Installation Manual

System Weighing Controller

PR5610

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List of Contents

1   Safety Hints, Electrical Protection Class

This instrument was built and tested in accordance with the safety regulations for measuring and control instrumentation for protection class I (protective earth connection) according to IEC 1010/ EN61010 or VDE 0411. The instrument was delivered in safe condition. To maintain this condition and to ensure safe operation, the operator must follow the hints and warnings given in this documentation.

1.1   Application of the Instrument

The instrument is intended exclusively for application in weighing and batching installations and is particularly suitable for tank and hopper weighing, weighbridges, platform scales, crane weighing, batching systems and as a weight indicator in intelligent control systems. Product operation, commissioning and maintenance must be done by well trained and qualified persons who know of the risks and avoid them, or take measures to protect themselves.
The instrument is state of the art. No warranty is taken that the product is free of errors, especially with reference to the software and hardware required for operation and supplied by third parties. The manufacturer does not take any liability for damage caused by incorrect use of this product. Using this product implies recognition of the above-mentioned regulations.

1.2   Initial Inspection

Check the contents of the consignment for completeness and note whether any damage has occurred during transport. If the content is incomplete or damaged, a claim must be filed with the carrier immediately and the Sartorius sales or service organization must be informed to permit repair or replacement of the unit.

1.3   Before Commissioning

Visual inspection!
Before commissioning, after storage and transport, the instrument must be inspected visually to preclude mechanical damage.

1.3.1   Installation

The instrument has a mounting bracket with holes in different distances and can be mounted adjustable between rubber disks by knurled-head screws to the detachable mounting bracket. The stainless steel housing of the instrument fulfills IP 65. The unit can be mounted in any position, however, the PG glands should not point upwards (water). Before commissioning the instrument, all unused instrument apertures must be closed with blind plugs. For cooling the instrument, the air circulation must not be hampered. Heat influences, e.g. direct sun radiation, must be avoided. The environmental conditions specified in the technical data must be taken into account. The unit is suitable for:

Table-top mounting:	The unit stands on the detachable mounting bracket.
Wall mounting:	Mount mounting bracket on the wall. The unit is held by knurled-head screws.
Installation in control cabinets:	With installation brackets, the optional installation kit PR 1713/91 has to be ordered.

1.3.2   Electrostatically Sensitive Components

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

1.3.3   Opening the Instrument

CAUTION
DANGER TO LIFE !

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. Before selecting a different supply voltage and before replacing the loadcell fuse, the unit must be disconnected from all voltage sources.

1.3.4   Earthing

Earthing of the unit must be via the protective earth conductor PE.

1.3.5   Protective Earth

The connecting cable of the unit must comply with the regulations in accordance with VDE 0411 or EN61010. The power cable must contain a protective earth conductor, which must not be interrupted inside or outside these units (e.g. by using an extension cable without protective earth). The protective earth must be connected with **terminal PE** in the power connecting block. Before commissioning, acceptance of the installation by a technically responsible expert is required.

1.3.6   Power Connection PR5610/X0
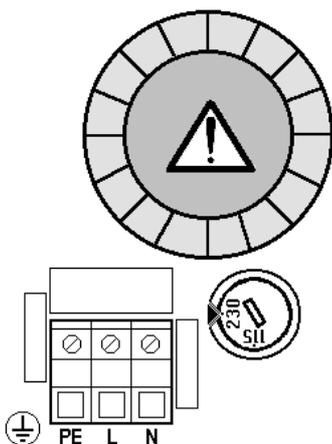
The **PR 5610/X0** is designed for **230 V AC / 115 V AC with 50 to 60 Hz** supply The adjusted operating voltage must correspond to the nominal power voltage. Changing over from **230 V (factory setting)** to 115 V is done by means of a rotary switch, which can be actuated using a screwdriver. Turn the switch to the required voltage marked below the arrow. Power connecting terminals, supply voltage selector switch and transformer are located on board 1, left above the row of cable glands.

Caution: The power cable conductors must be tied together with a cable strap shortly before the terminal block! As the unit has no power switch, it is ready for operation immediately after connecting the supply voltage. The firm **power connection must be protected with a fuse**. Additionally, an interruption (safely) of both lines of the supply voltage must be possible, e.g. by means of a switch or a power connector.

1.3.7   Power Supply PR5610/X1

The **PR5610/X1** is designed for operation with **24 V AC with 50 to 60 Hz** or **24 V DC supply**, use mains screw L and N of terminal block to connect 24 V AC or 24V DC supply. For earth connection, refer to chapter 1.3.5.

1.3.8   Failure and Excessive Stress

If the instrument is suspected of being unsafe, shut it down and protect it against accidental operation. This is the case when the unit

- is physically damaged,
- does not function any more,
- is stressed beyond the tolerable limits (e.g. during storage, transport).

1.3.9   For Special Attention

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. The conductors of each cable must be tied together with a cable strap shortly before the terminal block. The manufacturer cannot be held responsible for personnel injury or damage caused by an instrument repaired incorrectly by user or installer.

1.3.10   Fuse
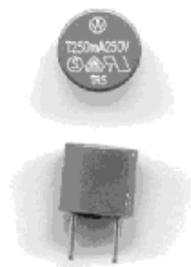
The load cell supply circuit is protected by a 250 mA slow blowing fuse.
The following fuse is fitted:

Wickmann order no. 19372K, TR 5 Radial, slow blowing IEC 127-3 250 mA T

! WARNING !

Only a qualified person may replace the fuse.
Using repaired fuses and short-circuiting of the fuse holder are not permitted. Note that only fuses of the specified type and current rating in accordance with IEC 127 may be used for replacement.

The transformer primary winding is protected by means of a thermal fuse. After overheating, the thermal fuse is molten. The instrument has to be sent to our service for repair.
The secondary winding is protected by a Multifuse 1.85 A. If it switches off (e.g. due to low power voltage) disconnect the device from power. After a cooling down period of about 3 min. it can be used again, if the power voltage is OK.

1.4   Repair and Maintenance

Repairs are subject to checking and can be carried out only at Sartorius. In case of defect or functional trouble, please, contact your local SARTORIUS organization for repair. When returning the instrument for repair, an exact and complete fault description must be supplied. Maintenance work may be carried out only by a trained technician aware of the involved hazards, whereby the relevant precautions must be taken.

1.4.1   Soldering Work

The Basic unit does not require any soldering work.

1.4.2   Battery Activation

he unit is delivered with the battery **not** connected. The battery must be connected, follow the safety hints. The jumper for the battery is located on board 2 next to the 4-pole power supply cable.
The jumper must provide the connection between the posts to activate the battery.
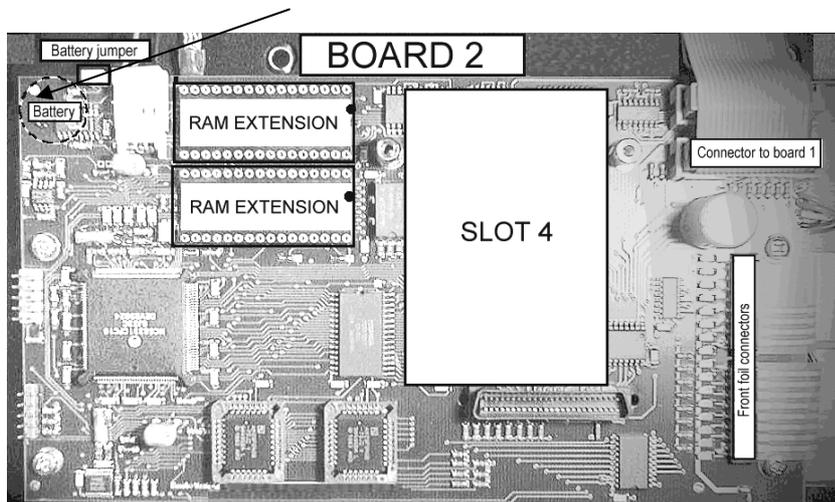
After the battery has been activated, the clock (data and time) needs adjustment.
There are different possibilities for monitoring the battery voltage during operation. One is that during startup, a low-battery sign will be displayed on the weight indicator:
For function and adjustment of the 'Lo Bat' indication, see chapter 4.8.3.3.

1.4.3   Battery Replacement

 The instrument contains a lithium battery for memory back-up (saving the data). When exceeding the specified minimum battery voltage or in case of defect, the battery must be replaced by the SARTORIUS customer service or by an equivalent trained person and disposed of in accordance with the local regulations.

For battery lifetime see chapter 6.2.1.

1.5   Disposal

Electronics scrap is special waste.
Please, follow your local disposal regulations.

1.6   Cleaning

If necessary, the front panel can be cleaned using a damp, soft cloth. Use only little water or isopropyl alcohol for moisturizing. With the PC keyboard connected, protection type IP 65 is not met any more! No moisture must enter the instrument inside.

2 System Weighing Controller

The instrument is equipped with an internal weighing point (internal ADC), display and keypad. With an application package (e.g. Batch-X5) the unit is a powerful system for control of weighing and batching processes and combines all functions such as convenient operator interface, weighing and batching controller, PLC and interfacing.

The instrument is programmable according to the IEC 61131-3 standard (for field of application, see data sheet). With PR 1750, PR 5610 can be matched easily to the application (operation), recipe functions (process steps) and process control (by built-in PLC).

2.1 Basic Instrument Survey

- Accuracy 5000 e for the internal ADC.
- Fluorescent display for weight, 2 lines for text.
- Front panel keypad with control and function keys.
- Stainless steel housing sealed to IP 65, with EMC cable glands
- PC keyboard connectable (no protection to IP 65)
- Serial interface RS 232 built-in for e.g. printer, remote display, terminal or communication.
- Extensible by means of options (4 slots), RAM-extension (2 sockets).
- Interfaces (except the RS 232, analog input, BCD output) are galvanically isolated.
- Power connection for 230 V/ 115 V AC (PR 5610/X0) or 24 V AC / DC (PR 5610/X1), protection class I (protective earth).
- All connections in the housing are made by plug-in terminal blocks (except the power cable).
- The unit is suitable for mounting in a panel cut-out, wall mounting or as a table-top unit.

Calibration and configuration of the instrument are menu-guided via front panel keypad, PC or terminal.

- Calibration by means of weights or by entry of the mV/V values without additional calculations.
- Configuration of the interface cards, e.g. for remote display
- Analog test for analog/ digital converter via terminal.

Communication Protocols:	
for the internal RS 232 or the optional RS 232/ 485 • EW protocol • remote display • printer, W&M printer • JBUS/MODBUS (slave) • DUST 3964R • Modem • xBPI (Sartorius scale) • 2-wire * (only for IEC 61131 user written prgs.)	Fieldbus slave with option PR 1721/xx • Profibus-DP • Interbus-S • Device-Net

* Rel. 03.16.03 required

Extensible by means of licenses	• Licenses are activated via a license number, which is related to the board number of the instrument.

PR 1750 is available on the CD "Complementary SW-TOOL-BOX", updates are available in the Internet.
PR 1750 can be used free-of-charge without license for:

      up to 64 lines IL(instruction list)-code
      only one task possible in the PLC resource
      Operating and recipe resource are not programmable

2.2   Options

PR 5610 Periphery

PR 1713/05 RAM extension		Fieldbus master
RAM sockets	**Slot 4** Fieldbus Slave	PR1721/01 Profibus-DP *or* PR1721/02 Interbus-S *or* PR1721/04 DeviceNet

Weight display

Front Display

Front Keypad

external Keyboard

PR 5610

Slot 3 / Slot 2 / Slot 1   **Max. 3 Option cards** of:

or PR1713/14 Ethernet

analog. I/O, 1 only — PR1713/07 4 anal. in 1 anal. out *or* PR1713/06 1 anal. out

digital I/O — PR1713/08 digital BCD or BIN out | PR1713/12 digital 4 in 4 out opto | PR1713/15 digital 4 in 4 out relais

I/O * extension 1 only — PR1713/13 DIOS mast . Interbus-S | PR1720 WP B | PR1713/17 digital 6 in 8 out,

serial I/O — PR1713/04 RS 485 RS 232 | Interbus-S peripheral units

* DIOS = Distributed I/O System

Licenses

Batching
PR1713/20
PR1713/21
PR1713/30

for **PR1740**
PR1713/20
PR1740/11
PR1740/21
PR1740/41
DDE/**InTouch**
PR1740/31

for **PR1750**
PR1750/20

for **DDE**
PR1791/13

for **InBatch**
PR1713/30
PR1781/13
PR1791/13

RS 232 Builtin

Legend:

Standard

Option

serial		
Hardware		PCprogram
Protocol		
standard,	special, 1 only	EW-COM, 1 only

Terminal

ASCII Printer

IEC 61131 programmed interface

Remote display 1627/1628

and/or

W&M Printer FX880/PH02

F l a s h i t ! 3 2 ↑ ?

Batch/ recipe   PR1740
  + InTouch   PR1790

Complex batching
InBatch   PR1780
DDE server   PR1791
  + Phaseconfig PR1781
  + InTouch   PR1790

DDE server   PR1791
  + InTouch   PR1790

Engineering   PR1750

2.2.1   Program Extensions (optional)

Licences to be entered in the PR5610:

Type	Function
PR1713/20	Batching function for 1 recipe, up to 255 components
PR1713/21	Batching function with several recipes, up to 255 components per reipe
PR1713/30	Standard batching phases, InBatch (< 256 I/Os)
PR1713/31	Open communication
PR1713/32	S88 Phase batching
PR1713/SM	Alibi Memory (W&M)
PR1713/AL	Recipe management and component management
PR1740/11	Production plan
PR1740/21	DDE interface, e.g. for InTouch
PR1740/31	PR 1740 Remote operation via a terminal
PR1740/41	Phase configurator
PR1781/13	DDE/OPC server communication
PR1791/13	OPC database access
PR1792/20	Batching function for 1 recipe, up to 255 components

Examples for application licences in PR5610:

Number	Function
102	PR5610/40 Flow Controller
104	PR5610/50 Fill Controller
105	PR5610/10 Truck scale
106	PR5610/70 Bulk Controller
107	PR5610/00 Pro Controller
109	PR5610/60 Mix Controller

Further software licences:

Type	Function
PR1750/00	Programming tool on CD (OEM)
PR1750/10	Programming tool (instrument)
PR1790/01	InTouch (< 256 I/Os)

For details on the programs, see the respective manual.

2.2.2   Plug-in Cards and Modules (optional)

On board 1 the PR5610 can accommodate up to 3 cards.

Product	Function
PR1713/04 2 serial interfaces RS 232 and RS 485/ RS 422.	The RS 485 serial interface must be configured before installation via DIL switches on the interface card! Protocols configurable by software set-up.
PR1713/06 1 Analog output, galvanically isolated, (only 1 card)	Configuration and adjustment of output levels with software correction. Signal output analog 16 bits, 20,000 divisions, 0/4 - 20 mA, 0/2...10 V.
PR1713/07 1 Analog output, 4 analog inputs, (only 1 card)	Output: see PR1713/06. Input: 4 channels with common ground, resolution 3,000 divisions.
PR1713/08 BCD output	5 decades decimal or 3 byte binary (with application program)
PR1713/12 4 inputs and 4 outputs	Digital interfaces galvanically isolated via optocouplers. Inputs active or passive. Configurable by software set-up.
PR1713/13 DIOS master, digital I/O system for connection of PR 1720 as 2nd weighing point and as bus interface for max. 256 additional dig. I/O, (only 1 card)	Master function based on Interbus-S standard for control of digital I/O. A PR1720 can be used as a 2nd weighing point at the DIOS card. Automatic detection of the connected modules. The max. possible number of ports is limited to 256 bits or 4 modules. The card has integrated termination resistors.
PR1713/15 4 optocoupler inputs 4 relay outputs	similar to PR1713/12, but configurable relay output.
PR1713/17 6 inputs and 8 outputs	Digital interfaces galvanically isolated via optocouplers. The input group has got 1 common minus potential, separated from 1 common minus potential for the outputs.

The following options can be inserted on board 2:

Product	Function
PR1713/05 RAM extension	The memory extension is detected after installation and cold start.
PR1713/14 Ethernet	Card for 10Mbit/sec network (e.g. with PR 1740)
PR1721 Field bus interface connecting unit max. transmission rate 1,5 Mbits	• PR1721/11 Profibus-DP (slave) • PR1721/12 Interbus-S (slave) • PR1721/14 DeviceNet (slave)

For details on the products, see chapter 3.4.

2.3 Housing

The instrument is accommodated in a stainless steel multi-purpose housing (288x144x130 mm) of protection class IP 65. It is suitable for table-top and wall mounting or panel installation. The instrument can be opened from the front. Keypad, display and board 2 form a unit with the front panel. The front bezel is 5 mm thick and held in position by means of 8 screws. For front panel installation a rectangular panel cut-out (278 mm x 134 mm) is required..
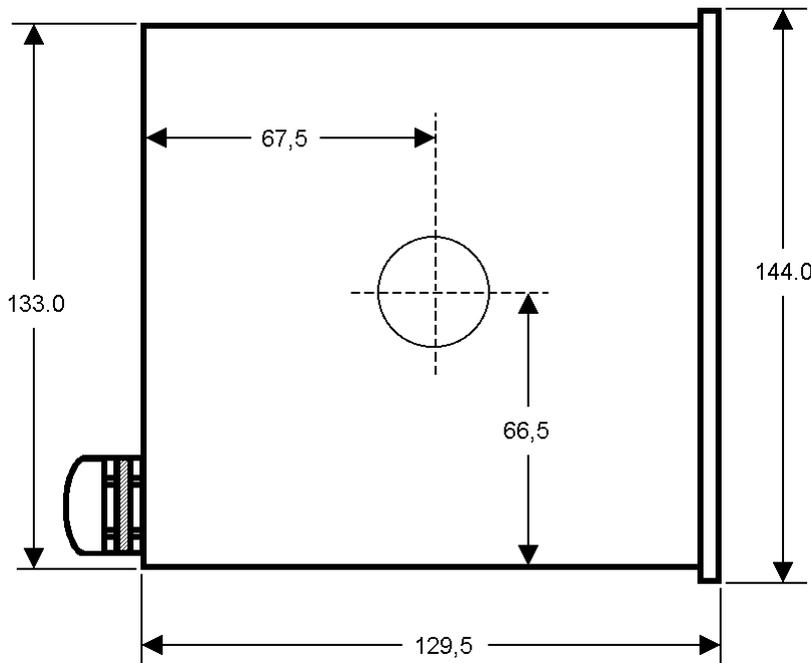
The cables are entered via 9 nickel-plated brass EMC glands on the housing rear. Unused cable glands must be closed with blind plugs (IP 65!). Except the external keyboard, all connections are made via internal screw terminal connectors. The cable glands for power connection, LC connection and Builtin are always provided. The remaining glands are divided as follows: 2x for the field bus option 1x for each of the three options. For connection of the options, three 16-pole connector blocks (2 terminal rows each with 8 terminals) are provided. The PR 1721/xx modules have got screw terminals. The socket for an external PC keyboard with DIN plug is accessible from the rear.

Caution: With external PC keyboard connected, protection type IP 65 is not met any more!

2.4   Description of controls

2.4.1   Display

Status indicators   Dialogue keys   Alphanumeric keys

Indicator keys   Function keys

The **Weight Display** allows display of 7 digits for weight plus a decimal point. The unit can be selected as tons, kilograms, grams or lbs. The display is capable of handling two lines of text in addition to the numeric output. The other symbols in the display are listed below:

Status-indicator	Description
B **G**	Gross weight is displayed **Gross = Net + Tare** (G only active in NTEP mode)
NET	Net weight is displayed
T	Tare or initial weight is displayed. This is the weight stored in memory. Tare in offsets the displayed weight and stores it.

Status-indicator	Description
→0←	The weight value is within ±¼ d.
◁▷	The weight is in standstill
◇	Batching is active
◇ (blinking)	Blinking, there is an alarm or manual component

2.4.2   Keypad

The symbols of the front-panel keys are given below:

Indicator keys	Description
(B)	Gross weight is displayed while this button is pressed (*B – Brutto, German for Gross*).
(T)	Tare weight is displayed while this button is pressed.
◈	Set and reset tare. The instantaneous gross weight is stored in the tare memory under the following conditions: - weight is standstill - indicator is not in error status

Indicator keys	Description
⊙	Print-out
WP	Toggle key for switching between logical weighing point A, B and C=A+B
→0←	Set gross weight to zero given that: - weight is standstill - within zero set range - not tared batching is not active

Dialogue keys	Description
Exit	Exit from menu, continue operation at next higher level
⌣	Softkey: Select a function
↑	Scroll up the menu options
↓	Scroll down the menu options
>More	Display the other menu options. the double arrow ⁙ means, that further functions are available

Dialogue keys	Description
←	Move the cursor to the left during editing / Selection
→	Move the cursor to the right during editing / Selection
OK	Enter / execute
C	Back space / delete

Function keys	Description
Stop	Stops the batching process
F1	Programmable function key
F2	Programmable function key

Alphanumeric keys
1 #"()= 2 ABC 3 DEF 4 GHI 5 JKL 6 MNO 7 PQRS 8 TUV 9 WXYZ . –+*/ 0 ÄÖÜ

2.4.3   Operating Concept

2.4.3.1   Operating via Softkeys

The operation is menu-guided. For this purpose, the instrument has a 'softkey'-functionality.

Three 'softkeys' below the display marked by an upward-direction arrow ⌒ correspond to the function described in the lower text display line.

```
StopExit reset
Cold & Erase& Flash
```
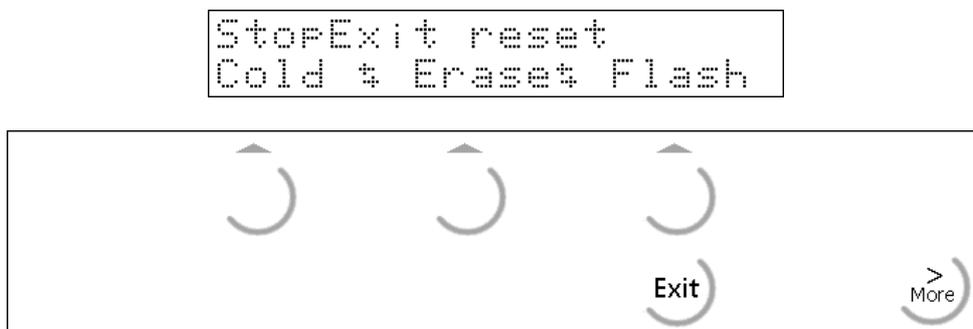

If more than three functions can be selected, double arrows ⸭ indicate that further items can be displayed with the more key ⌷.

A menu can be left with ⌷ , the operation is continued at the next higher level.

2.4.3.2   Selection via Scroll Keys

```
Setup
↓Calibration        ↑
```
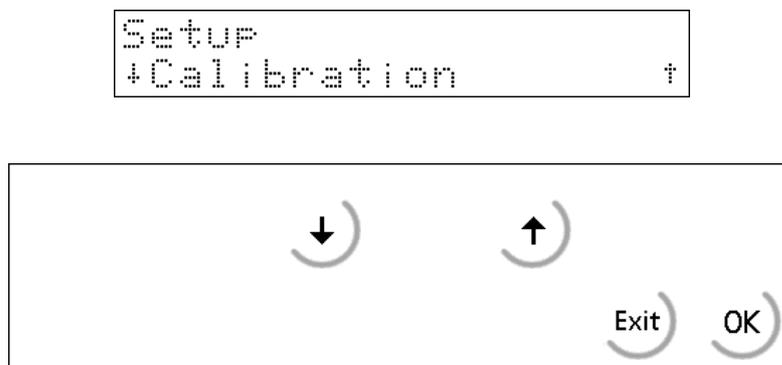

The functions in the menu can be scrolled in forward direction using the scroll down key ↓ or in reverse direction using the scroll up key ↑ .

The exit key ⌷ is used to leave the menu item and to continue at the next higher level.

2.4.3.3   Entering alphanumerical Characters

In the alphanumeric entry mode, a cursor blinks in the entry field. This mode is accessible by pressing a key from the alphanumeric keypad.

The alphanumeric keys have got more than one assignment. After pressing for the first time, the relevant first character, e.g. 'A' is displayed in the cursor position. After pressing for the second time, e.g. 'B' instead of 'A' is displayed; 'C' is displayed after pressing for the third time, etc. After the last signification, the first one is displayed again.
Pressing another character key, or the right arrow key ⊡ completes the entry of a character.

Going back to the previous character is done with the left arrow key ⊡ .
A character is removed by pressing the delete key ⊡

If only numeric values are required for an entry, letters are not selectable. Therefore, values such as 555 can be entered by pressing the key successively three times without using the arrow key.

Key	Character	Remarks
1	#"()=$?!%1	
2	ABCabc2	Komma, Dezimalpunkt bzw. Semikolon können mit der Punkttaste ⊡ eingegeben werden.
3	DEFdef3	
4	GHIghi4	
5	JKLjkl5	Werte mit Vorzeichen werden ebenfalls mit der Punkttaste ⊡ eingegeben, und zwar durch einmaliges Drücken für Minus und zweimaliges Drücken für Plus.
6	MNOmno6	
7	PQRSpqrs7	
8	TUVtuv8	
9	WXYZwxyz9	Ein Leerzeichen wird mit der Taste ⊡ eingegeben
.	—+*/:;_'&,<>.	
0	ÄÖÜäöüß0	Jede Eingabe wird mit der Taste ⊡ abgeschlossen.

3   Installing the Instrument and Options

Before starting any work, read chapter 1 and follow all hints! Further procedure:
- Check the consignment: unpack all parts pertaining to the project.
- Safety inspection: damages ?
- Ensure that the installation is correct and complete including cables, e.g. power cable, power connection with fuse, load cells, cable junction box, data cable, console/ cabinet, etc.
- The instructions for installation of the unit (related to application, safety, ventilation, sealing, external effects) must be followed!

Opening the instrument
- Check the supply voltage. If necessary, turn voltage selector into the correct position. If necessary, mount the options (plug-in cards, memory extension).
- Set the jumper to activate the internal battery.
- Connect the cable from the cable junction box or load cell.
- If necessary, connect further data cables.
- Connect the power cable.
- Check the installation and connect the unit.

3.1   Mechanical Preparation

PR5610 als Tischgerät braucht eine ebene, feste Unterlage. Bei Wandmontage muss der Aufstellbügel an der Wand befestigt werden. Bei Schrank- oder Paneleinbau muss ein entsprechender Ausschnitt im Gehäuse angebracht sein. Halten Sie alle Teile, technische Unterlagen und nötiges Werkzeug bereit. Kabel an den Montageort heranführen und befestigen (z.B. mit Kabelbindern). Kabelenden absetzen und abisolieren, Litzen kurz halten.

3.2   Hardware Construction

The electronic is accommodated on two printed circuit boards (board 1 and board 2) connected via two 20-core flat cables and a 4-core cable. On board 1 the power supply, analog circuitry and slots 1-3 are located. On board 2 the processor, memories, RAM extension sockets, display connection and slot 4 (50-pole) are located. The display board is located below board 2.

3.2.1   Installing the Options

Board 1 is provided with 3 identical sockets (double row, 2*25 contacts) for options. The designation for the sockets (from left to right) is slot 1 ... 3. The plug-in card connections are taken identically from each slot to 16-pole terminal blocks. For application packages the option cards are plugged into fixed slots, which cannot be changed later.

For detecting the options a COLD start has to be performed!

The instrument detects a change in the configuration (e.g. additional card installed) automatically and requests for a cold start.
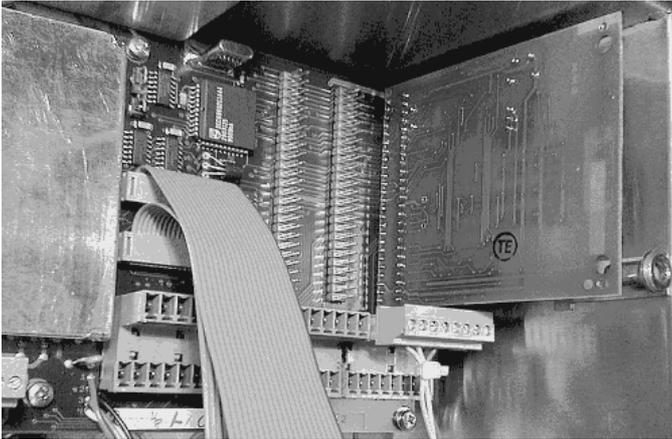
Option slot 3 (most right) and
terminal B (upper block) in use.

Installation: layer side left, component side right

Attention: position plug exactly above contact pins! Set both rows correctly in the holes of the plug.

The optional plug-in cards are provided with pin markings and port addresses (list for each slot) as well as connecting examples, as far as necessary.

The upper row of the terminal blocks is called B, the lower A.

The terminals are described A1, A2, ... A8 and B1, B2, ... B8 (A1 is the most left pin of row A).

3.2.2   Digital Board (Board 2)

On board 2 the processor, memories, two RAM extension sockets and display connection are located.
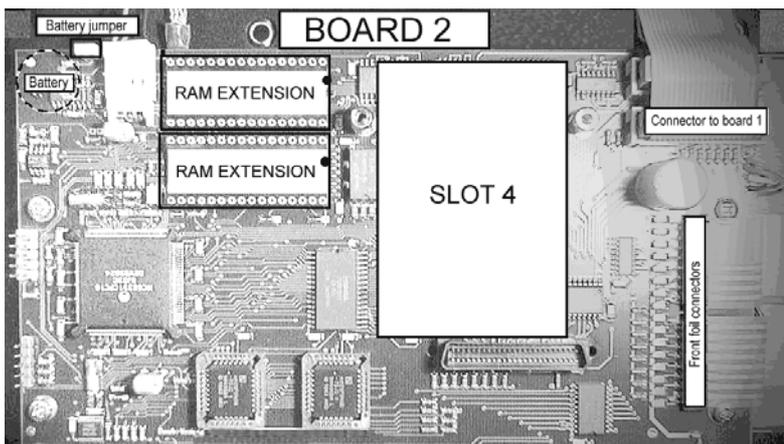
The display board is mounted below board 2. At the top left corner the battery jumper is located, the battery itself is found on the layer side of the board. Board 2 contains a 50-pole connector called slot 4.

After plugging in the option, the card has to be locked by two screws.

3.2.3   Cable gland and connection

All cables have to be fed into the instrument via glands to ensure protection according to IP 65. Cable diameters of 6...12 mm for PG13.5, 5...10 mm for PG11 and 4...8 mm for PG9 are suitable. The conductors are connected to screw terminals in the instrument. Max. conductor cross-section 2,5 mm^2.
The strip connectors are mounted on the housing bottom, above the holes for the EMC glands. The power connecting terminals excepted, all connecting terminal units are of the plug-in type. 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.

<div align="center">Mounting the Cable:</div>
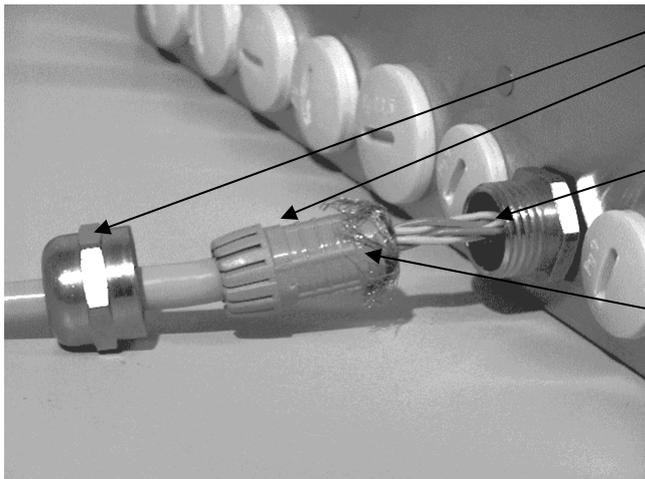
- Remove the (screw) cap
- Slide cap and plastic cone over the cable

- Take the cable through the gland

- Fold the cable screen over the lower part of the plastic cone (approx. 10mm)

- Connect the cable conductors
- Tighten the PG-gland.

The cable screens must be connected in the metal sleeves of the PG gland.
Don't take the screens into the unit!

3.3   Mainboard (Board 1)

On board 1 the power supply, the analog circuitry and slot 1 - 3 for options are located.
The chip containing the unique board no. (SIL chip) looks like a transistor and is found next to the CAL-switch.
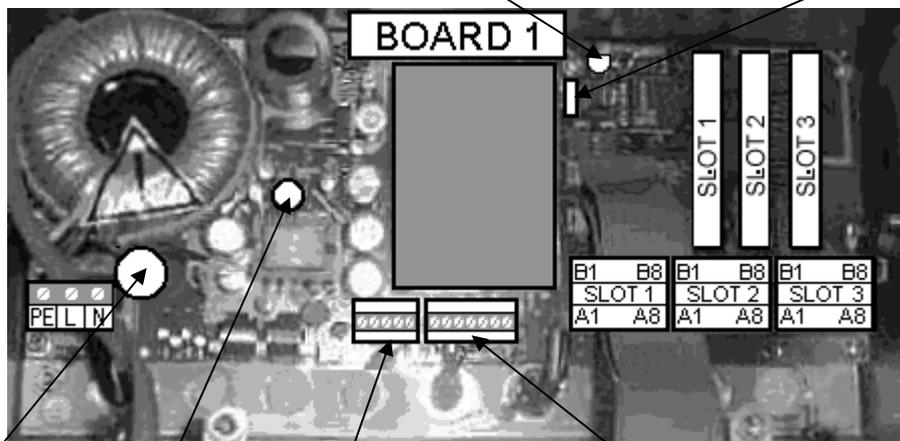
Voltage selector   Fuse   Serial port Builtin   Load cell terminals

3.3.1   Load Cell Cable / Junction Box

Connection of up to 8 load cells (650 Ohm) in 6-wire technique
via cable junction box PR6130/.. with cable PR6135/..
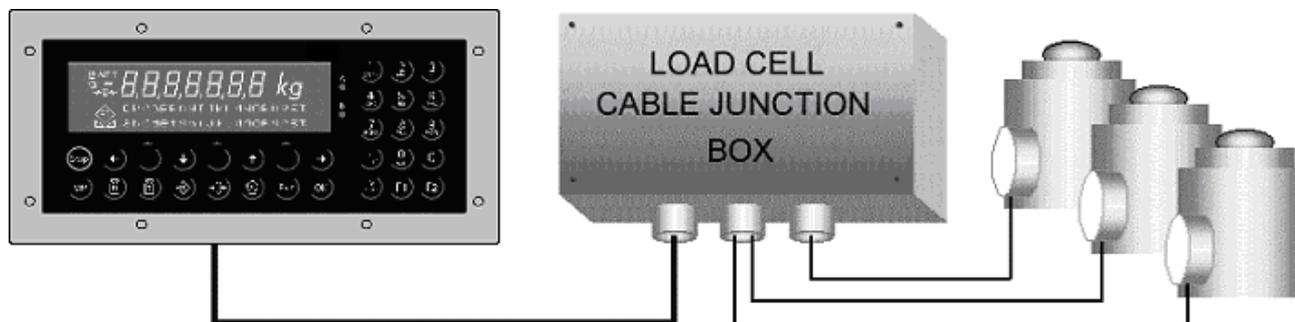
⚠ The here mentioned cable colours are valid for SARTORIUS load cells of series PR 62 . . resp. for extension cable PR 6135.

For use of Sartorius platforms or other load cells the cable colours could have a different meaning!
Before connecting please refer to the respective manual / datasheet for the meaning of the cable colours.
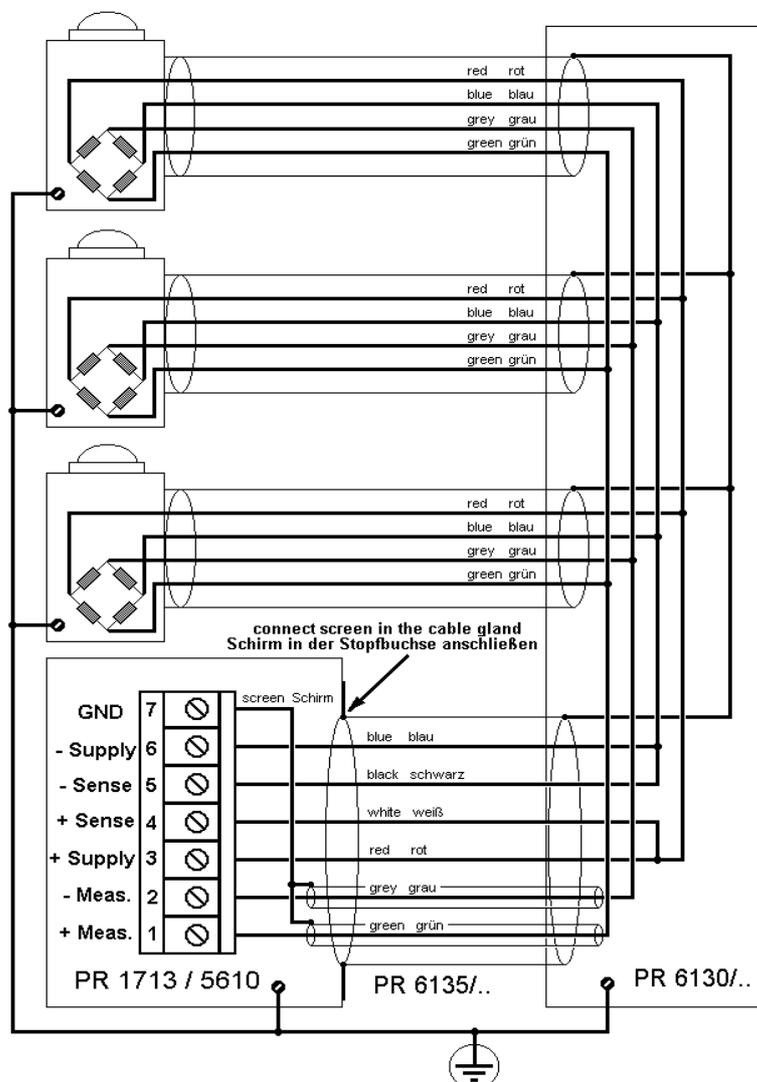
Recommendation: - lay in steel tubes connected to earth potential.
                      - min. 1 m distance to power cables
Load cell supply circuit
          Load cell circuit resistance load $\geq$ 75 Ohm e.g. 8 load cells, each with 650 Ohm,
          firmly adjusted to 12 V, protected by a 250 mA slow blowing fuse (see chapter 1.3.10).

Connection of one load cell in 4-wire technique:

- Connect + Supply (3) to + Sense (4) and - Supply (6) to - Sense (5) at the terminal block.
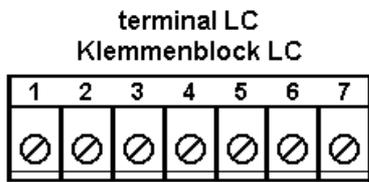
terminal LC	connection	description
1	+ Meas.	+ signal / LC out
2	- Meas.	- signal / LC out
3	+ Supply	+ supply / excitation
4	+ Sense	+ sense
5	- Sense	- sense
6	- Supply	- supply / excitation
7	GND	ground / screen

Connection of PR6221 load cells
Please refer to the instruction manual PR 6021/08, -/68.

3.3.1.1   External Supply for Load Cells
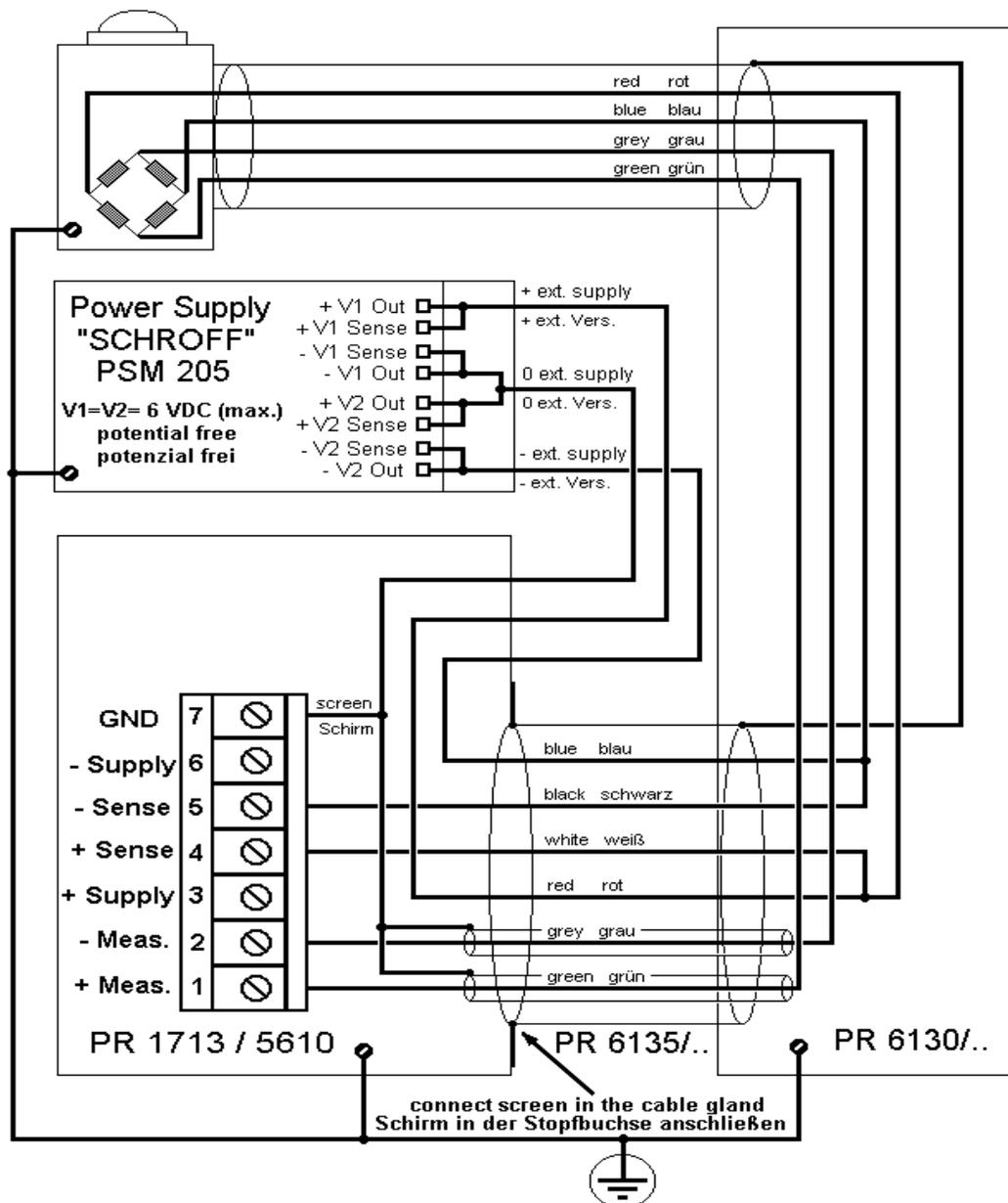
3.3.2   External PC Keyboard

The instrument is equipped with an alphanumeric front-panel keypad and a connection for a PC keyboard with DIN-plug (at the rear side of the housing). Both functions are equivalent. They can be used alternatively.
We recommend the Cherry keyboard 'Business Line' G83-6300 (with AT/DIN connector, 35 mA current).

Keyboard	F1 F2 F3 F4	F5 F6 F7 F8	F9 F10 F11 F12
Keypad	F1 F2	Stop Exit ↓	↑ >More ⊙

Keyboard	← (Backspace)	↵ (Enter)	↑ ← ↓ →
Keypad	C	OK	↑ ← ↓ →

The external keyboard is set to US (default).
If a GERMAN keybord is used, the character set has to be changed to GERMAN with [Strg][F2],
back to US with [Strg][F1].
The LEDs of the PC keyboard are not controlled.

⚠ Please check the power consumption before connecting the keyboard,
it may not exceed **50 mA @ 5 V**. Overload is prevented by a multifuse element.
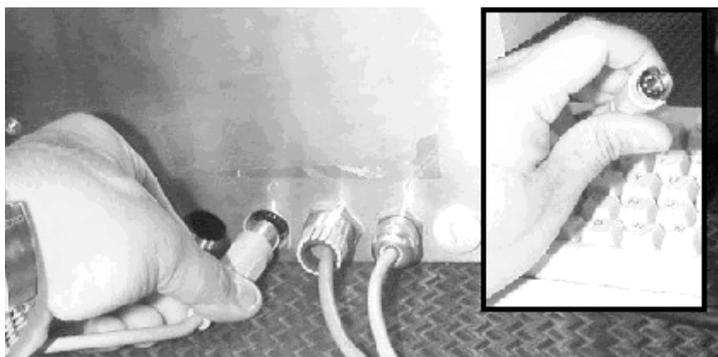
Remove the (screw) cap at the rear and insert the cable plug (DIN) of the PC keyboard.

DIN connector pin allocation

1	KBD Clock
2	KBD Data
3	nc
4	GND
5	+ 5 V

For keyboard with PS/2 plug
use adapter cable (MINI DIN 6-f to DIN 5-m):

Adapter cable

PS/2-f   **5pole DIN-m**
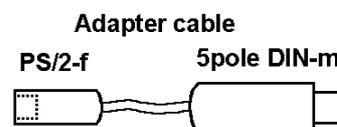
Caution: With external PC keyboard connected, protection class IP 65 is not met any more!

3.3.3   Bar Code Reader

The DIN socket (at the rear side of the housing) can be used to connect a bar code reader instead of an external keyboard.

Please check the power consumption of the bar code reader before connecting,
it may not exceed **50 mA @ 5 V**.
Overload is prevented by a multifuse element.
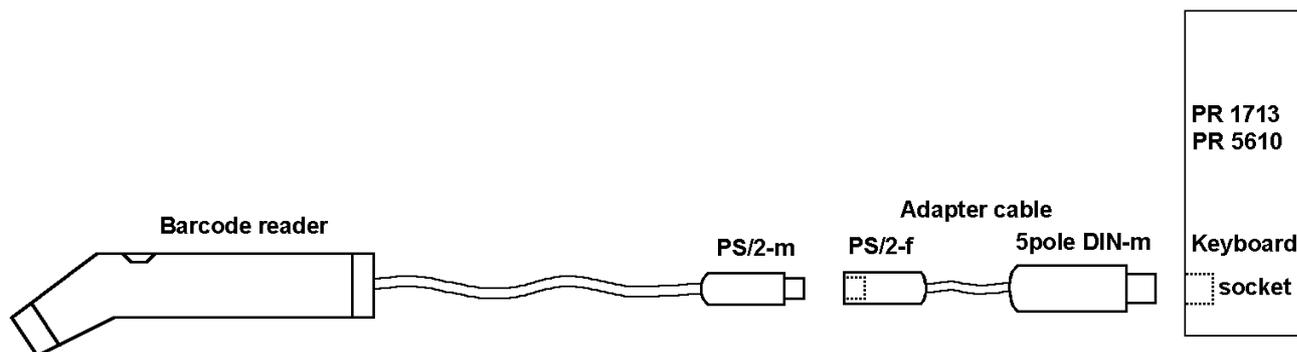
For PIN layout of the DIN socket refer to chapter 3.3.2.
At the instrument the keyboard character set has to be set to US (default). If a GERMAN keyboard had been used, return to US with [Strg][F1] before connecting the reader.

Bar code reader setup (Table: Opticon OPL 6735 wedge) is done by scanning the respective codes of the handbook.
Default values are indicated in <>.

Opticon CPL 6735 wedge	
Linker:	AT wedge
Keyboard layout:	<with keyboard >
Keyboard language:	<US>
Intercharacter delay for wedges:	Delay = 10
Set suffix:	Clear all suffixes
Read mode options:	Single read
Redundancy:	3 times redundant

Further bar code readers to be used are: Syntech (Cipher 1021G) and Gryphomn (M-100).

For safe readings it is recommended to set the redundancy to 3 readings.
To acknowlege each reading via keypad on the instrument, the auto carriage return function of the bar code reader has to be switched off.

Caution: With bar code reader connected, protection class IP 65 is not met any more!

3.3.4   RS 232 Built-in Interface

The instrument is equipped with a standard RS 232 interface, called Builtin. If a PC with terminal program or a terminal is connected, the interface can be used for calibration and configuration of the instrument. The interface can be used freely and can be configured e.g. for data transmission to a supervisory system, a remote display, a printer or an external Sartorius scale (xBPI).

Technical data

Connecting method:	1-row 5-pin connector	Number of channels:	1
Type:	RS 232 full duplex	Speed:	300 to 115K2 Bit/sec
Data bits:	7 / 8 Bit	Parity:	None, odd, even
Number of signals:	2 output signals (TXD, RTS) 2 input signals (RXD, CTS)	Output signal level:	logic 1 (high) - 5 ... - 15 V logic 0 (low) + 5 ... + 15 V
Input signal level:	logic 1 (high) - 3 ... - 15 V logic 0 (low) + 3 ... + 15 V	Potential isolation:	no
Cable type:	twisted pairs, screened (e.g. LifYCY 3x2x0.20), 1 pair of wires for GND	Cable length:	max. 15 m
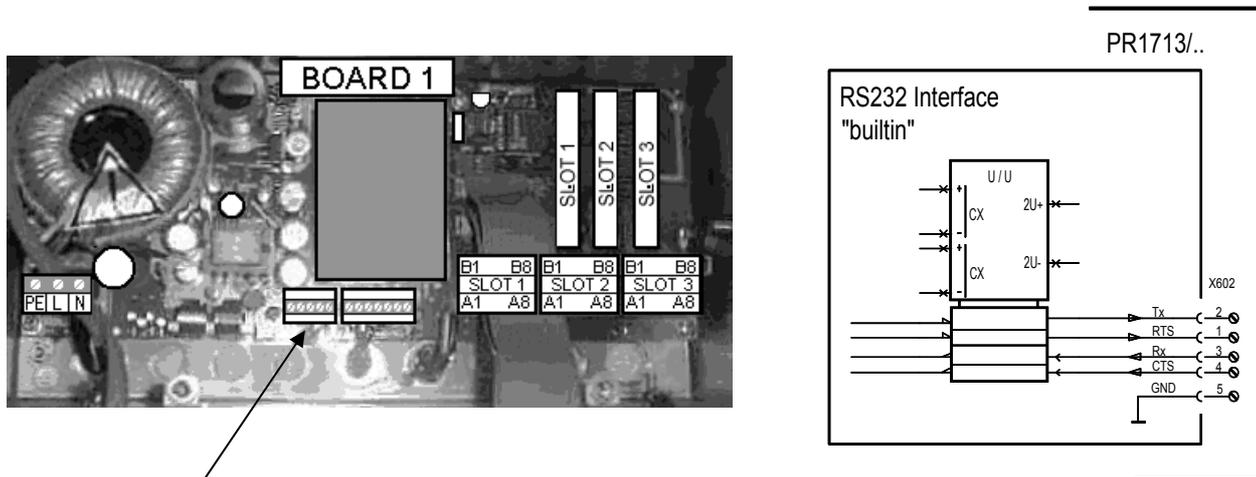
3.3.4.1   PC or Terminal Connection
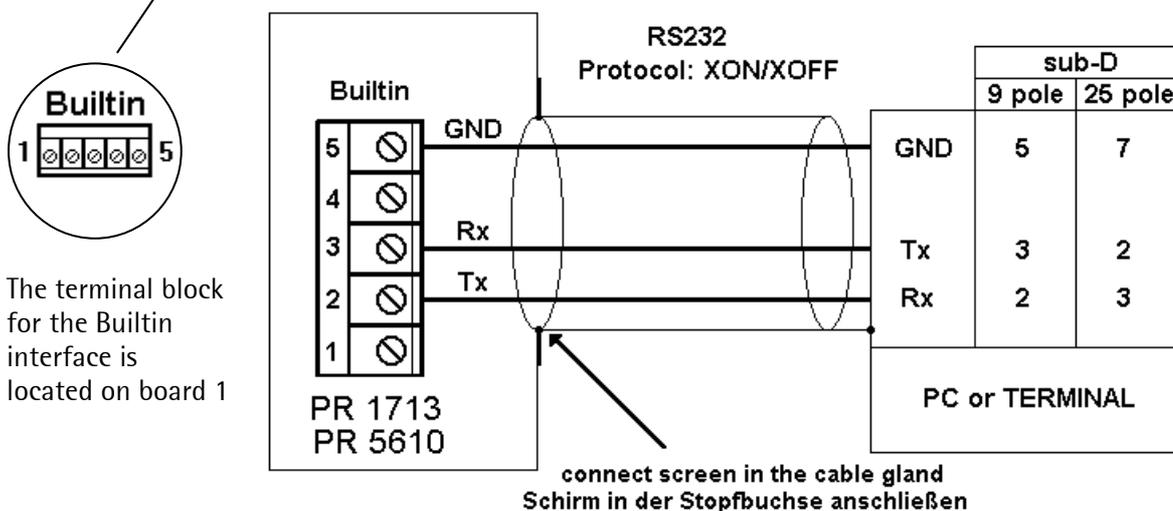
If [Operator device at] is selected at [Builtin RS232], no further setup on the instrument is necessary, parameters for the PC or terminal are: 9,600 bits/sec, 8 data bits, no parity, 1 stop bit and XON/XOFF protocol.

3.3.4.2   Remote Display / Remote Terminal Connection
The builtin RS 232 interface can be used to connect the remote display PR1627 or the remote terminal PR1628.
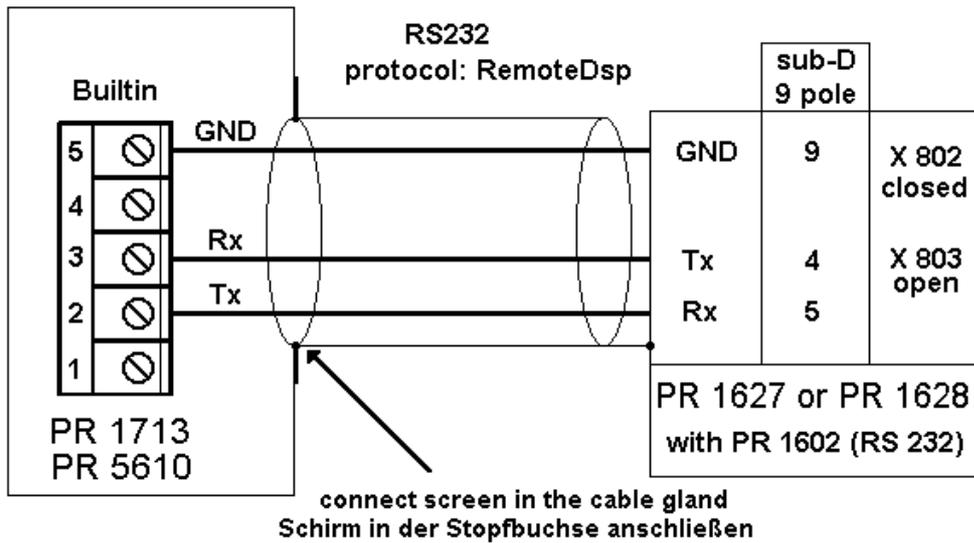
In [Serial port setup]-[Builtin RS232]-[Protocol] select [RemoteDsp], it has got some fixed parameters:
Bits-7, Parity-Even, Stopbits-1.
The [Baudrate] has to be set to [4800] to correspond with the default values of PR1627 or PR1628.

3.3.4.3   Ticket Printer Connection

The Ticket printer TM 295II/PH02 has got a special EPROM to run the [W&M Print] protocol.
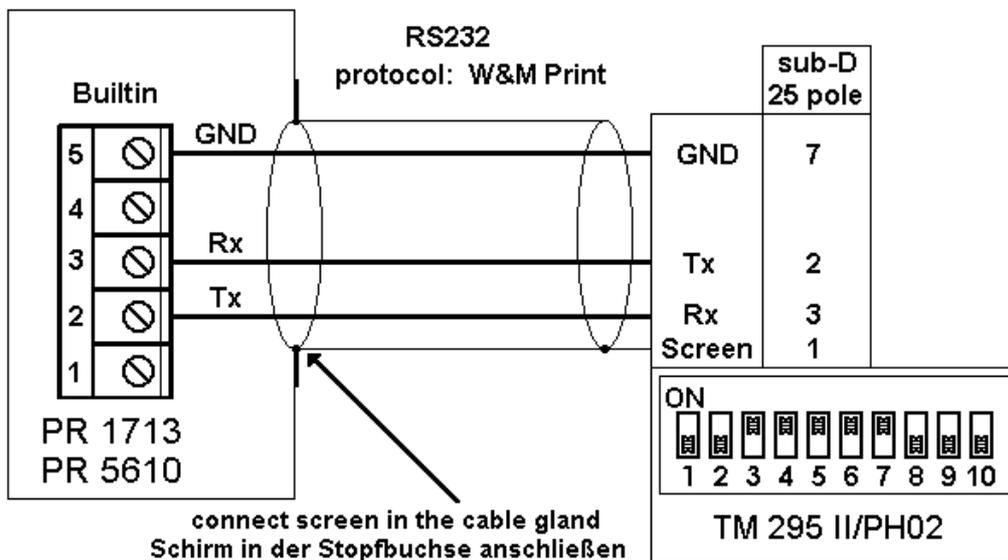
The following setup has to be done: [Serial port setup]-[Builtin RS232]:[Protocol]-[W&M Print],
[Baudrate]-[4800], [Bits]-[7], [Parity]-[Even], [Stopbits]-[1], [Devtype]-[Raw] and [Echo]-[Disabled].

The printer has to be configured by the 10 DIP switches.

3.3.4.4 xBPI Platform Connection RS232

The builtin RS 232 interface can be used to connect a Sartorius platform with xBPI protocol.
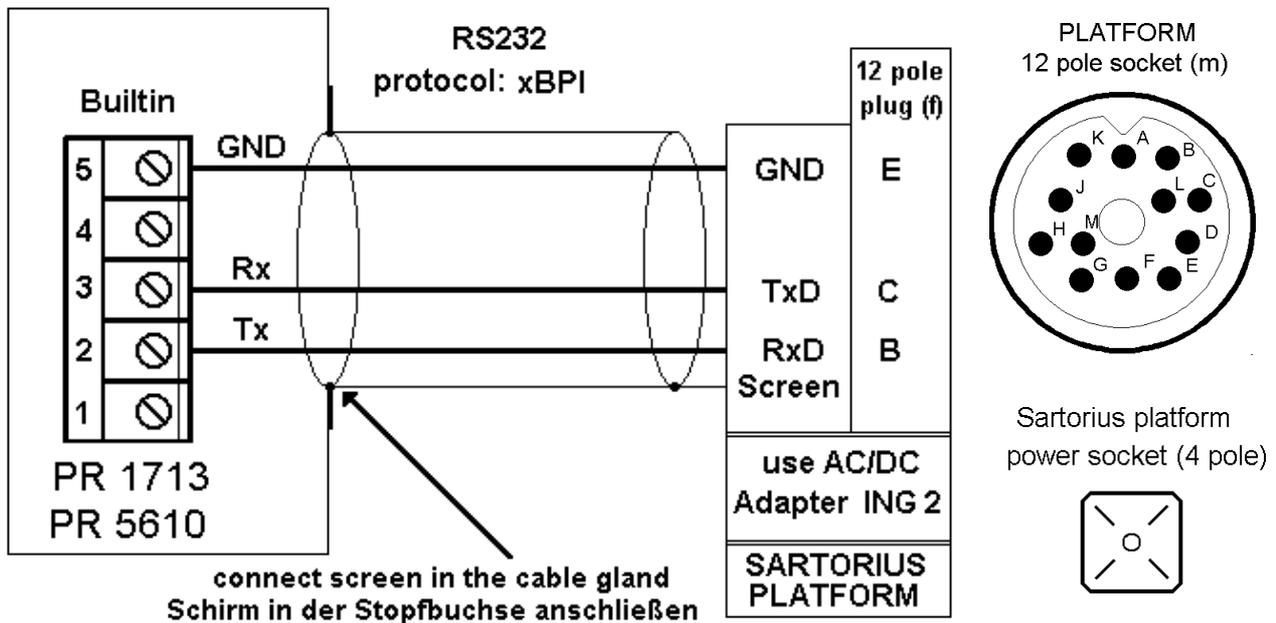
For details please refer to the manual of the Sartorius platform.

3.3.4.5 xBPI Terminal Connection RS232

The built-in RS 232 interface can be used to connect a Sartorius terminal with xBPI protocol.
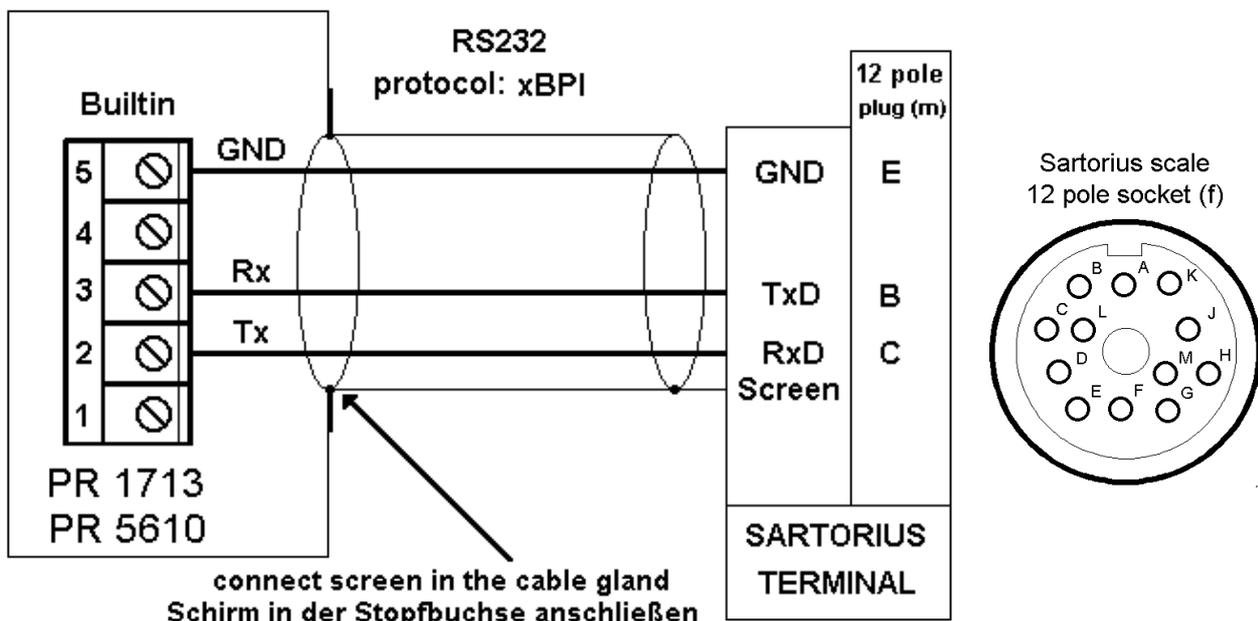
For details please refer to the manual of the Sartorius terminal.

3.4 Optionen

3.4.1 PR1713/04 Serial I/O

The plug-in card contains 1x RS 232 and 1x RS 485/ 422, whereby only the RS 485 is galvanically isolated. Max. 3 cards PR 1713/04 can be used. The parameters of the RS 232 and RS 485/ 422 are adjusted by software configuration. The RS 485/ RS 422 interface must be additionally configured by DIP switches on the card before installation.
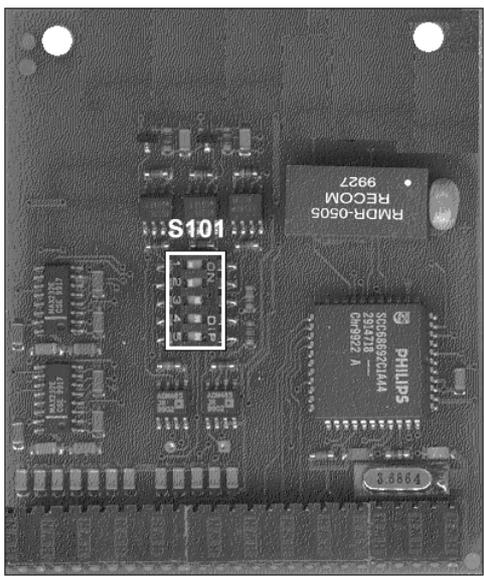
Connecting method:	2-row 25-pin connector
	Terminal block A/B with 2x8 screw terminals
Number of channels:	1 RS 232, 1 RS 422/485
Type:	full duplex
Speed:	300 to 19,200 Bit/sec
Signals RS 232:	Output: TXD, RTS, DTR
	Input: RXD, CTS, DCD, RI
Signals RS 422/485:	TxA, RxA, TxB, RxB
Potential isolation:	RS 232 no, RS 422 / 485 yes
Cable length:	RS 232 max. 15m
	RS 422 / 485 max. 1000m

Dimension (LxWxH):	80 x 68 x 15 mm	Cable type:	twisted pairs, screened
Weight:	33 g		(e.g. LifYCY 3x2x0.20), 1 pair of wires for GND.

Protocols are configurable by software set-up.

DIP switch S101		Settings for RS 422/ 485	
1:	e enable:	OFF - RS 422	ON - RS 485
2:	Rx:	OFF – continuously enabled	ON – disabled while transm.
3:	pull-up resistor:	OFF - not conn.	ON - (RxB 1k54 +V)
4:	Bus terminator:	OFF - not conn.	ON - (RxA 205E RxB)
5:	pull-down resistor	OFF - not conn	ON - (RxA 1k54 -V)

The table indicates, which switches have to be closed (ON) for a certain mode.

PR 1713/04 S101	Two-wire system		Four-wire system	
	point-to-point	bus	point-to-point	bus
master	RS 485 1, 2, 3, 4, 5 = on	RS 485 1, 2, 3, 4, 5 = on	RS 422 4 = on	RS 422 3, 4, 5 = on
single slave	RS 485 1, 2 = on	–	RS 422 4 = on	–
other slaves	–	RS 485 1, 2 = on	–	RS 485 1 (default) = on
last slave	–	RS 485 1, 2, 3, 4, 5 = on	–	RS 485 1, 3, 4, 5 = on

PR1713 PR5610
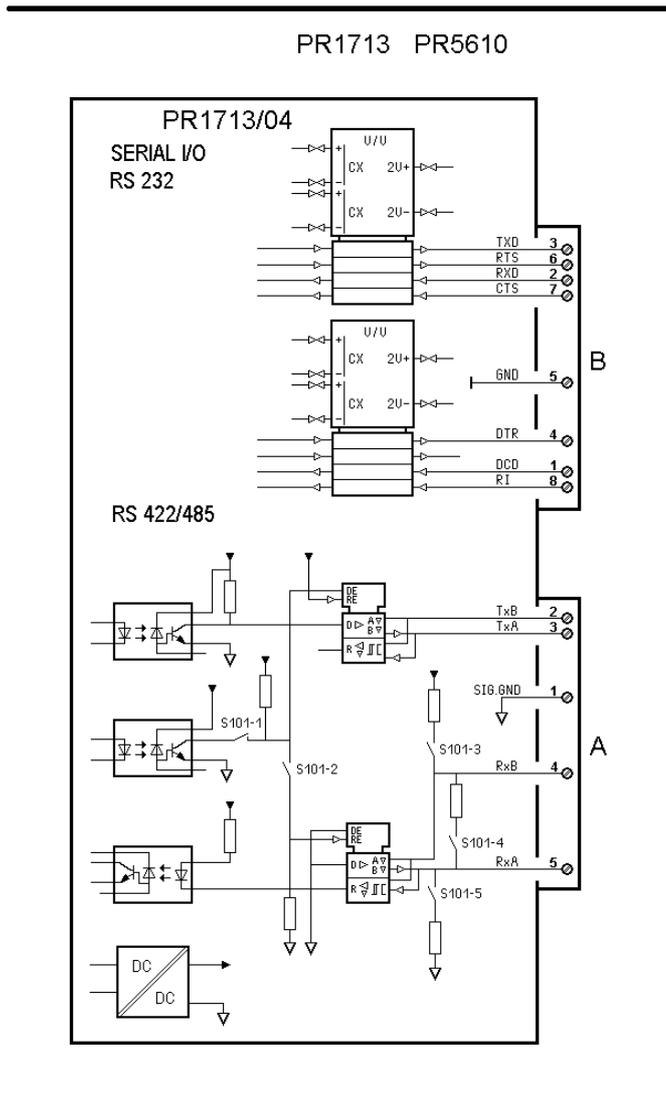
Pin allocation of connectors for PR1713/04 (Installation see chapter 3.2.1)

The interfaces are given logic names in the order of allocation found in the slots. The first card is detected as TTY1 and TTY2, whereby TTY1 is the RS 485 and TTY2 is the RS 232 interface. If 2 or 3 PR 1713/04 cards are fitted, names TTY3 and TTY4 for the second and TTY5 and TTY6 for the third card are given.

Terminal block B	RS 232	B1	B2	B3	B4	B5	B6	B7	B8
upper row		DCD	RXD	TXD	DTR	Sign. GND	RTS	CTS	RI

Terminal block A	RS485/ 422	A1	A2	A3	A4	A5	A6	A7	A8
lower row	Set S101 acc. to table	Sign. GND	TxB	TxA	RxB	RxA	nc	nc	nc

Connection to the RS 232 Interface (all protocols)

Supervisory system/ PLC/ printer
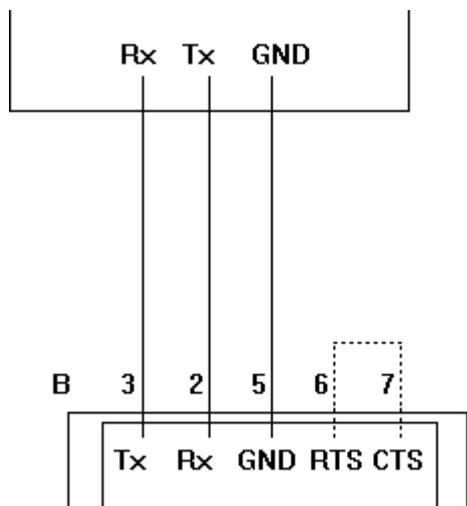
PR1628/00 /24 remote terminal
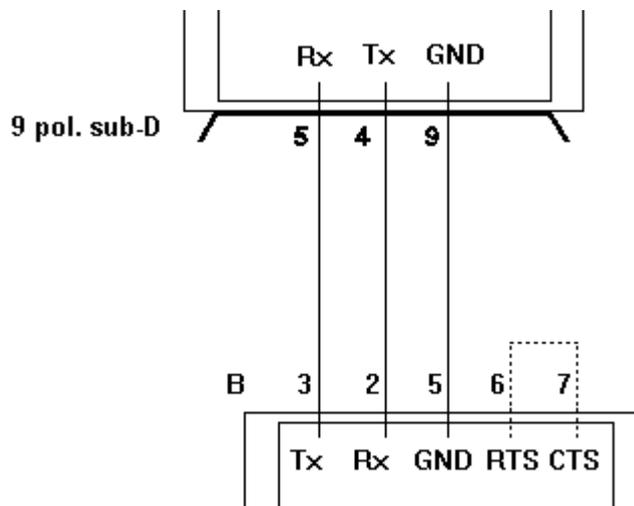
PR1713/04

PR1713/04

With XON/XOFF protocol, jumper RTS-CTS must be fitted.With hardware handshake, connect cables with the handshake partner according to RTS-CTS.

Connection to the RS 422/ 485 Interface (point-to-point)

Printer
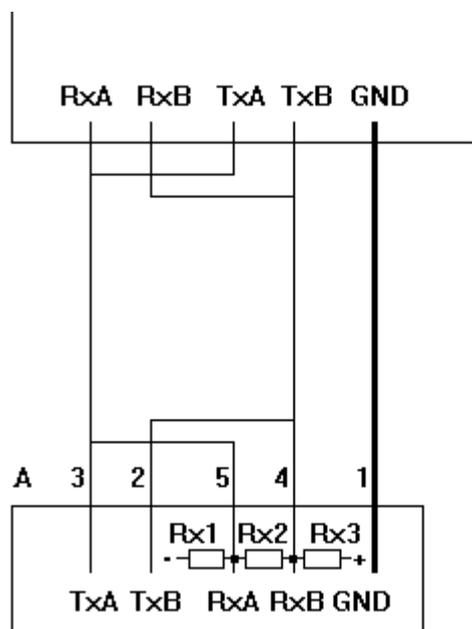
PR1628/00 /24 remote terminal
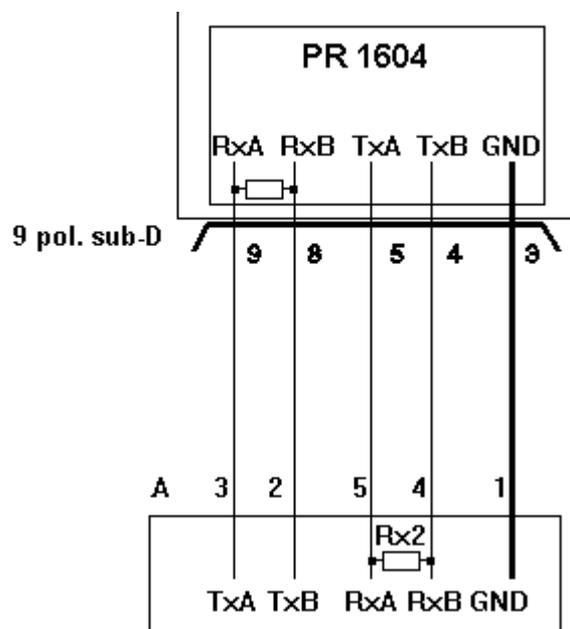
PR1713/04

PR1713/04

3.4.1.1   xBPI Platform Connection RS485

The PR 1713/04 RS 485 interface can be used to connect a Sartorius platform with xBPI protocol.
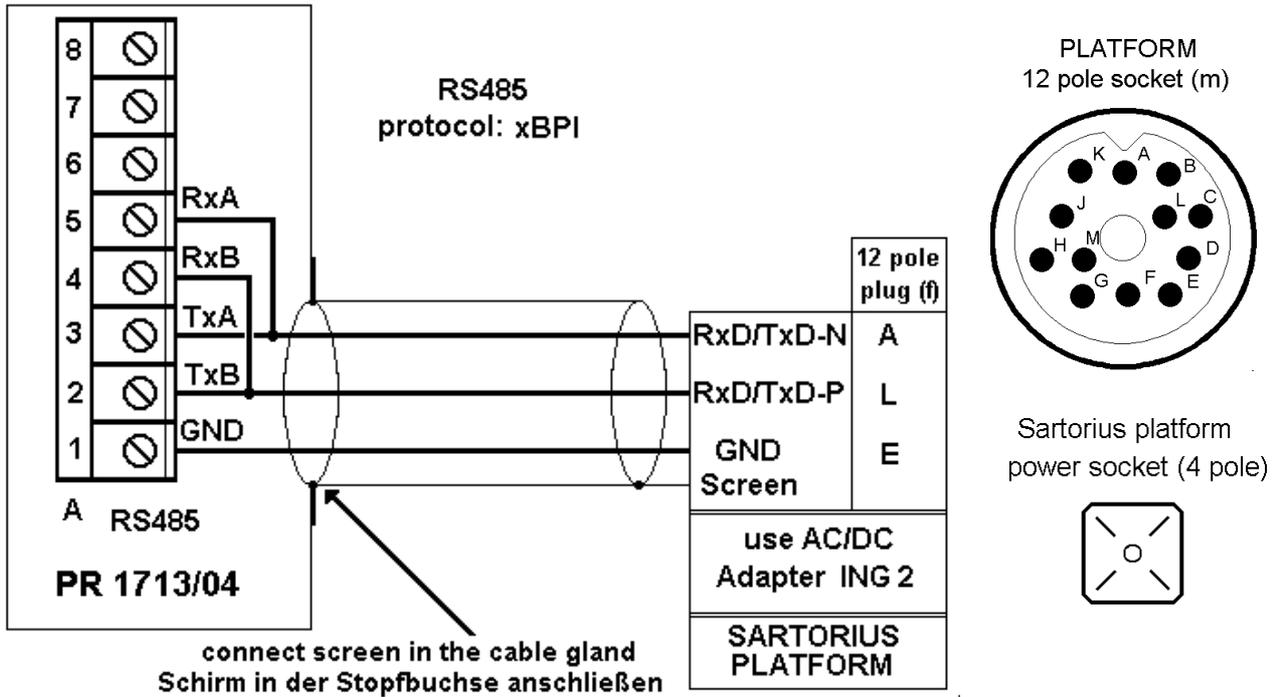
For details please refer to the manual of the Sartorius platform.

3.4.1.2   xBPI Terminal RS485

The PR 1713/04 RS 485 interface can be used to connect a Sartorius terminal with xBPI protocol.
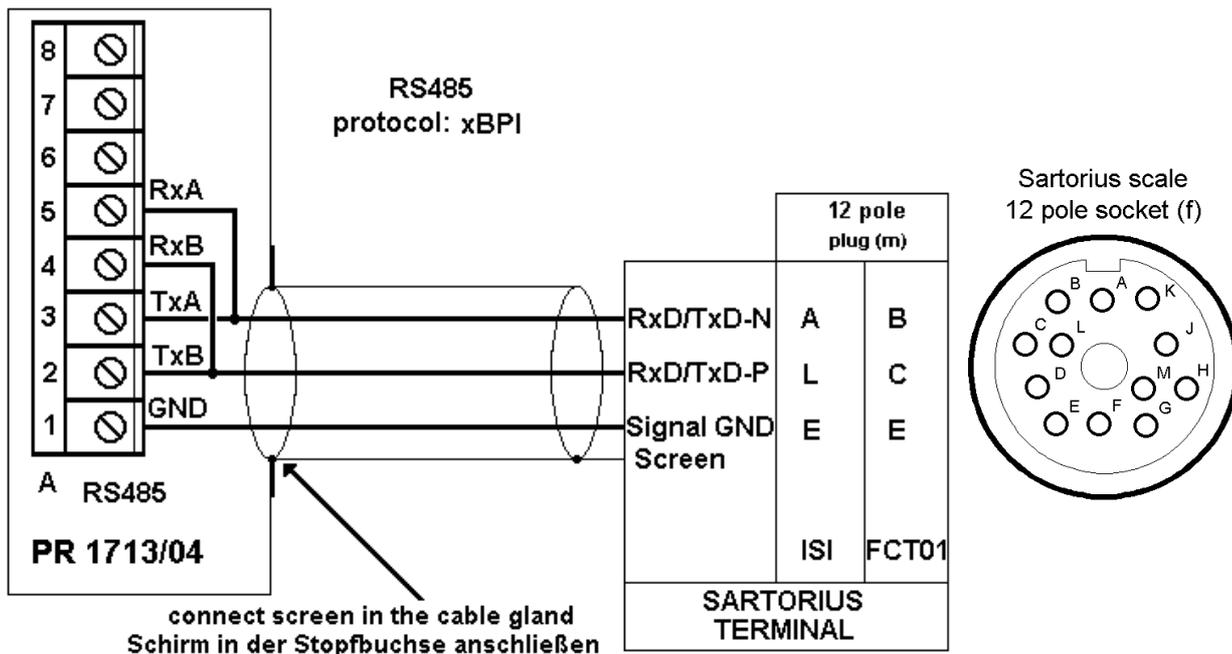
For details please refer to the manual of the Sartorius terminal.

Connection of a Modem to the RS 232 Interface (asynchronous protocol)

Modem

zeitlicher Ablauf:

Sendeseite:
5610 veranlaßt: DTR einschalten
5610 veranlaßt: RTS einschalten
Modem bestätigt: CTS einschalten
5610 veranlaßt: TxD senden

Empfangsseite:
Modem bestätigt: DCD ist gut
5610 erwartet: RxD empfangen

PR5610 with PR1713/04
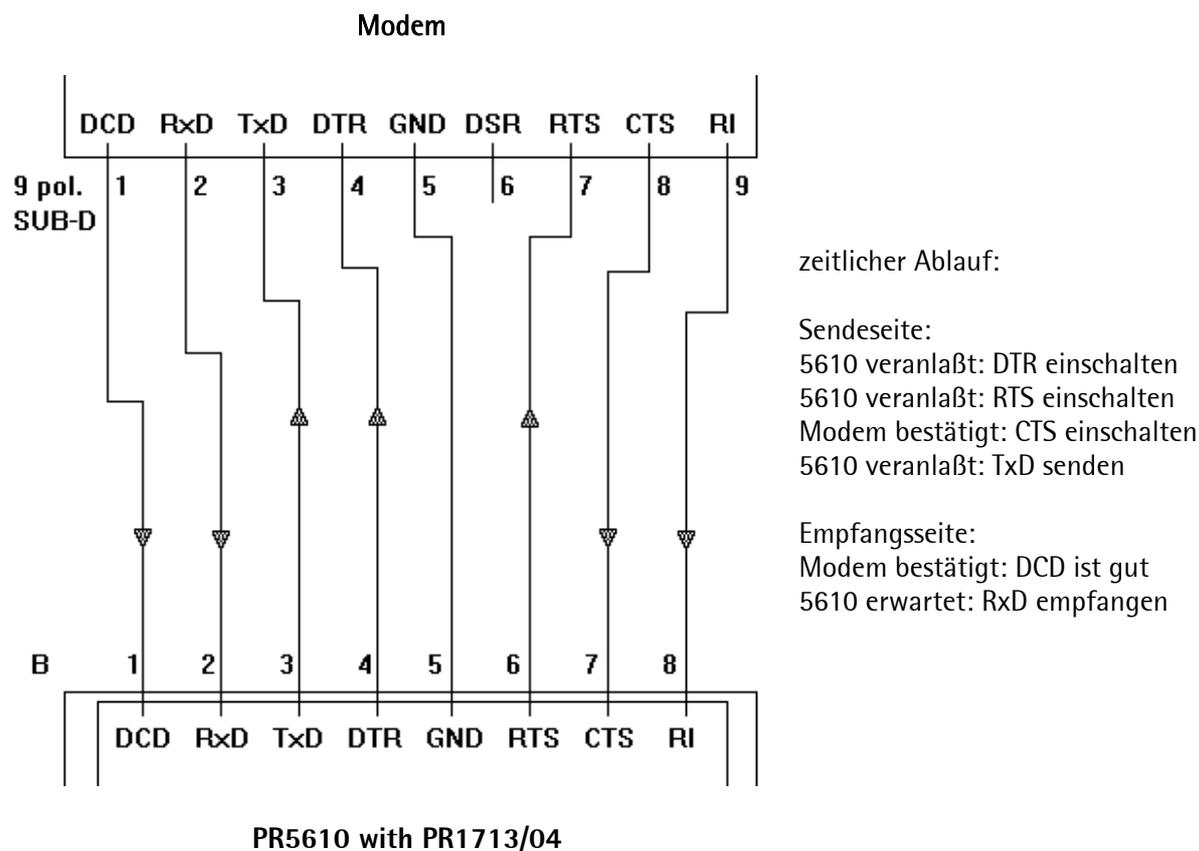
In case of hardware handshake:

Connect lines with the opposite side (see above).
The modem is controlled by the signals of the interface PR 1713/04 (see above).

In case of software handshake:

XON/XOFF control has to be enabled, the Lines RxD, TxD and GND are connected 1 : 1. Provide links on both sides between RTS-CTS and DCD-DTR-DSR or link RTS-CTS-DSR. With this operation mode the modem answers automatically with a 'OK' after a command 'at'. Now you can start to set the parameters with a terminal.

a) *auto answer = on*
This parameter is stored in register 's0' of the modem. The command is **ats0=1**.

b) *DCD = on*
Data carrier detect is always on. Command is **at&c0**.

c) *hang up on DTR off*
Modem assumes command state when DTR goes on to off. The command is **at&d1**. Other modems than Elsa Microlink 33.6TQV may require **at&d2** (hang up if DTR goes to off). If this parameter is wrong, the auto answer function is not working or the modem will not hang up.

In case of problems consult the manual of the modem to find out the right commands!

Connection to an RS 485 Bus (two-wire system)

Supervisory system/ PLC
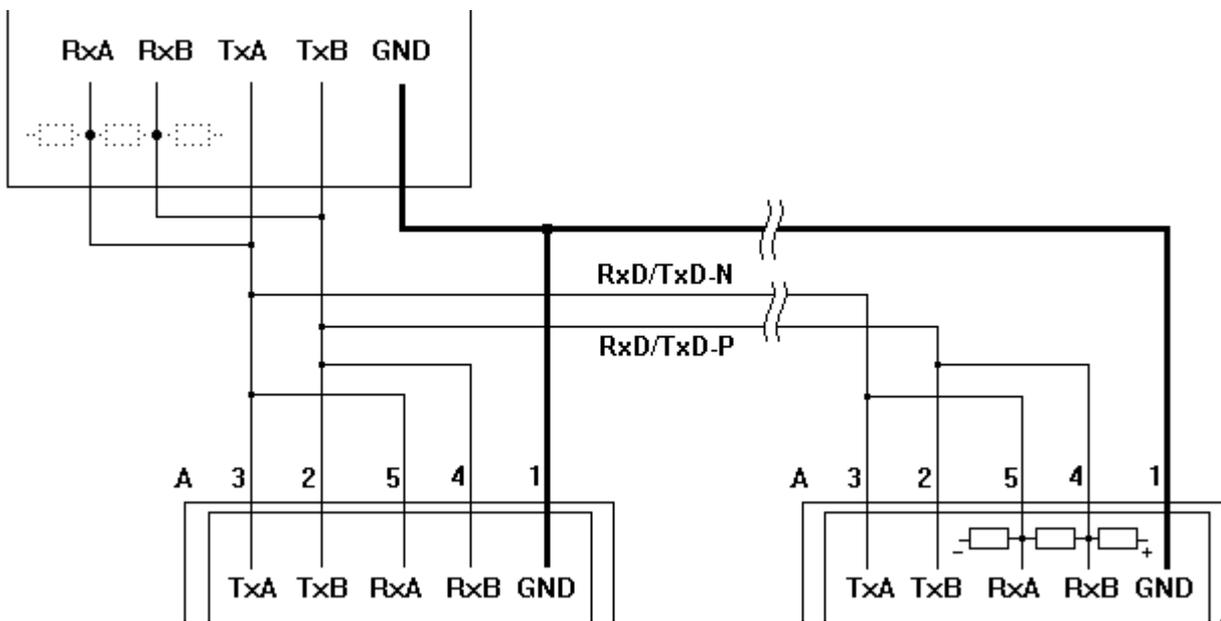
PR5610, slave 1   PR5610, last slave

Connection to an RS 485 Bus (four-wire system)

Supervisory system/ PLC

1-signal, on: A < B
0-signal, off: A > B
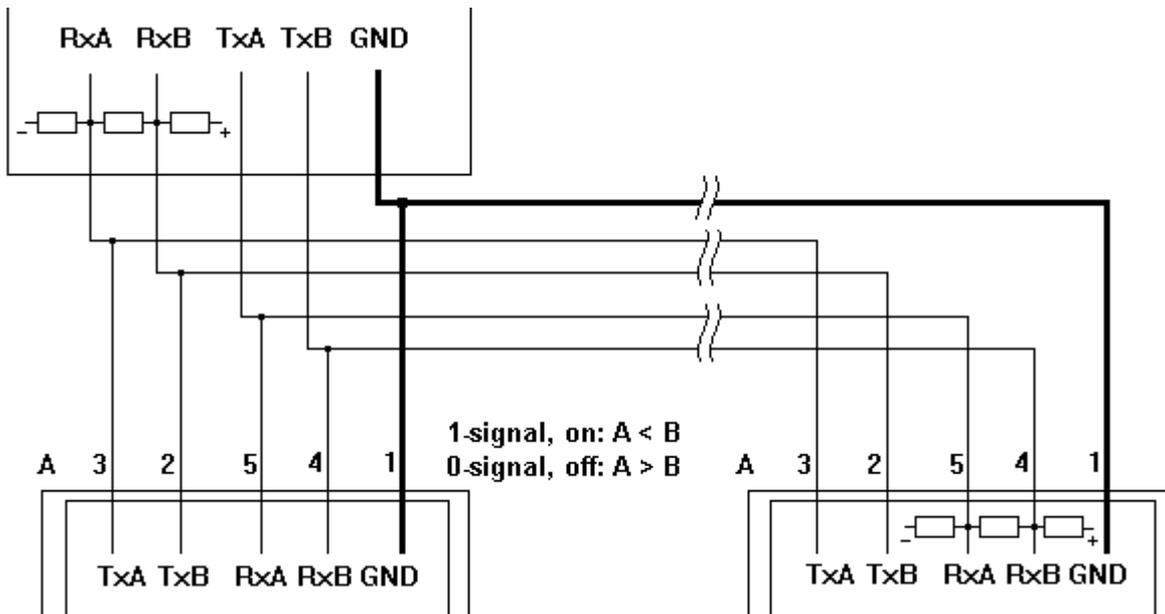
PR5610, slave 1   PR5610, last slave

3.4.2   PR1713/05 RAM Extension

If higher RAM storage capacity is required (e.g. for Alibi Memory PR 1713/81), two chips of 512 kbyte can be fitted. The 2 empty sockets for the memory extension are located on board 2 beside the connector with the 4-pole power supply cable. When inserting, take care to orient the components correctly.
The marking on the RAM chip and the marking in the socket must be located on the same side.

Inserting the RAM extension chips:
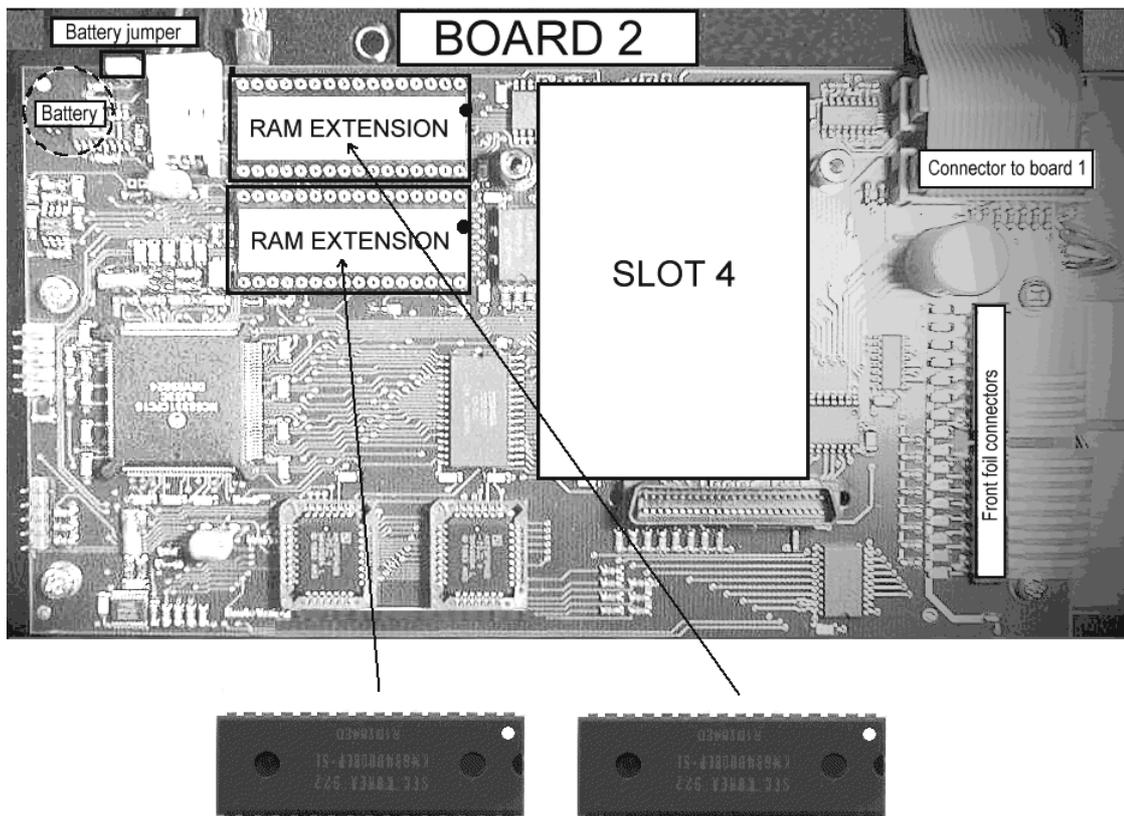
3.4.3   PR1713/06 Analog Output Card

		Connecting method:	2-row 25-pin connector
			Terminal block A with 8 screw terminals
		Number of outputs:	1 current output, voltage by use of external resistor
		Output:	Gross, net weight or application defined
		Range:	0/4 ... 20mA, configurable via software
		Resolution:	16 bits binary, 20,000 internal counts represent e.g. 0 - 20 mA
		Linearity error:	0 - 20mA: 0.04 % 4 - 20 mA: 0.02 %
		Temperature error:	< 100 ppm/K
		Error on zero:	0.05 %
		Error on FSD:	< 0.1 %
		Load:	0 ... 500 Ohm max.
		Protected against short circ.:	yes
Dimension (LxWxH):	80 x 68 x 15 mm	Potential isolation:	yes
Weight:	33 g	Cable length (screened):	150 m (current output)

The instrument can work with only 1 **analog output** (power consumption).

Set-up in **[Config]** of the application program is necessary. After **cold** start, the card is detected and the output is set to 4...20 mA and gross weight. The adaptation of the 4 and 20 mA output current is possible via software, see chapter 3.4.3.1.

Pin allocation of option PR 1713/06 (Installation see chapter 3.2.1)
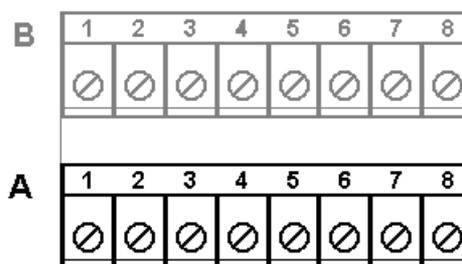
Terminal block A lower row	analog output	A1 I + out	A2 I – GND (ext.)	A3 nc	A4 nc	A5 nc	A6 nc	A7 nc	A8 nc

PR1713/0..

ROW A

0 (4)...20mA

(Sig.GND)

PR1713/06
Analog out
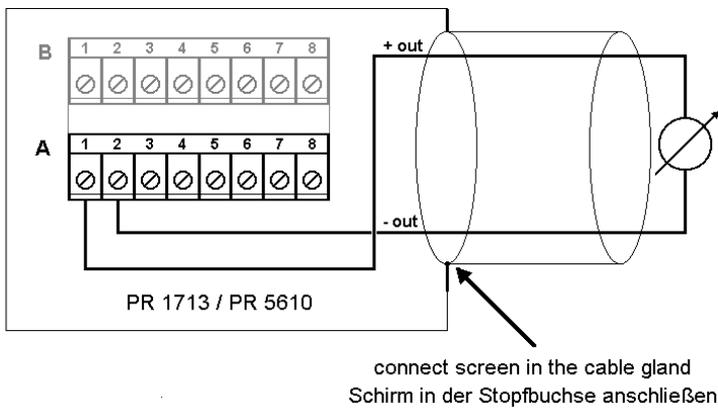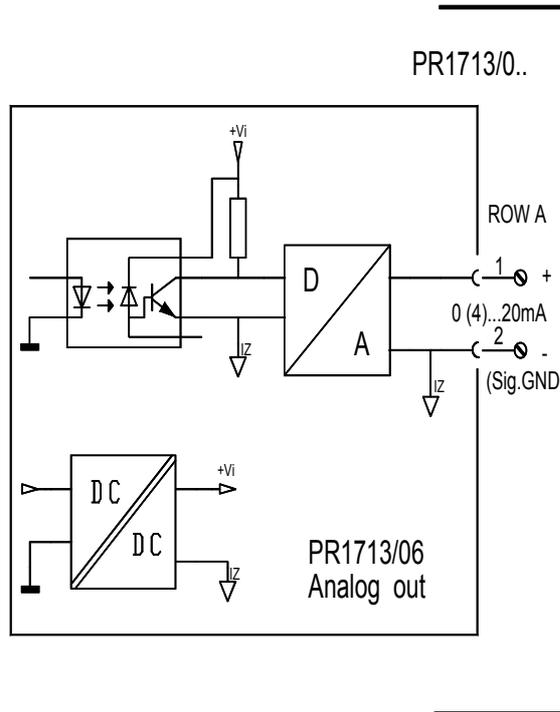
0 ... 20mA

Analog signal,
current output.

The current is
supplied directly from
the terminals.

connect screen in the cable gland
Schirm in der Stopfbuchse anschließen
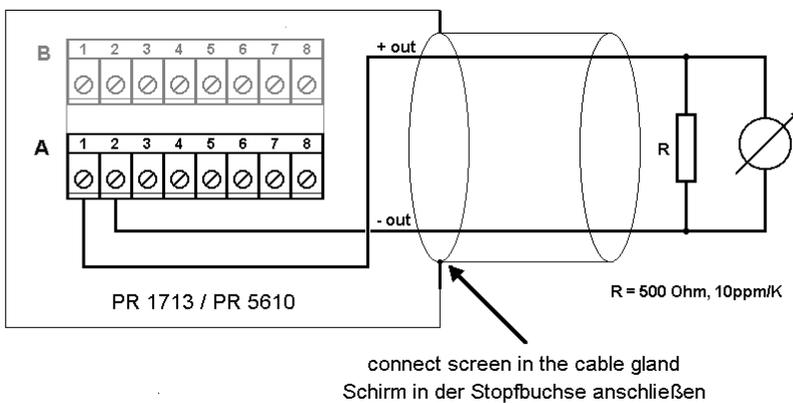
0 ... 10V

Analog signal,
voltage output.

The voltage level corresponds to
the voltage drop at the 500
Ohm resistor.

R = 500 Ohm, 10ppm/K

connect screen in the cable gland
Schirm in der Stopfbuchse anschließen

3.4.3.1 Analog Output Adaptation

The current of the PR 1713/06 analog output card or PR 1713/07 analog input/output card can be adapted in the range of +/- 1 mA.
This adaptation is necessary, if due to subsequent conversion(s) small deviations occur.
The application (e.g. BATCH, TRUCK, IBC) has to support the analog output !

The menu can be reached with [Setup]-[I/O Slots].

Select with ⊕/⊕ the slot in which the e.g. PR1713/07 card is fitted.

```
↓Slot 3:PR1713/07↑@1
Out: 22.0%= 4.400mA↕
```

Press the left ⟲ and within 2 sec. [OK]. The instrument asks for safety confirmation

```
Adapt analog output
 YES  =  ----  =   NO
```

If [YES] is selected the value for 4 mA appears:
If [No] is selected, return to the previous menu

```
Output    :   4.000  mA
Measured  :   4.000  mA
```

In the field [measured] the value can be overwrittten by the measured value deviating (+/- 1mA) from 4 mA and confirmed by [OK]

```
Output    :   4.000  mA
Measured  :   3.994  mA
```

The value for 20 mA appears

```
Output    :  20.000  mA
Measured  :  20.000  mA
```

In the field [measured] the value can be overwrittten by the measured value deviating (+/- 1mA) from 20 mA and confirmed by [OK]

```
Output    :  20.000  mA
Measured  :  19.992  mA
```

The correction values are calculated and stored, instrument returns to the previous menu

```
↓Slot 3:PR5510/06    ↑
Out: 22.0%= 4.400mA↕
```

Restore default settings

Select with ⊕/⊕ the slot in which the e.g. PR1713/07 card is fitted

```
↓Slot 3:PR1713/07↑@1
Out: 22.0%= 4.400mA↕
```

Press the right ⟲ and within 2 sec. [OK]. The instrument asks for safety confirmation

```
Reset to default
 YES  =  ----  =   NO
```

With [Yes] the factory settings are stored back, with [No] the adapted values are kept

```
↓Slot 3:PR5510/06    ↑
Out: 22.0%= 4.400mA↕
```

⚠ If at [Setup]-[Reboot]-[Bios] the function [Erase] is done, the entered adaptation is lost and replaced by the factory settings!

3.4.4   PR1713/07 Analog I/O

The instrument supports only **1 analog output** (power consumption). The card (installation see Chapter 3.2.1) has 1 output like PR1713/06 and **4 analog inputs**. After coldstart, set-up in configuration mode is necessary. The output can be configured to 0/4...20 mA and gross or net weight.
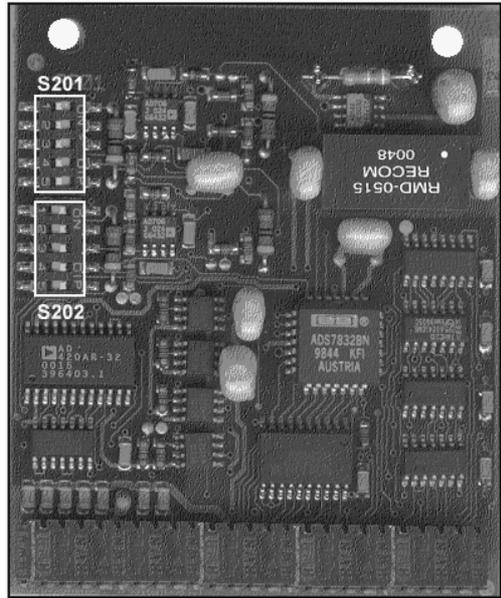
		Connecting method:	2-row 25-pin connector
			Terminal block A/B with 2x8 screw terminals
		Output:	1 current output, voltage by use of external resistor (for spec.: Refer to o PR 1713/06).
		Inputs:	4 channels for current or voltage input
		Range, input:	0 ... 20 mA, input resistance 250 Ohm 0 ... 10 V, input resistance 100 kOhm 0 ... 5 V, input resistance >10 MOhm
		Resolution, input:	3,000 internal counts represent e.g. 0 - 20 mA / 0 ... 10 V
		Accuracy, input:	0.2 %
		Linearity error, input:	< 0.03 %
		Temperature error, input:	< 50 ppm/K
Dimension (LxWxH):	80 x 68 x 15 mm	Potential isolation:	Yes for output, no for inputs
Weight:	33 g	Range reserve, input:	+- 15%, i.e. –1.5V ... +11.5V

The analog input with 4 channels has to be supported by the application program. It can be used e.g. with an internal IEC 61131 program (see Programming manual).

The **analog output** circuitry is identical with the output of **PR1713/06** (see Chapter 3.4.3).
The adaptation of the 4 and 20 mA output current is possible via software, see chapter 3.4.3.1.

The **analog input** has **4 channels** with common ground, **no galvanic isolation** between internal and external electronics.

Analog input signal selection	Input channel	Current 0...+ 20mA DC	Voltage 0...+ 10V DC	Voltage 0...+ 5V DC	Not used
		Setting of switches:			
	CH1	ON	OFF	OFF	ON
	CH2	ON	OFF	OFF	ON
	CH3	ON	OFF	OFF	ON
	CH4	ON	OFF	OFF	ON
	----	----	----	----	----
	CH1	OFF	ON	OFF	ON
	CH2	OFF	ON	OFF	ON
	CH3	OFF	ON	OFF	ON
	CH4	OFF	ON	OFF	ON
	----	----	----	----	----
Input impedance		250 Ohm	100 kOhm	> 10 MOhm	
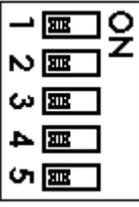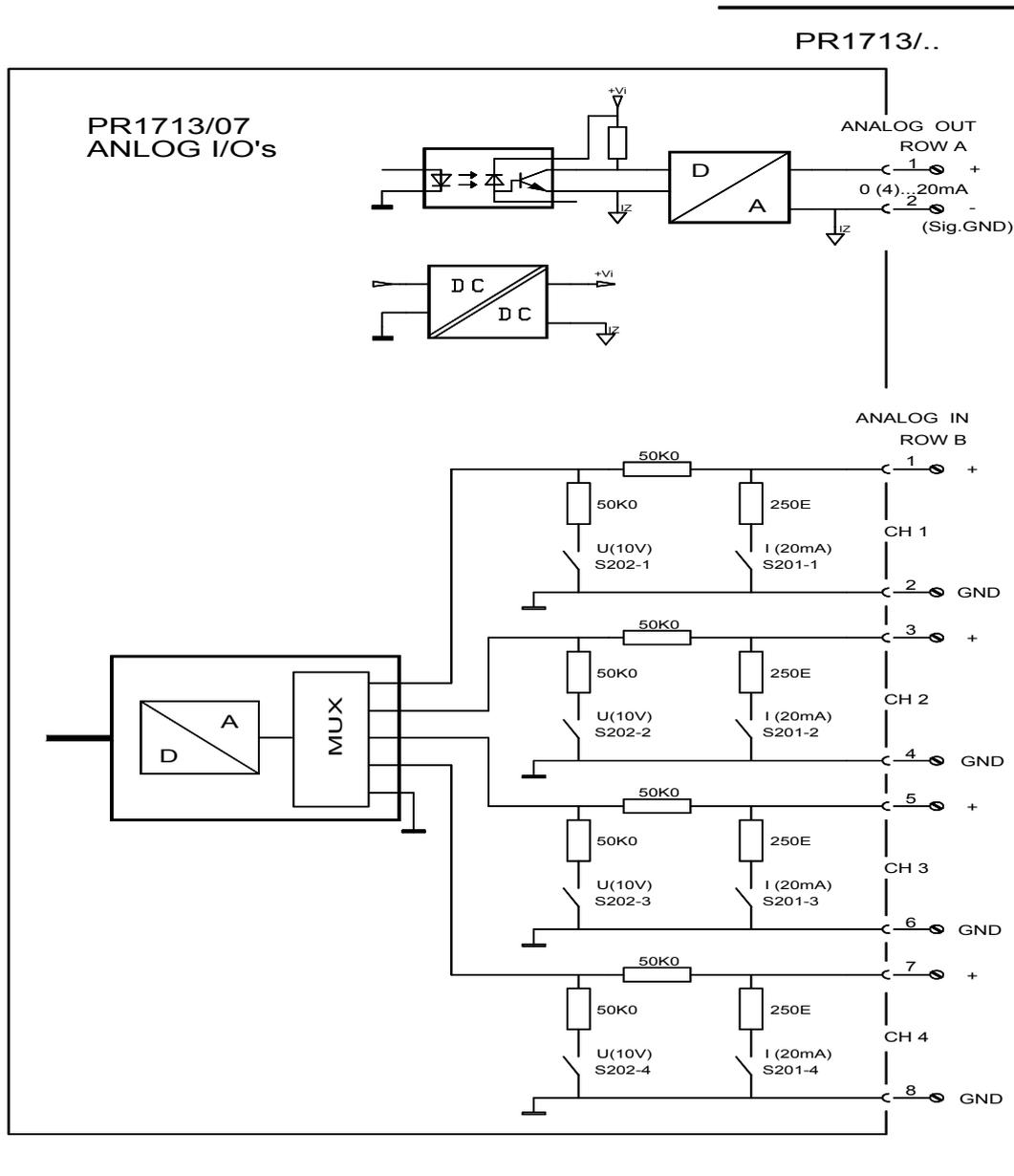
Pin allocation of option connectors in the unit (installation see Chapter 3.2.1)
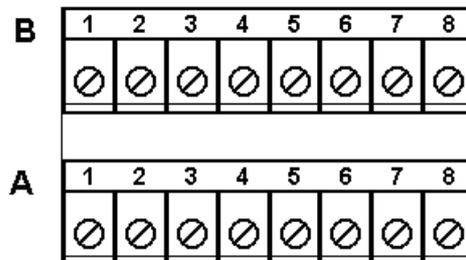
Terminal block B upper row	input 4 channels	B1 + CH1	B2 GND	B3 + CH2	B4 GND	B5 + CH3	B6 GND	B7 + CH4	B8 GND

Terminal block A lower row	output 1 channel	A1 I +	A2 I – GND (ext.)	A3 nc	A4 nc	A5 nc	A6 nc	A7 special (OBW–applic)	A8 special (OBW–applic)

3.4.5   PR1713/08 BCD Output

This option card for is preferably used in the slot 3 (installation see Chapter 3.2.1), because otherwise plugs for other cards are blocked. It does not make use of the terminal blocks A/B.
The card can be used only in connection with an application package supporting it or with a program written in IEC 61131. Binary data needs to be decoded by the program for a BCD output..
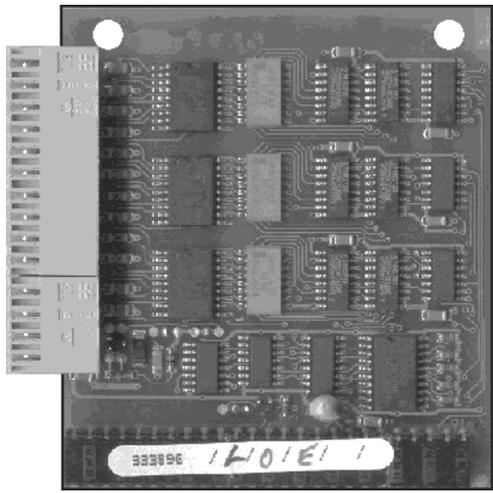
	Connecting method:	2-row 25-pin connector
		28 pole connector (20 + 8 pole plug)
	Number of outputs:	Output: 24 bit binary, corresponding to 6 BCD decades.
	Number of inputs:	Input: 1bit.
	Output stage:	Common collector connected to +Uext., open emitter
	External Supply:	+5 V ... +24 V, max. 32 V
	Voltage drop:	Approx. 1.7 V
	Output current:	Max. 50 mA
	Input (enable):	5 V / 24 V jumper selectable 5 V high > 3.1 V, low < 1.5 V 24 V high > 16 V, low < 10V protected against wrong polarity
Dimension (LxWxH):	80 x 68 x 15 mm	**Potential isolation:**	no
Weight:	40 g	**Cable length (screened):**	Max. 50 m

Accessory: 27 pole connection cable, 3m with plugs 20 pole and 8 pole at one side

Plug and connection cable (Output bit: %QXn.m., n-slot, m-bit):

X104

%QXn.0	black	1		2	brown	%QXn.1
%QXn.2	red	3		4	orange	%QXn.3
%QXn.4	yellow	5		6	green	%QXn.5
%QXn.6	blue	7		8	violet	%QXn.7
%QXn.8	grey	9		10	white	%QXn.9
%QXn.10	white – black	11		12	white – brown	%QXn.11
%QXn.12	white – red	13		14	white – orange	%QXn.13
%QXn.14	white – yellow	15		16	white – green	%QXn.15
%QXn.16	white – blue	17		18	white – violet	%QXn.17
%QXn.18	white – grey	19		20	brown – black	%QXn.19

%QXn.20	brown – red	1		2	brown – orange	%QXn.21
%QXn.22	brown – yellow	3		4	brown – green	%QXn.23
Enable	brown – blue	5		6	brown – violet	**Uext**
GND	brown – grey	7		8	free	

X105

If PR 1713/08 is used as BCD-output for weight values, the output bits of the 6th decade can be used as follows:	%QXn.20	SIGN	sign bit
	%QXn.21	STSTI	standstill bit
	%QXn.22	ERROR	error bit
	%QXn.23	DAHOL	data valid

Voltage supply for the output transistors 6 - **Uext**, ground potential 7 - **GND**
Attention: avoid earth loops to GND!

Output: Each output line of the module PR 1713/08 works with common external voltage supply as reference potential and an open emitter output. A passive output has a high impedance. An active output supplies a voltage, which is approx. 1,7 V lower than the supply voltage. The load has to be applied between the output and GND.

Plug X104 supplies the data bits %QXn.0 to %QXn.19 in 5 decades with 20 wires, plug X105 supplies the highest data bits %QXn.20 to %QXn.23, reference potential and the input (Enab.).

Input:

One input is provided to control all 24 output bits. To enable or disable (high-resistive) the output the input signal is fed to pin 5 - Enab. of the 8 pole plug. On delivery the Enable input is configured to work with 5 V logic active high. A positive Enab. signal enables the output permanently. With open or grounded input the output is controlled by the application program.

By solder pads J103 and J104 the logic level is defined, with an open J105 the input is disabled.

Solder pads J100, J101 and J102 are factory set for the output type and may not be changed.

The enable signal DEEXT and the setting of solder pads J106, J107 and J108*) can be detected by software.
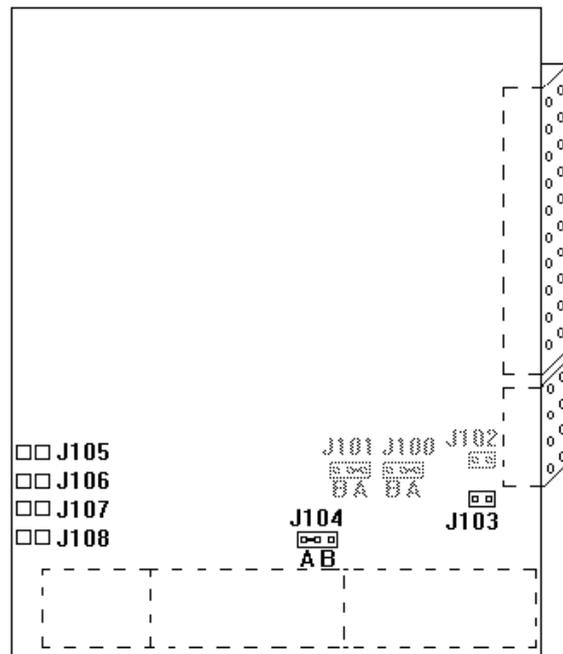
Data enable		J103	J104 A	J104 B	Logikpegel	I Eingang
On high	5 V mode	c	c	o	> 3.1 V	0,5 mA
On low	5 V mode	c	o	c	< 1.5 V	0,3 mA
On high	24 V mode	o	c	o	> 16 V	1,0 mA
On low	24 V mode	o	o	c	< 10 V	0,5 mA

o = open, c = closed

*) reserved for detecting of the output type of card
DEEXT is the transferred Enab. signal, defined by J103/J104-table setting. With open J105, Enab. can be used for any purpose.

PR1713/..

PR1713/08
BCD out

X104

$1*10^0$	1
2	2
4	3
8	4
$1*10^1$	5
2	6
4	7
8	8

EN
C1
1D

$1*10^2$	9
2	10
4	11
8	12
$1*10^3$	13
2	14
4	15
8	16

EN
C1
1D

$1*10^4$	17
2	18
4	19
8	20

EN
C1
1D

X105

SIGN	1
STSTI	2
ERROR	3
DAHOL	4
Enab.	5
Uext	6
GND	7
	8

DESEXT
&
J105

J104
A
B

=1

V1/V2

B12

J103
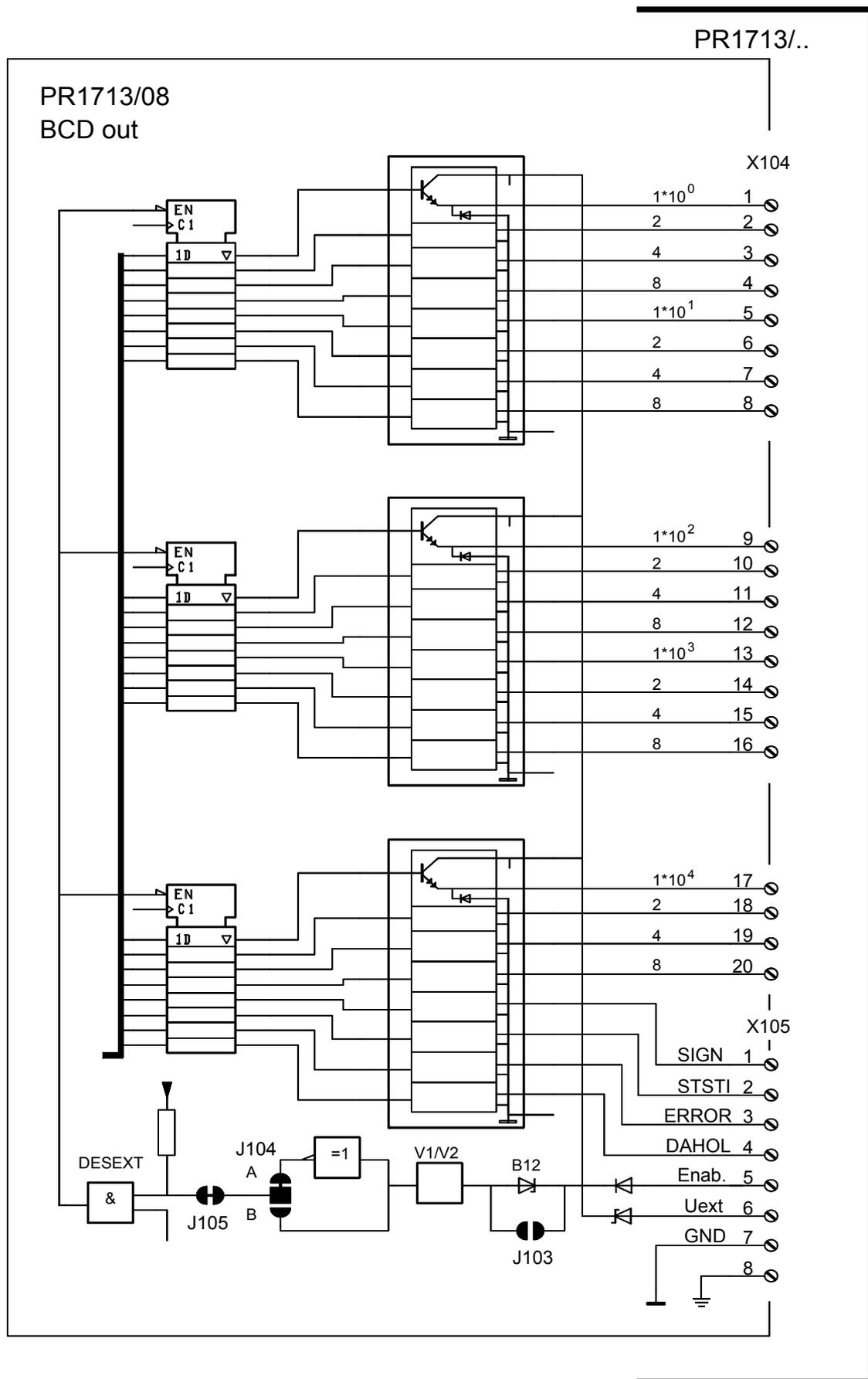
3.4.6   PR1713/12   4 Opto inputs / 4 Opto outputs

Max. 3 cards **PR1713/12** or **PR1713/15** can be used. The digital interfaces are passive (external supply is necessary) and have no common potential.

	Connecting method:	2-row 25-pin connector	
		Terminal block A/B with 2x8 screw terminals	
	Number of inputs / outputs:	Inputs: 4 , outputs: 4	
	Input signal:	Low: 0 ... 5V or open High: 10 ... 31 V External supply required	
	Input current:	< 7 mA at 24 V < 3 mA at 12 V	
	Output:	Max. switching volt.: 32 V Max. switching current : 25 mA Voltage drop @ 25 mA: 3 V External supply required	
Dimension (LxWxH):	80 x 68 x 15 mm	**Potential isolation:**	Yes, optocoupled
Weight:	33 g	**Cable length (screened):**	Max. 50 m

- 4x outputs, dig. (On - Off) OUT for process control, galvanically isolated
  with passive optocoupler outputs (open collector, max. 25 mA)
- 4x inputs, dig. (On - Off) IN for process control.

The inputs are galvanically isolated via optocoupler. The input signal of the digital interface is a logical "0" with open input lines.

Accessories/ options: external supply required

Pin allocation of option connectors in the unit (installation see chapter 3.2.1)
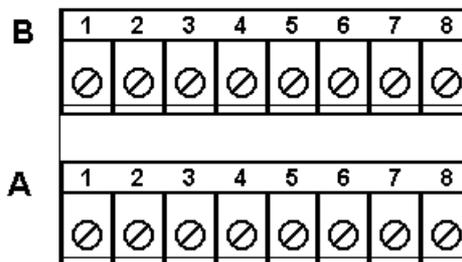
Terminal block B upper row	input 4 channels	B1 + CH1	B2 – CH1	B3 + CH2	B4 – CH2	B5 + CH3	B6 – CH3	B7 + CH4	B8 – CH4

Terminal block A lower row	output 4 channels	A1 + CH1	A2 – CH1	A3 + CH2	A4 – CH2	A5 + CH3	A6 – CH3	A7 + CH4	A8 – CH4

PR1713/..

PR1713/12
Control I/O's Opto
CONTROL OUT

CONTROL IN
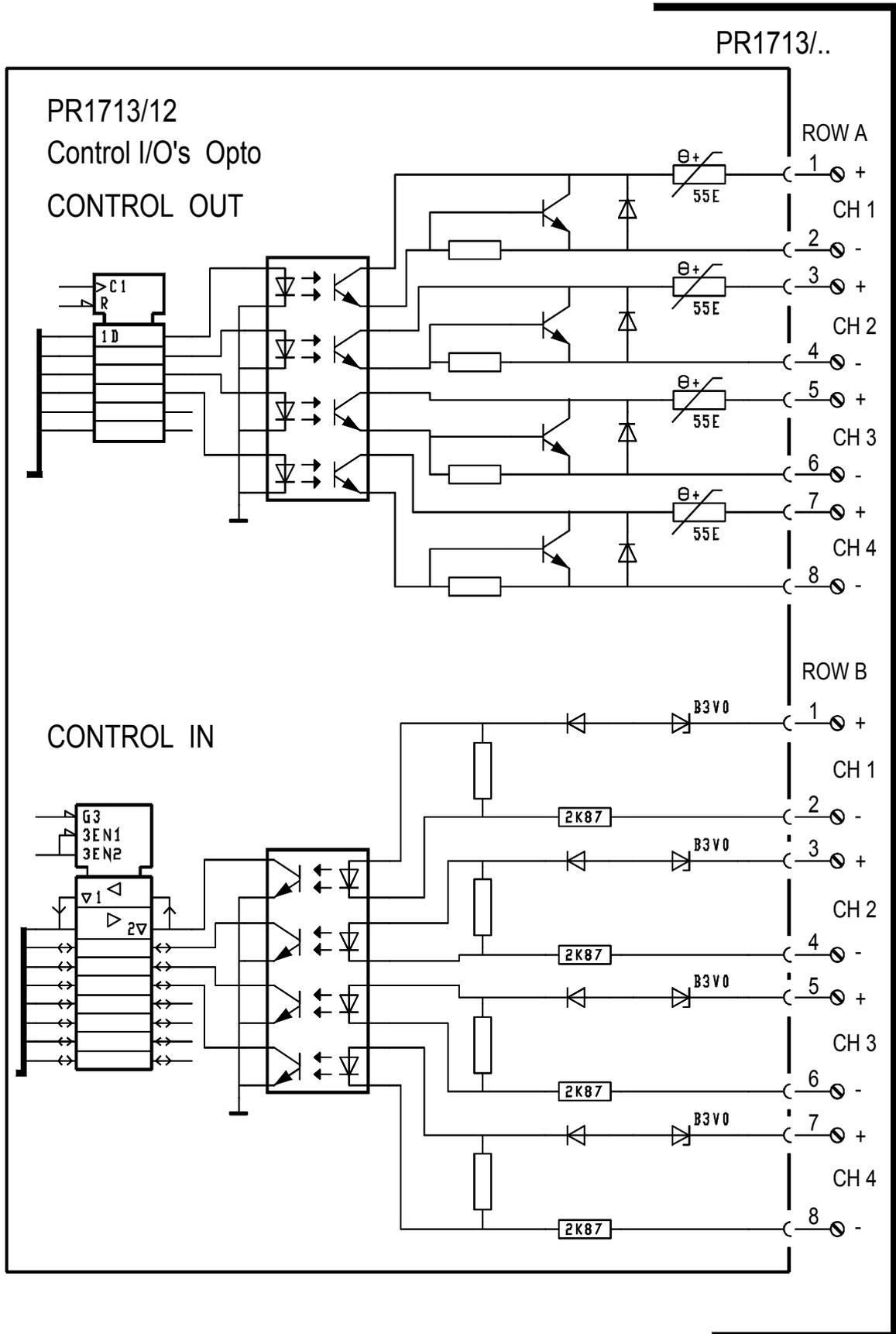
3.4.7   PR1713/13 DIOS Master

Only 1 card **PR1713/13** can be used. The DIOS card (digital I/O system as a simple Interbus-S master) is the connecting module for external I/O extension.
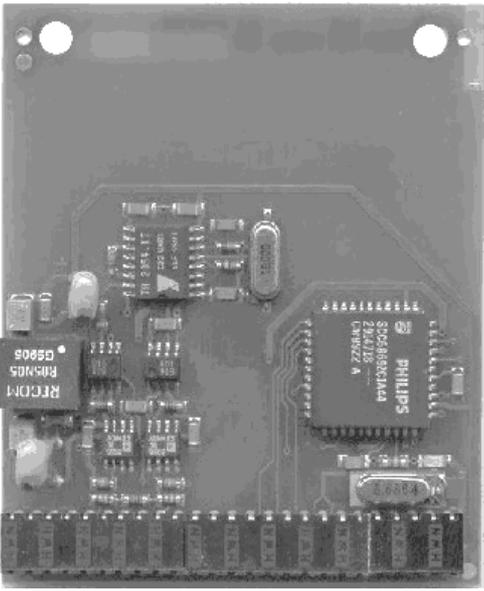
	Connecting method:	2-row 25-pin connector
		Terminal block A with 8 screw terminals
	Number of inputs / outputs:	max. 256 bits or 16 modules
Dimension (LxWxH):	80 x 68 x 15 mm	**Potential isolation:**	Yes, optocoupled
Weight:	33 g		

The maximum possible number of bits is 256 (sum of max. bits per module) or 16 modules at the remote bus. Only one Interbus-S master in the system is possible! Interbus-S is intended for process data input and output. The card has galvanically isolated connections and integrated termination resistors. No jumper 5-9 is fitted (master). The DIOS card parameters are adjusted via software configuration.

The transfer rate for e.g. 256 bits is approx. 32 ms.

The DIOS master offers:
- a bus interface for max. 256 additional dig. I/Os
- automatic detection of connected modules
- connection of PR1720 as 2nd weighing point

Pin allocation of option connectors in the unit (installation see Chapter 3.2.1)
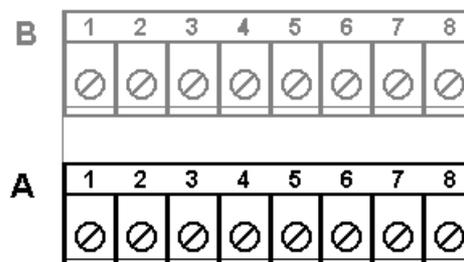
Terminal block A lower row	**Interbus-S**	A1 DO	A2 DI	A3 GND (ext.)	A4 nc	A5 nc	A6 /DO	A7 /DI	A8 nc
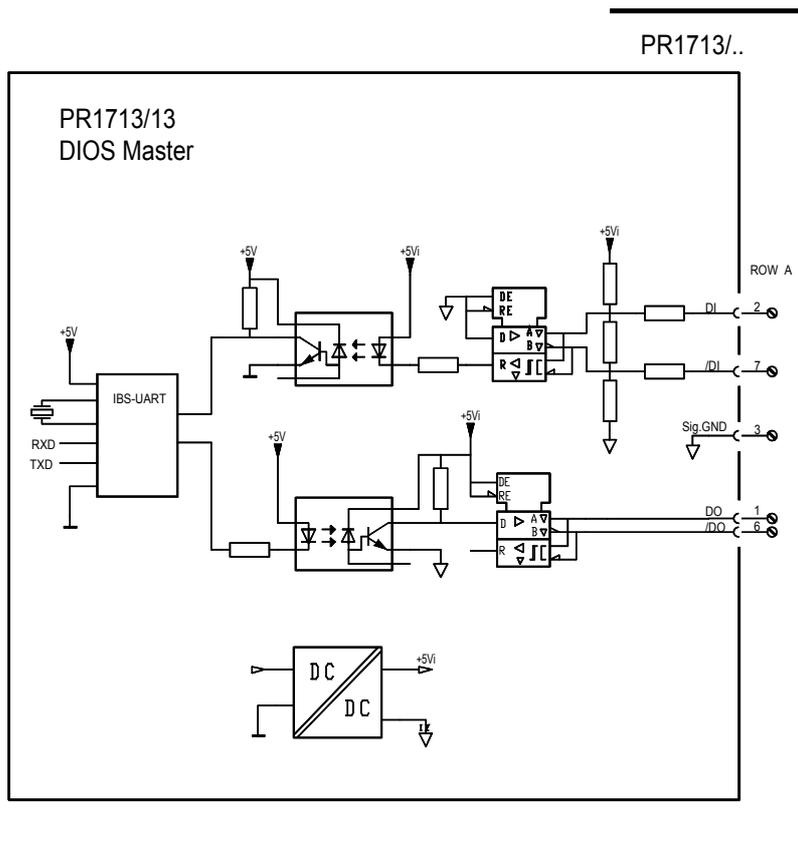
3.4.7.1   Geräte am Fernbus
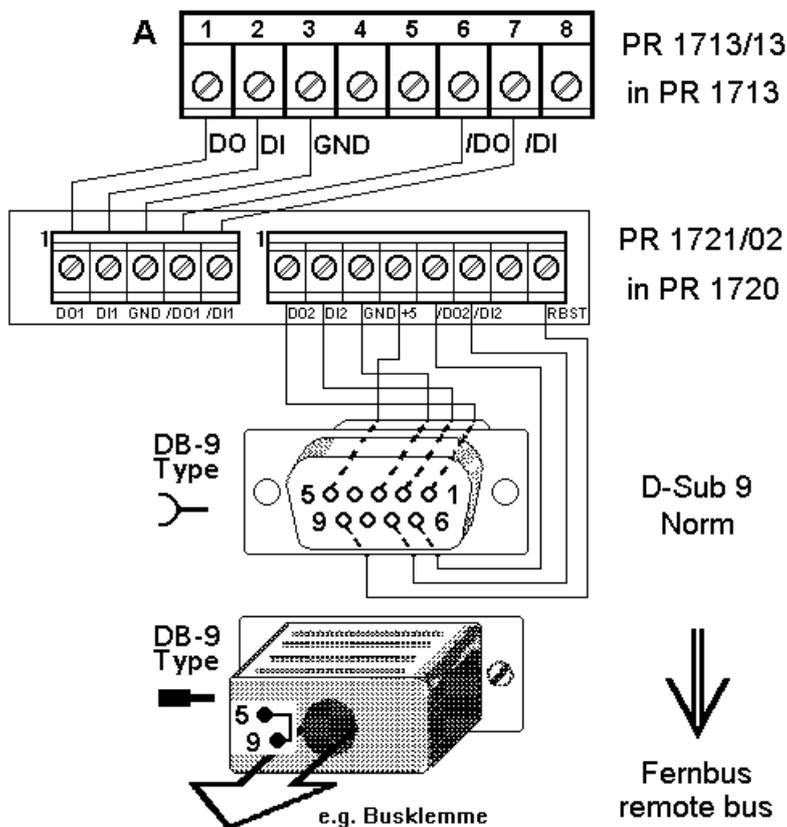
PR1713/13   +   3   remote bus devices
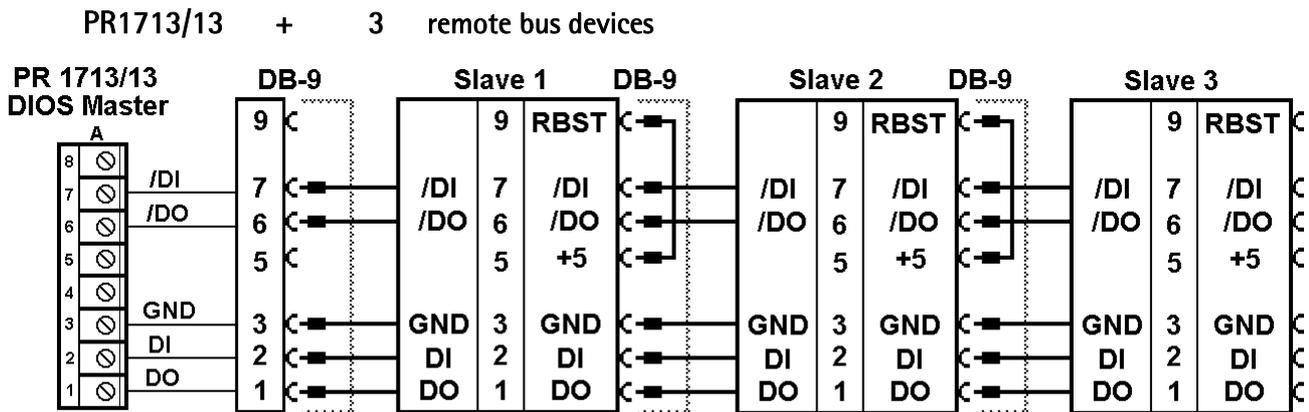
All Phoenix Interbus-S modules can be handled. Please, note the limitation to 256 I/Os. For e.g. PR 1720, 8 bytes are required, i.e. 192 I/O are still available in this case. A bus terminal (with local bus) is also a slave. Via jumper 5-9 at the output of a slave module, the master is informed that further modules in the bus will follow. With pre-fabricated Interbus cables (twisted pair), jumper 5-9 is integrated in the cable connector. When withdrawing the connector, the master is informed automatically that the bus has become shorter.

Interbus-S actuation

%IB n.7   = 00   Byte#16#00   no new input data
           = 80   Byte#16#80   no input because bus error. PLC should test this byte.
           = 01   Byte#16#01   new input data
%IB n.6   = 00   Byte#16#00   output has not been transferred
           = 01   Byte#16#01   output has been transferred
           = 80   Byte#16#80   no output because bus error. PLC should test this byte.
%IB n.4   = Diagnosis bit-Register
%IB n.3   = Module Count
%IB n.2   = (internal parameter)
%IX n.39   = Ready : Bus-Module is O.K. and running
%IX n.38   = Fail : Bus-Module has failure
%IX n.37   = Run : Interbus-S is in normal active state

With %Q(X|B|W|D|L)n.m.O the slave is addressed.
        X - bit
        B - byte (8 bit)
        W - word (16 bit)
        D - double word (32 bit)
        L - long word (64 bit)

        n - option slot (1 ... 3)
        m - slave module no. (1 ... 16)
        O - element position for type (X|B|W|D|L)

63	62									1	0	X
7		6		5		4		3		2		1		0	B
3			2			1			0		W
1				0				D
0								L

Note: PR1750 NT Rel. 2.32 is required. Interbus-S ST-Modules are supported.

3.4.8   PR1713/14 Ethernet

The card is plugged in slot 4 on board 2 (installation see chapter 3.2.2).
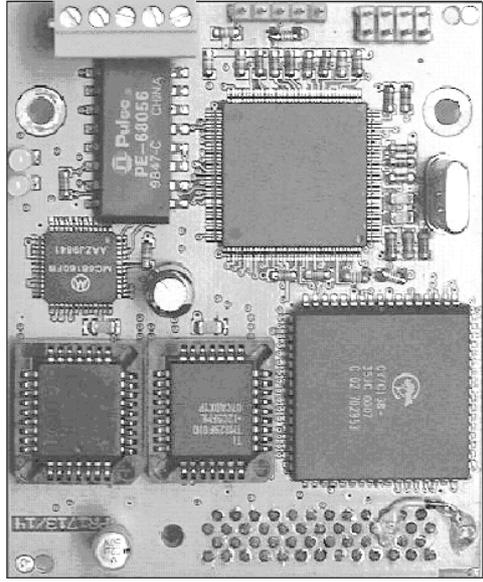
	Connecting method:	50 pole connector
		Terminal block with 5 screw terminals
	Transmission rate:	10 Mbits/sec
	Coupling:	Point to point
	Cable:	Shielded twisted pair
	Cable impedance:	150 Ohm
	Bus load	

Dimension (LxWxH):	78 x 64 x 20 mm	**Potential isolation:**	Yes
Weight:	50 g.	**Cable length to HUB:**	Max. 30 m

3.4.8.1   Connection to a PC (crossover)
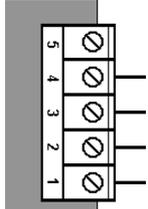
	Terminal	Signal	Wire Color	Signal	RJ 45
	Pin 5	n.c.			
	Pin 4	TPRXn	orange	TPTXn	2
	Pin 3	TPRX	weiß – orange	TPTX	1
	Pin 2	TPTXn	grün	TPRXn	6
	Pin 1	TPTX	weiß – grün	TPRX	3

3.4.8.2   Connection to a HUB (straight–through)
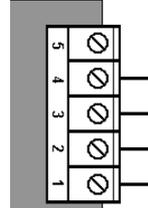
	Terminal	Signal	Wire Color	Signal	RJ 45
	Pin 5	n.c.			
	Pin 4	TPRXn	grün	TPTXn	6
	Pin 3	TPRX	weiß – grün	TPTX	3
	Pin 2	TPTXn	orange	TPRXn	2
	Pin 1	TPTX	weiß – orange	TPRX	1
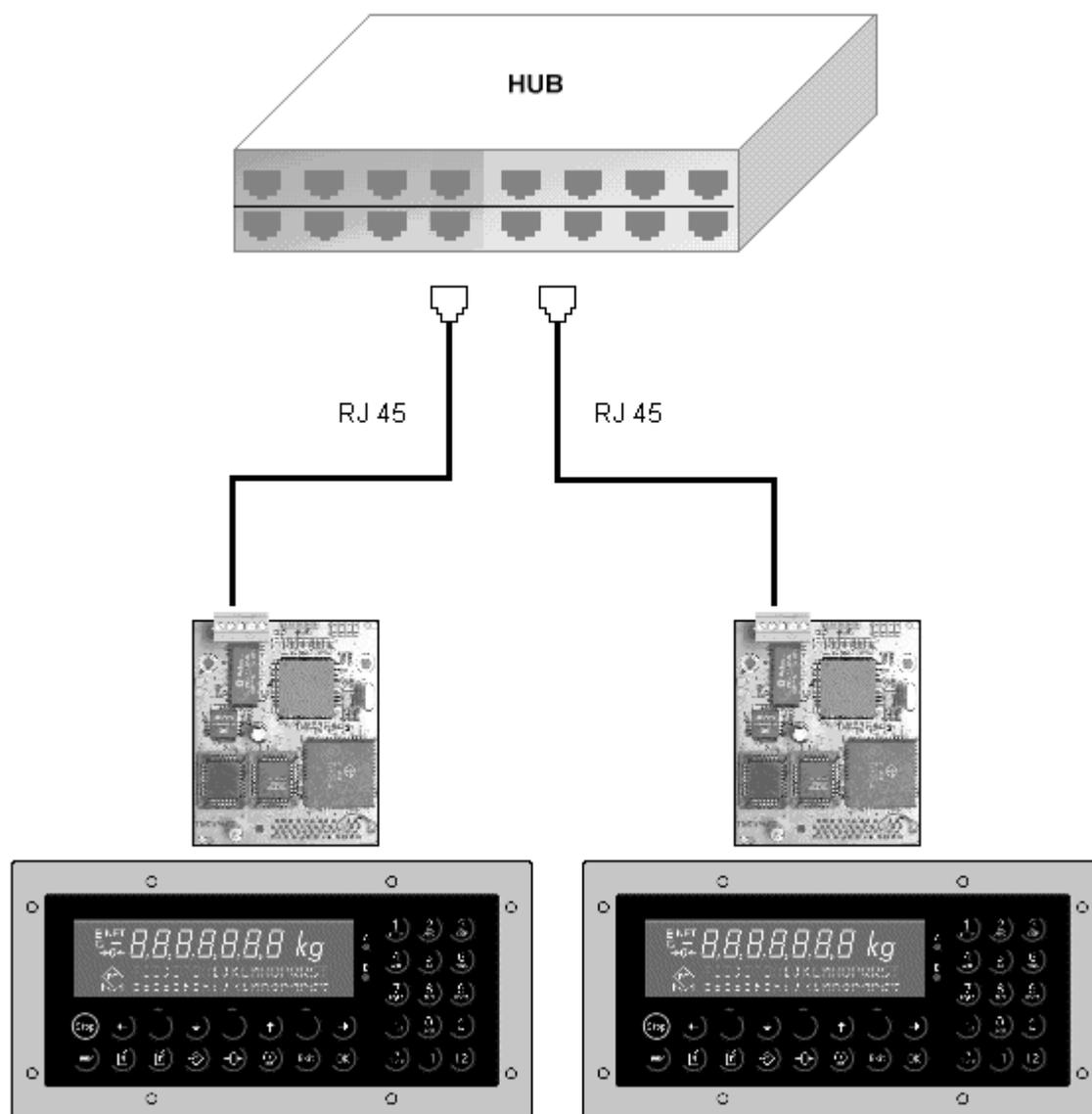
If the instrument connected to a switch, it has to be ensured, that the switch is set to **autodetect** or **half duplex**.

For further information refer to the User Manual delivered with the Ethernet card.

3.4.9 PR1713/15 4 Opto Inputs / 4 Relay Outputs

Max. 3 cards **PR1713/15** can be used. The digital interfaces are passive (external supply is necessary) and have no common potential.

		Connecting method:	2-row 25-pin connector
			Terminal block A/B with 2x8 screw terminals
		Number of inputs / outputs:	Inputs: 4 , outputs: 4
		Input signal:	Low: 0 ... 5V or open High: 10 ... 31 V External supply required
		Input current:	< 7 mA at 24 V < 3 mA at 12 V
		Output:	Max. switching voltage: 31 VDC/24 VAC Max. switching current : 1 A
		Output relay contact:	Closing (default, jumper pos. A) Opening (change jumper to pos. B) See drawing
		Potential isolation:	Yes, input: optocoupled output: potential free contacts
Dimension (LxWxH):	80 x 68 x 15 mm		
Weight:	50 g	**Cable length (screened):**	Max. 50 m

- 4x outputs, relay .
- 4x inputs, dig. (On -Off) IN for process control.

The input is galvanically isolated via optocoupler. The input signal of the digital interface is a logical "0" with open input lines.

Accessories / options: external supply required

Pin allocation of option connectors in the unit (installation see chapter 3.2.1)

Terminal block B upper row	input 4 channels	B1 + CH1	B2 - CH1	B3 + CH2	B4 - CH2	B5 + CH3	B6 - CH3	B7 + CH4	B8 - CH4

Terminal block A lower row	output relay 4 channels	A1 CH1	A2 CH1	A3 CH2	A4 CH2	A5 CH3	A6 CH3	A7 CH4	A8 CH4

The jumpers J102 (CH1), J105 (CH2), J108 (CH3), J111 (CH4) are set to A upon delivery (closing contact).

To change to an 'opening contact' open A and close B by soldering.

The jumpers J100, J101, J103, J104, J106, J107, J109, J110 are intended for special assembly and should not be altered.
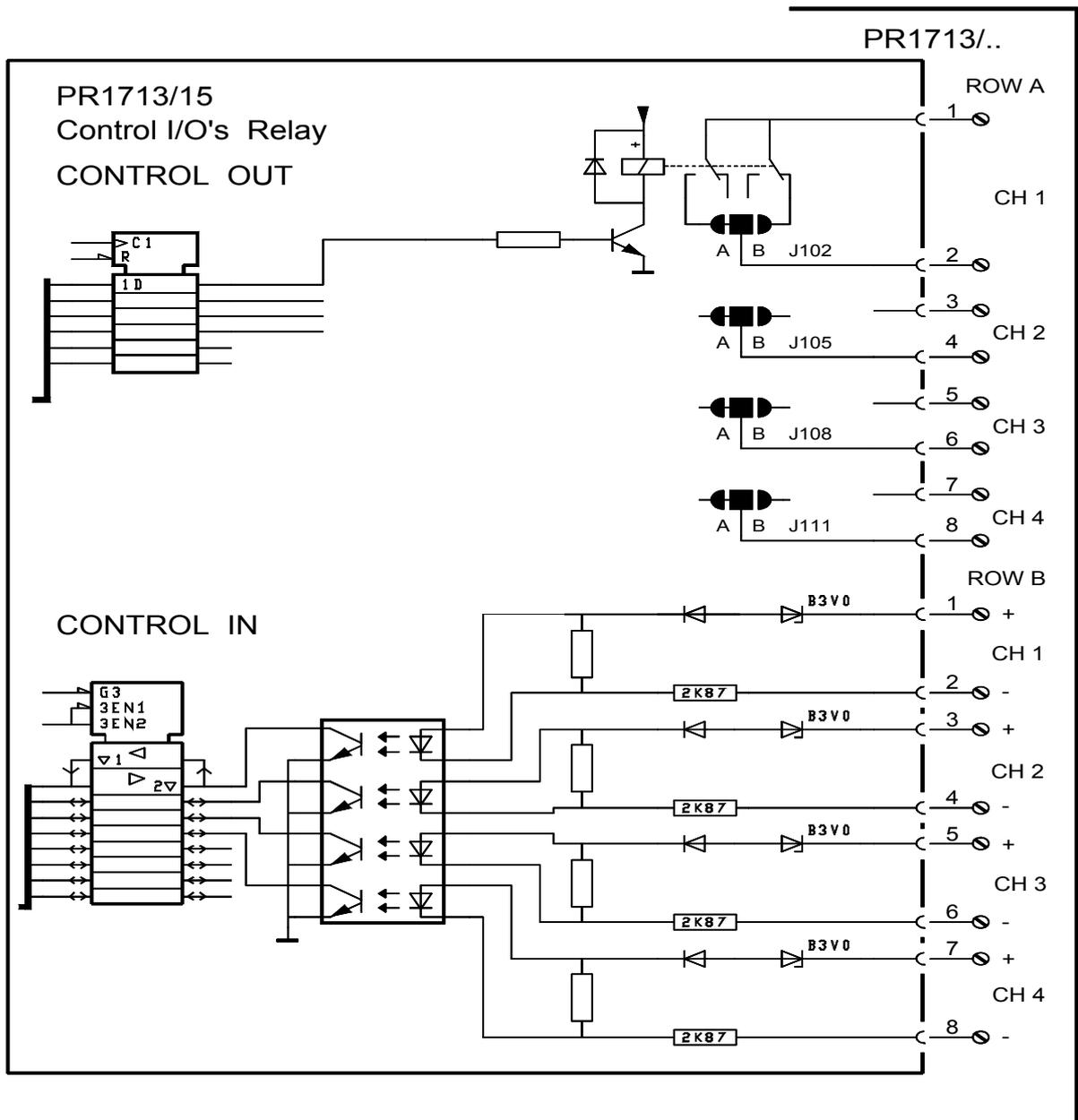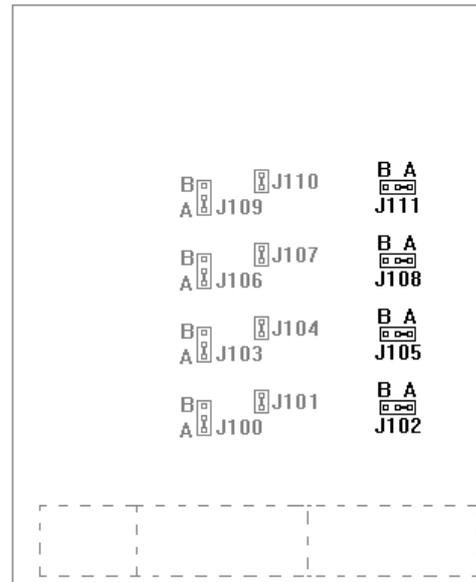
3.4.10   PR1713/17 6 Opto Inputs / 8 Opto Outputs

Max. 3 cards **PR1713/17** can be used. The digital interfaces are passive (external supply is necessary) and have one common potential per input group and one common potential per output group.
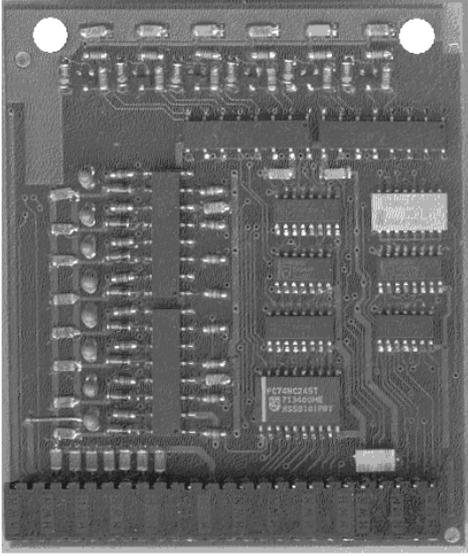
		Connecting method:	2-row 25-pin connector
			Terminal block A/B with 2x8 screw terminals
		Number of inputs / outputs:	Inputs: 6, outputs: 8
		Input signal:	Low: 0 ... 4 V or open High: 10 ... 31 V External supply required
		Input current:	< 7 mA at 24 V < 3 mA at 12 V
		Output:	Max. switching voltage: 31 V Max. switching current : 25 mA Voltage drop at 25 mA: 3 V External supply required
		Potential isolation:	Yes, 6 inputs have got 1 common minus potential, 8 outputs have got 1 common minus potential
Dimension (LxWxH):	80 x 68 x 15 mm		
Weight:	33 g		

Pin allocation of option connectors in the unit (installation see chapter 3.2.1)
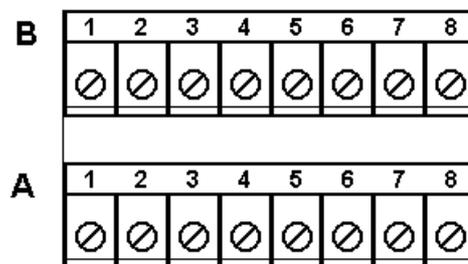
Terminal block B upper row	input 6 channels	B1 + CH1	B2 + CH2	B3 + CH3	B4 + CH4	B5 + CH5	B6 + CH6	B7 − INP	B8 − OUT
Terminal block A lower row	output 8 channels	A1 + CH1	A2 + CH2	A3 + CH3	A4 + CH4	A5 + CH5	A6 + CH6	A7 + CH7	A8 + CH8

3.4.11   PR1721/11 Profibus Interface

The Profibus interface PR 1721/11 is an option to be installed in slot 4 of PR 5610, see chapter 3.2.2. Communication protocols and syntax comply with the relevant bus standard.
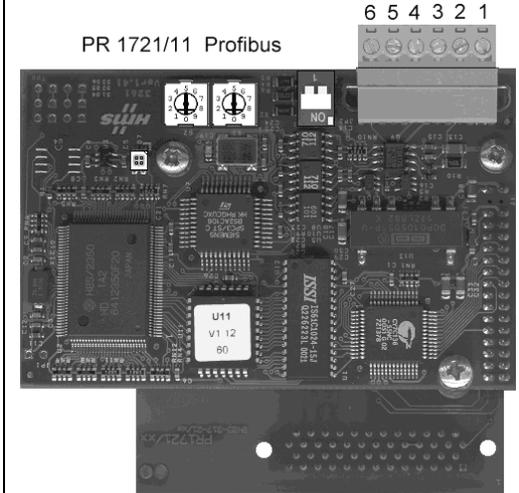
		Connecting method:	50 pole connector, slot 4
			Terminal block with 6 screw terminals
		Transmission rate:	Profibus-DP max. 12 Mbits/sec.
		Protocols:	Profibus-DP slave
		Cable:	Shielded twisted pair
		Cable impedance:	150 Ohm
Dimension (LxWxH):	70 x 86 x 25 mm	**Potential isolation:**	Yes
Weight:	65 g		

> ⚠ Please ensure, that the two rotary switches are set to 0 position.
> The switch next to pin 6 of the terminal block is used to switch ON/OFF the termination resistors.

Connection diagram for a master with three slaves in Profibus
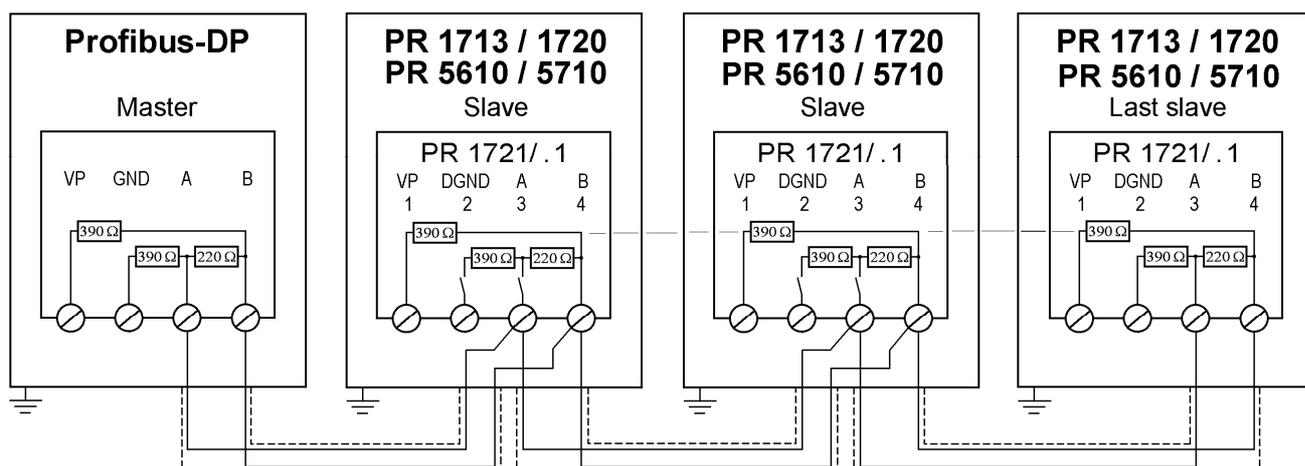
For further information please refer to the manuals Fieldbus-Interface PR1721/1x (hardware) and Fieldbus PR1713 with PR1721/.. (software).

3.4.12　　PR1721/12　Interbus Interface

The Interbus interface PR 1721/12 is an option to be installed in slot 4 of PR5610, see chapter 3.2.2. Communication protocols and syntax comply with the relevant bus standard.
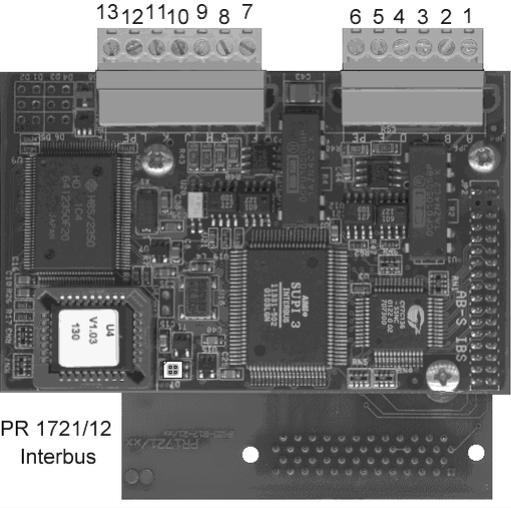
Connecting method:	50 pole connector, slot 4
	Terminal block with 6 + 7 screw terminals
Transmission rate:	500 kbits/sec.
Protocols:	Interbus-S slave
Cable:	Shielded twisted pair
Cable impedance:	150 Ohm

Dimension (LxWxH):	70 x 86 x 25 mm	Potential isolation:	Ja
Weight:	65 g		

Connection diagram for a master and three slaves in an Interbus–S
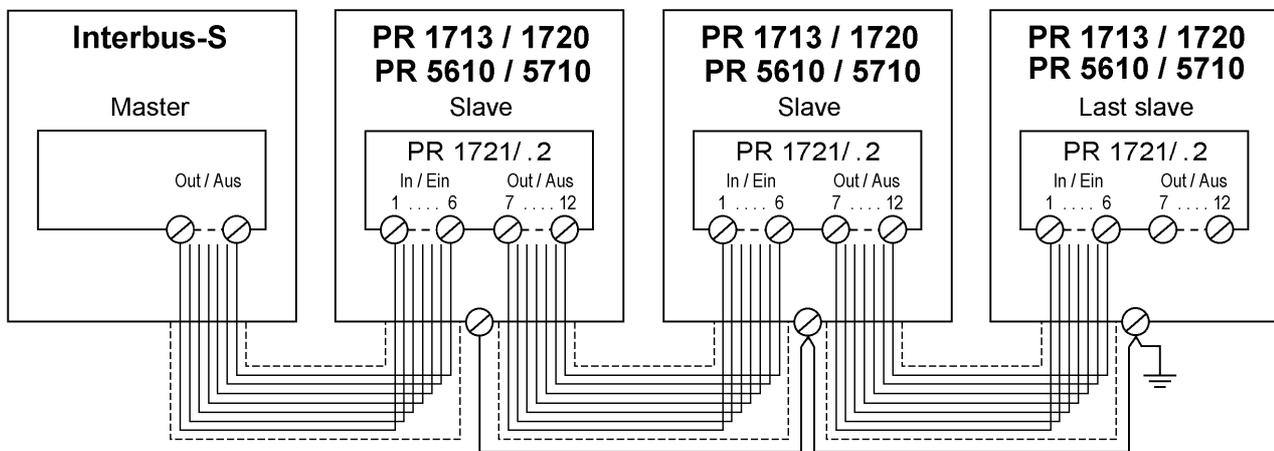
For further information please refer to the manuals Fieldbus-Interface PR1721/1x (hardware) and Fieldbus PR1713 with PR1721/.. (software).

3.4.13   PR1721/14 DeviceNet Interface

The DeviceNet interface PR 1721/14 is an option to be installed in slot 4 of PR5610, see chapter 3.2.2. Communication protocols and syntax comply with the relevant bus standard.
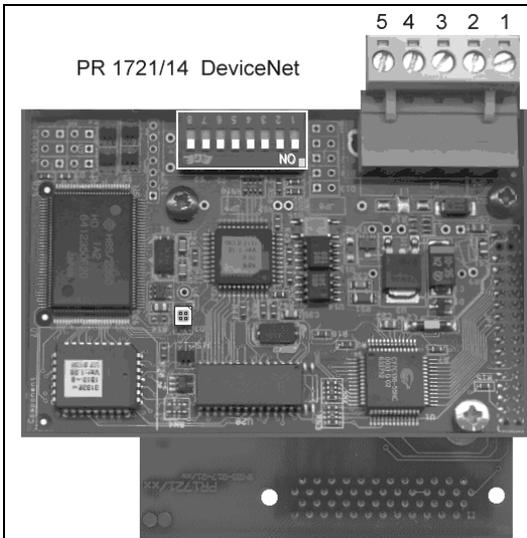
Connecting method:	50 pole connector, slot 4
	Terminal block with 5 screw terminals
Transmission rate:	DeviceNet 500 kbits/sec
Protocols:	Device-Net slave
Cable:	Shielded twisted pair
Cable impedance:	150 Ohm
Bus load:	30 mA @ 24 V DC

Abmess. (LxWxH):	70 x 86 x 25 mm	Potential isolation:	Yes
Gewicht:	65 g		

⚠ Please ensure, that the DIP switches 1- 8 are set to ON.

Connection diagram for a master and three slaves in a DeviceNet
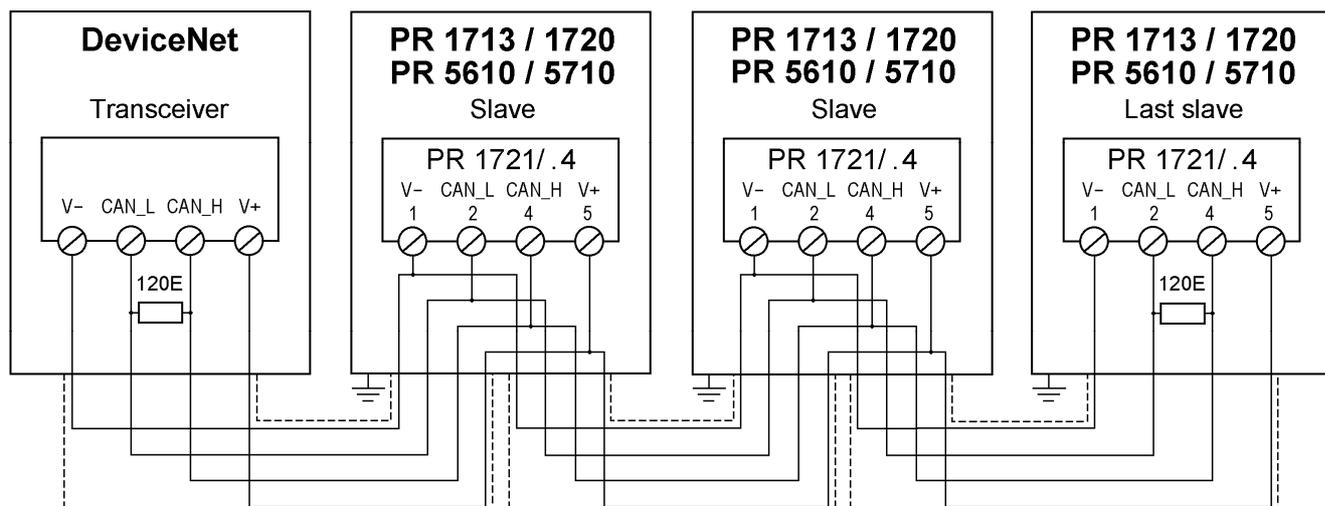
For further information please refer to the manuals Fieldbus-Interface PR1721/1x (Hardware) and Fieldbus PR1713 with PR1721/.. (Software).

4   Commissioning

Commissioning can be done via the front panel keypad or through a terminal emulation program running on a PC or through a terminal (VT 100 compatible).
After switching on for the fist time, the following error message can appear:

```
No valid RAM (      )
 Cold & Erase& Flash
```

The battery jumper has to be set (see chapter 1.4.2), this operation must be followed by a **cold** start (Cold) and clock (date and time) adjustment.

4.1   Data Saving / Power Failure

The configuration/ calibration data are stored in a non-volatile memory (EAROM). Data saving in EAROM is done by command (configuration, calibration). A power failure is registered with a system event (+ PLC address).
Write protection for the calibration data is provided (CAL-switch, see chapter 3.2)

* protected by CAL switch
* gesichert mit CAL Schalter
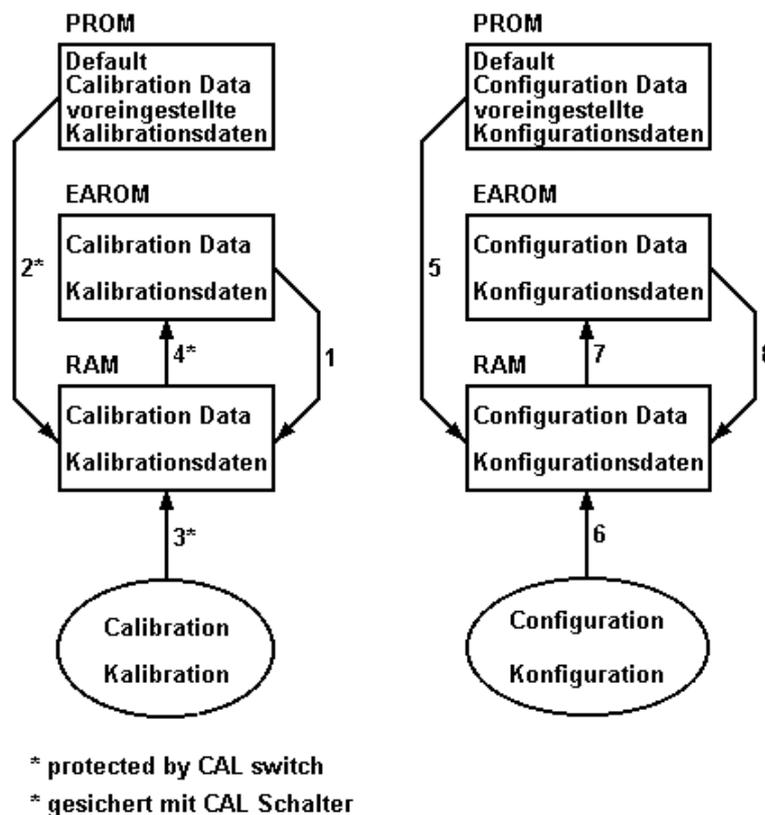
4.1.1   Calibration Data

Adjustment of: FSD values/ measuring time/ weighing parameters. The calibration parameters must be saved (by command !). Moreover, the calibration parameters can be protected by CAL-switch. Before calibration, the unit should be allowed to warm up.

1.   At power-on, the calibration data are loaded from EAROM into RAM (working memory).
2.   Function [Setup]-[Weighingpoints]-[WP X:Internal ADC]-[Calib]-[New]-[Reset all to default]-[YES] loads the default calibration data from PROM into RAM.
3.   During calibration the calibration data in RAM are modified.
4.   Function [Exit calibration]-[Save] stores the modified calibration data from RAM into EAROM.

4.1.2 Configuration Data

Adjusting the serial interface/ communication, field bus parameters. The configuration settings are also saved by command. The configuration settings are independent of CAL-switch, i.e. access to the configuration settings is always possible.

5. If the EAROM is erased, the default configuration data are loaded into RAM (working memory).
6. During configuration, the configuration data in RAM are modified.
7. Function **[Save software conf ?]–[YES]** stores the modified configuration data from RAM into EAROM.
8. At power-on, the configuration data are loaded from EAROM into RAM.

4.1.3 Programming with PR1750

Programming with PR 1750 is only possible with opened CAL-switch. Project files (P32) can be loaded on-line directly by EW-Com.

Firmware (.hex) can be loaded off-line with menu **[Flash]**, see chapter 4.3.2.2. FlashIt!32 also can merge project files.

4.1.4 Cold / Warm Start

With ⬛ kept pressed during switch-on (at power recovery), the boot menu is displayed:

```
STOP-Key pressed
 Cold ↕ Warm ↕ Flash
```

The user can select:

- **[Cold]**: Cold start - program and database are erased, interface configuration and calibration data remain unchanged, options in slot 1-4 are detected

- **[Warm]**: Warm start - all data remain unchanged

In a further menu item, the default settings can be reestablished. Thereby, calibration data, interface configuration and hardware clock are set to standard values.

The boot menu can be called up from **[Setup]–[Reboot]**:

```
Reboot ?
 Cold ▪ Warm ▪ Bios
```

If **[Bios]** is selected, the booting is started, setting the instrument to default data.

4.2 Display Elements and Controls

Weight value
of the selected
weighing point

Dialogue keys

Indicator keys

Text display with
2x20 characters

Alphanumeric keys

Function keys

4.2.1 Control Signals

Functions zero setting, tare / reset tare, weight display mode and print are allocated to the front-panel keys and i.e. these functions are accessible to the operator. The function of F1 and F2 are programmable using the PR1750.

4.2.2 Language

Instrument configuration is exclusively in English. For system operation, two languages are available. The main language is English. With the standard version (factory setting), the alternative language is German. Switch-over is with the front-panel keypad (via configuration, see chapter 4.8.3.1).

4.2.2.1 Configuration / Calibration

Operator dialogue   in English.
Operation   via front-panel keypad,
                   or   via terminal VT100 (compatible)
                   or   with PC terminal software.

4.2.2.2 Operation

Operator dialogue   in 2 languages (English or alternative language).
Operation   via front-panel keypad
                   or   with ext. PC keyboard and front-panel display
                   or   via terminal VT100 (compatible)
                   or   with PC terminal software.

4.2.3   Operating Concept 'Commissioning'

The instrument configuration is done via keypad or, alternatively, with a terminal or a terminal program on a PC. The sections for calibration and configuration can be reached from the main menu via **[Setup]**. Gross weight display for calibration, if necessary, please: reset tare + set zero!

Operating concept: The instrument is menu-guided with softkeys via keypad. Inscriptions on the 3 softkeys ⟳ are with up to 6 characters per key on the lower display line. The symbols in the lower line of the alphanumeric display limit the softkey inscriptions. Thereby, ▥ means: only these softkeys, and ✛ means: further functions are available with 🔘 . **In the description of operation procedures with softkey functions the softkey symbol is not indicated, but the function (text) itself is indicated bold in square brackets.**

Example:
```
Reset all to default
 YES  ▥ ──── ▥  NO
```
    left softkey = **[YES]**, right softkey = **[NO]**

During editing, 🔘 must be used also for selecting the weight unit **[g , kg , t , lb]**.

Example:
```
↓Set Fullscale    ↑
          3000 ↕kg
```
    change FSD with numeric keys
and unit with 🔘 .

Depending on function, the input modes are switched over between selection from a menu / a selection box or entry of alphanumeric characters (editing). The relevant value is displayed beside the parameter, i.e. a quick survey of all configuration settings is possible by parameter 'scrolling'. For editing e.g. parameter **[Baudrate]**, it must be selected with 🔲 .

The parameters can be left either by 🔲 or 🔳 . In field **[Save]**, after changes, answer request for saving:

Example:
```
Save Slot 2  RS232 ?
 YES  ▥ ──── ▥  NO
```
    [YES]:   changed values are saved
[NO]:   no change, back to last menu

4.3   Main Menu

After connection to the power supply, the instrument shows the version number "PR1713 Rel. 02.00.0" or the name of the application package (e.g. IBC Controller).
The unit can be configured via the keypad or (after switching over) on a terminal. The operation of the unit is menu-guided. Calibration and configuration are accessible via menu **[Setup]**.

Example:

```
IBC Controller
Start ↕Param ↕Setup
```

Depending on the application package certain functions can be selected

```
IBC Controller
Atest ↕      ↕
```

Further items are displayed with the ⟩More button

Menue items depend on the application package (e.g. Batch-X5).
Without loaded applications only **[Setup]** is displayed.

Overview on the menu items in the main menu

Menu item	Description
[Setup]	Configuration, calibration, interface definition, initial data
[Atest]	Display of the testvalue for the internal ADC, which was calculated during calibration
'other'	Depending on application package, see respective operating manual
[Setup]-[Config]	Configuration for application program, see respective operating manual

4.3.1   Function Setup

In menu **[Setup]** the most important parameters can be set. Configuration of the instrument depends on the application package, licences and the built-in options.
Calibration of the internal WP is done in a dialogue. During calibration, all parameters which can be entered are checked. Storage of values which do not make sense is not possible. However, compliance with the relevant (Legal Metrology) standards must be checked by the installer (calibration officer). For protecting calibration data from overwriting, the CAL-switch must be closed (disconnect the instrument from power supply, open it, close the CAL-switch (see chapter 3.3), close the instrument and connect it to the power supply).

Configuration can be done without additional terminal via front panel display and keypad. Simply use the scrollkeys and the softkeys in connection with the alphanumeric display. Within setup menu, all items in each level are scrolled in an infinite loop, which can be left to the next higher level by pressing Exit . Exception: the calibration loop must be terminated by the function keys **[Save], [Undo]**. A displayed or selected information is entered by pressing OK key.

4.3.1.1   Setup Menu

Setup

    – Config   Menu depends on application package, *see resp. operating manual*
    – Weighingpoints

        – WP A:
        – WP B:

            – Assign   internal, liquid, user, GWT-Scale, x-BPIScale
            – Calib (for internal ADC)   *see chapter 4.3.1.2*
            – Config (for liquid)

                – W & M   <none>, OIML, NTEP
                – Fullscale   0.000100 ... <1000> ... 9999900 <kg>, t, lb, g
                – Stepwidth   <1>, 2, 5, 10, 20, 50
                – Overload   0 ... <9 d> ... 9999999 d
                – Minwgt   <0 d> ... 9999999 d
                – Scale Weight   0.000100 ...<1> ... 9999900 <kg>, t, lb, g (weight increase/x counts)
                – Scale counts   <1 cnt> ... 65000 cnt

            – Config (for user)

                – W & M   <none>, OIML, NTEP
                – Fullscale   0.000100 ... <1000> ... 9999900 <kg>, t, lb, g
                – Stepwidth   <1>, 2, 5, 10, 20, 50
                – Overload   0 ... <9 d> ... 9999999 d
                – Minwgt   <0 d> ... 9999999 d
                – Scale Weight   0.000100 ...<1> ... 9999900 <kg>, t, lb, g (weight increase/x counts)
                – Scale counts   <1 cnt> ... 65000 cnt
                – Update time   50 ... <300 ms> ... 2000 ms
                – SPM marker address   <32> ... 255

            – Config (for GWT Scale)

                – W & M   <none>, OIML, NTEP
                – Overload   0 ... <9 d> ... 9999999 d
                – Minwgt   <0 d> ... 9999999 d
                – Update time   50 ... <300 ms> ... 2000 ms
                – Fieldbus slave   <1> ... 32
                – Serial number   <0> if >0, check on boardl number is done

            – Config (for xBPIScale)

                – W & M   <none>, OIML, NTEP
                – Taring   <Remote>, Local   select Remote for ISI Terminal, local for platform
                – Overload   0 ... <9 d> ... 9999999 d
                – Minwgt   <0 d> ... 9999999 d
                – Update time   50 ... <300 ms> ... 2000 ms
                – Serial number   <0> if >0, check on serial number is done

            – Setup (for xBPIScale)   *For xBPI Setup please ref. to chapter 4.7.4*

        – WP C:

            – Assign   <none>, A+B
            – Config (for A+B)

                – Overload   0 ... <9 d> ... 9999999 d
                – Minwgt   <0 d> ... 9999999 d

4.3.1.2   Internal ADC Calibration Tree

WP X: Internal ADC

– Assign	internal, liquid, user, GWT-Scale, x-BPIScale
– Calib	

– New	

– Reset all to default	YES or NO
– Set Fullscale	0.000100 ...<3000>... 9999900 <kg>, t, lb, g
– Set Stepwidth	<1>, 2, 5, select with [More] 10, 20, 50 , current stepwidth in ><
– Set Deadload	[Load] or [mV/V]
Enter Deadload	<0.000000 mV/V>
– Set Span	[Load] or [mV/V]
Enter current load	0.0001 ... 9999900 kg, t, lb, g
Enter Span	<1.000000 mV/V>
– Calculate test	Test: Calculate testfigure
– Exit calibration	YES [Save] or [Undo], NO

– Modify	*Only for small modifications, in other cases use* [New]

– *see* New	

– Param	

– Analog filter	<on>, off
– Digital filter	<off>, bessel, aperiod., butterw., tscheby.
– Multirange mode	<off>, on
– Test mode	<Absolute>, Relative
– W & M	<none>, OIML, NTEP, NSC
– * Fcut	0.10 Hz ... 5.00 Hz *only if Digital filter not off
– * Measuretime	0.05 ... <0.30 s> ... 2.00 s *only if Digital filter = off, else M = 0.05 s
– Standstill time	<1 M> ... 8 M
– Zerotrack time	<0 M> ... 100 M
– Tare timeout	0 M ... <8 M> ... 100 M
– Standstill range	0.00 d ... <1.00 d> ... 10.00 d
– Zeroset range	0.00 d ... <50.00 d> ... 500.00 d
– Zerotrack range	0.00 d ... <0.25 d> ... 500.00 d
– Zerotrack step	0.00 d ... <0.25 d> ... 10.00 d
– * Supply	<12 Volt>, 20 Volt * only for PR 5710
– Overload	0 d ... <9 d> ... 9999999 d
– Don't print below	0 d ... <50 d> ... 9999999 d
– * Multirange limit 1	0 d ... 9999999 d, crossover from small to mean stepwidth
	*only if Multirange mode = on
– * Multirange limit 2	0 d ... 9999999 d, crossover from mean to large stepwidth
	*only if Multirange mode = on

– Check	Counters for Calibration and Configuration (cannot be modified/reset)
– View	

– *Same elements as* Param	(view only)
– Stepwidth	(view only)
– Fullscale	(view only)
– Deadload (mV/V)	(view only)
– Resolution (cd/c)	(view only)
– Calibrated at	(view only)
– Span (mV/V)	(view only)
– Sensitivity (µV/d)	(view only)

4.3.1.3   Parameter Tree

Setup

– Set Clock		Time and Date
– Serial Ports		
	– Operator device at	<Builtin RS232>, none, Slot 1 .. 3 RS485, Slot 1 ... 3 RS 232 (select)
	– Printer device at	<none>, Builtin RS232, Slot 1 .. 3 RS485, Slot 1 ... 3 RS 232 (select)
	– Remote device at	<none>, Builtin RS232, Slot 1 .. 3 RS485, Slot 1 ... 3 RS 232 (select)
	– Serial port setup	
	* Builtin RS232	Protocol, Baudrate, Bits, Parity, Stopbits, Devtype, Echo * if not sel. for operator dev.
	* Slot 2 RS 485	Protocol, Baudrate, Bits, Parity, Stopbits, Devtype, Echo * if installed
– Software Parameter		
	– Language	<English>, Local Language
	– Frontkey timeout	1 s, <2 s>, 3 s
	– Low battery check	<on>, 1min, off
	– Report to	<none>, communication, application, communic. & appl., application +Prod.
	– Tare key	<enabled>, disabled
	– Set zero key	<enabled>, disabled
	– Quit in mainlevel	<enabled>, disabled
	– Reset on stop+exit	<1 s>, 5 s, disabled
	– S88.01 Interface	<off>, on
	– Software download	<protected by setup>, always enabled
	– Lines per recipe	1, 2, ...<10> ... 255
	– Recipe simulation	<enabled>, disabled
	– Subrecipe	enabled, <disabled>
	– Automatic refresh	<on>, off
	– Refresh time at	Select time (only hour)
– * Fieldbus Parameter		* only if PR 1721/XX is installed in slot 4
	– PR 1721 protocol	<none>, Interbus-S, Profibus-DP, DeviceNet, CanBus-Mas
		see chapter 4.8.4
– Show Boardnumber		Display: Boardnumber required for licences
– Licence setup		Show, Add, Delete
– Print Setupdata		Activate printing on the selected interface, failure: no printer device
– Refresh Display		Highlight all segments (until leaving the Menu again), Maintenance/Service
– I/O Slots		Display: Slot 1 ...4, card type or empty, @ task no.
– Show Version		Display: Firmware version, Application, BIOS version
– * Enable download		Download enabled * only if [Software download] is set to [protected by setup]
– Reboot		
	– Cold	Cold start
	– Warm	Warm start
	– Bios	If selected, no Warm start possible
	– Cold	Cold start
	– Erase	Default settings
	– Flash	Load new software
	– Test	Test ROM, RAM, EAROM, keypad, display

4.3.2 Boot Menu

The Boot menu can be accessed by the following actions:

❖ Pressing (Stop) during instrument power up

❖ Pressing (Stop) + (Exit), if **[Setup]–[Software Parameter]–[Reset on stop+exit]** = 1 or 5 s,
   a **[Warm]** start is not possible!

❖ Menu **[Setup]–[Reboot]**

- If a warm start is possible:

```
STOP-Key pressed
 Cold ↕ Warm ↕ Flash
```

```
STOP-Key pressed
 Test ↕        ↕
```

[Cold] All programs and tables loaded in RAM are deleted.
[Warm] All data remain unchanged.
[Flash] Program loading (also parts).

[Test] Can be selected with [>More].

- If a warm start is not possible:

```
StopExit reset
 Cold ↕ Erase↕ Flash
```

```
StopExit reset
 Test ↕        ↕
```

[Cold] All programs and tables loaded in RAM are deleted.
[Erase] Erases the EAROM (only with CAL-switch = open).
[Flash] Program loading (also parts).

[Test] Can be selected with [>More].

With **[Erase]** all calibration and configuration data are adjusted to the default (factory) settings.

Possible error message:

```
Erase not possible
CAL-Jumper closed
```

If CAL-switch is closed.

```
Erase canceled
 Cold ↕ Erase↕ Flash
```

Safety prompt:

```
Erase all data?
 YES  ▪ ──── ▪  NO
```

[YES] Data are overwritten.
[NO] All data remain unchanged.

- Warm start possible (with Reboot)

```
Setup
↓Reboot               ↑
```

```
Reboot ?
 Cold ▪ Warm ▪ Bios
```

⚠ If **[Bios]** is selected, a **[Warm]** start is not possible anymore!

```
Bios ready
 Cold ↕ Erase↕ Flash
```

```
Bios ready
 Test ↕        ↕
```

[Test] can be selected with [>More].

[Cold]   All programs and data loaded in RAM are erased: Depending on the application package these could be recipes, component data etc. Data in EAROM remain unchanged.
Messages:

```
Doing Coldstart…
Check firmware…
Firmware Coldstart…
```

The firmware checksum is tested.
A cold start is carried out.

[Warm]   All programs and data in RAM and EAROM remain unchanged.
Messages:

```
Doing Warmstart…
Check firmware…
Firmware Warmstart…
```

The firmware checksum is tested.
A warm start is carried out.

[Erase]   Calibration data are set to default. Licences are erased, software configuration, parameters for Fieldbus, Network etc. are set to default.
Messages:

```
Erase…
Erase done
Check firmware…
Firmware Coldstart…
```

Erase is carried out

The firmware checksum is tested
A cold start is carried out.

[Test]   Activate Test menu

⚠	**Warning**	**The Deep RAMtest and the EAROM-Erase are destructive (data are lost)**

```
Test:↓Rom-Checksum↑
Test:↓Fast RAMtest↑
Test:↓Deep RAMtest↑
Test:↓SIL-NR-Check↑
Test:↓EAROM-Check  ↑
Test:↓EAROM-Erase  ↑
Test:↓KBD-Check    ↑
Test:↓DSP-Check    ↑
```

ROM-Test: BIOS passed, Firmware passed
Fast RAM-Test (size): RAM=040000+000000
Deep RAM-Test (destructive): Bank1= 262144 bytes, Bank2 =   0 bytes
SIL-NR-Check: Boardnr: 20060984
EAROM-Check: EAROM passed
EAROM-Erase (destructive): EAROM passed
KBD-Check: FFFDFFFF 0011 4031 (example: 1-key), end with [Stop] + [→]
DSP-Check: illuminate all segments, show characters with [↓] or [↑],
check weight display and status indicators with [F1] or [F2]

[Flash]   Loading of new firmware (refer to chapter 4.3.2.2).
Various messages are displayed in the boot menu:

```
Bios ready
Flash complete
Flash cancelled
Fatal error reboot
No valid firmware!
BIOS too old
```

Restart from the operating level was carried out
Loading of a new software was completed
Loading of a new software was cancelled
A fatal error occurred before restart
The checksum of the firmware is faulty
BIOS version not matching *
(BIOS too old after new firmware was flashed)

⚠	*) The BIOS must not be flashed without the message: `BIOS too old`. Do not interrupt the flashing, because the loader program for FlashIt!32 is included in the BIOS, otherwise the instrument needs to be repaired.

4.3.2.1   Weighing Point Initialization

After **[Erase]**, **[Cold]**, **[Warm]** or power-on the weighing points will be initialized.
This ensures that the physical weighing points are delivering valid weight values. If weighing points do not deliver valid data, an error message is generated.

After **[Erase]** only the WP A will be initialized (see chapter 4.4 for WP assignment)

Example for power-on (WP A and WP B are assigned):

```
Check firmware…
```
Firmware checksum is tested.

```
Firmware Warmstart…
```
Warmstart is carried out.

```
Init weishingpoints
A? BΓ
```
Weighing point initialization, '?' appears during initialization, '☜' if WP is ready.

```
Init weishingpoints
AΓ BΓ
```
Both WPs are ready.

Error message if WPs are
not ready after 5 sec.

```
Init weishingpoints
WP B failed
```

The weighing points which are not ready show the ERROR 9 message on the weight display (no communication). After the weighing point initialization the instrument returns to the main menu.

4.3.2.2   Loading new Firmware

The instrument includes firmware and application packages (e.g. Batch-X5). A firmware without application package may be used for projects. You need the software FlashIt!32 Rel 2.26, if you want to replace the application-PLC with your own PLC-project. Firmware and PLC program can be taken from the Complementary SW-Tool box CD or from our internet site. Update the BIOS only if requested by the instrument.

⚠ Do not interrupt the flashing, because the loader program for FlashIt!32 is included in the BIOS, otherwise the instrument needs to be repaired.

Settings of the interfaces: Den ausgewählten seriellen Port mit dem PC verbinden. Die Port-Parameter werden beim Einspielen automatisch gesetzt.

Prepare the PR5610:   Open menu **[Setup]-[Reboot]-[Bios],** wait for message Doing Bios…, Bios ready. Then select **[Flash],** select the serial port:

```
Start FlashIt!
↓Builtin      ↑
```

```
Start FlashIt!
↓Slot2 RS485↑
```

```
Start FlashIt!
↓Slot2 RS232↑
```

Select the serial port, which will be used for downloading the program.
If the serial port "Built-in" is occupied,
the interface can be selected with ↓ or ↑
(only available, if a serial I/O card PR 1713/04 is inserted).

Prepare the PC: FlashIt!32 must be started now on the connected PC. Select COM-Port, select firmware file from the list in the window, press **Flash** button, wait for message completed.

If the message   No communication No prompt from device   appears on the screen, the reason could be: wrong COM-Port selection or cable between PC and instrument are not or wrong connected.

During flashing various status messages are displayed:

```
Loading…
Call…
Erasing…
Blank test…
Blank test. passed
Flashing     8A5000
```

Subsequently, the boot menu with the following status line is displayed:

```
Flash complete
 Cold %Erase % Flash
```
Initialize PR 5610 with **[Cold]**.

Flash erases the databases of the instrument, therefore Erase is not necessary before Flash, to erase internal databases.
If **[Erase]** is started, the safety question has to be answered before erase is executed, after that Reboot.

4.4   Weighing Point Assignment

It has to be differenciated between physical weighing points (e.g. internal ADC, xBPI scale) and logical weighing points (WP A, WP B and WP C). In menu [Setup]-[Weighingpoints]-[WP X]-[Assign] the physical weighing point can be assigned to a logical weighing point according to the following table:

physical weighing point	logical weighing point		
	A	B	C
[none]	—	<√>	<√>
[internal]	<√>	√	—
[liquid] / [user]	√	√	—
[GWT-Scale]	√	√	—
[xBPIScale]	√	√	—
[A+B]	—	—	√

< > = default

Note: A physical weighing point can be assigned only once to a logical weighing point.
Example: If [internal] is assigned to WP A, it cannot be assigned to WP B anymore.
[liquid] and [user] are treated as one physical weighing point, so either [liquid] or [user] can be assigned.
The weight display shows WP A as default, with [WP] the weight display can be switched to WP B (toggle). If WP C is set to [A+B], [WP] switches from WP A to WP B to WP C to WP A and so on.
Example for setting an xBPI scale as WP A and the internal ADC as WP B:

`Setup` `↓Weighingpoints        ↑`	Select [Weighingpoints] with [↓] or [↑]; confirm with [OK].
`↓WP A:Internal ADC  ↑` `Calib ▪       ▪Assign`	Select displayed weighing point (WP A) with [Assign].
`Weighingpoint A` `WP type :↓internal   ↑`	Select other function with [↓] or [↑] between [liquid], [internal], [xBPIScale] or [GWT-Scale]; confirm with [OK].
`Weighingpoint B` `WP type :↓liquid     ↑`	Select other function for WP B with [↓] or [↑] between [liquid], [internal], [xBPIScale] or [GWT-Scale]; confirm with [OK].
`Weighingpoint C` `WP type :↓A+B        ↑`	Select with [↓] or [↑] [none] or [A+B], confirm with [OK].
`Save changes?` `  YES   ▪ ———— ▪  NO`	Save with [YES], keep previous assignment with [NO].
`↓WP A:xBPI-Scale    ↑` `Setup ▪Config▪Assign`	Now [Setup] and [Config] for the xBPI-Scale can be carried out.
`↓WP B:<none>        ↑` `      ▪       ▪Assign`	Select with [↓] or [↑] [WP B], than select with [Assign].
`Weighingpoint B` `WP type :↓none       ↑`	Select with [↓] or [↑] [Internal].
`Weighingpoint B` `WP type .↓internal   ↑`	Confirm with [OK].
`Save changes?` `  YES   ▪ ———— ▪  NO`	Save with [YES], keep previous assignment with [NO].
`↓WP B:Internal ADC  ↑` `Calib ▪       ▪Assign`	Now [Calib] for the internal ADC can be accessed.

4.4.1 Error Messages on the Weight Display

The internal ADC and the external weighing points can generate error messages to appear on the weight display. If more than 1 weighing point has been assigned, the selection is done with [WP] . The messages are displayed with 'Error X' .

Error messages on the weight display	
Error 1	internal arithmetic overflow (faulty calibration values)
Error 2	input voltage is above FSD + overload
Error 3	input voltage is above the permissible range of 36 mV. However, an error in the analog section, a defective load cell, or a cable break are also possible.
Error 4	weight value exceeds display digits
Error 5	weight is not available, e.g. weighing point is busy
Error 7	input voltage is negative or incorrect load cell connection
Error 8	ADC error, e.g. internal ADC defective or overloaded
Error 9	no communication with weighing point
Error 11	weight is not available
Error 15	serial number check failed
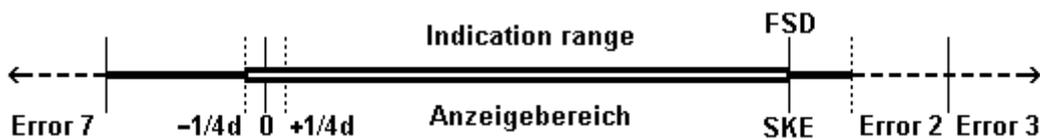
4.4.2   W&M Parameter

For all weighing point types a W&M parameter can be set individually (see chapter 4.3.1.1).
The parameter can only be set / changed, if the CAL switch is open.
The following selections are possible (the default data are displayed):

```
↓W & M              ↑
↕            none↕
```
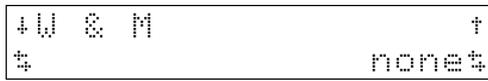
Select W&M input mode with ⌗. The stored value or the default value is displayed.

[internal ADC]

```
↓W & M              ↑
↕            OIML↕
```

Select W&M mode **[OIML]**, **[NTEP]** or **[NSC]** with ↩ or → ; confirm with ⌗.

```
↓W & M              ↑
↕             NSC↕
```

Example for **[NSC]**.

[xBPI], [liquid], [user] or [GWT-Scale]:

```
↓W & M              ↑
↕            OIML↕
```

Select W&M mode **[OIML]** or **[NTEP]** with ↩ or → ; confirm with ⌗.

```
↓W & M              ↑
↕            NTEP↕
```

Example for **[NTEP]**.

[none]
If the parameter is set to **[none]** for all assigned weighing points, gross (B), net (N) and tare (T) is displayed with weight unit on the display.

[OIML]
If a weighing point is set to OIML, the weight values for Diff, Flow, Setp and User are displayed without weight unit. For further information, refer to the table.
If LEDs for indicating the WP are existent or the parameter is set to **[none]** for all other weighing points : gross (B), net (N) and tare (T) are displayed with weight unit .

[NTEP] or [NSC]
If a weighing point is set to NTEP or NSC, the weight values for Diff, Flow, Setp and User are displayed without weight unit. For further information, refer to the table.
If LEDs for indicating the WP are existent or the parameter is set to **[none]** for all other weighing points : gross (G), net (N) and tare (T) are displayed with weight unit .

If the parameter is set to **[OIML]** or **[NTEP]** for more than one weighing point and no LEDs for displaying A and B are existent, gross (B/G), net (N) and tare (T) are displayed without weight unit.

	none	OIML	NTEP	NSC
negative weight (<-1/4d)	unit	no unit	unit	no unit
weight in range (-1/4d ... FSD)	unit	unit	unit	unit
weight > FSD	no unit	no unit	unit	no unit
weight > FSD+overload	ERROR 2	ERROR 2	ERROR 2	ERROR 2
gross indication	B	B	G	G
Diff weight	unit	no unit	no unit	no unit
Flow	unit	no unit	no unit	no unit
Setp	unit	no unit	no unit	no unit
User	unit	no unit	no unit	no unit

4.4.3 Correcting the Zero of an Empty Scale

Following a subsequent dead load correction is described.

The parameter can be changed only with CAL switch position ⬚!
The sequence starts with [Setup]-[Weighingpoint].

```
Setup
↓Weighingpoint        ↑
```
Press [OK] to select the item.

```
Calibration
New    ↕Modify↕ Param
```
Press [↑] to select [Modify].

```
↓ Set Fullscale
              6000 kg
```
Press [OK] to select the item.

```
Setting Fullscale...
```

```
↓ Set Stepwidth       ↑
↕                    2↕
```
Press [OK] to select the item.

```
Setting Stepwidth…
```

```
↓Set Deadload        ↑
 ──── ▪ Load ▪ mV/V
```
Unload the scale to determine the current weight as deadload.

Press [↑] to select [Load].

```
Setting Deadload…
```
Calculate the deadload value.

```
Calibration(changed)
New    ↕Modify↕ Param
```
Complete the change with [Exit].

```
Exit weighingpoint
Save ▪          ▪ Undo
```
Press [↑] to select [Save]. The CAL values are stored in non-volatile EAROM.

At the end of the sequence, set the CAL switch into the safe operating position ⬚.

4.5 Calibration, internal ADC

Calibration of the internal weighing point by weights or mV/V can be realized via keypad or terminal / PC. Calibration data are protected by the CAL-switch, which has to be sealed in legal for trade applications.

Calibration data setting / changing is only possible, if the CAL-switch is open. If calibration is active, press 🔟 for a 10 fold magnifier (toggle).

If mV/V are entered based on the load cell data, it can be necessary, to correct the data depending on the local gravitation (Data for STAR load cells are based on the gravitation in Hamburg: 9.81364).

4.5.1 Calibration Sequence

The sequence is started with **[Setup]–[Weighingpoints]–[WP X:Internal ADC]–[Calib]. [Set Fullscale]** is reached with **[New]** or **[Modify]** , see chapter 4.5.7. Changing to the next item is done with 🔽 (up t 4.5.12 **[Exit calibration]**) or with 🔼 in an endless loop up to the previous menu item of these chapters. The endless loop can be left with **[Exit]:** without changes or, as described in chapter 4.5.12 after changes, in order to cancel the new settings or to save it. In all display clips the default value is displayed.

4.5.2 Error messages at Calibration Start

When calling up **[Calib]**, the following messages can appear:

Message:

`Can not calibrate` `Jumper is closed`	If CAL-switch is closed.
`Can not calibrate` `Tare active`	If the instrument has been tared.
`Configuration is` `active`	If the instrument is connected to terminal / PC.

4.5.3 Calibration / Configuration Counters

In menu **[Setup]–[Weighingpoints]–[WP X:Internal ADC]–[Calib]–[Check]** two 5 digit counters (max. 65000) exist:

Counters for NTEP

```
Calibration  :  00005
Configuration:  00011
```

At saving calibration the data of the internal ADC are compared. If span (in mV/V) is changed, the calibration counter is incremented. If any other parameter is changed (including FSD, deadload, stepwidth, measuretime, standstill etc.), the configuration counter is incremented. Both counters are saved together with the calibration data.

The purpose is to trace (**NTEP** requirement) whether calibration and/or configuration data have been changed. The counters are always present (independent of the selected **[W&M]** mode) and cannot be reset or modified. The counters can be displayed with CAL-switch closed and with tare active.

[Erase] or flashing of BIOS or flashing of firmware does not affect the counters.

4.5.4   Select Weighing Point

The selection of the weighing point is carried out by **[Setup]-[Weighingpoints]**.

```
↓WP A:Internal ADC ↑
Calib ▪       ▪Assign
```
Change weighing point with ⬇ or ⬆ and select calibration of the displayed weighing point with **[Calib]**.

```
Calibration
New    ↳Modify↳ Param
```
The calibration menu with the selections **[New]**, **[Modify]** or **[Param]** is displayed.

4.5.5   Display Calibration Data

```
Calibration
New    ↳Modify↳ Param
```
Display further functions with 🔘 .

```
Calibration
       ↳Check ↳ View
```
Select **[View]**.

All calibration parameters and data are displayed as these have been entered / calculated during calibration procedure.

4.5.6   Select Calibration Mode

[New]

```
Calibration
New    ↳Modify↳ Param
```
[New] starts a calibration with default values.

```
Reset all to default
 YES  ▪ ———— ▪  NO
```
Safety prompt; if **[YES]** default values are loaded and calibration procedure starts.

In all display clips the default value is displayed. Default values for **[New]**:

Fullscale	<3000> <kg>
Stepwidth	<1>
Deadload	<0.000000 mV/V>
Span	<1.000000 mV/V>
[Param]	All parameters remain unchanged !

[Modify]

⚠ This menu should only be used for small changes, in other cases **[New]** has to be selected!

```
Calibration
New    ↳Modify↳ Param
```
[Modify] changes current calibration data (fullscale, weight unit, stepwidth, deadload and span).

4.5.7   Set Full Scale

```
↓Set Fullscale     ↑
            3000 ↕kg
```

Enter numeric values for FSD with or without decimal point. Change weight unit with [>More], confirm with [OK].

```
Setting Fullscale…
```

Acknowledgement of full scale, Continue with chapter 4.5.8.

4.5.7.1   Resolution Magnifier

The weight display can be switched to 10-fold during calibration with [🔒] (toggle function).

4.5.8   Set Step Width

```
  Set Stepwidth    ↑
↕                 1↕
```

Select entry mode for step width with [OK]. The current value is indicated.

```
  Set Stepwidth    ↑
↕                 2↕
```

Select the step width 1, 2, 5, 10, 20 or 50 with [←] or [→] and confirm with [OK].

```
Setting Stepwidth…
```

Acknowledgement of step width. Continue with chapter 4.5.9.

4.5.9   Set Dead Load

```
  Set Deadload     ↑
---- ▪ Load ▪ mV/V
```

The choices [Load] and [mV/V] for the dead load entry are displayed.

[Load]

```
  Set Deadload     ↑
---- ▪ Load ▪ mV/V
```

Unload the scale and select the current weight as dead load with [Load].

```
Setting Deadload…
```

Calculation of dead load.

```
  Set Span by...   ↑
Data ▪ Load ▪ mV/V
```

Continue with chapter 4.5.10.

[mV/V]

```
  Set Deadload     ↑
---- ▪ Load ▪ mV/V
```

Select [mV/V], if dead load has been calculated or is known from a previous calibration.

```
Enter  Deadload
       0.123456 mV/V
```

Enter dead load in mV/V and confirm with [OK].

```
Setting Deadload…
```

Acknowledgement after pressing [OK].

```
  Set Span by...   ↑
Data ▪ Load ▪ mV/V
```

Continue with chapter 4.5.10.

4.5.10 Set Full Scale Deflection (Span)

```
 Set Span by...      ↑
 Data ▪ Load ▪ mV/V
```

The choices **[Load]**, **[mV/V]** and **[Data]** for the span entry are displayed.

[Load]

```
 Set Span by...      ↑
 Data ▪ Load ▪ mV/V
```

Select **[Load]**, if the scale is to be loaded with a known weight.

```
Enter current load
          3000   kg
```

Put the known weight on the scale, enter the weight value with numeric keys, change the weight unit with [>More] ,
and confirm with [OK].

```
Setting Span...
```

Acknowledgement after pressing [OK].

```
 Calculate test     ↑
 Test ▪ ———— ▪ ————
```

The menu for calculating the test value is displayed. Continue with chapter 4.5.11.

[mV/V]

```
 Set Span by...      ↑
 Data ▪ Load ▪ mV/V
```

Select **[mV/V]**, if the span has been calculated or is known from a previous calibration.

```
Enter Span
       0.654321 mV/V
```

Enter span value in mV/V and confirm with [OK].

```
Setting Span...
```

Acknowledgement after pressing [OK].

```
 Calculate test     ↑
 Test ▪ ———— ▪ ————
```

The menu for calculating the test value is displayed. Continue with chapter 4.5.11.

[Data]

```
 Set Span by...      ↑
 Data ▪ Load ▪ mV/V
```

Select **[Data]**, if the load cell data are known.

```
Span by LC-Data
 Setup▪ Enter▪ Calc
```

Select **[Setup]**, **[Enter** or **[Calc]**. The menus are explained one after the other.

[Setup]

```
↓Number of loadcell↑
↕                 4↕
```

After selection of **[Setup]** enter the number of load cells between 1 and 10 can with numeric keys or select with [←] or [→]; confirm with [OK].

```
↓Nominal load       ↑
          1000   kg
```

Enter the nominal capacity per load cell; confirm with [OK].

```
↓Gravity            ↑
      9.81379 m/s^2
```

Enter the local gravity from 9.00000 to10.00000;
confirm with [OK]

```
↓Hysteresis error   ↑
↕         specified↕
```

Select the hysteresis error with [←] or [→] **[specified]** or **[not specified]** with [←] or [→]; confirm with [OK]. The choice **[specified]** is followed by the entry of the correction values, which is jumped over for **[not specified]**.

```
↓Correction A        ↑
           +0.00000 %
```
Enter the lower correction value A in %; confirm with OK.

```
↓Correction B        ↑
           +0.00000 %
```
Enter the upper correction value B in %; confirm with OK.

```
↓Certified data      ↑
↕         all LC same↕
```
Select the load cell data **[all LC same]** or **[each LC specific]** with ← or → ; confirm with OK.

```
Span by LC-Data
  Setup■ Enter■ Calc
```
Automatic jump in the entry menu for the load cell data. Enter the additional load cell data with **[Enter]**.

[Enter]

```
↓LC   1 sensitivity ↑
          1.000000mV/V
```
Enter the sensitivity for load cell 1; confirm with OK.

```
↓LC    1 resistance ↑
          600.000 Ohm
```
Enter the output resistance for load cell 1; confirm with OK. With **[each LC specific]** enter these data the same way for all other load cells.

```
Span by LC-Data
  Setup■ Enter■ Calc
```
After that, and also with **[all LC same],** jump back in the entry menu for the load cell data.

[Calc]

```
Calculating mV/V...
```
Calculation of the span value according to the entered data (Smart-Calculation) with **[Calc]** .

```
Span = 0.750000 mV/V
Accept■ ---- ■Change
```
Display of the span value. Select between confirmation of this value with **[Accept]** or jump back in the entry menu for the span value with **[Change]**.

```
Setting Span...
```
Acknowledgement after pressing OK.

```
 Calculate test     ↑
 Test ■ ---- ■ ----
```
Display of the calculation menu for the test value. Continue with chapter 4.5.11.

4.5.11   Calculate Test Value

[Test]

```
↓Calculate test     ↑
 Test ■ ---- ■ ----
```
Select **[Test]** for calculating the test value.

```
Calculating test
```
Acknowledgement after **[Test]**, weight display shows FSD.

```
Calbration(changed)
New    ↕Modify↕ Param
```
Automatic return to the selection menu for the calibration with the indication, that the calibration has been changed. Continue with chapter 4.5.12.

4.5.12   Exit Calibration

```
Calibration(changed)
New    %Modify% Param
```
Finish the calibration with [Exit].

```
Exit weighingpoint
 Save #       # Undo
```
Display of the choices **[Save]** and **[Undo]**.

[Save]

```
Saving calibration…
```
Store new calibration data with **[Save]**.

```
Exit calibration…
```
Acknowledgement of leaving the calibration menu.

```
↓WP A:Internal ADC ↑
Calib #       #Assign
```
Automatic jump in the selection menu for weighing points.

[Undo]

```
Undo calibration…
```
Leave the calibration menu without data storage with **[Undo]**.

```
↓WP A:Internal ADC ↑
Calib #       #Assign
```
Automatic return to the selection menu for weighing points.

If [Exit] was pressed during calibration procedure:

```
Exit calibration?
 YES  # ---- #  NO
```
Safety prompt, if [Exit] has been pressed during calibration. With **[NO]** the instrument remains in the calibration menu.

```
Calibration(changed)
New    %Modify% Param
```
With **[YES]** the calibration will be finished. Automatic jump in the calibration menu.

4.5.12.1   Calibration Error Messages

```
Set stepwidth failed
Fsd no mult. of Step
```
FSD cannot be divided by step width, input value for FSD or step width will not be altered.

```
Set deadload failed
Signal above max
```
Dead load plus span is > 3.0 mV/V.

```
Set span failed
To many d for signal
```
Span is < 0.3 mV/V for 3000 d (OIML or NTEP).
Span is < 0.03 mV/V for 3000 d, (W&M = none).

```
Set span failed
Signal above max
```
Span plus dead load is > 3.0 mV/V.

```
Set fullscale failed
Fsd below cal weight
```
FSD is smaller than the calibrated weight (span).

4.5.13   Set Parameters

[Param]

```
Calibration
New   %Modify% Param
```
Select **[Param]** to enter the measuring parameters.

```
↓Measuretime        ↑
↕            300 ms%
```
Enter measure time with numeric keys from 50 to 1000 ms; confirm with `OK`.

```
↓Analog filter      ↑
                  on
```
Select choices **[on]** or **[off]** for analog filter for the measuring signal with ← or →; confirm with `OK`.

```
↓Digital filter     ↑
↕        bessel ms%
```
Select digital filter characteristics **[off]**, **[bessel]**, **[aperiod.]**, **[butterw.]** or **[tscheby.]** with ← or →; confirm with `OK`.

```
↓Fcut               ↑
0.1...8.0   2.00 Hz
```
Enter cut-off frequency with numeric keys from 0.1 to 8.0 Hz; confirm with `OK`.

```
↓Test mode          ↑
↕         Absolute%
```
Select mode for the test value **[Absolute]** or **[Relative]** with ← or →; confirm with `OK`.

```
↓W & M              ↑
↕             none%
```
Select W&M mode **[none]**, **[OIML]**, **[NTEP]** with ← or →; confirm with `OK`.

```
↓Supply             ↑
↕        12 Volt%
```
Select load cell excitation voltage **[12 Volt]** or **[20 Volt]** with ← or →; confirm with `OK`.

```
↓Standstill time    ↑
...1.6:       1.00 s
```
Enter standstill interval with numeric keys from 0.01 to 1.6 s; confirm with `OK`.

```
↓Standstill range   ↑
...10:        1.00 d
```
Enter standstill tolerance with numeric keys from 0.01 to 10 d; confirm with `OK`.

```
↓Tare timeout       ↑
...25:         0.8 s
```
Enter time for aborting an unexecutable tare / set zero command with numeric keys from 0.1 to 25 s; confirm with `OK`.

```
↓Zeroset range      ↑
...500:      50.00 d
```
Enter zero set range with numeric keys from 0.01 to 500 d; confirm with `OK`.

```
↓Zerotrack range    ↑
...500:       0.25 d
```
Enter zero track range with numeric keys from 0.01 to 500 d; confirm with `OK`.

```
↓Zerotrack step     ↑
...10:        0.25 d
```
Enter zero track step with numeric keys from 0.01 to 10 d; confirm with `OK`.

```
↓Zerotrack time     ↑
...25:         0.0 s
```
Enter zero track time interval for the automatic zero setting with numeric keys from 0.0 to 25 s; confirm with `OK`.

```
↓Overload           ↑
...9999999:        9 d
```

Enter the overload range > FSD with numeric keys from 0 to 9999999 d; confirm with [OK].

```
↓Don't print below ↑
...9999999:       50 d
```

Enter minimum weight for print-out with numeric keys from 0 to 9999999 d; confirm with [OK].

```
↓Multirange mode   ↑
↕              off↑
```

Select operating mode multi range scale (max. 3 ranges) **[on]** or **[off]** with [↑] or [→]; confirm with [OK]. The entry of the switch over points appears only for selection **[on]**.

```
↓Multirange limit 1↑
...50000          0 d
```

Enter switch over point from range 1 to range 2 from 0 to 9999999 d (0 = only 1 range) with numeric keys; confirm with [OK].

```
↓Multirange limit 2↑
...50000          0 d
```

Enter switch over point from range 2 to range 3 from 0 to 9999999 d (0 = only 2 ranges) with numeric keys; confirm with [OK].

```
Calbration(changed)
New   ↕Modify↕ Param
```

Exit parameter entry mode with [Exit]. Automatic jump to the selection menu for the calibration with the indication, that the calibration has been changed. Continue with chapter 4.5.12.

4.5.13.1   W&M Mode

In menu **[Setup]–[Weighingpoints]–[Calib]–[Param]–[W&M]** the options are possible: **[none]**, **[OIML]**, **[NTEP]** and **[NSC]**.
The main difference is the appearance of the weight unit on the display and the signal range:

weight	none	OIML	NTEP	NSC
negative	unit	no unit	unit	no unit
> FSD	no unit	no unit	unit	no unit
> FSD + overload	ERROR 2	ERROR 2	ERROR 2	ERROR 2
gross indication	B	B	G	G
min. measuring signal	> 0.03 mv/V at 3000 d	> 0.3 mv/V at 3000 e	> 0.3 mv/V at 3000 e	> 0.25 mv/V at 3000 e
	> 0.05 mv/V at 5000 d	> 0.5 mv/V at 5000 e	> 0.5 mv/V at 5000 e	> 0.42 mv/V at 5000 e

4.5.13.2   Multirange Scale

The multirange function is controlled by three parameters in menu **[Setup]–[Weighingpoints]–[Calib]–[Param]**.
With **[Multirange mode]** = **[on]**, the scale has 3 ranges with 3 different resolutions: The change-over limits **[Multirange limit 1]** and **[Multirange limit 2]** represent the range borders. If the gross weight is larger than range 1, the next higher range will be selected and the next higher stepwidth is valid (1->2->5->10->20->50). If the gross weight is <= 0.25 d of range 1, the scale in standstill and untared condition, the scale will be switched back to range 1. On the display the ranges are marked by quotes or dashes (' range 1, " range 2, = range 3) left of the weight value.
During calibration the multirange function is principally switched off.
For 'legal for trade' application a label has to be placed stating Max., Min. and e per range.

4.6   Configuration for 'liquid', 'user', 'GWT–Scale', 'xBPI–Scale'

The physical weighing points can be assigned to the logical weighing points (WP A, WP B), see chapter 4.4. After the assignment, the physical weighing points have to be configured. The configuration differs according to the scale type. Therefore they explained one after the other. **In all display clips the default value is displayed.**

```
Setup
↓Weighingpoints          ↑
```

Select **[Weighingpoints]** with 🔽 or 🔼; confirm with 🆗.

```
↓WP B:<none>             ↑
      ■            ■Assign
```

With **[Assign]** the physical weighing point can be defined.

```
Weighingpoint B
WP type :↓none          ↑
```

With 🔽 or 🔼 one of the options **[liquid]**, **[xBPI-Scale]**, **[GWT-Scale]**, **[user]** or **[none]** can be assigned and confirmed with 🆗.

```
Save changes?
  Yes   ■ ---- ■   No
```

If the weighing point function has been changed, the change can be stored with **[Yes]**.

```
Weighingpoint B
WP type :↓none          ↑
```

With **[No]** the weighing point function remains unchanged.

4.6.1   Weighing Point Function Liquid Counter

The weighing point function **[liquid]** needs a digital input for the pulses (counts). The fixed address is channel 6 (terminals B6-B7) of options PR 1713/17 plugged into position1 (slot 1).

```
↓WP B:Liquid            ↑
      ■Config■Assign
```

With **[Config]** the configuration fof the liquid counter can be accessed.

```
↓ W & M                 ↑
↕                 none  ↕
```

Select W&M mode **[none]**, **[OIML]**, **[NTEP]** with 🔼 or ➡️; confirm with 🆗.

```
↓Fullscale              ↑
               1000kg
```

Enter numeric value for FSD with or without decimal point. Change weight unit with ⏩ ; confirm with 🆗 .

```
↓Stepwidth              ↑
↕                     1 ↕
```

Select the step width 1, 2, 5, 10, 20 or 50 with 🔼 or ➡️ and confirm with 🆗.

```
↓Overload               ↑
 9999999:          9   d
```

Enter the overload range > FSD with numeric keys from 0 to 9999999 d; confirm with 🆗.

```
↓Minwgt                 ↑
 9999999:          0   d
```

Enter minimum weight for print-out with numeric keys from 0 to 9999999 d; confirm with 🆗.

```
↓Scale Weight           ↑
                   1  kg
```

Enter the increase in weight per x count(s) with numeric keys, numeric range depends on FSD. Change the weight dimension from **[kg]** to **[t]**, **[lb]** or **[g]** with ⏩ ; confirm with 🆗.

```
↓Scale Counts           ↑
1...65000:         1 cnt
```

Enter the number of counts with numeric keys necessary to get the defined weight increase, confirm with 🆗.

```
↓Update time            ↑
0.1...2.0:        0.3  s
```

Enter time interval for weight data transfer from the external weighing point with numeric keys; confirm with 🆗.

```
Save WP Data
  Yes   ■        ■   No
```

Exit configuration and store data with **[Yes]**. With **[No]** the data remain unchanged.

```
↓WP B:Liquid        ↑
    ▪Config▪Assign
```
Automatic return to the weighing point selection menu.

4.6.2 Weighing Point Function GWT Scale

With the GWT scale the update time must be defined and with fieldbus applications additionally a slave address must be defined.

```
↓WP B:GWT-Scale     ↑
    ▪Config▪Assign
```
With **[Config]** the configuration of the GWT scale can be accessed.

```
↓ W & M             ↑
↕            none  ↕
```
Select W&M mode **[none]**, **[OIML]**, **[NTEP]** with ⬑ or ⬐; confirm with ⌑.

```
↓Overload           ↑
 9999999:         9 d
```
Enter the overload range > FSD with numeric keys from 0 to 9999999 d; confirm with ⌑.

```
↓Minwat             ↑
 9999999:         0 d
```
Enter minimum weight for print-out with numeric keys from 0 to 9999999 d; confirm with ⌑.

```
↓Update time        ↑
0.1...2.0:      0.3 s
```
Enter time interval for weight data transfer from the external weighing point with numeric keys; confirm with ⌑.

```
↓Fieldbus slave     ↑
1...32:            1
```
Enter slave number for fieldbus application with numeric keys; confirm with ⌑.

```
↓Serial number      ↑
...9999999:        0
```
Enter serial number of a connected scale with numeric keys, if it has to be checked ; confirm with ⌑. In the case of non-conformity error 15 is displayed.

```
↓WP B:GWT-Scale     ↑
    ▪Config▪Assign
```
Automatic return to the weighing point selection menu.

4.6.3 Weighing Point Function User Scale

The user defined weighing point function delivers weight data via a SPM variable.

```
↓WP B:User-WP       ↑
    ▪Config▪Assign
```
With **[Config]** the configuration of the user scale can be accessed.

```
↓ W & M             ↑
↕            none  ↕
```
Select W&M mode **[none]**, **[OIML]**, **[NTEP]** with ⬑ or ⬐; confirm with ⌑.

```
↓Fullscale          ↑
            1000kg
```
Enter numeric value for FSD with or without decimal point. Change weight unit with ⬀ ; confirm with ⌑ .

```
↓Stepwidth          ↑
↕                1↕
```
Select the step width 1, 2, 5, 10, 20 or 50 with ⬑ or ⬐ and confirm with ⌑.

```
↓Overload           ↑
 9999999:         9 d
```
Enter the overload range > FSD with numeric keys from 0 to 9999999 d; confirm with ⌑.

```
↓Minwat             ↑
 9999999:         0 d
```
Enter minimum weight for print-out with numeric keys from 0 to 9999999 d; confirm with ⌑.

```
↓Scale Weight          ↑
                  1 kg
```
Enter the increase in weight per x count(s) with numeric keys, numeric range depends on FSD. Change the weight dimension from **[kg]** to **[t], [lb]** or **[g]** with ⌨ ; confirm with ⌨.

```
↓Scale Counts          ↑
                 1 cnt
```
Enter the number of counts with numeric keys necessary to get the defined weight increase, confirm with ⌨.

```
↓Update time           ↑
0.1...2.0:       0.3 s
```
Enter time interval for weight data transfer from the external weighing point with numeric keys; confirm with ⌨.

```
↓SPM marker address↑
32...255:          32
```
Enter SPM address, to which the weight data have to be routed; confirm with ⌨.

```
↓Serial number         ↑
...9999999:          0
```
Enter board number of a connected scale with numeric keys, if it has to be checked ; confirm with ⌨ . In the case of non-conformity error 15 is displayed.

```
↓WP B:User-WP          ↑
       ▪Config▪Assign
```
Automatic return to the weighing point selection menu.

4.6.4   Weighing Point Function xBPI Scale

With the xBPI-scale the tare function has to be defined according to the application. Additionally the update time has to be defined. Furthermore a serial number can be entered.

```
↓WP B:xBPI-Scale       ↑
Setup  ▪Config▪Assign
```
With **[Config]** the configuration of the xBPI scale can be accessed. For further information please refer to chapter 4.7.

```
↓  W & M               ↑
↕               none  ↕
```
Select W&M mode **[none], [OIML], [NTEP]** with ⬅ or ➡; confirm with ⌨.

```
↓Taring                ↑
↕            Remote↕
```
Select tare mode **[Remote]** or **[Local]** with ⬅ or ➡; confirm with ⌨. **[Remote]** has to be selected for an ISI-terminal. The tare function is not carried out in the PR 5610. **[Local]** has to be selected for a xBPI platform. The tare function is carried out in the PR 5610.

```
↓Overload              ↑
 9999999:          9 d
```
Enter the overload range > FSD with numeric keys from 0 to 9999999 d; confirm with ⌨.

```
↓Minwgt                ↑
 9999999:          0 d
```
Enter minimum weight for print-out with numeric keys from 0 to 9999999 d; confirm with ⌨.

```
↓Update time           ↑
0.1...2.0:       0.3 s
```
Enter time interval for weight data transfer from the external weighing point with numeric keys; confirm with ⌨.

```
↓WP B:xBPI-Scale       ↑
Setup  ▪Config▪Assign
```
Automatic return to the weighing point selection menu.

4.7   xBPI Scale

The PR5610 can communicate with a Sartorius scale or platform via the xBPI protocol. The serial interface option PR1713/04 has to be installed or the serial port Builtin can be used. For applications written in IEC 61131 an additional set of functions is described in a separate documentation. The communiction with the Sartorius scale / platform is using the serial interface only (no variables in SPM or digital I/Os).
The weight determination and transmission is strongly dependend on the scale / platform.
Weight values with more than 7 valid digits (6 digits if multirange) cannot be shown.
The FSD values have to be set in the scale or are already preset in case of a platform, FSD cannot be changed via xBPI protocol.
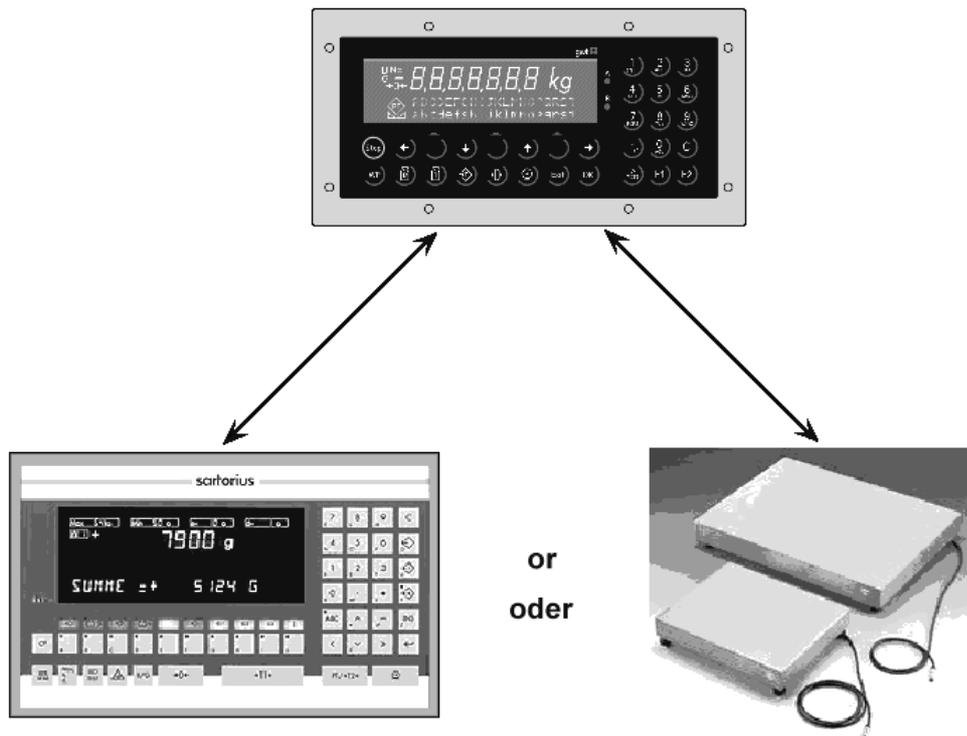
4.7.1   xBPI Serial Port Setup

In menu **[Setup]-[Serial Ports]-[Serial port setup]** the port connected to the Sartorius scale / platform has to be defined.

```
Serial port setup
↓Slot 3 RS485       ↑
```
Select with ⬇ or ⬆ the interface module and confirm with ⟨OK⟩.

```
Serial port setup
shutdown remote…
```
```
Setup Slot 3  RS485
↓Protocol↑:RemoteDsp
```
If currently a protocol is running, it will be stopped and shown.

```
Setup Slot 3  RS485
Protocol ↓RemoteDsp↑
```
With ⟨OK⟩ protocol can be selected.

```
Setup Slot 3   RS485
↓Protocol↑:      xBPI
```
Select with ⬇ or ⬆ the xBPI protocol and confirm with ⟨OK⟩.

```
Setup Slot 3   RS485
↓Baudrate↑:      9600
```
```
Setup Slot 3   RS485
Baudrate ↓      19k2↑
```
If necessary, select and alter further parameter with ⬇ or ⬆ according to the configuration of the xBPI device.

```
Setup Slot 3   RS485
startup xBPI…
```
The xBPI protocol is started.

```
Serial port setup
↓Slot 3   RS485     ↑
```
Leave the serial port setup with ⟨Exit⟩.

4.7.2   xBPI Weighing Point Assignment and Configuration

In menu **[Setup]-[Weighingpoints]-[WP X]** the scale can be assigned to the logical WP A or B and configurated.

```
Setup
↓Weighingpoints     ↑
```
Select **[Weighingpoints]**, confirm with ⟨OK⟩.

```
↓WP B:<none>        ↑
         ▪     ▪Assign
```
Select with ⬇ or ⬆ the logical WP B, select with **[Assign]**.

```
Weighingpoint B
WP type :↓xBPIScale↑
```
Select with ⬇ or ⬆ **[xBPIScale]** and confirm with ⟨OK⟩.

```
Save changes?
  YES   ▪ ---- ▪  NO
```
Select **[YES]** for assignment of xBPI scale to WP B.

```
↓WP B:xBPI-Scale    ↑
Setup ▪Config▪Assign
```
Select **[Config]**.

For configuration refer to chapter 4.6

4.7.3   xBPI Platform Configuration

The XBPI platforms have got so-called specification blocks to select the different operating modes (Single range, multi range etc.).

```
↓WP B:xBPI-Scale   ↑
Setup ▪Config▪Assign
```
Select **[Setup]**.

```
xBPI Scale Setup
Reading parameters…
```
The PR5610 is loading the parameters from the Sartorius platform.

Error message:
No communication with xBPI scale

```
xBPI Scale setup
Retrieve failed
```

```
xBPI Scale setup
there is no xBPI dev
```

```
xBPI Scale setup
Calib ▪Config▪Select
```
Select **[Select]**.

```
xBPI Scale setup
Configuration:    12
```
Enter numeric value (1 … 20), if specification block is not valid, an error message appears.

```
Save scale conf ?
 YES  ▪ ---- ▪  NO
```
Select **[YES]** for saving the data, **[NO]** for leaving with data unchanged.

```
Saving scale config:
download values…
```

```
Saving scale config:
Reconfig system…
```

```
Saving scale config:
Write nonvolatile…
```

```
Saving scale config:
Done…
```
After selecting **[YES]** the progress of saving data is shown.

```
xBPI Scale setup
Calib ▪Config▪Select
```
Return to next higher level.

```
xBPI Scale setup
Calib ▪Config▪Select
```
For printing the scale parameters press ⊙.

4.7.4   xBPI Scale Parameters

In menu **[Setup]-[Weighingpoints]-[WP X:xBPIScale]-[Setup]-[Config]** the scale parameters are set. Before entering this menu, the protocol (see chapter 4.7.1) and the WP (see chapter 4.7.2) have to be defined and the communication between the instrument and the Sartorius scale or platform must be in active status.

```
↓WP B:xBPI-Scale   ↑
Setup ▪Config▪Assign
```
Select **[Setup]**.

```
xBPI Scale Setup
Reading parameters…
```
The PR5610 is loading the parameters from the Sartorius scale.

Error message:
No communication with xBPI scale

```
xBPI Scale setup
Retrieve failed
```

```
xBPI Scale setup
there is no xBPI dev
```

```
xBPI Scale setup
Calib ▪Config▪Select
```
The scale menu appears, select **[Config]**.

```
xBPI Scale parameter
Scale ▪ Appl ▪Interf
```
Select **[Scale]** or **[Appl]** or **[Interf]**, the list of parameters is shown in chapter 4.7.5.

```
↓Ambient conditions↑
Stable (filter on)
```
If **[Appl]** was selected, the first parameter is shown, parameters can be altered as in other menus.

```
xBPI Scale parameter
Scale ▪ Appl ▪Interf
```
The menu can be left with [Exit]

```
Save scale conf ?
 YES  ▪ ---- ▪  NO
```
Select **[YES]** for saving the data, **[NO]** for leaving with data unchanged.

```
Saving scale config:
download values…
```
```
Saving scale config:
Reconfig system…
```
```
Saving scale config:
Write nonvolatile…
```
After selecting **[YES]** the progress of saving data is shown.

```
Saving scale config:
Done…
```

```
xBPI Scale setup
Calib ▪Config▪Select
```
Return to next higher level.

```
xBPI Scale setup
Calib ▪Config▪Select
```
For printing the scale parameters press [⊙].

4.7.5   xBPI Scale Parameter Tables

In the following tables the parameters to be entered under **[Setup]–[Weighingpoints]–[WP X:xBPIScale]–[Setup]–[Config]–[Scale]**, ... **[Config]–[Appl]** and ... **[Config]–[Interf]** are listed. Depending on the scale not all items can be selected. If this is the case, the message *not valid for scale* appears.

[Scale]		

▪ 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 "

[Appl]		

▪ **"Application Tare :"**
    "Accessible   "
    "Blocked   "
 	
"Number of ranges :"
    "1 weighing range "
    "2 weighing ranges "
    "3 weighing ranges "
 	
"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"
 	
"Output values 1 :"
    "basic accuracy   "
    "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"
	
	"Output values 2 :"
	    "basic accuracy "
	    "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"
		
		▪ **"Output values 3 :"**
		    "basic accuracy "
		    "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 "

[Interf]		

▪ "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 "

4.7.6   xBPI Scale Setting Deadload

In menu **[Setup]–[Weighingpoints]–[WP X:xBPIScale]–[Setup]–[Calib]** the deadload can be set. For GWT scales the term *deadload* is used, for Sartorius scales the term *preload* is used.

xBPI Scale Setup Reading parameters…	After selecting **[xBPI Scale Setup],** the instrument is loading the parameters from the Sartorius scale.
xBPI Scale setup Calib ▪Config▪Select	The scale menu appears, select **[Calib].**
xBPI Scale calibrat. Deadld▪Adjust▪	Select **[Deadld].**
xBPI Scale deadload ▪ Set ▪Delete	Unload the scale and select **[Set]**. The weight display shows 0. The menu returns to **[xBPI Scale calibrat.].**

Alternatively the stored deadload can be erased:

xBPI Scale deadload ▪ Set ▪Delete	Unload the scale and select **[Delete].** The stored deadload will be erased. The weight display shows the current deadload. The menu returns to **[xBPI Scale calibrat.]**

4.7.7   xBPI Scale Error Message

Not zero at CalStart ▪Cancel▪	Menu appears if an error occurs during calibration. The error has to be acknowledged.
xBPI Scale calibrat. Deadld▪Adjust▪	Depending on the behaviour of the scale the instrument remains in the calibration (adjustment) level.

4.7.8 xBPI Calibration with Internal Weight

In menu [Setup]–[Weighingpoints]–[WP X:xBPIScale]–[Setup]–[Calib]–[Adjust] the scale can be calibrated with the internal weight. Before entering this menu, the protocol (see chapter 4.7.1) and the additional WP (see chapter 4.7.2) have to be defined and the communication between the instrument and the Sartorius scale or platform must be in active status.

```
xBPI Scale Setup
Reading parameters…
```
```
xBPI Scale setup
Calib ▪Config▪Select
```

After selecting [xBPI Scale Setup], the instrument is loading the parameters from the Sartorius scale.
The weight display shows the weight of the scale.
The scale menu appears, select [Calib].

```
xBPI Scale calibrat.
Deadld▪Adjust▪
```

Select [Adjust].

```
xBPI Scale adjust
  User ↕ Auto ↕Deflt.
```
```
xBPI Scale adjust
       ↕Intern↕
```

With ⟳ the menu item [Intern] is shown.
Select [Intern].

```
Busy…
```

The progress is shown on the instrument.

```
Motor  in motion…
       ▪        ▪Abort
```

Depending on the scale and its internal procedure different steps can be shown.

```
CTarget=        14000.0
       ▪        ▪Abort
```

The setpoint [CTarget] is shown on the display.

```
CDelta =          -1.2
Accept▪        ▪Abort
```

The deviation is shown. After selecting [Accept] the instrument returns to menu [xBPI Scale adjust].
If the paramter [Confirming adjust.] has been set to [automatically], no confirmation is necessary.

4.7.9   xBPI Calibration with User Weight

In menu **[Setup]-[Weighingpoints]-[WP X:xBPIScale]-[Setup]-[Calib]-[Adjust]** the scale can be calibrated with user weight. Before entering this menu, the protocol (see chapter 4.7.1) and the additional WP (see chapter 4.7.2) have to be defined and the communication between the instrument and the Sartorius scale or platform must be in active status.

```
xBPI Scale Setup
Reading parameters…
```
```
xBPI Scale setup
Calib ▪Config▪Select
```

After selecting **[xBPI Scale Setup]**, the instrument is loading the parameters from the Sartorius scale.
The weight display shows the weight of the scale.
The scale menu appears, select **[Calib]**.

```
xBPI Scale calibrat.
Deadld▪Adjust▪
```

Select **[Adjust]**.

```
xBPI Scale adjust
 User ▪ Auto ▪Deflt.
```

Select **[User]**.

```
Enter user weight  :
            2.000 kg
```

The previously stored user weight is shown, the weight can be altered and confirmed with ⌗ .

```
CTarget=       2000.0
     ▪       ▪Abort
```

The target weight for calibration is shown, the calibration weight has to be placed on the scale.

```
CDelta =        -1.2
Accept▪       ▪Abort
```

The deviation is shown. After selecting **[Accept]** the instrument returns to menu **[xBPI Scale adjust]**.
If the parameter **[Confirming adjust.]** has been set to **[automatically]**, no confirmation is necessary.

4.7.10   xBPI Calibration with Automatic Weight Recognition

The procedure is the same as in chapter 4.7.8. Instead of **[Intern]** the function **[Auto]** has to be selected..

4.7.11   xBPI Calibration with Preset Weight

The procedure is the same as in chapter 4.7.8. Instead of **[Intern]** the function **[Deflt.]** has to be selected.

4.8   Configuration of non–weighing Point Related Parameters

The configuration of all parameters, which do not belong to the internal weighing point, is divided into several sections (see Chapter 4.3.1.3).

4.8.1   Set Clock (Date and Time)

For adjusting date and time, select **[Setup]–[Set Clock]** and ⬚.

```
Set Clock
↓Time↑ 13:38:36
```

```
Set Clock
↓Date↑ 08.01.2002
```

```
Setup
↓Set Clock          ↑
```

Press ⬚ to alter the time, enter numeric values, the colon (:) is entered with ⬚ , confirm with ⬚.

Change to date with ⬚ or ⬚. Press ⬚ to alter the date, enter numeric values the dot (.) is entered with ⬚ , confirm with ⬚.

Return to the **[Setup]** with ⬚ .

4.8.2   Serial Ports

Configuration of serial interfaces, select **[Setup]–[Serial Ports]** and ⬚.

[Operator device at]

```
↓Operator device at↑
↕      Builtin RS232↕
```

```
↓Operator device at↑
↕      Slot 3  RS485↕
```

```
↓Operator device at↑
(no serial device)
```

```
↓Operator device at↑
(in use by printer)
```

Switches the operating console to a serial interface connected to a terminal or PC with terminal program.

Further options depending on the installed interfaces. Select with ⬚ or ⬚ **[Builtin RS232]** or **[Slot (1 ... 3) RS485 or RS 232]** or **[none];** confirm with ⬚.

Error message, if no serial interface is installed in selected slot.

Error message, if serial interface is already assigned to another device (e.g printer).

If Operator device is selected, interface parameters cannot be changed and are set to:
[Protocol]: XON/XOFF, **[Baudrate]:** 9600, **[Bits]:** 8, **[Parity]:** None, **[Stopbits]:** 1, **[Devtype]**: Ansi, **[Echo]:** Enabled

[Printer device at]
Menu is comparable to **[Operator device at]**
Select the serial interface connected to the printer.

[Remote device at]
Menu is comparable to [Operator device at]
Select the serial interface connected to the remote device (Example EXTEC terminal TERM300), interface parameters cannot be changed and are set to:
Raw, **[Echo]:** Disabled
[Protocol]: XON/XOFF, **[Baudrate]:** 9600, **[Bits]:** 8, **[Parity]:** None, **[Stopbits]:** 1, **[Devtype]**: Raw, **[Echo]:** Disabled.

Setting the interface parameters [Serial port setup]

```
Serial port setup
↓Builtin RS232      ↑
```

Selection of the built-in interface **[Builtin RS232]**, **[Slot 1...3 RS485]** or **[Slot 1...3 RS232] with** ⬇ or ⬆; confirm **[Protocol]** with 🆗.

Protocols available are:

XON/XOFF	software handshake
3964R-slv	Siemens S5 Dust slave
3964R-mas	Siemens S5 Dust master
3964RS5sl	Siemens S5 Dust slave with header
3964RS5ms	Siemens S5 Dust master with header
EW-COM V1	EW-protocol V1 (standard)*
EW-COM V2	EW-protocol V2 (multiprogram PR 1740)*
EW-COM V3	EW-protocol V3 (DDE server)*
RTS/CTS	hardware handshake
JBUS/ModB	JBUS / Modbus protocol*
RemoteDsp	Remote display string*
W&M Print	W&M printer string*
Modem	Modem control
xBPI	Additional scale*
2-wire	Half duplex, 2-wire *2

```
↓Protocol   ⁞        ↑
↕           XON/XOFF↕
```

* The protocol can be selected only once per instrument. A second selection is not possible, if the protocol has already been assigned.

* 2 From rel. 03.16.03 onwards, only relevant for user written applications in IEC 61131

Protocol parameters

```
↓Protocol   ⁞        ↑
↕           XON/XOFF↕
```

Select the protocol parameters with ⬇ or ⬆; confirm with 🆗.

```
↓Baudrate   ⁞        ↑
↕              9600↕
```

Select baud rate between [300, 600, 1200, 2400, 4800, 9600, 19k2, 38k4 and 115k2]

```
↓Bits       ⁞        ↑
↕                 8↕
```

Select bits [7] or [8]

```
↓Parity     ⁞        ↑
↕              None↕
```

Select parity [None], [Odd] or [Even]

```
↓Stopbits   ⁞        ↑
↕                 1↕
```

Select stop bits [1] or [2]

```
↓Devtyp     ⁞        ↑
↕              Ansi↕
```

Select device type [Ansi], [VT52] or [Raw] . Ansi and VT52 for VDUs, Raw for printer, remote display and communication.

```
↓Echo       ⁞        ↑
↕          Enabled↕
```

Select echo mode [Enabled] or [Disabled]

```
↓Slave-adr⁞        ↑
               A
```

Enter slave address, [A ... Z] for EW protocol or
[1 ... 127] for JBUS/ModBus protocol

```
Save Builtin RS232 ?
 YES  ⁞ ---- ⁞  NO
```

After change of at least one parameter safety check. With [YES] storage of changed data, with [NO] data remain unchanged.

```
Serial port setup
↓Builtin RS232      ↑
```

Automatic return to the setup menu for serial interfaces.

Possible error message

```
Serial port setup
(locked by oper)
```

User tried to select the parameters of e.g. Built-in RS232, which has been assigned to printer device or operator device (parameters are already fixed).

4.8.3   Software Parameters

Basic parameters are defined in the section **[Setup]-[Software Parameter]**.

```
Setup
↓Software Parameter↑
```

Select **[Software Parameter]** with ⬇ or ⬆; confirm with ⏺.

4.8.3.1   Language

The dialogue language for all general menu items found under **[Setup]** is English. The items under **[Setup]-[Config]** depend on the application program and can be changed with the following menu:

```
↓Language          ↑
↕        English↕
```

Select **[English]** or **[Local Language]** (Deutsch) with ⬅ or ➡; confirm with ⏺.

4.8.3.2   Key Timeout

```
↓Frontkey timeout  ↑
↕          2 s↕
```

Select **[1]**, **[2]** or **[3]** sec. with ⬅ or ➡; confirm with ⏺. Defined parameter is the hold time for showing Net or Gross after respective key was released.

4.8.3.3   Low Battery Check

```
↓Low battery check ↑
↕            on↕
```

Select battery check **[on]**, **[off]** or **[1 min]**. If **[on]** or **[1 min]** is selected , and the battery is low, the following message appears:
```
Lo bAt
```

4.8.3.4   Report to

Configuration item for reports generated by an application package (e.g. IBC-Controller). The queue of reports is limited to a maximum of ten entries. In case the reports could not be sent, the operator is asked whether he wants to delete the oldest report.

```
↓Report to         ↑
↕          none↕
```

Select the options **[none]**, **[communication]**, **[application]**, **[communic. & appl.]** or **[application +Prod.]** for the reports generated by the application program (e.g. IBC-Controller) with ⬅ or ➡; confirm with ⏺.
Select **[communication]** for PR 1740 and **[application]** for the local printer.
Select **[communic. & appl]** for PR 1740 and a local printer.
Select **[application +Prod.]** for IEC 61131 Programs which use the Production Report Table.

4.8.3.5 Tare Key

```
↓Tare key            ↑
↕          enabled↕
```

Select the tare key function **[enabled]** or **[disabled]** with ⬅ or ➡ ; confirm with [OK].

4.8.3.6 Set Zero Key

```
↓Set zero key        ↑
↕          enabled↕
```

Select the set zero key function **[enabled]** or **[disabled]** with ⬅ or ➡ ; confirm with [OK].

4.8.3.7 Quit in Mainlevel

If the instrument is configured via terminal or PC the Q command can be used to terminate the communication. It can be reactivated with **[Setup]-[Serial Ports]-[Operator device at]-[Built-in RS232]**.

```
↓Quit in mainlevel ↑
↕          enabled↕
```

Select with ⬅ or ➡ whether the communication can be terminated with **[enabled]** or **[disabled]**; confirm with [OK].

4.8.3.8 Reset on Stop + Exit

After pressing the keys Stop and Exit simultaneously the boot menu appears (see Chapter 4.3.2).

```
↓Reset on stop+exit↑
↕              1 s↕
```

Select whether the keys need to be pressed **[1]** sec. or **[5]** sec. or are without function **[disabled]** with ⬅ or ➡ ; confirm with [OK].

4.8.3.9 S88.01 Interface

The S88.01 interface has to be activated if application software packages (e.g. Truckline, InBatch) are used.

```
↓S88.01 interface   ↑
↕              off↕
```

Select S88.01 interface activated **[on]** or not activated **[off]** with ⬅ or ➡ ; confirm with [OK].

4.8.3.10 Software Download

To prevent from the risk that a new application can be loaded and started via network (e.g. with the PR1750 tool), the download function can be protected and only released via action on the keypad.

```
↓Software download ↑
↕protected by setup↕
```

Select the function software download **[protected by setup]** or **[always enabled]** with ⬅ or ➡ ; confirm with [OK].

4.8.3.11   Lines per Recipe

With lines per recipe the maximum number of component lines in a recipe is defined.

```
↓Lines per recipe   ↑
1...255:          10
```

Enter the number of requested lines per recipe form **[1]** to **[255]** with numeric keys; confirm with ⌷ᴏᴷ⌷.

4.8.3.12   Recipe Simulation

The recipe simulation calculates whether the amounts of components in a recipe are exceeding the range 0 to FSD. If this is the case, Error 19 will be generated and the recipe will not start.

```
↓Recipe simulation ↑
↕          enabled↕
```

Select the recipe simulation **[enabled]** or **[disabled]** with ⌷←⌷ or ⌷→⌷; confirm with ⌷ᴏᴷ⌷.

4.8.3.13   Subrecipe

The subrecipe is used, if certain component sequences are used in several recipes. The subrecipe is called like a component in a recipe.

```
↓Subrecipe         ↑
↕         disabled↕
```

Select the subrecipe function **[enabled]** or **[disabled]** with ⌷←⌷ or ⌷→⌷; confirm with ⌷ᴏᴷ⌷.

4.8.3.14   Refresh

This menu item is used to activate all segments once a day for a duration of two minutes. Thus irregular wear of individual segments is prevented.

```
↓Automatic refresh ↑
↕               on↕
```

Use refresh?:
Press ⌷←⌷ ⌷→⌷ to select:
[on], off   Then ⌷ᴏᴷ⌷
                                             or ⌷↓⌷ ⌷↑⌷

```
↓Refresh time at   ↑
↕             0:00↕
```

Set refresh time:
Press ⌷←⌷ ⌷→⌷ to select the refresh time (only hour).   Then ⌷ᴏᴷ⌷
                                             or ⌷↓⌷ ⌷↑⌷

4.8.4   Fieldbus Parameter

This section appears only, if a PR1721/xx module is inserted in slot 4. Select protocol, parameter and operating mode for the optional fieldbus interface PR1721/xx.

```
Setup
↓Fieldbus Parameter↑
```

Enter with [OK].

4.8.4.1   PR1721 Protocol

```
↓PR1721 Protocol   ↑
↨             none↨
```

Select the fieldbus protocol **[Interbus-S]** for ../12, **[Profibus-DP]** for ../11 or **[DeviceNet]** for ../14 with [←] or [→]; confirm with [OK].

Dependent on selection, further parameters are required, e.g.:

[Interbus-S]

```
↓IBS cycles/25ms   ↑
↨             10↨
```

Enter update interval from **[1]** to **[50]*** with numerical keys; confirm with [OK].

*   The actualization interval has to be calculated according to the following formula:
    1000 / (15 + number of bytes + 0.3 x number of slaves).

[Profibus-DP]

```
↓Profibus addres   ↑
↨             1↨
```

Enter value for the Profibus-DP address with numeric keys **[1...126]** and confirm with [OK].

[DeviceNet]

```
↓DeviceNet baudrate↑
↨           250k↨
```

Select baud rate **[125k]**, **[250k]** or **[500k]** with [←] or [→]; confirm with [OK].

```
↓DeviceNet MAC-ID  ↑
             1
```

Enter value fort he DeviceNet address **[1 ... 62]** with numerical keys; confirm with [OK].

For all protocols the [Scale- interface] has to be set.

```
↓Scale-interface   ↑
          disabled
```

Select the operating mode **[enabled]** for a standard interface fieldbus – PR5610 with 8 Bytes and **[disabled]**, if a IEC 61131-application program is handling the fieldbus; confirm with [OK].

Leaving the menu

```
Save Fieldbus conf ?
 YES   ▪ ──── ▪   NO
```

Leaving the fieldbus configuration menu.
Select **[YES]** for saving the fieldbus configuration, the instru-ment will perform a WARM start.
Select **[NO]** for going back to **[Setup]-[Fieldbus Parameter]**.

After saving the fieldbus configuration, the instrument makes a warm start in order to initialize the PR1721 module.

4.8.5 Licence Setup

Additional application programs e.g. licence 102 FLOW and general software functions e.g. PR 1713/21 can be activated via a licence setup menu.
The access is carried out via the menu **[Setup]-[Licence Setup].**

```
Setup
↓Licence Setup      ↑
```

Select the access with ⬜OK.

```
Licence Setup
  Show ▪ Add  ▪Delete
```

Select the function **[Show]**, **[Add]** or **[Delete]**.

```
Licence  show
↓PR1713/20↑:Disabled
```

After **[Show]** an overview of the function licences can be displayed with ⬜↓ or ⬜↑. The function licences are displayed one after another with their status **[Enabled]** or **[Disabled]**.

```
Licence  show
↓Appl Lic↑:    0
```

After that entered licences for application programs can be displayed with ⬜↓ or ⬜↑. Leave the menu with ⬜Exit.

```
Add Licence
Enter  number      0
```

After **[Add]** a 7 digit licence number can be entered and confirmed with ⬜OK. For a valid number the message 'PR17XX/XX enabled' is displayed. Otherwise the message 'wrong Licence number' is displayed. Leave the menu with ⬜Exit.

```
Delete Licence
Enter  number      0
```

After **[Delete]** a 7 digit licence number can be entered and confirmed with ⬜OK. For a valid number the message 'PR17XX/XX disabled' is displayed. Otherwise the message 'wrong Licence number' is displayed. Leave the menu with ⬜Exit.
Prompt at leaving the menu.
Select **[Save]** for storing changes in the licence setup.

```
Licence Setup
  Save ▪noSave▪ Undo
```

Select **[noSave]** if changes are temporary (only in RAM).
Select **[Undo]**, if no changes have been made.
This safety prompt appearsm, if **[Undo]** has been entered.

```
Undo licence changes
  YES ▪ ---- ▪  NO
```

With **[YES]** no changes are stored, with **[NO]** changes shall become valid.

4.8.6 Show Boardnumber

In menu **[Setup]-[Show Boardnumber]** the 9-digit instrument specific board number (unique) is displayed.

```
Setup
↓Show Boardnumber   ↑
```

Wählen Sie den Zugang mit ⬜OK.

```
Boardnr=020060984
```

Diese Nummer wird benötigt, um eine Software-Lizenz zu bestellen. Verlassen des Menüs mit ⬜Exit.

4.8.7   Print Setup Data

```
Setup
↓Print Setupdata    ↑
```

```
Setup
No printer device
```

Select the access with [OK].

The board number is required to order function or application licences. Leave the menu with [Exit].

4.8.8   Last Fault

```
Setup
↓Print last fault   ↑
```

```
Setup
No printer device
```

Select access with [OK]. Print the last fault via the selected interface in **[Setup]–[Serial Ports]–[Printer device at].**

Error message if no interface was assigned to the printer device. Leave the menu with [Exit].

4.8.9   Refresh Display

Refreshes the weight display luminosity manually.
The weight display elements, which are used very rarely, gradually lose their brightness. Consequently, the luminosity e.g. within a digit can be different. However, regeneration of the display intensity is very easy.

```
Setup
↓Refresh Display    ↑
```

The manually refreshing of the display is started after pressing [OK]. All display segments are switched on for refreshing intensity, wait approx. 5 min. Termination of refresh with [Exit] .

4.8.10   I/O Slots

The type of interface installed in slot 1 ... slot 4 is shown.

```
Setup
↓I/O Slots          ↑
```

```
↓Slot 1:PR1713/12↑@1
I:0101  O:1110
```

```
↓Slot 1:PR1713/04↑@1
```

```
↓Slot 3:empty     ↑@1
```

```
↓Slot 4:PR1721    ↑@1
IBS-Slv no comm     ↕
```

```
↓Slot 4:PR1721    ↑@1
IN:000000000000000↕
```

Enter with [OK] , depending on the type of interface different information is given

Example: PR 1713/12 is installed in slot1, with @ the task no. is shown. Inputs: 0 (Ch. 4), 1 (Ch. 3), 0 (Ch 2), 1 (Ch 1), outputs: 1 (Ch. 4), 1 (Ch. 3), 1 (Ch 2), 0 (Ch 1)

Example: PR 1714/04 is installed in slot 2, @ task no. 1

Example: Slot 3 is empty

Example: Interbus-S PR 1721/02 is installed, with [More] , the input and output status can be displayed.

For PR 1721 the input status is displayed, with [More] the output status can be displayed as well. Leave the menu with [Exit]

4.8.11   Show Version

```
Setup
↓Show Version          ↑
```

Select access with [OK]. The default information is the firmware data.

```
↓Firmware version↑
PR1713/00 rel.2.00.0
```

The information is shown as flow text. For reading the comprehensive information with release, date, and time step by step use [←] or [→] . Scroll to other data with [↓] or [↑].

```
↓Flash info           ↑
Flashed 11.05.2004 1
```

The last flash action is displayed with date and time.

```
↓BIOS version ↑
PR1713/Bios rel.01.0
```

Release, revision and date are shown as flow text.

```
↓Application          ↑
IBC Controller rel.
```

Type of application package (e.g. IBC Controller) and release are shown as flow text. Leave the menu with [Exit]

4.8.12   Enable Download

This menu appears only if **[Setup]-[Software Parameter]-[Software download]** is set to **[protected by setup]**.

```
Setup
↓Enable download      ↑
```

Select access with [OK].

```
Download enabled
      *  Done  *
```

The download is enabled, menu can be left with [Exit].

If the **[Software download]** is set to **[protected by setup]** and **[Download enabled]** is not active, an error message appears on the PR1750 (for Rel. 2.10: Download disabled, for Rel.< 2.10: only error no.) and the download is blocked.

4.8.13   Reboot

```
Setup
↓Reboot               ↑
```

Select access with [OK].

```
Reboot ?
  Cold * Warm * Bios
```

Select **[Cold]** for cold start, **[Warm]** for warm start or **[Bios]** for starting the Bios (booting).

```
Bios ready
  Cold ↕ Erase↕ Flash
```

After **[Bios]** select **[Cold]** for cold start, **[Erase]** for setting back to default parameter or **[Flash]** for loading new Bios and/or firmware and/or application software.

```
Bios ready
  Test ↕        ↕
```

With [More] the test function can be called. With test the functions **[ROM-Checksum]**, **[Fast Ramtest]**, **[Deep RAMtest]**, **[SIL-NR-Check]**, **[EAROM-Check]**, **[EAROM-Erase]**, **[KBD-Check 32]**, **[KBD-Check 64]** and **[DSP-Check]** (display) can be executed.

4.9   Config Program for Application Parameter

The menu [Setup]-[Config] depends on the application package. For further information please refer to the respective manual e.g. IBC Controller or FlowController.

4.10 MODBUS / J-BUS Protokoll

4.10.1   Communication

The MODBUS / J-BUS protocol implemented in PR 5610 permits quick, simple and reliable communication between a PC or a PLC and max. 127 units.

PR5610 fully supports Modbus-RTU including functions 1, 2, 3, 4, 5, 6, 8 (subfunction 0), 15 and 16.

J-Bus is a french clone of Modbus. There is only one small difference: J-Bus addresses are counted from 0 (instead of 1) up to hex FFFF (instead of dec. 9999). Some Modbus masters subtract the 1 automatically before sending a message and some Modbus slaves add 1 to get at the requested address. So it could end up with accessing an address off by one, but that's the only item to be looked-out for (simple to solve). In practice no other problems with connecting J-Bus equipment to ordinary Modbus equipment should occur.

The MODBUS / J-BUS protocol is used for data transmission in binary from and to the PR 5610 SPM. Each data exchange includes two telegrams: a command from the PC to PR 5610 and a reply from PR 5610 to PC.
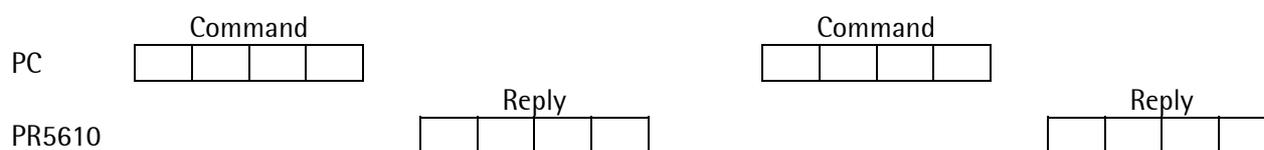
Each telegram comprises four blocks:
>   1. device address
>   2. function code
>   3. data (addresses and values)
>   4. CRC check word

Note: All 2-byte values (16-bit values/ word) have Motorola notation. Sequence: MSB - LSB

A reply is sent on each faultless command, the answertime amounts to 4ms (typical) and 8 ms (max.) at 9600 baud.

A faulty command received by PR5610 (e.g. parity error in the data or CRC error) is ignored. In this case, no reply is sent.

The pauses between the individual characters in a command must not be longer than 3.5 times a character length. Otherwise, PR5610 detects an early end of command.

If the received command is faultless, but cannot be handled (e.g. faulty address, faulty data), the reply has got an error telegram. A telegram to slave 0 is executed by all PR5610 units, but not replied by anyone.

4.10.2   Function 1 or 2: Read n Bits

	Device address	Function number	Address of 1st bit	Number of bits	CRC 16
Command					
	1 byte	1 byte	2 bytes	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 must not be lower than 8 and must be a multiple of 8.

	Device address	Function number	Number of read bytes	Value of 1st byte	Value of 2nd byte	..	Value of last byte	CRC 16
Reply								
	1 byte	1 byte	1 byte	1 byte	1 byte		1 byte	2 bytes
				8th 1st			last bit	
				bit				

If the address of a bit to be read is out of the permissible range (0...32760), an error message is sent as a reply. Example of function 1 for reading the scale status bit:

Command	1	1	2	56	0	8	CRC	CRC

Reply	1	1	1	X	CRC	CRC

The read byte X is interpreted as follows: bit 0 = SPM bit 575 = sign bit
                                                bit 1 = SPM bit 574 = is tared
                                                              :
                                                bit 6 = SPM bit 569 = inside center zero
                                                bit 7 = SPM bit 568 = standstill

4.10.3   Function 3 or 4: Read n successive Words

	Device address	Function number	Address of 1st word	Number of words	CRC 16
Command					
	1 byte	1 byte	2 bytes	2 bytes	2 bytes
Range	1...127	3,4	0...2047	1...125	

	Device address	Function number	Number of bytes	Number of words	CRC 16
Reply					
	1 byte	1 byte	1 byte	n bytes	2 bytes

MSB	LSB	MSB	- - - - - -	MSB	LSB
1st word				last word	

If the address of a word to be read is out of the permissible range (0..2047), an error message is sent as a reply.

Example of function 3 for reading the gross weight (893 kg):

Command	1	3	0	32	0	2	CRC	CRC

Reply	1	3	4	0	0	3	125	CRC	CRC

The individual bytes are shown.

4.10.4   Function 5: Write a Bit

Command	Device address	Function number	Bit address	Bit value	always 0	CRC 16
	1 byte	1 byte	2 bytes	1 byte	1 byte	2 bytes
Range	0...127	5	0...32760	0 or 255	0	

With device address 0 the command is handled by all connected units, however, no reply is sent.

Reply	Device address	Function number	Bit address	Value of bit	always 0	CRC 16
	1 byte	1 byte	2 bytes	1 byte	1 byte	2 bytes

With an address out of the permissible range (0...32760), an error message is sent as a reply.

Example of function 5 for setting bit 140 (taring)

Command	1	5	0	140	255	0	CRC	CRC

Reply	1	5	0	140	255	0	CRC	CRC

The individual bytes are shown.

4.10.5   Function 6: Write a Word

Command	Device address	Function number	Word address	Value of word	CRC 16
	1 byte	1 byte	2 bytes	2 bytes	2 bytes
Range	0...127	6	0...2047		

With an address of 0 the command is handled by all connected units, however, no reply is sent.

Reply	Device address	Function number	Word address	Value of word	CRC 16
	1 byte	1 byte	2 bytes	2 bytes	2 bytes

With an address outside the permissible range (0...2047), an error message is sent as a reply.

4.10.6 Function 8: Diagnosis

Command	Device address	Function number	Sub-function	any value	CRC 16
	1 byte	1 byte	2 bytes	2 bytes	2 bytes
Range	1...127	8	0		

This function is used for communication checking.
Only sub-function 0 is supported.
The received command is sent as a reply.

Command	Device address	Function number	Sub-function	Value of command	CRC 16
	1 byte	1 byte	2 bytes	2 bytes	2 bytes

4.10.7 Function 15: Write n successive Bits

Command	Device address	Function number	Address of 1st bit	Number of bits	Number of bytes	Value of bits	CRC 16
	1 byte	1 byte	2 bytes	2 bytes	1 byte	n bytes	2 bytes
Range	0...127	15	0...32760	8,16, 24	1,2,3...		

1st byte	2nd byte	3rd byte	- - - - - - - -	last byte
8th 1st				last
bit				bit

With address 0 the command is handled by all units and no reply is sent. The bit address must always be the 1st bit of a byte. The number of bits to be written must not be below 8 and must be a multiple of 8.

Example of function 15

Command	1	15	0	64	0	8	1	3	CRC	CRC

Reply	1	15	0	64	0	8	CRC	CRC

The individual bytes are shown.

4.10.8 Function 16: Write n successive Word

	Device address	Function number	Address of 1st word	Number of words	Number of bytes	Value of words	CRC 16
Command							
	1 byte	1 byte	2 bytes	2 bytes	1 byte	n bytes	2 bytes
Range	0...127	16	0...2047	1...123	2...246		

MSB	LSB	MSB	- - - - - - - - -	MSB	LSB
1st word				last word	

With device address 0. The command is handled by all units and no reply is sent.

	Device address	Function number	Address of 1st word	Number of words	CRC 16
Reply					
	1 byte	1 byte	2 bytes	2 bytes	2 bytes

If the address of a word is out of the permissible range (0...2047), an error message is sent as a reply.

Example of function 16 for writing limit1_on with value 893:

Command	1	16	0	48	0	2	4	0	0	3	125	CRC	CRC

Reply	1	16	0	48	0	2	CRC	CRC

The individual bytes are shown.

4.10.9 MODBUS / J-BUS Error Messages

With a correctly transmitted command, which, however, cannot be handled, because e.g. the address is too high, an error message is sent as a reply on the command.

The error message has the following format:

Device address	Number of function +128	Error number	CRC 16
1 byte	1 byte	1 byte	2 bytes

The 2nd byte contains the received function number and the most significant bit is set additionally. The signification of the error number is:

    1   number of function unknown
    2   address not within valid range
    3   faulty data format (e.g. more data written than specified in number)

Example for an error message, which is generated by an invalid function number.

Command	1	9	0	0	0	0	CRC	CRC

Reply	1	137	1	CRC	CRC

The individual bytes are shown.

4.10.10 MODBUS / J‑BUS Word Addresses

32	Gross weight 1st byte (MSB)	Gross weight 2nd byte

33	Gross weight 3rd byte	Gross weight 4th byte (LSB)

34	

35	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575

Address   Description

Read bits:
568   standstill
569   within 'centre zero'
570   weight below zero or above FSD
574   tare active
575   sign

Write bits:
139   set zero
140   set tare
141   reset tare

Remark: Further addresses can be found in the helpfile for PR 1750NT (FBFUN001.HLP)

5 Commissioning with Terminal

One of the serial interfaces, e.g. RS 232 Builtin, can be defined for the system console. The system console can be used for calibration, configuration and operation.

5.1 System Console: Connecting Menu Structure

A terminal or a PC can be used as a system console. Connection to the builtin interface: see chapter 3.3.4 (other interfaces are used in the same way). To use the terminal as operator device the following set up has to be made:

- In **[Setup]-[Serial Ports]-[Operator Device at]**, select the intended interface (see Chapter 4.8.2).
- IF Operator device is selected, interface parameters cannot be changed and are set to:
  [Protocol] XON/XOFF, **[Baudrate]** 9600, **[Bits]** 8, **[Parity]** None, **[Stopbits]** 1, **[Devtype]** Ansi, **[Echo]** Enabled
- The interface parameters of the PC/terminal have to be set to the same as in the instrument.

5.1.1 Connecting PR5610 to PC

The PC is connected with a directly connected cable (Rx-Tx not crossed) to the Builtin RS 232 interface.

5.1.2 Terminal Program

The terminal emulation program 'Hyper Terminal' provided by Windows is in the 'Accessories'. If this program is not available, proceed analogously with a comparable program.

Terminal programs of various manufacturers can be used for commissioning on many operating systems, provided that they behave like a VT100 (ANSI terminal) and can be adjusted to the required parameters. Adjust according to the interface configuration.

5.1.2.1 Setup Terminal Emulation Program

Start programm 'Hyper Terminal'. Enter 'Name:' in the 1st dialog window, button **[OK]**.
Select 'direct connection via COM1' in the 2nd dialog window at 'connect via:', button **[OK]**.
Select port COM2: (if the MOUSE is connected to COM1).
The 3rd dialog window is the registry card 'Data transmission'. Settings, button **[OK]**.

Settings:

Bits per second:	9600
Data bits:	8
Parity:	none
Stop bits:	1
Protocol	XON/XOFF

5.1.2.2 Switch-on Messages

The terminal output after instrument switch-on is the initialization message, followed by the main screen: Instrument and version message, date/ time, main menu, see chapter 5.1.3.

5.1.2.3 Terminate Terminal Emulation Program

Before switching on the PC or before closing the terminal emulation program, return to the main menu.

⇒ If the PC is switched off in a sub-menu instead of the main menu, the full mask may not be displayed when starting the terminal emulation program. In particular, information on the operating and editing functions are missing. Press space bar to display the mask at full size

5.1.3 Main–Command–Level Menu Structure

```
PR1713 Rel.03.16 28.10.2005 09:05
    Main-Command-Level                   Mo 31.Oct 2005 09:31:51

  C Configuration

  W Weighingpoint

  S Service

  L Command line



  Q Quit

```

Access to the various input masks (survey, see Table of menu structure below) from this main menu (*Main-Command-Level*) is via sub-menus. Calling up the required sub-menus is by pressing the relevant key **[C]**, **[W]**, **[S]** or **[L]**.

- Configuration — *C Configuration*
- Weighing point — *W Weighingpoint*
- Service — *S Service*
- Commandline — L *Commandline*
- Leaving the main menu — *Q Quit*

⇒ If a production is active, the configuration is disabled:
Production is active, no configuration possible. Hit any key to continue
Press any key to remove this message from the display.

⇒ The entry of Q can be disabled:
Set in PR5610 **[Setup]-[Software Parameter]-[Quit in mainlevel]** to **[disabled]**, then the menu item for Quit is removed from the screen.

⇒ If **[Quit in mainlevel]** has been set to **[enabled]** and the Q command is given on the keyboard, the communication is stopped.
To reactivate the communication go to **[Setup]-[SerialPorts]-[Operator device at]** and select the interface , e.g. **[Builtin]** again.

5.1.3.1   Menu Structure (Tree)

With configuration on a serially connected terminal, the following menu is valid:

Main-Command-Level

– C Configuration	Configuration data
– D Set date	Enter date
– T Set time	Enter time
– C Change serial port parameter	Change port parameters
– L Add, delete, show license	License handling
– S Set software configuration	Configuration data
– U Set units	Entry of user-defined units
– F Set fieldbus configuration	Fieldbus configuration
– P Print all configuration data	Print
– E Exit	Return to higher level
– W Weighingpoint	Weight display and function keys
– 0 Set Zero	Set gross weight to zero
– I Tare In	Set tare
– O Tare Out	Reset tare
– T Tare	Display tare weight
– G Gross	Display gross weight (B, G if [W&M]=[NTEP])
– N Net	Display net weight
– ? Test	Test
– F Flow	Display weight change/minute
– Z Zeroset	Display zeroset (actual zero - initial zero)
– D Diff	Display difference weight
– S Setp	Display setpoint
– P Print	Print
– C Calib/Config	Access calibration (configuration) mask
– A Assign weighingpoints	Assign weighing points
– E Exit	Return to higher level
– S Service	
– H Show hardware configuration	Display hardware configuration
– M Show available memory	Display memory occupation
– T Test Inputs/Outputs	Test I/Os in slot 1 - 4
– F Show last fault	Show last fault
– B show Bios version	Show bios version
– P Print all configuration data	Print configuration data
– E Exit	Return to higher level
– L Commandline	For entering IEC 61131 commands
– Q Quit	Terminate terminal mode

5.1.4   General Operating Notes

All terms used in the masks are in English. In the description, the relevant *English expression* or display text is shown in a different font.

A submask can be left on several ways, which are displayed in the lower mask area, e.g.

E Exit	save and leave
Q Quit	leave immediately

Using the automatic repeat function of the keyboard can cause a crash of the **terminal emulation program**. Remedial action in case of trouble:

1. Close the **terminal emulation program** under Windows.
2. Open the terminal emulation program under Windows.
3. Reactivate the communication with **[Setup]–[Serial Ports]–[Operator device at]** and select the interface , e.g. **[Builtin]**.

5.1.4.1   Editing Functions in Masks

In the lower mask area of some masks, the possible editing functions are displayed.

```
Previus / Next ....
+/- change parameter
Undo changes for ....
```

Editing functions

- Display of the previous/ next selection with the keys P or N
Previous / Next ....

  Select input field by means of cursor keys **[↑]** and **[↓]**. **[+] / [-].** Changing parameters
+ / - change parameter
Selection is from 2 or more possible values

- *Undo changes for ....*

5.2   Configuration

Calling up mask *Configuration* is from the *Main-Command-Level*, by pressing key **[C]**.

```
PR1713 Rel. 03.12. 20.05.2004 09:05
    Configuration                        Mo 05.July 2004 13:06:16

  D Set date
  T Set time
  C Change serial port parameter
  L Add, delete, show license
  S Set software configuration
  U Set units
  F Set fieldbus configuration

  P Print all configuration data
  E Exit
```

⇒ If a production is active, configuration is disabled:
Production is active, no configuration possible. Hit any key to continue
Press any key to remove this message from the display.

Function survey:

• Set date	*D Set date*
• Set time	*T Set time*
• Change serial port parameters	*C Change serial port parameter*
• Add, delete and display licences	*L Add, delete, show license*
• Change and display software configuration	*S Set software configuration*
• Entry of user-defined units	*U Set units*
• Parameter of fieldbusoption PR 1721/0x	*F Set fieldbus configuration*
• Print out all configuration data	*P Print all configuration data*
• Leave menu Configuration	*E Exit*

5.2.1   Set Date

```
PR1713 Rel.03.16 28.10.2005 09:05
    Configuration                        Mo 31.Oct 2005 09:31:51

  D Set date
  T Set time
......



Enter new date [31.10.2005]:
```

- Press key **[D]**
- Message: *Enter new date [30.10.2005]: _*   is displayed
- Enter the new date e.g.: *15.11.2005*
- Press key **[↵]**, the line is removed from the display if the entry was correct. With faulty entry, message: *(bad date) enter new date [30.11.2001]: _* is displayed.
- Check against the header (top right)

5.2.2   Set Time

```
   Configuration                      Mo 31.Oct 2005 09:31:51

  D Set date
  T Set time
......

Enter new time [13:06:16]:

```

- Press key **[T]**
- The following message is displayed:
Enter new time [13: 06:16]:
- Enter the new time e.g.: *13: 07: 00*
- Press key **[⏎]**, to remove the display.
- Check against the header (top right)

5.2.3   Serial Port Setup

Calling up serial port setup mask *Change serial port parameter* is done from sub-menu *Configuration* by pressing key **[C]**.

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Serial port setup                Mo 31.Oct 2005 09:31:51

Operator device: Builtin RS232 (protected)
Printer device :           none
Remote device  :           none

Builtin: CON  RS232   (locked by operating)
Slot  1: -no serial-
         -no serial-
Slot  2:TTY3 RS485
........TTY4 RS232
Slot  3: -no serial-
         -no serial-
```

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Slot 2  RS485 (TTY3)              Mo 31.Oct 2005 09:31:51

Port     :Slot 2  RS232  (TTY3)
Protocol :XON/XOFF
Baudrate : 9600
Bits     : 8
Parity   :None
Stopbits : 1
Devicetyp:Ansi
Echo        :Enabled
```

⇒ When calling up this mask, the communication is disabled.
In the first mask the serial port is the selected, in the second mask the interface parameter are set. The possible editing functions are displayed below.

- Save configuration   *Exit and save*
  If changes were made, the system asks e.g.:
  Save Slot 2 RS485 ? (Y/N) Press **[Y]** *or* **[N]**

⇒ The changes are effective only after *Exit* !
   The parameters for the serial ports are saved in EAROM.

♦ List of parameters and possible entries (selection):
- Selecting the serial interface: (*Serial IO*): *1, 2, … 7*
- Selecting the previous/next serial interface: *Previous / Next serial I/O*
- Protocol*: None XON/XOFF, DUST3964R slave, DUST3964R master, DUST3964R S5 slv, DUST3964R S5 mas, EW-COM Slave V1, EW-COM Slave V2, EW-COM Slave V3, RTS/CTS, JBUS/MOD-Bus, Remote Display, W&M Printer, Modem, xBPI*
- Number of data bits (*Bits*): *7, 8*
- Parity check (*Parity): None, Odd, Even*
- Number of stop bits (*Stopbits): 1, 2*
- Transfer rate (*Baudrate*): *300, 600, 1200, 2400, 4800, 9600, 19k2, 38k4, 115k2.*
- PR 5610 slave address *(Slave-adr): <space>, A to Z*
- Terminal type (Devicetyp): Raw, Ansi, VT52
- Echo *(Echo): Disabled, Enabled*

If elements appear in brackets on the screen, selection is not possible.

⇒ A PR5610 can be equipped with max. 7 serial interfaces. For a survey, see chapter 5.2.3.1.
⇒ Dependent of selected protocol (and interface), defined default settings are made by the system.

5.2.3.1 Survey: Physical Interfaces

The instrument can besides the built-in interface be equipped with max. 6 additional serial interfaces, provided that the 3 options sockets are fitted with 1713/04. The interface no. is allocated from TTY1 to TTY6 via software. All interfaces can use each protocol, but EWCOM, Remotedisplay, xBPI and W&M printer only once per instrument.

The following settings are useful dependent of protocol. These settings can also be changed subsequently.

Protocol	Default settings	Example	Rem.
None			
XON/XOFF	8, none, 1, 9600, -, ANSI, enabled	System console	1
EWCOM slave V1	7, even, 1, 9600, A	EW protocol V1	5, 6
EWCOM slave V2	8, even, 1, 19.2, A	EW protocol V2, PR 1740	6
EWCOM slave V3	8, even, 1, 19.2, A	EW protocol V3, DDE-server	6, 7
RTS/CTS	standard: as XON/XOFF	Printer	3
W&M printer	7, even, 1, 9600, -, raw I/O, disabled	W&M printer	2
Remotedisplay	7, even, 1, 9600, -, raw-I/O, disabled	PR 16xx, remote display	4
xBPI	8, odd, 1, 9600,	Sartorius scale	

Remarks:
1. A terminal or a PC with a terminal emulation program is used as system console.
2. An FX880/PH02 printer permits W&M weight data print-out.
3. Via this protocol, print-out of all configuration data and weight print-out during weighing point calibration (if necessary) are made.
4. Thee instrument sends the remote display telegram successively for all 2 weighing point modules. This is followed by a pause of approx. 80 msec.
   Data contents: see PR 1627 and PR 1628 documentation.
5. Protocol for communication with PR 16xx units
6. For operation with **PR1750.**
7. For operation with **PR1791** (DDE server).

5.2.4   Entry of Software Licence Numbers

Calling up mask *License configuration* is done from sub-menu *Configuration* by pressing key **[L]**.

```
PR1713 Rel. 03.16 28.10.2005 09:05
     License Configuration                Mo 31.Oct 2005 09:31:51

 Boardnumber: 8409060

 S88 Disabled        PR1713/20 Single component batching     Disabled
                     PR1713/21 Multi component batching      Disabled
 A Add a License      PR1713/30 Standard batching phases     (Disabled)
                     PR1713/31 Open communication           Disabled
 D Delete a          PR1713/32 S88 Phase Batching           Disabled
                     PR1713/OB Onboard weighing             Disabled
                     PR1713/SM SMS Messaging                Disabled
                     PR1713/AL ALIBI                        Disabled
 P Print License     PR1740/11 Production control and superv.Disabled
                     PR1740/21 Production plan              Disabled
                     PR1740/31 DDE transfer                 Disabled
                     PR1740/41 PR1740 Remote control        Disabled
                     PR1781/13 Phase configuration          (Disabled)
                     PR1791/13 DDE Server communication     Disabled
                     PR1792/13 OPC Server communication     Disabled
 E Exit              PR1792/20 OPC database access          Disabled
```

♦ **The licence numbers** to be entered **must refer to the board number** displayed on top of the mask.

♦ The status of all licences is displayed: *enabled* or *disabled.* Licences which cannot be used are indicated in parenthesis (e.g. depending on S88 status).

♦ Editing function
  - *A Add a License*
  - *D Delete a License*
  - *P Print License*
  - *E Exit*

♦ After pressing the relevant key **([A] or [D]),** the system prompts for entry of a licence number: *Enter License number:* _
The system checks the licence number. Unless it is accepted by the system, message: *Not a License number* or: *Wrong License number* is displayed.

♦ If the licence number is unknown, delete the wrong licence number with the backspace key and terminate the entry with return key.

5.2.5   Entry of Software Parameters

Calling up mask *Set software configuration* is from sub-menu *Configuration* by pressing key **[S].**

```
PR1713 Rel. 03.16 28.10.2005 09:05
     Software Configuration              Mo 31.Oct 2005 09:31:51


Language              :English
Frontkey timeout      :2sec
Low battery check     :   on
Report to             :none
Tare key              :enabled
Set zero key          :enabled
Quit in mainlevel     :enabled
Reset on stop+exit    :   1 s
S88.01 Interface      :  off
Software download     :protected by setup
Lines per recipe      : 10
Recipe simulation     :enabled
Subrecipe............:disabled
```

5.2.5.1   List of Parameters and Possible Entries

Language	**Language for operator dialog** Selecting the dialogue language for the operator (not for configuration): *English* (default) or *Local Language* (Default alternative language: German)
Frontkey timeout	**Gross and tare display holding time** Holding time of function keys: *1 sec, 2 sec, 3 sec*
Low battery check	**Battery monitoring display** Alarm message for battery low The alarm message is output continuously with *on*, not output with *off* , and with *1 min,* the alarm message is output once per minute (display: **Lo bAt)**
	Report to Specify destination for batching reports, select with scroll keys for *: none, communication* (PR 1740), *application* (local printer*), communic. & applic.* (local printer and PR 1740), *application +Prod .* (IEC 61131 programs are using the production report table).
Tare key	**Tare key** Keypad function tare can be *enabled* or *disabled*
Set zero key	**Set zero key** Keypad function set zero can be e*nabled* or *disabled*
Quit in mainlevel	**Quit in main level** Can be set to: e*nabled,* d*isabled.* Has to be set to enabled if the serial interface for terminal program is used also for other purposes (e.g. programming), therefore the terminal mode has to be terminated.
Reset on stop + exit	**Stop + Exit** After pressing keys 'Stop' and 'Exit' for *1sec* or *5sec* during operation, the boot menu is displayed. Inhibit with: *disabled.*
S88.01 Interface	**Inbatch mode** *: on* Unit is used with InBatch. *off* Unit at PR 1740 or stand-alone.
Software download	**Software download** Can be set to: e*nabled,* d*isabled.* Disabled inhibits downloading e.g. if instrument is working in a network.
*Lines per recipe	**Lines/ Recipe** Maximum number of lines for recipes (*1....255*).
*Recipe simulation	**Recipe simulation** For starting recipes with modified batching modules recipe simulation can be set to *disabled.*
*Subrecipe	**Subrecipe** With e*nabled* subrecipes can be called in a recipe*.*

* - Functions are not present if S88.01 Interface is set to on

5.2.6   Fieldbus Parameter

Calling up mask *Set fieldbus configuration* is from sub-menu *Configuration* by pressing key [F].

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Fieldbus Configuration

PR1721 protocol        :Interbus-S
IBS cycles/25ms        :10
```

Interbus-S

Calculate actualization interval:
1000 / (15 + number of bytes+ 0.3 x number of slaves)

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Fieldbus Configuration

PR1721 protocol        :Profibus-DP
Profibus-DP address  :     1
```

Profibus-DP

Enter [1 ... 126] for Profibus-DP address

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Fieldbus Configuration

PR1721 protocol        :DeviceNet
DeviceNet baudrate   : 250k
DeviceNet MAC-ID     : 1
```

DeviceNet

Select baudrate [125k or 250k or 500k]
Enter [1 ... 62] for DeviceNet address

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Fieldbus Configuration

PR1721 protocol        :

Scale-interface......:enabled
```

All protocols

Scale-interface: enabled for using standard interface fieldbus - PR5610 with 8 bytes. Disabled if IEC 61131 application program is handling the fieldbus.

After parameter entry the instrument makes a warm start, in order to initialize the PR 1721 module in the unit.

5.2.7   Entry of User-Defined Units

```
PR1713 Rel.03.16 28.10.2005 09:05
    Configuration                          Mo 31.Oct 2005 09:31:51

  U Set units

  F Set fieldbus configuration
  E Exit

Enter new units : u1u2u3u4u5u6u7u8
```

For use of IEC 61131 firmware functions MAKE_WEIGHT and SET_WEIGHT_UNIT, 8 different units can be defined. Each unit is composed of 2 characters.

- Press key [U]
- A string (16 characters) of the 8 actual units á 2 characters is displayed:
Enter new units: u1u2u3u4u5u6u7u8
The cursor is behind the 16th character.
- Move cursor with arrow keys, delete characters with the backspace key. (line editor).
- Entry of required characters (units).
- Press the Enter key. If the entry is correct, the line is removed from the display. If the entry is faulty, the following message *(must be 16 characters): lbcmdm* and the characters entered so far are displayed.

5.2.8   Printing all Configuration Data

All parameters are printed out via the serial port configured for the printer device.

5.3   Weighing Point Mask

Calling up mask *Weighingpoint* is done from the *Main Command Level* by pressing key [W].

```
PR1713 Rel. 03.16 28.10.2005 09:05
     Weighingpoint
Max=      3000kg        e=      0001kg
A < > N              0050kg

Max=      3000kg        e=      0001kg
B < > N              0330kg

Max=      6000kg        e=      0002kg
AB< > N              0380kg

 Keys
0 Set Zero I/O Tare In/Out
Select Display T Tare G Gross N Net ? Test F Flow Z Zeroset D Diff S Setp
P Print C Calib/Config A Assign weighingpoints E Exit
```

♦ The functions of this mask are:
  • Weight display and function keys for the weighing points
  • Calling up sub-menus/ masks:
  calibration / configuration   *Calib/Config*
  weighing point assignment   *Assign weighingpoints*

♦ Return to the main menu is with [E] *Exit*.

♦ Weight display and function keys for the weighing points.

♦ Weighing point selection (A, B or AB) is by means of the cursor up and down keys. The actually selected weighing point is highlighted by inverse display.

If a physical weighing point has been assigned to e.g. WP B, but does not deliver valid weight data, it is displayed as follows:

```
Max=      3000kg        e=      0001kg
B         Err 9:nocom
```

⇒ The function keys relate to the instantaneously selected weighing point.

Mask description.
♦ Gross/ net/ tare weight display   *G/N/T Select Display*
The gross, net or tare weight can be displayed by pressing the relevant key with the scale tared. This is shown by display of the relevant letter.
♦ Setting the zero is done with key   [0] *Set Zero*
When the scale was set to zero, **>0<** is displayed in front of the weight.
♦ Setting or erasing the tare memory is done with keys [I] or [O]   *I/O Tare In/Out*
♦ Press key [?] to carry out the analog test *? Test*. Test value and reply line *Toggle Testmode Status OK* instead of the weight is displayed. Pressing key [?] once more displays the previous value again.
♦ Pressing key [P] *Print* prints out the weight values on the printer port.
♦ Calling up mask *Assign weighing points* is done by pressing key [A]. If a production is running, this call is disabled, message: *Production is active, no configuration possible*

5.3.1   Weighing Point Assignment

For general information refer to chapter 4.4.
Calling up mask *Assign weighingpoints* is done from the mask *Weighing point* by pressing key [A].

```
PR1713 Rel.03.16 28.10.2005 09:05
     Weighingpoint assignment

 A :internal                              internal
 B :GWT-Scale                             liquid
 C :A+B                                   user
                                          (GWT-Scale)
                                           xBPIScale

```

The physical weighing points (e.g. internal, xBPIScale) can be assigned to logical WPs (e.g. A, B):

Not defined	*none*
Liquid counter (internal)	*liquid*
Customer-specific weighing point	*user*
PR 1720 or PR 5610 / PR 1713 (via Interbus)	*GWT Scale*
Sartorius scale	xBPI Scale

- After entering [↵] the weighing point type for B can be selected using the two cursor keys [↑] and [↓]. The actually selected weighing point is highlighted by inverse display.

5.4   Weighing Point Parameters: Storing, Saving, Protecting

This chapter describes how to save and protect parameters of the internal weighing point (internal ADC). The individual weighing point parameters, entry, configuration and calibration are described in the two following sub-sections.

5.4.1   Access Protection: CAL–Switch

The calibration data and parameters are protected against unauthorized/ accidental access by the CAL-switch (on board 1). Check of the switch position is done when calling up mask *Calib/Config:*

⇒ CAL-switch in open position: access permitted

- When calling up mask *Calib/Config*, the weighing point can be configured and calibrated. In addition to the actual weighing point parameters, mask *Calibration* indicates the access functions which are enabled now (see Chapter 5.4.1.1).

⇒ CAL-switch in closed position: calibration data are protected, download or flash not possible
♦ When switching on the instrument
  - the calibration data saved in the EAROM (only with valid calibration data) are loaded.
  - otherwise, factory setting and factory calibration are loaded.

♦ When calling up mask *Calib/Config* , the weighing point parameters are protected. The weighing point parameters are only displayed in mask *Calib/Config* .
♦ For W&M weighing systems, the CAL-switch has to be sealed in compliance with the calibration standards.

5.4.1.1   Calling up and Display of the Weighing Point Calibration Mask

♦ Calling up weighing point calibration mask *Calib/Config*

- Weighing point selection is by means of the cursor keys [↑] and [↓]. The actually selected weighing point is highlighted by inverse display.

- Calling up the weighing point calibration mask is done by pressing key [C] *Calib/Config*. If a production is running, this call is disabled, message: *WP is in use*

⇒ When calling up mask *Calib/Config* with the CAL-switch open, tare memory and zero setting memory are erased. Moreover, the following functions are disabled during weighing point calibration: test, automatic zero tracking, taring and zero setting

♦ The weighing point calibration mask is shown below:

```
PR1713 Rel.03.16 28.10.2005 09:05
    CALIBRATION                          Mo 31.Oct 2005 09:31:51
    033.323
A < >            033.3kg

 Configuration
Ana.Filter:       on   Meastime  : 2.00  Standst.rn:  1.00 d  Overload  :    9 d
Dig.Filter:      off   Fcut      : 1.00  Zeroset.rn: 50.00 d  no p below:   50 d
Multirngmd:      off   Standst.ti: 0     Zerotrk.rn:  0.25 d  Stepwidth :    1
Test mode :Absolute    Zerotrk.ti: 0     Zerotrk.st:  0.25 d  Multirang1: 3000 d
W and M   :     none   Tare timot: 8     Supply    : 12 Volt  Multirang2: 6000 d
 Current calibration
Fullscale:     600.0kg Deadload :-0.027408 mV/V   Resolution:  8.774623 cd/c
Calipoint:---fixed--- Span      : +0.889043 mV/V   Sensitivity: 4.000000 µV/d
 Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed,Set Fullscale,Calibrate by Weight or Millivolts
E Exit calibration
```

The weighing point calibration mask contains all weighing point parameters. They are classified as follows:

♦ Configuration parameter *Parameters*:
During configuration, the parameters which are <u>not</u> included into conversion of measured counts into a weight value are determined for operation of the analog part.

♦ Calibration parameters *Current calibration*. During calibration, the conversion of the analog input signal (or digital: of measured counts) into the weight value is determined.

The access functions (*Keys*) are displayed below these two weighing point parameter groups.

5.4.1.2   Leaving the Weighing Point Calibration Mask

When leaving the mask, decision what shall be done with the entered weighing point parameters must be made. Leaving the mask is always started with command

- *Exit calibration* : enter letter E

Now, the system offers the following reactions (see below line *Keys* in the figure):

```
 Keys
S Save Q Quit calibration C Stay in calibration
```

These are:
- Saving in EAROM: *Save*   Enter letter S
- Quit calibration without saving the entries/ data: *Quit calibration*   Enter letter Q
- Staying in the mask: *Stay in calibration*   Enter letter C

When leaving the weighing point calibration mask with Q (*Quit calibration*), all weighing point parameters are left unchanged. The function *Save* (in EAROM)' is described in chapter 5.4.2.

- After leaving the weighing point calibration mask, return is to sub-menu *Weighingpoint*.

5.4.2   Saving the Weighing Point Parameters in EAROM

After configuration and calibration of the internal ADC, all relevant weighing point parameters can be saved in a non-volatile EAROM.

Saving of the weighing point parameters in EAROM is from mask *Calibration* (only possible with switch CAL open):
- For finishing the calibration: *Exit calibration* Enter letter E
- From the reactions offered by the system, select saving in EAROM: *Save:* Enter letter S. The data are saved in the EAROM.
- For saving, the two steps must always be carried out.

5.5   Internal ADC, Parameters

The editing functions for parameter entry are described in the first sub-section, the individual parameters are described in the following sub-sections.

5.5.1   Editing Functions for Parameter Entry

Weighing point selection is done with the cursor keys [↑] and [↓]. The selected weighing point is highlighted by inverse display.

The weighing point calibration mask is displayed with different command lines dependent of the CAL-switch position.

- Command line: calibration protected

```
Keys
E Exit display
Cal - Jumper closed
```

A note that the CAL-switch is closed is displayed (*Cal-Jumper closed*). I.e. the data can be displayed without changing them. The mask can be left by pressing key [E] (*E Exit display*).

- Command line: access permitted

```
Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed,Set Fullscale,Calibrate by Weight or Millivolts
E Exit calibration
```

1. The commands for entry of the weighing point parameters are displayed in the first line:
   Select item with cursor up/down/left/right Change with +/-
   See items Select item and Enter/change parameters' .

2. The second line refers to weighing point calibration.

3. The last line contains the command for leaving the mask
   E Exit calibration.
   See chapter 5.4.2.

♦ Item selection
Item selection is with the four cursor keys [←], [→], [↑] and [↓] (*Select item with cursor up/down/left/right*). The selected item is displayed inversely.

♦ Parameter entry/ changing
   The entry/ change is dependent of the item. The two types of entry/ change are:

- Selection item: selection of predefined parameters is with keys [+] and [–]
   Selection fields are: *Filter, Testmode* and *Stepwidth*. All other fields are normal input items. Nevertheless, they can be changed with keys [+] and [-].

- Input item: entry of required parameter value.
   During entry, the values are shifted from right to left. Point or comma are part of the mask (cannot be entered). During entry, the content of the item is underlined. The entry can always be canceled by pressing the space bar [_]. The old value remains unchanged.
   The parameter entry is completed with key Enter [↵]. Subsequently, the entry is checked:
   If an entry is within the permitted range, the value is stored and not underlined any more.
   If an entry is not within the permitted range, the entered value is replaced by the next permitted value and remains underlined.
   The operator has the following possibilities: Press key Enter [↵] to confirm this next value. Enter a new value. Redisplay the old value by pressing the space bar [_].

5.5.2 Filter: Analog Filter

Select between filter = on or no filter = off.
The anlog filter (low-pass) has got a 2nd-order Butterworth characteristic with a cutoff frequency of 2Hz. The filter is located before the ADC and should be set to on.

Digital Filter

Select between no or bessel (Bessel), aperiodic, butterw. (Butterworth) or tscheby (Tschebyscheff) filter. With digital filter enter the cutoff frequency (Fcut 0.1 ... 5.00 Hz). **The measuring time is fixed to 50 ms if the digital filter is not off.**
The digital filter (low-pass, 4-th order) is located behind the ADC, each 50 ms a new value is calculated.
For coarse / fine / flow control (e.g. Batch-X5, IBC-X5, Flow-X5) the weight values are taken before the digital filter and therefore the digital filter has no influence on the control.
Weight values to be displayed / printed (e.g. amount batched, weight on a platform / weighbridge) are generated after the digital filter.

- After changing of the filter parameters, the maximum accuracy should be reestablished by re-calibration.

5.5.3 Analog Test Mode: *Testmode*

Determination, whether the test measurement displays the deviation related to *FullScale* (absolute) or to *0* (relative) is made.
Calibration (with/ without weights) is completed with a test measurement and the result is scaled so that FullScale is displayed.
This value is displayed when pressing the key **[ATest].**

5.5.4 Measuring Time: *Meastime*

Measuring time in ms, enter 50 or 100 ... 2000 (multiples of 100), if digital filter is not set to off, the measuring time is fixed to 50 ms.

5.5.5 Standstill Detection

The standstill detection requires the two following parameters to determine the mechanical standstill of the scale. During a defined period of time (standstill time), the weight value of the scale must be within defined limits (the standstill range). In this case, the scale is in standstill condition.

Standstill range: *Standst.rn*
Permissible range 0.00d to 10.00d.

Standstill time: *Standst.ti*
Entry 'Number of measuring times', permissible range 1 ... 8.

5.5.6 Zero Set Range: *Zeroset.rn*

Definition of a +/- range around the calibration zero, within which

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

Permissible range: 0.00d to 500.00d

5.5.7   Automatic Zero Tracking

In case of change of the empty scale (hopper weight) e.g. due to loss (dead load reduction) or formation of slag (dead load increase) by only a very low amount, automatic zero tracking ensures that the scale is reset to zero automatically.

Automatic zero tracking is defined with the following parameters. With the scale in standstill condition and the gross weight within the zero set range, automatic zero tracking is stepwisely done (step width) at defined intervals.

5.5.8   Automatic Zero Correction Switch–on/off

Switch-on: interval > 0   (*Zerotrk.ti > 0*)
Switch-off: interval = 0   (*Zerotrk.ti = 0*)

5.5.9   Zero Tracking Range: *Zerotrk.rn*

Permissible range 0.00d to 500.00d.

5.5.10   Zero Tracking Stepwidth: *Zerotrk.st*

Permissible range 0.00d to 10.00d
* For W&M applications, the correction must not be above 0.5 d/sek.
* The automatic zero tracking stepwidth must be smaller than the standstill range also for non W&M applications.

5.5.11   Zero Tracking Interval: *Zerotrk.ti*

Entry is in multiples of measuring time, permissible range 0 (= off) to 100
* Switching off the automatic zero tracking is by setting Zerotrk.ti = 0.

5.5.12   Multirange Scale

The multirange function is controlled by three parameters in the calibration. With
Multirange mode= on the scale has three ranges with different resolution: the change-over limits *Multirange limit 1* and *Multirange limit 2* represents the range border. If the gross weight has more d as the relevant change-over limit, the next (wider) stepwidth is used (1->2->5->10->20->50).
If the gross weight is <= 0.25 d of the lowest range, the scale in standstill and untared condition, the scale will be switched back to the lowest range.
During Calibration the multirange function is principally switched off.

5.5.13   Tare Time–out: *Tare timot*

Unless the tare command can be executed within time n (n = number of measuring times), e.g. because the scale was not in standstill condition, the weighing point module generates a message (e.g. no standstill noStAnd).

5.5.14 Maximum Permissible Overload: *Overload*

Entry is in d, permissible range 0d to 9999999d

5.5.15 Min. Weight Limit for Print-out: *no p below*

Entry is in d, permissible range 0d to 9999999d

5.5.16 Stepwidth (scale divisions): *Stepwidth*

Step widths: 1, 2, 5, 10, 20, 50

5.5.17 W&M Mode: W & M

Select W&M: none or OIML or NTEP. Description see chapter 4.4.2.

5.6   Weighing point calibration

During calibration, the relationship of display and measured variable (weight) is determined.
This relation is determined by the two entries
- Deadload (weight of the empty scale *Deadload*) and
- Scale measuring range (*Span*).

During calibration, these two parameters are determined by
- a physical weighing operation/ weighing point calibration with weights or by
- entry of the equivalent input voltage in mV/V.

When calling up mask 'weighing point calibration' with CAL-switch open, tare memory and zero set memory are erased. Moreover, the following functions are disabled during weighing point calibration: Test, automatic zero tracking, taring and zero setting.

5.6.1   Calibration Data

The weighing point calibration parameters are described below. The entries and the corresponding error messages are described in the following sub-sections.

Fullscale

The full scale value determines the maximum weight which can be measured. Permissible entries are within the limits of the full scale value:

>   overall weight range
>   within 0.1 00 and 99999 00
>   in g, kg, t or lb.

The value must be divisible by the step width and must have max. 3 digits behind the decimal point.

Calipoint

This is the value of the

calibration weight	weighing point calibration with weights or the
theoretical calibration weight	weighing point calibration without weights

Deadload

The value of the unloaded scale / empty hopper is the deadload. The input voltage equivalent to this weight value is displayed/ stored in mV/V.

Span

- The span is determined by calibration by means of weights or
- must be entered during calibration without weights.

The span indicates the equivalent input voltage in mV/V related to the scale FSD (full scale):

$$span\ [mV/V] = \frac{full\ scale \cdot load\ cell\ sensitivity\ C\ [mV/V]}{load\ cell\ capacity\ (sum\ of\ all\ load\ cells)}$$

Span in [mV/V]
Full scale as a weight value
Load cell sensitivity C [mV/V]
Load cell capacity (= sum of all load cells) as a weight value

Resolution cd/c

The resolution c/d indicates the number of internal counts (= result of analog conversion) related to the stepwidth (= smallest division d, by which the display value can change).
This value should be as high a possible related to 1. The resolution cd/d is the inverse value of resolution c/d multiplied by 100 (cd, Centi-d =one hundredth of a display step).

Sensitivity μV/d

The sensitivity μV/d indicates the effective voltage per step (scale interval). For 'legal for trade' applications this value has to be equal or greater than the limits given in chapter 6.1.2.

5.6.2   Editing Functions for Parameter Entry

♦ Weighing point selection
Weighing point selection has to be done before calling up this weighing point calibration mask: Weighing point selection is by means of the two cursor keys [↑] and [↓]. Thereby, the actually selected weighing point is highlighted by inverse display.

♦ Item selection
Direct access is only to item *Fullscale*. Item selection is by entry of a letter (unlike the cursor keys as for weighing point configuration parameters). Parameters *Resolution* are not accessible (only used for informative purposes).

♦ Entry/ change of parameter
  - Enter the required parameter value: value and + dimension
  - Change the entry by overwriting (select character with the cursor keys). Delete by pressing the backspace key [←] and re-enter.
  - Press the enter key [↵] to complete the entry.
  - Subsequently, the entry is checked.

5.6.3   Adjusting the Full Scale Value: *Fullscale*

Enter the full scale value into item *Fullscale*.
♦ Open the entry dialogue by entry of letter 'F'.

♦ Prompt for entry of the measurement value: *Enter new fullscale [3000kg], E to exit*: The old measuring range with dimension is displayed [in square brackets] (default value: *3000 kg*). the instrument expects the following entries:
- Measuring range with comma (or point)
- no or one or several spaces
- dimension (g, kg, lb or t)
Complete by pressing the enter key [↵].

♦ The instrument checks the entry for plausibility. If the entered full scale is lower than the calibration weight specified during calibration (*Calipoint*) or if the calculated input voltage for the specified full scale is out of the permissible limits, the new full scale value is rejected. The full scale is rejected, if less than 0.8 counts/d are provided.

  - If the entry is accepted, the following message is displayed during approx. 1 sec: *Status OK*

  - Error messages:

Bad Weight	e.g. dimension missing
Status Arithmetik overflow	e.g. weight value too high
Status Above phymax	calculated input voltage: > 36 mV
Too many d	resolution too low: < 0.8 c/d
Status Below Cal	value below calibration point
Illegal Fullscale	the last two digits are unequal to 00 or have more than 3 digits behind the decimal point

♦ Leave input item without changing the old measurement value (with operator error):

  - If necessary, delete entries: position the cursor in the leftmost position with the cursor key [←]. Delete all entries with the delete key [Del].

  - Enter key [↵]: The old span remains unchanged.

⇒ Adjusting the stepwidth (divisions): *Stepwidth*

5.6.4   Default Span

Use the default span value:

    Return to FiXed or *X to set fixed span*

Press key [X] for taking over the default span. To avoid operator errors, the displayed prompt must be replied with YES/ NO [*Y/N*].

5.6.5   Weighing Point Calibration Procedure / Sequenc

Weighing point calibration (or recalibration) is as follows:

1. Load default values (with **[X]** if required)
2. Allow the unit to warm up (min. 60 minutes)
3. CAL-switch open: weighing point parameter access enabled
4. Call up the calibration mask of the relevant weighing point
5. Enter the weighing point configuration parameters

   Check/ change (default) parameter *Filter*

- With subsequent modification of this parameter, recalibration is recommended. All other weighing point parameters can also be changed subsequently.

6. Determine the full scale: *Fullscale*
7. Select the calibration mode

```
Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed, set Fullscale, Calibrate by Weight or Millivolts
E Exit calibration
```

   Weighing point calibration with weights *Calibrate by Weight*: Press key [W]

   Weighing point calibration without weights *or Millivolts*: Press key [M]

8. Realize weighing point calibration
9. Save the weighing point parameters in EAROM
10. Close CAL-switch to protect weighing point parameters

⇒ The CAL-switch for the built-in WP has to be closed and sealed for W&M use, in other cases it should be closed too.

5.6.6   Weighing Point Calibration with Weights

The two methods of weighing point calibration with weights are:

- If a calibration weight corresponding roughly to (smaller or equal) the full scale can be placed on the scale, calibration in one step is possible.
- If only a relatively small calibration weight (e.g. 10% of the full scale) can be placed on the scale, step-by-step calibration is required.

⇒ The calibration weight should be a high as possible, otherwise, the error is too high.

5.6.6.1   Calibration in one Step with Weights

Proceed as described in points 1. to 7. of the 'Weighing point calibration procedure'. This is followed by the actual calibration:

1. Command line zero *Unload* in the calibration mask

```
Calibration by weight
Unload and hit O or S to skip,
Q to quit, E to end, X to set fixed span, P to print
```

    The system offers the following replies:

Unload and hit 0	unload the scale and set the zero
S to skip	skip zero setting
Q to quit	leave the calibration without doing anything
E to end	calibrate and finish
X to set fixed span	set the fixed span
P to Print	print out the weight value

2.   Set the zero

    Unload the scale, press key [0].
   - The instrument evaluates the data. The command line of the weighing point calibration mask is:

Setting deadloads …	the system stores the data. This is followed by:
Setting deadloads … Status OK	message is displayed during approx. 2 seconds

   - The following weight value is displayed: *0000 kg*

    Repeat zero setting in case of error. See section 3 and 5

3.   The following command line is displayed in the mask: *Unload/Load*

```
Calibration by weight
Unload and hit O or S to skip,
E to end, X to set fixed span, P to print
```

    The system offers the following replies:

Unload and hit 0	unload the scale and set the zero
Load and hit Return	load the scale and set the span
E to End	finish the calibration
X to set fixed span	set the fixed span
P to print	print out the calibration parameters

4.   Calibrating the weighing point
   1. Place the calibration weights on the scale (if possible = full scale)
   2. Press enter key [↵]
   The following line is displayed in the weighing point calibration mask:
   Enter calibration point [6000kg], E to exit:
   The full scale is proposed as calibration weight.
   3. Enter the calibration weight
   Weight value with comma (or point), as applicable
   - no or one or several spaces
   - dimension (g, kg, lb or t)
   - Press the enter key to complete [↵]
   The following command line is displayed in the weighing point calibration mask:
   Enter calibration point [6000kg], E to exit: 4000 kg
   If the values are within the permitted range, the following message is displayed after a few seconds:
   Setting unit … Status OK

Setting weight … Status OK	Message is displayed during approx. 2 sec.

    Possible error messages:

Setting weight … Bad Weight	e.g. dimension missing
Setting weight … Status Above Scale	specified weight to high
Setting weight … Status Above phymax	input voltage > 36 mV

5. The command line as shown in point 3. is displayed: *Unload/Load*

```
Calibration by weight
Unload and hit O or S to skip,
E to end, X to set fixed span, P to print
```

- Repeat the calibration step (as shown in section 4.).
  Apply the calibration weight   *Load and hit Return*
  Press the Enter key **[↵]** (see 4.)

- Set the fixed span   *X to set fixed span*
  If the calibration cannot be finished correctly for any reason, press key [X]. To avoid operator errors, a prompt is displayed and must be replied with Yes/ No: *[Y/N]*.
  The system executes the command. Subsequently, the command line as shown in point 5 is displayed again.
- Print the actual weight: *P to Print*
  Press key [P]. The system executes the command. Subsequently, the command line as shown in point 5 is displayed again.
- Set the zero   *Unload and hit O*
  If necessary, zero setting (as described in point 2.) can be repeated.
- Finish calibration   *E to End*
  Press key [E]
  Calculating test ...   the system calculates the test value
  Calculating test ... Status OK

Subsequently, the standard command line is displayed:

```
Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed, Set Fullscale, Calibrate by Weight or Millivolts
E Exit calibration
```

Calibration is finished. The data must be saved: Proceed as described in points 9. and 10. of the 'Weighing point calibration procedure'.

5.6.6.2   Subsequent Deadload Correction

If the hopper weight changes e.g. due to loss (deadload reduction) or slag (deadload increase) by an amount which is higher than the zero set range, the automatic zero tracking and manual zero setting will not function any more. In these cases, subsequent deadload correction is possible, without recalibrating.
For this, call up the weighing point calibration and set only the deadload. Calibration must be skipped.

Zero correction
Proceed as described in points 1. to 7. of the 'Weighing point calibration procedure'. This is followed by actual calibration: zero correction:

1.   The following command line is displayed in the calibration mask: *Unload*

```
Calibration by weight
Unload and hit O or S to skip,
Q to quit, E to end, X to set fixed span, P to print
```

The system offers the following replies:
Unload and hit 0	unload scale, set the zero
S to skip	skip zero setting
Q to quit	leave the calibration without doing anything
E to end	calibrate and finish
X to set fixed span	set the fixed span
P to Print	print out the weight

2.   Set the deadload
- 1. Unload the scale
- 2. Press key [0]
- The instrument evaluates the data. The following command line is displayed in the calibration mask:

Setting deadloads ...	system saves the data, subsequently:
Setting deadloads ... Status OK	message is displayed during approx. 2 sec. The weight display goes to: 0000 kg

- In case of error, repeat zero setting. See point 3

3.   The following command line is displayed in the mask: *Unload/ Load*

```
Calibration by weight
Unload and hit O or S to skip,
E to end, X to set fixed span, P to print
```

The system offers the following replies:
Unload and hit 0	unload scale, set the zero
Load and hit Return	load the scale, set the span
E to End	finish calibration
X to set fixed span	set the fixed span
P to print	print out the calibration parameters

4.   Set only the zero = finish calibration   *E to End*
Press key [E]
Calculating test ...	system calculates the test value
Calculating test ... Status OK	Now, the following command line is displayed:

```
Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed, Set Fullscale, Calibrate by Weight or Millivolts
E Exit calibration
```

Subsequent deadload correction is finished. The data must be saved: proceed as described in points 9. and 10. of the 'Weighing point calibration procedure'.

5.6.7   Weighing Point Calibration without Weights

If the scale to be calibrated is not subject to the calibration law and if calibration with weights is not possible or not required for reasons of accuracy, weighing point calibration without weights is possible.

As a prerequisite, however, the load cell sensitivity (if possible, the sensitivity of each load cell) must be known.

This information can be used to calculate the span.

- Calculation of the load cell sensitivity

If the sensitivity C and the output resistance Ra of the individual load cells 1 to n are different, the mean load cell sensitivity C_{Avr} is calculated as follows:

$$C_{Avr} = \frac{\frac{C1}{Ra1} + \frac{C2}{Ra2} + ... + \frac{Cn}{Ran}}{\frac{1}{Ra1} + \frac{1}{Ra2} + ... + \frac{1}{Ran}}$$

The formula is simplified, if the output resistance Ra is almost equal for all load cells:

$$CAvr = \frac{1}{n} \sum C$$

Span: Calculation of equivalent input voltage in mV/V
The span indicates the equivalent input voltage in mV/V related to the full scale. It is calculated as follows:

$$\text{span [mV/V]} = \frac{\text{full scale} * \text{ load cell sensitivity CAvr [mV/V]}}{\text{load cell capacity (nominal load} * \text{no. of load cells)}}$$

- Deadload: calculation of the equivalent input voltage in mV/V
The input voltage equivalent to the deadload in mV/V is calculated as follows:

$$\text{deadload [mV/V]} = \frac{\text{deadload (weight)} * \text{ load cell sensitivity CAvr [mV/V]}}{\text{load cell capacity (nominal load} * \text{no. of load cells)}}$$

Unless the deadload is known from the very beginning, it must be estimated, and this estimation must be used to calculate the deadload in mV/V. The subsequent zero correction can be used to redetermine the

$\Rightarrow$ deadload subsequently (hopper is empty). See 'Subsequent zero correction' in 'Weighing point calibration with weights.'

5.6.7.1   Calibration without Weights

Proceed as described in points 1. to 7. of the 'Weighing point calibration procedure'. This is followed by the actual calibration:

1. The following command line is displayed in the calibration mask: *Deadload*

```
 Calibration by mV/V
Enter deadload mV/V, Q to quit, S to skip: _
```

Enter deadload mV/V	enter deadload in mV/V
Q to Quit	+ press Enter [↵] and quit without doing anything
S to Skip	+ press Enter [↵] and skip the tare entry

2. Enter the deadload in mV/V
    - Enter the deadload with comma (or point)
    - Complete by pressing the Enter key **[↵]**
    - The instrument evaluates the data.
      Now, the following command line is displayed in the weighing point calibration mask:
      Setting deadloads ...   system saves the data, subsequently:
      Setting deadloads ... Status OK   message is displayed during approx. 2 s
    - The weight display does not change.

3. The following command line is displayed in the calibration mask: Span

```
 Calibration by mV/V
Enter span mV/V, E to exit: _
```

Enter span mV/V	Enter the span in mV/V
E to Exit	+ Enter key **[↵]** no entry/ terminate calibration

4. Enter the span in mV/V
    - Enter the span with comma (or point)
    - Finish the entry by pressing the enter key [↵].

    - The instrument evaluates the data.
      Now, the following command line is displayed in the weighing point calibration mask:
      Setting span ...   the system saves the data. subsequently:
      Setting span ... Status OK   the message is displayed during approx. 2 s
      Calculating test ...   the system calculates the test value
      Calculating test ... Status OK

    - The new gross weight is displayed: *0027 kg*. Subsequently, the standard command line is displayed:

```
 Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed, Set Fullscale, Calibrate by Weight or Millivolts
E Exit calibration
```

Calibration is finished. The data must be saved: Proceed as described in points 9. and 10. of the 'Weighing point calibration procedure'.

5.6.7.2   Subsequent Deadload Correction

Proceed as described in points 1. to 7. of the 'Weighing point calibration procedure'.
This is followed by the actual calibration:

1.   The following command line is displayed in the calibration mask *Deadload*

```
Calibration by mV/V
Enter deadload mV/V, Q to quit, S to skip:_
```

Enter deadload mV/V	Enter the deadload in mV/V	
Q to Quit	+ Enter key [↵]	quit the calibration without doing anything
S to Skip	+ Enter key [↵]	skip the tare entry

2.   Enter the deadload in mV/V
          - Enter the deadload with comma (or point)
          - Press the Enter key to complete the operation [↵]

   •   The instrument evaluates the data.
        Now, the following command line is displayed in the weighing point calibration mask:
        Setting deadloads …   the system saves the data. Subsequently:
        Setting deadloads … Status OK   the message is displayed during approx. 2 s

   •   The weight display does not change.

3.   The following command line is displayed in the calibration mask   *Span*

```
Calibration by mV/V
Enter deadload mV/V, E to exit:_
```

Enter span mV/V	enter the span in mV/V
E to Exit	+ enter key [↵],
	no entry/ finish calibration

4.   Set only the zero = finish the calibration *E to End*
      Press key [E]

   •   The instrument evaluates the data.
        Now, the following command line is displayed in the weighing point calibration mask:
        Calculating test …   the system calculates the test value
        Calculating test … Status OK

   •   The new gross weight value is displayed: 0027 kg
   Subsequently, the standard command line is displayed:

```
Keys
Select item with cursor up/down/left/right Change with +/-
Return to FiXed, Set Fullscale, Calibrate by Weight or Millivolts
E Exit calibration
```

Calibration is finished. The data must be saved: proceed as described in points 9. and 10. of the 'Weighing point calibration procedure'.

5.6.8   Error Messages in the Calibration Menu

no standstill	no standstill was reached during calibration.
value is invalid	the parameter is too high or too low. Proposal of the highest permissible value with: **setting max. ...**
ADC Error	general error ADC/ load cells
current load is below deadload	occurs when entering the SPAN value. The deadload was removed. Subsequently, SPAN is below zero.
Current load is above full scale	occurs when entering the SPAN value or the calibration weight value. The input voltage or the input voltage calculated for the FSD >FSD.
Illegal stepwidth	the entered step width is not correct.
FSD not multiple of stepwidth	FSD not divisible by stepwidth/ incompatible stepwidth.
Fullscale is below calibration point	after calibration, a new FSD was entered again, which is below the initial calibration point/ FSD. Caution: subsequent entry of a **larger** scale is permissible, without recalibration!
overflow in converting units	These messages are only generated with different dimensions.
underflow converting units	To generate an error message, the scale must be incalculable, e.g. FSD 1000 kg, entered calibration weight 1g (should be 1 t, which would be accepted).
Input voltage above max	The actual or the calculated input voltage is > 36 mV
not enough counts per d	The measurement signal for the specified scale is too small

device not ready
protocol error
BCC error
	EAROM error
	    " "
	    " "

Canceled	Cancel by pressing key Q

5.6.9   Liquid Counter

With a liquid counter, weight value measurement is volumetric. The material flow passes through a flow counter, which generates one/several pulse(s) per defined flow rate. These specific data are entered during configuration of the liquid counter. The pulses are read in via a digital input, counted and converted into a weight value. Pulse evaluation is continuous, i.e. independent of whether batching is active or not. The max. frequency is 100 Hz at a mark to space ratio of 1:1.

⚠	The liquid counter pulse input has got a fixed input: PR 1713/17 has to be installed in slot1, channel 6 (B6-B7). The input cannot be used for other purpose, if a liquid counter has been assigned

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Configuration of WP B

  Type                 :liquid
  W & M                :    none
  Fullscale            :     1000kg
  Stepwidth            :  1
  Overload             :     9 d
  Minwgt               :     0 d
  Scale Weight         :       1kg
  Scale Counts         :   1 cnt
  Update Time   :      :   300 ms
```

The parameters can be selected using the two cursor keys **[↑]** and **[↓]**, for altering use the enter key **[↵]**.

- *W & M* : select none, OIML or NTEP see chapter 4.4.2
- FSD value: *Fullscale*
  The full scale value determines the maximum weight to be measured. Permissible entries cover the overall weight range between 0.1 00 and 99999 00 in g, kg, lb or t.
  The value must be divisible by 100 and must have max. 3 digits behind the decimal point. If the entry does not meet these criteria or weight unit (g, kg, lb or t) is missing, the following error message is displayed:
  Bad weight
- Stepwidth (divisions): *Stepwidth*
  Stepwidths: 1, 2, 5, 10, 20, 50. If the entry is different to a valid step, the following error message is displayed:
  Illegal step
- Maximum permissible overload: *Overload*
  Entry in d, permissible range 0 d to 9999999 d
- Min. weight limit for print-out: *Minwgt*
  Entry in d, permissible range 0 d to 9999999 d
- Weight value/ x pulse(s): *Scale Weight*
  Enter weight / pulse(s) with weight unit
  Permitted weight entries: 7 digits with decimal point
  Error message if no weight unit was entered: *Bad weight*
  Confirm with enter **[↵]**
- Number of pulses: *Scale Counts*
  Enter the number of pulses and confirm with enter **[↵]**
- Cycle time for weight display: *Update time*
  Permitted range: 50, 100, 200, ... 2000 ms
  Error message with faulty cycle time entry*: invalid,* values greater 2000 will be set to 2000

- Finish the configuration with *E Exit configuration*
  If parameters were changed, the following prompt is displayed:
  Save WP data (Y/N)

5.6.10 Customer–specific Weighing Point (user)

With a customer-specific weighing point, weight measurement is done by an external weighing point, which is connected via an interface. The weight must be provided at a definable SPM address by a customer-specific IEC 61131 program.

♦ Gravimetric weight measurement
   The weight values can be provided as follows:

   • The weight values are read in.
     The weight values are determined by an external weighing point module (e.g. PR 1710), read in by an IEC 61131 program and stored in the relevant SPM address.
   • Reading in and scaling of the measuring signal
     An analog or digital measuring signal, analogous to the weight value, is read in by an IEC 61131 program, converted according to a scale factor and stored in the relevant SPM address.

   The value is available for evaluation by the customer-specific IEC 61131 program. The scale factor can be entered in the configuration mask. Entry is as parameters 'Scale Weight' and 'Scale Counts'.

♦ Volumetric weight measurement
   Conversion into a weight value and weight pulse counting must be programmed in a customized IEC 61131 program.
   The parameters 'Scale Weight' and 'Scale Counts' can be entered in the configuration mask, i.e. it is available for evaluation by the customized IEC 61131 program.

♦ General technical data user weighing point

   • Weight input   configurable
   Memory location   M   marker area
   Size D   double word per weighing point

   • permitted input address range   %MD32 ... %MD255
   • Permitted batch modes   as standard weighing point
   • Batching cycle   50 msec
   • Power failure behavior
     Batching sequence   provided, as standard

   • Save the definition data in the PR 5610 RAM. Data must be re-entered after COLD start.

♦ Entering of configuration parameter is done with the following mask:

```
PR1713 Rel. 03.16 28.10.2005 09:05
     Configuration of WP B

 Type                 :user
 W & M                :    none
 Fullscale            :    1000kg
 Stepwidth            :  1
 Overload             :    9 d
 Minwgt               :    0 d
 Scale Weight         :     1kg
 Scale Counts         :   1 cnt
 Update Time  :       : 300 ms
 SPM marker address   :   32
```

The parameters can be selected using the two cursor keys **[↑]** and **[↓]**, for altering use the enter key **[↵].**

- *W & M* : select none, OIML or NTEP , see chapter 4.4.2
- FSD value: *Fullscale*
  The full scale value determines the maximum weight to be measured. Permissible entries cover the overall weight range between 0.1 00 and 99999 00 in g, kg, lb or t.
  The value must be divisible by 100 and must have max. 3 digits behind the decimal point. If the entry does not meet these criteria or weight unit (g, kg, lb or t) is missing, the following error message is displayed:
  Bad weight

- Stepwidth (divisions): *Stepwidth*
  Stepwidths: 1, 2, 5, 10, 20, 50. If the entry is different to a valid step, the following error message is displayed:
  Illegal step

- Maximum permissible overload: *Overload*
  Entry in d, permissible range 0 d to 9999999 d

- Min. weight limit for print-out: *Minwgt*
  Entry in d, permissible range 0 d to 9999999 d

- Weight value/ x pulse(s): *Scale Weight*
  Enter weight / pulse(s) with weight unit
  Permitted weight entries: 7 digits with decimal point
  Error message if no weight unit was entered: *Bad weight*
  Confirm with enter [↵]

- Number of pulses: *Scale Counts*
  Enter the number of pulses and confirm with enter [↵]

- Cycle time for weight display: *Update time*
  Permitted range: 50, 100, 200, ... 2000 ms
  Error message with faulty cycle time entry*: invalid,* values greater 2000 will be set to 2000

- Address of SPM marker: *SPM marker address*
  Enter address within range 32 - 255.

- Finish the configuration with *E Exit configuration*
  If parameters were changed, the following prompt is displayed:
  Save WP data (Y/N)

5.6.11 GWT Scale

The weight is read directly from the PR 1720 or PR 5610. By means of a customized IEC 61131 program, the weight value (read out with GET_WEIGHT) can be made available on the alphanumeric display.
The weighing point is indicated in the mask header: *Configuration of WP B*

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Configuration of WP B

 Type             :GWT Scale
 W & M            :    none
 Overload         :       9 d
 Minwgt           :       0 d
 Update time      :     300 ms
 Fieldbus slave   :       1
 Serial number    :       0
```

- *W & M* : select *none, OIML* or *NTEP*, see chapter 4.4.2
- Enter maximum permissable *Overload*
  Permitted range: 0 … 9999999d
- Enter weight limit for print-out *Minwgt*
  Permitted range: 0 … 9999999d
- Enter *Update time*
  Permitted range: 50, 100…2000 ms
  Error message with faulty cycle time entry*: invalid,* values greater 2000 will be set to 2000
- Enter *Fieldbus slave* address
  Permitted range: 1 … 32 (according to the position at the remote bus)
- Enter board number *Serial number*
  If the board number (for PR 1720 rel. 2.50 is required) is not set to *0*, it will be checked. If the number does not match, an error 15 is generated.
- Finish the configuration with *E Exit configuration*
  If parameters were changed, the following prompt is displayed:
  Save WP data (Y/N)

5.6.12   Sartorius Scale (xBPI)

The weight is read from a Sartorius scale via the xBPI protocol.
The weighing point is indicated in the mask header: *Configuration of WP B*

```
PR1713 Rel. 03.16 28.10.2005 09:05
     Configuration of WP B

 Type                   :xBPIScale
 W & M                  :    none
 Overload               :       9 d
 Minwgt                 :       0 d
 Update time            :     300 ms
 Serial number          :       0
```

- *W & M* : select *none, OIML* or *NTEP* , see chapter 4.4.2
- Enter maximum permissable *Overload*
  Permitted range: 0 ... 9999999d
- Enter weight limit for print-out *Minwgt*
  Permitted range: 0 ... 9999999d
- Enter *Update time*
  Permitted range: 50, 100...2000 ms
  Error message with faulty cycle time entry *: invalid,* values greater 2000 will be set to 2000
- Enter *Serial number*
  If serial number is not set to *0* , the scale . will be checked. If the number does not match, an error 15 is generated

- Finish the configuration with *E Exit configuration*
  If parameters were changed, the following prompt is displayed:
  Save WP data (Y/N)

5.7   Sub-Menu Service

Mask *Service* is called up from the *Main-Command-Level* by pressing key [S].

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Service                           Mo 31.Oct 2005 09:31:51

  H Show hardware configuration
  M Show available memory
  T Test Inputs/Outputs
  F Show last fault

  B Show Bios version
  P Print all configuration data
  E Exit
```

The following menu items are called up by pressing the relevant keys:
- Display of hardware configuration   *H Show hardware configuration*
- Display of available memory   *M Show available memory*
- Test of input and output modules   *T Test Inputs/Outputs*

⇒ If a production is busy, the module test (T) is disabled:
> *Production is active, testmode is not possible*
> *Hit any key to continue*
> *Press any key to remove this message.*

- Hex-Dump of the last "fatal system error"   *F Show last fault*

⇒ The last error is shown, even if a new software has been flashed

- Current Bios version   *B Show Bios version*
- Print out all configuration data.   *P Print all configuration data*
- Leave sub-menu Service   *E Exit*
   As no data can be changed, return is direct to the main menu without additional prompts.

5.7.1   Available Memory in PR5610

Calling up mask *Show available memory* is from sub-menu *Service* by pressing key [M].

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Service                           Mo 31.Oct 2005 09:31:51

MEMORY STATISTICS

  262144 bytes physical memory bank 1
+      0 bytes physical memory bank 2
  262144 bytes total physical memory
- 156928 bytes used by system
  105216 bytes maximum memory available
-  16608 bytes memory in use
   88608 bytes free memory

       1 blocks
   88608 bytes in largest block
Hit any key to continue
```

The following information is displayed in the mask

- Standard memory [bytes]   *bytes physical memory bank 1*
- Memory Ext. PR 1713/05 [bytes]   *bytes physical memory bank 2*
- Max. free memory capacity [bytes]   *bytes total physical memory*
- Memory used by system [bytes]   *bytes used by system*
- Memory available [bytes]   *bytes maximum memory available*
- Memory used [bytes]   *bytes memory in use*
- Free memory capacity [bytes]   *bytes free memory*

- Number of available blocks   *blocks*
- Largest available block [bytes]   *bytes in largest block*

Hit any key to continue to leave the mask.

5.7.2   Show Hardware Configuration

Calling up mask *Show hardware configuration* is done from sub-menu *Service* by pressing [H] Hardware

```
PR1713 Rel. 03.16 28.10.2005 09:05
   Show hardware configuration          Mo 31.Oct 2005 09:31:51


I/O-Slot 1 : PR1713/04 Serial Interface RS232 and RS485
I/O-Slot 2 : PR1713/06 Analog Out
I/O-Slot 3 : PR1713/12 Digital I/O (opt)
I/O-Slot 4 : PR1721    Fieldbus card


Hit any key to continue
```

- The option modules identified by the system software are displayed.
- If modules are containing firmware, the software version is also displayed.

5.7.3   Testing the Input and Output Modules

- During module testing (T), no outputs are set by the internal PLC programs, i.e. the PLC programs continue running, the inputs are read, but the output commands are not transmitted to the process.

Calling up mask *Test Inputs/Outputs* is from sub-menu *Service* by pressing key [T].

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Test Inputs/Outputs                 Mo 31.Oct 2005 09:31:51

1  I/O-Slot 1 : PR1713/04 Serial Interface RS232 and RS485
2  I/O-Slot 2 : PR1713/06 Analog Out
3  I/O-Slot 3 : PR1713/12 Digital I/O (opt)
4  I/O-Slot 4 : PR1721    Fieldbus card

E Exit
```

The modules in slot 1 - 3 and in slot 4 identified by the system software are displayed.

- Select and test module
  The mask corresponding to the module type is displayed by entry of the slot number 1...4. Description of the module-specific tests is in the following sub-sections.

- Leave sub-menu 'Test Input/Output' *E Exit*

⇒ After leaving this mask (E), return is to sub-menu 'Service'. Only then all outputs set during testing are reset and the output commands of the PLC programs are retransmitted to the process.

5.7.3.1   PR1713/04 Serial I/O Module Testing

At the hardware test level, PR 1713/04 serial interface cards can be tested, provided that the following jumpers are fitted in the terminal blocks:

Terminal block B upper row	RS 232	B1 DCD	B2 RXD	B3 TXD	B4 DTR	B5 Sign. GND	B6 RTS	B7 CTS	B8 RI

DIP switch settings S101:
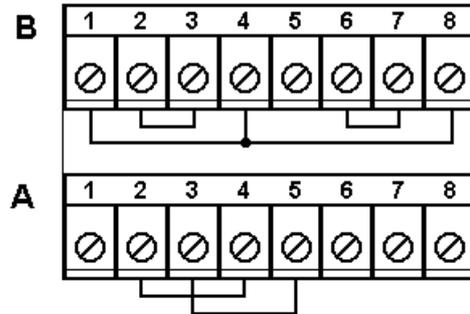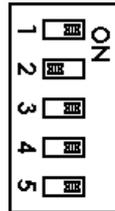
Terminal block A bottom row	RS485/ 422 Switch ON acc. to table	A1 Sign. GND	A2 TxB	A3 TxA	A4 RxB	A5 RxA	A6 nc	A7 nc	A8 nc

The interfaces are given logic names in the order of allocation found in the slots. In this example, the only card is always detected as TTY1 and TTY2, whereby TTY1 is the RS 485 and TTY2 is the RS 232 interface.
Output in case of success:

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Test PR1713/04 Slot-Number 1          Mo 31.Oct 2005 09:31:51

  RS485:
      Send with RTS ON : passed
      Send with RTS OFF: passed (nodata)
      Send with RTS ON : passed

  RS232:
      TxD-RxD    : passed
      RTS-CTS    : passed
      DTR-DCD/RI : passed
```

Output in case of error (e.g.):

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Test PR1713/04 Slot-Number 1          Mo 31.Oct 2005 09:31:51

  RS485:
      Send with RTS ON : failed (nodata)
      Send with RTS OFF: passed (nodata)
      Send with RTS ON : failed (nodata)

  RS232:
      TxD-RxD    : failed (nodata)
      RTS-CTS    : pattern failed
      DTR-DCD/RI : pattern failed
```

5.7.3.2   Analog Input / Output Module Testing

The test can be executed for PR 1713/06 and PR 1713/07.

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Test PR1713/06  Slot-Number 2         Mo 31.Oct 2005 09:31:51

   Current Analog Output Value:  Dec: 75.0% = 15.000 mA (9FAD)
Enter decimal output 0..100%: _
   Set Output:
   D Decimal-Input-Format 0..100% for Output-Value
   C Current-Input-Format 0.000..24.000 mA for Output-Value

   E Exit
```

♦ Display of the socket number is in mask header:
Test PR 1713/06 Slot-Number 2
♦ Enter the analog output value
    Entry of the analog output value is possible in two formats. Selection is by entry of the relevant letter.
-     decimal entry 0...100%   *D Decimal-Input-Format 0...100% for Output-Value*
-     current entry 0.000 - 24.000 mA   *C Current-Input-Format 0.000 24.000 mA for Output-Value*
    The dialog line for decimal input is displayed as an example.
♦ Display of the actual analog output value is in the two formats. See line: *Current Analog Output Value*
-     decimal   *Dec: 75.0%*
-     current   *15.000 mA*
♦ Leave mask 'Test PR 1713/06' with *E Exit*

$\Rightarrow$ After leaving this mask (E), return is to the sub-menu
Test Inputs/Outputs: The entered output values remain set, until returning to menu *Service*.

With PR 1713/07 additionally the analog-inputs are displayed:

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Test PR1713/07  Slot-Number 2         Mo 31.Oct 2005 09:31:51

   Current Analog Output Value:  Dec: 75.0% = 15.000 mA (9FAD)

Enter decimal output 0..100%: _
   Analog Input 1 = 3072 = 75% = 3,75V Hex: BFF
   Analog Input 2 = 3072 = 75% = 3,75V Hex: BFF
   Analog Input 3 = 3072 = 75% = 3,75V Hex: BFF
   Analog Input 4 = 3072 = 75% = 3,75V Hex: BFF
   Set Output:
   D Decimal-Input-Format 0..100% for Output-Value
   C Current-Input-Format 0.000..24.000 mA for Output-Value

   E Exit
```

5.7.3.3   Digital Module Testing

The test can be executed for PR 1713/12, PR 1713/15 and PR 1713/17.

```
PR1713 Rel. 03.16 28.10.2005 09:05
    Test PR1713/12  Slot-Number 3

  Inputs: I1= 1  I2= 0  I3= 1  I4=  1
  Outputs: Dec: 11    Hex: B    Bin:  1011

  Set Outputs:
  D Decimal-Input-Format for Output-Value
  H Hexadecimal-Input-Format for Output-Value
  S Set Bit   Bit-Nr. 0..n
  R Reset Bit Bit-Nr. 0..n

  E Exit
```

◆ Display of slot number
The slot number is displayed in the mask header: *Test PR 1713/12 Slot-Number 3*

◆ Display of the actual digital input values
    The actual values are displayed:
    Inputs: I1= 1 I2= 0 I3= 1 I4= 1

◆ Entry of output values
    Entry of the values for the outputs (e.g. 4 in PR 1713/ 12 and 1713/15) is possible in various formats.
    Selection is by entry of the relevant letter.
    Set all outputs simultaneously:
    • Decimal input format   *D Decimal-Input-Format for Output-Value*
    • Hexadecimal entry   *H Hexadecimal-Input-Format for Output-Value*
    Setting/ resetting individual outputs:
    • Set a bit, bit no. 0...n   *S Set Bit Bit-Nr. 0 ... n*
    • Reset a bit, bit no. 0...n   *R Reset Bit Bit-Nr. 0 ... n*

    Example for dialogue line for setting a bit: *Enter Bit-Number for Set: 3*

◆ Display of output values
    Display is in three formats. See the following mask line: *Outputs:*
    • Decimal   *Dec:*   *11*
    • Hexadecimal   *Hex:*   *B*
    • Binary (MSB left, LSB right)   *Bin:*   *1011*

◆ Leave mask 'Test PR 1713/12' with   *E Exit*

After leaving this mask (E), return is to the sub-menu. *Test Inputs/Outputs:*
The entered output values remain set until returning to menu 'Service'.

5.7.3.4   Test BCD-Output

The screen for testing PR1713/08 is displayed, if the card is detected in the system. The actual input- and output values are displayed binary and for the output also in hex- and decimal notation. Single output bits may be changed by 'Set Bit' or 'Reset Bit'. You may enter output data in hex- or decimal format. By means of 'Control: X1Y0' the output is controlled by the input Enab.

5.7.3.5   Test DIOS Card

The screen for testing PR 1713/13 is displayed, if the card is detected in the system. The fields 'Ready' and 'Run' must be active. Changes of the inputs at the remote bus are displayed. By means of 'Modify bytes' outputs at the remote bus can be changed. The fields "BSA, CTR, RB, LB, MOD" are not in use, they are intended for future extensions.

```
PR1713 Rel.03.16 28.10.2005 09:05
    Test PR1713/13  Slot-Number 3

  Diag Bits=A0: Ready Fail Run BSA CTR RB LB MOD

  %IB 3.x  =000100A001000000 IBS Status
  %IB 3.1.x=0000            %QB 3.1.x=0000

  E Exit       Return  Modify bits
```

5.7.3.6   Test Fieldbus Card

The screen for testing PR 1721 is displayed, if the card is detected in the system. Depending of the type of the card a fitting headline is generated, additionally the input- and output string is displayed, e.g. for PR 1721/01:

```
PR1713 Rel.03.16 28.10.2005 09:05
    Test PR1721

  PR1721 Profibus-DP Slave

  Indata  0000000000000000
  Outdata 0000000000000000

  E Exit
```

5.7.4   Printing all Configuration Data

Calling up is done by pressing key [P]:

- Print out all configuration data: *P Print all configuration data*

Printing out is done via the serial interface configured for the printer.

5.8   IEC 61131 Operating Level

The operating level is required for testing (user-specific) IEC 61131 programs.
Calling up Commandline operating level is done from the Main-Command-Level by pressing key [L].

- An empty screen with prompt character '>' is displayed.
  The cursor is positioned behind character '>'.
  The operating level expects the entry of a command.

- By entry of command *Help* (complete by pressing the Enter key [↵]), a short-form description of possible commands is displayed.

Subsequently, the system waits again for entry of a command:

```
>help
DIR [FB|FU|PG] [OPER|PLC|REC]
SHOW TASK    [OPER|PLC|REC] [/STATUS][/TIME][/CONT]
SHOW TABLES [<dbase_name>]
SHOW TOPCPU
EXIT
KILL <OPER|PLC|REC> <1|2|3|4|ALL>
RESTART <OPER|PLC> <1|2|3|4|ALL>
DELETE <dbase_name>
[@] <program_name> [/NOBREAK]

>_
```

Leaving the IEC 61131 operating level

- By entry of command *Exit* (complete by pressing the Enter key [↵]), return is to the Main-Command-Level.

6   Technical Data

The characteristical data are valid after a min. warm-up time of 60 minutes (reference temperature 23° C). Values specified without tolerances are average values and are only used for information.

6.1   Analog Part, A/D Conversion

Principle	DC. voltage, integrating A/D converter, ratiometric to the load cell supply voltage
Conversion time	50 ms
Measuring time	50 ms, 100 ms and multiples up to 2 s
Analog filter	active Butterworth low-pass 40 dB/ decade, limiting frequency 2 Hz
Digital filter	active 4th order (low-pass) Bessel or aperiod. or Butterworth or Tschebyscheff filter, limiting frequency adjustable within 0.1 Hz and 5 Hz

6.1.1   Accuracy and Stability

Accuracy class Ⓘ	$\leq$ 5000 e according to OIML R76 / EN 45501 , (EC-type approval D99-09-039) class III
Min. meas. signal (OIML)	0.3 mV/V or $\geq$ 3.6 mV for 3000 e, 0.5 mV/V or $\geq$ 6 mV for 5000 e
Min meas. signal (NSC)	0.25 mV/V or $\geq$ 3.0 mV for 3000 e, 0.417 mV/V or $\geq$ 5 mV for 5000 e
Linearity error	< 0.007 %
Zero stability error	TK_0 < 0.1 μV/K RTI
SPAN stability error	TK_{Spn} < +/- 6 ppm/K

6.1.2   Sensitivity

Sensitivity	1.2 μV/e for 5000 e OIML , 1.0 μV/e for 5000 e NSC 1.0 μV/e for 3000 e OIML, for 5000e NSC multi range scale
(at 4 cnt/d)	0.42 μV/d, not 'legal for trade'
(at 1 cnt/d)	0.11 μV/d, not 'legal for trade', internal sensitivity
Resolution internal	>330,000 steps with 36 mV
Min. meas. Signal	>0.03 mV/V for 3000 steps internal, not 'legal for trade'
Input voltage (meas.-signal + deadload)	0 ... max. 36 mV =
Deadload range	36 mV - (max. meas. signal); entry/ calibration via software

6.1.3   Load Cells

Load cell connection	all strain gauge cells, 6 or 4-wire connection possible.
Load cell supply	U= $\pm$ 6 V for I_{max}= 160 mA
Load cell supply circuit	12V DC for max. 8 load cells each with 650 Ω for 4 load cells each with 350 Ω
Max. load	$\geq$ 75 Ω

6.1.4   Safe Condition

The software is monitored by a watchdog timer. In case of error, reset occurs, whereby all digital and analog outputs are reset to a defined condition. The load cell input is checked, if the error leads to a measurement value which does not make sense. No failure checking of digital inputs and outputs or of analog output is made.

6.1.5   EC–Declaration of Conformity

The EC-Declaration of Conformity can be found as PDF file in the directory Certificates on the CD-Rom delivered with the instrument.

6.1.6   Test Certificate

For the instrument PR1713..., PR5610 (X5), PR5710 (X6) a test certificate has been issued by the PTB for class III, n<=5000e with the number D09-02.33.
In the directory certificates on the CD-ROM delivered the respective document can be found as PDF-file.

6.1.7   Certificate of type approval

The SARTICS scale is based on the instrument and has got the type approval no. D04-09-015 by Physikalisch-Technische Bundesanstalt (PTB) for non-automatic weighing machines.
The EC type-approval certificate can be found as PDF file in the directory Certificates on the CD-Rom delivered with the instrument.

For 'legal for trade' applications the **W&M** mode has to be set to **OIML** (**NTEP** for US, **NSC** for Australia), see chapter 4.5.13.1.

6.2   Digital Part

Processor: MC68331 with 16 MHz
SRAM: 2x 128k8 (max. 2x 512k8) in SMD
                    Optional: PR 1713/05 2x 512k8 for plugging into DIP
FLASH: 2x 512k8
EAROM: 2k8 SPI

6.2.1   Backup Battery

	Battery not activated	10 years
Lifetime:	Battery activated, instrument connected to mains	10 years
	Battery activated, instrument not connected to mains	5 years

6.2.2   Display

Vacuum-fluorescent display with serially connected data interface.

Weight display   (top)   7 large digits for weight, dimension and status
Dialogue display   (bottom)   2 rows each with 20 characters (dot matrix) for text.

6.2.3   Keypad

Für die Eingabe hat die Frontplatte ein alphanumerisches Tastenfeld mit 31 Tasten.
Abmessungen: 103 x 247 mm

6.2.4   External Keyboard

External PC keyboard, max. 50 mA current consumption (no additional units are possible!). The DIN socket for the keyboard is protected by a multi-fuse element.

6.2.5   Builtin RS 232 Interface

Terminal block; functions: calibration, configuration, operation, communication
Mode   RS 232, XON/XOFF, ANSI, various protocols
Baudrate   300 - 19200 Bd
Data bits   7/ 8 Bit
Parity   none, odd, even

6.2.6   Power Supply

Power voltage PR 5610/X0	115 V/ 230 V AC	+10% / -15%	48-62 Hz
Power voltage PR 5610/X1	24 V AC or 24V DC	+10% / -15%	48-62 Hz
Power consumption	14,5 W/ 19 VA		

6.3   Environmental Effects

6.3.1   Power Voltage Sags

Power voltage sags   >10 ms at 100% sag, without instrument reaction
                                       >20 ms at 50% sag, "   "   "   "

6.3.2   Environmental Conditions

Temperature range
    Ambient temperature operation   -10... +40 ℃
    Switch-on temperature   0... +40 ℃
    Storage/ transport   -40... +70 ℃
Humidity   < 95 %, without condensation, (acc. to IEC 68-2)
Protection type   IP 65
Vibration   to IEC 68-2-6, test Fc

6.3.3   Electromagnetic Immunity

Electrostatic discharge   min. EN 61000-4-2, level 3
Interference (supply and data cables) min. EN 61000-4-4, level 2
Electromagnetic fields   min. EN 61000-4-3, level 2

6.3.4   RF Interference Suppression

Electromagnetic emission   acc. to EN55011 group 1, limit value class B

6.4 Mechanical Data

6.4.1 Construction Type

All metal housing of stainless steel. Protection class IP 65.

6.4.2 Dimensions

Housing	Dimensions
Width	288 mm
Height	144 mm
Depth	130 mm (135 mm incl. blind plugs)

6.4.3 Connections

Via PG glands. Plug-in screw terminals in the unit.

6.4.4 Accessories

Installation manual on CD-ROM.
2 cable ties, screw driver, metal PG glands:

EMC-glands	2x PG 13,5
	1x PG 9

Optional	
Installation manual on paper (English)	order no. 9499 050 60004
Installation manual on paper (German)	order no. 9499 050 60084
W&M sealing labels, (for PR17xx family, X5)	order no. 9405 317 99991

6.4.5 Weight

Net weight	3.5 kg
Shipping weight	5 kg

6.4.6 Installation kit (optional)

Installation kit PR1713/91 for installation in control cabinets or control panels
Control panel cut out, (W x H): 278 mm x 134 mm

6.5   Fieldbus Options

6.5.1   Interbus–S/ Profibus–DP/ DeviceNet

INTERBUS	Standard	DIN 19258 INTERBUS
	Baudrates [kBps]	500 [kBps]
	Node width	8 bytes or 4 words
	Process data	yes
	Parameter data	no
	ID	03 ⇔ remote digital bus unit with I/O
PROFIBUS	Standard	EN 50 179 volume 2, PROFIBUS DIN 19245: PROFIBUS, Process Field Bus (part 1 and 3)
	Baudrates [kBps]	9.6, 19.2, 93.75, 187.5, 500, 1500, 12000, automatic detection
	Buffer size	8 bytes
	I/O data	8 bytes per
	UserPrm	No
	Sync	YES
	Freeze	YES
	Clear	YES
	Set–Slave–Add	No
DeviceNet	Standard	Specification DeviceNet Volume 1 Release 1.3 and Volume 2 Release 1.2 from 4.3.1996
	Baudrates [kBps]	125, 250, 500
	Common Services	Get_Attribute_Single, Set_Attribute_Single, Reset

6.5.2 GSD File for PR1721 Profibus DP

The GSD-file gwt_5610.gsd can be found on the CD-ROM which is enclosed in the instrument delivery. The file can also be loaded from the internet: http://www.sartorius-mechatronics.com.

```
;
;=======================================================================
;GSD-Datei für das Profibus-Interface von PR1721/xx ab Firmware 3.12
;Stand 11.05.2004 - GLOBAL Weighing Technologies
;=======================================================================
;
#Profibus_DP
Vendor_Name       = "GLOBAL Weighing Technologies"
Model_Name        = "PR1721/xx Profibus Interface"
Revision          = "Version 1.3"
GSD_Revision      = 1
Ident_Number      = 0x5610
Protocol_Ident    = 0         ;Nur DP-Gerät
Station_Type      = 0         ;Kompakt Station
FMS_supp          = 0         ;FMS wird nicht unterstützt
Hardware_Release = "1.0"
Software_Release = "3.12"
Slave_Family = 0
Max_Diag_Data_Len=6
;
9.6_supp   = 1                ;unterstützte Baudraten
19.2_supp  = 1
93.75_supp = 1
187.5_supp = 1
500_supp   = 1
1.5M_supp  = 1
3M_supp    = 1
6M_supp    = 1
12M_supp   = 1
;
MaxTsdr_9.6   = 60    ;max. Antwortzeiten bei den unterschiedlichen Baudraten
MaxTsdr_19.2  = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500   = 100
MaxTsdr_1.5M  = 150
MaxTsdr_3M    = 250
MaxTsdr_6M    = 450
MaxTsdr_12M   = 800
;
Redundancy = 0         ;keine redundante Übertragung

Repeater_Ctrl_Sig   = 2        ; TTL
Implementation_Type = "SPC3"

24V_Pins            = 0   ;keine 24V für den Anschluss eines Wartungsgerätes
Freeze_Mode_supp    = 1   ;Freeze Modus wird unterstützt
Sync_Mode_supp      = 1   ;Sync Modus wird unterstützt
Auto_Baud_supp      = 1
Set_Slave_Add_supp = 0
User_Prm_Data_Len   = 0
Min_Slave_Intervall = 50     ; 50x100uS->5ms. min. Slave intervall
Modular_Station = 1
Max_Module = 4
Max_Output_Len = 64
Max_Input_Len = 64
Max_Data_Len = 128
;----------------------------------------------------------------------
; Bei Einbau einer PR1721/01 Karte muss
; "8 Byte I/O Konsistent" gewählt werden
;----------------------------------------------------------------------
; Bei Einbau einer PR1721/11,/21,/31 Karte und Benutzung des
; GwtStdScale Interface muss je nach Anzahl der konfigurierten I/Os
; ein oder mehrfach "8 Byte I/O Konsistent" gewählt werden
;----------------------------------------------------------------------
; Bei Einbau einer PR1721/11,/21,/31 Karte und Benutzung des
; PhaseControllers muss je nach Anzahl der konfigurierten I/Os
; ein oder zweifach "16 Word I/O Konsistent" gewählt werden
;----------------------------------------------------------------------
; Sonst kann bei Einbau einer PR1721/11,/21,/31 Karte
; jede beliebige Kombination von Modulen gewählt werden,
; die rechnerisch die konfigurierte Anzahl von I/Os ergibt.
;----------------------------------------------------------------------
```

```
Module = "8 Byte I/O Konsistent" 0xB7
EndModule
Module = "16 Byte I/O Konsistent" 0xBF
EndModule

Module = "8 Byte I/O Separate" 0x37
EndModule
Module = "16 Byte I/O Separate" 0x3F
EndModule

Module = "4 Word I/O Konsistent" 0xF3
EndModule
Module = "8 Word I/O Konsistent" 0xF7
EndModule
Module = "16 Word I/O Konsistent" 0xFF
EndModule

Module = "4 Word I/O Separate" 0x73
EndModule
Module = "8 Word I/O Separate" 0x77
EndModule
Module = "16 Word I/O Separate" 0x7F
EndModule
```

6.5.3   EDS File for PR1721 DeviceNet

EDS file pr1713.eds can be loaded from the internet **http://www.sartorius-mechatronics.com** or generated from this listing.

```
$ DeviceNet Manager Generated Electronic Data Sheet
[File]
      DescText = "PR1713";
      CreateDate = 11-24-99;
      CreateTime = 11:28:26;
      ModDate = 11-24-99;
      ModTime    = 11:28:26;
      Revision = 1.0;

[Device]
      VendCode = 560;                            $ Vendor Code
      ProdType = 100;                            $ Product Type Generic
      ProdCode = 1713;                           $ Product Code

      MajRev = 1;                                $ Major Rev
      MinRev = 1;                                $ Minor Rev
      VendName = "GWT Global Weighing Technologies GmbH";
      ProdTypeStr = "Weigh Scale";
      ProdName    = "System Weighing Controller";
      Catalog = "PR1713";

[IO_Info]
      Default = 0X0001;

      PollInfo =
      0X0001,
      1,
      1;

      Input1 =
      8,                                         $ Up to 8 bytes
      0,                                         $ All bits significant
      0x0001,                                    $ Poll only connection
      "Input Data",
      0,
      "0",
      "The Slot 4 input data";                   $ Help string

      Output1 =
      8,
      0,
      0x0001,                                    $ Poll only connection
      "Output Data",
      0,
      "0",
      "The Slot 4 output data";
[ParamClass]
      MaxInst=0;
      Descriptor=0;
      CfgAssembly=0;

[Params]

[EnumPar]

[Groups]
```

7 Annex

7.1 Spare Parts

Description	Service code number
MAINBOARD, BOARD 1 (POWER SUPPLY / ANALOG PART / SLOT 1 - 3) PLEASE OBSERVE BOARD NUMBER / LICENCE	5312 216 98338
DIGITAL BOARD, BOARD 2 (PROCESSOR / SLOT 4)	5312 216 98339
MAINS TRANSFORMER	5312 145 48006
FRONT FOIL KEYPAD Batch-X5	5312 455 98044
FRONT FOIL KEYPAD IBC-X5	5312 455 98045
FRONT FOIL KEYPAD Flow-X5	5312 455 98046
FRONT FOIL KEYPAD Truck-X5	5312 455 98047
DISPLAY BOARD CX 050	5312 131 98011
FRONTPLATE 8 SCREWS (without PCBs)	5312 310 18047
BATTERY LITHIUM 3V CR2354 (ON BOARD 2)	5312 138 18013
FUSE 250 MA delayed	5312 253 28005
CABLE ENTRY GLAND PG 9	5312 505 48013
CABLE ENTRY GLAND PG 13.5	5312 505 48014
CABLE ENTRY GLAND PG 11	5312 505 48015
CONNECTOR, 7 POL / LOADCELL	5312 264 48007
CONNECTOR , 5 POL BUILT-IN SER I/O	5312 264 48008
CONNECTOR , 8 POL - OPTION SLOTS	5312 264 48009
SCREW FOR FRONTPLATE (10 pieces)	5312 502 18009
GASKET FOR FRONTPLATE	on request

7.2 Further Documents

Depending on the application package (e.g. Batch-X5), the corresponding Operating Manuals are delivered.

7.3 Glossary

The following terminology is used in this document:

ADC	Analog digital converter, internal ADC (LC signal converter)
CAL	Single in line switch for data protection (see chapter 3.2)
COLD start	All programs and tables loaded in the RAM are erased
DDE	Microsoft communication protocol (Dynamic Data Exchange)
EW protocol	The serial communication protocol for SARTORIUS batching systems, version V1/ V2/ V3
Flash	Program loading (also parts)
FSD	Full scale deflection
GND	Ground, common (earth) potential
InBatch	Batch Control System of the Wonderware company
Interbus-S	A standard communication protocol
ISA S88.01	ISA standard related to Batch Control
PLC	Programmable logic controller (German: SPS)
Profibus DP	A standard communication protocol
Recipe	Recipe (see ISA S88)
SPM	Memory area (Scratch Pad Memory) of internal PLC
Warmstart	Initialization, all data remain unchanged

8 Index