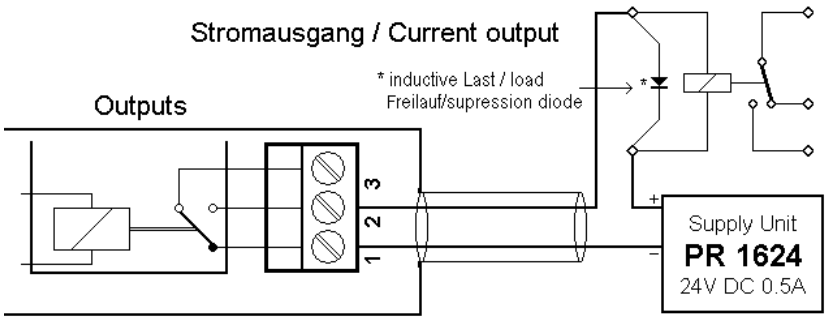
Number of outputs	3 (CH 1, CH 2, CH 3)		
Output	Change-over contact		
	Max. switching voltage	250 V AC	250 V DC
	Max. switching current	5.0 A	0.3 A
Electrical isolation	Free relay change-over contact		
Connection	Plug-in terminal block, each with 3 pins, conductor cross-section max. 1.5 mm^2		

Component layout on the main board

In this option the jumper R320 ...R325 are fitted on the main board.

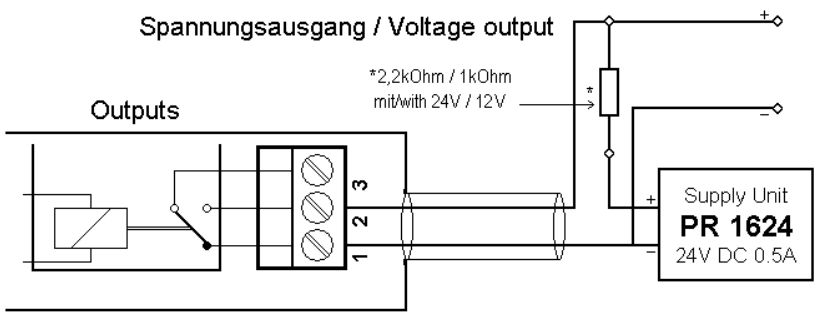


4.2.8.1 Connecting Example: Relay control



The relay switches, when the output is active (true). For protection of the output circuit, relays with free-wheel diode must be provided.

4.2.8.2 Connecting Example: Voltage output



When the output is active (true), the output voltage goes from 24 V/12 V to 0 V.

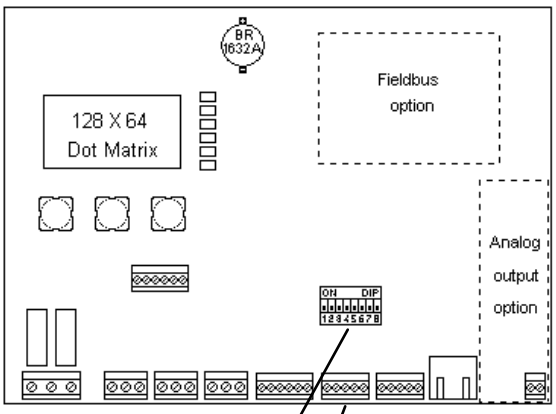
The load resistance must be 2.2 kΩ/1 kΩ.

4.2.9 Interface RS-485

The instrument is provided with a built-in RS-485/422 interface.

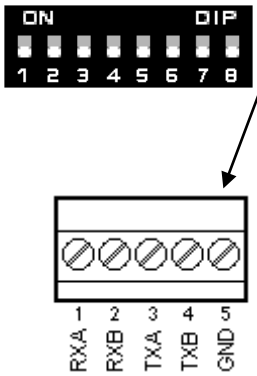
When mounting, the RS-485 interface must be configured by DIL switch S401 on the card.

Using RS-485 is compulsory with a multi-point connection (Tristate status). The RS-485 interface can be used also for point-to-point connection.

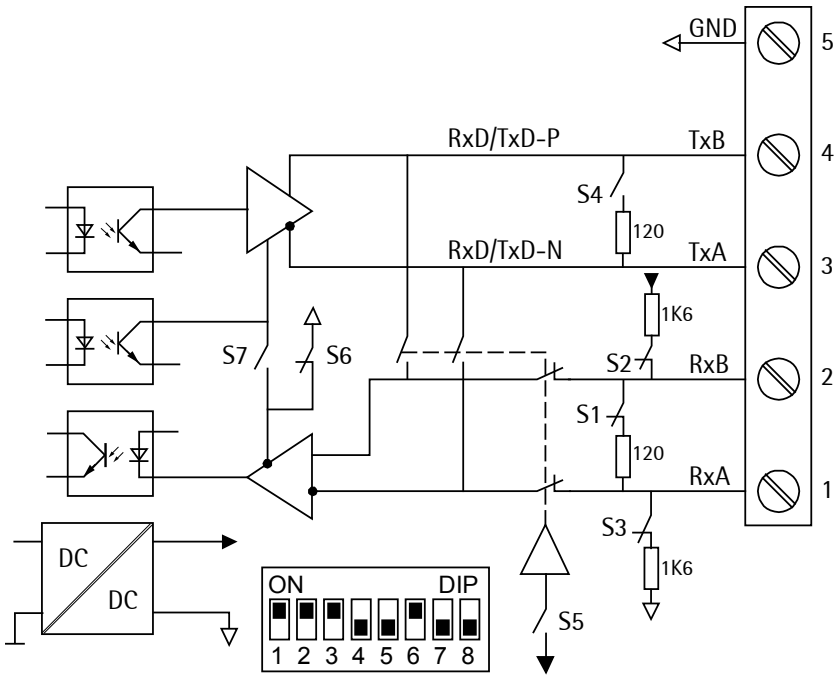


Connection	5-pin plug-in terminal block
Number of channels	1 RS-485
Type	Full duplex
Transfer rate	300...19,200 bit/sec
Signals	TxA, RxA, TxB, RxB
Electrical isolation	Yes
Cable length	Max. 1000 m
Cable type	shielded twisted pair (e.g. LifYCY 3x2x0.20), 1 pair of wires for GND

DIL switch S401



Block diagram RS-485

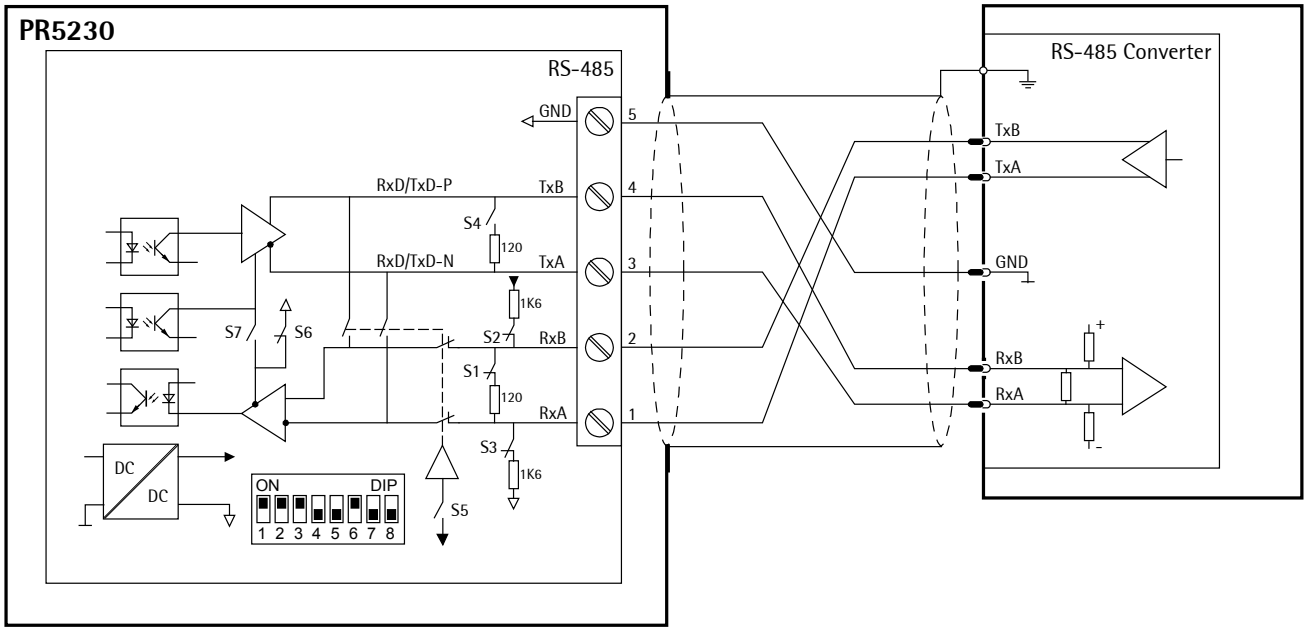


S	Function	Settings for RS-485	
		4-wire	2-wire
1	Rx bus termination	OFF: not connected	ON: (RxA 120 Ω RxB)
2	Rx pull-up resistor	OFF: not connected	ON: (RxB 1K6 Ω +V)
3	Rx pull-down resistor	OFF: not connected	ON: (RxA 1K6 Ω -V)
4	Tx/Rx bus termination	OFF: not connected	ON: (TxA 120 Ω TxB)
5	Change-over 2- / 4-wire	OFF: 4-wire	ON: 2-wire
6	Rx enable	OFF: Rx disabled, if Tx enabled: S7 must be ON.	ON: Rx always enabled: For 4-wire S7 must be OFF.
7	Tx enable/Rx disable (2-wire)	OFF: S6 must be ON.	ON: S6 must be OFF.
8	n. c.	no function	

4.2.9.1 Connecting to PC or to RS-485/RS-232 Converter

Point-to-point connection for following protocols:

- SMA
- Asycom
- ModBus



Switch settings

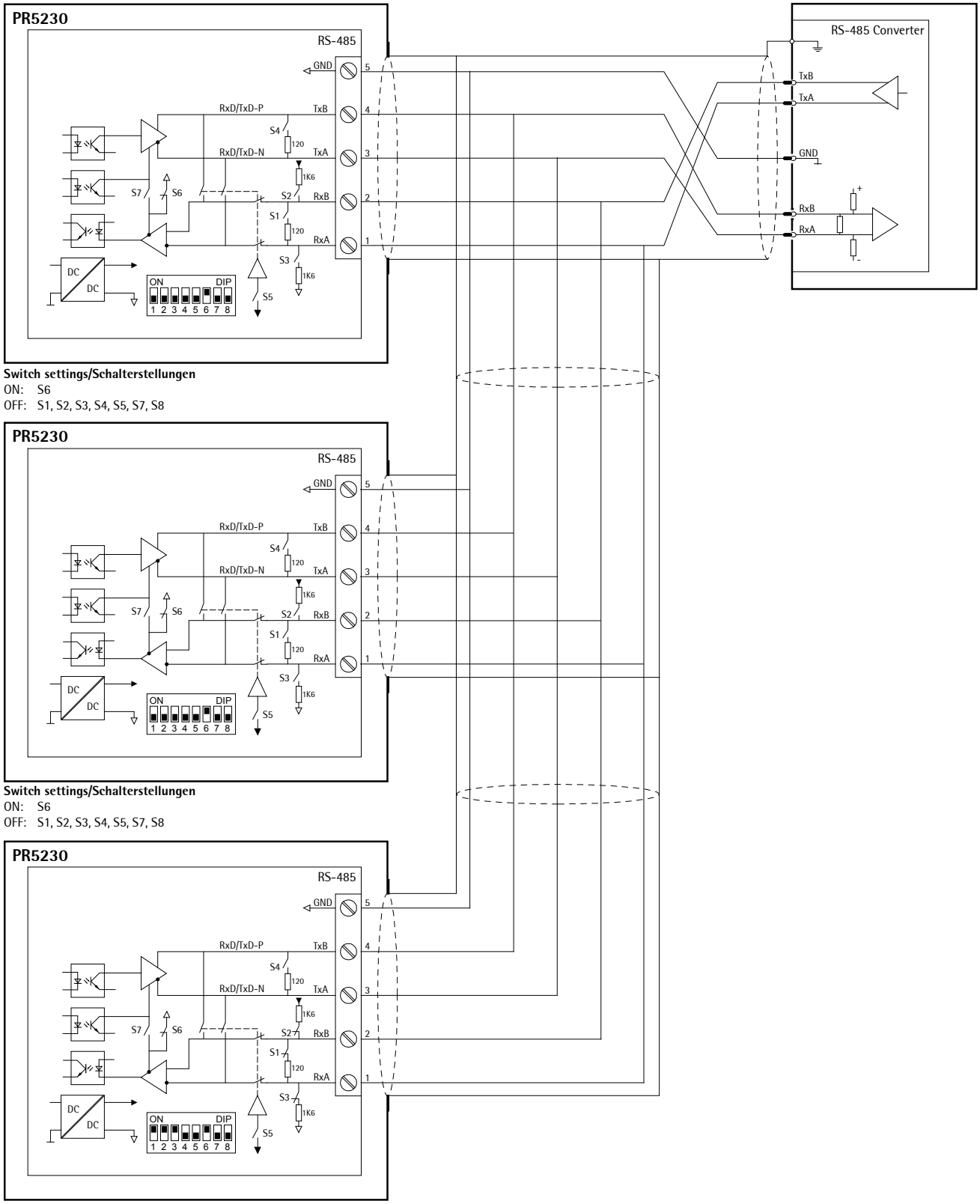
ON: S1, S2, S3, S6

OFF: S4, S5, S7, S8

Configuration: Setup-[Serial ports parameter]-[...]-[Builtin RS485]

4.2.9.2 Connecting several PR 5230 to PC or to RS-485/RS-232 Converter

Connection of the Asycom protocol.



Switch settings/Schalterstellungen
ON: S6
OFF: S1, S2, S3, S4, S5, S7, S8

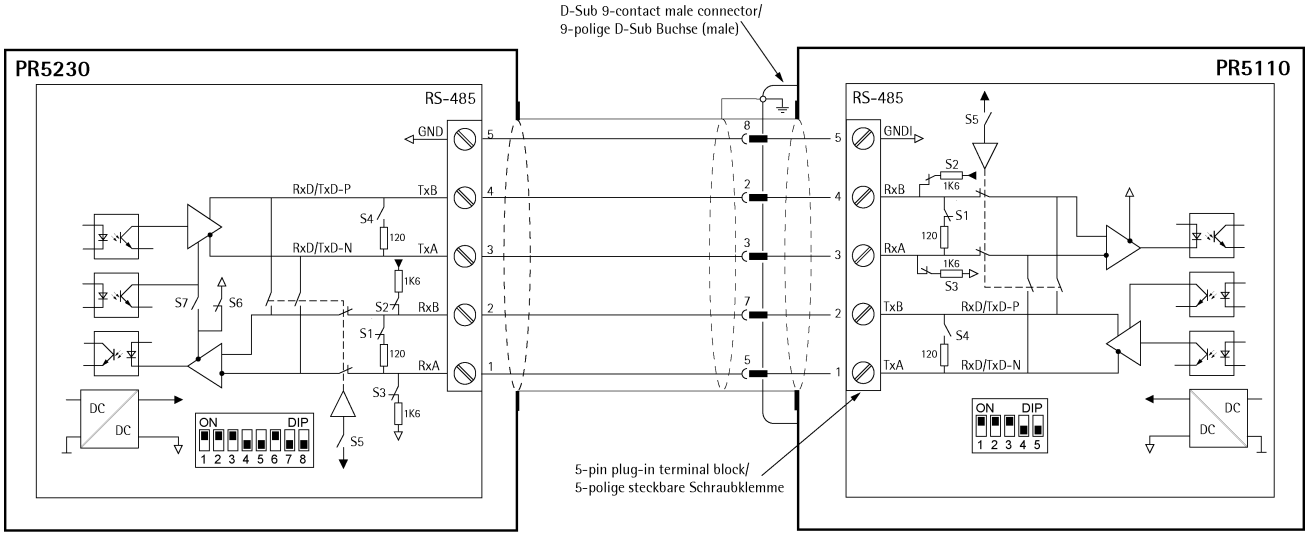
Switch settings/Schalterstellungen
ON: S6
OFF: S1, S2, S3, S4, S5, S7, S8

Switch settings/Schalterstellungen
ON: S1, S2, S3, S6
OFF: S4, S5, S7, S8

Configuration: Setup-[Serial ports parameter]-[Asycom]-[Builtin RS485]

4.2.9.3 Connecting a PR 5110 Remote Display

Four-wire transmission, point to point, full duplex (simultaneous sending and receiving possible) with PR 5110 remote display.



Switch settings PR 5230

ON: S1, S2, S3, S6

OFF: S4, S5, S7, S8

Switch settings PR 5110

ON: S1, S2, S3

OFF: S4, S5

Configuration PR 5230

Setup-[Serial ports parameter]-[Remote display]-[Builtin RS485]

Configuration PR 5110

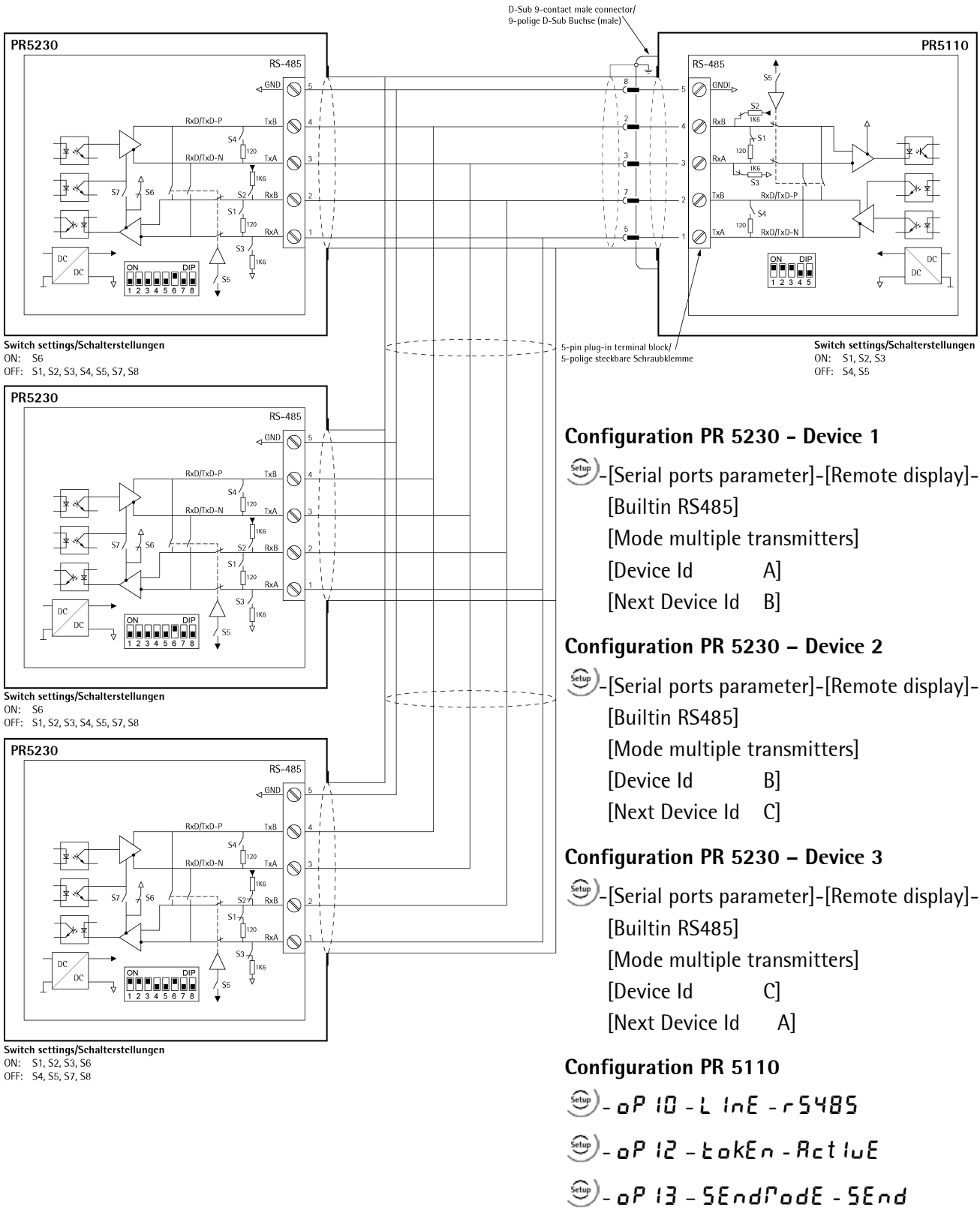
Setup - oP 10 - LInE - rS485

Setup - oP 12 - toKEn - oFF

Setup - oP 13 - SEndModE SEnd

Note: When replacing PR 1627/PR 1628 with PR 5110, note that the pin assignment must be attended! Description see instrument manual PR 5110.

4.2.9.4 Connecting a PR 5110 Remote Display to several PR 5230



Configuration PR 5230 - Device 1

Setup-[Serial ports parameter]-[Remote display]-
[Builtin RS485]
[Mode multiple transmitters]
[Device Id A]
[Next Device Id B]

Configuration PR 5230 – Device 2

Setup-[Serial ports parameter]-[Remote display]-
[Builtin RS485]
[Mode multiple transmitters]
[Device Id B]
[Next Device Id C]

Configuration PR 5230 – Device 3

Setup-[Serial ports parameter]-[Remote display]-
[Builtin RS485]
[Mode multiple transmitters]
[Device Id C]
[Next Device Id A]

Configuration PR 5110

Setup-oP 10-LInE-rS485

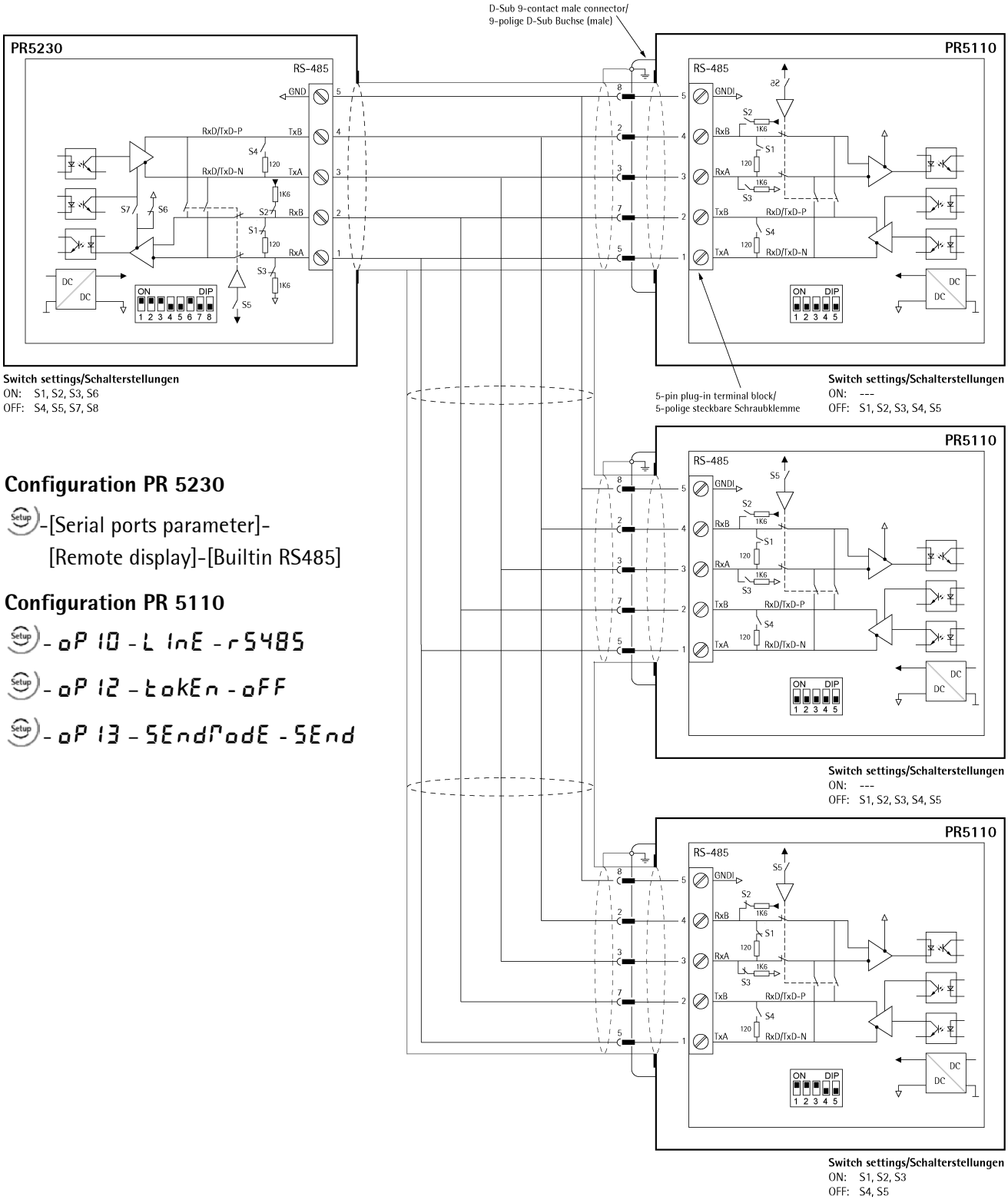
Setup-oP 12-tokEn-ActIvE

Setup-oP 13-SEndModE-SEnd

Note: When replacing PR 1627/PR 1628 with PR 5110, note that the pin assignment must be attended! Description see instrument manual PR 5110.

4.2.9.5 Connecting several PR 5110 Remote Displays

Connection of several PR 5110 remote displays over RS-485, 4-wire, full-duplex (simultaneous sending and receiving possible).



Switch settings/Schalterstellungen
ON: S1, S2, S3, S6
OFF: S4, S5, S7, S8

Switch settings/Schalterstellungen
ON: ---
OFF: S1, S2, S3, S4, S5

Switch settings/Schalterstellungen
ON: ---
OFF: S1, S2, S3, S4, S5

Switch settings/Schalterstellungen
ON: S1, S2, S3
OFF: S4, S5

Configuration PR 5230

Setup-[Serial ports parameter]-
[Remote display]-[Builtin RS485]

Configuration PR 5110

Setup - oP 10 - L InE - r5485

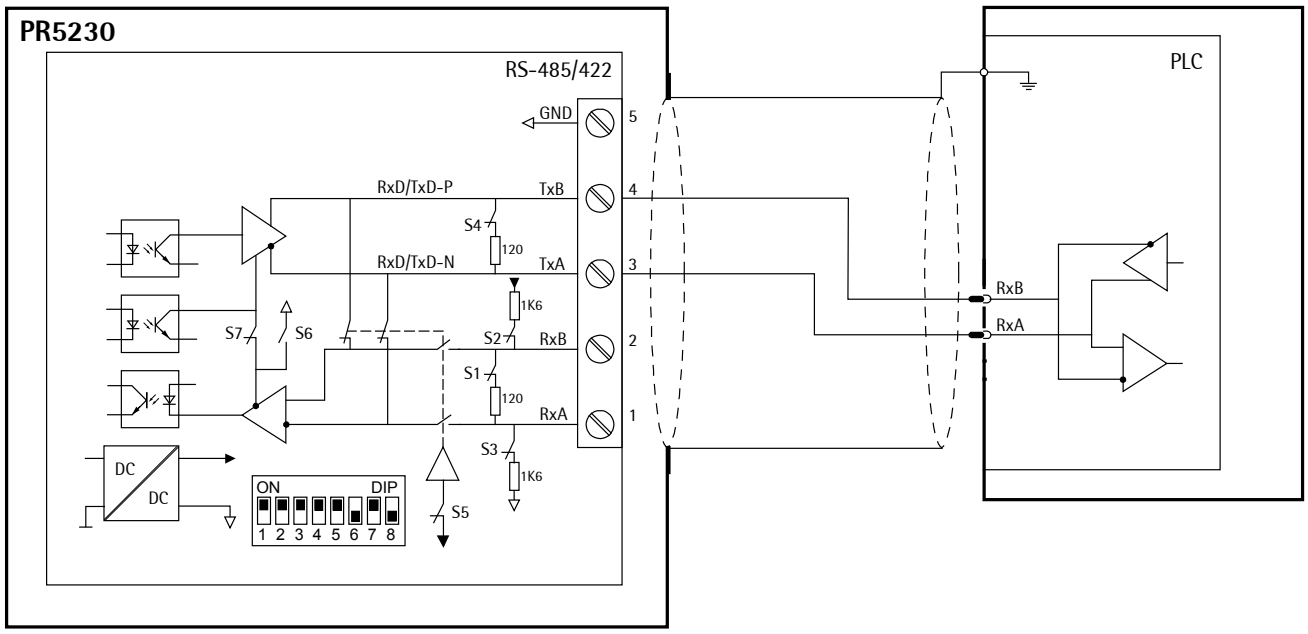
Setup - oP 12 - toKEn - oFF

Setup - oP 13 - SEndModE - SEnd

Note: When replacing PR 1627/PR 1628 with PR 5110, note that the pin assignment must be attended! Description see instrument manual PR 5110.

4.2.9.6 Connecting to PLC

2-wire-connection of the ModBus and xBPI protocol.



Switch settings

ON: S1, S2, S3, S4, S5, S7

OFF: S6, S8

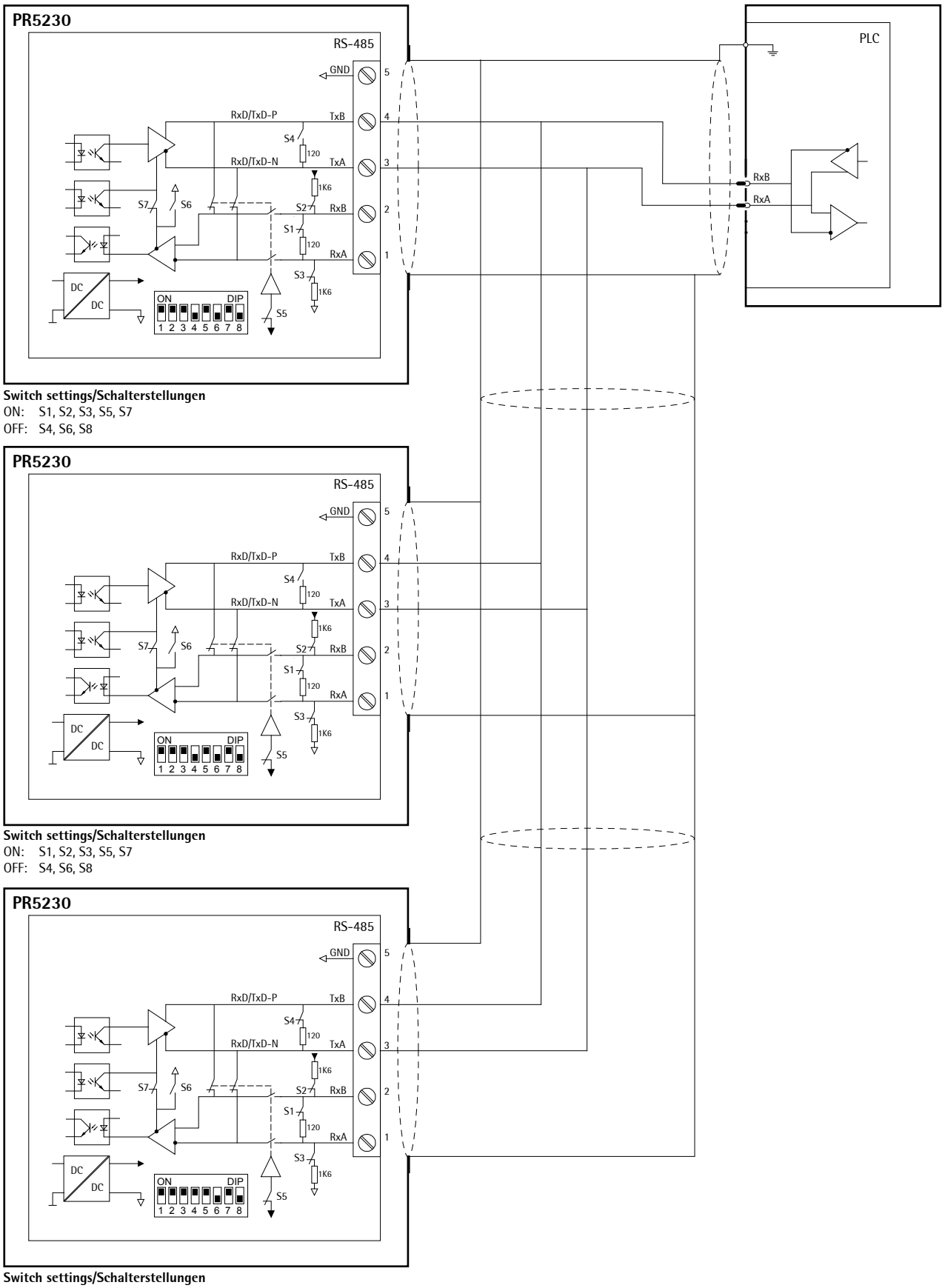
Configuration: Setup-[Serial ports parameter]-[JBUS/MOD-Bus]-[Builtin RS485]

or

Configuration: Setup-[Serial ports parameter]-[xBPI-Port]-[Builtin RS485]

4.2.9.7 Connecting several PR 5230 to PLC

2-wire-connection of the ModBus and xBPIprotocol.



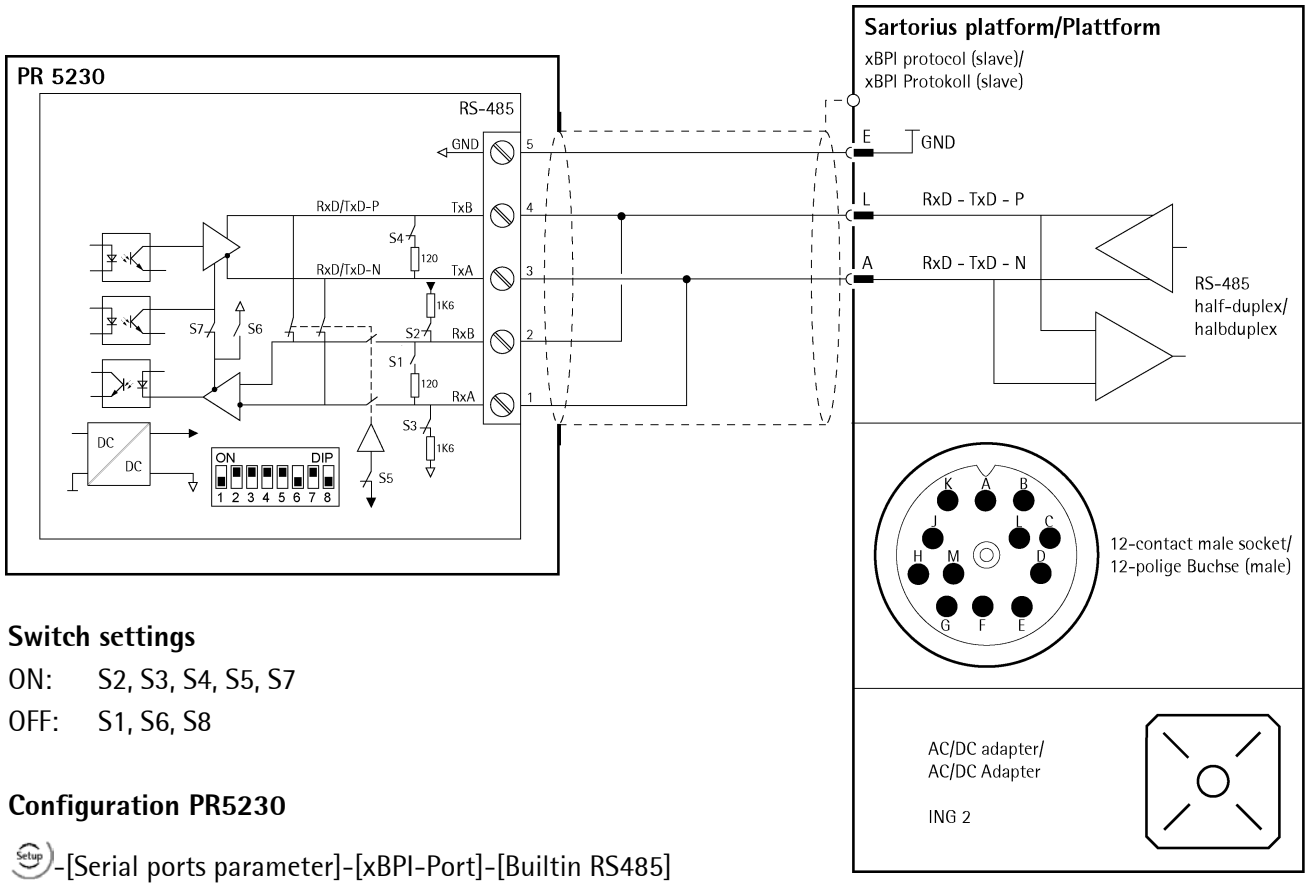
Switch settings/Schalterstellungen
ON: S1, S2, S3, S5, S7
OFF: S4, S6, S8

Switch settings/Schalterstellungen
ON: S1, S2, S3, S5, S7
OFF: S4, S6, S8

Switch settings/Schalterstellungen
ON: S1, S2, S3, S4, S5, S7
OFF: S6, S8

Configuration: Setup-[Serial ports parameter]-[JBUS/MOD-Bus]-[Builtin RS485] or [xBPI-Port]-[Builtin RS485]

4.2.9.8 Connecting a xBPI Platform over RS-485 (2-wire)



Switch settings

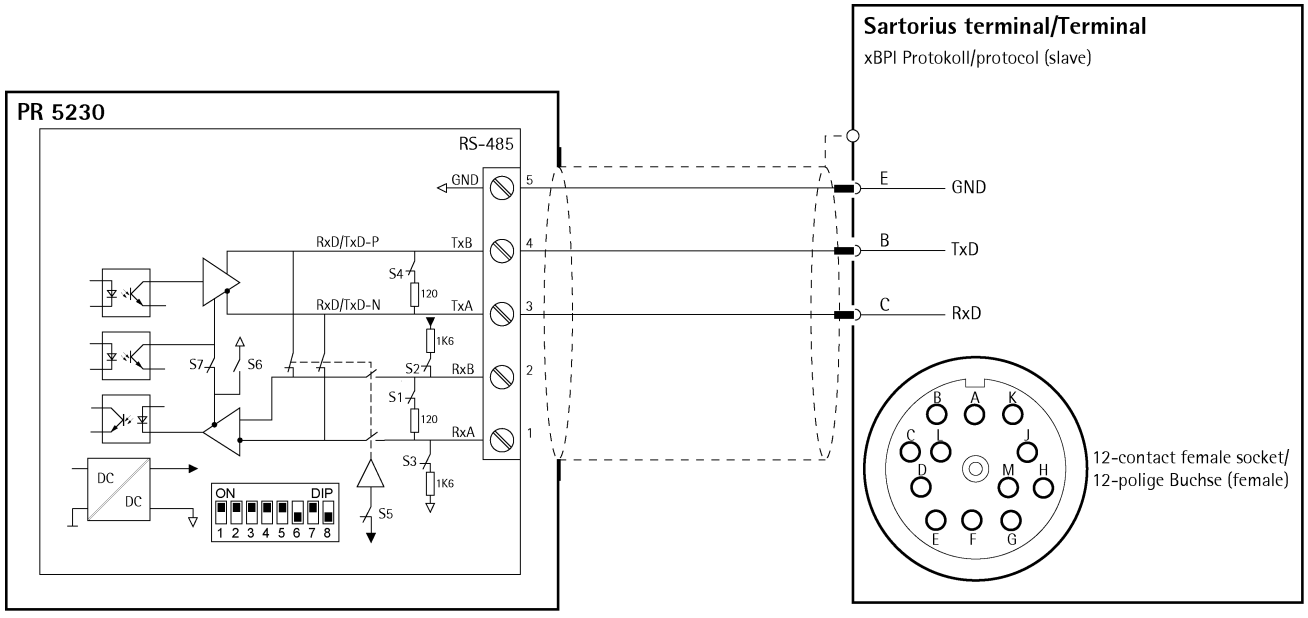
ON: S2, S3, S4, S5, S7

OFF: S1, S6, S8

Configuration PR5230

Setup-[Serial ports parameter]-[xBPI-Port]-[Builtin RS485]

4.2.9.9 Connecting a xBPI Terminal over RS-485 (2-wire)



Switch settings

ON: S1, S2, S3, S4, S5, S7

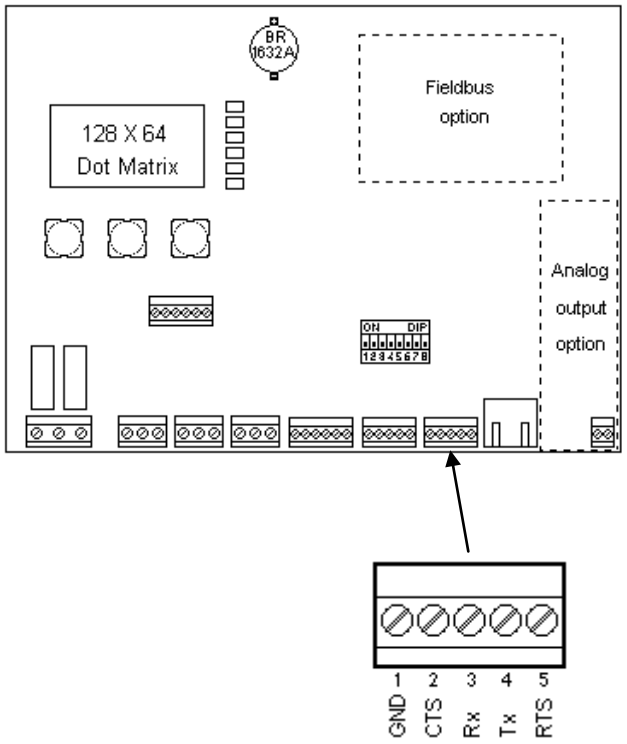
OFF: S6, S8

Configuration PR5230

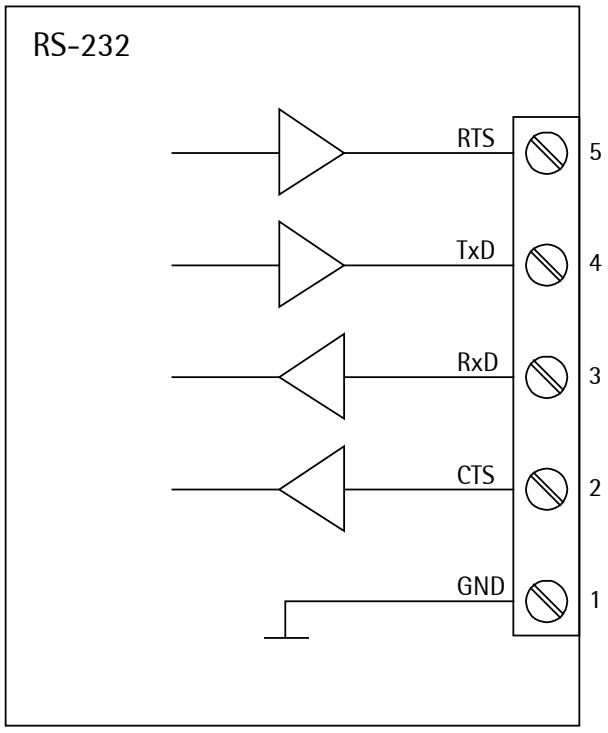
Setup-[Serial ports parameter]-[xBPI-Port]-[Builtin RS485]

4.2.10 Interface RS-232

The instrument is provided with a built-in RS-232 interface. This interface is configurable, and can be used, for example, for data transmission to a remote display or a printer.



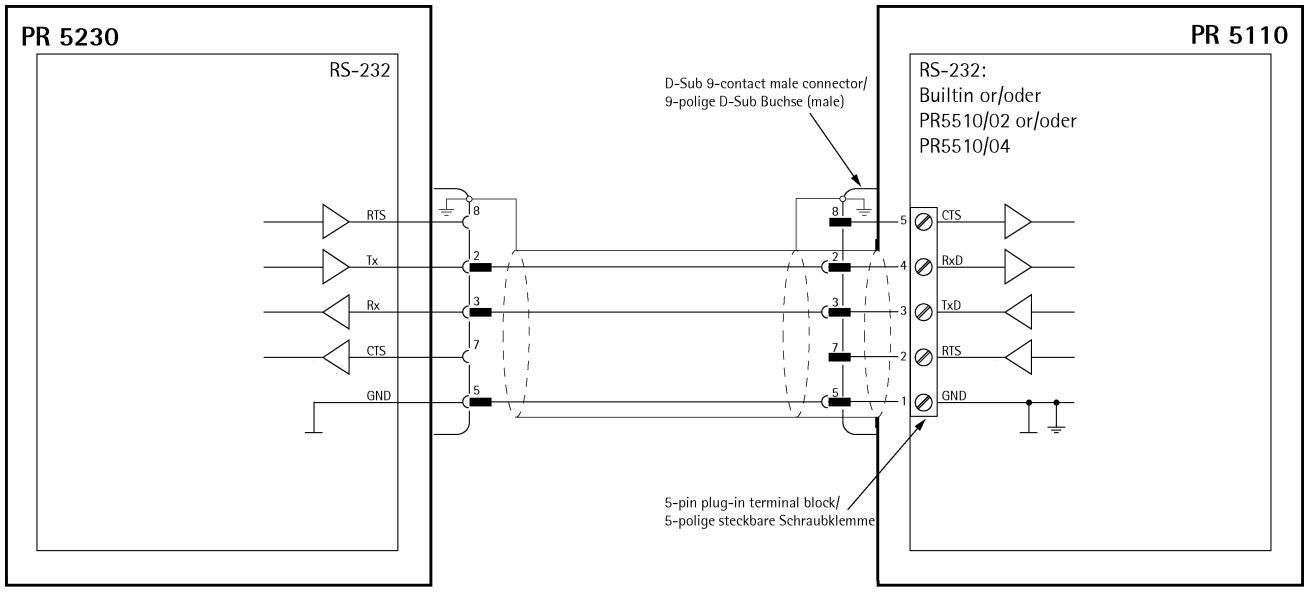
Number of channels	1
Type	RS-232, full duplex
Transfer rate	300...115K2 bit/sec
Parity	none, odd, even
Data bits	7/8 bit
Input signal level	Logic 1 (high) - 3 ... - 15 V Logic 0 (low) + 3 ... + 15 V
Output signal level	Logic 1 (high) - 5 V Logic 0 (low) + 5 V
Number of signals	2 output signals (Tx, RTS) 2 input signals (Rx, CTS)
Electrical isolation	none
Connection	5-pin plug-in terminal block
conductor cross-section	max. 1.5 mm²
Cable type	shielded twisted pair (e.g. LifYCY 3x2x0.20), 1 pair of wires for GND
Cable length	max. 15 m



Caution!

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

4.2.10.1 Connecting the Remote Terminal PR 5110



Configuration PR 5230

Setup-[Serial ports parameter]-[Remote display]-[Builtin RS232]-[Param]

Configuration PR 5110

Setup-oP 10-LInE-r5232

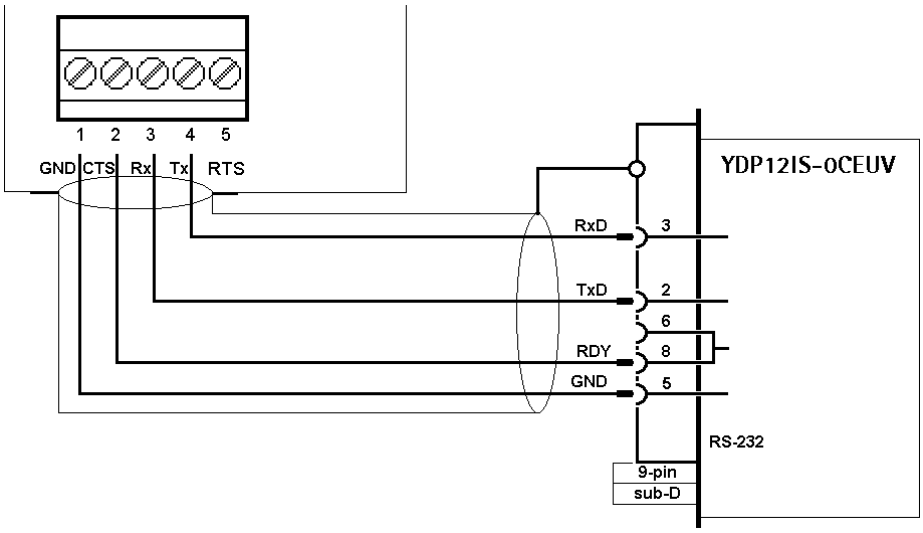
Setup-oP 12-tokEn-oFF

Setup-oP 13-SEndModE SEnd

Note: When replacing PR 1627/PR 1628 with PR 5110, note that the pin assignment must be attended! Description see instrument manual PR 5110.

4.2.10.2 Connecting a YDP12IS or YDP04IS Ticket Printer

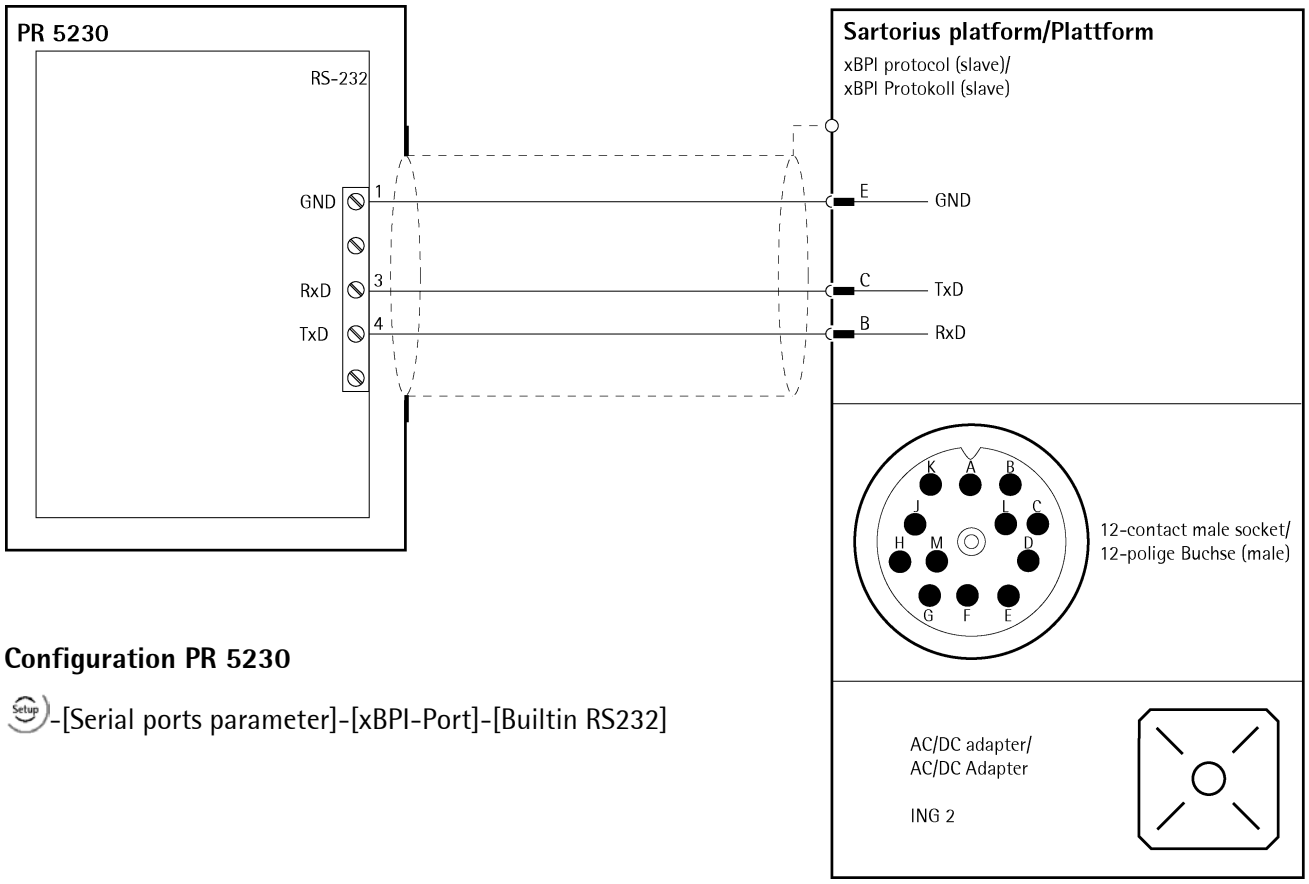
The ticket printer YDP12IS-OCEUV or YDP04IS-OCEUV can be connected via [Builtin RS232] interface.



If the printer is connected to the [Builtin RS232] port:

- Press Setup-[Serial ports parameter]-[Printer]-[Builtin RS232]-[Param] and configure the following settings under [Protocol]: [RTS/CTS], [Baudrate]: 9600, [Bits]: 8, [Parity]: [none], [Stopbits]: 1 and [Output mode]: [Raw].
- The printer must be set to Line Mode (factory setting: Page Mode). Press the 'FEED' button to change modes; please refer to the installation instructions delivered with the printer.

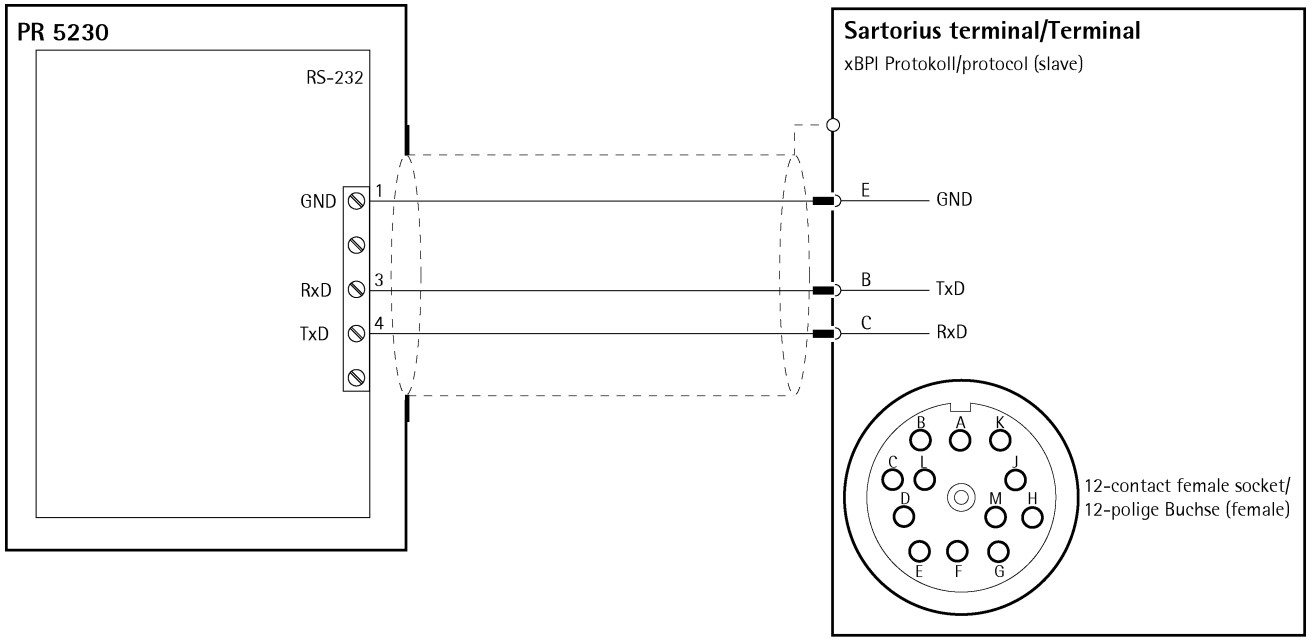
4.2.10.3 Connecting a xBPI Platform over RS-232



Configuration PR 5230

Setup-[Serial ports parameter]-[xBPI-Port]-[Builtin RS232]

4.2.10.4 Connecting a xBPI Terminal over RS-232



Configuration PR 5230

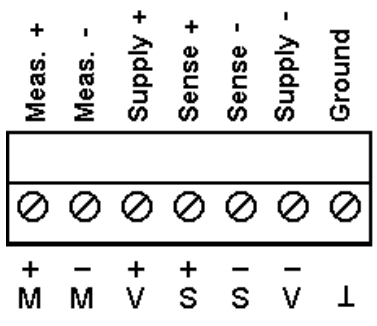
Setup-[Serial ports parameter]-[xBPI-Port]-[Builtin RS 232]

4.3 Connecting Load Cells

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

Caution!

Do not shorten the load cell cable. Connect the prepared cable end and roll up the remaining cable.



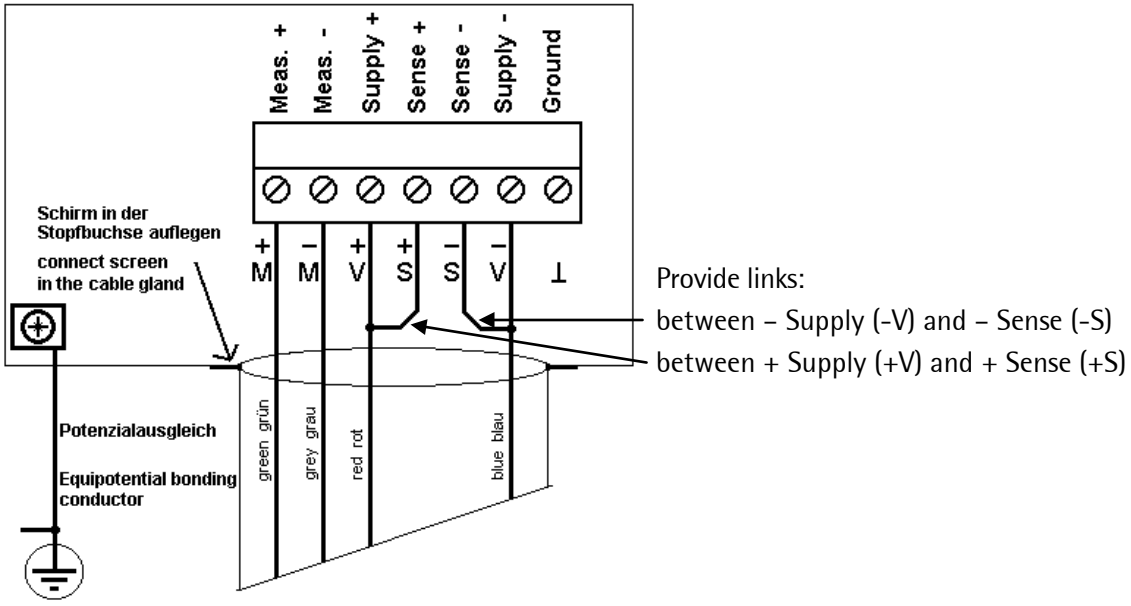
Terminal block		Connection		Description	
+	M	+	Meas.	+	Meas. voltage/load cell output
-	M	-	Meas.	-	Meas. voltage/load cell output
+	V	+	Supply	+	Supply voltage
+	S	+	Sense	+	Sense
-	S	-	Sense	-	Sense
-	V	-	Supply	-	Supply voltage
⊥		Ground		Ground	

4.3.1 Connecting a Load Cell with 4-Wire Cable

Caution!

The cable colors shown above are applicable to the 4-wire PR 62.. series load cells.

Before connecting, check the assignment of cable colors in the load cell manual.



4.3.2 Connecting PR 6221 Load Cells

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

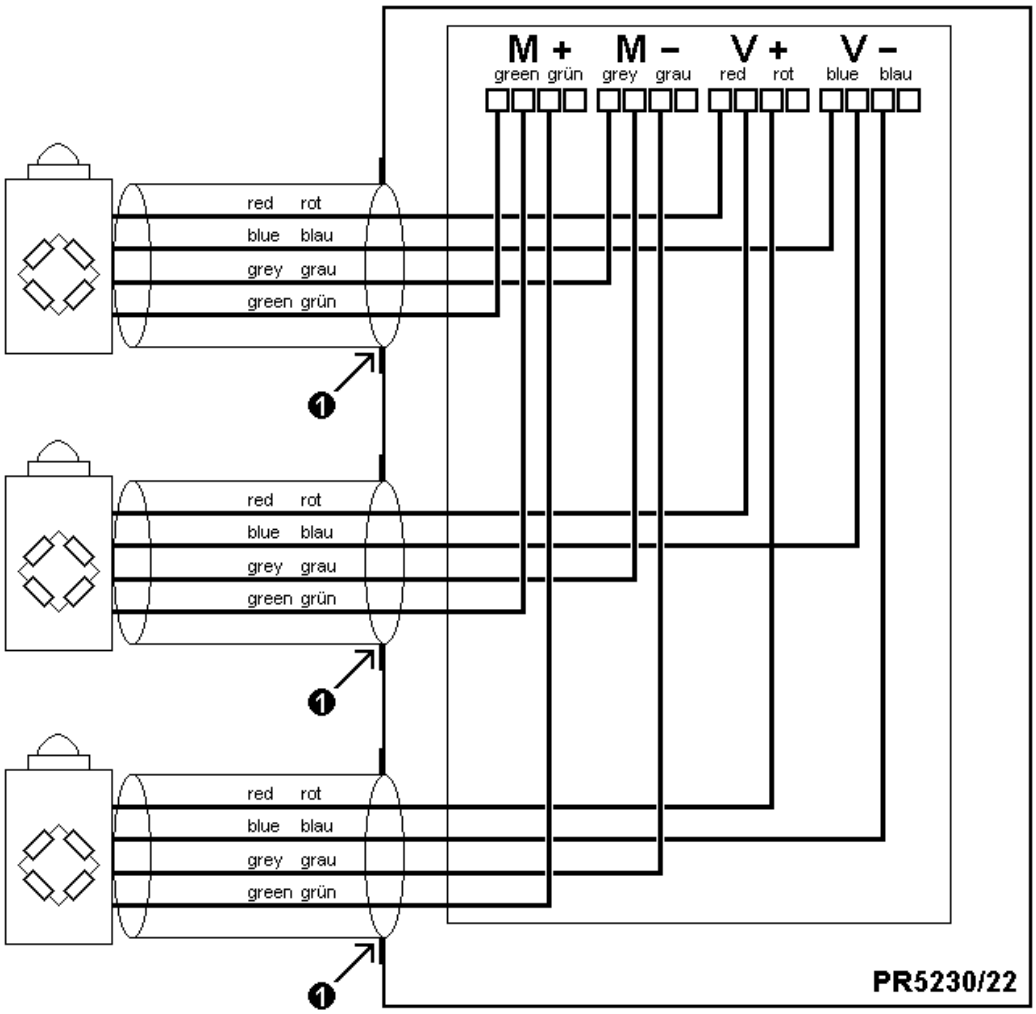
4.3.3 Connecting up 2 to 4 Load Cells via PR 5230/22 Load Cell Junction Board

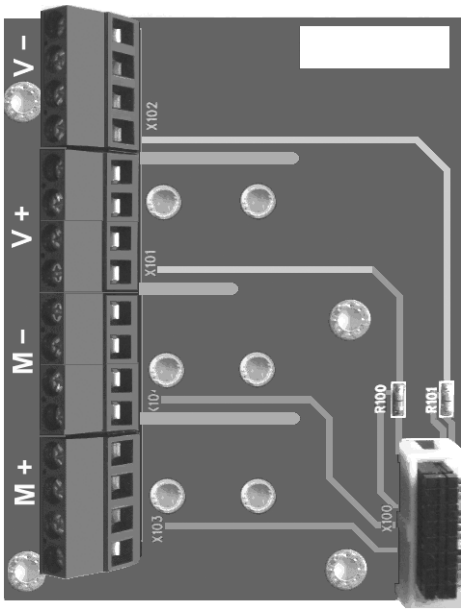
The PR 5230/22 load cell junction board for 2 to 4 load cells, which is available as an accessory, can be used instead of a cable junction box.

This is an advantage, if the PR 5230 is installed in the immediate vicinity of the load cells and the load cell cables are long enough for connection.

The load cell cables are passed through the metal cable glands. The load cell cable screens ❶ are connected in the metal cable glands, see Chapter 4.2.4.

4.3.3.1 Connecting 4-Wire Load Cells





The 4 load cell cores are color-marked:

Terminal block	Color	Connection	Description
- V	blue (bu)	- Supply	- Supply
+ V	red (rd)	+ Supply	+ Supply
- M	grey (gy)	- Meas./LC out	- Measuring voltage/load cell output
+ M	green (gn)	+ Meas./LC out	+ Measuring voltage/load cell output

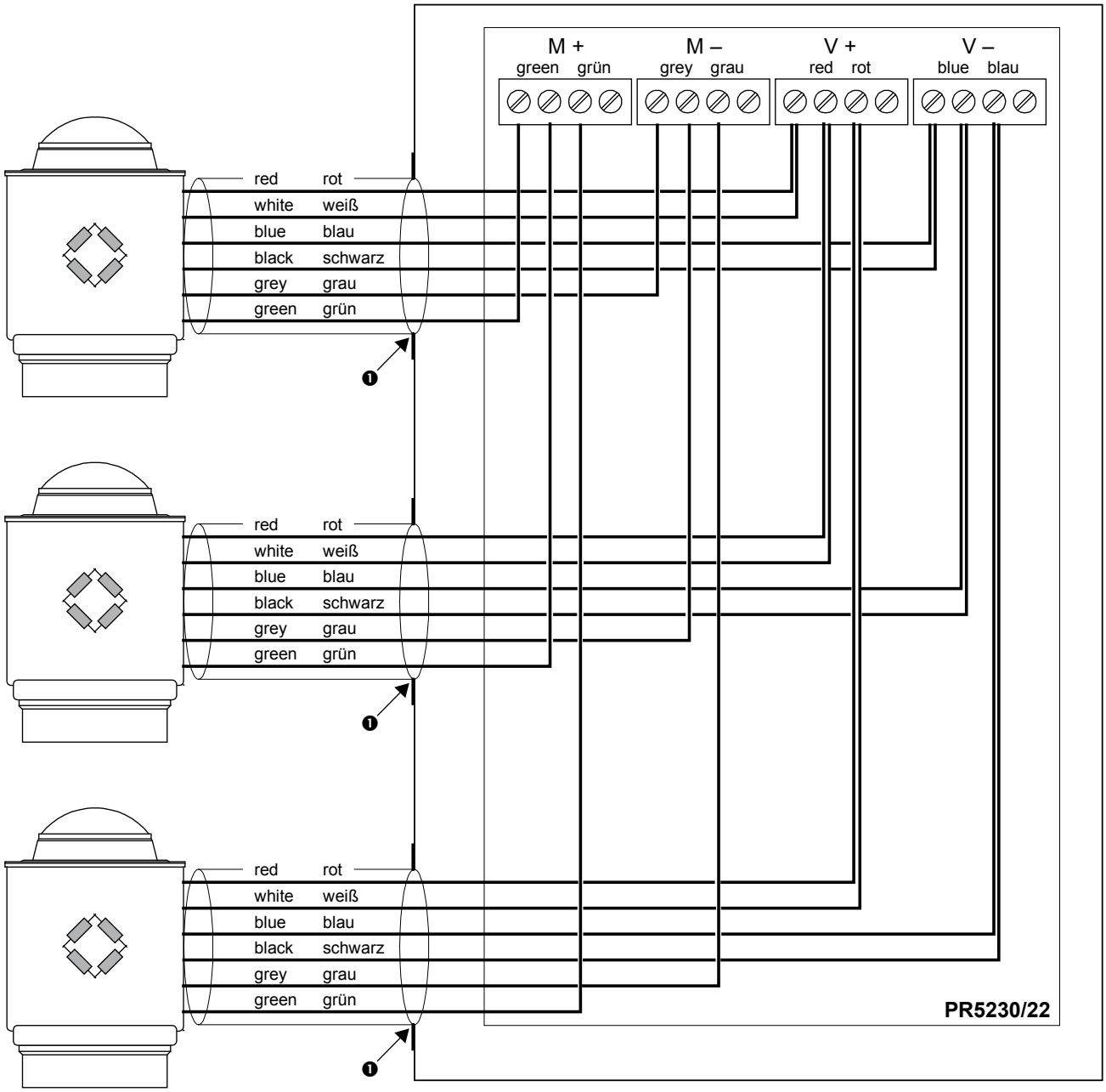
Caution!

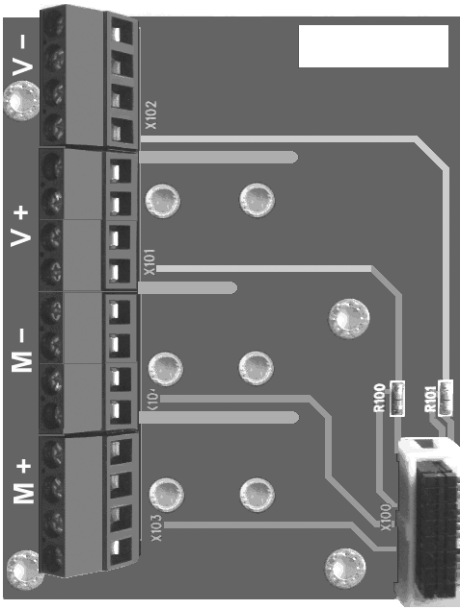
The cable colors shown above are applicable to the 4-wire PR 62.. series load cells.

Before connecting, check the assignment of cable colors in the load cell manual.

Note: The load cells are connected directly. Corner adjustment on the load cell junction board is not provided.

4.3.3.2 Connecting 6-Wire Load Cells





The 6 load cell cores are color-marked:

Terminal block	Color LC	Connection	Description
- V	blue (bu)	- Supply	- Supply
	black (bk)	- Sense	- Sense voltage
+ V	red (rd)	+ Supply	+ Supply
	white (wh)	+ Sense	+ Sense voltage
- M	grey (gy)	- Meas./LC out	- Measuring voltage/load cell output
+ M	green (gn)	+ Meas./LC out	+ Measuring voltage/load cell output

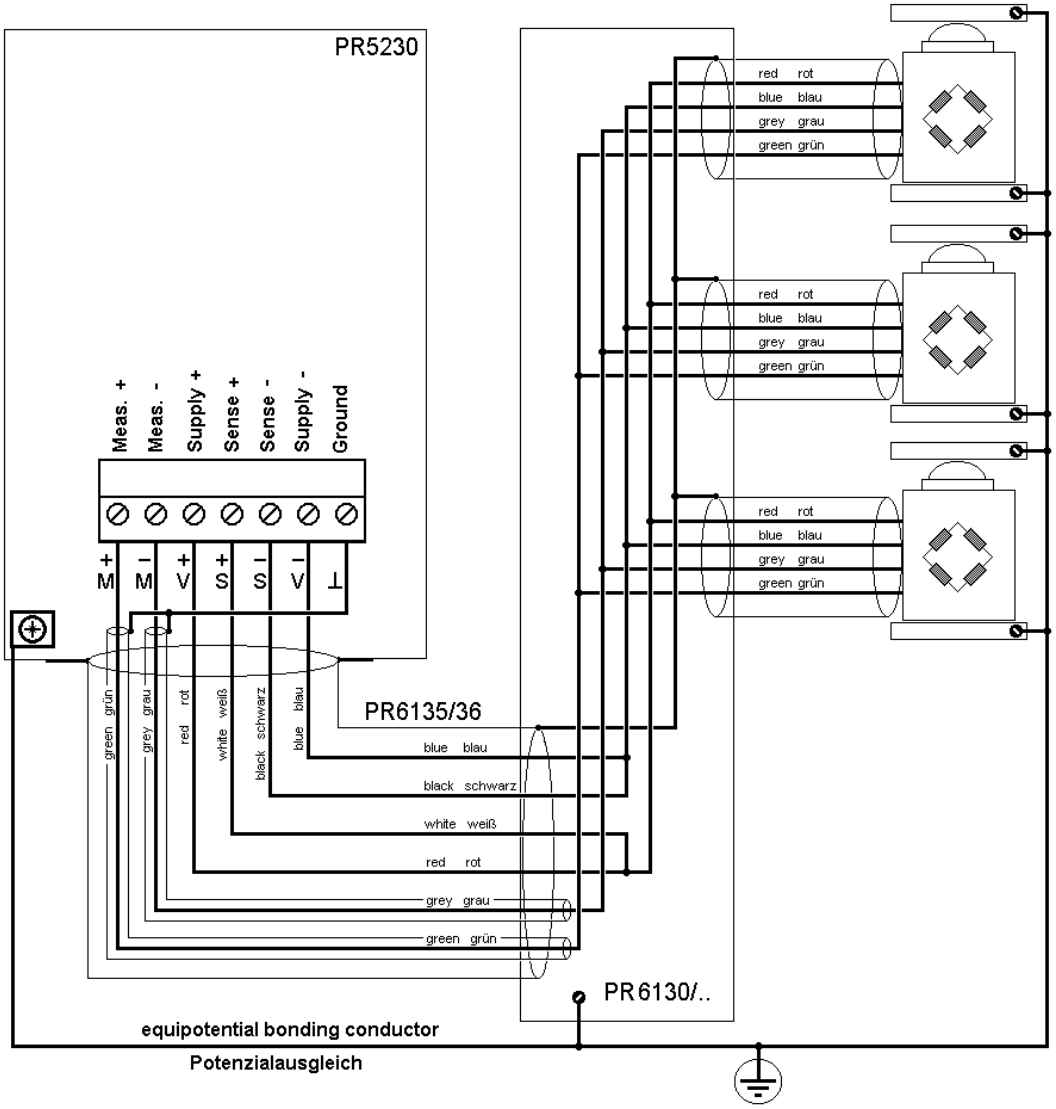
Caution!

Before connecting, check the assignment of cable colors in the load cell manual.

Note: The load cells are connected directly. Corner adjustment on the load cell junction board is not provided.

4.3.4 Connecting up 2 to 8 Load Cells using 6-Wire Connecting Cable

Connections are made via junction box PR 6130/.. and connecting cable PR 6135 or PR 6136.



Caution!

The cable colors shown above are applicable to the 4-wire PR 62.. series load cells and to the connecting cable PR 6135/36.

Before connecting, check the assignment of cable colors in the load cell manual.

Recommendation

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

Load cell supply circuit

- Load resistance of load cell circuit >75 Ω, e.g. 8 load cells of 650 Ω each
- Supply voltage is 12 V DC, for further data, see Chapter 16.5.

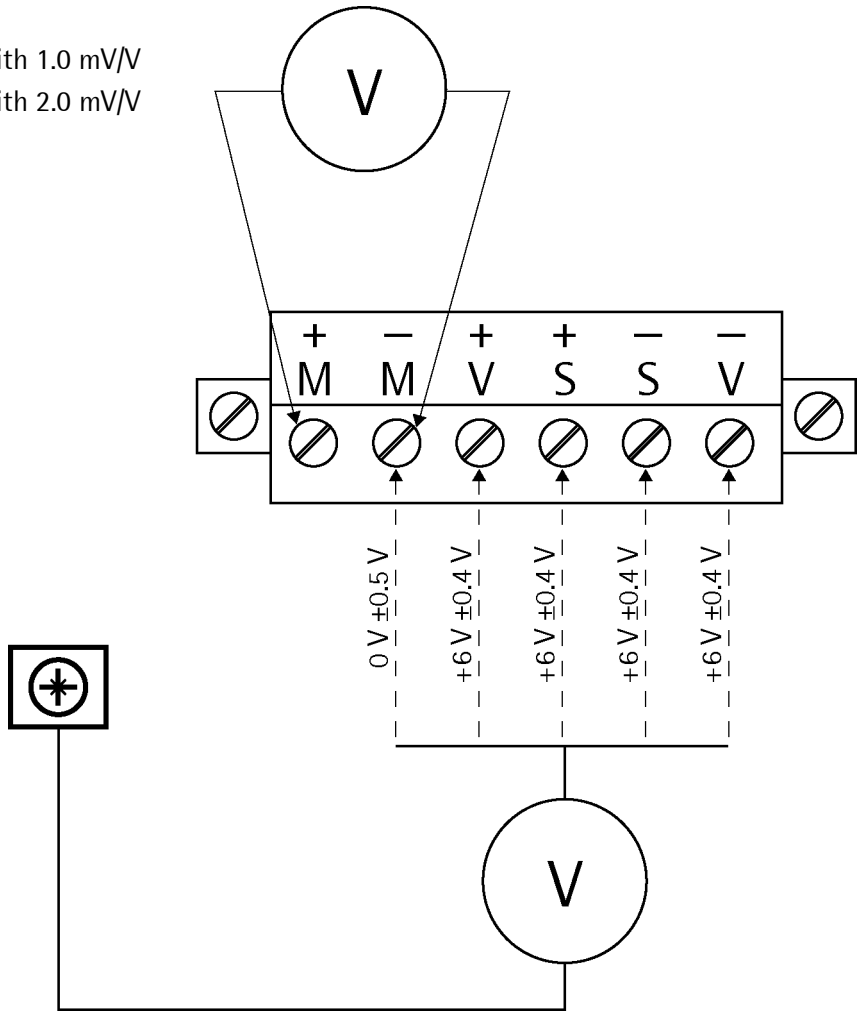
Testing the Measuring Circuit

A simple test with the load cells connected can be carried out with a multimeter (not with external supply or intrinsically safe load cell interface):

Measuring voltage:

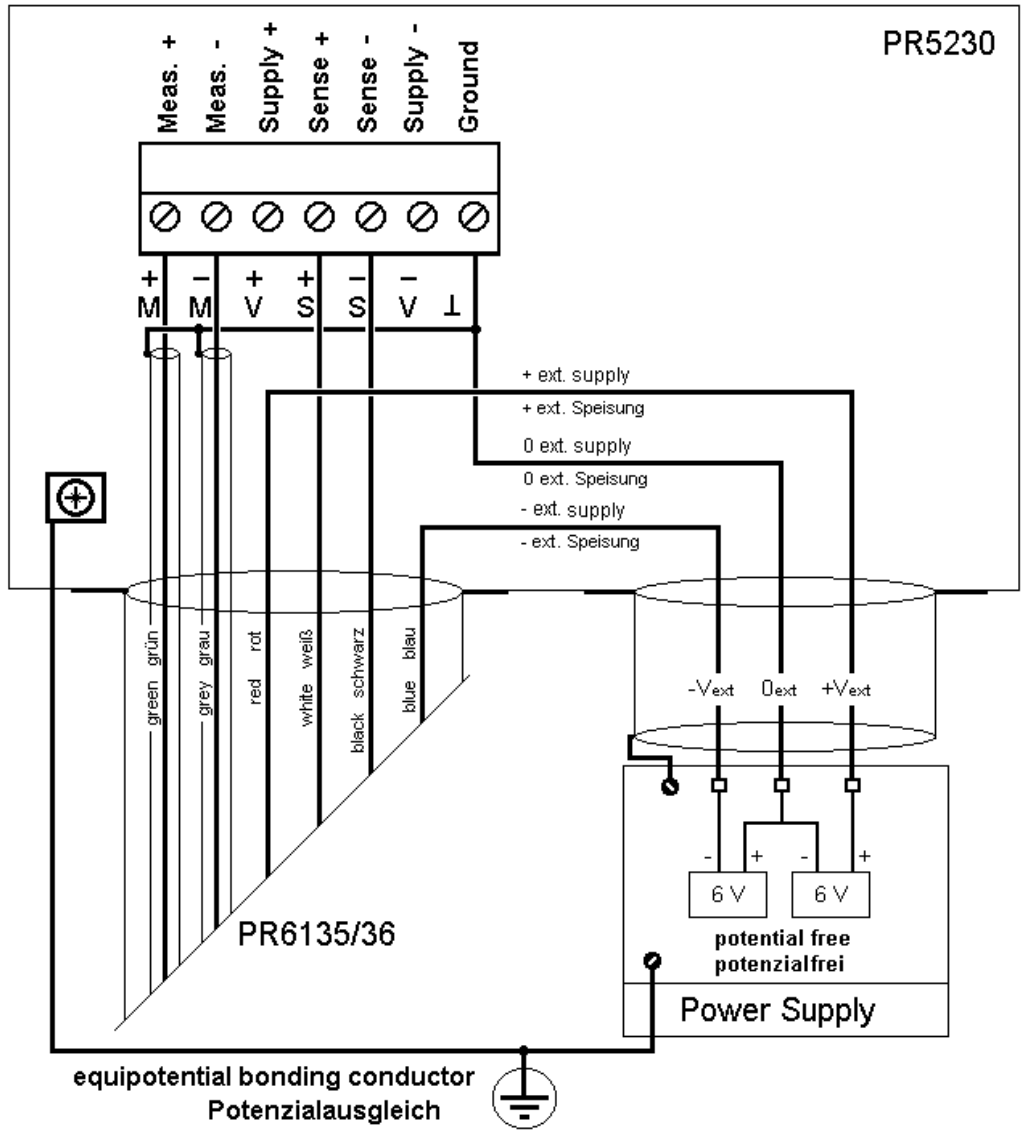
0 - 12 mV = @ LC with 1.0 mV/V

0 - 24 mV = @ LC with 2.0 mV/V



4.3.5 Connecting Load Cells with External Supply

When the load of the load cells is <75 Ω (e.g. more than 4 load cells with 350 Ω), external load cell supply is required. In this case, the internal supply is replaced by a potential-free external supply. The neutral wire of the external supply voltage (0 ext. supply) must be connected to the instrument housing to ensure that the voltage is symmetrical to 0. The internal supply is not connected!



Caution!

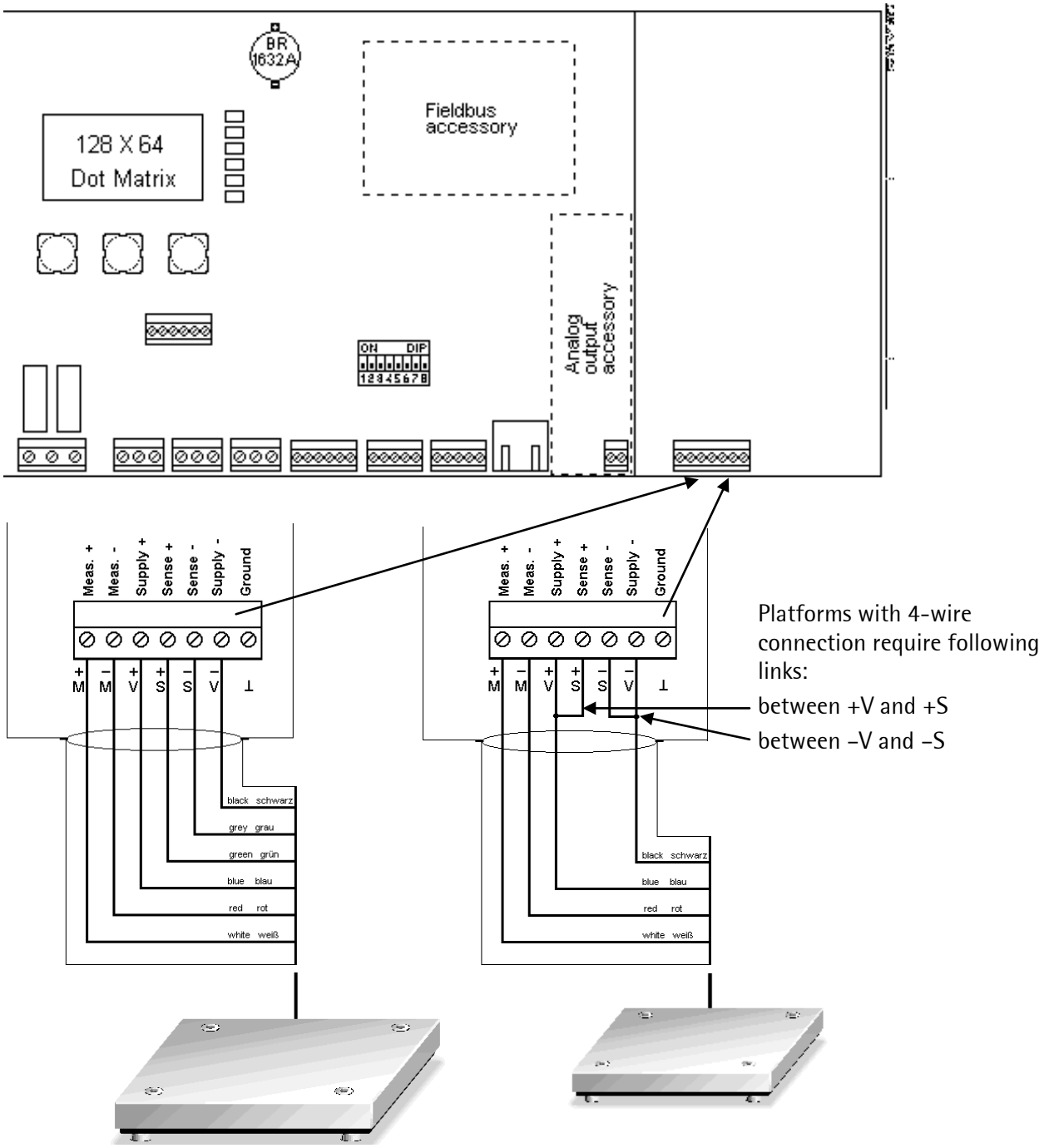
The cable colors shown above are applicable to the connecting cable PR 6135/36.

Before connecting, check the assignment of cable colors in the load cell manual.

4.3.6 Connecting Analog Platforms (CAP...)

One Combics analog platform (CAP... series) can be connected to the instrument.

The following example shows a platform with 6-wire connection and another one with 4-wire connection.



Caution!

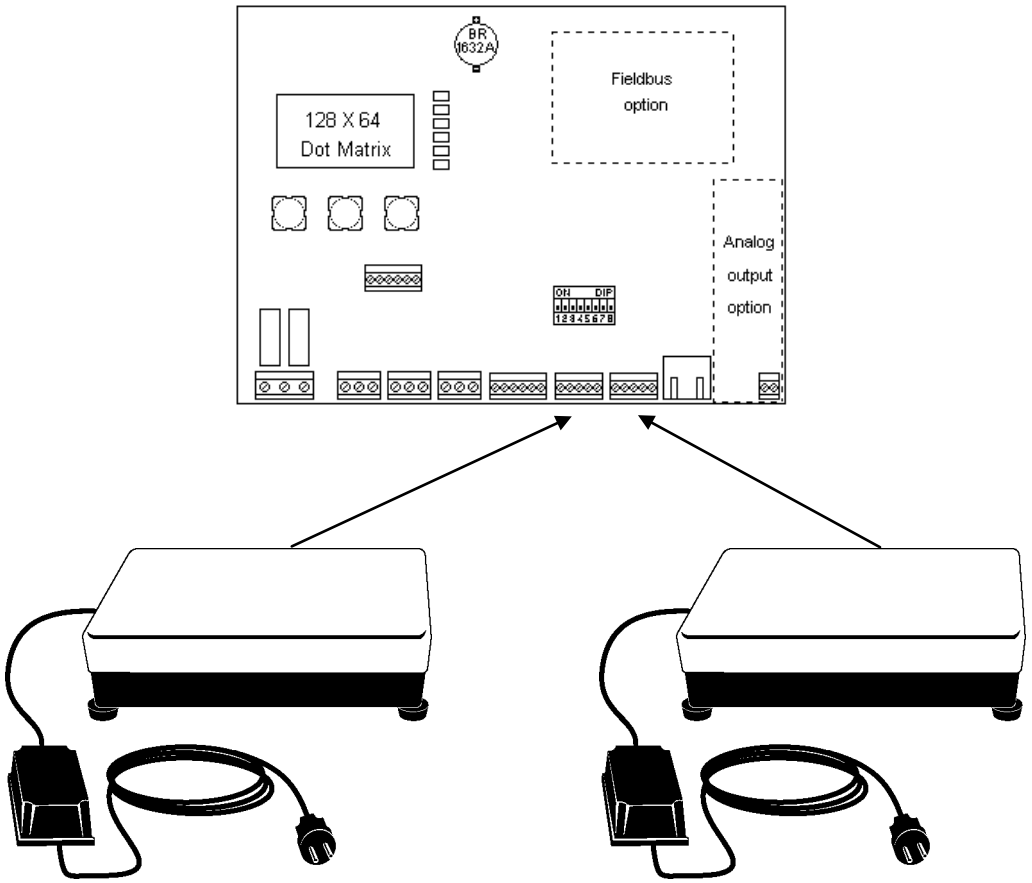
The cable colors shown above are valid for a CAPP4 500 x 400 and a CAPP1 320 x 420, as an example.

The assignments of cable colors are given in the platform operating manual.

The cable shields must be connected to the GND terminal of the instrument (see Chapter 4.2.4). If the measuring lines (+M, -M) are shielded individually, these shields must be connected to the GND terminal as well.

4.3.7 Connecting xBPI Platforms (IS...)

One xBPI platform (IS... series) can be connected to the instrument.
The xBPI platform will be delivered either with a RS-232 or RS-485 interface.



Connection to a RS-485 interface,
see Chapter 4.2.9.8.

Connection to a RS-232 interface,
see Chapter 4.2.10.3.

4.4 Accessories

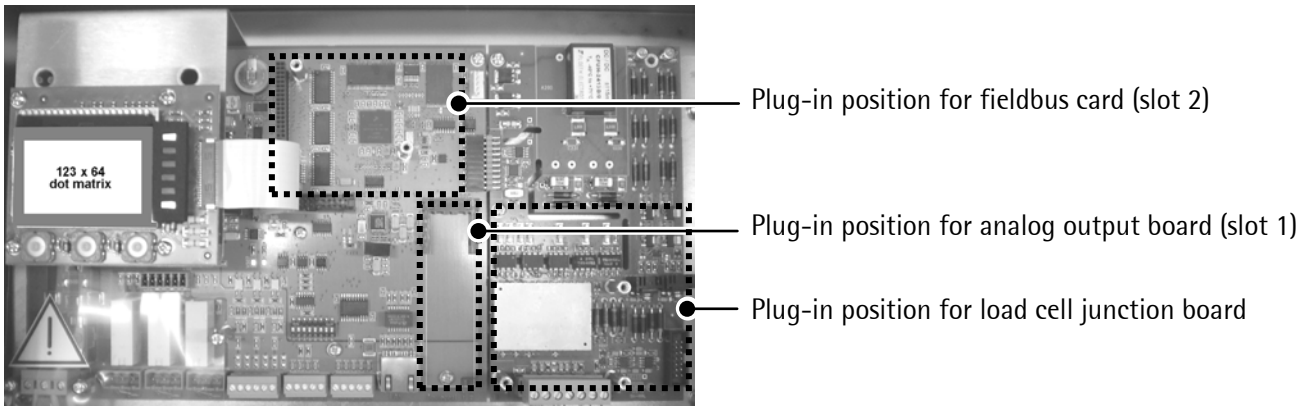
4.4.1 Installing Plug-in Cards

The main board has two additional function-specific sockets, which can be equipped with the following boards:

- plug-in position for the analog output board 0/4 – 20 mA, electrically isolated
- plug-in position for a fieldbus card (see Chapter 2.4)
- plug-in position for load cell junction board (see Chapter 4.4.3)

Warning!

Before installing or removing a plug-in card, disconnect the instrument from all voltage sources.

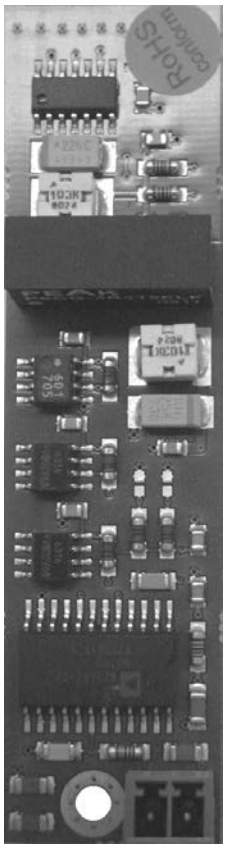


Note: After installation/modification, the PCBs are detected automatically!
To view a list of the installed plug-in cards, except for PR 5230/22, select Info-[Show HW-Slots]:

Info/HW-Slots		
Builtin	**RS485**	Built-in serial interface
Builtin	**RS232**	Built-in serial interface
PR5230/06	**analog out**	Optionally interface (slot 1, C11)
Builtin	**digital i/o**	Built-in digital interface
PR1721/41	**ProfiBus-DP**	Fieldbus cards (slot 2, C2x) only
PR5230/W1	**ADC**	For weighing electronics board (W1 or WE1)

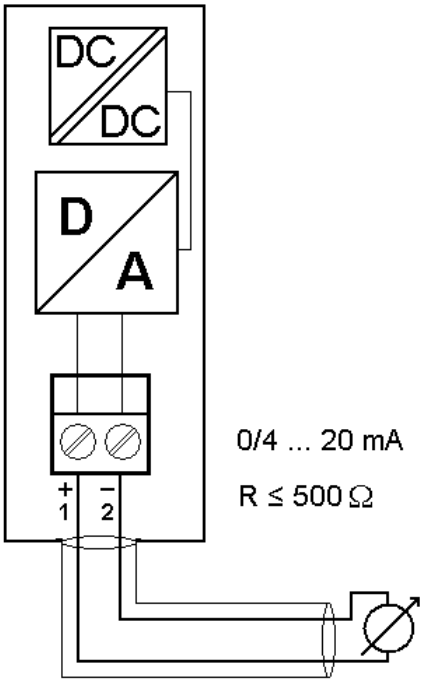
4.4.2 PR 5230/06 Analog Output Board

The analog output board is a plug-in card for installation in Slot 1. It has a 2-pole screw terminal for an active analog output.



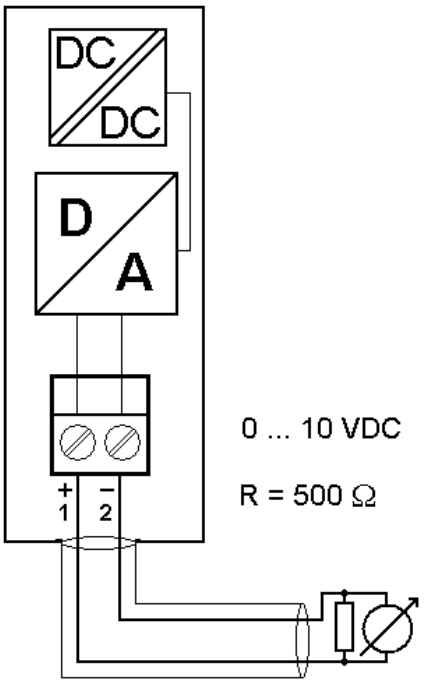
Internal connection	20-pin flat plug
Number of channels	1 active current output: 20 mA, 10 V output voltage via external 500 Ω resistor
Output function	Gross/Net/display tracking, configurable
Output range	0/4...20 mA, configurable
Resolution	16 bit binary, 20.000 internal digits @ 20 mA
Linearity error	@ 0 – 20 mA: 0.04 % @ 4 – 20 mA: 0.02 %
Temperature effect	<100 ppm/K
Zero error	0.05 %
Max. error	<0.1 %
Load	0...500 Ω max.
Potential isolation	yes
Protected against short circuits	yes
External connection	2- pin plug-in terminal block
Accessories	Mounting screws M3 x 12 mm, spacer ring 2 mm thick
Dimensions (LxWxH)	85 x 22 x 14 mm
Weight	15 g

Current Output



Current is supplied directly via the terminals.

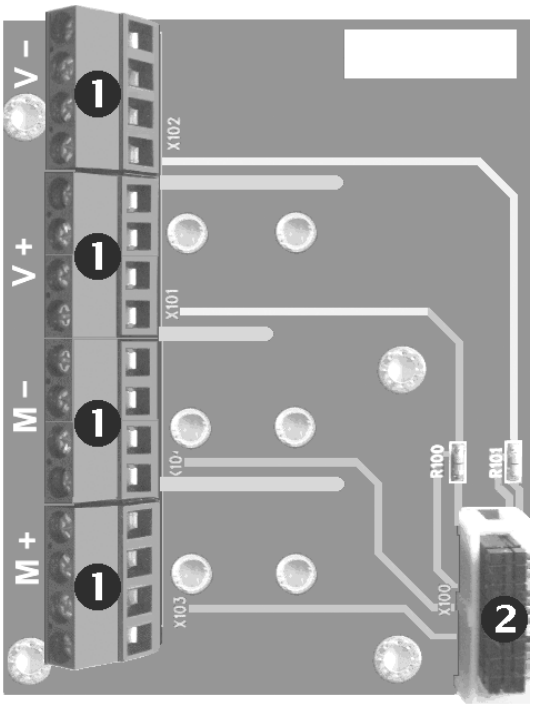
Voltage Output



The voltage corresponds to the drop across the external 500 Ω resistor.

4.4.3 PR 5230/22 Load Cell Junction Board

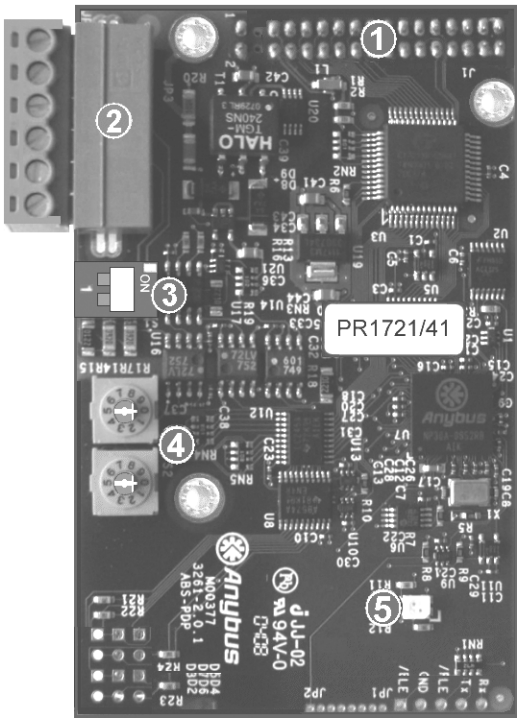
The load cell junction board is connected to the main board by a flat cables plug.



Number of load cells	1...4
Type of load cells	Strain gauge, 6 or 4-wire connection possible
Internal connection	14-pin flat plug ❷
External connection	4x 4-pin terminal block ❶
Load cell cable length	500 m max.
Dimensions (LxWxH)	95 x 74 x 19 mm
Weight	33 g

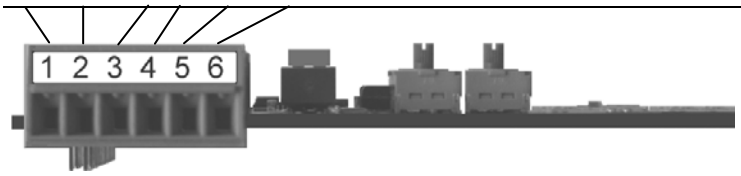
4.4.4 PR 1721/41 ProfiBus-DP Interface

The ProfiBus interface PR 1721/41 is a plug-in card for mounting in slot 2; see Chapter 4.4.1. Communication protocols and syntax comply with the ProfiBus-DP standard to IEC 61158, with transfer rates up to 12 Mbit/s.



Internal connection	34- pin connector on flat cable for slot 2 ❶
External connection	6-pin plug-in terminal block ❷

VP DGND A B free free



A = cable color: green
B = cable color: red

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 EN 50 170 (DIN 19245), mono or multi-master systems are supported. Master and slave devices, max. 126 nodes possible. Watchdog timer
Addressing	Via software, rotary switch ❹ on position 0
Bus termination	Via DIL-switch ❸
Certificates	ProfiBus test center Comdec in Germany and PNO (ProfiBus User Organization). Suitable for industrial applications to CE, UL and cUL
Potential isolation	Optocoupler in lines A and B (RS-485)
Cable length	Max. distance 200 m can be extended with 1.5 Mbit/s by means of additional repeater.

Configuration	GSD file ‚Sart5230.gsd'
Cable	Special ProfiBus color: violet, shielded twisted pair cable
Cable impedance	150 Ω
Dimensions (LxWxH)	87 x 55 x 15 mm
Weight	35 g

Note: The GSD file is stored on the CD (directory 'Fieldbus' of the according instrument) supplied with the unit. The current file is also available for download via the Internet: http://www.sartorius-mechatronics.com [Downloads].

4.4.4.1 Controls on Fieldbus Card

③

The terminating resistors can be switched on (ON) and off by pressing the switch, see Chapter 4.4.4.4.

④

Caution!

The rotary switch settings will not use.

Make sure that the switches for mode address 1...99 are set to position '0'!

The mode address will be set in the menu [Setup]-[Fieldbus Parameter].

4.4.4.2 Status-LEDs on Fieldbus Card

Watchdog LED ⑤			Meaning
Frequency		Color	
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	Check error in ASIC and FLASH ROM, module is defect.

4.4.4.3 Status Display

Requirements

In Setup-[Display items] the items are configured, see Chapter 5.6.7.

In Info-[HW-Slots] PR 1721/41 is selected.

Display

	1	2	3	4
LED	---	---	---	---

1	2	3	4
Lit **- - -**: no function	Lit **grn**: Fieldbus is online, data transmission is possible.	Flashing 1 Hz **red**: Input/output length configuration error.	Lit **red**: Fieldbus is off-line, data transmission is not possible.
		Flashing 2 Hz **red**: User parameter error.	
		Flashing 4 Hz **red**: Error in ASIC	

Legend

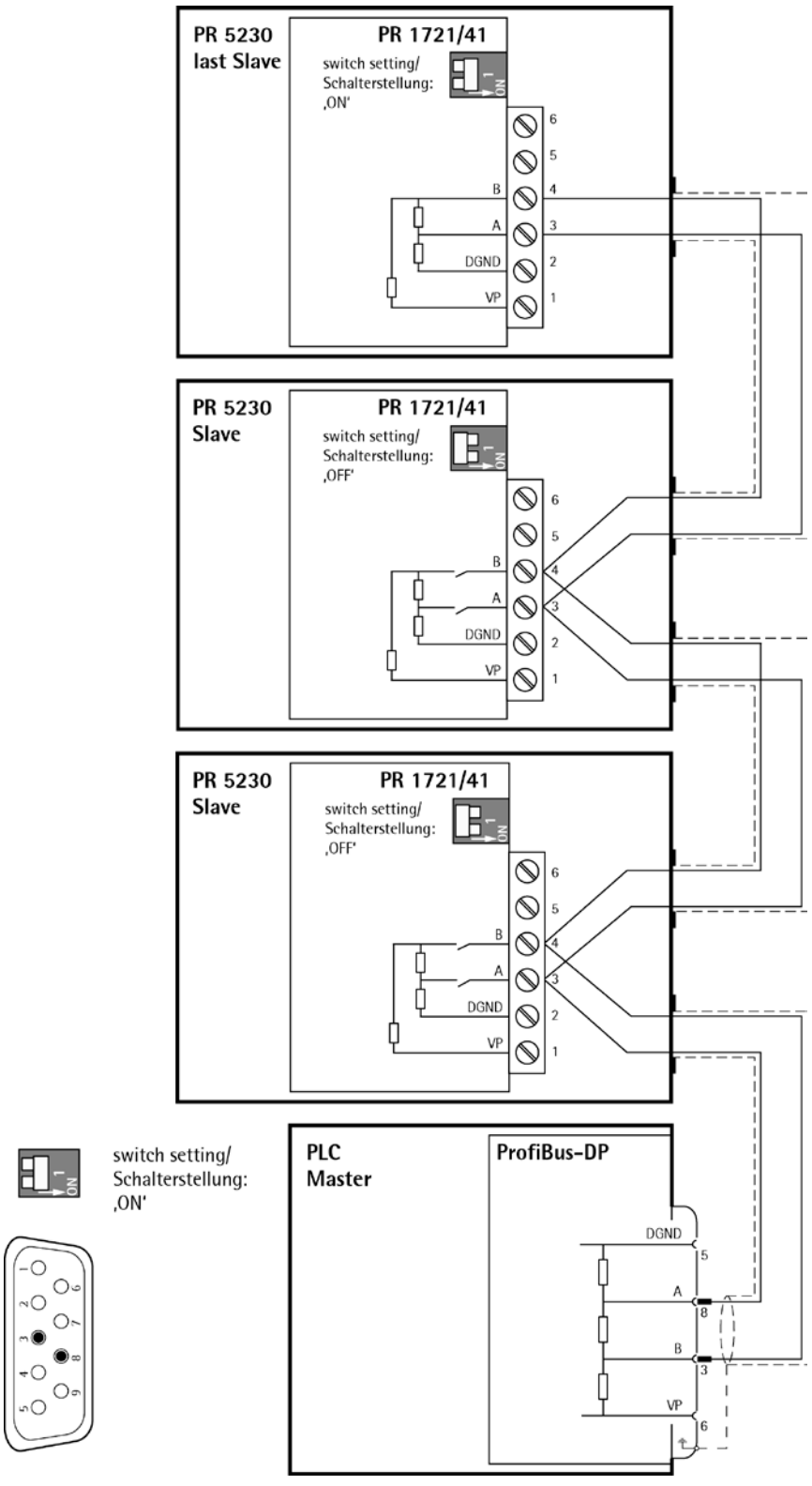
---	off
red	red
grn	green

4.4.4.4 Bus Termination

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

	Bus termination switch ❸ in mounting plate
Bus termination switch 'ON'	Bus termination switched on. If the module is the last one or the first one in the network, this switch must be set to 'ON', or an external terminating resistor in the connector must be used.
Bus termination switch ‚OFF'	Bus termination switched off. When using an external termination in the ProfiBus connector, the switch in the mounting plate must be in position 'OFF'.

4.4.4.5 Connecting Diagram for a Master with three Slaves



Caution!

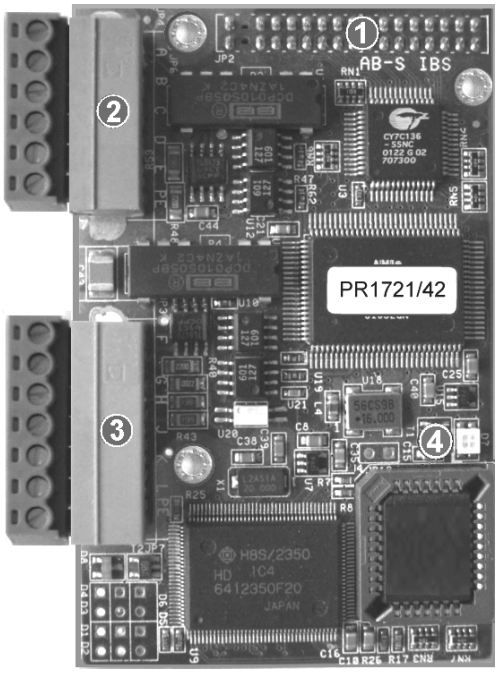
The cable screens must be connected in the metal sleeves.

Don't take the screens into the unit!

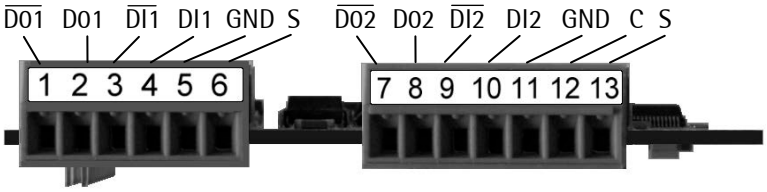
Before, during and after installation, make sure that the sealing rings are seated correctly.

4.4.5 PR 1721/42 InterBus-S Interface

The InterBus-S interface PR 1721/42 is a plug-in card for mounting in slot 2, see Chapter 4.4.1.
The interface is based on the InterBus chip technology and enables transfer rates of 500 kbit/s and 2 Mbit/s.



Internal connection	34- pin connector on flat cable for slot 2 ❶
External connection	6-pin (IN) ❷ and 7-pin (OUT) ❸ plug-in terminal block.



C = Con_Test
S = Screen

Transfer rate	500 kbit/s
Topology	Bus as a closed ring
Protocol	InterBus-S master-slave fixed telegram length, deterministic cyclical process data transmission with max. 10 words I/O.

Cable	InterBus, color: green 3x 2 twisted pairs, common shield	**Lead termination**	Not required, due to active ring topology
Cable impedance	150 Ω	**Certificates**	From INTERBUS Club e. V.: Compatibility with InterBus standard. IEC 61158 (Parts 3 to 6) EN 50254 (DIN 19258) Suitable for industrial applications CE, UL & cUL
Dimensions (LxWxH)	87 x 55 x 15 mm	**Potential isolation**	Yes, optocoupler and DC/DC converter
Weight	35 g	**Cable length**	400 m (between two remote bus sharing units). Overall length: 13 km

4.4.5.1 Status-LEDs on Fieldbus Card

Watchdog LED ④			Meaning
Frequency		Color	
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	Check error in ASIC and FLASH ROM, module is defect.

4.4.5.2 Status Display

Requirements

In Setup-[Display items] the items are configured, see Chapter 5.6.7.

In Info-[HW-Slots] PR 1721/42 is selected.

Display

	1	2	3	4
LED	---	---	---	---

1	2	3	4
Lit **grn**: Cable OK, no Reset mode in the master.	Lit **grn**: Bus is aktive.	Lit **red**: Remote bus is not active.	Lit **grn**: PCP communication is active, hold = 500 ms

Legend

---	off
red	red
grn	green

4.4.5.3 9-Pole D-Sub Connector ‚IN' ❷

E.g. Phoenix Contact IBS RTC-T			
Pin allocation acc. to DIN 41642	**Signal**	**Color DIN 47100**	**Description**
Cable sheath		green	special InterBus cable (certified)
1 ----------	IDO1	green	inverted data output
2 ----------	DO1	yellow	not inverted data output
3 ----------	IDI1	pink	inverted data input
4 ----------	DI1	grey	not inverted data input
5 ----------	GND	brown	signal - ground
6 ----------	S		Screen

4.4.5.4 9-Pole D-Sub Connector ‚OUT' ❸

E.g. Phoenix Contact IBS RTC-T			
Pin allocation acc. to DIN 41642	**Signal**	**Color DIN 47100**	**Description**
Cable sheath		green	special InterBus cable (certified)
7 ----------	IDO2	green	inverted data output
8 ----------	DO2	yellow	not inverted data output
9 ----------	IDI2	pink	inverted data input
10 ----------	DI2	grey	not inverted data input
11 --------- * only if necessary	GND	brown	signal - ground (continuation jumper: 11-12)
12 --------- * only if necessary	C		Con_Test (continuation jumper: 11-12)
13 ----------	S		Screen

4.4.5.5 Connecting Diagram for a Master with three Slaves

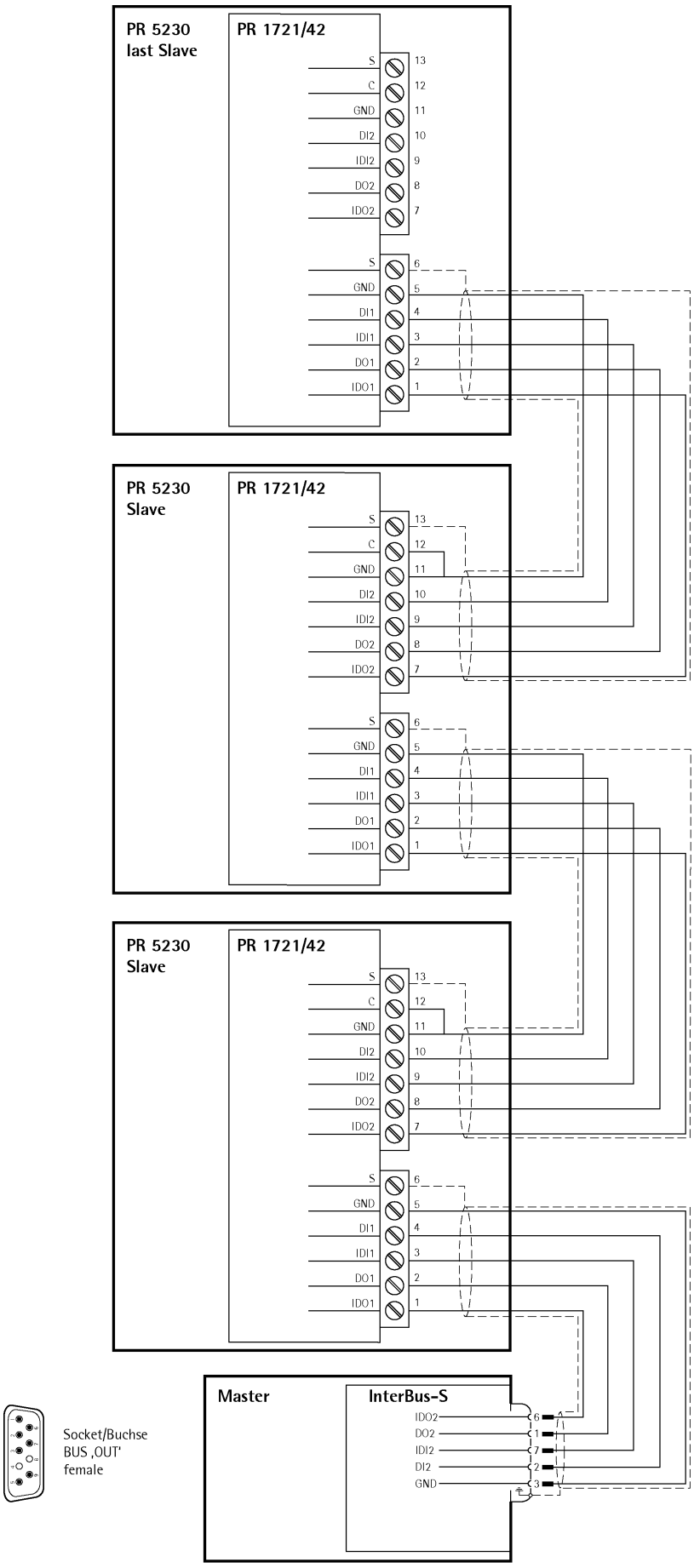
Caution!

With Bus OUT ❸ 11 and 12 must be bridged, if another slave follows. Thus the link is not fitted at the last slave, see next page.

Caution!

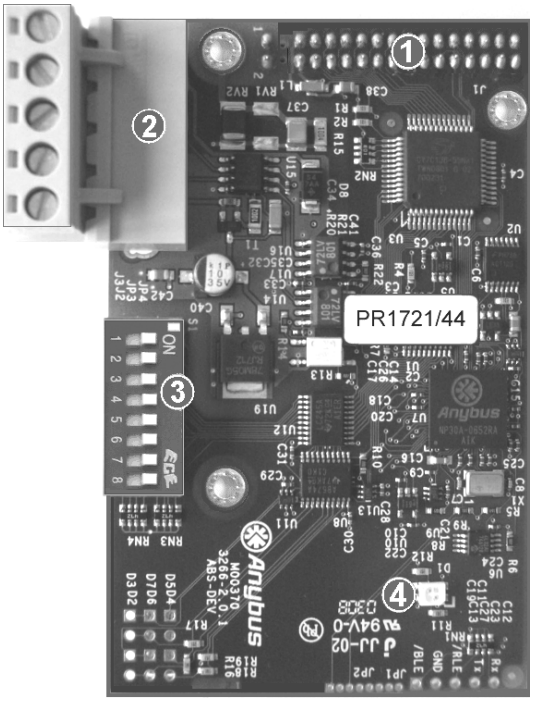
The cable screens must be taken into the instrument through the cable glands and connected to terminals 6 or 13 (see next page).

Before, during and after installation, make sure that the sealing rings are seated correctly.

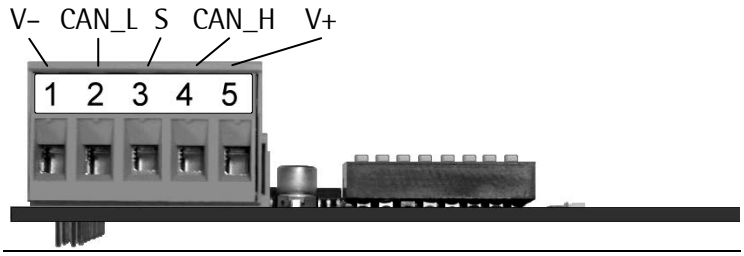

PR 5230
last Slave
PR 1721/42
S
C
GND
DI2
IDI2
DO2
IDO2
S
GND
DI1
IDI1
DO1
IDO1
13
12
11
10
9
8
7
6
5
4
3
2
1
PR 5230
Slave
PR 1721/42
PR 5230
Slave
PR 1721/42
Master
InterBus-S
IDO2
DO2
IDI2
DI2
GND
6
1
7
2
3
Socket/Buchse
BUS ‚OUT'
female

4.4.6 PR 1721/44 DeviceNet Interface

The DeviceNet interface PR 1721/44 is a plug-in card for mounting in slot 2, see Chapter 4.4.1. It is a complete DeviceNet adaptor (slave) with CAN controller and transfer rates up to 500 kbit/s.



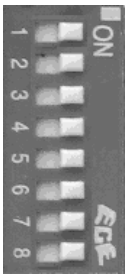
Int. connection	34- pin connector on flat cable for slot 2 ❶
Ext. connection	5-pin plug-in terminal block ❷



Transfer rate	125, 250 and 500 kbit/s
Protocol	DeviceNet master-slave Polling method (polled IO) CRC error detection to IEC 62026 (EN50325) Max. 64 station nodes Max. data width 512 bytes input&output
Configuration	EDS file ‚Sag5230.eds' MAC-ID (1...62)
Cable	DeviceNet, color: petrol-green 2x 2 shielded twisted pair
Certificates/ conformity	Compatible with DeviceNet specification Vol. 1: 2.0, vol. 2: 2.0 ODVA certificate in accordance with conformity test software version A-12. Suitable for industrial applications CE, UL & cUL
Dimensions (LxWxH)	87 x 55 x 15 mm
Bus load	33 mA
Weight	35 g
Potential isolat.	Yes, optocoupler and DC/DC converter

Note: The EDS file is stored on the CD (directory 'Fieldbus' of the according instrument) supplied with the unit. The current file is also available for download via the Internet: http://www.sartorius-mechatronics.com [Downloads].

4.4.6.1 DIL Switch



❸

Caution!

The DIL switch settings will not be used.

Make sure that the switches 1...8 are set to position 'ON'!

Settings will be done in the menu [Setup]-[Fieldbus Parameter].

4.4.6.2 Status-LEDs on Fieldbus Card

Watchdog LED ❹			Meaning
Frequency		Color	
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	Check error in ASIC and FLASH ROM, module is defect.

4.4.6.3 Status Display

Requirements

In Setup-[Display items] the items are configured, see Chapter 5.6.7.

In Info-[HW-Slots] PR 1721/44 is selected.

Display

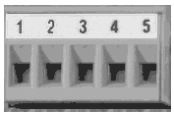
	1	2	3	4
LED	---	---	---	---

1	2	3	4
Lit **- - -**: No function.	Lit **- - -**: Not powered, not online.	Lit **- - -**: No function.	Lit**- - -**: No power to device.
	Lit **grn**: Link OK, online, connected.		Lit **grn**: Device operational.
	Flashing **grn**: Online, not connected.		Flashing **grn**: Data size > configuration.
	Lit **red**: Critical link error.		Lit **red**: Unrecoverable error.
	Flashing **red**: Connection timeout.		Flashing **red**: Minor error.

Legend

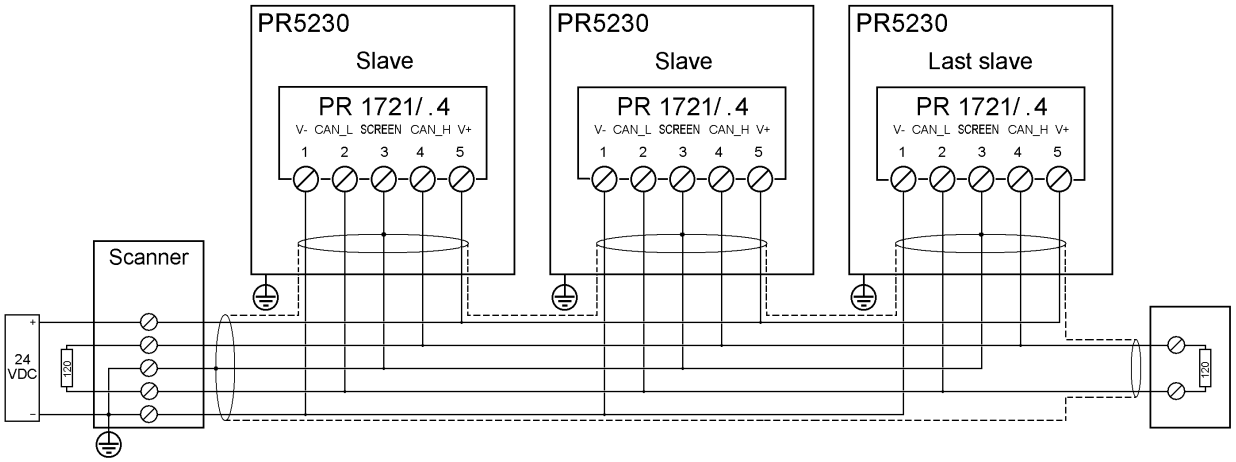
---	off
red	red
grn	green

4.4.6.4 5-Pole Terminal Block Allocation



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

4.4.6.5 Connecting Diagram for a Master with three Slaves



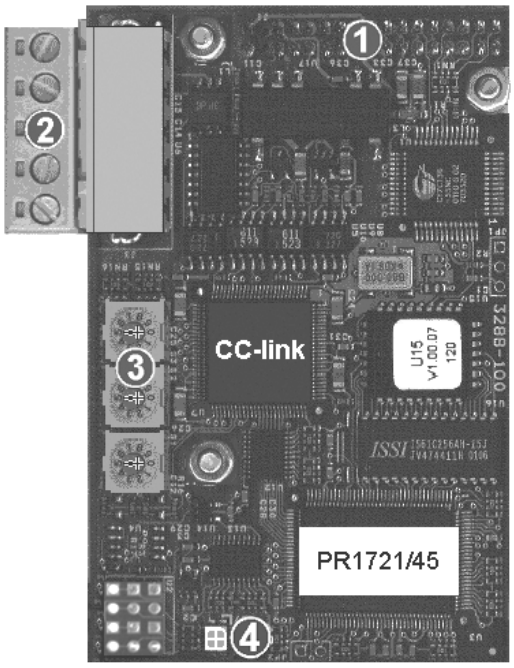
Caution!

The cable screens must be taken into the instrument through the cable glands and connected to terminals 6 or 13 (see connecting diagram).

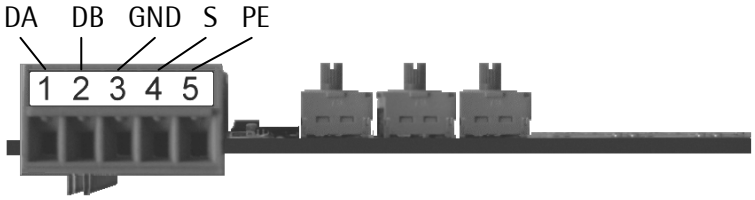
Before, during and after installation, make sure that the sealing rings are seated correctly.

4.4.7 PR 1721/45 CC-Link Interface

The CC-Link interface PR 1721/45 is a plug-in card for mounting in slot 2, see Chapter 4.4.1.
It contains all functions to provide a complete CC-Link slave with transfer rates up to 10 Mbps.



Internal connection	34- pin connector on flat cable for slot 2 ❶
External connection	5-pin plug-in terminal block ❷



S = screen

Transfer rate	156; 625 kbps; 2,5; 5, 10 Mbps
Protocol	CRC error detection, 128 I/O bits and 16 (32 bit) words, max. 64 station nodes
Cable	2x 2 shielded twisted pair
Bus termination	110 Ω at the cable ends
Bus load	100 mA
Configuration	CSP file ‚PR1721_1.csp'
Certificates/ conformity	Type: ABS-CCL (H/W: 1.01, S/W: 2.00.05, CC-Link: 2.0) Reference Number 372
Potential isolation	Yes, optocoupler and DC/DC converter
Cable length	100m @ 10 Mbps, 1200m @ 156 kbps

Dimensions (LxWxH)	87 x 55 x 15 mm
Weight	125 g

Caution!

Ensure that the three rotary switches ❸ (station no. and baud rate) are set to 9. Settings are made via software.

Note: The CSP file is stored on the CD (directory 'Fieldbus' of the according instrument) supplied with the unit. The current file is also available for download via the Internet: http://www.sartorius-mechatronics.com [Downloads].

4.4.7.1 Status LEDs on Fieldbus Card

Watchdog LED ④			Meaning
Frequency		Color	
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	Check error in ASIC and FLASH ROM, module is defect.

4.4.7.2 Status Display

Requirements

In Setup-[Display items] the items are configured, see Chapter 5.6.7.

In Info-[HW-Slots] PR 1721/45 is selected.

Display

	1	2	3	4
LED	---	---	---	---

1	2	3	4
Lit **- - -**: No power on the module.	Lit **- - -**: No power on the module.	Lit **- - -**: No power on the module.	Lit **- - -**: No power on the module.
Lit **grn**: Normal operation.	Lit **red**: CRC error, Illegal station number or illegal baudrate selected.	Lit **grn**: Data being transmitted.	Lit **grn**: Data being received.

Legend

---	off
red	red
grn	green

4.4.7.3 Connection

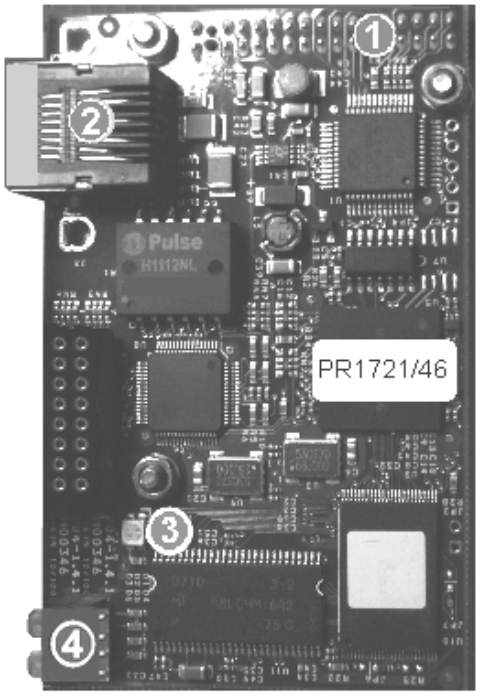
Caution!

The cable screen must be taken into the instrument through the cable gland and connected to terminal 4 (see page 84).

Before, during and after installation, make sure that the sealing rings are seated correctly.

4.4.8 PR 1721/46 ProfiNet I/O Interface

The ProfiNet I/O interface PR 1721/46 is a plug-in card for mounting in slot 2, see Chapter 4.4.1. The card is fitted with a standard RJ-45 socket for network connection and contains a powerful UDP/IP connecting circuitry with transfer rates of 10 and 100 Mbits/s.



Internal connection	34- pin connector on flat cable for slot 2 ❶
External connection	RJ-45 connecting socket ❷

Transfer rate	10 Mbit/sec and 100 Mbit/sec Autodetection (10/100, HalfDX/FullDX)
Connection mode	Network
Protocol	ProfiNet I/O
Configuration	XML file ‚GSDML-xxx-Sartorius-PR5230-xxx.xml'
Cable	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: Z10006 Report: PN005-1, 12.02.2007.

Potential isolation	Yes
Dimens. (LxWxH)	87 x 55 x 15mm
Weight	125 g

Note: The IP-Address and the Subnet-Mask are set at Fieldbus parameter (see also Chapter 5.6.5 and 9).

The XML file is stored on the CD (directory 'Fieldbus' of the according instrument) supplied with the unit. The current file is also available for download via the Internet: http://www.sartorius-mechatronics.com [Downloads].

4.4.8.1 Status Display

Requirements

In Setup-[Display items] the items are configured, see Chapter 5.6.7.

In Info-[HW-Slots] PR 1721/46 is selected.

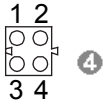
Display

	1	2	3	4
LED	---	---	---	---

4.4.8.2 LEDs on the fielbus card

Watchdog LED ③			Meaning
Frequency		Color	
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	Check error in ASIC and FLASH ROM, module is defect.

LEDs

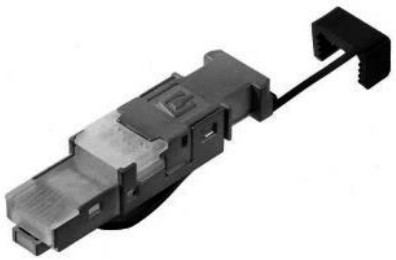


LED 1	LED 2	LED 3	LED 4
Lit **- - -**: No link or power off.	Lit **- - -**: Offline, no connection.	Lit **- - -**: No function.	Lit **- - -**: No power or not initialized.
Lit **grn**: Link established.	Lit **grn**: Link established and online connected.		Lit **grn**: Initialized, no error.
Flashing 1 Hz **grn**: Receiving/Transmitting data.	Flashing 1 Hz **grn**: Online, no connection.		Flashing 1 Hz **grn**: Diagnostic data available.
			Flashing 2 Hz **grn**: Engineering tool to identify is active.
			Flashing 1 Hz **red**: Configuration error.
			Flashing 3 Hz **red**: No station name, no IP address
			Flashing 4 Hz **red**: Internal error.

Legend

---	off
red	red
grn	green

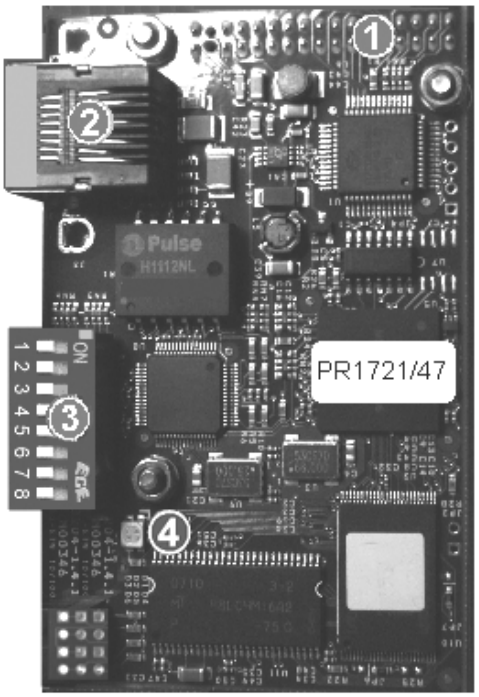
4.4.8.3 Connection



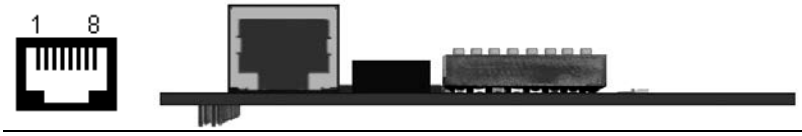
- Take the cable (e.g. patch cable CAT5) into the instrument through the metal sleeve of the cable gland, strip the insulation and mount the delivered RJ-45 plug (see mounting informations).
- Put the RJ-45 plug into the RJ-45 connecting socket of the fieldbus card.
- Tighten the cable gland of the instrument.

4.4.9 PR 1721/47 EtherNet-IP Interface

The EtherNet/IP interface PR 1721/47 is a plug-in card for mounting in slot 2, see Chapter 4.4.1. The card is fitted with a standard RJ-45 socket for Ethernet connection and contains a powerful TCP/IP and EtherNet/IP connecting circuitry with transfer rates of 10 and 100 Mbits/s.



Internal connection	34- pin connector on flat cable for slot 2 ❶
External connection	RJ-45 connecting socket ❷



Transfer rate	10 Mbit/sec and 100 Mbit/sec Autodetection (10/100, HalfDX/FullDX)
Connection mode	Network
Protocol	EtherNet-IP
Configuration	EDS file ‚sag_5230_ethernetip.eds'
Cable	Twisted pairs, screened e.g. patch cable CAT5 Autolink (straight or crossover)
Cable impedance	150 Ω
Cable length to HUB	Max. 115 m

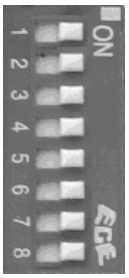
Potential isolation	Yes
Dimens. (LxWxH)	87 x 55 x 15mm
Weight	125 g

Certificate	EtherNet-IP Specification ODVA File No. 10286 Test Date: 06.09.2005 Vendor ID 90 See also: www.odva.org Tested according to: CE, UL & cUL

Note: The IP-Address and the Subnet-Mask are set at Fieldbus parameter (see also Chapter 5.6.5 and 9).

The EDS file is stored on the CD (directory 'Fieldbus' of the according instrument) supplied with the unit. The current file is also available for download via the Internet: http://www.sartorius-mechatronics.com [Downloads].

4.4.9.1 DIL Switch



❸

Caution!

The DIL switch settings will not be used.

Make sure that the switches 1...8 are set to position 'OFF'!

Settings will be done in the menu [Setup]-[Network Parameter].

4.4.9.2 Status Display

Requirements

In Setup-[Display items] the items are configured, see Chapter 5.6.7.

In Info-[HW-Slots] PR 1721/47 is selected.

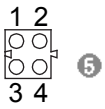
Display

	1	2	3	4
LED	---	---	---	---

4.4.9.3 Status-LEDs on Fieldbus Card

Watchdog LED ③			Meaning
Frequency		Color	
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	Check error in ASIC and FLASH ROM, module is defect.

LEDs

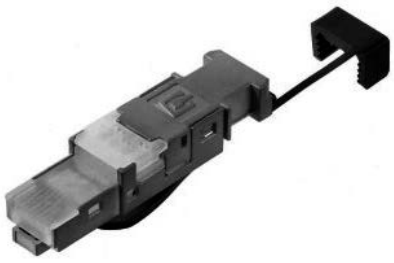


LED 1	LED 2	LED 3	LED 4
Lit **– – –**: No link.	Lit **– – –**: No power.	Lit **– – –**: No function.	Lit **– – –**: No power or no IP address.
Lit **grn**: Connection established.	Lit **grn**: Controlled by a scanner.		Lit **grn**: Online, connection established.
	Flashing **grn**: Not configured or scanner in idle state.	Flashing **grn**: Packet is received or transmitted.	Flashing **grn**: Online, no connection established.
	Lit **red**: Major unrecoverable fault.		Lit **red**: IP Address double, fatal error.
	Flashing **red**: Minor recoverable fault.		Flashing **red**: Connection timeout.
	Alternat. **red/grn**: Self test in progress.		Alternat. **red/grn**: Self test in progress.

Legend

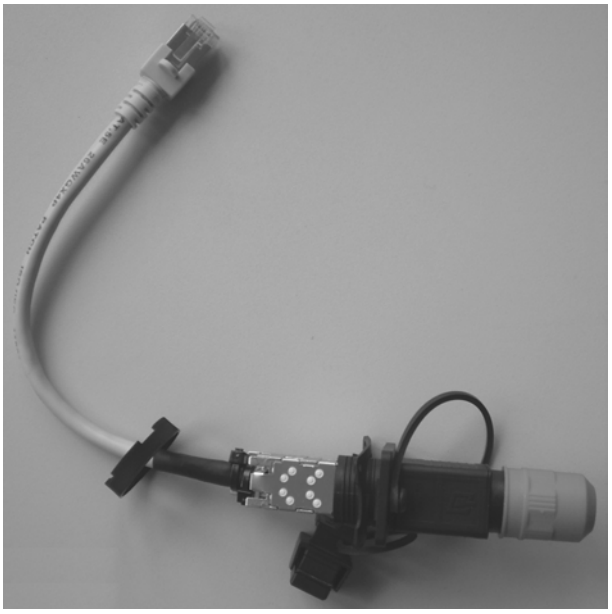
---	off
red	red
grn	green

4.4.9.4 Connection



- Take the cable (e.g. patch cable CAT5) into the instrument through the metal sleeve of the cable gland, strip the insulation and mount the delivered RJ-45 plug (see mounting informations).
- Put the RJ-45 plug into the RJ-45 connecting socket of the fieldbus card.
- Tighten the cable gland of the instrument.

4.4.10 PR 5230/30 Ethernet Socket



For the Builtin Ethernet interface only!

4.4.11 PR 5230/31 Ethernet Cable

For the Builtin Ethernet interface only!

5 Commissioning

The control and display assignment is described in Chapter 2.3.

5.1 Data Protection/Power Failure

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 (CAL switch, see Chapter 5.1.1).

Clock and calendar continue running in the event of a power failure.

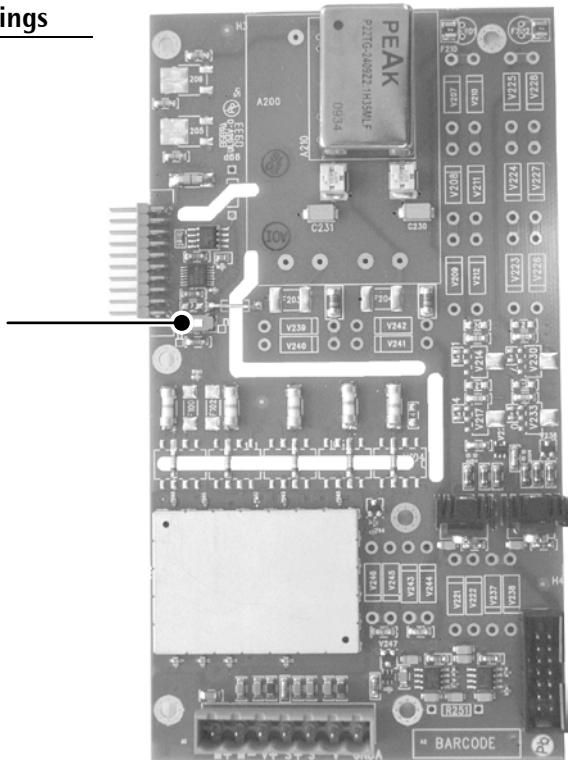
5.1.1 CAL Switch

The CAL switch is located on the weighing electronics board. Generally, we recommend setting the switch into the closed position after calibration to prevent accidental overwriting/data loss.

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

Note: If the weighing electronics board has been changed after calibration or the device is not calibrated the weight value display will show 'E:BadDev' if the CAL switch is closed.

Status	Indication	Switch settings
[opened]	Weight value normal	
[closed]	Weight value invers	



To view the position of the CAL switch, select Info-[Show status]:

Info/Status	
Free system RAM	5480 of 15204 kb
Cal-Switch	opened
Builtin RS232	no signal

[opened] = opened; no write protection

[closed] = closed; write protection is active

5.2 Switching on the Instrument

The instrument can be put into operation and calibrated using a notebook/PC with the VNC program (on the enclosed CD) and an Internet Browser.

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

PR 5230	The instrument type is displayed (PR 5230)
	BIOS version
	Firmware version
	Automatic display test
	Weight display
E:Sense	Error message, if no load cells are connected (see also Chapter 15.1).
E:NoCom	Error message, if there is no communication with xBPI scale (see also Chapter 15.3).

When switching on the first time, the date and time must be set, select Setup–[Date&Time]:

Setup/**Clock**	
Date	**2009-08-18**
Time	**11:24:53**

5.3 Configuration and Calibration

There are following possibilities:

- with VNC viewer (on the enclosed CD-ROM), see Chapter 5.3.4.
- with an Internet Browser (‚Microsoft InternetExplorer' or ‚Mozilla Firefox Webbrowser'), see Chapter 5.3.5. The prerequisite is an installed and activated Java (Sun) 'applet'.

5.3.1 Connecting the Device to the Network and Finding out the IP address

The DHCP server is active in the network

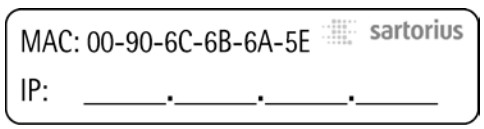
An IP address is assigned to the device automatically.

The DHCP server is not active in the network

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!**

IndikatorBowser

The IP address can be found out using the 'IndicatorBrowser' (supplied on CD-ROM) and via the 'host name' of the device (see also Chapter 5.3.3). 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 fitted inside the door of the instrument.



Hostname: PR5230-6B6A5E

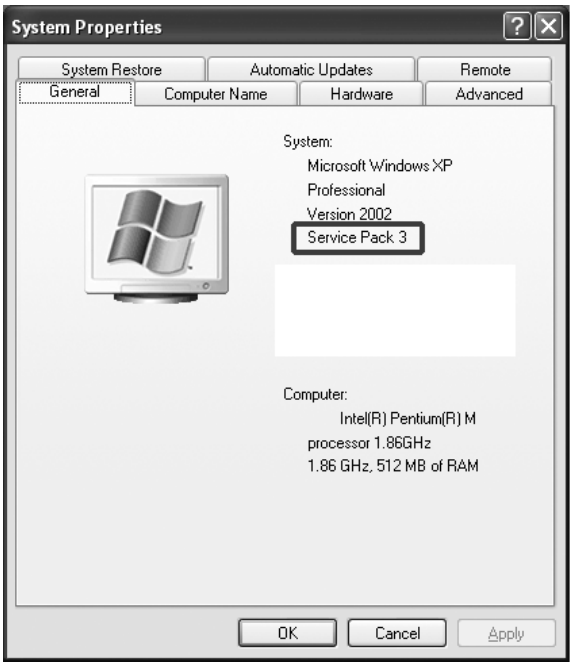
UPnP view with Microsoft Windows XP

The IP address can be found out also using the 'Microsoft InternetExplorer' under 'Network', if the 'UPnP' view is switched on (default: off).

Procedure:

1. Click 'Start' -> 'Control Panel' -> 'System'.

The display shows:



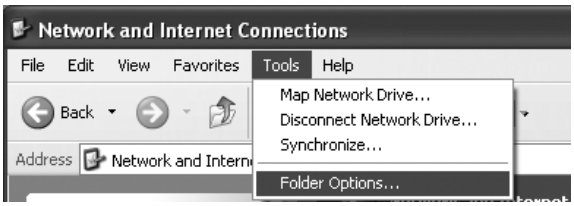
Note:

At least 'Service Pack 2' or higher must be installed.

2. Click ‚OK'.

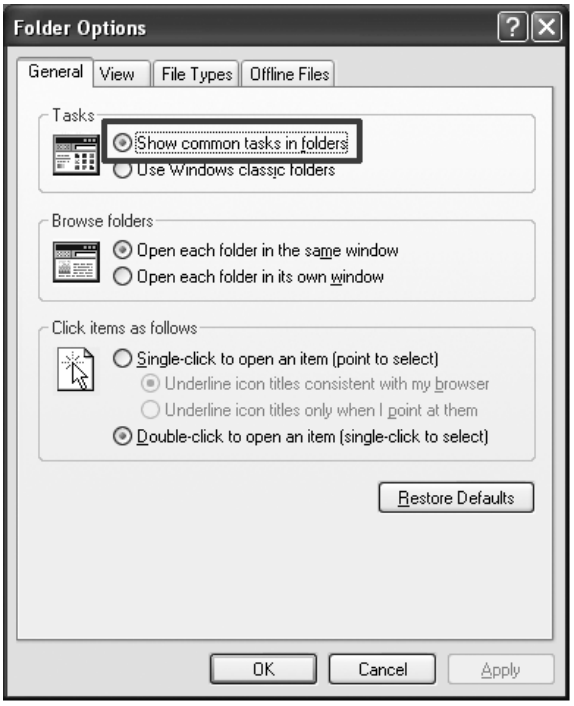
3. Double-click the icon for the network environment on the 'desktop'.

The display shows:



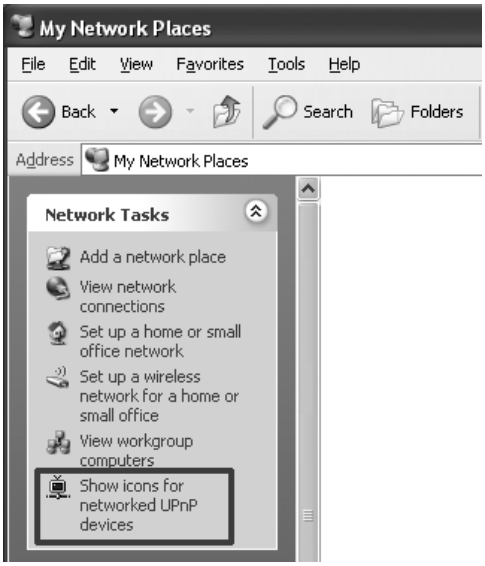
4. Click menu item 'Tools' -> 'Folder options...'.

The display shows:



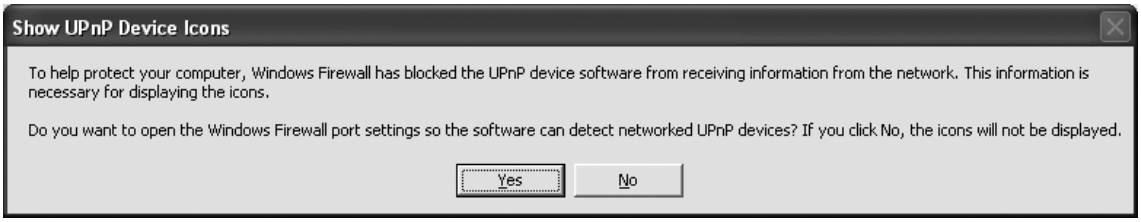
5. Click item 'Show common tasks in folders'.

6. Click ‚OK'.



7. Click item 'Show icons for networked UPnP devices' in window 'Network Tasks' under 'My Network Places'.

The display shows:



8. Click ‚Yes'.

The icons for the devices are displayed.

9. Click the relevant icon with the right mouse key and select menu item 'Properties'.
10. Read the IP address.

UPnP view with Microsoft Windows 7

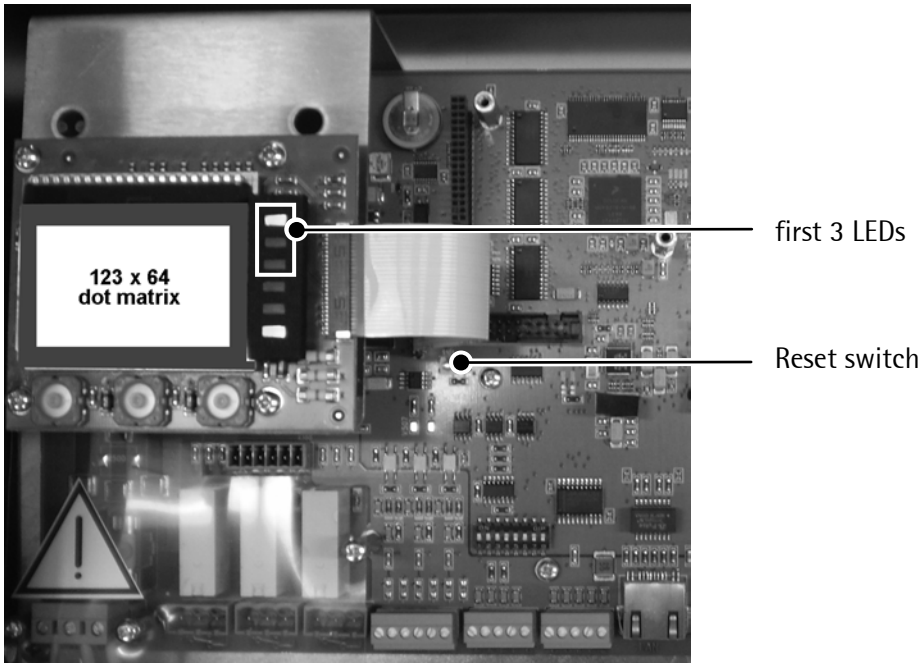
The device icons are displayed automatically under 'Network'.

5.3.2 Resetting the Network Address/Activating Network ‚DHCP'

The instrument can be reset using a round-headed pin with a diameter of approx. 2.0 mm.

The instrument is re-started by a short-time actuating of the reset switch (function like switch-off/-on).

Pressing the reset switch during a long time (wait until the 3 upper LEDs are lit simultaneously) resets the network settings to default/factory settings.



That means:

- 'DHCP' is activated.
- 'Host name' is initialized e.g. PR5230-**6B6A5E** (instrument type-**MAC ID**).

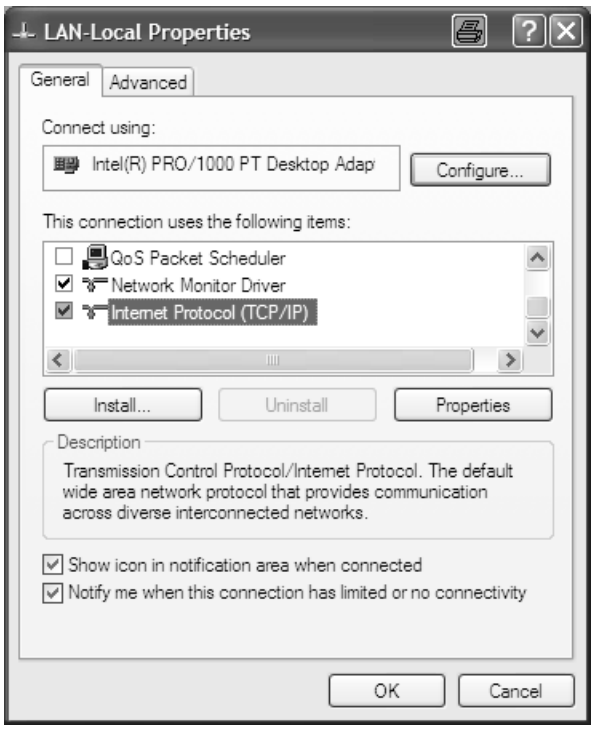
  Example of MAC ID: 00-90-6C-**6B-6A-5E**

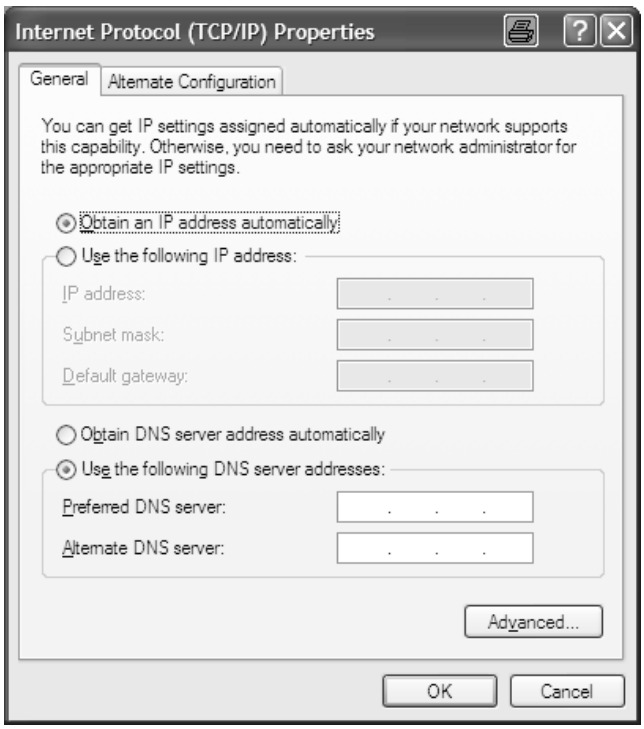
This ensures that a valid address for identification of the instrument in the network can be assigned to the instrument, see Chapter 5.6.6.

Note: The last 3 bytes of the MAC ID are displayed. A label with the complete MAC ID is fitted to the outside of the device.

An device set to 'active' DHCP (default/factory setting) and connected to an IT network (company network) with a DHCP server does not require further actions except for a **2...3-minute waiting time**. Subsequently, a network connection is established automatically (device <-> workstation/PC).

Temporarily connected notebooks/PCs must have the following network adaptor properties (DHCP/DNS automatic):





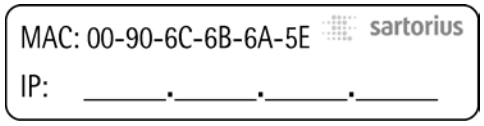
PR 5230 can be operated only, if a Notebook/PC is connected!

For commissioning, the first network contact is possible only by finding the IP address/subnet mask under DHCP 'on' (factory setting) automatically.

5.3.2.1 MAC ID

The MAC ID or (6-digit) hardware address, e.g. 00-90-6C-**6B-6A-5E**, is a unique number for identification of any network adaptors.

A label with the complete MAC ID is fitted inside the instrument door.



Due to the last 3 bytes, the initialized host name is always unique.

5.3.2.2 DHCP

Normally, DHCP servers are provided only in IT-supported company networks and not on locally (directly) connected notebooks/PCs.

Nevertheless, 'DHCP' must be activated on the notebook/PC. The 'DHCP' devices find each other because they fall into a so-called 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).

Caution!

When connecting the IT/DHCP network cable temporarily from the Notebook/PC to a device, the DHCP server is lost and the Notebook/PC returns to the auto-IP address within approx. 2 minutes.

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

Example

If the search time is exceeded (due to the result 'no server found'), the PR 5230 is provided with an IP address (e.g. 169.254.0.123) automatically. The same applies to the Notebook/PC (e.g. 169.254.0.54). These IP addresses are different on both sides:

- equal regarding the first 3 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.)

5.3.2.3 Host Name (device name)

With DHCP applications, this must be a unique name.

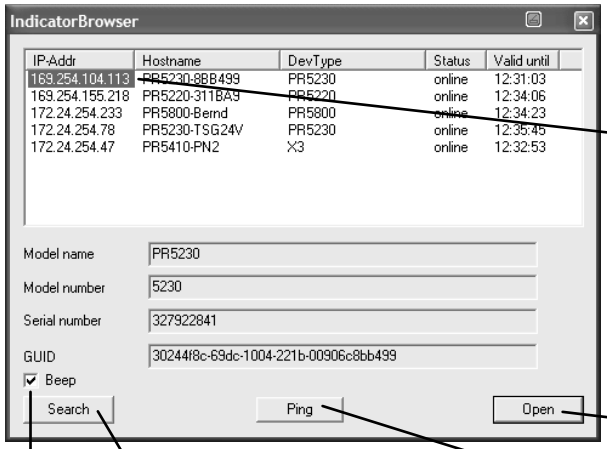
If own names are defined (host name is editable)

- the same host name must not exist twice within the network ID.
  Correct is e.g. host name device 1: PR5230 scale1, device 2: PR5230 scale2
  Always correct is the 'default' with PR5230-6B6A5E, whereby the last 3 bytes of the MAC-ID are unique.
- there is a limitation to 2...24 characters.
  Permitted are
  - letters A...Z, a...z
  - digits 0...9, which must not be the first or last character
  - character "-", which must not be the first or last character

5.3.3 Searching the Instrument in the Network with 'Indicator Browser'

The address can be determined using the 'Indicator Browser' program (on the enclosed CD-ROM).

Install and start the 'IndicatorBrowser'.



The 'IndicatorBrowser' searches within the current network ID, e.g. 169.254. and 172.24., on all available network adaptors in the PC (several possible/recommended, e.g. LAN global/LAN local)

Result:
List of all connected devices with status:
search??? – online - byebye – lost???

Click the button to open the 'standard' web browser, e.g. Microsoft InternetExplorer, directly with the marked IP address.

Click the button to localize the associated device.
Short-term visual response of the device:
Flashing background of the display.

Click the button
to re-start the network search run.
Waiting 2...3 minutes is essential!

Acoustic signal for each device that was found 'online'.

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

Note: Only certain Sartorius devices are supported by the 'indicator browser'!

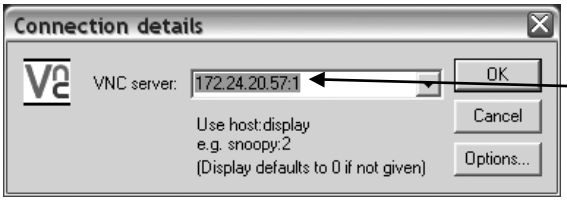
5.3.4 Operation Using the VNC Program

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

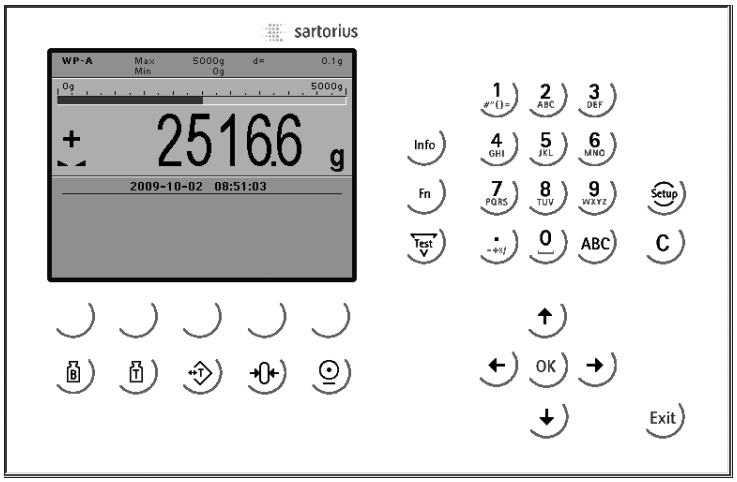
The program distinguishes between the VNC server and VNC client (viewer). The server program is part of the instrument software. The client program (viewer) must be executed on the notebook/PC to be used for operating the instrument.

Caution!

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



For direct operation using the VNC program, the IP address (extended by :1), must be specified when you run the program;e.g 172.24.20.57:1.



The address range of the controlling notebook/PC can be limited in the instrument; see Chapter 5.6.6.

The operator interface of the VNC program appears.

Note: Instead of the VNC viewer, the web browser, e.g. Microsoft InternetExplorer, ‚Mozilla Firefox Webbrowser' etc., can be used directly.

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

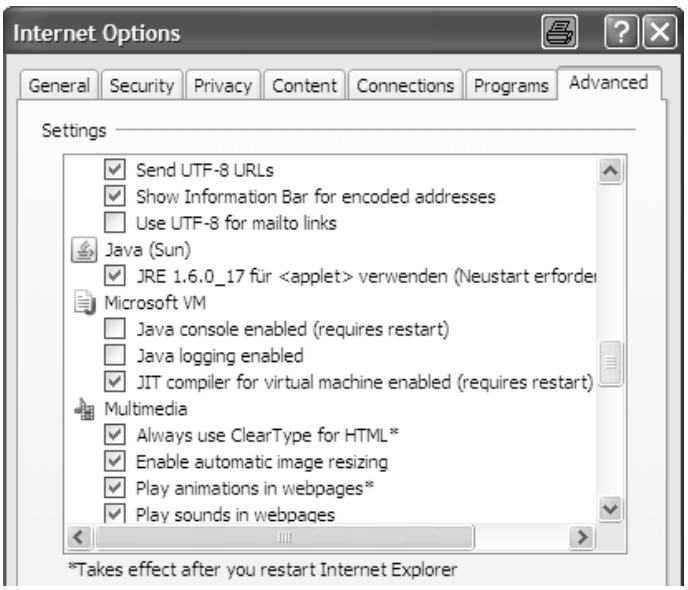
In addition to VNC, this includes:

- easy operation for back-up/restore
- easy operation for analysis
- easy operation for printing/data of the entire device configuration, see page 102.

5.3.5 Operation Using InternetBrowser

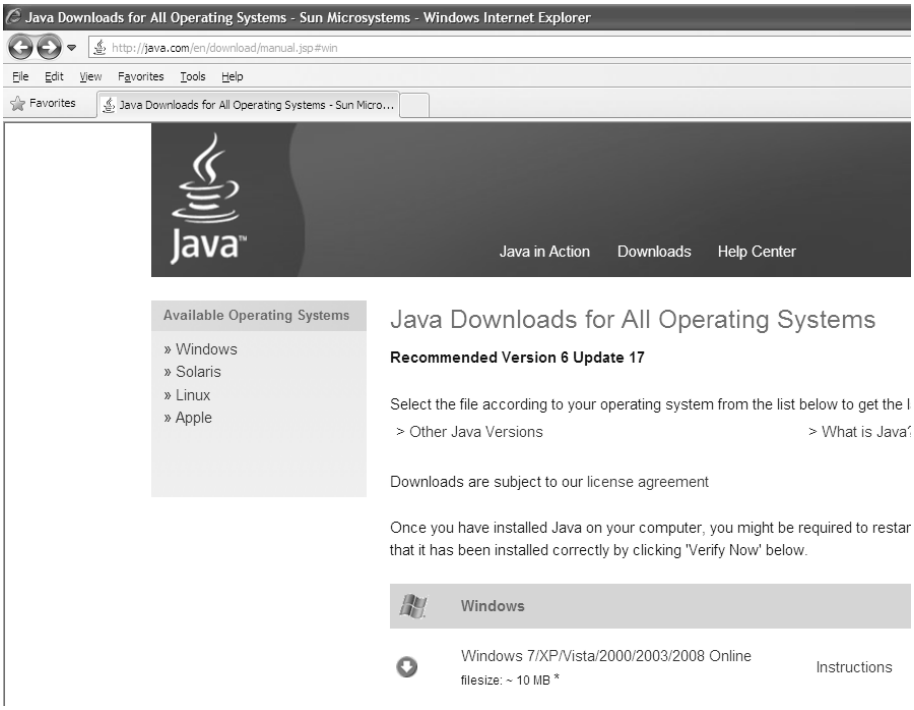
Example: Microsoft InternetExplorer under Windows XP

With Internet Explorer, check if the required Java (Sun) 'applet' is installed and activated.



- Start the Internet Explorer
- Click [Tools] – [Internet Options...].
- Click the [Advanced] tab.
- [Java (Sun)]: Check whether entries are provided.
- If so, check ☑ with [IRE 1.6.xxx ...] (not activated by default).
- If no entries are provided, load 'Java (Sun) applet' as freeware from the Internet and install it.

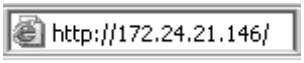
Note: In earlier Windows installations, Java was provided as standard, but not activated

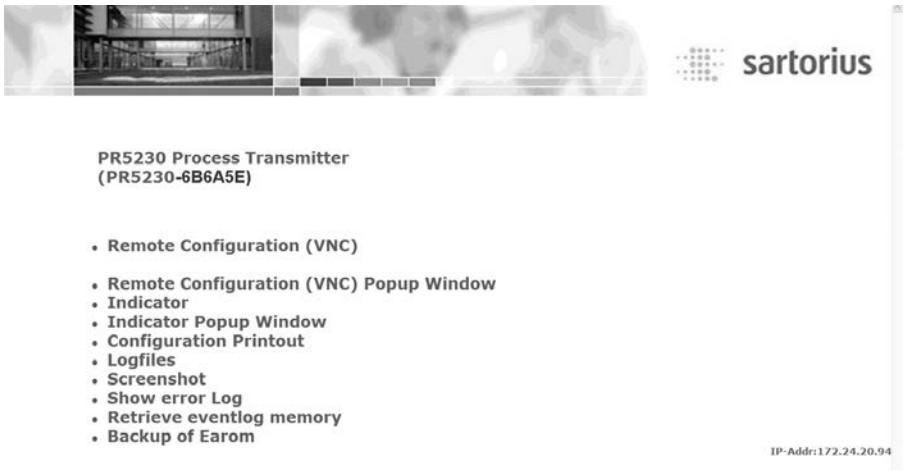


Example: Microsoft InternetExplorer under Windows 7

With InternetExplorer, check if the required Java (Sun) 'applet' is installed.
If it is not installed, the link for a 'Java' download is suggested automatically.

With the Internet browser, the [IP address] must be entered.

Example: 



The menu appears on the monitor. The line in brackets below the header corresponds to the device name specified in [Hostname].

[Remote Configuration (VNC)], [Remote Configuration (VNC) Pop up Window]

For instrument operation using the VNC program without additional installation of VNC, see page 101.

[Indicator], [Indicator Pop up Window]

The weight value is displayed with the unit and status symbols.

[Configuration Printout]

Can be used for printing the configuration data as a text file, see Chapter 11.

[Logfiles]

Display of log files, see Chapter 5.11.

[Screenshot]

Device display for saving the display.

[Show error Log]

Display of the error logs, see Chapter 15.7.

[Retrieve eventlog memory]

Displaying the event log (see Chapter 5.11.

[Backup of Earom]

Saving and restoring the configuration and calibration data (see Chapter 5.13).

5.3.6 Function INFO

When you press Info the program releases and status messages are displayed. The Info key also has other functions; see Chapters 5.4.1.1 and 5.4.9.

Info
Show version
Show status
Show HW-slots

When you select [Show version], the installed program releases and the board number are displayed:

Info/Version		
Firmware	Rel. 03.00.00.00000 2011-10-10 11:11	Firmware release and creation date
Application	Rel. 01.20.05 2010-11-11 11:11	Application release and creation date
Bios	Rel 02.00.00.00000 2010-11-11 11:11	BIOS release and creation date
Boardnumber	327923612	Main board identification number (different from the device serial number)

When you select [Show status], instrument status information is displayed:

Info/Status		
Free system RAM	5328 of 15204 kb	
CAL-Switch	opened	opened = CAL switch is open, closed = CAL switch is closed.
Builtin RS232	no signal	

When you select [Show HW-slots], the installed plug-in cards are displayed:

Info/HW-Slots		
Builtin	RS485	Firmly installed serial interface
Builtin	RS232	Firmly installed serial interface
Builtin	analog out	Optional interface (Slot 1, B1*)
Builtin	digital i/o	Firmly installed digital interface
PR1721/41	ProfiBus-DP	Only field bus cards (Slot 2, B2*)
PR5230/xx	ADC	For weighing electronics board (W1 or WE1)

When selecting ‚PR5230/xx', factory serial number and production date are displayed:

Serial No 30252 00055
Prod.date: 2010-04-26 13:48:30

5.3.7 Setup Function (VNC)

Press Setup to configure the main operating parameters. The configuration depends on the application licenses registered and the plug-in cards installed.

Calibration is in a simple dialogue. Compliance with the relevant (verification) standards must be checked by the person commissioning the instrument or the verification officer. To protect the calibration data from overwriting, close the corresponding CAL switch on the weighing electronics board. On legal-for trade instruments, the CAL switch must be sealed in the closed (write-protected) position; see Chapter 5.1.1.

5.3.8 Setup Menu (VNC)

Setup

- Serial ports parameter	
- Printer	<none>, Builtin RS232, Builtin RS485
- Param	Assigned to, Protocol, Baudrate, Bits, Parity, Stopbits, output mode
- Config	See 'Printing parameter'.
- Remote display	<none>, Builtin RS232, Builtin RS485
- Param	Assigned to, Protocol, Baudrate, Bits, Parity, Stopbits, Mode
- JBUS/MOD-Bus	<none>, Builtin RS232, Builtin RS485
- Param	Assigned to, Protocol, Baudrate, Bits, Parity, Stopbits, Slave, Modbus mode
- SMA	<none>, Builtin RS232, Builtin RS485
- Param	Assigned to, Protocol, Baudr., Bits, Parity, Stopbits
- xBPI-Port	<none>, Builtin RS232, Builtin RS485
- Param	Assigned to, Baudrate, Bits, Parity, Stopbits
- Asycom	<none>, Builtin RS232, Builtin RS485
- Param	Assigned to, Protocol, Baudr., Bits, Parity, Stopbits, Slave
- Date & Time	Change date and time
- Operating parameter	
- Address	Address of the instrument
- PIN	Access code for setup.
-Sequencenumber	Counter for print jobs
- Set Tare Key	Tare& reset tare, tare&tare again, disabled
- Set Zero Key	Only when not tared, reset tare on zeroset, disabled
- Printing parameter	
- Printing mode	Print selected items, via Nice Label
- Printing interval	Print interval
- Printing interval unit	Select: Seconds, Minutes, Hours, Meas. time
- Print layout Item 1...6	Select: -none-, Grossweight, Net weight, Tare weight, Date & Time, Sequencenumber, CR/LF, Device address, displayed weight, Form feed
- Fieldbus parameter	Fieldbus protocol (read only), only if PR 1721/4x is installed in Slot 2, see Chapter 5.6.5.
- Network parameter	HW Address (read only), Hostname, Use DHCP, IP address, Subnet mask, Default gateway, Remote access VNC-Client

- Weighingpoint	<Internal A>, xBPI-Scale
- Calib	‚Internal A' selected: New, Modify, Param, see Chapter 5.3.8.1.
- Setup	‚xBPI-Scale' selected: Calibration, Configuration, Select, Show device info, see Chapter 5.3.8.2
- Config	‚xBPI-Scale' selected: Type, W&M, Tare timeout, Serial number, SBN Address, see Chapter 5.3.8.2
- Param	‚xBPI-Scale' selected: Assigned to, Baudrate, Bits, Parity, Stopbits, see Chapter 5.3.8.2
- Display items 1...10	Indicator displayed value; more menu items see Chapter 2.3.1.1
- Limit parameter	
- Limit 1/2/3 on/off	Limit 1/2/3 'on'/ 'off', Action, Condition, see Chapter 5.7
- Digital I/O parameter	
- Output 1/2/3	Configuring outputs; see Chapter 5.8.1.
- Input 1/2/3 on/off 3	Configuring inputs; see Chapter 5.8.2.
- Analog output parameter	Configuring outputs; see Chapter 5.10.

5.3.8.1 Weighingpoint ‚Internal A'

- Calibration	Calibration of weighing electronics
- New	
Reset Span and dead load	Contin, Cancel
- Max	0.00001 ...<3000>... 999999 <kg>, t, lb, g
- Scale interval	<1>, 2, 5, 10, 20, 50
- Dead load at	<0.000000 mV/V> or [by load]
- Max at	<1.000000mV/V> or [by load]
by load	0.00001 ... 999999 <kg>, t, lb, g
- Calibrated at	(Display only)
- Sensitivity (µV/d)	(Display only)
- Test	Determine test value
Exit calibration	Save or cancel changes
- Modify	Only for minor modifications/ setting new dead load, otherwise [New]
see New	
- Param	
- Measuretime	5 ms, 10, 20, 40, 80, 160, <320>, 640, 960, 1280, 1600ms
- Digital filter	<off>, Bessel, aperiod., butterw., tscheby.
- External supply	<8 -12 VDC>, below 8 VDC
- * Fcut	Cut off frequency, *only unless filter 'off', 0.1 - 80.0 Hz
- Test mode	<Absolute>, relative
- W & M	<none>, OIML (cannot be selected, if 'Range mode: Multi-interval' has been selected or Max has more than 3 decimals), NSC, NTEP
- Standstill time	0.01 s…<0.50 s> ... 2.0 s (range is dependent on response time)
- Standstill range	0.00 d ... <1.00 d> ... 10.00 d
- Tare timeout	0.1 s ... <2.5 s> ... 25 s, timeout due to instability
- Zeroset range	0.00 d ... <50.00 d> ... 10000.00 d
- Zerotrack range	0.00 d ... <0.25 d> ... 10000.00 d
- Zerotrack step	0.00 d ... <0.25 d> ... 10.00 d
- Zerotrack time	<0.0 s> ... 25 s
- Overload	0 d ... <9 d> ... 999999 d
- Min	0 d ... <50 d> ... 999999 d, minimum weight
- Range mode	<Single range>, multiple range, multi-interval (not if OIML selected)
- * Range limit 1	In weight, unit same as Max, transition from small to medium scale interval
- * Range limit 2	In weight, unit same as Max, transition from medium to high scale interval
* only for multiple range or multi-interval	
- View(when CAL switch 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)

5.3.8.2 Weighingpoint ‚xBPI-Scale'

- Setup	
- Calibration	
- Dead load	
- Set	Accept, ResError, Abort
- Delete	Accept, ResError, Abort
- SPAN	
- Adjust with user weight	
- Adjust with auto weight	
- Adjust with default weight	
- Adjust with intern weight	
- Linearity	
- Default	Accept, ResError, Abort
- User	Accept, ResError, Abort
- Configuration	
- Weighing parameters	
- Ambient conditions	Very stable, stable, unstable, very unstable
- Application filter	Final readout, Filling mode, low filtering, w/o filtering (without)
- Stability range	0,25 digit, 0,5 digit, 1 digit, 2 digit, 4 digit, 8 digit
- Stability symb. delay	no delay, short delay, average delay, 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.user.wt., confirm preload, delete preload, adjust disabled
- Confirming adjust.	manual, automatically
- Zero range	1% of max load, 2% of max load, 5% of max load, 10% of max load
- Power-On zero range	2% of max load, 5% of max load, 10% of max load, 20% of max load
- Power-On tare/zero	active, inactive, only for zeroing
- Measure rate	normal output, fast output
- Calibration check	calibration prompt, off
- External adjustment	accessible, blocked
- Application settings	
- Application Tare	accessible, blocked
- Number of units	1 weight unit, 2 weight units, 3 weight units
- Weight unit 1	Gramm [g], Kilogram [kg], Carat [ct], Pound [lb], Unze [oz], Troy unze [ozt],
- Weight unit 2	Tael Hongkong [tlh], Tael Singapur [tls], Tael Taiwan [tlt], Grain [GN],
- Weight unit 3	Pennyweight [dwt], Milligramm [mg], Parts/pound [/lb], Tael china [tlc], Momme [mom], Karat [k], Tola [tol], Baht [bat], Mesghal [m], Ton [t]
- Display accuracy 1	all digits, reduced when moved, one level lower, two level lower,
- Display accuracy 2	three level lower, 1%, 0.5%, 0.2%, 0.1%, 0.05%, 0.02%, 0.01%,
- Display accuracy 3	Multi-interval, increased by 10

- Setup	
- Configuration	
- 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
- Stop bits	1 stop bit, 2 stop bits
- Handshake	Software handshake, CTS with 2 chr.pau, CTS with 1 chr.pau
- Print in weigh mode	on requ always, on requ when stab, on requ with store, auto without stable, 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
- Select specification group	
- Specif. group 1 ...6	see Operating Instructions of the relevant scale
- Show device info	
- Set user	User name of the unit
- Set SBN	The xBPI address of the interface has to be <0 >, because there is no bus mode.
- Config	
- Type	xBPI-Scale
- W&M	<none>, OIML, NSC, NTEP
- Tare timeout	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 mode.
- Param	
- Assigned to	xBPI-Port
- Baudrate	<9600>, 19200
- Bits	8
- Parity	odd
- Stopbits	<1>, 2

5.4 Calibration of the Internal Weighing Point

Calibration using weights, mV/V or load cell data can be done using the VNC program. During calibration, the instrument must be set to gross weight display (reset tare, if necessary).

For a 'legal-for-trade' application, set the mode under Setup-[Calibration]-[Param] to [W&M] before starting calibration; see Chapter 5.4.13.1.

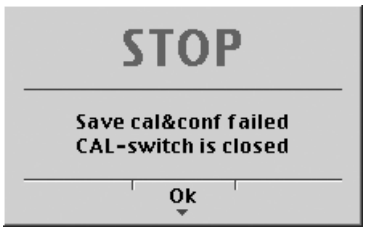
Select [New] to go to the maximum capacity [Max] (see Chapter 5.4.3); select the scale interval and determine the dead load.

Now calibrate the maximum capacity by applying a calibration weight, in mV/V or with load cell data.

After determining the test value, the menu can be closed as described in Chapter 5.4.12, in order to save the new settings.

Calibration data can be protected by the CAL switch (see Chapter 5.1.1), which must be sealed in the closed (write-protected) position for 'legal-for-trade' applications.

5.4.1 Displaying Calibration Data



When the CAL switch is closed, the following message is displayed, only data display possible with [Param]:

With [View], the calibration data can be displayed, but not changed.

WP A/**View Calibration**			
Max	3000 d	3000 kg	Number of scale intervals and max. capacity
Scale interval	3000 d	1 kg	Scale interval
Deadload at	0.00 kg	0.000000 mV/V	Dead load in weight and mV/V
Max at	3000.00 kg	1.000000 mV/V	Weight and mV/V for maximum capacity
Calibrated at	3000.00 kg	1.000000 mV/V	Test load* and corresponding mV/V
Sensitivity	833.33 cnts/d	4.000000 µV/d	Number of internal counts and voltage per scale interval
Param			

The calibration data and parameters (press [Param]) are displayed in the format entered/determined during calibration.

* After input with mV/V, the maximum capacity and the mV/V value entered are displayed.

5.4.1.1 Increased Resolution (10-Fold)

In the Setup-[Calibration] menu, the weight is displayed with 10-fold resolution (also with the CAL switch closed) when you press the key Info, and marked as an invalid weight with ⚠ above the weight unit. The display on the instrument remains unchanged. After 5 s, the VNC display returns to normal resolution or you can press the key ↓ to return to normal display immediately.

5.4.2 Selecting the Calibration Mode

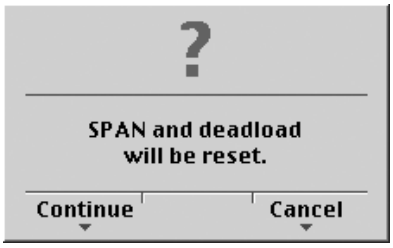
You can choose between [New] and [Modify]:

New	Modify	Param		

5.4.2.1 New Calibration

Open the menu via Setup-[Weighingpoint]-[Calib].

When you press [New], the data is set to default first and calibration is started.



You are prompted to confirm:

Press [Continue] for the default settings, or [Cancel] to cancel the selection.

Default settings with [New]:

Weighingpoint/WP A/**Calibration**		
Max	**3000 d**	**3000 kg**
Scale interval	3000 d	1 kg
Deadload at		0.000000 mV/V
Max at		1.000000 mV/V
Not calibrated		
Sensitivity	833.33 nV/d	4.000000 µV/d
		CalcTest

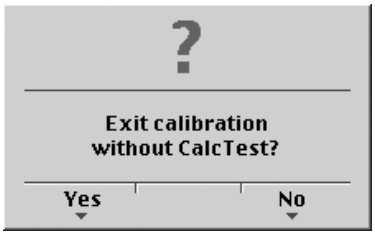
5.4.2.2 Modify Calibration

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]!

Open the menu via Setup-[Weighingpoint]-[Calib]-[Modify].

WP A/**Calibration**		
Max	3000 d	3000 kg
Scale interval	3000 d	1 kg
Deadload at	1.07 kg	0.000358 mV/V
Max at	3000.00 kg	1.000000 mV/V
Calibrated with mV/V	3000.00 kg	1.000000 mV/V
Sensitivity	833.33 cnt/d	4.000000 µV/d
by load	by mV/V	CalcTest

For setting a new value for Dead load, press ↓/↑ to select [Deadload at] and either enter a new mV/V value with [by mV/V] or discharge the scale/hopper and press [by load].



When closing the menu with Exit you are prompted whether the menu should be closed without calculation of the test value:

Reply [Yes] to close the menu.

5.4.3 Determining the Maximum Capacity [Max]

The maximum capacity (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 (nominal capacity * number of load cells).

Permissible values are:

Max weight value from 0.00010 to 999999, with ABC in kg, t, g, mg, lb or oz

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

Note: If the liniarization is active (see Chapter 5.4.10):
After selection of the line ‚Max at' the following tip is displayed:

Can not be changed here while linearization is active

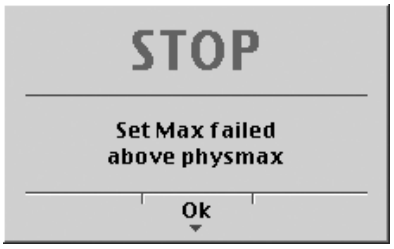
Weighingpoint/WP A/**Calibration**		
Max at	3000 d	3000 kg

The weight unit can be changed from kg into t, g, mg, lb or oz pressing ABC.

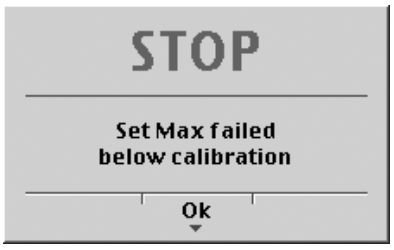
After pressing OK or ↓ confirmation of the change is displayed with:

Setting Max

Possible Error messages



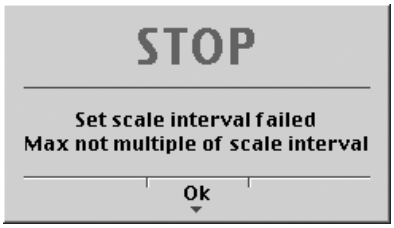
This message displays, if the maximum capacity is too high.



Subsequent changing of the maximum capacity is possible; if you decrease the capacity, a message is displayed if the new maximum capacity is lower than the test load ([Calibrated at]).

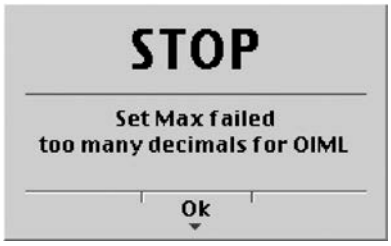
This message displays, if the selected resolution is to low, e.g. 5 kg.

The selected resolution is so high that less than 0.8 internal counts per scale interval (d) or 0.5 µV/e for legal-for-trade acc. to OIML/NSC are available.



This message displays, if the maximum capacity [Max] of the scale range (weighing range) is not an integer multiple of the scale interval.

Mass units don't match, e. g. subsequent change for [Max] from kg into lb.



This message is displayed, if during calibration

- [W&M]-[OIML] has been selected and
- a max. value with more than 3 decimals has been entered.

After you press [OK], the input value for the maximum capacity is canceled.

5.4.4 Determining the Scale Interval

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

With a legal-for-trade weigher, this value is called "verification scale interval", which corresponds to the scale interval:
d = e.

Example

Max = 3000 kg

Scale division = 1

Calculation (automatic):

d = Max / scale division

d = 3000 kg / 1 kg

d = 3000

Weighingpoint/WP A/**Calibration**			
Max	**3000 d**		**3000 kg**
Scale interval	**3000 d**	⇵	**1 kg**

The scale division 1, 2, 5 10, 20 or 50 can be set by pressing ←/→.

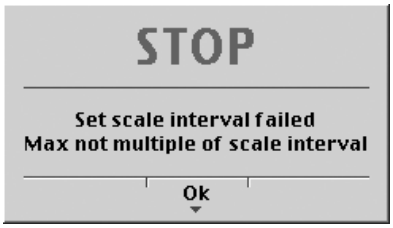
The scale interval [d] is calculated from the scale division and the Max weight value.

The weight unit is taken from [Max] and cannot be changed here.

The number of digits behind the decimal point has been determined already when entering [Max] as well.

After OK or ↓ confirmation of the change is displayed with:

Set Scale interval



This message displays, if the maximum capacity [Max] of the scale range (weighing range) is not an integer multiple of the scale interval.

5.4.5 Determining the Dead Load

Note: If the liniarization is active (see Chapter 5.4.10):
After selection of the line ‚Dead load at' the following tip is displayed:

Can not be changed here while linearization is active

Weighingpoint/WP A/**Calibration**			
Max	**3000 d**	**3000 kg**	
Scale interval	**3000 d**	**1 kg**	
Deadload at	**0.00 kg**	**0.000000**	mV/V
Max at	**3000.00 kg**	**1.000000**	mV/V
Not calibrated			
Sensitivity	833.33 d/mV	4.000000 µV/d	
by load	**by mV/V**		**CalcTest**

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

- discharge the scale/hopper.
- press [by load].

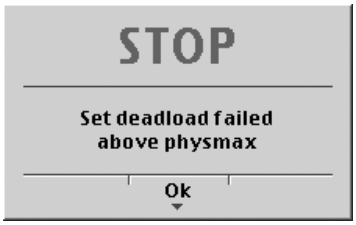
After OK or ↓ confirmation of the change is displayed:

Set deadload

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].

Weighingpoint/WP A/**Calibration**			
Max	**3000 d**	**3000 kg**	
Scale interval	**3000 d**	**1 kg**	
Deadload at	**0.00 kg**	**0.000000**	mV/V
Max at	**3000.00 kg**	**1.000000**	mV/V
Calibrated at	3000.00 kg	1.000000	mV/V
Sensitivity	833.33 d/mV	4.000000 µV/d	
by load	**by mV/V**		**CalcTest**

Possible error messages

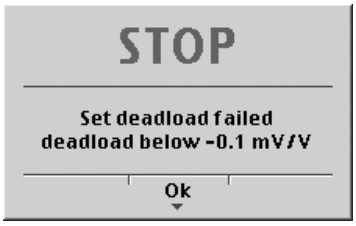


The dead load entered in mV/V plus maximum capacity in mV/V is higher than 3 mV/V (= 36 mV).

This message displays, if the scale is not stable.

Remedial action

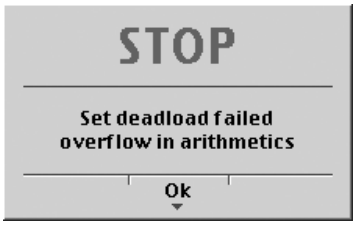
- Check the mechanical function of the scale.
- Adapt the filter setting; reduce the resolution, if necessary.
- Adapt the stability conditions.



This message displays, if the Measurement signal is negative when determining the dead load with [by load].

Cause

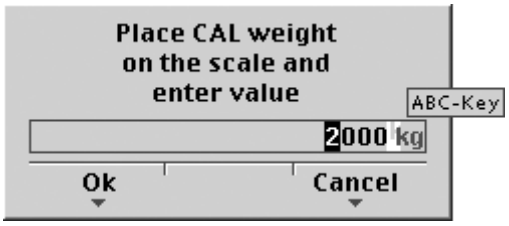
Load cells connected with wrong polarity or defective.



This message displays, if dead load entered in mV/V is higher than 5 mV/V.

5.4.6 Calibration with Weight [by load]

Select [by load] for calibration using weight.



The weight value for the calibration weight must be entered in separate window.

After applying the weight, enter the weight value and confirm with OK. The weight unit for the calibration weight (press ABC to change) may differ from the unit in the instrument; conversion is automatic.
Afterward, the following message is displayed:

Setting SPAN by load

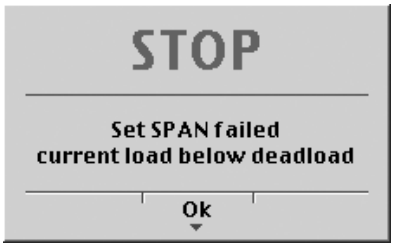
Weight value, weight unit and measuring signal in mV/V corresponding to this value are displayed in the [Calibrated at] line.

Weighingpoint/WP A/**Calibration**				
Max	3000 d	3000 kg		
Scale interval	3000 d	1 kg		
Deadload at	165.11 kg	0.057920		
Max at	3000.00 kg	1.052369		
Calibrated at	2000 10kg	0.701579		
Sensitivity	876.97	4.209600		
by load	by mV/V	by data	Linear.	CalcTest

This message displays, if the scale is not stable.

Remedial action

- Check the mechanical function of the scale.
- Adapt the filter setting; reduce the resolution, if necessary.
- Adapt the stability conditions.



This message displays, if the weight on the scale is less than the dead load after input of the weight value.

The next step is calculation of the test value with [CalcTest] (see Chapter 5.4.10), and calibration is completed with Exit (see Chapter 5.4.12).

5.4.7 Calibration with mV/V Value [by mV/V]

The scale can be calibrated without weights. During input of the load cell mV/V value, the acceleration of gravity at the place of installation can be taken into account. The STAR load cell data is based on the acceleration of gravity effective at Hamburg, Germany: 9.81379 m/s².**SPAN**

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

$$\text{SPAN [mV/V]} = \frac{\text{maximum capacity * load cell sensitivity Cn [mV/V]}}{\text{load cell capacity (nominal load * number of load cells)}}$$

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

5.4.7.2 Dead Load

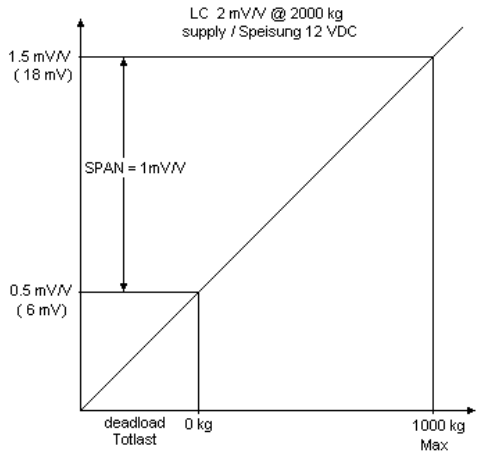
The input voltage in mV/V equivalent to the dead load can be calculated by using the dead load rather than the maximum capacity in the formula specified above.

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

Subsequent dead load correction (as described in Chapter 5.4.9) can be used for later re-determination of the dead load, when the scale/hopper is empty.

Example

- Load cell(s) with rated output C_n of 2 mV/V
- at nominal load of 2,000 kg
- dead load 500 kg
- load cell supply voltage 12 V DC



The calibration dialog provides an overview of all settings:

Weighingpoint/WP A/**Calibration**		
Max	**1000 d**	**1000 kg**
Scale interval	**1000 d**	**1 kg**
Deadload at	**500.00 kg**	**0.500000** mV/V
Max at	**1000.00 kg**	**1.000000** mV/V
Calibrated at	1000.00 kg	1.000000 mV/V
Sensitivity	2500.00 cnt/d	12.000000 µV/d

After selecting [mV/V], the values for the Max and for the dead load (if necessary) can be entered.

The next step is calculation of the test value with [CalcTest] (see Chapter 5.4.10).

The calibration is completed by pressing Exit (see Chapter 5.4.12).

5.4.8 Calibration with Load Cell Data (smart calibration)

If the scale is not 'legal for trade', calibration without weights can be performed. The easiest method is the one using load cell data without calculation [by data].

Weighingpoint/WP A/**Calibration**			
Max	3000 d	3000 kg	
Scale interval	3000 d	1 kg	
Deadload at	3.00 kg	0.001000	mV/V
Max at	3000.00 kg	0.000000	mV/V
Not calibrated			
Sensitivity	833.33 cnt/d	4.000000	µV/d
by load | by mV/V | by data | Linear. | CalcTest			

Start by pressing [by data].

Weighingpoint/WP A/Calibration/**Load cell configuration**		
Number of load cells	⇵	4
Nominal load		3000 kg
Gravity		9.81379 m/s²
Hysteresis error		not specified
Certified data		all LC same
LC sensitivity		1.000000 mV/V
Enter | Calc		

Weighingpoint/WP A/Calibration/**Load cell configuration**		
LC resistance	⇵	600.000 Ω
Enter | Calc		

[Number of load cells]

Number of load cells connected in parallel (1, 2...<4>...9, 10)

[Nominal load]

Max. capacity E_{max} of a load cell (not the overall nominal weight of the scale!)

[Gravity]

Acceleration of gravity at the place of installation; default is the value for Hamburg, Germany 9.81379 m/s².

[Hysteresis error]

When switching from [Not specified] to [Specified], values for [Correction A/B] must be filled in. The data is given on the load cell certificate.

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

With [all LC same] only 1 value for the sensitivity [LC sensitivity] and the output resistance [LC resistance] must be filled in. With [each LC specific] individual values for each load cell are requested.

[Calc]

The mV/V value is calculated and after confirmation with [OK], the calculated mV/V value is stored in the calibration data.

5.4.9 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:

Current zero set: 0.123 kg

If the entire zero-setting range is already utilized, you can still correct the dead load (CAL switch must be open) without affecting other calibration data/parameters.

To do this, select Setup-[Weighingpoint]-[Calib]-[Modify] and determine the dead load with [Deadload at]-[by load] (see Chapter 5.4.5).

Note: If the liniarization is active (see Chapter 5.4.10):
After selection of the line ‚Dead load at' the following tip is displayed:

Can not be changed here while linearization is active

5.4.10 Linearization

After selecting Setup-[Weighingpoint]-[Calib]- [New]/[Modify] and after completing calibration, select the linearization menu with softkey [Linear.]:

by load	by mV/V	by data	Linear.	CalcTest

When you press [Linear.] the menu shown below appears:

Weighingpoint/WP A/Calibration/**Linearization**				
Max at	3000.00 kg		1.000000 mV/V	
Add			**by mV/V**	**by load**

To add a new linearization point, press [Add], fill in the weight value, apply the weight and press [by load]. Then fill in the corresponding value in mV/V for the weight. After pressing [mV/V], the value can be entered directly.

Up to 3 linearization points can be determined.

A linearization point can be added with [Add], removed with [Delete] and changed with [Change].

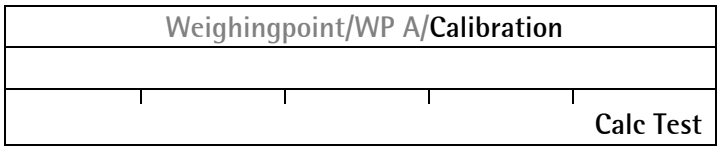
Weighingpoint/WP A/Calibration/**Linearization**				
1. Lin. point	**750 kg**		**0.250010** mV/V	
2. Lin. point	**1500 kg**		**0.500020** mV/V	
3. Lin. point	**2250 kg**		**0.750040** mV/V	
Max at	3000.00 kg		1.000000 mV/V	
Add	**Change**	**Delete**	**by mV/V**	**by load**

A linearization point can be selected with ↓/↑, changed with [Change] and deleted with [Delete].

5.4.11 Determination Test Value/Display Test Value

Press [Calc Test] activates test value calculation. The maximum capacity (Max) is displayed with the designation **TST** without a weight unit.

The value determined during calibration after starting the test [CalcTest] is shown.



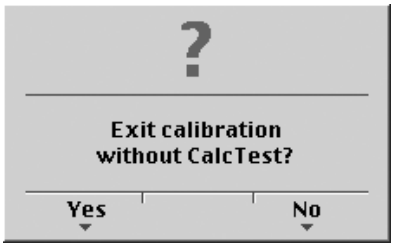
Depending on the settings under Setup-[Weighingpoint]-[Calib]-[Param]-[Test mode], either

- the maximum capacity with [Absolute], or
- the deviation from the test value with [Relative]

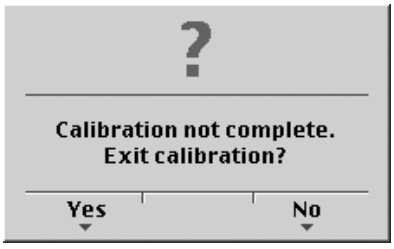
is shown when you press Test to view the test data.

5.4.12 Finishing/Saving the Calibration

Finish the calibration with Exit.

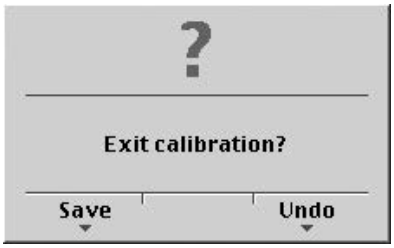


You are prompted to confirm whether calibration should be closed without determining the test value.



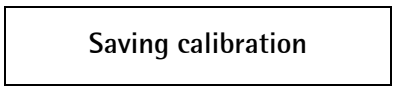
If not all data was determined when calibrating with [New] (e.g. dead load not set/entered), this message is shown:

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

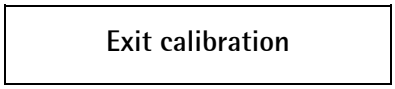


Press [Save] to save changes in calibration data. If you press [Undo], changes are not saved and the display returns to the selection menu for the weighing points.

The confirmation is displayed as follows:



After quitting the menu, the following message is displayed:



After finishing the calibration, set the CAL switch to the closed position; see also Chapter 5.1.1.

5.4.13 Parameter Input

Open the menu via Setup-[Weighingpoint]-[Calib]-[Param].

Weighingpoint/WP A/**Calibration**		
Measuretime	⇵	**160 ms**
Digital filter		**bessel**
Fcut		**2.00 Hz**
External supply		**Above 8V**
Test mode		**absolute**
W & M		**none**
Standstill time		**0.50 s**

This line is shown only, if the filter is on.

[Measuretime]

Select the measurement time; possible values: 5, 10, 20, 40, 80, 160, 320, 640, 960, 1280, 1600 ms.
In 'legal-for-trade' mode select ≤1 s.

[Digital filter]

The digital filter can be switched on only with the [measurement time] set to ≤160 ms.
Select the filter characteristic: [off], [Bessel], [aperiod.], [Butterw.], [Tscheby.].

[Fcut]

Enter the cut-off frequency for the low-pass filter (0.1...80 Hz); the setting is dependent on the measurement time.

[External supply]

The external supply voltage is selected. Possible values: >8 V and ≤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 5.4.10.

[W & M]

Setting for 'legal-for-trade' mode; select [none], [OIML], [NTEP] (for USA) or [NSC] (for Australia); see Chapter 5.4.13.1.

[Standstill time]

Parameters [Standstill range] and [Standstill time] are required for determining the mechanical stability of the scale. Input in seconds; permissible range: 0.01...2 sec. If 0 is set, stability is not checked. The stability time must not be less than the measurement time.

[Standstill range]

The mechanical stability of the scale can be detected as long as any changes in the weight value are within this range; permissible range 0.01...10.00d. In 'legal-for-trade' mode, select ≤1 d.

Weighingpoint/WP A/**Calibration**		
Tare timeout	**2.5**	**s**
Zeroset range	**50.00**	**d**
Zerotrack range	**0.25**	**d**
Zerotrack step	**0.25**	**d**
Zerotrack time	**0.0**	**s**
Overload	**9**	**d**

[Tare timeout]

Enter a timeout value between 0.1 and 25 s for a taring/zero set command that cannot be executed (e.g., if scale mechanically unstable, filter settings faulty, resolution too high, stability condition too narrow).

[Zeroset range]

Determine 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.

Available range: 0.00...10000.00d

In 'legal-for-trade' mode a value ≤2 % of max. must be entered. Example: 60 d for 3000e, class III.

[Zerotrack range]

Range within which automatic zero tracking compensates deviations, 0.25...10000.00d.

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

[Zerotrack step]

If a weight change exceeds the adjusted value, automatic tracking does not function any more. Step for automatic tracking 0.25...10d. In 'legal-for-trade' mode a value of 0.25 d has to be entered.

[Zerotrack time]

Enter a time interval for automatic zero tracking within. At 0.0 s the tracking is switched off.

In 'legal-for-trade' mode a value of 1 s has to be entered.

[Overload]

Weighing range above the maximum capacity [Max], without error message. Available range: 0...999900 d.

In 'legal-for-trade' mode max. 9 d = e has to be entered.

Weighingpoint/WP A/**Calibration**		
Minimum weight	**50**	**d**
Range mode	**Single range**	

[Minimum weight]

Weighing range above the maximum capacity (Max), without error message. Available range: 0...999900 d.

In 'legal-for-trade' mode min. 20 d has to be entered.

[Range mode]

For scale range selection, see Chapter 5.4.13.2.

5.4.13.1 Legal-for-Trade Operation

Under Setup-[Weighingpoint]- [Calib]-[Param]-[W&M] you can choose between:
[none] a legal-for-trade mode [OIML], [NTEP] or [NSC].

	[none]	[OIML]	[NTEP]	[NSC]
Gross weight display	**B**	**B**	**G**	**G**
Min. meas. signal	0,125 mV/V at 30000 d	0,125 mV/V at 3000 e	0,125 mV/V at 3000 e	0,125 mV/V at 3000 e
	0,25 mV/V at 60000 d	0,25 mV/V at 6000 e	0,25 mV/V at 6000 e	0,25 mV/V at 6000 e
		0,42 mV/V at 10000 e	0,42 mV/V at 10000 e	0,42 mV/V at 10000 e

If legal-for-trade operation is selected, the parameters (zero tracking etc.) must be set accordingly; they are not checked.

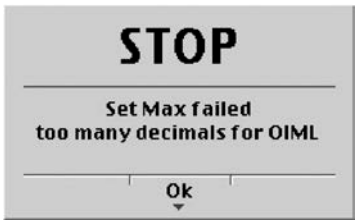
The relevant CAL switches (see Chapter 5.1.1) must be sealed in the closed position.

Note: If the multi-interval scale [Multi-interval] has been selected in the menu [Range mode], the W&M mode [OIML] cannot be selected.

With [OIML] selection, the following message is displayed:

W&M mode OIML not allowed as long as Range mode is multi interval

When used in legal metrology, no more than 3 decimals are permissible.



If a max. value with more than 3 decimals has been entered during calibration, the following message is displayed.

Moreover, the following message is shown, if [OIML] has been selected:

W&M mode OIML not allowed as with max of more than 3 decimals.

Note: In W&M mode an invalid weight is shown without mass unit.

5.4.13.2 Multiple Range Scale/Multi-Interval Scale

Range selection is controlled by three parameters under Setup-[Weighingpoint]-[Calib]-[Param].

Weighingpoint/WP A/**Calibration**		
Range mode	⇵ Multiple range	Select [Multiple range] or [Multi-interval]
Range limit 1	1000 kg	Switch point from range 1 to 2
Range limit 2	2000 kg	Switch point from range 2 to 3

Multiple Range Scale (Class III or one range scale Class I and II with variable interval)

With [Range mode] = [Multiple range], the scale has up to 3 ranges with different resolutions.
The corresponding ranges are indicated above the mass unit as follows:

R1, R2 or R3

The switch points [Range limit 1] and [Range limit 2] are the range limits. As soon as the gross weight exceeds range 1, the next higher range with the next higher interval becomes valid (1->2->5->10->20->50->100->200). When reducing the weight, the interval of the previous range is kept. When the gross weight is ≤0,25 d of range 1 and the scale is stable and not tared, the scale returns to range 1 with the corresponding interval.

When reaching the next range if the tare has been set, a rounded tare value is displayed and printed according to the new range.

Multi-Interval Scale (Class III or one range scale Class I and II with variable interval)

With [Range mode] = [Multi-interval], the scale has up to three ranges with different resolution. Each range has the corresponding interval. Unlike [Multiple range], switching the interval is also triggered by weight reduction; i.e., when the weight drops below the range limits.

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

Note: If the W&M mode [OIML] has been selected, selection of the multi-interval scale [Multi-interval] is not possible.

When selecting [Multi-interval], the following message is displayed:

> Range mode multi interval not allowed as long as W&M is set to OIML

Display VNC

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

WP-A	R2	Max	2000kg	d=	2kg
		Min	40kg		

5.5 Calibrating a xBPI Scale

Legal-for-trade application of PR5230 with a xBPI scale is not possible.

5.5.1 xBPI Set-up for Serial Port

Determination and setting of the interface to which the scale/platform is connected must be done in menu

Setup-[Serial ports parameter]-[xBPI-Port].

Setup/**Serial ports**			
Printer		**Slot1 RS232**	
Remote display		**Builtin RS232**	
JBUS/MOD-Bus		**-none-**	
SMA		**-none-**	
xBPI-Port	⇵	**Slot1 RS485**	Select the interface for the XBPI scale with ←/→.
Param			Press [Param].

The menu appears.

Setup/Serial ports/**Slot1 RS485**			
Assigned to		**xBPI-Port**	Select with ↓/↑ and
Baudrate	⇵	**9600 bd**	set the following parameters with ←/→.
Bits		8	
Parity		odd	
Stopbits		**1**	1, 2

5.5.2 xBPI Scale Function

Weighingpoint		
Weighingpoint A	⇵	**xBPI-Scale**
Setup	**Config**	**Param**

Select [xBPI-Scale] with ←/→ and OK.

Select [Config].

The menu appears.

Weighingpoint/**WP A**		
Type		**xBPI-Scale**
W&M	⇵	**none**
Tare timeout		**1.0 s**
Serial number		**0**
SBN Address		**0**

Select the W&M mode with ←/→.

Leave with Exit.

[Tare timeout]

Waiting time for the execution of a zero set or taring command. If the xBPI-scale has not executed the command in the specified time, the action will be aborted.

[Serial number]

Serial number of the connected xBPI scale/weighing module. The number is required for checking with legal for trade application. With serial number 0, checking is omitted.

[SBN Address]

With an address unequal to 0, bus operation active, possible addresses: 1 - 31, i.e. max. 31 xBPI scales can be operated at an RS 485 bus line. The SBN Address is shown in the display.

Example: Address 31 at WP-A.

WP-A.31	Max	5000kg	d=	0.1kg
	Min	2kg		

5.5.3 xBPI Platform Configuration

Weighingpoint		
Weighingpoint A	⇵	**xBPI-Scale**
Setup	**Config**	**Param**

Select [xBPI-Scale] with ←/→ and OK.

Select [Setup].

Read the parameters from the xBPI scale with [Setup].

Weighingpoint/**xBPI-Scale Setup**	
Reading parameters	
model	☑
metrologie	☑
device info	☑
settings	☑

Ticks indicate the progress.

An error message displays, unless communication with the xBPI scale is possible!

Weighingpoint/xBPI-Scale Setup
Calibration
Configuration
Select group of specification
Show device info

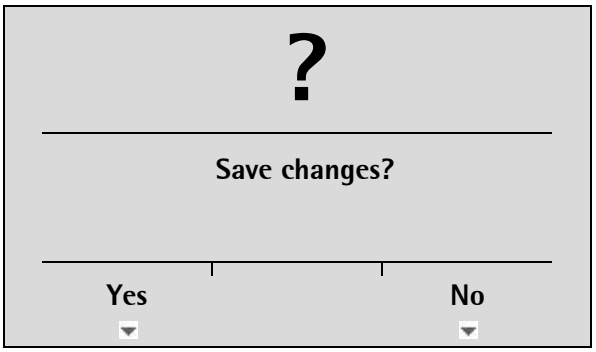
Open with OK.

Selection of specification group (see operating instructions of the scale):

Weighingpoint/xBPI-Scale Setup	
Specification group 1	○
Specification group 2	○
Specification group 3	◉
Specification group 4	○
Specification group 5	○
Specification group 6	○

Select with ↓/↑ and OK.

Leave with Exit.

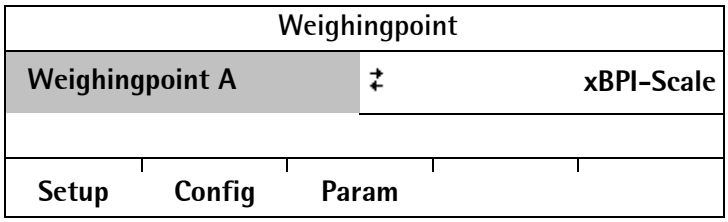


Save the data with [Yes].
Press [NO] for exit from the menu without data change.

Weighingpoint/xBPI-Scale Setup	
Saving changes parameters	
download values	☑
write nonvolatile	☑
reconfig system	☑

Ticks indicate the progress.

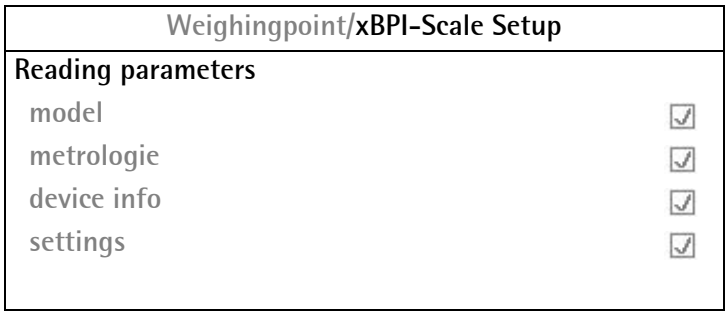
5.5.4 xBPI Scale Parameter



Select [xBPI-Scale] with ←/→ and OK.

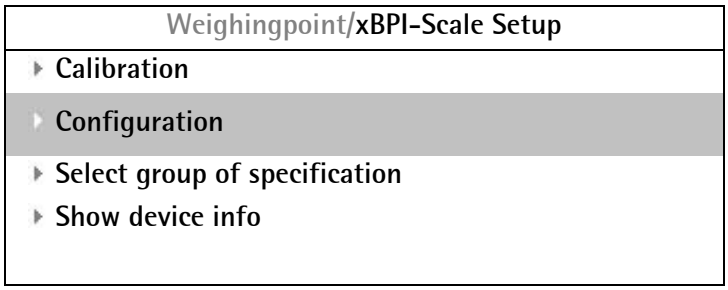
Select [Setup].

Read the parameters from the xBPI scale with [Setup].

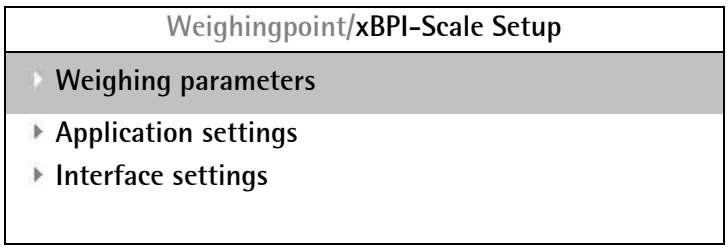


Ticks indicate the progress.

An error message displays, unless communication with the xBPI scale is possible!

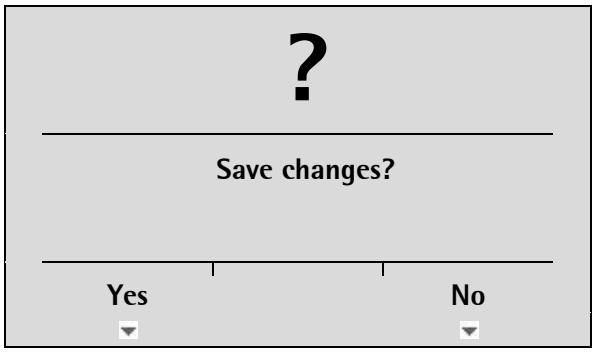


Open with OK.



Open with OK.

For further procedure, see Chapter 5.5.5.



Save the data with [Yes].

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

5.5.5 xBPI Parameter Tables

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

Weighingpoint/**xBPI-Scale Setup**		
Ambient conditions	⇕	**Very stable cond.**
Application/Filter		**standard mode**
Stability range		**8 digit**
Stability symb. delay		**no delay**
Tare parameter		**at any time**
Auto zero function		**Auto Zero off**

Select the parameter with ↓/↑ and
Make the setting with ←/→.

Leave with Exit.

[Weighingpoint A-xBPI-scale]-[Setup]-[Configuration]-[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 digit
  - 4 digit
  - 8 digit
- 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
  - 20% of max load
- Power-On tare/zero
  - activ
  - inactiv
  - only for zeroing
- Measure rate
  - normal output
  - fast output
- Calibration check
  - Off
  - Calibration prompt
- External adjustment
  - Accessible
  - Blocked
- Maximum capacity
  - reduced by preload
  - constant

[Weighingpoint A-xBPI-scale]-[Setup]-[Configuration]-[Application settings]

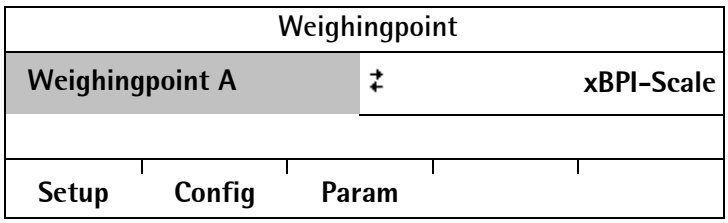
- Application Tare
  - Accessible
  - Blocked
- Number of units
  - 1 weight unit
  - 2 weight units
  - 3 weight units
- Weight unit 1
  - gramm g
  - kilogram kg
  - Carat ct
  - Pound lb
  - Unze oz
  - Troy unze ozt
  - Tael Hongkong tlh
  - Tael Singapur tls
  - Tael Taiwan tlt
  - grain GN
  - pennyweight dwt
  - milligramm mg
  - Parts/pound /lb
  - Tael china tlc
  - Momme mom
  - Karat k
  - Tola tol
  - Baht bat
  - Mesghal m
  - Tonne t
- Display accuracy 1
  - 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%
  - Multiinterval
  - increased by 10
- Weight unit 2
  - gramm g
  - kilogram kg
  - Carat ct
  - Pound lb
  - Unze oz
  - Troy unze ozt
  - Tael Hongkong tlh
  - Tael Singapur tls
  - Tael Taiwan tlt
  - grain GN
  - pennyweight dwt
  - milligramm mg
  - Parts/pound /lb
  - Tael china tlc
  - Momme mom
  - Karat k
  - Tola tol
  - Baht bat
  - Mesghal m
  - Tonne t
- Display accuracy 2
  - 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%
  - Multiinterval
  - increased by 10
- Weight unit 3
  - gramm g
  - kilogram kg
  - Carat ct
  - Pound lb
  - Unze oz
  - Troy unze ozt
  - Tael Hongkong tlh
  - Tael Singapur tls
  - Tael Taiwan tlt
  - grain GN
  - pennyweight dwt
  - milligramm mg
  - Parts/pound /lb
  - Tael china tlc
  - Momme mom
  - Karat k
  - Tola tol
  - Baht bat
  - Mesghal m
  - Tonne t
- Display accuracy 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%
  - Multiinterval
  - increased by 10

[Weighingpoint A-xBPI-scale]-[Setup]-[Configuration]-[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
- 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

5.5.6 xBPI Setting Dead Load

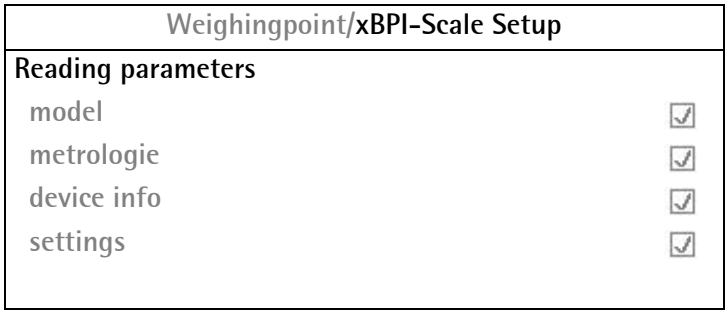
Note: Both terms 'dead load' and 'preload' are used by Sartorius.



Select [xBPI-Scale] with ←/→ and OK.

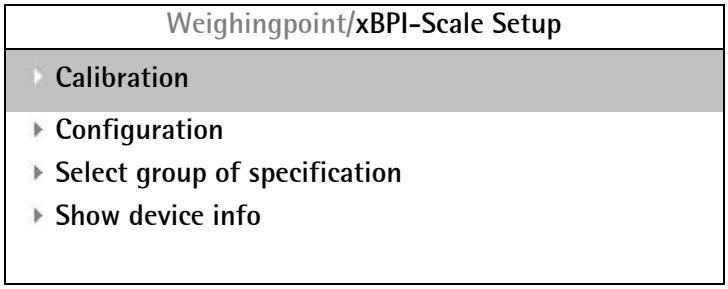
Select [Setup].

Read the parameters from the xBPI scale with [Setup].

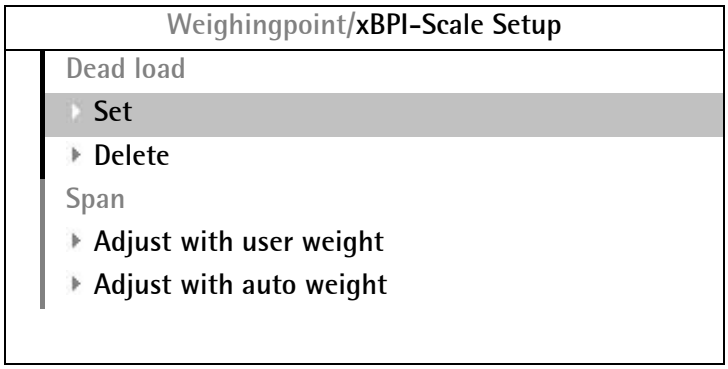


Ticks indicate the progress.

An error message displays, unless communication with the xBPI scale is possible!



Open with OK.



Set dead load.

Delete dead load.

Leave with Exit.

For setting the dead load, remove the weight from the scale and select [Set]. After sending the command, 0 is indicated on the gross weight display.

Alternatively, the stored dead load can be deleted:

Remove the weight from the scale and select [Delete]. The stored dead load is deleted. The instantaneous dead load is shown on the weight display.

5.5.7 xBPI Calibration with the User Weight

Prerequisites:

- The xBPI protocol has been selected (see Chapter 5.5.1).
- The weighing point ‚xBPI-scale' has been selected (see Chapter 5.5.4).
- The platform configuration has been executed (see Chapter 5.5.3).
- The setting in the following menu has been done: [Weighingpoint A-xBPI-Scale]-[Setup]: [Configuration]-[Confirming adjust.]: [manual] (see Chapter 5.5.5).
- The communication between instrument and platform is active.

Weighingpoint/**xBPI-Scale Setup**
▸ **Calibration**
▸ **Configuration**
▸ **Select group of specification**
▸ **Show device info**

Open with OK.

Weighingpoint/**xBPI-Scale Setup**
Dead load
▸ **Set**
▸ **Delete**
Span
▸ **Adjust with user weight**
▸ **Adjust with auto weight**

Select with ↓/↑ and enter with OK.

Enter user weight The previously stored user weight is displayed.

2000 g

The weight can be changed.

Following window appears:

Weighingpoint/**xBPI-Scale Setup**	
Calibration status	**Load to small**
Cal-Target	**-2000 g**
--	**0.01 g**

Calibration progress without weight.

The following window is displayed after applying the weight:

Weighingpoint/**xBPI-Scale Setup**	
Calibration status	**Difference display**
Cal-Delta	**-0.3 g**
--	**1999.75 g**

The weight is displayed in high-resolution (10x).

Accept	ResError	Abort

Select [Accept].

The data are saved and the instrument generates a corresponding message:

Weighingpoint/xBPI-Scale Setup	
Calibration status	complete
Net=Grs	2000 g
--	2000.01 g

The weight is displayed in high-resolution (10x).

Accept ResError Abort

Leave with Exit.

5.5.8 xBPI Calibration with Automatic Weight Detection

Prerequisites:

- The xBPI protocol has been selected (see Chapter 5.5.1).
- The weighing point ‚xBPI-scale' has been selected (see Chapter 5.5.4).
- The platform configuration has been executed (see Chapter 5.5.3).
- The setting in the following menu has been done: [Weighingpoint A-xBPI-Scale]-[Setup]: [Configuration]-[Confirming adjust.]: [manual] (see Chapter 5.5.5).
- The communication between instrument and platform is active.

Weighingpoint/xBPI-Scale Setup
▸ Calibration
▸ Configuration
▸ Select group of specification
▸ Show device info

Open with OK.

Weighingpoint/xBPI-Scale Setup
Dead load
▸ Set
▸ Delete
Span
▸ Adjust with user weight
▸ Adjust with auto weight

Select with ↓/↑ and enter with OK.

Following window appears:

Weighingpoint/xBPI-Scale Setup	
Calibration status	Load to small
Cal-Target	-10000.0 g
--	-0.02 g

Calibration progress without weight.

The weight is displayed in high-resolution (10x).

In this example, a weight of 5000 g is put onto the scale.
The following window is displayed after applying the weight:

Weighingpoint/xBPI-Scale Setup		
Calibration status	Difference display	
Cal-Delta	0.1 g	
--	5000.06 g	The weight is displayed in high-resolution (10x).
Accept ResError Abort		Select [Accept].

The data are saved and the instrument generates a corresponding message:

Weighingpoint/xBPI-Scale Setup		
Calibration status	complete	
Net=Grs	5000.0 g	
--	5000.01 g	The weight is displayed in high-resolution (10x).
Accept ResError Abort		Leave with Exit.

5.5.9 xBPI Calibration with Default Weight

Prerequisites:

- The xBPI protocol has been selected (see Chapter 5.5.1).
- The weighing point ‚xBPI-scale' has been selected (see Chapter 5.5.4).
- The platform configuration has been executed (see Chapter 5.5.3).
- The setting in the following menu has been done: [Weighingpoint A-xBPI-Scale]-[Setup]: [Configuration]-[Confirming adjust.]: [manual] (see Chapter 5.5.5).
- The communication between instrument and platform is active.

Weighingpoint/xBPI-Scale Setup	
▸ Calibration	Open with OK.
▸ Configuration	
▸ Select group of specification	
▸ Show device info	

Weighingpoint/xBPI-Scale Setup	
▸ Adjust with default weight	Select with ↓/↑ and enter with OK.
▸ Adjust with intern weight	
Linearity	
▸ Default	
▸ User	

Following window appears:

Weighingpoint/xBPI-Scale Setup	
Calibration status	Load to small
Cal-Target	-5000.0 g
--	0.00 g

The following window is displayed after applying the weight:

Weighingpoint/xBPI-Scale Setup		
Calibration status	Difference display	Calibration progress without weight.
Cal-Delta	-0.0 g	
--	4999.98 g	The weight is displayed in high-resolution (10x).
Accept ResError Abort		Select [Accept].

The data are saved and the instrument generates a corresponding message:

Weighingpoint/xBPI-Scale Setup		
Calibration status	complete	
Net=Grs	5000.0 g	
--	5000.00 g	The weight is displayed in high-resolution (10x).
Accept ResError Abort		Leave with Exit.

5.5.10 xBPI Calibration with Built-in Weight

Prerequisites:

- The xBPI protocol has been selected (see Chapter 5.5.1).
- The weighing point ‚xBPI-scale' has been selected (see Chapter 5.5.4).
- The platform configuration has been executed (see Chapter 5.5.3).
- The setting in the following menu has been done: [Weighingpoint A-xBPI-Scale]-[Setup]: [Configuration]-[Confirming adjust.]: [manual] (see Chapter 5.5.5).
- The communication between instrument and platform is active.

Weighingpoint/**xBPI-Scale Setup**
▸ **Calibration**
▸ **Configuration**
▸ **Select group of specification**
▸ **Show device info**

Open with OK.

Weighingpoint/**xBPI-Scale Setup**
▸ **Adjust with default weight**
▸ **Adjust with intern weight**
Linearity
▸ **Default**
▸ **User**

Select with ↓/↑ and enter with OK.

The procedure is shown e.g. with the following message:

Weighingpoint/**xBPI-Scale Setup**	
Calibration status	**Motor in motion**
Accept	ResError Abort

The calibration progress is displayed.

Weighingpoint/**xBPI-Scale Setup**	
Calibration status	**Difference display**
Cal-Delta	**0.0 g**
--	**1212.73 g**
Accept	ResError Abort

Select [Accept].

The data are saved and the instrument generates a corresponding message:

Weighingpoint/**xBPI-Scale Setup**	
Calibration status	**complete**
Net=Grs	**-0.0 g**
--	**-0.06 g**
Accept	ResError Abort

Leave with Exit.

5.6 Configuring General Parameters

The configuration of parameters which are not related to the weighing electronics is divided into several sections (see Chapter 5.3.8).

5.6.1 Serial Interfaces [Serial ports parameter]

To configure the serial interfaces, press Setup-[Serial ports parameter].

Press OK.

Press ↓/↑ to select the specific protocol.

Press ←/→ to select the respective port.

Setup
▸ Serial ports parameter
▸ Date & Time
▸ Operating parameter
▸ Printing parameter

Select [Serial ports parameter] with OK.

Example of Selection

Setup/Serial ports		
Printer	⇵	Builtin RS232
Remote display		-none-
JBUS/MOD-Bus		-none-
SMA		-none-
Asycom		-none-
xBPI-Port		Builtin RS485
Param	Config	

Select [Param].

Note: Determine the print settings with [Config], see Chapter 5.6.4.

[Printer]

Select the serial interface to which the printer is connected. Select [Param] to define the transfer characteristics.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

Setup/Serial ports/**Builtin RS232**			
Assigned to		**Printer**	
Protocol	⇵	**XON/XOFF**	XON/XOFF, RTS/CTS, W&M Printer, no printer
Baudrate		**9600 bd**	300, 600, ... 19200, 38400
Bits		**7**	7, 8
Parity		**even**	no, odd, even
Stopbits		**1**	1, 2
Output mode		**raw**	raw, CR/LF translation

Determine the print settings with [Config], see Chapter 5.6.4.

Setup/Serial ports/**Printing parameter**			
Print mode	⇵	**print selected items**	Select the desired setting.
1. Item		**Sequencenumber**	
2. Item		**Grossweight**	
3. Item		**CR/LF**	
4. Item		**-none-**	
5. Item		**-none-**	
6. Item		**Displayed weight**	

Remote display protocol [Remote display]

Select the serial interface to which the remote display is connected and then select [Param] to define the [Baudrate] and the remote display type [Mode] connected.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

The light gray displayed parameter cannot be changed.

Setup/Serial ports/**Builtin RS485**		
Assigned to	**Remote display**	
Protocol	Remote display	
Baudrate	⇵ **9600 bd**	300, 600, 1200, 2400, 4800, 9600, 19200
Bits	7	
Parity	even	
Stopbits	1	
Mode	**multiple transmitters**	Several remote displays are connected.
Device ID	**A**	Address of the instrument
Next Device ID	**B**	Next address of the instrument

If only 1 instrument is connected to a remote display (normal case), [Mode] must be set to [single transmitter].

For PR 1577 remote display [PR 1577 mode] has to be set.

If more than 1 instrument is connected to 1 remote display, [Mode] must be set to [multiple transmitters].

At [Device Id] the own instrument address (A, B, C ...) has to be entered, at [Next Device Id] the address of the subsequent instrument has to be entered

Press Exit to return to the menu ‚Serial ports'.

JBUS/MOD-Bus protocol [JBUS/MOD-Bus]

To configure the serial interfaces, press Setup-[Serial ports parameter]-[JBUS/MOD-Bus] to select a RS-232 interface.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

The light gray displayed parameter cannot be changed.

Setup/Serial ports/**Builtin RS232**			
Assigned to		**JBUS/MOD-Bus**	
Protocol		JBUS/MOD-Bus	
Baudrate	⇵	**9600 bd**	300, 600, ... 19200, 38400
Bits		8	
Parity		**even**	no, odd, even
Stopbits		1	
Slave		**1**	

Press Exit to return to the menu ‚Serial ports'.

Press Exit to return to the setup menu of [Serial ports parameter]. When you close this menu, the following messages are displayed if at least one setting was changed:

Save settings

Starting JBUS/MOD-Bus

The JBUS/MOD bus protocol is described in Chapter 5.10.

SMA protocol [SMA]

To configure the serial interfaces, press Setup-[Serial ports parameter]-[SMA] to select a RS-485 interface.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the s respective values.

The light gray displayed parameter cannot be changed.

Setup/Serial ports/**Builtin RS485**			
Assigned to		**SMA**	
Protocol		SMA	
Baudrate	⇵	**9600 bd**	300, 600, ... 19200
Bits		8	
Parity		none	
Stopbits		1	

The SMA protocol is described in Chapter 7.

xBPI protocol [xBPI Port]

To configure the serial interfaces, press Setup-[Serial ports parameter]-[xBPI-Port] to select a RS-485 or RS-232 interface.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the s respective values.

The light gray displayed parameter cannot be changed.

Setup/**Serial ports**		
Printer		**Slot1 RS232**
Remote display		**Builtin RS232**
JBUS/MOD-Bus		**-none-**
SMA		**-none-**
xBPI-Port	⇵	**Slot1..RS485**
Param		Click [Param].

Only the baud rate and the stop bits are adjustable; the other parameters are fixed.

Setup/Serial ports/ **Slot1 RS485**			
Assigned to		**xBPI-Port**	
Baudrate	⇵	**9600 bd**	9600, 19200
Bits		8	
Parity		odd	
Stopbits		**1**	1, 2

Asycom protocol [Asycom]

To configure the serial interfaces, press Setup-[Serial ports parameter]-[Asycom] to select a RS-485 interface.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

The light gray displayed parameter cannot be changed.

Setup/Serial ports/**Builtin RS485**			
Assigned to		**Asycom**	
Protocol		**Asycom V1**	Select V1, V2 or V3*
Baudrate	⇵	**9600 bd**	300, 600, ... 19200
Bits		**8**	7, 8
Parity		even	
Stopbits		1	
Slave		**A**	Select A - Z

* V1 = for old communication programs
V2 = for recipe controller
V3 = for OPC

The old EW command sets (e.g. PR 1612) for the Asycom protocol are described in Chapter 8.

5.6.2 Date and Time

Select Setup-[Date & Time] to set date and time.

Setup/**Clock**		
Date	**2009-08-18**	Date and
Time	**11:24:53**	time can be overwritten

5.6.3 Operating parameters

Define the basic operating parameters under Setup-[Operating parameter].

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

Setup/**Operating parameter**		
Address	**A**	Select A - Z
PIN	**********	Enter the access code
Sequencenumber	**28**	Counter for print jobs
SetTareKey	**tare & reset tare**	tare & reset tare, tare & tare again, disabled
SetZeroKey	**only when not tared**	Only when not tared, reset tare on zeroset, disabled

[Address]

Device address; e.g. for print-out.

[PIN]

The access code can be used to protect the [Setup] from unauthorized operation. Enter a number with up to 6 digits. As long as you are in this menu, the value can be overwritten as required.

SUPER-PIN

If the PIN-Code is lost, the Setup can be unlocked with Super-PIN '212223'.

[Sequencenumber]

The number (counter for print jobs) may appear (selectable) on the print-out too, is incremented automatically (max. 999999) and can be set here.

[SetTareKey]

The function of the tare key on the keypad can be configured:

[tare & reset tare]: the scale is tared if it was not tared previously; otherwise, tare is reset.

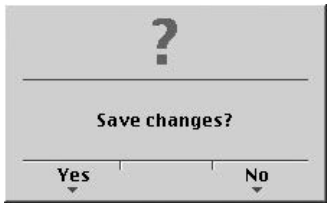
[tare & tare again]: when you press the [Tare] key, the current value is stored in the tare memory and a net weight of 0 is displayed. [disabled]: The key has no function.

[SetZeroKey]

[only when not tared]: The function of the zero-setting key on the keypad can be limited to gross mode. [reset tare on zeroset]: The zero-setting key switches the scale to gross mode automatically. 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. [disabled]: The key has no function.

Closing the menu

To close the menu, press Exit. The following message is displayed:



Press [Yes] to save the data.

Press [No] to close the menu without changing data.

5.6.4 Printing parameter

Define the basic printing parameters under Setup-[Printing parameter].

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

Setup/**Printing parameter**			
Print mode	⇵	**Cyclic**	Cyclic, Cyclic with enable, Triggered
Printing interval		**5**	Enter value
Printing interval unit		**Seconds**	Seconds, Minutes, Hours, Measures
Printlayoutlitem1		**Sequencenumber**	
Printlayoutlitem2		**Grossweight**	
Printlayoutlitem3		**Date & Time**	
Printlayoutlitem4		**CR/LF**	
Printlayoutlitem5		**Form feed**	
Printlayoutlitem6		**-none-**	

[Cyclic]

Cyclic printing with adjusted parameters.

[Cyclic with enable]

Continuous printing.

[Triggered]

Singular printing.

[Sequencenumber]

Current sequence number, max. 6 digits, after #999999 the #000001 is following.

[CR/LF], [Form feed]

Carriage returns and line feed, form feed.

[Device address]

Address of the instrument (A, B ... Z).

[-none-]

Nothing is printed. The function can be used for printing less than 6 data items.

[Displayed weight], [Grossweight], [Net weight], [Tare weight]

The displayed gross, net or tare weight is printed. If [OIML], [NTEP] or [NSC] has been selected, printing is done only, if the stability criteria is fulfilled, the weight is shown in '< >'. For [NTEP] or [NSC] the gross weight is indicated with G (else B).

[Date & Time]

The date and time are printed as DD.MM.YYYY HH:MM:SS

Example for printing

PrintlayoutItem1	**Date & Time**
PrintlayoutItem2	**Sequencenumber**
PrintlayoutItem3	**Grossweight**
PrintlayoutItem4	**Net weight**
PrintlayoutItem5	**CR/LF**
PrintlayoutItem6	**-none-**

```
17.01.2007 11:18:56 #009140          <436 kg> B          <291 kg> N
```

5.6.5 Fieldbus parameter

This menu item can only be selected if a fieldbus card is installed in slot 2.

Which protocol is displayed automatically depends on the Fieldbus card installed:

[ProfiBus-DP] for PR 1721/41, [InterBus-S] for PR 1721/42, [DeviceNet] for PR 1721/44, [ProfiNet I/O] for PR 1721/46 and [EtherNet-IP] for PR 1721/47.

Define the fieldbus parameters under Setup-[Fieldbus parameter].

Which additional parameters are required, depends on the interface type.

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

[ProfiBus-DP]

Setup/**Fieldbus parameter**		
fieldbus protocol	**ProfiBus-DP**	
ProfiBus-DP address	**1**	Enter address

[InterBus-S]

Setup/**Fieldbus parameter**	
Fieldbus protocol	**InterBus-S**

[DeviceNet]

Setup/**Fieldbus parameter**		
Fieldbus protocol	**DeviceNet**	
DeviceNet baudrate	**500k**	Select 500, 250 or 125 k
DeviceNet MAC-ID	**1**	Enter address 1 ... 62

[CC-Link]

Setup/Fieldbus parameter		
Fieldbus protocol	CC-Link	
CC-Link baudrate	156k	Select 156k, 625k, 2.5M, 5M or 10M
CC-Link ID	1	Enter address

[ProfiNet I/O]

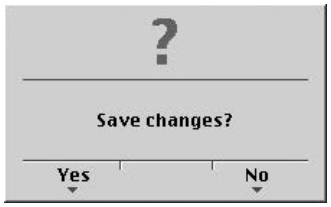
Setup/Fieldbus parameter		
Fieldbus protocol	ProfiNet I/O	
Use DHCP	⇵ off	Select on/off
IP address	192.168.1.1	Enter IP address
Subnet mask	255.255.255.0	Enter Subnet mask

[EtherNet/IP]

Setup/Fieldbus parameter		
Fieldbus protocol	Ethernet/IP	
Use DHCP	⇵ off	Select on/off
IP address	192.168.1.1	Enter IP address
Subnet mask	255.255.255.0	Enter Subnet mask

Closing the menu

To close the menu, press Exit. The following message is displayed:



Press [Yes] to save the data.

Press [No] to close the menu without changing data.

5.6.6 Network parameter

You can configure settings for the network connections (built-in LAN adapter).

Define the network parameters under Setup-[Network parameter].

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

The light gray displayed parameter cannot be changed.

Setup/**Network parameter**		
HW address	00:90:6C:6A:6B:5E	Fixed address determined by the instrument
Hostname	**PR5230-6A6B5E**	Device name; user-definable*
Use DHCP	☑	Address is assigned by the server
IP Address	172.24.20.57	Address assigned by the server
Subnetmask	255.255.240.0	Mask for permissible IP address range
Default gateway	172.24.16.1	IP number for gateway
Remote access		
VNC-Client	**255.255.255.255**	Permissible client for operation of the instrument

[Hostname]

Caution!

The host name must be unique in the network!

* The device name [Hostname] 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** (upper and lower case letters are not distinguished) are permitted.
- **-** or **.** may be included, but neither at the end nor in succession.

[Use DHCP]

If the checkbox has been marked, the server defines the IP address automatically.

[VNC-Client]

You can configure access permissions for the address:

VNC-Client	0.0.0.0.	Access over 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], [Subnet mask] and [Standard gateway], please consult with your network administrator.

5.6.7 Display items

Define the display items under Setup-[Display items].

Press ↓/↑ to select the specific items.

Press ←/→ to select the respective parameter.

Setup/Display items		
Item 1	Indicator value	Cannot be changed
Item 2	⇵ Bargraph	
Item 3	Gross	
Item 4	Digital inputs	
Item 5	Fieldbus LEDs	
Item 6	Digital outputs	
Item 7	Hostname	
Item 8	IP-address	
Item 9	Limits	
Item 10	Analog output	

For information on the settings, see Chapter 2.3.1.1.

5.7 Configuring Limit Values

Each limit value consists of a switch-on and a switch-off point for definition of a hysteresis. The three pairs of values must be entered according to the same principle. The limit values always refer to the gross weight.

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 limit values under Setup-[Limit parameter].

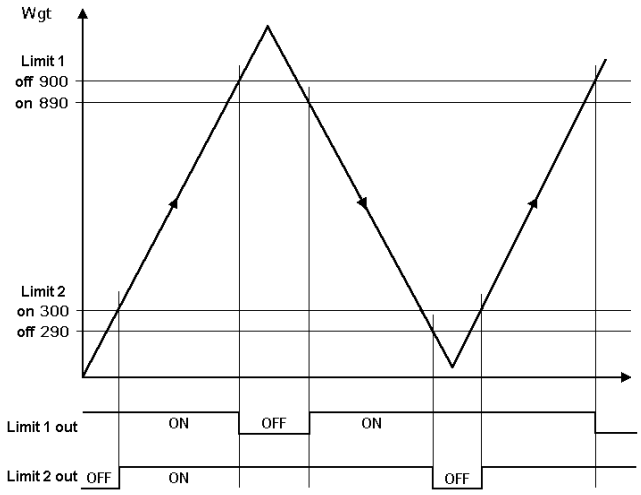
Press ↓/↑ to select the specific items.

Press ←/→ to select the respective parameter.

Setup/**Limit parameter**		
Limit 1 on		**890 kg**
	Action	**-no action-**
Limit 1 off		**900 kg**
	Action	**-no action-**
Limit 2 on		**300 kg**
	Action	**-no action-**
Limit 2 off		**290 kg**
	Action	**-no action-**

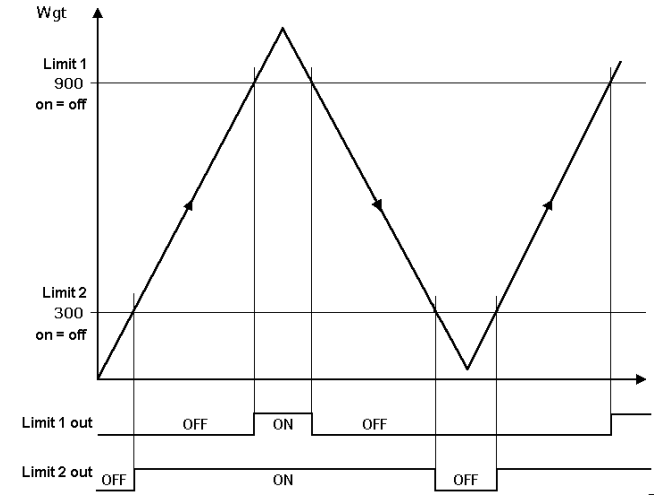
Determine the limit values.

Example:



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

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



If the limits (Limit 1 and Limit 2) for 'On' and 'Off' are equal (on = off), output 1 (Limit 1 out) switches ON, when the weight (Wgt) exceeds the value and output 2 (Limit 2 out) switches OFF, when the weight drops below the value.

1. Determining an action

Determine the action for the rising edge of the reference signal under [Limit 1 on] from the following list (here: Marker 1 is set when 900 kg are exceeded).

Accordingly, an action for [Limit 1 off] can be determined.

Setup/**Limit parameter**		
Limit 1 on		**900 kg**
Action	**set marker 1**	**X64=1**
Condition	**no condition**	**-----**

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

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

2. Determining a condition

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

Selection list for conditions [condition]

Condition	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	Limit signal 1: not active
actual limit 2	X17=0	Limit signal 2: not active
actual limit 3	X18=0	Limit signal 3: not active
ADC error	X32=0	General error in the 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	No mechanical stability of the scale
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'.

Condition	SPM bit	Description
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	Limit signal 1: active
actual limit 2	X17=1	Limit signal 2: active
actual limit 3	X18=1	Limit 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	Mechanical stability of the scale
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'.

5.8 Digital Outputs and Inputs

5.8.1 Configuring Digital Outputs

Configure the required function for [Output 1] to [Output 3] by selecting a signal from the list. The output goes to the corresponding state, see Example.

Press Setup and select [Digital I/O parameter] to open the configuration menu.

Setup/Digital I/O parameter		
Output 1	below zero	X35=1
Output 2	above Max	X33=0
Output 3	center zero	X36=1
Input 1 on	-no action-	

[Output 1] is true (active), when the weight value drops below zero (X35=1).

[Output 2] remains (active), as long as the weight is not above Max (X33=0).

[Output 3] is true (active), when the weight is zero ±¼ d (X36=1).

Selection list for output functions

Function	SPM bit	Description
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	Limit signal 1: not active
actual limit 2	X17=0	Limit signal 2: not active
actual limit 3	X18=0	Limit signal 3: not active
ADC error	X32=0	General error in the 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	No mechanical stability of the scale
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'.

Function	SPM bit	Description
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	Limit signal 1: active
actual limit 2	X17=1	Limit signal 2: active
actual limit 3	X18=1	Limit 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	Mechanical stability of the scale
out	X39=1	Weight below zero or above Max
command error	X48=1	For internal use only.
command busy	X49=1	For internal use only.
power fail	X50=1	Set after power-on (=power failure)
test active	X56=1	Analog test was started.
cal active	X57=1	For internal use only.
tare active	X58=1	Instrument is tared.
marker bit 1	X64=1	Marker bit 1 set, after power-on the markers are set to '0'.
marker bit 2	X65=1	Marker bit 2 set, after power-on the markers are set to '0'.
marker bit 3	X66=1	Marker bit 3 set, after power-on the markers are set to '0'.

Example: ‚overload'	X34=1	Function and output are active (e. g.: if 'overload' is reached, a lamp is lit).
	X34=0	Function and output are not active (e. g.: if 'overload' is reached, a lamp is lit).

5.8.2 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.

Press Setup and select [Digital I/O parameter] to open the configuration menu.

Setup/Digital I/O parameter		
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 tare	X113=1
Condition	no condition	-----
Input 1 off	-no action-	
Input 2 on	-no action-	
Input 2 off	-no action-	
Input 3 on	-no action-	
Input 3 off	-no action-	
BCD out		Gross

1. Determining an action

Determine the action for the rising edge of input 1 under [Input 1 on] from the following list (here: When the input signal changes from 0 to 1, a tare command is generated).

Accordingly, an action for the falling edge can be determined.

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
set print	X120=1	Activate a print order
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

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). Select the condition from the list; see page 152. No condition is defined when selecting [no condition]; the action is executed directly.

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

Press Setup and select [Digital I/O parameter] to open the configuration menu.

Setup/**Digital I/O parameter**		
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 tare**	**X113=1**
Condition	**tare active**	**X58=0**
Input 1 off	**-no action-**	
Input 2 on	**-no action-**	
Input 2 off	**-no action-**	
Input 3 on	**-no action-**	
Input 3 off	**-no action-**	
BCD out		**Gross**

In this example: 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).

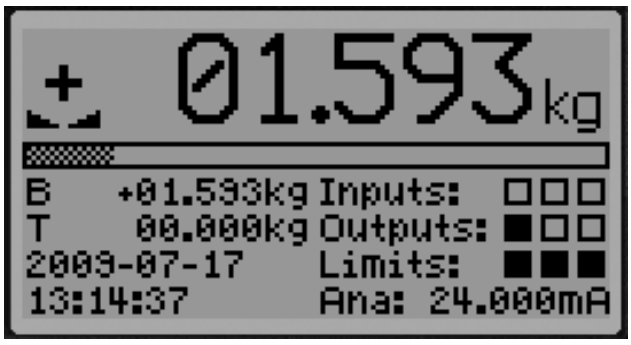
5.9 Display of Limits and Digital Inputs/Outputs

5.9.1 VNC Display

Info/**HW-Slots**	
Builtin	**Digital i/o**
In use by PLC task	**2**
Digital outputs	**001**
Digital inputs	**000**

The status is indicated from right to left.

5.9.2 Instrument Display



The status is indicated from left to right.

5.10 Analog Output

The analog output card PR 5230/06 can be mounted in slot 1.

Define the analog output parameters under Setup-[Analog output parameter].

Press ↓/↑ to select the specific parameter.

Press ←/→ to select the respective values.

Setup/**Analog output parameter**		
Analog mode	**⇵Gross**	**D08**
Analog range		**0...20 mA**
Output on error		**0 mA**
Output if < 0		**linear**
Output if > Max		**linear**
Weight at 0/4 mA		**0 g**
Weight at 20 mA		**240000 g**

[Analog mode]	[no output]		The analog output is not used
	[Gross	D08]	Output of the gross weight
	[Net if tared	D09]	Output of the net weight, if tared; otherwise gross weight
	[Selected	D11]	Output Gross or Net, depending 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 the output to 0 mA
	[4 mA]		Set the output to 4 mA
	[20 mA]		Set the output to 20 mA
[Output if < 0]	[0 mA]		Set the output to 0 mA
	[4 mA]		Set the output to 4 mA
	[20 mA]		Set the output to 20 mA
	[linear]		The output drops below 4 mA up to the limitation (at 4 .. 20 mA)
[Output if > Max]	[0 mA]		Set the output to 0 mA
	[4 mA]		Set the output to 4 mA
	[20 mA]		Set the output to 20 mA
	[linear]		The output exceeds 20 mA up to the limitation
[Weight at 0/4 mA]			Weight value for 0/4 mA output
[Weight at 20 mA]			Weight value for 20 mA output

Press Exit to return to the previous menu.

5.10.1 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.

Press Info-[Show HW-slots] to open the menu:

Info/**HW-Slots**	
▸ **Builtin**	**RS485**
▸ **Builtin**	**RS232**
▸ **Builtin**	**analog out**
▸ **Builtin**	**Digital i/o**
▸ **PR1721/45**	**CC-Link**
▸ **PR5230/xx**	**ADC**

Press ↓ to select [analog out].

Info/**HW-Slots**	
Builtin	**analog out**
In use by PLC task	2
Analog output	0.000 mA
counts	12 cnt

Stop PLC **Stop I/O** **Adjust** **Reset**

Press [Adjust]

Adapt analog output ?

Safety prompt: Reply [Yes] to start adapting.

Info/HW-Slots/**Adjust Analog Output**	
Output	4.000 mA
Measured	**4.004 mA**

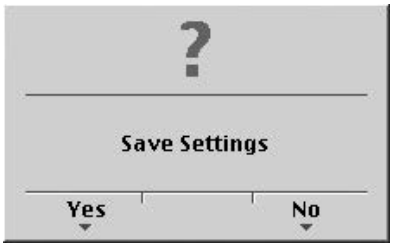
Enter e.g. the value for 4 mA measured by the connected PLC under [Measured].

After pressing OK, the 2nd value (20 mA) is displayed:

Info/HW-Slots/**Adjust Analog Output**	
Output	20.000 mA
Measured	**20.010 mA**

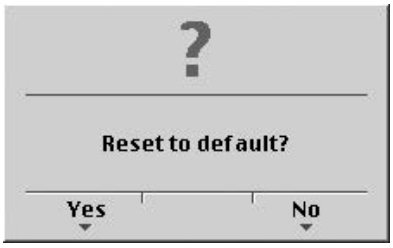
Enter e.g. the value for 20 mA measured by the connected PLC under [Measured].

After pressing OK, this message is displayed:



Press [Yes] to validate the changes.
Press [No] to keep the previous values.

If you want to return to the factory settings (4 mA and 20 mA):
Press [Reset]: A safety prompt is displayed:



Press [Yes] for reset to the factory settings.
Press [No] if you want to keep the entered values unchanged.

5.11 Logfiles

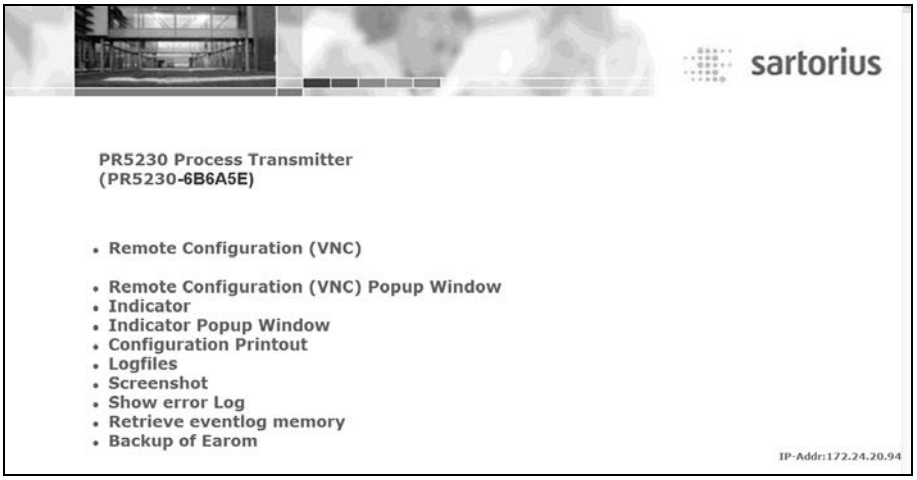
These files contain all actions from processes of the device.
After selecting menu item 'Logfiles', several log files are listed.

DIR of /var/log/

```
 1997 18.02.2011 10:46:21 logd.2       text/plain
10013 18.02.2011 08:05:58 logd.1       text/plain
10056 15.02.2011 19:57:52 logd.0       text/plain
 3686 15.02.2011 18:24:43 messages     text/plain
```

The files contain the log lines that can be evaluated, if necessary.

5.12 Retrieve Eventlog Memory



This function will be selected in the main menu under [Retrieve eventlog memory].

This memory can be used to save events with a time stamp and to retrieve them, if necessary.

The 4 event types are:

- fatal error
- setup
- indicator
- powerfail

The types are distinguished by corresponding error/status codes.

Example

Type	Date	Time	Code	Cond
Indicator	08.05.2009	15:59:04	2	on
Indicator	08.05.2009	16:02:10	2	off
Powerfail	08.05.2009	18:02:10	1	on
Setup	09.05.2009	08:02:10	100	on

5.12.1 FatalError

Code	Events
1	Watchdog
2	Fatal Error
3	Assert error
4	Exception error
5	Hardware error

5.12.2 Setup

This event log memory contains events, which are stored as altered data in EEPROM.

Code	Events
1	Wrong PIN has been entered.
2	EEPROM has been deleted.
10	Start new adjustment.
11	Set dead load with mV/V.
12	Set span with mV/V.
13	New dead load with weight.
14	New SPAN with weight.
15	New full scale.
16	New scale interval.
17	Memory for adjustment.
18	Changes undone.
100	Serial parameters stored.
101	Change of serial interface assignment.
200	Serial assign stored.
300	Digital input/output changed.
400	Parameter limits changed.
500	Analog out parameters changed.
600	Field bus parameters changed.
700	Network parameters changed.
800	Software parameters changed.
900	Printer parameters changed.
1000	ADC parameters changed after download via HTTP.
1001	Core EEPROM changed after download via HTTP.

5.12.3 Indicator

Code	Events
1	Internal arithmetic error
2	Overload
3	No valid ADC values
6	No sense input voltage
7	Negative input voltage (wrong polarity)
9	Faulty communication with ADC

5.12.4 Powerfail

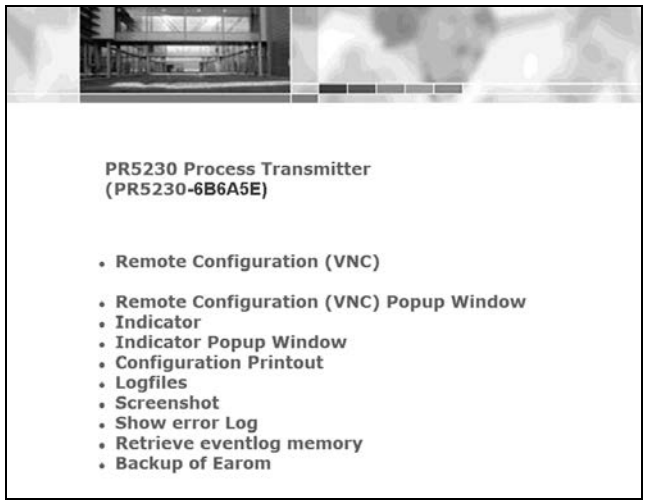
Only the instrument switch-on is recorded.

5.13 Saving Configuration Data [Backup of EAROM]

The configuration and calibration data of the two EAROMs can be saved for back-up on the PC and downloaded, if necessary.

5.13.1 Saving Configuration and Calibration Data

Procedure:

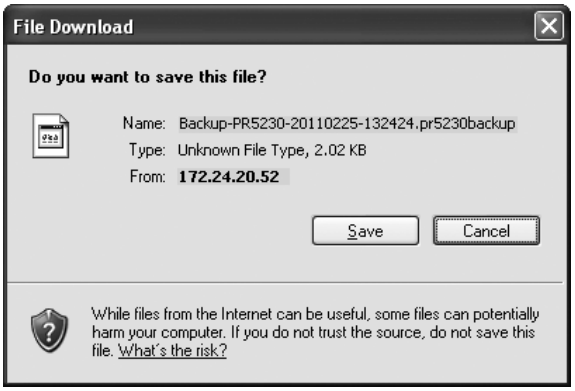


1. Click on ‚Backup of Earom' to open the menu 'Backup-/Restore'.

Following window appears:

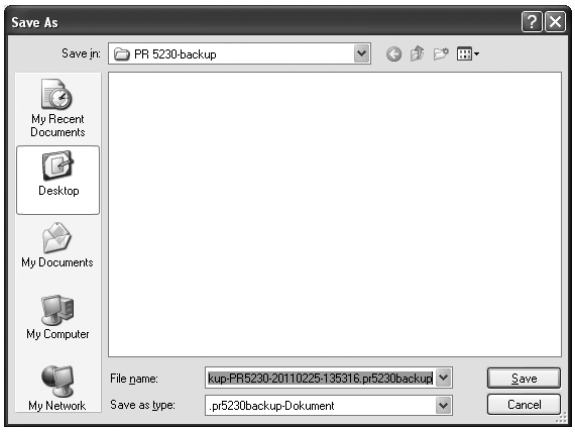
2. Click on ‚Backup'.

Following window appears:



3. Click on 'Save'.

Following window appears:



4. Create and open the required directory e.g. on the notebook.
5. Click button 'Save' to save the file in the relevant directory.

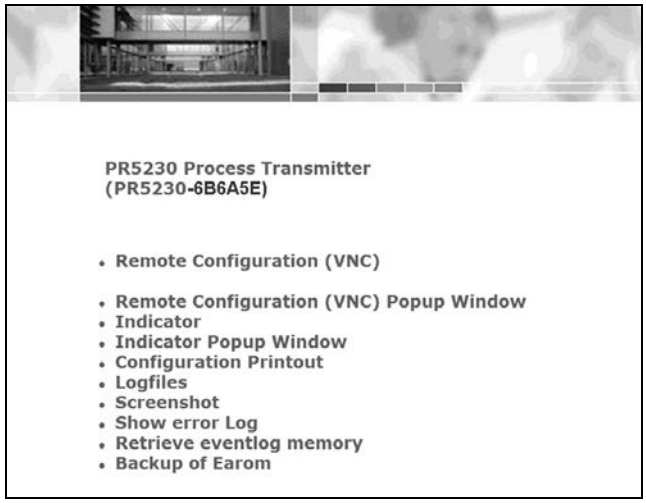
5.13.2 Loading Configuration and Calibration Data into the Device

Caution!

All data which can be adjusted in the setup menu are overwritten!

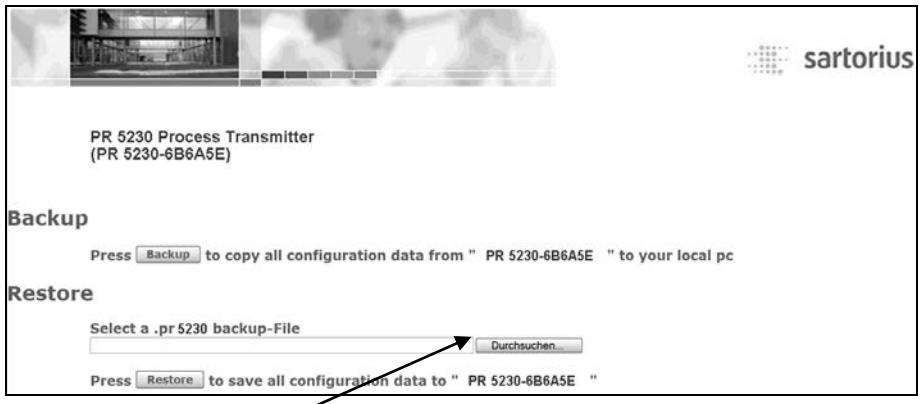
If the file is loaded into several devices, changing the network settings and the host name is indispensable!

Procedure:



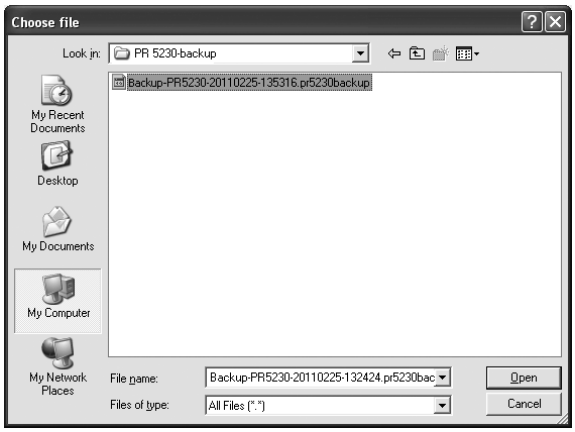
1. Open the CAL-switch in the device.
2. Click on ‚Backup of Earom' to open the menu 'Backup-/Restore'.

Following window appears:



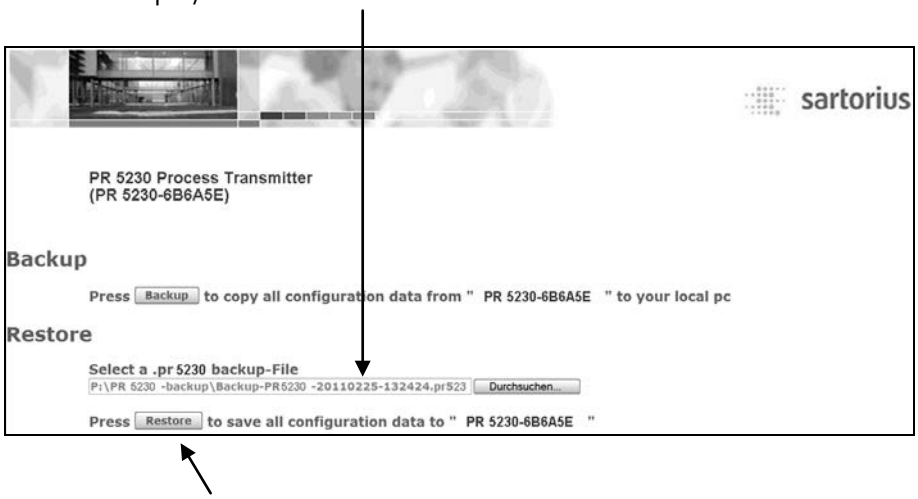
3. Click on ‚Durchsuchen' (depending on Internet browser).

Following window appears:



4. Click the file that must be loaded.
5. Click on 'Open'.

The file is displayed in the window.



6. Click on ‚Restore'.

The selected file is loaded into the device.

7. Press the softkey ‚Modify' in the menu [Setup]-[Weighingpoint]-[Internal]-[Calib.].
8. Change a value (e.g. scale interval).
9. Press 'Exit' several times until you are prompted to confirm whether the changes should be saved.
10. Press the the softkey ‚Yes'. When saving, the copied serial number is overwritten with the serial number of the weighing electronics board provided in this instrument.
11. Undo the change and save it.
12. Close the CAL switch.

6 J-Bus/ModBus Protocol

6.1 General Description

The J-Bus/ModBus protocol implemented in the instrument permits fast, simple and reliable communication between a PC or a PLC and up to 127 instruments.

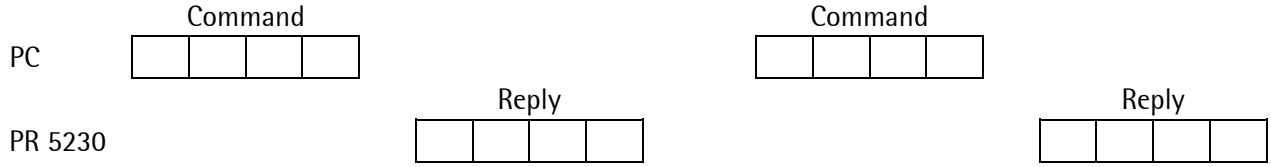
PR 5230 fully supports

- ModBus-RTU (via serial interface), see Chapter 6.2
- ModBus-TCP (via network interface), see Chapter 6.3
- ModBus-UDP (via network interface), see Chapter 6.3

including functions 1, 2, 3, 4, 5, 6, 8 (sub-function 0), 15 and 16.

J-Bus is a French 'clone' of the ModBus. There is a small difference: J-Bus addresses count from 0 (instead of 1) to hex FFFF (instead of dec. 9999). Some ModBus masters automatically subtract 1 before sending a message, and some ModBus slaves subtract 1 to get the requested address. Thus it may happen that access to an address shifted by 1 is made; this is the only point which must be taken into account. In everyday practice, no other problems when connecting J-Bus and ModBus instruments should appear.

Binary data from and to the SPM of PR 5230 are transmitted using this protocol. Any data exchange includes two telegrams: a command from the PC to PR 5230 and a reply from PR 5230 to the PC.



Note: A telegram sent to Slave 0 is executed by all ModBus users, but not replied by anyone!
2-byte values (16-bit values/word) have the Motorola notation. Consequence: MSB - LSB

If the received command is correct but cannot be executed nevertheless (e.g. due to a faulty address or faulty data), reply is with an error telegram.

6.2 ModBus-RTU

A serial interface is used for connection.

The telegram consists of four blocks:

$Addr_8$	$Func_8$	<data>	Crc_{16}

Legend

$Addr_8$	Slave device address within 1...126
$Func_8$	Function code
<data>	For further data, see Chapter 6.4
Crc_{16}	Checksum of all preceding characters

Note: A telegram sent to Slave 0 is executed by all ModBus participants, but replied by none of these devices!

At 9600 bauds, the reply time is typical 4 ms and maximal 8 ms.

A faulty command received by PR 5230 (e.g., parity error in the data, or CRC error) is ignored and no reply is sent.

The pauses between the individual characters and a command must not exceed the 3.5-fold value of a character length; otherwise PR 5230 detects a premature end of the command.

6.3 ModBus-TCP/-UDP

Connection is via the network interface (fixed address or with DHCP).

The telegram consists of six blocks:

$Trans_{16}$	$Proto_{16}$	$Size_{16}$	$Addr_8$	$Func_8$	<data>

Legend

$Trans_{16}$	Sequential transaction number. The number is reflected by the instrument in such a way that the reply can be assigned to the enquiry.
$Proto_{16}$	Reserved for future extension, here always 0.
$Size_{16}$	Number of subsequent bytes
$Addr_8$	Normally, the device address is not used with ModBus-TCP/-UDP. It is used if ModBus-TCP/-UDP is connected behind a ModBus RTU gateway. With ModBus-TCP/-UDP, PR 5230 ignores this parameter.
$Func_8$	Function code (see Chapter 6.4)
<data>	Further data (see Chapter 6.4)

The telegrams can be exchanged using TCP or UDP via Port 502. Normally, this is a fixed setting in the ModBus-TCP master.

With UDP, the typical response time is 4 ms and max. 8 ms. With high network traffic, failed telegram transmissions must be expected. Suitable measures must be taken in the ModBus-TCP master to force a repeated transmission in the event of telegram loss.

With TCP, the typical response time is approx. 10 ms. With high network traffic, transmission can be delayed (max. 120 seconds in extremely disturbed networks, or with long transmission distances as encountered e.g. with the Internet). Normally, however, no telegrams are lost.

Comparison

ModBus-TCP	ModBus-UDP
Reliable transmission: As long as the line is not interrupted, no telegram is lost.	Unreliable transmission: With high network traffic or transmission over long distances, telegram loss must be expected.
Low speed: With transmission problems, transmission can be delayed considerably.	High speed: The reply is transmitted quickly, or not at all.
Suitable for: - Parameter transmission - Result logging - Non-time-critical process control	Suitable for: - Transmission of dynamic values - Visualization - Time-critical process control (requiring timeout handling)

6.4 Functions

Function 1 or 2: Reading n Bits

Command	Device address	Function number	Address of 1st bit	Number of bits
	1 byte	1 byte	2 bytes	2 bytes
Range	1...127	1, 2	0, 8 , 16...	8, 16, 24...

The bit address must always be the 1st bit of a byte. The number of bits to be read may not be smaller than 8 and must be a multiple of 8.

Reply	Device address	Function number	Number of read bytes	Value of 1st byte	Value of 2nd byte	..	Value of last byte
	1 byte	1 byte	1 byte	1 byte	1 byte		1 byte
				8. ...1. bit			last bit

If the address of a bit to be read is out of the permissible range (0...127), an error message is sent as a reply (the address plus the number of bits must not exceed 128).

Example of function 1 for reading the status bits of the scale (8 bits start at bit 32) with ModBus-RTU.

Command	1	1	0	32	0	8	CRC	CRC

Reply	1	1	1	X	CRC	CRC

Example with ModBus-TCP:

Command	47	11	0	0	0	6	0	1	0	32	0	8

Reply	47	11	0	0	0	4	0	1	1	X

The individual bytes are shown.

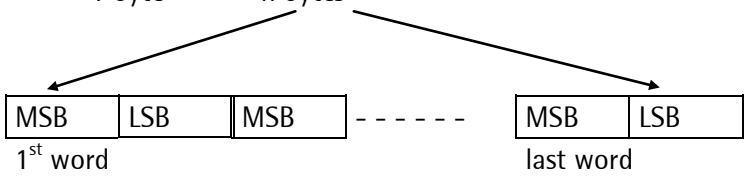
The read byte X is interpreted as follows:

Bit 0 = bit 32 of SPM = ADC error
Bit 1 = bit 33 of SPM = above Max (maximum capacity)
:
Bit 6 = bit 38 of SPM = weight is stable
Bit 7 = bit 39 of SPM = weight is below zero or above Max

Function 3 or 4: Reading n Successive Words

Command	Device address	Function number	Address of 1st word	Number of words
	1 byte	1 byte	2 bytes	2 bytes
Range	1...127	3, 4	0...63	1...64

Reply	Device address	Function number	Number of bytes	Value of the words
	1 byte	1 byte	1 byte	n bytes



If the address of one of the words to be read is out of the permissible range (0...63), an error message is sent as a reply (the address plus the number of bytes must not exceed 64).

Example of function 3 for reading a gross weight (D8 = W16) of 893 kg with ModBus-RTU:

Command	1	3	0	16	0	2	CRC	CRC

Reply	1	3	4	0	0	3	125	CRC	CRC

Example with ModBus-TCP:

Command	47	12	0	0	0	6	0	3	0	16	0	2

Reply	47	12	0	0	0	7	0	3	4	0	0	3	125

The individual bytes are shown.

Function 5: Writing a Bit

Command	Device address	Function number	Address of the bit	Value of the bit	Always 0
	1 byte	1 byte	2 bytes	1 byte	1 byte
Range	0...127	5	0...127	0 or 255	0

Reply	Device address	Function number	Address of the bit	Value of the bit	Always 0
	1 byte	1 byte	2 bytes	1 byte	1 byte

If the address of the bit is out of the permissible range (0...127), an error message is sent as a reply.

Example of function 5 for setting bit 113 (taring) with ModBus-RTU:

Command	1	5	0	113	255	0	CRC	CRC
Reply	1	5	0	113	255	0	CRC	CRC

Example with ModBus-TCP:

Command	47	13	0	0	0	6	0	5	0	113	255	0
Reply	47	13	0	0	0	6	0	5	0	113	255	

The individual bytes are shown.

Function 6: Writing a Word

Command	Device address	Function number	Word address	Value of the word
	1 byte	1 byte	2 bytes	2 bytes
Range	0...127	6	0...63	

Reply	Device address	Function number	Word address	Value of the word
	1 byte	1 byte	2 bytes	2 bytes

If the address is out of the permissible range (0...63), an error message is sent as a reply.

Function 8: Diagnosis

Command	Device address	Function number	Sub-function	Any value
	1 byte	1 byte	2 bytes	2 bytes
Range	1...127	8	0	

This function is intended for testing the communication.

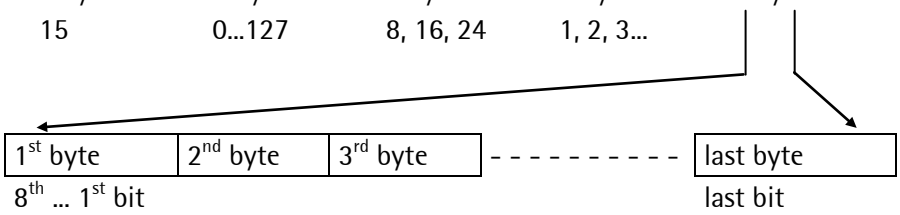
Only sub-function 0 is supported.

The received command is sent as a reply.

Reply	Device address	Function number	Sub-function	Value of the command
	1 byte	1 byte	2 bytes	2 bytes

Function 15: Writing n Successive Bits

Command	Device address	Function number	Address of the 1st bit	Number of bits	Number of bytes	Value of bits
	1 byte	1 byte	2 bytes	2 bytes	1 byte	n bytes
Range	0...127	15	0...127	8, 16, 24	1, 2, 3...	



The bit address must always be the 1st bit of a byte. The number of bits to be read must not be smaller than 8 and must be a multiple of 8. The address plus the number of bits must not exceed 128.

Reply	Device address	Function number	Address of the 1st bit	Number of bits
	1 byte	1 byte	2 bytes	2 bytes

Example of function 15 with ModBus-RTU:

Command	1	15	0	64	0	8	1	3	CRC	CRC

Reply	1	15	0	64	0	8	CRC	CRC

Example with ModBus-TCP:

Command	47	14	0	0	0	8	0	15	0	64	0	8	1	3

Reply	47	14	0	0	0	6	0	15	0	64	0	8

The individual bytes are shown.

Function 16: Writing n Successive Words

Command	Device address	Function number	Address of 1st word	Number of words	Number of bytes	Value of words
	1 byte	1 byte	2 bytes	2 bytes	1 byte	n bytes
Range	0...127	16	0...63	1...64	2...128	

MSB	LSB	MSB	- - - - - -	MSB	LSB
1st word				last word	

Reply	Device address	Function number	Address of 1st word	Number of words
	1 byte	1 byte	2 bytes	2 bytes

If the address is out of the permissible range (0...63), an error message is sent as a reply (the address plus the number of bytes must not exceed 64).

Example of function 16 for writing the limit_1 switch-on point using value 893 with ModBus-RTU:

Command	1	16	0	48	0	2	4	0	0	3	125	CRC	CRC

Reply	1	16	0	48	0	2	CRC	CRC

Example with ModBus-TCP:

Command	47	15	0	0	0	8	0	16	0	48	0	2	4	0	0	3	125

Reply	47	15	0	0	0	6	0	16	0	48	0	2

The individual bytes are shown.

6.5 Error Messages

If a command was transmitted correctly, but cannot be executed because e.g. the address is too high, an error message is sent as a reply to the command.

The error message has the following format:

Device address	Function number +128	Error number	CRC 16
1 byte	1 byte	1 byte	2 bytes

The 2nd byte contains the received function number; the most significant bit is set additionally.

Meaning of the error number:

1	The function number is unknown
2	The address is out of the permissible range
3	The data format is faulty (e.g. more data than specified in the number were written)

Example of an error message, which was generated by an invalid function number with ModBus-RTU.

Command	1	9	0	0	0	0	CRC	CRC

Reply	1	137	1	CRC	CRC

Example for ModBus-TCP:

Command	47	16	0	0	0	8	0	9	0	0	0	0

Reply	47	16	0	0	0	3	0	137	1

The individual bytes are shown.

6.6 Word Addresses

16	Gross weight, 1st byte (MSB)	Gross weight, 2nd byte
17	Gross weight, 3rd byte	Gross weight, 4th byte (LSB)

2	39	38	37	36	35	34	33	32	47	46	45	44	43	42	41	40
7	119	118	117	116	115	114	113	112	127	126	125	124	123	122	121	120

Address	Description
Read bits:	
32	ADC error
33	Above Max (full scale deflection)
34	Above Max + n d
35	Below zero (minus sign)
36	Zero within ¼ d
37	Within zero setting range
38	The weight is stable
39	The weight is below zero or above Max
Write bits:	
112	Set zero
113	Set tare
114	Reset tare

For further bits, see Chapter 10.

7 SMA Protocol

7.1 General

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-232 interface or RS-485 interface is used as an interface. Fixed interface settings are 8 bits, no parity and 1 stop bit.

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

The instrument sends a reply on each received command after approx. 100 µs. With commands that wait for stability of the weight value, the reply can be delayed by the waiting time.

7.2 Description of Used Symbols

All characters used in this protocol are printable ASCII characters. Characters <CR> <LF> <SPACE> and <ESC> are excepted.

< >	The symbols < and > are used to put communication fields and non-printable ASCII characters into brackets. These symbols are never part of any communication message.
<LF>	A data set starts with a line feed character (line feed = 0A hex).
<CR>	A data set ends with the carriage return character (carriage return = 0D hex).
'_' <space>	The underscore or space character is used to mark an ASCII space character (20 hex).
<ESC>	The 'escape' character (1B hex) is used to cancel a command.
'!'	An ASCII exclamation mark (21 hex) is used for communication errors.
':'	An ASCII colon is used as a field delimiter.
'-'	ASCII minus sign (2D hex)
'?'	An ASCII question mark (3F hex) is used for unknown or non-supported commands.
'c'	Command character. All printable ASCII characters are permitted.
<s><r><n>	Scale status indicator characters; ASCII letters or spaces
<m><f>	For details, see page 180.
<r><e>	Scale diagnostics indicator characters; upper case ASCII letters or spaces.
<c><m>	For details, see page 182.
<xxxxxx.xxx>	Weight data including minus sign (right-adjusted) and a decimal point (if any). If necessary, leading spaces are introduced with a leading zero before the decimal point. The entire field is always 10 characters long. With some error states, the field is filled up with minus signs '-'.
	Examples: <_ _ _ _ _0.000>; <_ _ _ _11.120>; <_ _ _ _ -1.000>; <- - - - - - - - - ->
<yyyyyy>	Text field of printable ASCII characters; for transporting scale information. The field has max. 25 characters.
<uuu>	Abbreviation of the used unit. The field is always 3 characters long; it is left-adjusted and filled up with spaces.

7.3 SMA Command Set

The SMA command set is intended for requesting weight values and status information as well as for control of the scale. The commands start with <LF> and end with <CR>.

Format: <LF>c<CR>

Requesting a Weight

Requesting a Weight

Command:	<LF>W<CR>
Reply:	The scale immediately returns the weight and status: gross weight if not tared, net weight if tared.
	<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Requesting the Weight with Stability

Command:	<LF>P<CR>
Reply:	The scale returns the weight and the status only, when the stability condition is met: Gross weight if not tared, net weight if tared.
	For this function, the stability condition must be met. The maximum waiting time for stability is set under [Tare timeout]; see Chapter 5.4.13.
	<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>
	After elapse of the waiting time without reaching stability, the following reply is sent:
	<LF><_><1><n><_><f><----------><___><CR>
	For details, see page 180.

Requesting Weight Continuously

This is a command which generates non-requested replies, because it does not function according to the strict pattern of command and reply. After the command, the scale repeats the reply continuously.

Command:	<LF>R<CR>
Reply:	The scale repeats the weight and status information continuously until another command is received.
	<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Dependent on the used baud rate, the repetition rate of reply telegrams is roughly as follows:

19200 Bd ⇨ 100 ms
9600 Bd ⇨ 110 ms
4800 Bd ⇨ 170 ms

Requesting the High-Resolution Weight

Command:	<LF>H<CR>
Reply:	The scale immediately returns the high-resolution (10x) weight and status: Gross weight if not tared, net weight if tared.
	Note: The <n> gross/net status is shown in lower-case letters while the high-resolution weight is sent.
	<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Requesting the High-Resolution Weight with Stability

Command:	<LF>Q<CR>
Reply:	The scale returns the weight and status only, when the stability condition is met: Gross weight if not tared, net weight if tared.
	The stability condition must be met for this function. The maximum waiting time for stability is set under [Tare timeout]; see Chapter 5.4.13.
	<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>
	After elapse of the waiting time without reaching stability, the following reply is sent:
	<LF><_><1><n><_><f><----------><___><CR>
	For details, see page 180.

Requesting the High-Resolution Weight Continuously

This is a command which generates non-requested replies, because it does not function according to the strict command-and-reply pattern. After the command, the scale repeats the reply continuously.

Command:	<LF>S<CR>
Reply:	The scale repeats the high-resolution weight and status information continuously, until another command is received.
	<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Dependent on the used baud rate, the repetition rate of reply telegrams is roughly as follows:

19200 Bd ⇨ 100 ms
9600 Bd ⇨ 110 ms
4800 Bd ⇨ 170 ms

Requesting the Tare Weight

Command:	<LF>M<CR>
Reply:	The scale returns the tare weight and signals the 'tared' status in the <n> status character.
	<LF><s><r><T><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Controlling the Scale

Request for Taring of the Scale

Command:	<LF>T<CR>
Reply:	The scale makes a taring attempt and signals the tared status in the <s> and <n> characters.
	For this function, the stability condition must be met. The maximum waiting time for stability is set under [Tare timeout]; see Chapter 5.4.13.
	<LF><s><r><N><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Request for Taring with Fixtare Value

Command:	<LF>T<xxxxxx.xxx><CR>
Reply:	The scale makes a taring attempt using the fixtare value <xxxxxx.xxx> and signals the tared status in the <s> and <n> characters
	<LF><s><r><N><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Request for Zero Setting of the Scale

Command:	<LF>Z<CR>
Reply:	The scale makes a zero setting attempt and signals the zero status in the <s> character.
	For this function, the stability condition must be met. The maximum waiting time for stability is set under [Tare timeout]; see Chapter 5.4.13.
	<LF><Z><r><n><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.
	Unless the scale is in the zero setting range, an error reply is generated.

Request for Tare Resetting

Command:	<LF>C<CR>
Reply:	The scale deletes the tare weight and signals the tare reset status in the <n> status character. The scale tare is reset.
	<LF><s><r><G><m><f><xxxxxx.xxx><uuu><CR>
	For details, see page 180.

Scale Diagnosis

Command:	<LF>D<CR>
Reply:	The scale starts the diagnosis and returns a diagnosis reply.
	<LF><r><e><c><m><CR>
	For details, see page 180.

Scale Data

Scale Data – First Line

Command:	<LF>A<CR>
Reply:	The scale sends the first line of its scale data.
	<LF><SMA>:<yyyyyy><CR>
	For details, see page 180.

Scale Data – Other Lines

Command:	<LF>B<CR>
Reply:	The scale sends further lines of its scale data.
	<LF><MFG>:<yyyyyy><CR>
	For details, see page 180.

Scale Information

Scale Information - First Line

Command:	<LF>I<CR>
Reply:	The scale sends the first line of its scale information.
	<LF><SMA>:<yyyyyy><CR>
	For details, see page 180.

Scale Information – Other Lines

Command:	<LF>N<CR>
Reply:	The scale sends further lines of its scale information.
	<LF><TYP>:<yyyyyy><CR>
	For details, see page 180.

Escape Command

Command:	<ESC>
Reply:	This is the only command which does not work according to the protocol principle. It does not have a reply. The <ESC> character is detected at any time and cancels any current command.

7.4 SMA Reply Messages

In this section, the replies are described in detail. The data format of each reply has a fixed length. The communication error is the only exception from this pre-definable format. Thus the controlling computer can check each reply according to fixed rules, because each data field is in a fixed position.

Standard Reply

With most commands, the reply format is as described below:

Exceptions are the commands: 'D', 'A'/'B' and 'I'/'N'.

<LF> <s> <r> <n> <m> <f> <xxxxxx.xxx> <uuu> <CR>

Reply format and meaning:

<LF>		Start of reply message
<s>	Scale status	Definition / example
	'Z'	Zero within 1/4d <xxxxxx.xxx>= 0.000
	'O'	Above Max <xxxxxx.xxx>= +weight
	'U'	Below zero <xxxxxx.xxx>= - weight
	'E'	Zero setting error
	'T'	Taring error
	<space>	None of the above conditions
		Note: For 'E', 'I', 'T' error conditions
		<xxxxxx.xxx>= ————— (minus sign)
		And 'Z', 'O', 'U' are overwritten.
<r>	Range	('1', '2', '3', etc.) always '1' for single range scales
<n>	Gross/net	Status
	'G'	Gross weight
	'T'	Tare weight (as reply from 'M' command)
	'N'	Net weight
	'g'	High-resolution gross weight
	'n'	High-resolution net weight
<m>	Stability status	
	'M'	The scale is not stable
	<space>	The stability-of-scale condition is met
<f>	Reserved for future extensions	
<xxxxxx.xxx>	Weight value; the field has always 10 characters	
<uuu>	Unit of the weight value	
<CR>	End of the reply message	
Examples:		
Command	Reply	
<LF>W<CR>	<LF> <_> <1> <G> <_> <_> <_ _ _ _ 5.025> <lb_> <CR>	
<LF>W<CR>	<LF> <_> <1> <N> <_> <_> <_ _ _ _ 100000> <lb_> <CR>	
<LF>H<CR>	<LF> <_> <1> <g> <_> <_> <_ _ _ _5.0025> <lb_> <CR>	
<LF>Z<CR>	<LF> <Z> <1> <G> <_> <_> <_ _ _ _ _0.000> <lb_> <CR>	
<LF>R<CR>	<LF> <_> <1> <G> <_> <_> <_ _ _ _ 7.025> <kg_> <CR>	
	<LF> <_> <1> <G> <M> <_> <_ _ _ _ 7.650> <kg_> <CR>	
	... Repeat...	
	<LF> <_> <1> <G> <_> <_> <_ _ _ _ 7.650> <kg_> <CR>	
	The scale repeats the weight, until another command is received.	

Reply with Unknown Command

<LF> ? <CR>	A command from the controlling computer that is not implemented, or invalid, is replied with an ASCII '?'.

Reply in Case of Communication Error

<LF> ! <CR>	A command from the controlling computer that is unknown to the scale due to a communication error is replied with an ASCII '!'. This includes parity error or frame error (if any).

Reply with Diagnosis Command

When a diagnosis command is given, the scale makes a test and gives a status reply.

<LF> <r> <e> <c> <m> <CR>

Reply format and meaning:

<LF>	Start of diagnosis reply
<r>	'R' = RAM or ROM error; '_' = OK,
<e>	'E' = EEPROM error; '_' = OK
<c>	'C' = calibration error; '_' = OK
<m>	Always: '_' = OK
<CR>	End of the diagnosis reply

Example: without error status!

Command:	<LF>D<CR>
Reply:	<LF> <_> <_> <_> <_> <CR>

Reply with ‘A’ and ‘B’ Command

Reply format with 'A' and 'B' commands (variable length):

<LF><xxx>:<yyyyyy><CR>

The reply format and meaning are:

<LF>	Start of reply from 'A'/'B' command
<xxx>	The field name is three characters long, left-adjusted and filled up with spaces on the right, if necessary.
	The following fields are sent:
	“SMA” level/revision
	(reply from ‘A’ command)
	“MFG” manufacturer marking
	(reply from the 1st ‘B’ command)
	“MOD” product / model identification
	(reply from the 2nd ‘B’ command)
	“REV” software version
	(reply from the 3rd ‘B’ command)
	“SN_“ serial number
	(reply from the 4th ‘B’ command)
	“END”: This is always the last inscription field
	(reply from the last ‘B’ command)
':'	Separator between field name and field content.
<yyyyyy>	The data field contains up to 25 characters.
	The SMA field contains <level/revision>
	With the following meaning: level = (1, 2, etc.); revision = (1.0; 1.1; etc.)
<CR>	End of reply from 'A'/'B' command

Example:

Command	**Reply**
<LF> A <CR>	<LF>SMA:1/1.0 <CR>
<LF> B <CR>	<LF>MFG:Sartorius <CR>
<LF> B <CR>	<LF>MOD:PR5230 <CR>
<LF> B <CR>	<LF>REV:01.01.9 <CR>
<LF> B <CR>	<LF>SN_:148388723 <CR>
<LF> B <CR>	<LF>END: <CR>

Note: If the controlling computer sends another 'B' command:
<LF> B <CR> <LF> ? <CR>

Scale Reply with 'I' and 'N' Commands

Reply format with 'I' and 'N' commands (variable length):

<LF><xxx>:<yyyyyy><CR>

Reply format and meaning:

<LF>	Start of reply from 'I'/'N' command	
<xxx>	The field name is three characters long, left-adjusted and filled up with spaces, if necessary.	
	The following fields are sent:	
	"SMA"	level/revision
		(reply from 'I' command)
	"TYP"	Scale type: 'S'= scale
		(reply from the 1st 'N" command)
	"CAP"	Max, unit, scale interval and decimal position, separated by ':'
		Meaning: yyyyyy= uuu:c..c:n:d
		uuu= unit
		n= scale interval (e.g. 1, 2, 5,10,20...) without decimal point
		d= decimal point position
		'0'= without, '1'= xxxx.x, '2'= xxx.xx, '3'= xx.xxx , ... etc.
		(reply from the 2nd 'N' command)
	"CMD"	Supported SMA commands
		(reply from the 3rd 'N' command)
	"END"	This is always the last inscription field
		(reply from the last 'N' command)
':'	Separator between field name and field content.	
<yyyyyy>	The data field contains up to 25 characters.	
	The SMA field contains <level/revision>	
	Meaning: level = (1, 2, etc.); revision = (1.0, 1.1, etc.)	
<CR>	End of reply from 'I'/'N' command	

Example: 6000 kg x 1 kg platform scale

Command	Reply
<LF> I <CR>	<LF>SMA:2/1.0 <CR>
<LF>N<CR>	<LF>TYP:S <CR>
<LF>N<CR>	<LF>CAP:kg_:6000:1:0 <CR>
<LF>N<CR>	<LF>CMD:HPTMCR <CR>
<LF>N<CR>	<LF>END: <CR>

Example: 5000g x 1 g, 10000g x 2, 25000 g x 5 multiple range/multi-interval

Command	Reply
<LF> I <CR>	<LF>SMA:2/1.0 <CR>
<LF>N<CR>	<LF>TYP:S <CR>
<LF>N<CR>	<LF>CAP:g__:5000:1:0 <CR>
	<LF>CAP:g__:10000:2:0 <CR>
	<LF>CAP:g__:25000:5:0 <CR>
<LF>N<CR>	<LF>CMD:HPTMCRQ <CR>
<LF>N<CR>	<LF>END: <CR>

7.5 Communication Error

When a communication error due to a parity error or a frame error (if used) was detected, the scale sends an ASCII '!' character. The only other error is the detection of an unknown or non-supported command. In this case, an ASCII '?' character is sent as a reply. Dependent on the error messages, the controlling computer must decide how to continue the scale operation.

8 Asycom Protocol

This function enables the use of the following commands of the old EW-command set, e.g. PR 1612- command set.

No license is required for using.

8.1 Commands of the Weight Function

Command	Reply	Description
WGA	QGAwwwwwwemz	Read gross weight
WNA	QNAwwwwwwemz	Read net weight
WTA	QTAwwwwwwemz	Read tare weight wwwwwwe = Weight with sign and exponent (e.g. '002340' = 002.34 g; 001005 = 100 kg) e = Exponent m = 1: no motion/Stand still z = 1: tared with status request Possible error messages: E100@0 general error, for @ see Chapter 8.3 E30000 BCC error E50000 analog test active E60000 weighing point unknown
WZA	Q	Set instrument to zero Possible error messages: E100@0 general error, for @ see Chapter 8.3 E30000 BCC error E60000 weighing point unknown E70000 weighing point tared or no standstill
WSA	Q	Set tare
WSAwwwwwwe	Q	Fixtare Possible error messages: E100@0 general error, for @ see Chapter 8.3 E30000 BCC error E60000 weighing point unknown E63000 Fixtare > MAX E70000 weighing point tared or no standstill
WFA	Q	Reset tare Possible error messages: E100@0 general error, for @ see Chapter 8.3 E60000 weighing point unknown E70000 weighing point tared or no standstill
ZS1Awwwwwwewwwwwe ZS2Awwwwwwewwwwwe ZS3Awwwwwwewwwwwe	QZS1A QZS2A QZS3A	Set Limit 1 Set Limit 2 Set Limit 3 Possible error messages: E20000 error in telegram E60000 weighing point unknown E63000 Fixtare >MAX
I	QIwwwww ddssnnnnn	d = Unit, variable (mg, g, kg, t, lb, oz) ss = Scale interval (01, 02, 05, 10, 20, 50) nnnnn = Span in mV/V (01234 acc. 0.1234 mV/V)

8.2 Other Commands

Command	Reply	Description
ZSDTTMMJJJJssmm	QZSD	Set date and time Possible error messages: E20000 telegram too long E60000 telegram too short
ZSC	QZSC	Reset communication
V	QV5230-1.00	Version request
LV	QLVxxxx/xx-x.xxaaaaaa dssnnnnnttttt	xxxx/xx-x.xx = instrument version aaaaaa = Max in 5 digits with dec. point d = Unit, variable (mg, g, kg, t, lb, oz) ss = Scale interval (01, 02, 05, 10, 20, 50) nnnnn = Span in mV/V (e.g. 01234 acc. to 0.1234 mV/V) ttttt = deadload in mV/V (e.g. 00234 acc. to 0.0234 mV/V)

8.3 SPM Commands

Command	Reply	Description
mrx<aa><aa>	qmrx<0q>	Read SPM bit
mrb<aa><aa>	qmrb<dd>	Read SPM byte
mrw<aa><aa>	qmrw<dd><dd>	Read SPM word
mrd<aa><aa>	qmrd<dd<dd><dd><dd>	Read SPM double word
mrb<aa><aa><nn>	qmrb<dd>	Read SPM bytes
mrw<aa><aa><nn>	qmrw<dd>	Read SPM words
mrd<aa><aa><nn>	qmrd<dd>	Read SPM double words
Length 1 can be omitted.		
msx<aa><aa>	q	Set bit
mcx<aa><aa>	q	Clear bit
msb<aa><aa>	q	Set byte
mcb<aa><aa>	q	Clear byte
msw<aa><aa>	q	Set word
mcw<aa><aa>	q	Clear word
msd<aa><aa>	q	Set double word
mcd<aa><aa>	q	Clear double word
mwx<aa><aa><0q>	q	Write SPM bit
mwb<aa><aa><dd>	q	Write SPM byte
mww<aa><aa><dd><dd>	q	Write SPM word
mwd<aa><aa><dd><dd><dd><dd>	q	Write SPM D word
mwb<aa><aa><nn><dd>	q	Write nn SPM bytes
mww<aa><aa><nn><dd><dd>	q	Write nn SPM words
mwd<aa><aa><nn><dd><dd><dd><dd>	q	Write nn SPM D words
Length 1 can be omitted. An AND/OR function is also possible.		

Legend

(<aa> a character in binary code)

m	Memory command, binary
r,w,a,o,s,c	Read, write, AND, OR, set, clear
x,b,w,d	Bit, byte, word, double word
q	Quit

<aa><aa>	Address (high byte, low byte)
<dd>	Data byte
<nn>	Number of data
<0q>	1 bit
<dd>	Several data bytes

In case of error, the reply is e<xx><yy><zz>, see also Chapter 8.4.

Note: The addresses in these telegrams are binary.
Die addresses in the list of Chapter 9 are decimal.

8.4 Error Messages for Asycom Commands

Error	Description	Error	Description
E20000	Error in telegram structure	E10010	Arithmetic overflow
E30000	BCC error	E10020	Overload
E40000	Hardware error messages	E10030	ADC hardware error
E50000	Analog test active	E10040	weight > 5 digits
E60000	Wrong address/weighing point	E10050	No weight
E63000	Fixtare > MAX	E10060	No Sense voltage
E70000	Tared weighing point or no standstill	E10070	Exchanged inputs

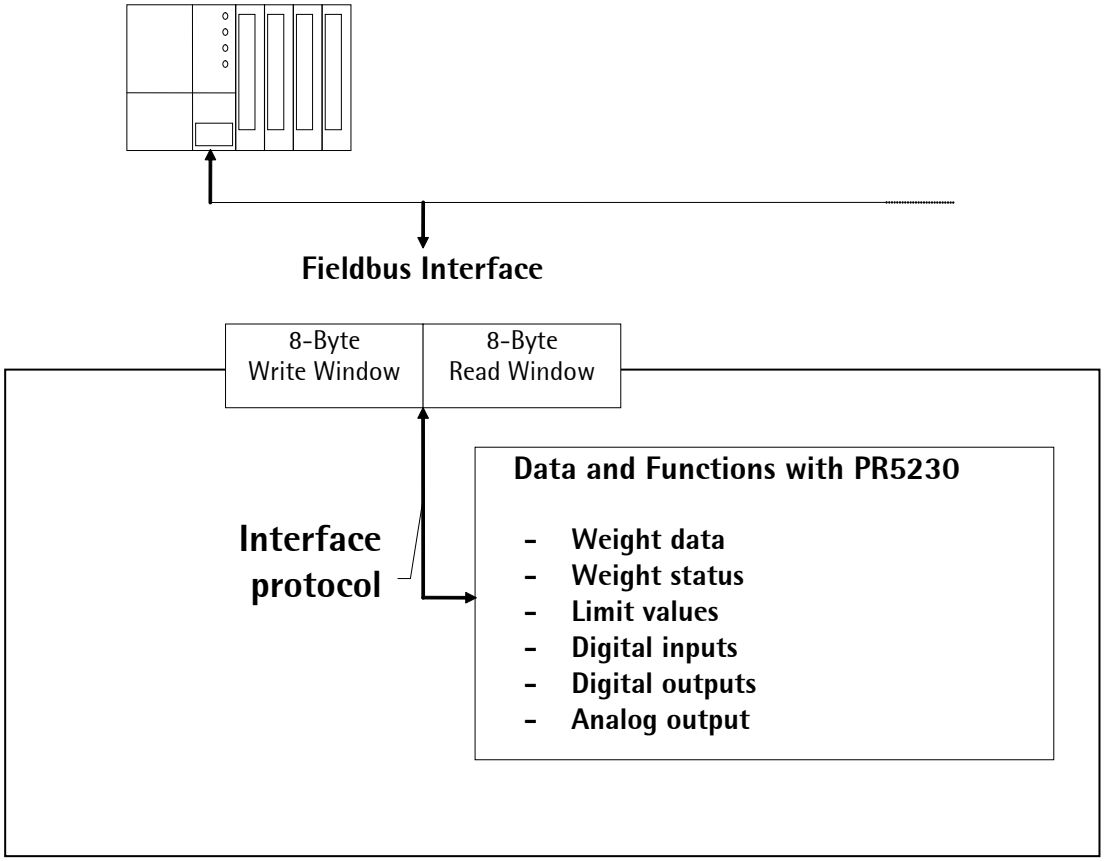
9 Fieldbus Interface

9.1 Fieldbus Interface Protocol

The interface works with an 8-byte write window and an 8-byte read window. The fieldbus exchanges its data cyclically with each slave. This means: In each cycle, 8 bytes are written and 8 bytes are read, also if the data content is unchanged.

The fieldbus protocol ensures the data transport between the fieldbus master and the 2 x 8-byte data windows.

The interface protocol runs under the fieldbus and manages the access to a multitude of different data.



Write Window (Input Area)

Data transmission from the master to the slave (PR 5230) is in this window.

The first four bytes are used only for writing a data value.

The register number is in byte 5.

Bytes 6 and 7 contain bits in direct access independent of the write data.

The command is executed after a 0-1 transition of the corresponding bit.

Byte 0	Write data: MSB
Byte 1	"
Byte 2	"
Byte 3	Write data: LSB
Byte 4	Read_Value _Select
Byte 5	Write_Value _Select
Byte 6	Direct control bits
Byte 7	Direct control bits

Read Window (Output Area)

Data transmission from the slave (PR 5230) to the master is in this window.

The first four bytes are used for reading a data value.

The register number of data is mirrored in byte 4 by the write window, when data is available.

Bytes 5, 6 and 7 contain status bits independent of the read data.

Byte 0	Read data: MSB
Byte 1	"
Byte 2	"
Byte 3	Read data: LSB
Byte 4	Read_Value _Selected
Byte 5	General system bits: - Write_Active - power_fail - analog error...
Byte 6	Status bits
Byte 7	Status bits

Reading and Writing Data

The number of data exceeds the size of the read/write window by far. For this reason, data is addressed with Write_Value_Select and Read_Value_Select. To do this, the first six bytes of the write window and the first five bytes of the read window are required. These can be used by the master to write data in PR 5230: e.g., a limit value is set to 100 kg. The master can also read out weight values or other data from the PR 5230. For this purpose, the write and the read window are always required. Safe data exchange is ensured by a write and a read procedure.

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

Procedure for reading data:

1. Writing the register number as Read_Value _Select in byte 4 of the **write window** (e.g. net weight).
2. Waiting, until the Read_Value _Selected in byte 4 of the **read window** is equal to the Read_Value _Select in byte 4 of the write window.
3. Now the value is available in bytes 0 to 3.

Procedure for writing data:

1. Waiting, until Write_Active = 0 in the **read window** (ready to receive new data).
2. Writing the value in bytes 0 to 3.
3. Writing the register number in byte 5 (Write_Value_Select).
4. Waiting, until Write_Active = 1 (acknowledges data reception).
5. Writing 0 in byte 5 (Write_Value_Select) -> Write_Active goes to 0.

9.2 Description of the I/O Area (Read / Write Window)

Input Area

Data transmission from the master to the PR 5230 (slave) is via the input area.
Weight or data requests are transmitted to the slave by the master.
The master has write access; the slave has read access.

Byte	Name								Description
0	Write_Value (MSB)								e.g. limit value
1	:::								"
2	:::								"
3	Write_Value (LSB)								"
4	Read_Value_Select								e.g. gross weight
5	Write_Value_Select								Write: Limit 1 On
6	free	Res M3	Res M2	Res M1	free	Set M3	Set M2	Set M1	Free/digital outputs
7	Get FixTare	Set FixTare	Res Power	Res Test	Set Test	Res Tare	Set Tare	Set Zero	Control byte, response to 0->1 transition
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

The control byte activates the corresponding action in the instrument with a set bit.
After execution of the operation, the bit should be reset.

Variable	Function
Write_Value	The weight value is transmitted as a binary 32-bit value with plus or minus sign Data type: DINT
Read_Value_Select	For selecting the value sent by the instrument
Write_Value_Select	For selecting the function to be executed by the instrument
GetFixTare	The gross weight is copied into the fixtare memory.
SetFixTare	Taring is performed using the value stored in the fixtare memory.
ResPower	The Power_Fail bit in the output area is deleted.
ResTest	The test operating mode is finished.
SetTest	The test operating mode is started. Now the test value can be read out by reading the gross weight.
ResTare	Tare is reset.
SetTare	The scale is tared.
SetZero	The scale is set to zero.
Res M1...3	Marker 1...3 is reset
Set M1...3	Marker 1...3 is set

Output Area

Data transmission from the PR 5230 to the master is via the output area.

The weight or data information requested by the master is transmitted to the master by PR 5230.

The PR 5230 has write access, the master has read access.

Byte	Name								Description
0	Read_Value (MSB)								e.g. gross value
1	:::								"
2	:::								"
3	Read_Value (LSB)								"
4	Read_Value _Selected								e.g. gross
5	Write Active	Power Fail	Out 3	Out 2	Out 1	Limit 3	Limit 2	Limit 1	Status
6	Cmd Busy	Cmd Error	Inp.3	Inp.2	Inp.1	Tare Active	Cal Active	Test Active	Command status
7	Out	Stand-still	Inside ZSR	Center Zero	Below Zero	Over-load	Above Max	Adu Error	Device status
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Variable	Function
Read_Value	The weight value is transmitted as a binary 32-bit number with plus or minus sign. Data type: DINT
Read_Value_Selected	Acknowledgement of the transmitted value.
Write_Active	The function selected with Write_Value_Select is executed once. This bit is deleted, when Write_Value_Select is set to 0.
Power_Fail	Is set when switching on the instrument. Is reset by ResPower with transition from 0→1.
Cmd_Busy	The instrument is busy executing a command (e.g. the instrument has received a taring command and waits for stability.
Cmd_Error	The instrument has interrupted the execution of a command (e.g. Standstill could not be reached within the defined standstill time). The error number can be read at LastError. It is set only, if an action is executed.
Tare_Active	The instrument was tared.
Cal_Active	The instrument is / was configured. When this bit is 1, the scale parameters (Expo/Unit/Step) must be read again. Set after power On and reset after reading the max. capacity.
Test_Active	The instrument executes the ADC test. The read weight value is not the gross value, but the test value.
Out	Below zero or above Max (FSD)
Standstill	The instrument is stable.
InsideZSR	The weight value is within the zero setting range.
CenterZero	The weight value is within center zero (0 +/- 0.25 d)
BelowZero	The weight value is negative (gross< -0.25d)
Overload	The weight value has exceeded the measuring range; no valid weight data is specified (gross>max. capacity+overload)
AboveMax	The weight value has exceeded the Max. capacity, but is still within Max + permissible overload (gross <= max. capacity+overload)
AduError	A/D conversion error. (Details are given in register 1, Read_Value_Select = 1)

Reading and Writing Register via Fieldbus

Reading Data: Read_Value, Read_Value_Select, Read_Value_Selected

When the master has to read from the instrument, the register number is transmitted in Read_Value_Select in the input area. The result is specified with Read_Value_Selected in the output area.

Action of the master	Response of PR 5230
Writing register no. in Read_Value_Select	
	Writing the selected register in Read_Value
	Copying Read_Value_Select into Read_Value_Selected
Waiting, until Read_Value_Selected = Read_Value_Select	
Reading Read_Value	

Writing data: Write_Value, Write_Value_Select, Write_Active

When the master has to write into the instrument, the required action is transmitted into the input area with Write_Value_Select together with the data. Execution is indicated by bit Write_Active in the output area.

Action of the master	Response of PR 5230
Writing value in Write_Value	
Writing the register number in Write_Value_Select	
	Writing Write_Value in the selected register
	Setting bit Write_Active
Waiting, until Write_Active was set	
Writing 0 in Write_Value_Select	
	Resetting bit Write_Active

Setting Bit: Action_Select, Write_Active

Single bits can be set or reset directly with Write_Value_Select.

For setting, the bit number (80.. 127) is written in Write_Value_Select.

For resetting, the bit number + 128 (208..255) is written in Write_Value_Select.

Action of the master	Response of PR 5230
Writing register number in Write_Value_Select	
	Writing Write_Value in the selected register
	Setting the Write_Active bit
Waiting, until Write_Active was set.	
Writing 0 in Write_Value_Select	
	Resetting the Write_Active bit

Reading Bit

Single bits can be read only by reading a register. The procedure is described in page 193.

Control Byte

Some instrument functions can be executed by setting bits in the input area directly.

Action of the master	Response of PR 5230
Setting bits in the control byte	
	The operation is handled
Resetting bits in the control byte	

Waiting for the Result of the Action

When an action taking a longer time was started, the end of execution can be waited for after starting (see page 193 and 194).

Action of the master	Response of PR 5230
Setting bits as on page 193 or 194	
	Acknowledging the set bit as on page 193
	Setting the CmdBusy bit
	The operation is handled
	In the event of an error: Setting the CmdError bit and the LastError byte
	Resetting the CmdBusy bit
Waiting, until CmdBusy was reset	
Checking the CmdError bit	
When set, reading LastError (see page 193)	

This is applicable to taring, zero setting etc. over the fieldbus.

Example: Reading the Gross Weight

The master writes value 8 in Read_Value_Select (byte 4) of the input area.

Input area

Byte	Value								Description
0									
1									
2									
3									
4	8								Gross
5									
6									
7									

The master waits, until value 8 was reflected in Read_Value_Selected (byte 4) of the output area.

Output area

Byte	Value								Description
0	00								Gross value
1	00								"
2	4								"
3	D2								"
4	8								Gross weight request was detected
5									Status
6								Test Active	Command status
7		Stand-Still	Inside ZSR	Center Zero	Below Zero	Over-load	Above Max	Adu Error	Device status
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

The gross value (hex:000004D2 <=> 1234) can be read from bytes 0...3. When the 'Overload', 'Test Active' or 'ADC error' bits are set, the read value is invalid.

Negative values are output in two's complement.

9.3 Special hints for DeviceNet and EtherNet-IP

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

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

Sequence of bytes 0...3, e.g. with device type and software version, see table:

Standard sequence		Sequence for DeviceNet and EtherNet –IP	
Byte 0	TYPE MSB	Byte 0	SUBVERSION
Byte 1	TYPE LSB	Byte 1	MAINVERSION
Byte 2	MAINVERSION	Byte 2	TYPE LSB
Byte 3	SUBVERSION	Byte 3	TYPE MSB

Consequently, the sequence on the PLC side must be changed when using the DeviceNet and EtherNet –IP field bus types.

9.4 Fieldbus Register

Register 0: IO Status Bits for Reading

(Dynamic status), only reading is permitted

	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								

Register 1: Scale Status

(Dynamic status), only reading is permitted

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	OUT	STND	INZSR	CZERO	BELOW0	OVL	>Max	ADUERR
Byte 1				E9	E6	E1	E3	E7
Byte 2						PowerFail	ActionActive	CmdError
Byte 3						TareActive	CalActive	TestActive

Byte 0 corresponds to byte 7 in the output area; for weight error, see also the table in Chapter 15.1.

ADUERR	Error of analog conversion/ load cell circuit (OR function of the E1, E3, E7 bits)
>Max	Gross value is higher than Max (FSD); the full scale deflection was exceeded.
OVL	Scale overload; Gross >Max + overload, `Error 2`
BELOW0	Gross weight is negative (<0-¼d)
CZERO	Center of zero; weight within 0 ±¼d
INZSR	The gross weight is within the zero setting range
STND	The scale is stable
OUT	Below zero or above Max (FSD) (0-¼d >weight value >Max)
E7	The input signal is negative (inverse conversion), `Error 7`
E6	No sense voltage, or Sense voltage is low, `Error 6`
E3	The input signal is >36mV (no end of conversion), `Error 3`
E1	Arithmetic error (overflow), `Error 1`
E9	No communication with xBPI scale, `Error 9`

CmdError	Error during execution (cmdError); e.g. the 'taring' operation is not handled, because the scale is not stable. The error is stored in LastError (register 4). The bit is reset with the ResetError bit (register 121).
ActionActive	The operation is handled; handling is busy
PowerFail	Power failure; is always set after power on. The PowerFail bit is reset with the ResetPWF bit (register 85) 'Reset power failure'.
TestActiv	The analog test is busy
CalActive	The instrument is/was configured. When this bit is 1, the scale parameters (Expo/Unit/Step) must be read again. Set after power On and reset after reading the max. capacity.
TareActiv	The instrument was tared.

Register 2: State of State-Controlled Action Bits

Only reading is permitted; the signal state is shown.

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

Register 4: Calibration Information, Error Byte

Only reading is permitted.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	EXPO							
Byte 1	UNIT							
Byte 2	STEP							
Byte 3	LASTERROR							

EXPO	One byte for the position of the decimal point; content in decimal form 0 ... 255
	0 = 000000
	1 = 00000.0
	2 = 0000.00
	3 = 000.000
	4 = 00.0000
	5 = 0.00000
UNIT	One byte for the weight unit; content in decimal form: 0 ... 255
	2 = g, grams 3 = kg, kilograms
	4 = t, tons 5 = lb, pound
STEP	One byte for scale interval; content in decimal form: 0 ...255
	1 = scale interval '1', 2 = scale interval '2', 5 = scale interval '5'
	10 = scale interval '10', 20 = scale interval '20', 50 = scale interval '50'
LASTERROR	LastError byte; see also CmdError bit, number of 'last error':
	31 = no stability was reached (e.g. when taring)
	33 = negative weight value when taring and 'legal-for-trade' mode on
	47 = no zero setting; weight not within zero setting range
	107 = no stability with Getfixtare

Register 5: Device Type and Software Release

Only reading is permitted.

	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. 5230 Rel. 1.00 = 52300100_{hex}

Register 6: Board Number

Only reading is permitted.

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

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

Register 7: (Reserved)

Register 8 ...15: Weight Data

Only reading is permitted.

The gross, net and tare weight are stored as DINT fix point.

The real data value is derived from DINT and EXPO as follows:

$$Value_{Real}=reading_{DINT}*10^{(-EXPO}$$

Register 8	Current gross value
Register 9	Current net value, if tared; otherwise gross
Register10	Current tare value, if tared, otherwise 0
Register11	Actual gross/net selected with X72
Register12	Reserved
Register13	Reserved
Register14	Max
Register15	Reserved

Register 24 ... 29: Limit Values (Read/Write)

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

Register 30, 31: Fixed Values (Read/Write)

Register 30	Fixed value for analog output; value (num) 0... 20000 corresponds to 20 mA
Register 31	Fixed value for fixtare; see also SetFixTare, GetFixTare (see page 197)

Register 80 ... 89: State-Controlled Action Bits (Write)

For setting bits, see page 193.

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 page 193), the bit is reset at the specified number +128.

Register 80	SetZero	Set the gross weight to zero
Register 81	SetTare	Execute taring
Register 82	ResetTare	Reset tare
Register 83	SetTest	Start the ADC test
Register 84	ResetTest	Finish the ADC test
Register 85	ResetPwf	Reset the PowerFail bit (Register 1; the bit was set after power on)
Register 86	SetFixTare	Taring with weight in numerical address D31 'Fixtare'
Register 87	GetFixTare	The current gross weight is copied into numerical address D31.
Register 89	ResetError	The CmdError error bit is reset

Register 112 ... 121: Transition-Controlled Action Bits (Write)

For setting bits, see page 193.

As soon as the bit was set, it is reset internally and the operation is handled; this is transition-controlled (for writing once).

The bit is set as Write_Value_Select with the specified number (see page 193).

Register 112	SetZero
Register 113	SetTare
Register 114	ResetTare
Register 115	SetTest
Register 116	ResetTest
Register 117	ResetPwf
Register 118	SetFixTare
Register 119	GetFixTare
Register 121	ResetError

To prevent excessively frequent writing in the EAROM memory, the write interval should not be less than 15 seconds.

10 Global SPM Variables

Definined ranges are assigned to firmware functions.

Weights are DINT formats in 'kg' or 'lb', depending on scale configuration.

For communication via OPC, the following variables are available:

Format	Address for read [R]/ write [W]	Funktion	Address
BOOL	R	Digital input 1	X0
BOOL	R	Digital input 2	X1
BOOL	R	Digital input 3	X2
BOOL	R	Digital output 1	X8
BOOL	R	Digital output 2	X9
BOOL	R	Digital output 3	X10
BOOL	R	Output limit 1	X16
BOOL	R	Output limit 2	X17
BOOL	R	Output limit 3	X18
BOOL	R	ADC error	X32
BOOL	R	Above Max (FSD)	X33
BOOL	R	Overload, above (Max + plus the range that is still permissible)	X34
BOOL	R	Below zero	X35
BOOL	R	Zero ±¼d	X36
BOOL	R	Within the zero setting range	X37
BOOL	R	The weight is stable	X38
BOOL	R	Below zero or above Max (FSD)	X39
BOOL	R	Load cell measuring signal negative (error 7)	X40
BOOL	R	Load cell measuring signal >36 mV (error 3)	X41
BOOL	R	Internal arithmetic error; CAL data are perhaps faulty (error 1)	X42
BOOL	R	No or too low sense voltage (error 6)	X43
BOOL	R	No Communication with xBPI scale (error 9)	X44
BOOL	R	Command error	X48
BOOL	R	Command active	X49
BOOL	R	Power fail signal	X50
BOOL	R	Test mode active	X56
BOOL	R	Calibration active	X57
BOOL	R	Instrument is tared	X58
BOOL	R/W	Read/write marker bit 1	X64
BOOL	R/W	Read/write marker bit 2	X65
BOOL	R/W	Read/write marker bit 3	X66
BOOL	W	Switch D11 to net weight	X72

Format	Address for read [R]/ write [W]	Funktion	Address
BOOL	W	Set the instrument to zero	X112
BOOL	W	Set tare of the instrument	X113
BOOL	W	Reset the tare of the instrument	X114
BOOL	W	Start the ADC test	X115
BOOL	W	Finish the ADC test	X116
BOOL	W	Reset the power fail signal	X117
BOOL	W	Set the fixtare value as tare	X118
BOOL	W	Store the current gross weight in the fixtare memory (D31)	X119
BOOL	W	Start printing	X120
BOOL	W	Reset error	X121
BOOL	W	Read actual date and time	X123
BOOL	W	Store (set) actual date and time	X124
BYTE	R	Indicator status	B4 (X32...X39)
BYTE	R	ADC status	B5 (X40...X44)
BYTE	R	Command status	B6 (X48...X50)
BYTE	R	Active status	B7 (X56...X58)
BYTE	R	Exponent (digits behind the decimal point)	B16
BYTE	R	Weight unit 2=gr, 3=kg, 4=t, 5=lb	B17
BYTE	R	Scale interval (multi-interval/multiple range: d1 or e1)	B18
USINT	R	Last error	B19
BYTE	R	High byte of product code (0x54)	B20
BYTE	R	Low byte of product code (0x10)	B21
BYTE	R	Major version number (**1**.0)	B22
BYTE	R	Minor version number (1.**0**)	B23
UDINT	R	Boardnumber	D6
DINT	R	Current gross weight	D8
DINT	R	Current net weight	D9
DINT	R	Current tare weight	D10
DINT	R	Current gross/net weight selected with X72	D11

Format	Address for read [R]/ write [W]	Funktion	Address
DINT	R	MAX weight (FSD)	D14
DINT	R	MIN weight	D15
DINT	W	Counter will be incremented on every PLC-cycle	D23
DINT	W	Weight limit 1 on	D24
DINT	W	Weight limit 1 off	D25
DINT	W	Weight limit 2 on	D26
DINT	W	Weight limit 2 off	D27
DINT	W	Weight limit 3 on	D28
DINT	W	Weight limit 3 off	D29
UDINT	W	Analog output for 'transparent' mode	D30
DINT	W	Write the value in the fixtare memory	D31
REAL	R	Current gross value (as float)	R264
REAL	R	Current net value (as float)	R265
REAL	R	Current tare value (as float)	R266
REAL	R	Gross/net selected by X72 (as float)	R267
REAL	R	Max value from scale (FSD) (as float)	R270
REAL	R	Min value from scale (as float)	R271
REAL	R	Last printed gross value (as float)	R272
REAL	R	Last printed net value (as float)	R273
REAL	R	Last printed tare value (as float)	R274
REAL	R/W	Limit 1 on value (as float)	R280
REAL	R/W	Limit 1 off value (as float)	R281
REAL	R/W	Limit 2 on value (as float)	R282
REAL	R/W	Limit 2 off value (as float)	R283
REAL	R/W	Limit 3 on value (as float)	R284
REAL	R/W	Limit 3 off value (as float)	R285
REAL	R/W	Preset for fix tare (as float)	R287
INT	R	Conversion counter	W14

11 Configuration Print-out

The print-out can be started by [Configuration Printout] or using the keys Setup and via VNC (click one after another).

Prerequisite: Printer is connected, [Setup]-[Serial ports parameter]-[Printer]: e.g. [Builtin RS232].
Printing parameter has been set, [Setup]- [Printing parameter].

```
Configuration of PR5230
=====================================
Printed          :2009-10-14 11:36:27
Firmware (Beta) :Rel. 00.90.00.58374
                 :   2009-10-14 10:51
Application      :      Rel. 01.00.00
                     2009-09-04 10:57

Bios (Beta)      :Rel. 00.98.00.56454
                     2009-08-24 16:42

Boardnumber      :           327924490

HW-Options
=====================================
Builtin          :               RS485
Builtin          :               RS232
Builtin          :         digital i/o
PR1721/41        :         Profibus-DP
PR5230/W1        :                 ADC

Fieldbus parameter
=====================================
Fieldbus protocol  :      Profibus-DP
Profibus-DP address:                3

PR1721/41 Profibus-DP  version
=====================================
Fieldbus sw version:            02.01
Module sw version  :            02.01
Serial number      :       2685112110

Operating parameter
=====================================
Address          :                   A
PIN              :                   0
Sequencenumber   :                1092
Set Tare Key     :  tare & reset tare
Set zero key     :reset tare on zeros

Printing parameter
=====================================
Printing mode       :       Triggered
PrintlayoutItem1    :           CR/LF
PrintlayoutItem2    :     Grossweight
PrintlayoutItem3    :       Netweight
PrintlayoutItem4    :      Tareweight
PrintlayoutItem5    :          -none-
PrintlayoutItem6    :          -none-
```

```
Limits
=====================================
Limit 1 on       :              100 kg
          Action :set marker 1  X64=1
       Condition :no condition  -----
Limit 1 off      :              100 kg
          Action :clr marker 1  X64=0
       Condition :tare activ    X58=1

Limit 2 on       :              300 kg
          Action :         -no action-
Limit 2 off      :              290 kg
          Action :         -no action-

Limit 3 on       :              150 kg
          Action :         -no action-
Limit 3 off      :              100 kg
          Action :         -no action-

Digital I/O
=====================================
Output 1         :act. diginp 1 X00=1
Output 2         :marker bit 2  X65=1
Output 3         :cal activ     X57=1

Input 1 on       :select net    X72=1
Condition        :no condition  -----
Input 1 off      :         -no action-

Input 2 on       :select gross  X72=0
Condition        :no condition  -----
Input 2 off      :         -no action-

Input 3 on       :         -no action-
Input 3 off      :         -no action-

Analog out
=====================================
Analog mode      :Selected         D11
Analog range     :             0..20mA

Output on error  :                0mA
Output if < 0    :              linear
Output if > Max  :                20mA

Weight at 0/4mA  :                0 kg
Weight at 20mA   :             1000 kg
```

```
Serial assignment
====================================
Printer          :       Builtin RS232
Remote display   :            - none -
JBUS/MOD-Bus     :            - none -
SMA              :            - none -
Asycom           :            - none -

Serial port Builtin RS232
====================================
Protocol         :         no protocol
Baudrate         :             9600 bd
Bits             :                   8
Parity           :                none
Stopbits         :                   1

Network settings
====================================
HW-address       :   00:90:6C:8B:BB:0A
Hostname         :            HOPPER 1
Use DHCP         :                 Yes
VNC-Client       :     255.255.255.255

Display configuration
====================================
Item 1           :     Indicator value
Item 2           :            Bargraph
Item 3           :              Limits
Item 4           :         Digital I/O
Item 5           :               Gross
Item 6           :          IP-address
Item 7           :                 Net
Item 8           :       Fieldbus LEDs
Item 9           :                Tare
Item 10          :       Analog output

Calibration
====================================
Max              :            10000 kg
                              10000 d
Scale interval                    1 g
Deadload at      :      +0.100000 mV/V
                 :          1000.00 kg
Max at           :      +1.000000 mV/V
                 :         10000.00 kg
Calibrated with  :      +1.000000 mV/V
Sensitivity      :        250.00 cnt/d
                 :       1.200000 uV/d
```

```
Parameters
====================================
Measuretime      :            40 ms
Digital filter   :             off
External supply  :        above 8V
Test mode        :        Absolute
W & M            :            none
Standstill time  :          0.08 s
Standstill range :          1.00 d
Tare timeout     :           0.3 s
Zeroset range    :       9000.00 d
Zerotrack range  :       9000.00 d
Zerotrack step   :          0.00 d
Zerotrack time   :           0.0 s
Overload         :          1000 d
Minimum weight   :             0 d
Range mode       :  Multiple range
Range limit 1    :             0 kg
Range limit 2    :             0 kg
```

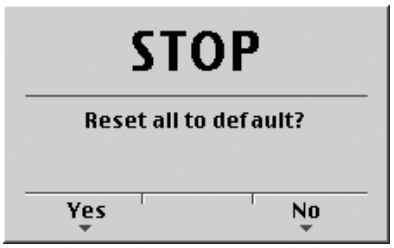
12 Extended Functions

12.1 Resetting the Instrument to the Factory Settings

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

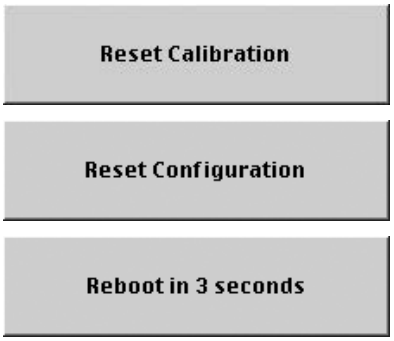
1. Click on Setup.
2. Click on C.

The following message is displayed:



Reply [Yes] for reset to the factory settings.
Reply [No], if you want to keep the entered values unchanged.

The following messages show the respective progress:



12.2 Updating a new Software with ‚FlashIt'

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

12.2.1 Updating in a Network Using DHCP Service

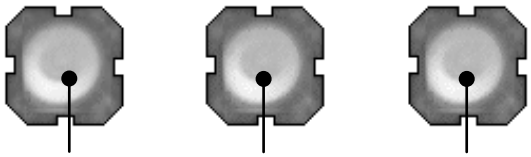
Prerequisites:
- Device and notebook/PC are connected to a network.
- The automatic address assignment 'DHCP' is activated in the device and in the notebook/PC (default setting), see Chapter 18.2/18.3.
- The 'FlashIt!32' program (in a directory on the enclosed CD-ROM) is installed on the notebook/PC.
- The 'FlashIt!32' program is started.

Operations on the instrument

Danger! High Voltage!

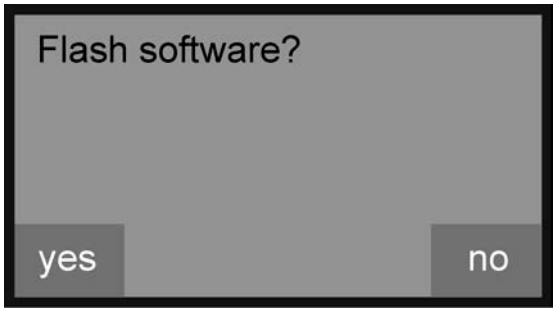
Working on the instrument while it is switched on may have life-threatening consequences.

The operation may be performed only by trained and qualified persons who are familiar with the implied hazards and avoid them, or take adequate measure to protect themselves.



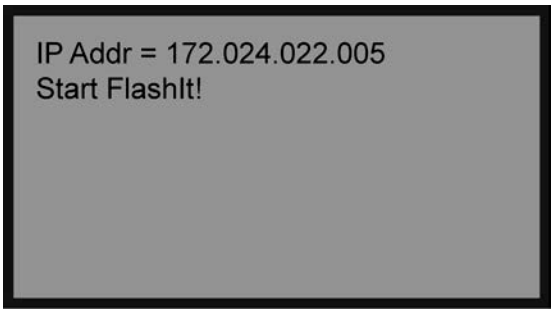
1. Open the door of the instrument.
2. Press keys (1) and (3) simultaneously and press key (2) three times.

On the display appears:



3. Press the key (1) to confirm the loading of the software.

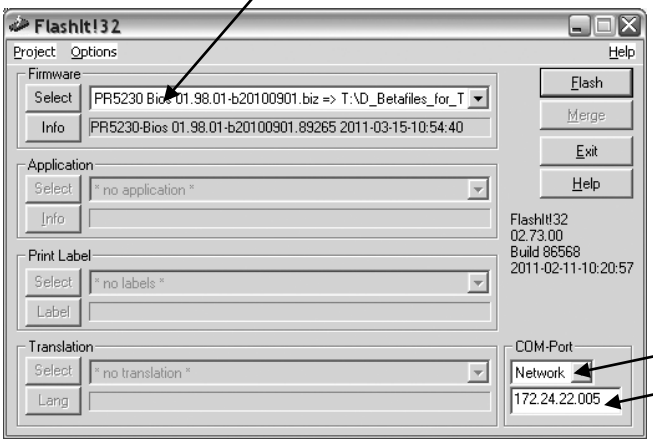
On the display appears:



Now the device is ready to load the software.

Procedure on the Notebook/PC

4. Click the relevant file in the 'Explorer' with the mouse and drag it into window [Select] (or use 'Copy and paste').



5. Select [Network].
6. Fill in the device IP address.
7. Click [Flash] to start the procedure.

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

Now the next file (firmware) can be loaded as described in steps 2...7.

12.2.2 Updating via a Point-to-Point Connection with DHCP Service

Function 'Auto-IP' is used.

Prerequisites:

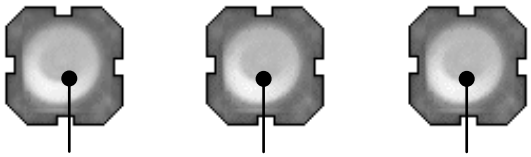
- Device and notebook/PC are connected to each other.
- The automatic address assignment 'DHCP' is activated in the device and in the notebook/PC, see Chapter 18.2/18.3.
- The 'FlashIt!32' program (in a directory on the enclosed CD-ROM) is installed on the notebook/PC.
- The 'FlashIt!32' program is started.

Operations on the Instrument

Danger! High Voltage!

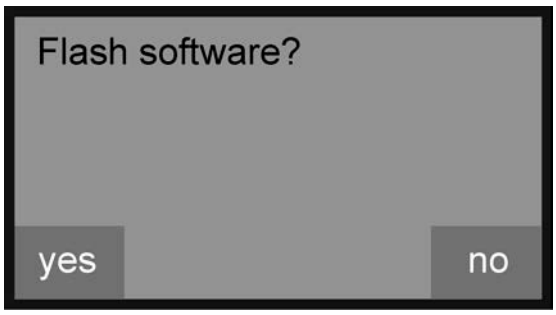
Working on the instrument while it is switched on may have life-threatening consequences.

The operation may be performed only by trained and qualified persons who are familiar with the implied hazards and avoid them, or take adequate measure to protect themselves.



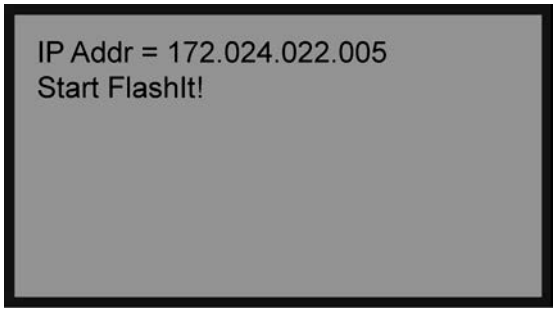
1. Open the door of the instrument.
2. Press keys (1) and (3) simultaneously and press key (2) three times.

On the display appears:



3. Press the key (1) to confirm the loading of the software.

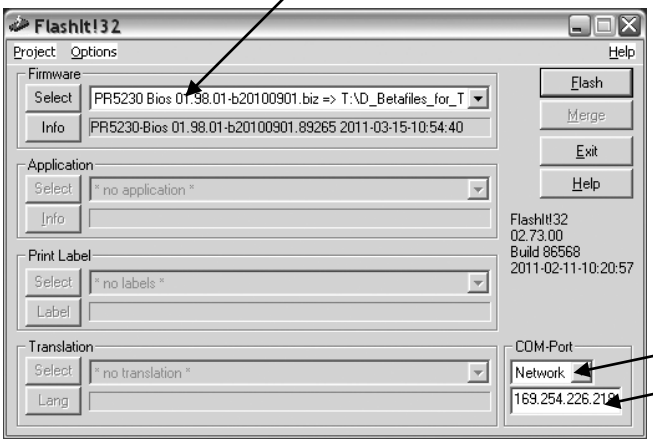
On the display appears:



Now the device is ready to load the software.

Procedure on the Notebook/PC

4. Click the relevant file in the 'Explorer' with the mouse and drag it into window [Select] (or use 'Copy and paste').



5. Select [Network].
6. Fill in the device IP address.
7. Click [Flash] to start the procedure.

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

Now the next file (firmware) can be loaded as described in steps 2...7.

12.2.3 Updating the Software in a Network with a Fixed IP Address

Prerequisites:

- Device and notebook/PC are connected to each other.
- The automatic address assignment 'DHCP' is deactivated in the device and in the notebook/PC, see Chapter 18.2/18.3.
- The 'FlashIt!32' program (in a directory on the enclosed CD-ROM) is installed on the notebook/PC.
- The 'FlashIt!32' program is started.

Device presettings in the setup menu

1. Select Setup-[Network parameter].

Setup/**Network parameter**	
HW address	00:90:6C:6B:6A:5E
Hostname	**PR5230-6A6B5E**
Use DHCP	☐
IP Address	**172.24.22.5**
Subnetmask	**255.255.0.0**
Default gateway	**0.0.0.0**
Remote access	
VNC-Client	**255.255.255.255**

2. Enter the corresponding IP address.
3. Enter the corresponding subnet mask.
4. Leave with Exit.

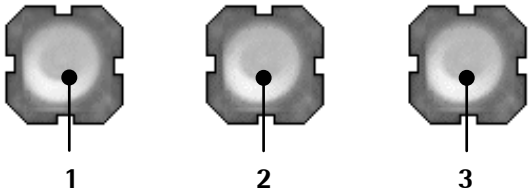
The IP addresse is shown in the display of the device.

Operations on the Instrument

Danger! High Voltage!

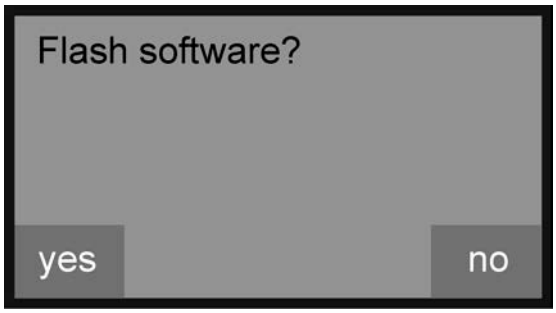
Working on the instrument while it is switched on may have life-threatening consequences.

The operation may be performed only by trained and qualified persons who are familiar with the implied hazards and avoid them, or take adequate measure to protect themselves.



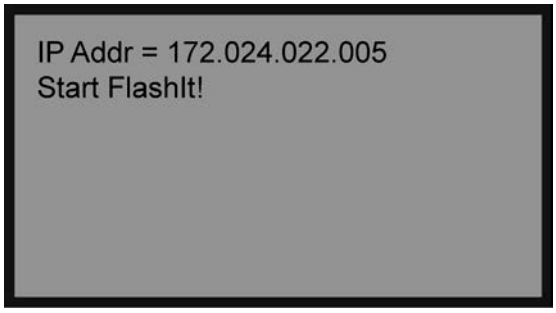
1. Open the door of the instrument.
2. Press keys (1) and (3) simultaneously and press key (2) three times.

On the display appears:



3. Press the key (1) to confirm the loading of the software.

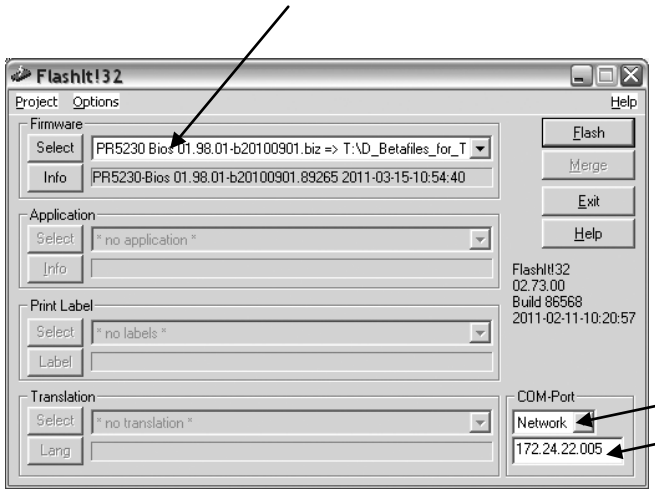
On the display appears:



Now the device is ready to load the software.

Procedure on the Notebook/PC

4. Click the relevant file in the 'Explorer' with the mouse and drag it into window [Select] (or use 'Copy and paste').



5. Select [Network].
6. Fill in the device IP address.
7. Click [Flash] to start the procedure.

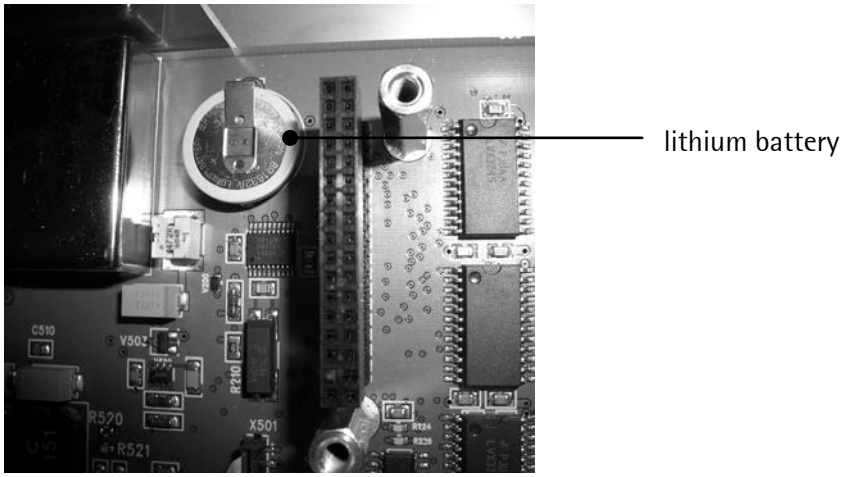
As soon as software loading is completed the device will be re-started.

Now the next file (firmware) can be loaded as described in steps 2...7.

13 Repairs and Maintenance

Repairs are subject to inspection and must be carried out at Sartorius. In case of defect or malfunction, please contact your local Sartorius dealer or service center for repair. When returning the instrument for repair, please include a precise and complete description of the problem. Maintenance work may be carried out only by a trained technician with expert knowledge of the hazards involved and the required precautions.

13.1 Battery for Date/Time



The lithium battery for back-up of the calendar/time chip is located beside the power supply on the main board.
The battery is activated before the instrument leaves the factory.

Note: After initial start-up, the clock must be checked and set, if necessary, under Setup-[Date&Time].

13.1.1 Battery Replacement

The instrument is equipped with a lithium battery for back-up of the time/calendar chip. If the voltage drops below the specified minimum, or in case of defect, the battery must be replaced by the Sartorius customer service or by an equivalent trained technician. For details on disposal, see Chapter 14.

For details on battery lifetime, see Chapter 16.3.1.

13.2 Solder Work

Soldering work on the instrument is neither required nor permitted.

13.3 Cleaning

⚠ Disconnect the instrument from the supply voltage.

⚠ Prevent moisture from penetrating the instrument.

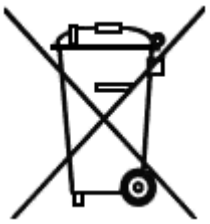
⚠ Do not use aggressive cleaning agents (solvents, etc.).

- Clean the indicator using a piece of cloth which has been wet with a mild detergent (soap).
- ○ If the instrument is used in the food industry, make sure permissible cleaning agents are used.
- Dry the instrument using a soft cloth.

⚠ Do not wash down the equipment with water or dry it with compressed air; this is not permitted.

14 Disposal

The packaging is made from environmentally-friendly materials that can be used as secondary raw materials. If the packaging is no longer required, it can be disposed of free of charge in Germany via the Duale System of the VfW (order number D-59101-2009-1129). Otherwise, dispose of the material according to your local waste disposal regulations.



Place discharged batterie in local collection boxes (not in the household waste). In Germany, corresponding collection boxes are made available by GRS (Stiftung 'Gemeinsames Rücknahmesystem Batterien') on request with Sartorius.

For scrapping of the instrument, please contact your local authorities. Prior to scrapping, any batterie should be removed. In Germany, Sartorius AG takes care of the return and legally compliant disposal of its equipment on its own.

In other countries, please consult with the local authorities.

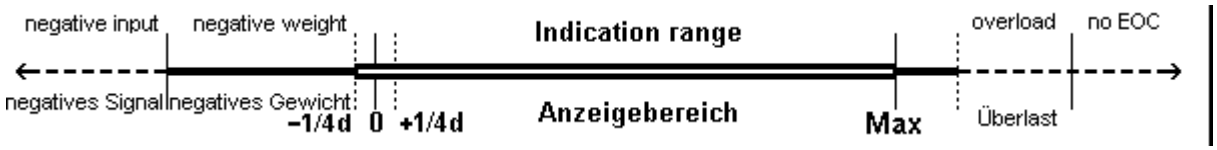
15 Error Messages

15.1 Error Messages in Measuring Circuit

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

Indication	VNC text	Error and possible cause	Remote display
E:Arith	**Arith. error**	Internal arithmetic overflow: - Faulty calibration values	**Error 1**
E:Overl	**Overload**	Input voltage is higher than Max + (x d): - faulty setting - to much weight on the scale	**Error 2**
E:NoSig	**Ext. meas.device error**	Measuring input open: - Measuring cable is interrupted (Cable break detection)	**Error 3**
E:Under	**Value exceeds display**	OIML selected: Gross weight < -20d - The scale has been unloaded excessively	**Error 4**
E:Sense *	**No sense voltage**	No sense voltage: - Load cells not connected. - Sense line or supply line is interrupted. - Wrong polarity or sense voltage is low	**Error 6**
E:Invers	**Negative input**	Negative input: - Wrong polarity of load cell signal. - Wrong polarity of supply voltage.	**Error 7**
E:HardE	**No values from scale**	Internal weighing point: Input signal is higher than the permissible range of 36 mV. Cannot read weight values from ADC (analogue-digital-converter). - Error in weighing electronics board - Defective load cell - Cable break	**Error 9**

* with Ex applications strictly see Chapter 15.6.



15.2 Weight Error Status

VNC text (see also Chapter 15.1)

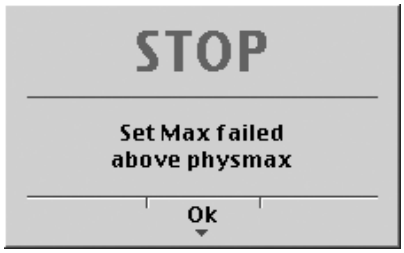
	E:Arith	E:Invrs	E:Overl	E:NoSig	E:Sense		E:HardE/ E:NoCom	
	flashing 1 Hz	flashing 1 Hz			Altern.	flash. 1 Hz	Altern.	flash. 1 Hz
	flashing 1 Hz			flashing 1 Hz	Altern.	flash. 1 Hz		
	flashing 1 Hz	flashing 1 Hz	flashing 1 Hz	flashing 1 Hz	Altern.	flash. 1 Hz	Altern.	flash. 1 Hz

Note: With all other messages, the upper status indicator LED blinks.

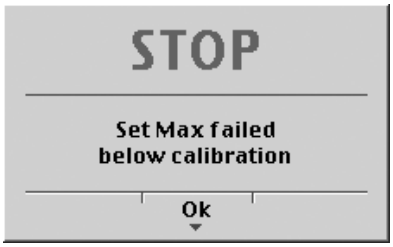
15.3 Error Messages with xBPI Scales

Indication	VNC text	Error and possible cause	Remote display
E:Value	**Value exceeds display**	The weight value is not displayed: - Too many digits have been set	**Error 4**
E:NoCom	**No values from scale**	No Communication with xBPI scale: - Cable break - Internal scale error - The scale is not connected to the supply voltage.	**Error 9**
E:NoWgt	**No weight data**	No weight data: - Wägepunkt umgeschaltet • Mit OK den neuen Wägepunkt dem Gerät zuweisen.	**Error •**
E:NotRed	**Scale not ready**	The scale is not ready for weighing: - The instrument is in the warm-up phase. - The instrument is in the automatic taring mode. - The instrument was switched on with the scale loaded. • Switch the device off and on again.	**Error c**
E:BadDev	**Wrong serial number**	'Serial number' does not correspond to the number set in the device.	**Error ?**

15.4 Error messages of the Calibration



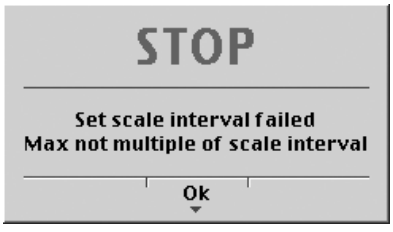
The maximum capacity is too high.



Subsequent changing of the maximum capacity is possible; if you decrease the capacity, a message is displayed if the new maximum capacity is lower than the test load ([Calibrated at]).

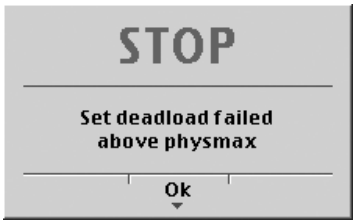
This message displays, if the selected resolution is to low, e.g. 5 kg.

The selected resolution is so high that less than 0.8 internal counts per scale interval (d) or 0.5 µV/e for legal-for-trade acc. to OIML/NSC are available.



The maximum capacity is not an integer multiple of the scale interval.

Weight units do not match, e.g. subsequent change of [Max] from kg to lb

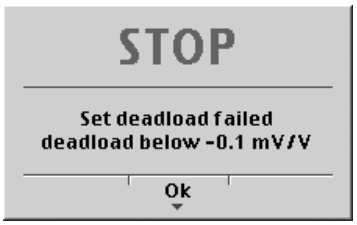


The dead load entered in mV/V plus maximum capacity in mV/V is higher than 3 mV/V (= 36 mV).

The scale is not stable.

Remedial action

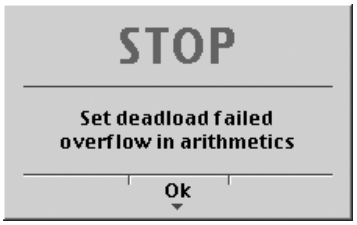
- Check the mechanical function of the scale.
- Adapt the filter setting; reduce the resolution.
- Adapt the stability conditions.



Measurement signal is negative (load cells connected with wrong polarity or defective) when determining the dead load with [by load].

Cause

Load cell connected with wrong polarity, or defective.

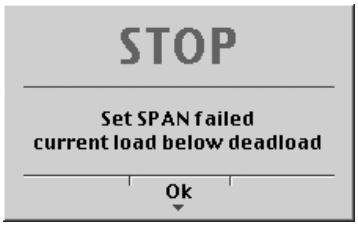


The dead load entered in mV/V is higher than 5 mV/V.

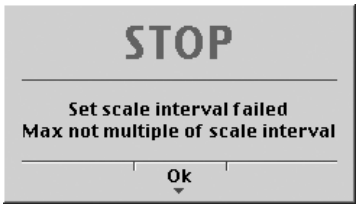
The scale is not stable.

Remedial action

- Check the mechanical function of the scale
- Adapt the filter setting; reduce the resolution.
- Adapt the stability conditions.



The weight on the scale is less than the dead load after input of the weight value.



The maximum capacity is not an integer multiple of the scale interval.

15.5 General Error Messages

Indication	VNC text	Error and possible Cause	Remote display
	Duplicate ID	The IP address is already used. Two instrument with identic IP address.	
	Supply voltage is low!	Supply voltage is too low -15 %. Supply voltage is too low (≤85 %).	
E:BadDev *	**Wrong serial number**	- Weighing electronics board has been changed after calibration. - Device is not calibrated.	**Error ?**

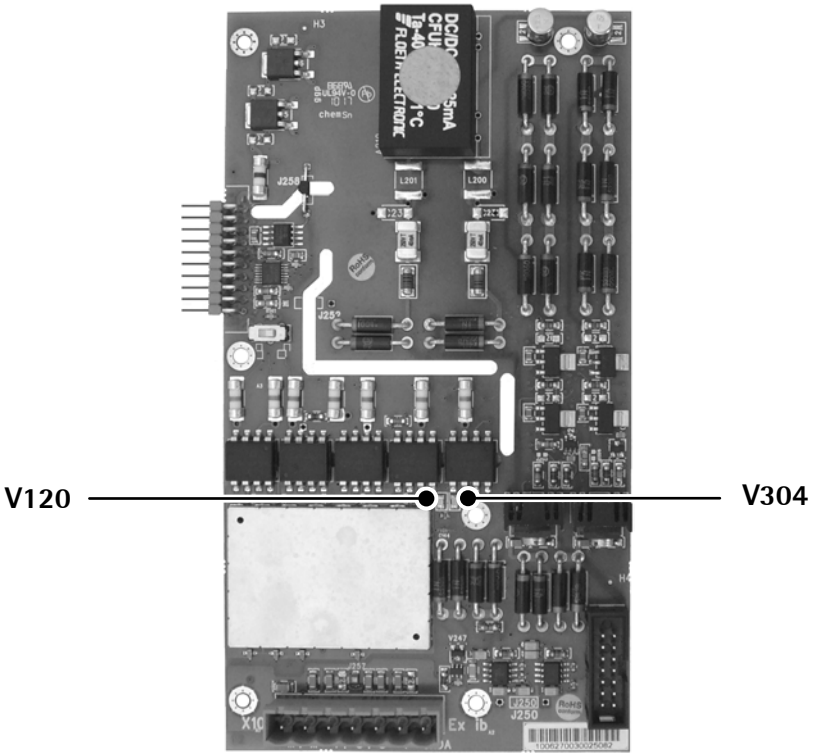
* Only if CAL switch is closed.

15.6 Error Messages with Ex Applications

In the event of load cell supply faults, the following error message is displayed:

E:Sense (via VNC: **No sense voltage**)

Two different faults are possible, which are displayed by two LEDs on the weighing electronics board.



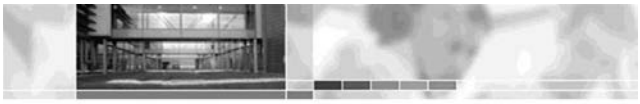
V120 lit: Sense voltage is too low.
The cause can be a line break in the power supply and/or Sense lines.

V304 lit: Current limiting for the load cell supply is active -> Sense voltage is too low.
The load cell supply current monitoring activates current limiting, if there is a short circuit in the load cell supply lines, the load cell resistance is too low (e.g. too many load cells connected), see also Chapter 3.2.8.2.
The current is limited to ≤96 mA.
After fault removal, current limiting must be de-activated. This can be achieved by switching off the instrument and/or disconnecting the load cells.

15.7 Show Error Log

An error protocol can be displayed and saved under this menu item.

Procedure:



- Click on ‚Show error Log' to display the error log.

Ser. No. Function Description

Record	Type	Message
1	HARDWARE	No ADC at powerup
2	HARDWARE	No ADC at powerup
3	HARDWARE	No ADC at powerup
4	HARDWARE	No ADC at powerup
5	HARDWARE	No ADC at powerup
6	HARDWARE	No ADC at powerup
7	HARDWARE	No ADC at powerup
8	HARDWARE	No ADC at powerup
9	HARDWARE	No ADC at powerup
10	HARDWARE	No ADC at powerup
11	EXCEPTION	11($02C): Unimplemented F-
12	EXCEPTION	4($010): Illegal instructi
13	EXCEPTION	2($008): Access Error faul
14	EXCEPTION	3($00C): Address Error fau

The error protocol can be saved as follows:

- Click [File]-[Save as...].
- Select the corresponding directory in window [Save website], fill in the required file name and select the 'txt' file type.
- Click [Save].

16 Specifications

16.1 Instructions for Use of 'Free Software'

The firmware in the PR 5230 instrument contains free software that is licensed under:

- General Public License (GPL) Version 2, June 1991, and
- GNU Lesser General Public License (LGPL) Version 2.1, February 1999.

This software, developed by third parties, is protected by copyright and is supplied free of charge.

The license terms and conditions of Free Software Foundation, Inc in English are enclosed in the delivery of the instrument.

The source text written under the above conditions is contained on the CD-ROM delivered with the instrument.

16.2 Decoding of the Serial Number

30 252 00015		
30	252	00015
Location no.:	Code of the year/month:	Current number
30 = Hamburg	252* = april 2010	

* will count up according to the table of the year group of Sartorius

16.3 General Data

Note: Technical data of PR 5230 with option WE1 see Chapter 3.2.10.

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

16.3.1 Backup Battery for Time/Date

The lithium battery for back-up of the time/calendar chip is activated before the instrument leaves the factory.

Battery lifetime at permanent running:	typical 10 years

16.3.2 Power Connection 230 V AC

Supply voltage	100 V - 230 V AC	+10%/-15%	50/60 Hz
Max. power consumption	12 W/15 VA		
Primary fuse	2x 3.15 AT, 250 V, IR 1500 A, 5x20 mm e.g. made by Schurter: SPT5x20, order no.: 0001.2509		

16.3.3 Power Connection 24 V DC

Supply voltage	24 V DC	-15 %/+20 %
Max. power consumption	12 W	
Primary fuse	2x 3.15 AT, 250 V, IR 1500 A, 5x20 mm e.g. made by Schurter: SPT5x20, order no.: 0001.2509	

16.4 Effect of Ambient Conditions

16.4.1 Environmental Conditions

Temperature range		
	Ambient temperature for operation	-10...+40 °C
	Ambient temperature 'not legal for trade'	-10...+50 °C
	Power-on temperature	0...+40 °C
	Storage/transport	-20...+70 °C
Humidity		<95 %, no condensation, (acc. to IEC 68-2)
Protection type		IP 66 housing
Height		<2000 m

16.4.2 Electromagnetic Compatibility (EMC)

All data in compliance with NAMUR NE 21, EN 45501 and EN 61326.

Housing	Radio frequency electromagnetic fields (80 – 3000 MHz)	EN 61000-4-3	10 V/m
	Electrostatic discharge (ESD)	EN 61000-4-2	6/8 kV
Signal and control lines	Fast transients (burst)	EN 61000-4-4	3 kV
	Peak voltages (surge) 1.2/50 µs	EN 61000-4-5	2 kV
	Conducted disturbances by radio frequency (0.15 – 80 MHz)	EN 61000-4-6	10 V
Mains inputs	Fast transients (burst)	EN 61000-4-4	3 kV
	Peak voltages (surge) 1.2/50 µs	EN 61000-4-5	1/2 kV
	Conducted disturbances by radio frequency (0.15 – 80 MHz)	EN 61000-4-6	10 V
	Voltage dips	EN 61000-4-11	0/40/70 % 20/200/500 ms
	Short interruptions	EN 61000-4-11	5 s

16.4.3 RF Interference Suppression

Electromagnetic emission	In acc. with EN 61326, limit value class A

16.5 Weighing Electronics

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

16.5.1 Load Cells

Load cell type	Strain gauge, 6 or 4-wire connection possible	
Supply voltage	U = 12 V DC	for I_{max} = 160 mA
		for - max. 8 load cells of 650 Ω each - 4 load cells of 350 Ω each
Sense voltage monitoring	Sense voltage below 8 V, switchable to <8 V	
Max. load	>75 Ω	
Cable length		
Standard	Max. 500 m	

16.5.2 Connecting Cable

Length of the connecting cable between junction box and PR 5230

Type	PR 6135, PR 6135A	Max. 500 m – length of the load cell cable

Length of the connecting cable between weighing platform and PR 5230

Type	LiYCY	Max. 500 m

16.5.3 Principle

Principle	DC voltage, delta-sigma converter, ratiometric to the load cell supply voltage
Conversion/measurement time	5, 10, 20, 40, 80, 160, 320, 640, 960, 1200, 1600 ms
Digital filter	Selectable, 4th order (low-pass), Characteristic: Bessel, aperiodic, Butterworth, Tschebyscheff
	Configurable cut-off frequency

16.5.4 Accuracy and Stability

The following values are applicable with a sampling rate of 160 ms.

Accuracy class	≤10000 e (Cl. III) acc. to OIML R76/EN 45501
Min. measuring signal (OIML)	≥0.66 mV/V = 8.0 mV corr. to 0.8 µV/e for 10000 e
Min. measuring signal (OIML)	≥0.40 mV/V = 4.8 mV corr. to 0.8 µV/e for 6000 e
Linearity error	<0.003 %
Zero stability error (TK_0)	<0.05 µV/K RTI <= 0,004 %/10K at 1 mV/V
Span stability error (TK_{Span})	< ±2.5 ppm/K

16.5.5 Sensitivity

Sensitivity	0.8 µV/e
Resolution	7.5 million counts at 3 mV/V, not legal for trade
Input voltage (input signal + dead load)	0... max. 36 mV DC, symmetrical to 0
Dead load range	36 mV DC (max. input signal); input/calibration via software

16.5.6 Analog Output (Option PR 5230/06)

Output	gross or net or fixed preset value
Range	0/4 mA...20 mA
	galvanically isolated
Load	0...500 Ω
Resolution	1 µA
Linearity error	<0,05 %
Total error	<0,1 %
Combined error - temperature	<100 ppm/K

16.5.7 Digital Inputs

3 inputs galvanically isolated via optocoupler (passive mode, external supply). Can be switched to active in the instrument, for connection of switches. No common potential in passive mode.

Input signal for 'Low'	0...5 V or open input
Input signal for 'High'	10...28 V
Input current for 'High'	<11 mA @ 24 V, <5 mA @12 V

16.5.8 Digital Outputs

16.5.8.1 Standard

3 outputs, relays	Switch-over contact		
Contact rating max.	250 V AC	5,0 A	1250 VA
	250 V DC	0,3 A	
	100 V DC	0,5 A	
	50 V DC	1,5 A	
	30 V DC	5,0 A	

16.5.8.2 Option

3 Opto-decoupled outputs

Supply voltage	24 V +10 %
Output current	Max. 40 mA
Voltage drop	3,2 V @ 40 mA

16.5.9 Serial Interfaces

16.5.9.1 RS-232

Transfer rate	Max. 19200 bd
	Not galvanically isolated

16.5.9.2 RS-485

Übertragungsrate	Max. 19200 bd
	Galvanically isolated

16.5.10 Network Interface

Ethernet	100 Mbd

16.5.11 Fieldbus Interfaces (Options)

ProfiBus-DP
DeviceNet
InterBus-S
CC-Link
ProfiNet I/O
EtherNet-IP

16.6 Mechanical Data

16.6.1 Construction

Metal housing of stainless steel with front cover, Protection class IP 66

16.6.2 Dimensions/Weights

Dimensions		
	Width	350 mm
	Height	250 mm
	Depth	120 mm
Weights		
	Net	6 kg
	Shipping weight	7 kg

16.7 Use in Legal-for-Trade Mode

The Guide to Verification and further documents can be found on the Internet at:
www.sartorius-mechatronics.com

16.7.1 Documentation for Verification on the Enclosed CD

The enclosed CD has a directory containing the following documents: (in preparation)

- EC Declaration of Conformity
- Plates and markings (sealing and labels)
- Test certificate for the instrument
- EC type approval

16.7.2 Additional Instructions

Information on the meaning of the CAL switch to be sealed can be found in Chapter 5.1.1.

Make sure when configuring the instrument (see Chapter 5.4.13) that the settings are in compliance with the legal requirements and the requirements of the EC Type Approval and the EC Test Certificate. Furthermore, the settings and functions described under Item 7 of the EC Test Certificate (Orders and Conditions) must be checked. The person performing installation is responsible for selecting the legally permitted settings. The settings must be checked.

17 Index

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X

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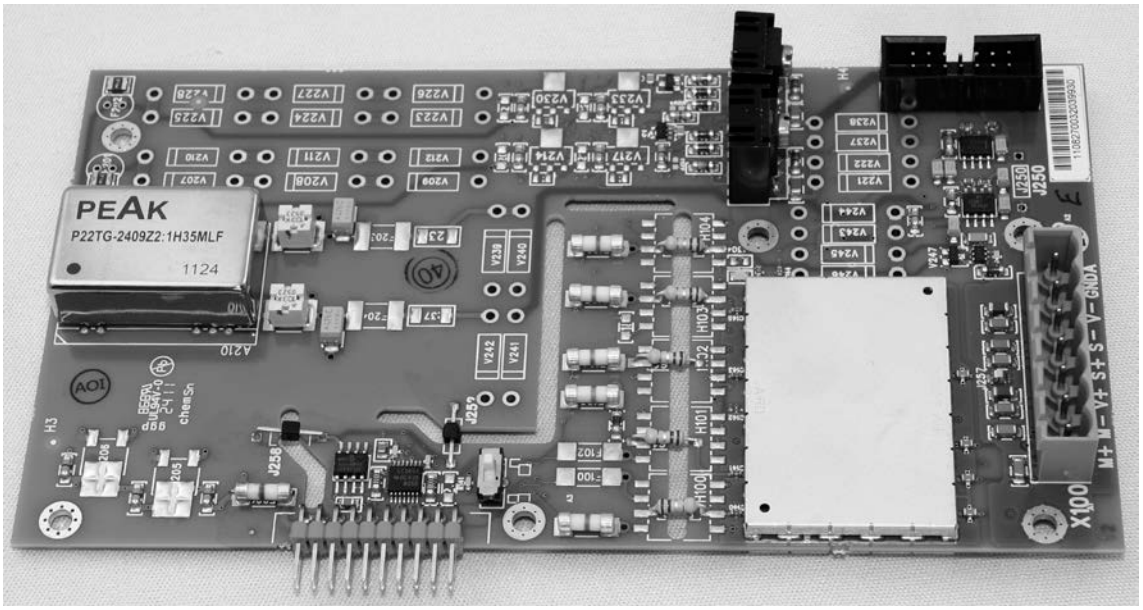
18 Appendix

18.1 Spare Parts

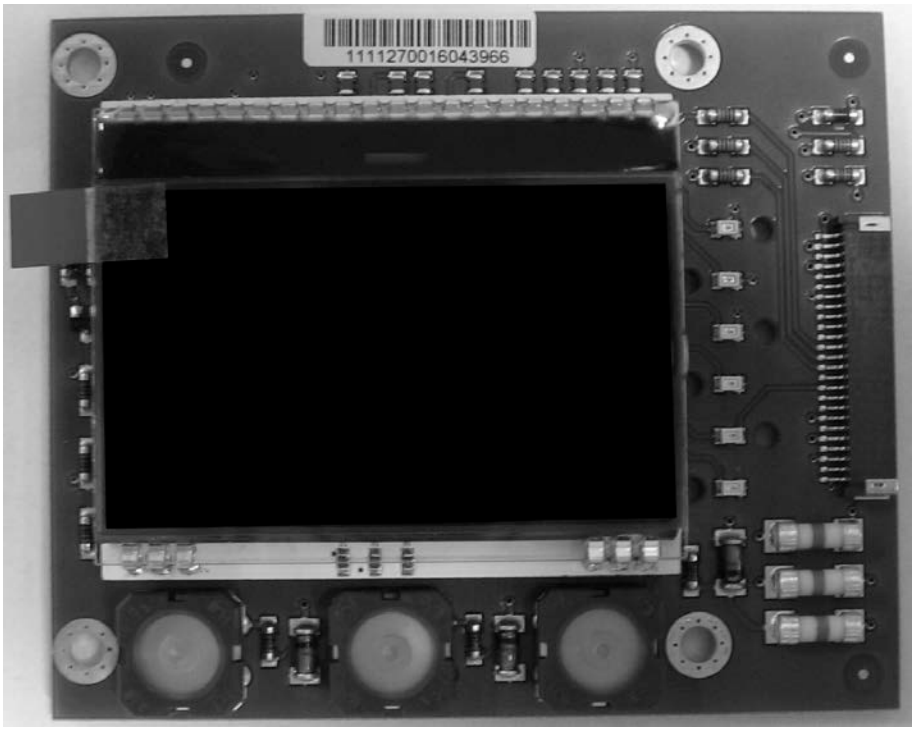
18.1.1 Weighing electronics board

Spare part no.	Spare part description
5312 218 58011	AD-Converter assemble PR 5230/xx



18.1.2 Display Board

Spare part no.	Spare part description
5312 130 98006	Display Print PR 5230/xx



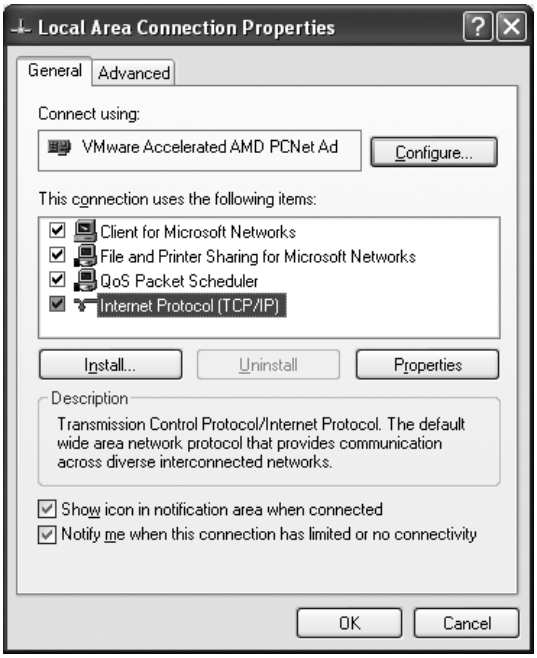
18.1.3 Fuses/Accessorie Kits

Spare part no.	Spare part description
5312 253 28007	Fuse 3.15A T 250V 5x20
5312 505 48021	Accessorie kit glands
5312 505 18016	Accessorie kit seal screw joint
5312 321 28051	Accessorie kit cables
5312 264 48018	Accessorie kit connectors

18.2 Network Settings under Windows XP

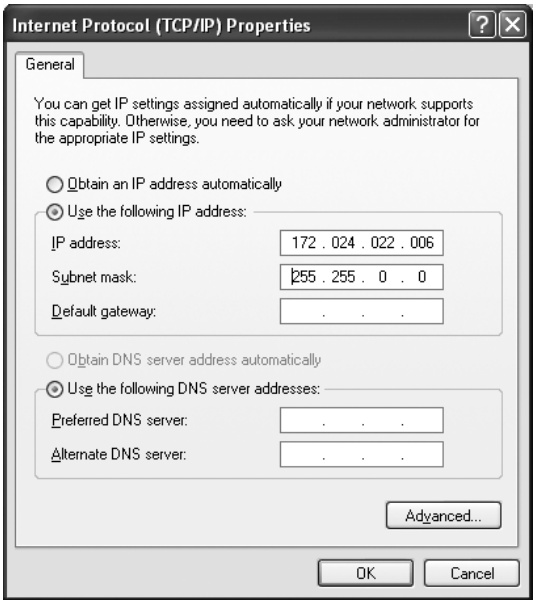
1. Double-click the icon for network connections on the desktop.
2. Click menu item [Network connections] under [Network tasks].
3. Click [LAN connection] using the right mouse key and select [Properties].

The following window appears:



4. Select 'Internet Protocol (TCP/IP)'.
5. Click [Properties].

The following window appears:

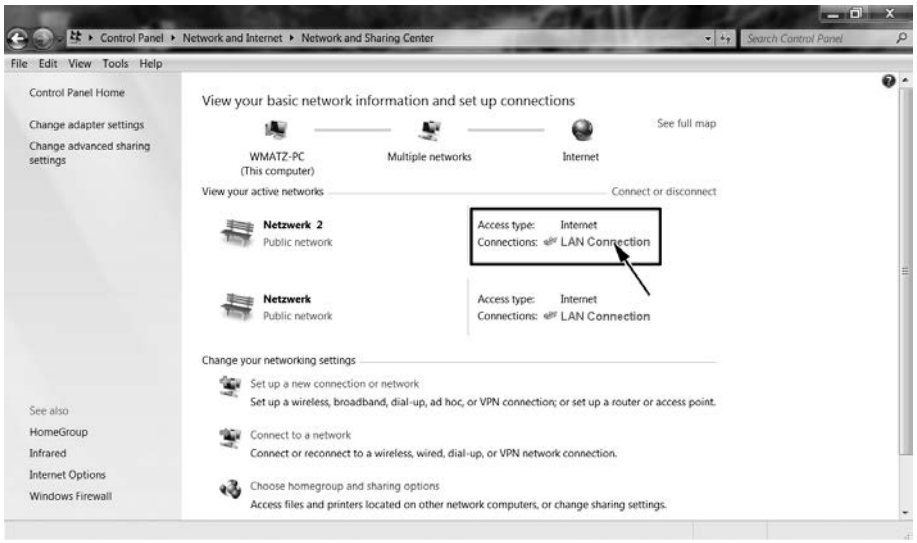


6. Get the IP address automatically (DHCP), select it, or enter the relevant IP address.
7. Enter the corresponding subnet mask.
8. Click [OK] to save the entries.

18.3 Network Settings under Windows 7

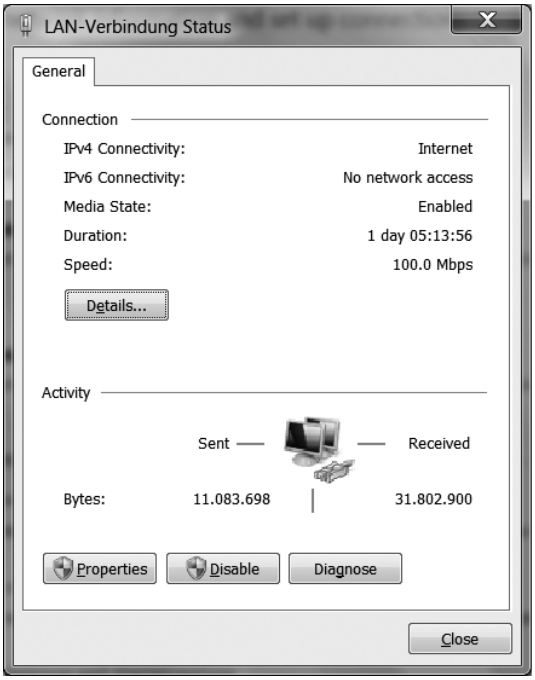
1. Select [Start]-[Control Panel]-[Network and Internet]-[Network and Sharing Center].

The following window appears:



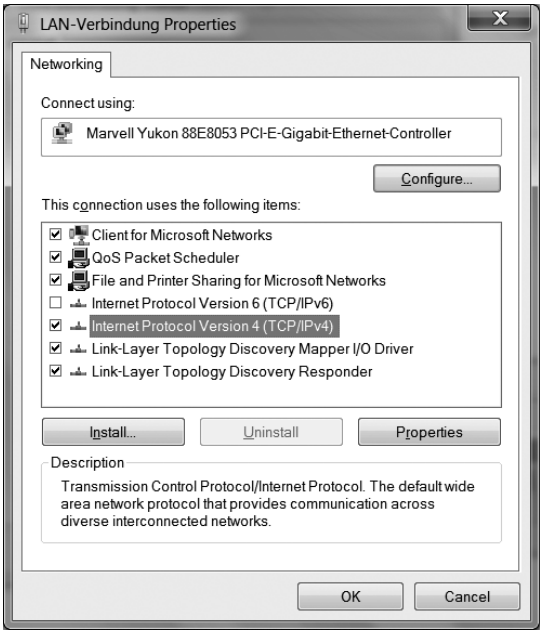
2. Select 'LAN connection'.

The following window appears:



3. Click [Properties].

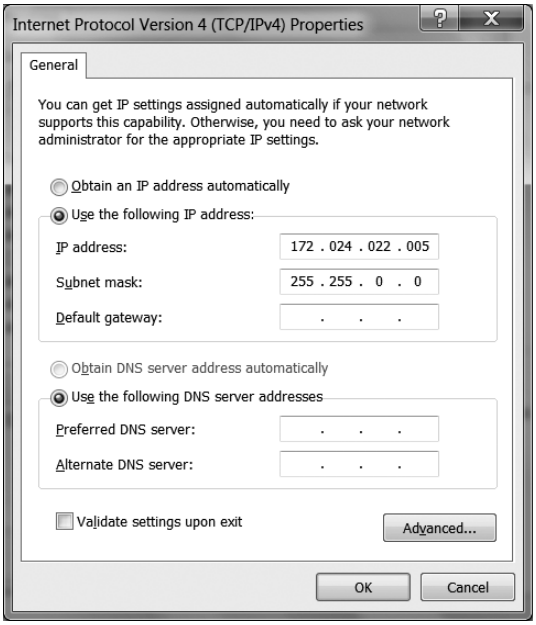
The following window appears:



4. Click 'Internet Protocol (TCP/IP)'.

5. Click [Properties].

The following window appears:

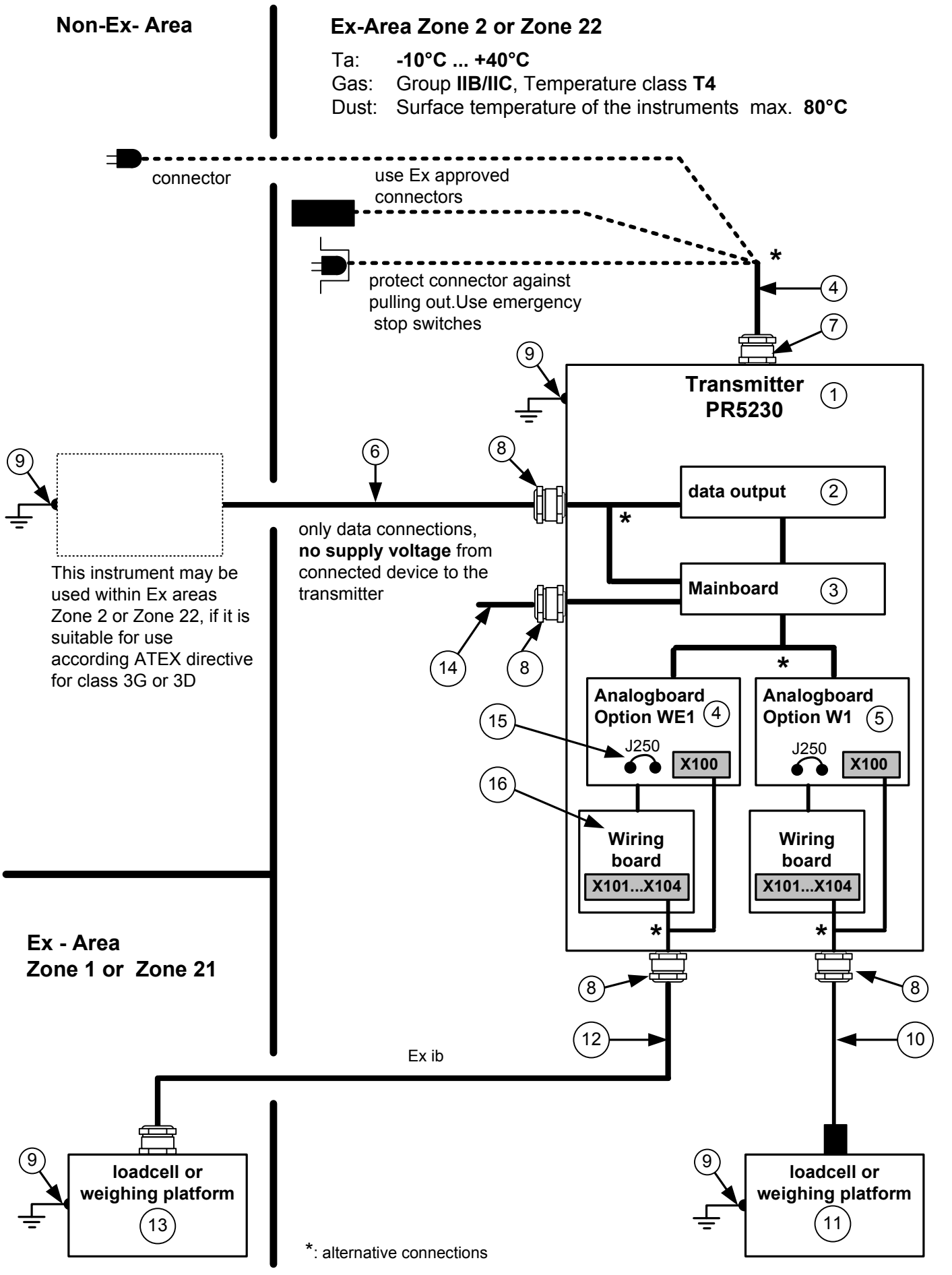


6. Get the IP address automatically (DHCP), select it, or enter the relevant IP address.
7. Enter the corresponding subnet mask.

8. Click [OK] to save the entries.

18.4 Technical Documents/Certificates

Item	Designation	Document no.
1	Safety Instructions	940515230000-460
2	Manufactor's label	65915-000-30
3	Manufactor's label	65915-000-31
4	Manufactor's label	65915-000-34
5	Manufactor's label	65915-000-35
6	Ex Design Zone 1/21 and Zone 2/22	65915-750-02
7	Ex Design Zone 2/22	65915-750-03
8	Manufactor's Certificate	PR5230 SAG09ATEX004X
9	EC Declaration of Conformity	PR5230 SHH10CE001



Ex	26.11.2010	sartorius mechatronics	Benennung: **Sicherheitshinweise/ Safety instructions**	Blatt **5** von **8**
	Klausgrete		Zeichnungs-Nr.: **940515230000-460**	**Revision 03**

Safety instructions for installation, use, maintenance and repair of the instrument

The numbers in brackets refers to the positions on sheet 5.

1. The transmitter PR5230 (1) is only with option Y2 suitable for using within Ex areas Zone 2 and Zone 22 (non conductive dust) according European directive 94/9/EG and related harmonized European standards. Compliance with other requirements is not subject of this instructions..
2. Do not use the transmitter as portable instrument.
3. Installation must be performed by qualified personnel in compliance with the applicable laws, regulations, ordinances and standards. In particular, the standards EN 60079-14 (gas) and EN 61241-14 (dust) must be taken into account.
4. The information on installation, operation, maintenance and repair given in the operation manuals supplied with the equipment must be observed. Also the temperatur range of the connected devices must be considered.
5. Use the transmitter only within the temperature range of -10°C ... +40°C, avoid exposure to inadmissible sources of heat, cold, direct sunlight, UV radiation or vibration. Install the instrument in that way, that air circulation is possible and heat sources are sufficient far away.
6. With Option V230 the cable (4) must be protected against damage and must be connected corretly to mains (100 - 230 Vac, ± 10%, 50-60Hz).

   With Option V24 the cable (4) must be protected against damage and must be connected corretly to 24Vdc (± 10%).

   The transmitter is suitable for electric circuits up to 1500A. Within the Ex- area the supply cable (4) must be supported by an approved connector. Alternative: Protect connector against pulling out or connect directly. Use than emergency stop switches.
7. The connection cable (4), the supply cable (10), (12) and the data cable (6), as far as they are not delivered by Sartorius, must be qualified regarding Ex zone, type of installation and the electrical and mechanical load. All cable from customer side are under his responsibility. For these, a qualifying examination has to be performed: With a pulling force of 10x cross section of the cable (in mm) in N, but at least 100N, over 6 hours must not move the cable more than 6mm out of the cable gland. Use cable end sleeves!
8. In the case, that cable must be installed later, be sure that the terminals are not corroded. The protective earth conductor of the power lead must have the same cross- section as the N and L conductors.
9. Use only ATEX approved cable glands (7), (8). The supplied cable glands are only fitting for firm installation in the Ex area. The cables must be fixed near to the cable glands (e.g. with cable clips). The cable glands may be replaced by ATEX approved ones, fitting for flexible installation. The cable glands must be tightened with a torque of 5 Nm.
10. Not used cable glands must be closed with ATEX approved srewings in order to secure IP65 protection.

11. The Transmitter and metal parts (load cells / weighing platforms) must be connected to potential equalsiation (PE) (9). This means that the transmitter and the load cells / weighing platforms must be connected, with low resistance, to the same PE (9). All connected non intrinsic safe devices with Um = 250V must also be connected to PE (9). This PE (9) must be connected to the PE (9) from the Ex-Area with low resistance. For this purpose, the user has to connect a conductor with a cross-section of at least 4mm² at suitable points. Fitting parts like screws can be used. If a flexible conductor is used, it must has a ring eye, for a save mounting. The installation must be save, against self loosening. Check this connection to the PE-rail to be of low resistance, during on-side installation and periodical time lag afterwards. Prevention against electrostatic charging is under the responsibility of the customer.
12. Before opening the instrument, switch off the supply voltage, or make sure that the area is not potentially explosive. Do not connect or disconnect any live calbes inside the hazardous area!
13. The influence of stray electrical interferences (e.g. due to magnetic fields) must be avoided by means of proper installation.
14. Chemicals that can attack housing gaskets and cable sheathings must be kept away from the instrument. These includes oil, herbal and animalistic grease, petrol, chlorinated and flavoured solvent, base and acid, acetone and ozone. If you are uncertain, contact the manufacturer.
15. Data cable to the connected devices and cable to the load cells are not sparking circuits. The connections are secured against unintended disconnection. Connect or disconnect only when power is switched off. Not used outputs must be closed according IP65. Keep voltage transients away from the device.
16. Use only data outputs (2), supplied by Sartorius for the PR5230. This options must be installed correctly (secure against self loosening) and must be connected with the mainboard according to the instructions.
17. **Relais**: With Option Y2, only external circuits (14) with voltages up to 60Vac or 75Vdc are allowed to be connected to the relais.
18. **Option W1 (5)**: Connected load cells or weighing platforms (11) must be certified for use in Ex areas Zone 2 or Zone 22 and for load cell supply voltages of more than 13,2V. Observe gas group and temperature class when use in Ex area Zone 2. When use in Zone 22, observe the allowed surface temperature.
19. Option WE1: In this case the Transmitter PR5230 (intrinsic safe output to load cells / weighing platforms) will be delivered, so that the intrinsic circuit (Connector X100 from the Analogboard or the connectors X101 ...X104 from the wiringboard, if exist) is connected to PE.

    If it is necessary to use an potential free output, it is possible to open the Jumper J250. Cut both ends from the Jumper short over the PCB surface, so that the distance between the ends is > 2mm and there is no connection to any other potential.

    If J250 is open, the intrinsic circuit is galvanically separated from the housing (PE) (500V test voltage).

20. **Option WE1 (4)**: Connected load cells or weighing platforms (13) must be certified for use in Ex areas Zone 1 or Zone 21 (EC-Type-Examination-Certificate). Observe gas group and temperature class when use in Ex area Zone 1. When use in Zone 21, observe the allowed surface temperature.

    For the connection of load cells or weighing platforms in Ex zone 1, the parameters of the transmitter with option WE1 are (intrinsic safe output Ex ib IIC):

    Uo = 21,0 V between the lines
    Io = 143 mA
    Po = 1,55 W
    IIC: Co = 188 nF between the lines
    Lo = 0,12 mH
    IIB: Co = 1,27µF between the lines
    Lo = 5 mH

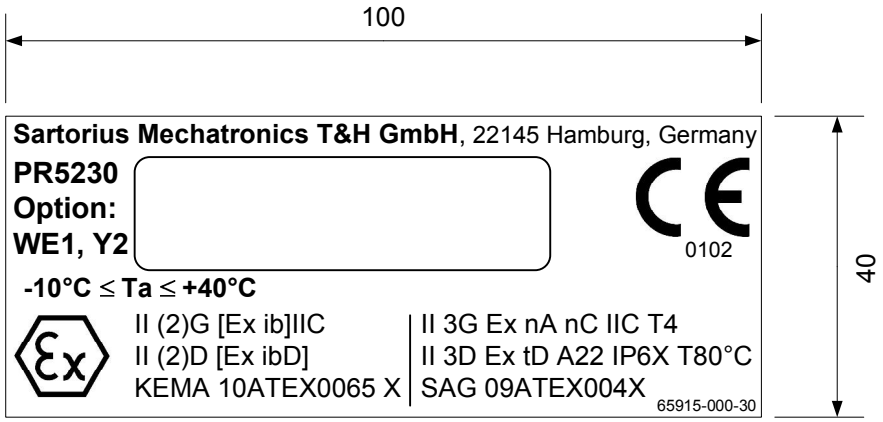
    Sartorius load cells / Sartorius weighing platforms of the following series can be used in Zone 1 and Zone 21:

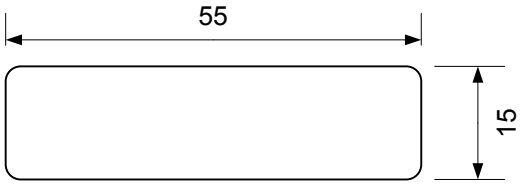
CAPX..-.....-.....	(KEMA 02 ATEX 1010X)
PR62../..	(PTB 02 ATEX 2059)
MP52	(Sira 04 ATEX 2142 X)
MP57, MP59, MP59T	(Sira 04 ATEX 2143 X)
MP55, MP58, MP58T	(BVS 09 ATEX E 131 X)

    also the cable junction boxes PR6130/64Sa, PR6130/65S (KEMA 06 ATEX 0016 X).

    Connection to the load cells or weighing platforms can take place via the intrinsic safe connector X100 (labeled with 'X100' and 'Ex ib') on the Analogboard, or via the intrinsic safe connectors X101 ... X104 on the 'Wiring board' (16), if existing.

21. The connection cable (12) between the transmitter and the intrinsic safe load cells / weighing platforms are limited in length. For standard cable (e.g. Typ LiYCY, 6-conductors, C' = 200nF/km, 800µH/km, R'=20Ohm/km) 300m cable length are permitted in group IIC, plus L0 = 100µH and C0 =120nF for the load cells / weighing platforms. For group IIB there is no limitation in cable length for such a type of cable.
22. The installation must be checked for correct function and safety by a trained and qualified person at appropiate intervals.
23. If the installation does not work properly, disconnect it from the supply voltage immediately!
24. In the event of repair, use only original spare parts supplied by the manufacturer!
25. Any modifications to the instrument (except by persons authorized by Sartorius) cause loss of conformity for use in Zone 2 and Zone 22 hazardous areas and invalidate all guarantee claims. Similarly, the instrument may only be opened by qualified and authorized persons.
26. Modifications (also by Sartorius personnel) are subject to written approval.
27. Remove dust regularly on instruments in Zone 22. Dust layers of more than 5mm are not permitted.
28. This additional instructions don't release the operating company from its responsibility for installation, operation and test according to the local applicable standards, directives, regulations and laws.

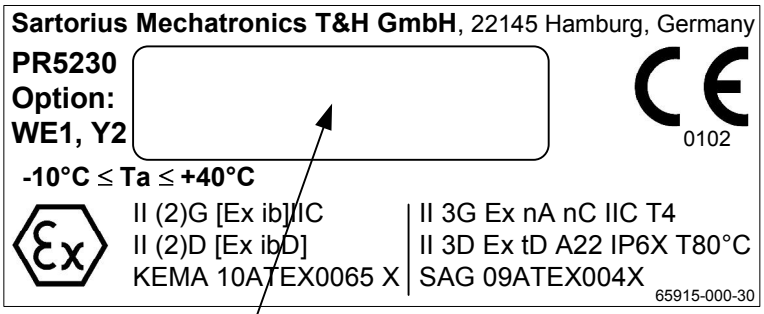




0,5 mm dick
Symbol und Schrift: schwarz RAL 9005, geätzt, vertieft
Oberfläche: blank erhaben, poliert

0.5 mm thick
Symbol and labeling: black, RAL 9005 standard, etched, recessed
Surface: blank and raised, polished

	Datum Date	Name	Material V2A1.4301			Maßstab / Scale
Erstellt Written by	03.03.10	Klausgrete	sartorius		Benennung / Title: Kennzeichnungsschild Manufacturer's label	---
Geprüft Reviewed by	03.03.10	Klausgrete				Blatt Sheet 1
Freigabe Released by	03.03.10	Klausgrete	Ausgabe / Revision: 00	Änderung / Alteration: ---	Zeichnungs-Nr. / Drawing number: 65915-000-30	von of 1



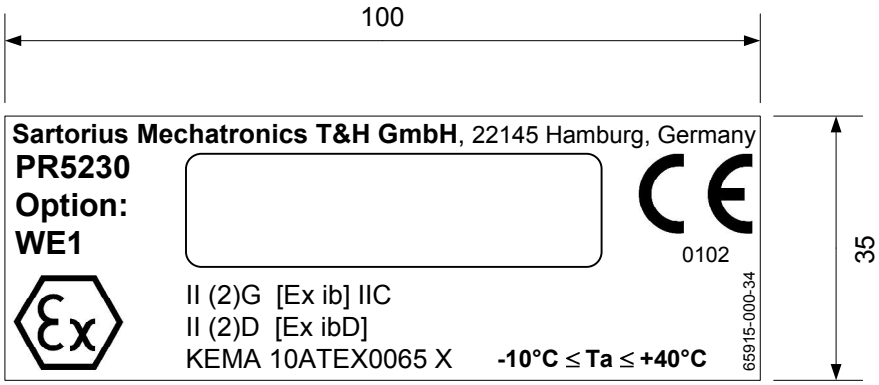
aufgeklebt /
glued on

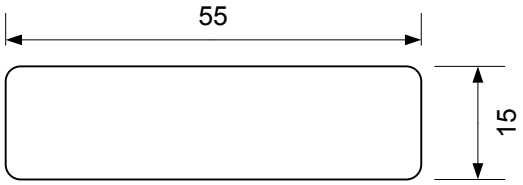
Typschild /
label

Option V230
100 - 240 Vac; 50 - 60Hz; 16VA
oder / or
Option V24
24Vdc; 12W

und Seriennummer und weitere Optionskürzel
and serial number and further option codes

	Datum Date	Name	Material **65915-000-30**			Maßstab / Scale
Erstellt Written by	03.03.10	Klausgrete	sartorius		Benennung / Title **Kennzeichnungsschild Manufacturer's label**	---
Geprüft Reviewed by	03.03.10	Klausgrete				Blatt Sheet 1
Freigabe Released by	03.03.10	Klausgrete	Ausgabe / Revision **00**	Änderung / Alteration **---**	Zeichnungs-Nr. / Drawing number **65915-000-31**	von of 1

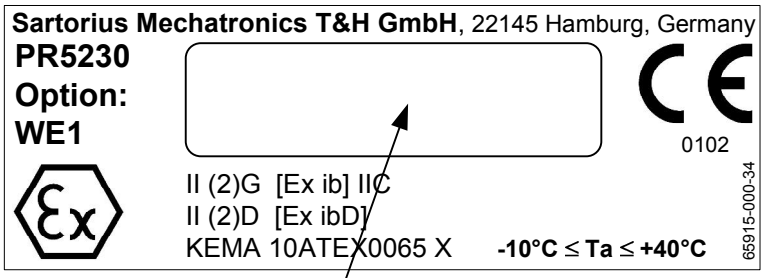




0,5 mm dick
Symbol und Schrift: schwarz RAL 9005, geätzt, vertieft
Oberfläche: blank erhaben, poliert

0.5 mm thick
Symbol and labeling: black, RAL 9005 standard, etched, recessed
Surface: blank and raised, polished

	Datum Date	Name	Material V2A1.4301			Maßstab / Scale
Erstellt Written by	03.03.10	Klausgrete	sartorius		Benennung / Title: Kennzeichnungsschild Manufacturer's label	---
Geprüft Reviewed by	03.03.10	Klausgrete				Blatt Sheet 1
Freigabe Released by	03.03.10	Klausgrete	Ausgabe / Revision: 00	Änderung / Alteration: ---	Zeichnungs-Nr. / Drawing number: 65915-000-34	von of 1



aufgeklebt /
glued on

Typschild /
label

Option V230
100 - 240 Vac; 50 - 60Hz; 16VA
oder / or
Option V24
24Vdc; 12W

und Seriennummer und weitere Optionskürzel
and serial number and further option codes

	Datum Date	Name	Material **65915-000-34**			Maßstab / Scale
Erstellt Written by	03.03.10	Klausgrete	sartorius		Benennung / Title **Kennzeichnungsschild Manufacturer's label**	---
Geprüft Reviewed by	03.03.10	Klausgrete				Blatt Sheet 1
Freigabe Released by	03.03.10	Klausgrete	Ausgabe / Revision **00**	Änderung / Alteration **---**	Zeichnungs-Nr. / Drawing number **65915-000-35**	von of 1

Ex Area
Zone 1, IIC / **Zone 21**

Ex Area
Zone 2, IIC T4 / **Zone 22,** T80°C
Ta: -10°C ... +40°C

PR 5230 + WE1 + Y2

stainless steel housing, IP6x

glass top (impact test: 4J)

Load Cell

Load Cell

Load Cell

Load Cell

Output:
Ex ib IIC
Uo = 21,0 V
Io = 143 mA
Po = 1,55 W
Co = 188 nF
Lo = 120 µH

65915-140-x0
Wiring Board

X101 V+
X102 V-
X103 M+
X104 M-
X100

LC Display
65915-120-x0
LED Backlight
X100

X100
X101

X200
X503

X501

65915-170-x0
Mainboard

X300 — Data cable Digital out
X301 — Data cable Digital In
X302 X303 X304 — Data cable Digital out
X401 RJ45 — Ethernet
X201 — **Field bus card** (Profibus, DeviceNet) 600 — Data cable Field bus
X402 — Data cable RS232
X403 — Data cable RS485/422
X502 — **65915-200-x0** Analog out: X100, X101 — Data cable Analog out
X500 — Mains cable

or

Load Cell or Weighing platform

X100

65915-150-x0
AD Converter Board
(Option WE1)

	Datum Date	Name	Material: PR5230 + Optionen Y2, WE1 (Ex Transmitter) / Wiring	Maßstab / Scale
Erstellt Written by	03.03.10	Klausgrete	sartorius mechatronics	Benennung / Title: Ex - Konzept Ex Design
Geprüft Reviewed by	03.03.10	Glandorf		Blatt Sheet 1
Freigabe Released by	03.03.10	Klausgrete	Ausgabe / Revision: 00 — Änderung / Alteration: --- — Zeichnungs-Nr. / Drawing number: 65915-750-02	von of 2

Ex Area

Zone 2, IIC T4 / **Zone 22,** T80°C
Ta: -10°C ... +40°C

PR 5230 + Y2 + W1

stainless steel housing, IP6x

glass top (impact test: 4J)

Load Cell

Load Cell

Load Cell

Load Cell

65915-140-x0
Wiring Board

X101 V+

X102 V-

X103 M+

X104 M-

X100

X101

LC Display
65915-120-x0

LED Backlight

X100

65915-170-x0
Mainboard

X501

X300 — Data cable Digital out

X301 — Data cable Digital In

X302 X303 X304 — Data cable Digital out

X200

X503

X401 RJ45 — Ethernet

Field bus card
(Profibus, DeviceNet)

X201

Data cable Field bus

X402 — Data cable RS232

X403 — Data cable RS485/422

65915-200-x0
Analog out

X502

X100

X101

Data cable Analog out

X500 — Mains cable

or

Load Cell
or
Weighing platform

X100

65915-110-x0
AD Converter Board
(Option W1)

	Datum Date	Name	Material	Maßstab / Scale
			PR5230 + Optionen Y2, W1 (Standard Transmitter) / Wiring	---
Erstellt Written by	03.03.09	Klausgrete	sartorius mechatronics	Benennung / Title: Ex - Konzept Ex Design
Geprüft Reviewed by	03.03.09	Glandorf		Blatt Sheet 1
Freigabe Released by	03.03.09	Klausgrete	Ausgabe / Revision: 00 — Änderung / Alteration: --- — Zeichnungs-Nr. / Drawing number: 65915-750-03	von of 1

sartorius
mechatronics

Herstellerbescheinigung
Manufacturer's Certificate

Sartorius Mechatronics T&H GmbH
Meiendorfer Str. 205
22145 Hamburg
Germany

bescheinigt in alleiniger Verantwortung, dass das Produkt
certifies under our sole responsibility that the product

Transmitter **PR5230 + Option Y2, W1, WE1**

auf das sich diese Bescheinigung bezieht, mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt (siehe Seite 2) gemäß den Bestimmungen der „Richtlinie **94/9/EG** des Europäischen Parlaments und des Rates vom 23. März 1994 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen".

*to which this certification relates is in conformity with the following standard(s) or other normative document(s) (see page 2) pursuant to the provisions of the "Directive **94/9/EC** of the European Parliament and the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres".*

Diese Erklärung bescheinigt die Übereinstimmung mit der genannten Richtlinie, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies conformity with the Directive listed above, but does not constitute an asseveration of characteristics. The safety directions of the delivered product documentation must be followed.

Sartorius Mechatronics T&H GmbH
Hamburg, 2010-03-31

i.A. Lothar Golla
Lothar Golla
Ex Approval Manager

K. Förster
Kathrin Förster
Quality Management

Folgende Normen werden zum Nachweis der Übereinstimmung mit den Vorschriften der Richtlinie eingehalten:

The standards listed below are fulfilled as proof of compliance with the provisions of the following Directive(s):

EN 60079-0: 2006	EN 60079-11: 2007	EN 60079-15: 2005
EN 61241-0: 2006	EN 61241-1: 2004	EN 61241-11: 2006

Die Eigensicherheit (bei Option WE1) ist bescheinigt durch die KEMA: Zertifikat Nr. KEMA 10ATEX 0065 X.
The intrinsic safety (for Option WE1) is certified by KEMA: certificate no. KEMA 10ATEX 0065 X.

Option	Kennzeichnung / Marking	
Y2 + WE1	II (2)G [Ex ib]IIB/IIC II (2)D [Ex ibD] KEMA 10 ATEX 0065 X	II 3G Ex nA nC IIB/IIC T4 II 3D Ex tD A22 IP6X T80°C SAG 09ATEX004X
Y2 + W1		II 3G Ex nA nC IIC T4 II 3D Ex tD A22 IP6X T80°C SAG 09ATEX004X
WE1	II (2)G [Ex ib] IIB/IIC II (2)D [Ex ibD] KEMA 10 ATEX 0065 X	

* * * * * *

Technische Daten / *Specifications:*

Umgebungstemperatur / Ambient temperature range: **-10°C ... +40°C**
Versorgungsspannung / Supply voltage:

Option V230	**100-240Vac** (±10%), 50-60Hz; 16VA
Option V24	**24 Vdc** (±10%); 12W

* * * * * *

Sicherheitshinweise gemäß Zeichnung **940515230000-460** beachten.
*Please observe the safety instructions as given in drawing **940515230000-460**.*

* * * * * *

Diese Erklärung wird erstellt auf Basis des internen Prüfberichts SAG.09.ATEX.004 der Sartorius AG Göttingen.
This Declaration of Conformity has been drawn up on the basis of the in-house test report SAG.09.ATEX.004 written by Sartorius AG of Goettingen, Germany.

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CE EG-Konformitätserklärung
EC Declaration of Conformity

Sartorius Mechatronics T&H GmbH
Meiendorfer Str. 205
22145 Hamburg, Germany

erklärt, dass das Betriebsmittel
declares that the equipment

Gerät: *Apparatus:*	Transmitter
Typ / type:	PR5230 + Option Y2, W1, WE1

mit den grundlegenden Anforderungen der folgenden Europäischen Richtlinien übereinstimmt:
complies with the basic requirements of the following European Directives:

Richtlinie 2004/108/EG Directive 2004/108/EC	Elektromagnetische Verträglichkeit *Electromagnetic* compatibility
Richtlinie 2006/95/EG *Directive 2006/95/EC*	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen *Electrical equipment designed for use within certain voltage limits*
Richtlinie 94/9/EG *Directive 94/9/EC*	Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen *Equipment and protective systems intended for use in potentially explosive atmospheres*

Das Gerät erfüllt die anwendbaren Anforderungen der in Anhang 1 aufgeführten harmonisierten Europäischen Normen. Zu Angaben zur Richtlinie 94/9/EG siehe Anhang 2.

The apparatus meets the applicable requirements of the harmonized European Standards listed in Annex 1. For specifications regarding Directive 94/9/EC see Annex 2.

Jahr der Anbringung des CE-Zeichens: **10**
Year of attachment of CE mark:

Sartorius Mechatronics T&H GmbH
Hamburg, 2010-03-31

i.A. Lothar Golla
Lothar Golla
Ex Approval Manager

K. Förster
Kathrin Förster
Quality Management

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EG-Konformitätserklärung
EC Declaration of Conformity
Anhang 1 / *Annex 1*

Liste der angewendeten harmonisierten Europäischen Normen
List of the applied harmonized European Standards

1. Richtlinie 2004/108/EG / *Directive 2004/108/EC*

EN 61326-1:2006 Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV- Anforderungen - Teil 1: Allgemeine Anforderungen (IEC 61326-1:2005)
Electrical equipment for measurement, control and laboratory use - EMC requirements – Part 1: General requirements (IEC 61326-1:2005)

2. Richtlinie 2006/95/EG / *Directive 2006/95/EC*

EN 61010-1:2001 Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 1: Allgemeine Anforderungen (IEC 61010-1:2001)
Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (IEC 61010-1:2001)

3. Richtlinie 94/9/EG / *Directive 94/9/EC*

EN 60079-0:2006 Elektrische Betriebsmittel für gasexplosionsgefährdete Bereiche – Teil 0: Allgemeine Anforderungen
Electrical apparatus for explosive gas atmospheres – Part 0: General requirements

EN 60079-11:2007 Explosionsfähige Atmosphäre - Teil 11: Geräteschutz durch Eigensicherheit „i"
Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"

EN 60079-15:2005 Elektrische Betriebsmittel für gasexplosionsgefährdete Bereiche - Teil 15: Konstruktion, Prüfung und Kennzeichnung von elektrischen Betriebsmitteln der Zündschutzart "n"
Electrical apparatus for explosive gas atmospheres – Part 15: Construction, test and marking of type of protection "n" electrical apparatus

EN 61241-0:2006 Elektrische Betriebsmittel zur Verwendung in Bereichen mit brennbarem Staub - Teil 0: Allgemeine Anforderungen
Electrical apparatus for use in the presence of combustible dust – Part 0: General requirements

EN 61241-1:2004 Elektrische Betriebsmittel zur Verwendung in Bereichen mit brennbarem Staub - Teil 1: Schutz durch Gehäuse „tD"
Electrical apparatus for use in the presence of combustible dust – Part 1: Protection by enclosures "tD"

EN 61241-11:2006 Elektrische Betriebsmittel zur Verwendung in Bereichen mit brennbarem Staub - Teil 11: Schutz durch Eigensicherheit "iD"
Electrical apparatus for use in the presence of combustible dust - Part 11: Protection by intrinsic safety "iD"

* * * * * *

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EG-Konformitätserklärung
EC Declaration of Conformity

Anhang 2 / *Annex 2*

Angaben zur Richtlinie 94/9/EG
Specifications regarding Directive 94/9/EC

1. Kennzeichnung / *Marking*

Option	Kennzeichnung / Marking	
Y2 + WE1	II (2)G [Ex ib]IIB/IIC II (2)D [Ex ibD] KEMA 10 ATEX 0065 X	II 3G Ex nA nC IIB/IIC T4 II 3D Ex tD A22 IP6X T80°C SAG 09ATEX004X
Y2 + W1		II 3G Ex nA nC IIC T4 II 3D Ex tD A22 IP6X T80°C SAG 09ATEX004X
WE1	II (2)G [Ex ib] IIB/IIC II (2)D [Ex ibD] KEMA 10 ATEX 0065 X	

2. Zertifizierung / *Certification*

EG-Baumusterprüfbescheinigung Nummer: KEMA 10ATEX0065X
EC-Type Examination Certificate number: KEMA 10ATEX0065X

Herstellerbescheinigung SAG 09ATE004X
Manufacturer's Certificate SAG 09ATE004X

3. Anerkennung der Qualitätssicherung Produktion / *Production Quality Assessment Notification*

durch die Physikalisch- Technische Bundesanstalt (PTB), benannte Stelle Nr. 0102 für Anhang IV nach Artikel 9 der Richtlinie 94/9/EG: PTB 02 ATEX Q010-2

by the Physikalisch- Technische Bundesanstalt (PTB), notified body no. 0102, for Annex IV in accordance with Article 9 of the Council Directive 94/9/EG: PTB 02 ATEX Q010-2

* * * * * *

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