KERN & Sohn GmbH
Ziegelei 1
D-72336 Balingen
E-Mail: info@kern-sohn.com
Tel: +49-[0]7433- 9933-0
Fax: +49-[0]7433-9933-149
Internet: www.kern-sohn.com

Operating instruction
Analytical balance

KERN ALJ_N/ALS_N

Version 2.2
10/2007
GB

ALJ_N/ALS_N-BA-e-0722

GB

KERN ALJ_N/ALS_N

Version 2.2 10/2007

Operating Manual

Electronic Analytical Balance

Table of Contents

1 Technical data

KERN	*ALJ 160-4NM*	*ALJ 220-4NM*
Weighing range (max)	*160 g*	*220 g*
Readability (d)	*0,1 mg*	*0,1 mg*
Minimum load	*10 mg*	*10 mg*
Verification value	*1 mg*	*1 mg*
Verification class	*I*	*I*
Reproducibility	*0,2 mg*	*0,2 mg*
Linearity	*± 0,2 mg*	*± 0,2 mg*
Stabilization time (typical)	*4 sec*	*4 sec*
Minimum unit weight at piece countin	*> 0,5 mg*	*> 0,5 mg*
Warm-up time	*8 hours*	
Adjustment weight	*internal*	
Reference quantities at piece counting	*10, 20, 50, freely selectable*	
Weighing Units	*mg, g, ct*	
Electric Supply	*230V/50 Hz (Euro)11V AC*	
Operating temperature	*+ 18° C …. + 30° C*	
Humidity of air	*max. 80 % (not condensing)*	
Underfloor weighing	*Clevis type eyelet, standard*	
Housing (B x D x H) mm	*206 x 335 x 335*	
Dimensions glass windscreen	*168 x 160 x 225 (weighing space)*	
Weighing plate (stainless steel) mm	*85 mm*	
Weight kg (net)	*6.3 kg*	
Interface	*RS 232C*	

KERN	*ALJ 220-5 DNM*	*ALJ 310-4N*
Weighing range (max)	*60 g/220 g*	*310 g*
Readability (d)	*0,01 mg/0,1 mg*	*0,1 mg*
Minimum load	*1 mg*	*-*
Verification value	*1 mg*	*-*
Verification class	*I*	*-*
Reproducibility	*0,02 mg/0,1 mg*	*0,1 mg*
Linearity	*± 0,1 mg/0,2 mg*	*± 0,3 mg*
Minimum unit weight at piece countin	*> 0,1 mg*	*> 0,5 mg*
Stabilization time (typical)	*13 sec/5 sec*	*4 sec*
Warm-up time	*8 hours*	
Adjustment weight	*internal*	
Reference quantities at piece counting	*10, 20, 50, freely selectable*	
Weighing Units	*mg, g, ct*	
Electric Supply	*230V/50 Hz (Euro)11V AC*	
Operating temperature	*+ 18° C …. + 30° C*	
Humidity of air	*max. 80 % (not condensing)*	
Underfloor weighing	*Clevis type eyelet, standard*	
Housing (B x D x H) mm	*206 x 335 x 335*	
Dimensions glass windscreen	*168 x 160 x 225 (weighing space)*	
Weighing plate (stainless steel)	*70 mm*	*85 mm*
Weight kg (net)	*6.3 kg*	
Interface	*RS 232C*	

KERN	*ALS 120-4N*	*ALS 220-4N*
Weighing range (max)	*120 g*	*220 g*
Readability (d)	*0.1 mg*	
Reproducibility	*0.2 mg*	
Linearity	*± 0.2 mg*	
Warm-up time	*8 hours*	
Recommended adjustment weight, not added (class)	*100 g (E2)*	*200 g (E2)*
Minimum unit weight at piece counting	*> 0.5 mg*	
Reference quantities at piece counting	*10, 20, 50, freely selectable*	
Weighing Units	*mg, g, ct, oz, ozt, GN, mom, dwt, teal*	
Stabilization time (typical)	*4 sec.*	
Electric Supply	*230V/50 Hz (Euro)11V AC*	
Operating temperature	*+ 18° C …. + 30° C*	
Humidity of air	*max. 80 % (not condensing)*	
Underfloor weighing	*Clevis type eyelet, standard*	
Housing (B x D x H) mm	*206 x 335 x 335*	
Dimensions glass windscreen	*168 x 160 x 225 (weighing space)*	
Weighing plate (stainless steel) mm	*85 mm*	
Weight kg (net)	*6.3 kg*	
Interface	*RS 232C*	

2 Declaration of conformity

KERN & Sohn GmbH
D-72322 Balingen-Frommern
Postfach 4052
E-Mail: info@kern-sohn.de
Tel: 0049-[0]7433- 9933-0
Fax: 0049-[0]7433-9933-149
Internet: www.kern-sohn.de

Konformitätserklärung

EC-Konformitätserklärung
EC- Déclaration de conformité
EC-Dichiarazione di conformità
EC- Declaração de conformidade
EC-Deklaracja zgodności

EC-Declaration of -Conformity
EC-Declaración de Conformidad
EC-Conformiteitverklaring
EC- Prohlášení o shode
EC-Заявление о соответствии

D	Konformitäts-erklärung	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.
GB	Declaration of conformity	We hereby declare that the product to which this declaration refers conforms with the following standards.
CZ	Prohlášení o shode	Tímto prohlašujeme, že výrobek, kterého se toto prohlášení týká, je v souladu s níže uvedenými normami.
E	Declaración de conformidad	Manifestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las normas siguientes
F	Déclaration de conformité	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.
I	Dichiarazione di conformitá	Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.
NL	Conformiteit-verklaring	Wij verklaren hiermede dat het product, waarop deze verklaring betrekking heeft, met de hierna vermelde normen overeenstemt.
P	Declaração de conformidade	Declaramos por meio da presente que o produto no qual se refere esta declaração, corresponde às normas seguintes.
PL	Deklaracja zgodności	Niniejszym oświadczamy, że produkt, którego niniejsze oświadczenie dotyczy, jest zgodny z poniższymi normami.
RUS	Заявление о соответствии	Мы заявляем, что продукт, к которому относится данная декларация, соответствует перечисленным ниже нормам.

Electronic Balance: KERN ALS...N, ALJ…NM, ALJ…N

Mark applied	EU Directive	Standards
CE	89/336EEC EMC	EN 61000-4-2 :1999 EN 61000-4-3 :1996 EN 61000-4-4 : 1999 EN 61000-4-5 : 1998 EN 61000-4-6 : 1999 EN 61000-4-11 : 1997 EN 55022 :2000

Date: 27.02.2007

Signature:

Gottl. KERN & Sohn GmbH
Management

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D	Konformitäts-erklärung	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt. **Diese Erklärung gilt nur in Verbindung mit der Konformitätsbescheinigung einer benannten Stelle.**
GB	Declaration of conformity	We hereby declare that the product to which this declaration refers conforms with the following standards. **This declaration is only valid with the certificate of conformity by a notified body.**
CZ	Prohlášení o shode	Tímto prohlašujeme, že výrobek, kterého se toto prohlášení týká, je v souladu s níže uvedenými normami. **Toto prohlášení platí pouze ve spojitosti s deklarací o souladu uvedeného pracoviště se směrnicemi EU.**
E	Declaración de conformidad	Manifestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las normas siguientes. **Esta declaración solo será válida acompañada del certificado de conformidad de una institución renombrada.**
F	Déclaration de conformité	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après. **Cette déclaration est valide seulement avec un certificat de conformité d'un organisme notifié.**
I	Dichiarazione di conformitá	Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate. **Questa dichiarazione sarà valida solo se accompagnata dal certificato di conformità della parte nominale.**
NL	Conformiteit-verklaring	Wij verklaren hiermede dat het product, waarop deze verklaring betrekking heeft, met de hierna vermelde normen overeenstemt. **Deze verklaring geldt uitsluitend in verbinding met het certificaat van overeenstemming vanwege een daarmee belaste instantie.**
P	Declaração de conformidade	Declaramos por meio da presente que o produto no qual se refere esta declaração, corresponde às normas seguintes. **Esta declaração vale só em combinação com um certificado de conformidade duma instituição nomeada.**
PL	Deklaracja zgodności	Niniejszym oświadczamy, że produkt, którego niniejsze oświadczenie dotyczy, jest zgodny z poniższymi normami. **Niniejsze oświadczenie obowiązuje wyłącznie w połączeniu z oświadczeniem o zgodności danego miejsca.**
RUS	Заявление о соответствии	Мы заявляем, что продукт, к которому относится данная декларация, соответствует перечисленным ниже нормам. **Эта декларация действует совместно с удостоверением соответствия названной лаборатории.**

Electronic Balance: KERN ALS...N, ALJ…NM

EU Directive	Standards	EC-type-approval certificate no.	Issued by	Modell
90/384/EEC	EN 45501	TCM 128/07 - 4519	CMI	ALJ..NM

Date: 27.02.2007

Signature:

Gottl. KERN & Sohn GmbH
Management

3 Basic Information (General)

3.1 Proper use

The balance you purchased is intended to determine the weighing value of material to be weighed. It is intended to be used as a “non-automatic“ balance, i.e. the material to be weighed is manually and carefully placed in the centre of the weighing plate. As soon as a stable weighing value is reached the weighing value can be read.

3.2 Improper Use

Do not use balance for dynamic weighings. In the event that small quantities are removed or added to the material to be weighed, incorrect weighing results can be displayed due to the “stability compensation“ in the balance. (Example: Slowly draining fluids from a container on the balance.)
Do not leave permanent load on the weighing plate. This may damage the measuring system.
--
Impacts and overloading exceeding the stated maximum load (max) of the balance, minus a possibly existing tare load, must be strictly avoided. Balance may be damage by this.
Never operate balance in explosive environment. The serial version is not explosion protected.
The structure of the balance may not be modified. This may lead to incorrect weighing results, safety-related faults and destruction of the balance.
The balance may only be used according to the described conditions. Other areas of use must be released by KERN in writing.

3.3 Warranty

Warranty claims shall be voided in case

- Our conditions in the operation manual are ignored
- The appliance is used outside the described uses
- The appliance is modified or opened
- Mechanical damage or damage by media, liquids, natural wear and tear
- The appliance is improperly set up or incorrectly electrically connected
- The measuring system is overloaded

3.4 Monitoring of Test Resources

In the framework of quality assurance the measuring-related properties of the balance and, if applicable, the testing weight, must be checked regularly. The responsible user must define a suitable interval as well as type and scope of this test. Information is available on KERN’s home page (www.kern-sohn.com with regard to the monitoring of balance test substances and the test weights required for this. In KERN’s accredited DKD calibration laboratory test weights and balances may be calibrated (return to the national standard) fast and at moderate cost.

4 Basic Safety Precautions

4.1 Pay attention to the instructions in the Operation Manual

Carefully read this operation manual before setup and commissioning, even if you are already familiar with KERN balances.

4.2 Personnel training

The appliance may only be operated and maintained by trained personnel.

5 Transport and storage

5.1 Testing upon acceptance

When receiving the appliance, please check packaging immediately, and the appliance itself when unpacking for possible visible damage.

5.2 Packaging

Keep all parts of the original packaging in case you need to return the appliance.
Only use original packaging for returning.
Before sending, disconnect all connected cables and loose/movable parts.
Attach possibly existing transport safeguards. Secure all parts, e.g. weighing plate, power unit etc., to prevent slipping and damage.

6 Unpacking, Setup and Commissioning

6.1 Installation Site, Location of Use

The balances are designed in a way that reliable weighing results are achieved in common conditions of use.
You will work accurately and fast, if you select the right location for your balance.

Therefore, observe the following for the installation site:

- Place the balance on a firm, level surface;
- Avoid extreme heat as well as temperature fluctuation caused by installing next to a radiator or in the direct sunlight;
- Protect the balance against direct draughts due to open windows and doors;
- Avoid jarring during weighing;
- Protect the balance against high humidity, vapours and dust;
- Do not expose the device to extreme dampness for longer periods of time. Non-permitted condensation (condensation of air humidity on the appliance) may occur if a cold appliance is taken to a considerably warmer environment. In this case, acclimatize the disconnected appliance for ca. 2 hours at room temperature.
- Avoid static charge of goods to be weighed or weighing container.

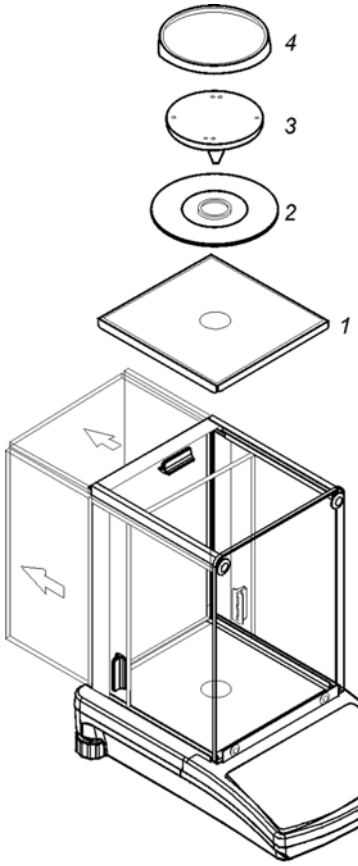
Major display deviations (incorrect weighing results) may be experienced should electromagnetic fields (e.g. due to mobile phones or radio equipment), static electricity accumulations or instable power supply occur. Change location or remove source of interference.

6.2 Unpacking

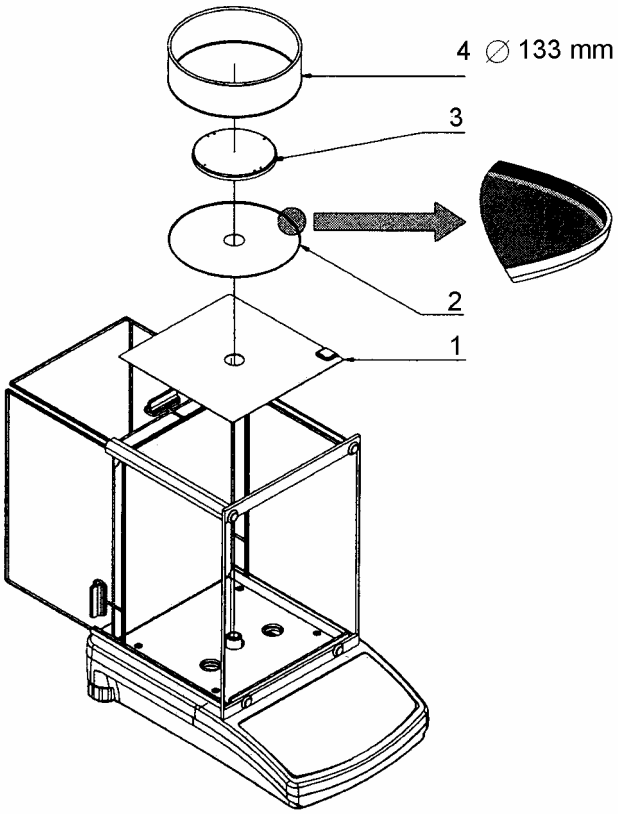
Carefully remove the balance from the packaging, remove plastic cover and setup balance at the intended workstation.

6.2.1 Placing

Design layout of weighing balance:



ALJ 220-5 DNM



Level balance with foot screws until the air bubble of the water balance is in the prescribed circle.

6.2.2 Scope of delivery

Serial accessories:

- Balance (see chapter 6.2.1)
- Mains power supply
- Operating Manual

6.3 Mains connection

Power is supplied via the external mains adapter. The stated voltage value must be the same as the local voltage.
Only use original KERN mains adapters. Using other makes requires consent by KERN.

6.4 Connection of peripheral devices

Before connecting or disconnecting of additional devices (printer, PC) to the data interface, always disconnect the balance from the power supply.

With your balance, only use accessories and peripheral devices by KERN, as they are ideally tuned to your balance.

6.5 Initial Commissioning

In order to obtain exact results with the electronic balances, your balance must have reached the operating temperature (see warming up time chap. 1).
During this warming up time the balance must be connected to the power supply (mains, accumulator or battery).
The accuracy of the balance depends on the local acceleration of gravity.
Strictly observe hints in chapter Adjustment.

6.5.1 Stability display

The appearance of the stability symbol **[▂▃]** on the display indicates that the balance is in a stable state. If the status is instable the [▂▃] display disappears.

6.5.2 Balance zero display

If an exact zero reading is not displayed on the balance in spite of the weighing dish being empty, press the TARE key and the balance will start resetting to zero **[→0←]** .

7 Adjustment

As the acceleration value due to gravity is not the same at every location on earth, each balance must be coordinated - in compliance with the underlying physical weighing principle - to the existing acceleration due to gravity at its place of location (only if the balance has not already been adjusted to the location in the factory). This adjustment process must be carried out for the first commissioning, after each change of location as well as in case of fluctuating environment temperature. To receive accurate measuring values it is also recommended to adjust the balance periodically in weighing operation.

7.1.1 Automatic adjustment with internal weight (ALJ only)

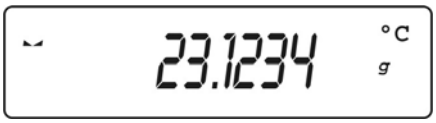
With the internal adjustment weight, the weighing accuracy can be checked and re-adjusted at any time.

The automatic adjustment function is always enabled. You can start adjustment at any time by pressing the **F**-key 3 times.

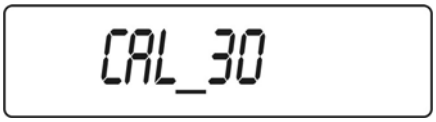
Automatic adjustment is started each time

- after the weighing balance was disconnected from the mains
- when temperature changes take place
- at the end of a time interval

Temperature / time controlled adjustment is taking place:
5 minutes before the start of automatic adjustment, this will be announced by a "º **C**“, (change of temperature) or a “►“ (after a certain time interval ends) symbol on the display.



The user must complete his/her weighing process within this time. After 5 minutes **[** CAL 30 **]** appears on the display.



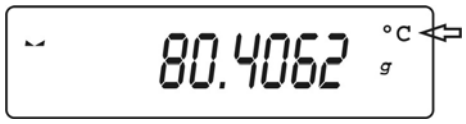
This starts a “count down” of 30 seconds **[** CAL 30 **]** → **[** CAL 0 **].** During these 30 seconds it is possible to cancel the adjustment by pressing the **TARE** key. This makes the balance return to weighing mode in order to e. g. complete an unfinished measurement.

After a further 5 minutes the automatic adjustment will restart and **[** CAL 30 **]** appears.

Selection options of internal adjustment:

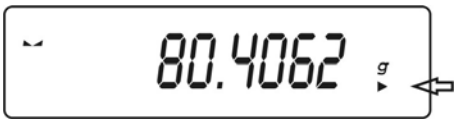
1. **Temperature controlled adjustment**

   A change in temperature of 0.8 °C triggers the weighing balance to send a message announcing internal adjustment:



2. **Time-controlled adjustment**

   After a set time interval (1 – 12 h) in the menu (**P1.5 CALt**) has passed the weighing balance will send a message about internal adjustment:



3. **By menu invocation "P1.1 iCAL", see chpt. 6.5.4**

4. **Press the F-key three times**

7.1.2 Adjustment functions “P1 CAL“

Menu “P1 CAL“ [adjustment]

P1.1	iCAL |		[internal adjustment] ALJ only
P1.2	ECAL|		[external adjustment] *
P1.3	tCAL |		[adjustment test]
P1.4	ACAL|	both/nonE/tenno/tinnE	[automatic adjustment] ALJ only *
P1.5	CALt |	1 h ÷ 12h	[time setting for automatic adjustment] ALJ only *
P1.6	CALr |	YES/no	[printout adjustment log]

* = locked for verifiable appliances [Er 9 lock].

1. Function iCAL: Manual start of internal adjustment (ALJ only)

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again. Ensure that there are no objects on the weighing plate.	**P1.1 iCAL**
⇨ Confirm by pressing the **F**-key; adjustment takes place automatically. After successful adjustment the balance automatically returns to weighing mode. Information: Adjustment errors are indicated by an acoustic signal and an error message will appear on the display. Press the **TARE**-key and repeat the adjustment process.	**CAL** ⇓ **0.0000 g**
⇨ You can cancel adjusting by pressing the **TARE**-key.	

2. Function ECAL: External adjustment

Carry out adjustment with the help of the recommended adjustment weight (see chapter 1 “Technical Specifications”).

Procedure when adjusting:

Observe stable environmental conditions. A warming up time (see chapter 1) is required for stabilization.

Menu activation:

Models ALJ **Models ALS**

Modelle ALS:

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again	**P1.1 ECAL**
⇨ Press **F** -key. Ensure that there are no objects on the weighing plate.	**unload**
⇨ Press the **PRINT**-key and wait until the weight value of the required adjustment weight pops up.	**CAL** ⇓ **load** ⇓ **200,0000 g**
⇨ Place the required calibration weight carefully in the centre of the weighing plate and press the **PRINT** key. **CAL** appears on the display, adjustment is started. The display shows **UNLOAD,** adjustment is completed.	**CAL** ⇓ **unload**
⇨ Remove adjusting weight, the balance will automatically return to weighing mode. Information: Adjustment errors are indicated by an acoustic signal and an error message will appear on the display. Press the **TARE**-key and repeat the adjustment process.	**- - - - - - - -** ⇓ **0.0000 g**

3. Function tCAL: Adjustment test

Here, deviation from the last adjustment is determined. This is only a check, i.e. no values are changed.

Menu activation:

Models ALJ **Models ALS**

Models ALJ:

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again.	**P1.1 iCAL**
⇨ Press the **UNIT**-key repeatedly until "P1.3 tCAL" appears.	**P1.3 tCAL**
⇨ Press the **F**-key; automatic adjustment test is carried out. The result is displayed	**CAL** ⇓ **diff** ⇓ **d 0,0042 g**
⇨ Press down and hold the **PRINT**-key until the balance returns to the menu.	**P1.3 tCAL**
⇨ Press the **TARE**-key repeatedly until "**SAVE**"? appears. Store executed changes by pressing the **PRINT** -key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**SAVE?** ⇓ **0.0000 g**

Models ALS:

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again.	**P1.1 ECAL**
⇨ Press the **UNIT**-key repeatedly until “P1.2 tCAL“ appears.	**P1.2 tCAL**
⇨ Press **F** key	**unload**
⇨ Press the PRINT-key and wait until the weight value of the required adjustment weight pops up.	**CAL** ⇓ **load** ⇓ **200,0000 g**
⇨ Place the required calibration weight carefully in the centre of the weighing plate and press the PRINT key. Adjustment test is carried out. The result is displayed	**CAL** ⇓ **diff** ⇓ **d 0,0042 g**
⇨ Press down and hold the **PRINT**-key until the balance returns to the menu.	**P1.2 tCAL**
⇨ Press the **TARE**-key repeatedly until “**SAVE**“? appears. Store executed changes by pressing the **PRINT** -key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**SAVE?** ⇓ **0.0000 g**

4. Function ACAL: Automatic internal adjustment (only ALJ)
This menu item is used to set criteria for the start of automatic adjustment .

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again.	**P1.1 ECAL**
⇨ Press the **UNIT**-key repeatedly until the “ACAL“ appears.	**P1.4 ACAL**
⇨ Press the **F**-key; current setting is flashing	**nonE**
⇨ Use the **UNIT** key to select one of the settings below: **nonE** Automatic adjustment disabled **tEmp** Start automatic Adjustment after change in temperature **timE** Start automatic Adjustment dependent on setting of function P1.5 CALt **both** Start automatic Adjustment dependent on temperature and time	**timE**
⇨ Confirm setting by pressing the **PRINT** key. Weighing balance returns to menu.	**P1.4 ACAL**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

5. Function CAL t:
Time setting for start of automatic internal adjustment (ALJ only)

Set the time interval after which automatic adjustment is to be started in this menu item as follows:

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again.	**P1.1 ECAL**
⇨ Press the **UNIT**-key repeatedly until the "**P1.5 CALt**" function appears	**P1.5 CALt**
⇨ Press the **F**-key; current setting is flashing	**1 h**
⇨ Use the **UNIT**-key to select a time interval of 1 – 12 h	**12 h**
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P1.5 CALt**
⇨ Press the **TARE**-key repeatedly until "SAVE"? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

6. Function CALr: “print adjustment log“

Go to this menu item to enable the function used to produce printouts for adjustment data.

Menu activation:

Models ALJ **Models ALS**

Enable/disable function:

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.0000 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **F**-key again.	**P1.1 ECAL**
⇨ Press the **UNIT**-key repeatedly until the “CALr“ function appears	**P1.6 CALr** Models ALJ **P1.3 CALr** Models ALS
⇨ Press the **F**-key; current setting is flashing	**no**
⇨ Use the **UNIT** key to select one of the settings below: **no** Data output disabled **yes** Data output enabled	**YES**
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P1.6 CALr** Models ALJ **P1.3 CALr** Models ALS
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

Data output adjustment log:

The content of the data output is determined in menu **P2 GLP**. All parameters set to "**YES**" will be issued.

Example:

P2 GLP			
P2.1	uSr	|	
P2.2	PrJ	|	
P2.3	Ptin	|	YES
P2.4	PdAt	|	YES
P2.5	PuS	|	YES
P2.6	PPrJ	|	YES
P2.7	PId	|	YES
P2.8	PFrn	|	YES

*** Automatic calibration report ***
Date : 09/02/2007
Time : 11:21:39
User Id : 12345678
Project Id: 87654321
Balance Id: 114493

Calibr. : Automatic
Difference: - 0.0002 g

Name .....

7.2 Verification

General introduction:

According to EU directive 90/384/EEC balances must be officially verified if they are used as follows (legally controlled area):

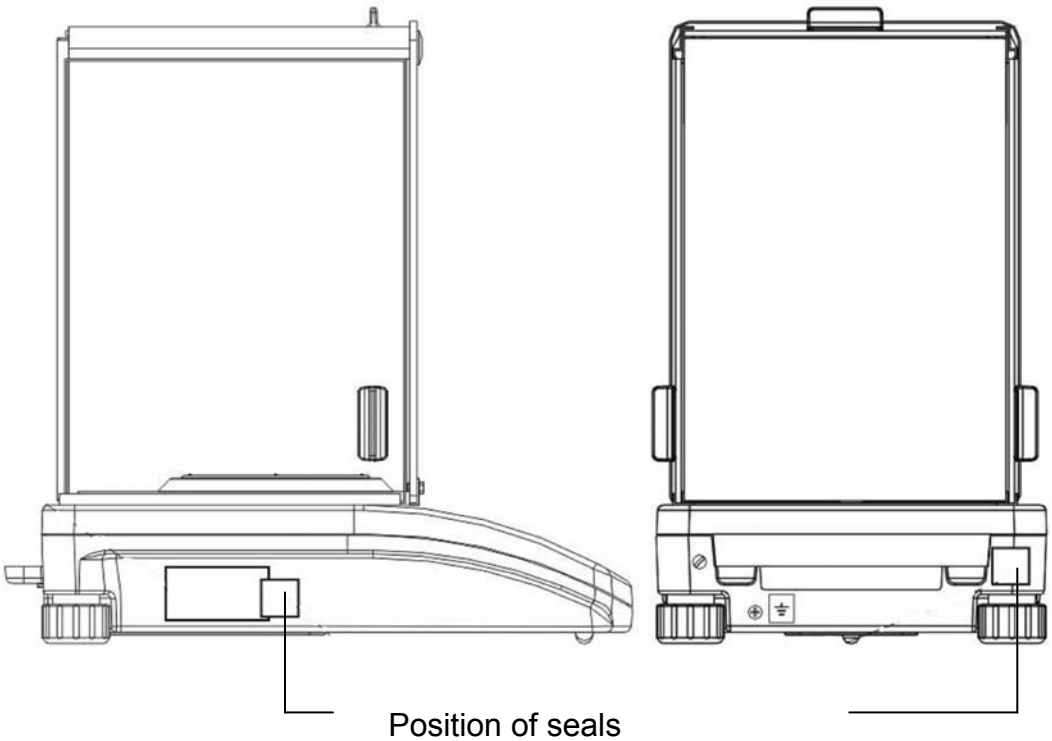
a) For commercial transactions if the price of goods is determined by weighing.
b) For the production of medicines in pharmacies as well as for analyses in the medical and pharmaceutical laboratory.
c) For official purposes.
d) For manufacturing final packages.

In cases of doubt, please contact your local trade in standard.

Verification instructions

An EU type approval exists for balances described in their technical data as verifyable. If a balance is used where obligation to verify exists as described above, it must officially verified and re-verified in regular intervals.
Re-verification of a balance is carried out according to the respective national regulations. The validity for verification of balances in Germany is e.g. 2 years.
The legal regulation of the country where the balance is used must be observed!
After verification the balance is sealed at the indicated positions.
Verification of the balance is invalid without the "seal".

Position of the “official seals“:



Balances with obligation to verify must be taken out of operation if:

- **The weighing result of the balance is outside the error limit.** Therefore, in regular intervals load balance with known test weight (ca. 1/3 of the max. load) and compare with displayed value.
- **The reverification deadline has been exceeded.**

8 Operating elements

8.1 Backlit display

Very contrastful display which can also be read in the darkness.

8.2 Keyboard overview

Key	Function
	▪ Turn on/off
	▪ Function key
	• Switch-over key into operating modes
	• Switching-over to other weighing units
	• Printout of the weighed value on an external appliance (printer or PC) • Confirm/save settings
	• Taring • Leave menu • Set weight display at zero

9 User menu

The user menu has seven main menus (P1 – P7), arranged in the following sub-menus:

P1 CAL [adjustment]

P1.1	iCAL |		[internal adjustment] ALJ only
P1.2	ECAL|		[external adjustment] *
P1.3	tCAL |		[adjustment test]
P1.4	ACAL|	both/nonE/tenno/tinnE	[automatic adjustment] ALJ only *
P1.5	CALt |	1 h ÷ 12h	[time setting for automatic adjustment] ALJ only *
P1.6	CALr |	YES/no	[printout adjustment log]

* = locked for verifiable appliances

P2 GLP [good lab practice]

P2.1	USr |	_	[user]
P2.2	PrJ |	_	[project]
P2.3	Ptin |	YES/no	[printout time]
P2.4	PdAt |	YES/no	[printout date]
P2.5	PUSr|	YES/no	[printout user]
P2.6	PPrJ |	YES/no	[printout project]
P2.7	PId |	YES/no	[printout serial number weighing balance]
P2.8	PFr |	YES/no	[frame printout]

P3 rEAd [main functions]

P3.1	AuE |	Stand/Slouu/FASt	[filter settings]
P3.2	ConF|	FASt_rEL/Fast/rEL	[rest control display]
P3.3	Auto |	On/OFF	[Auto zero]
P3.4	Ldi9 |	ALuuAYS/neper/uu_StAb	[delete last decimal place]

P4 Print [parameter for serial interface RS 232]

P4.1	bAud |	2400/4800/9600/19200	[Baud rate]
P4.2	CntA |	YES/no	[continuous output standard weighing unit]
P4.3	Cntb |	YES/no	[continuous output currently set weighing unit]
P4.4	rEPL |	YES/no	[manual (press key) or automatic output]
P4.5	PStb |	YES/no	[output stable/instable weighing values]
P4.6	Lo |	000.0000	[input minimal weight for automatic output]

P5 unit [weighing unit]

P5.1	StUn	g/mg/ct/oz/ozt/dwt/t/mom/G	[standard weighing unit, e.g. “g”]
P5.2	mg	YES/no	[mg - milligram]
P5.3	Ct	YES/no	[ct – carat]
P5.4	oZ	YES/no	[oz – ounce]
P5.5	oZt	YES/no	[ozt – Troy ounce]
P5.6	dwt	YES/no	[dwt – pennyweight]
P5.7	t	YES/no	[t – Tael]
P5.8	nno	YES/no	[mom - Momme]
P5.9	Gr	YES/no	[gr – Grain]

P6 Func [operating modes]

P6.1	FFun	ALL/PcS/HiLo/PrcA/Prcb/d_Co/d_Li	[selection enabled operating modes]
P6.2	PcS	YES/no	[piece counting]
P6.3	HiLo	YES/no	[weighing with tolerance control]
P6.4	PrcA	YES/no	[percentage weighing, reference weight determination "weighing"]
P6.5	Prcb	YES/no	[percentage weighing, reference weight determination “numeric“]
P6.6	d_Co	YES/no	[determination density “solids”]
P6.7	d_Li	YES/no	[determination density “liquids”]

P7 othEr [additional useful functions]

P7.1	bL	On/Aut/OFF	Display background illumination
P7.2	bEEP	On/OFF	[touch tone]
P7.3	PrnS		[printout “weighing parameters”]

9.1 Navigation in the menu

Keyboard overview in menu:

Key	Function
	• Call main menu • Call first parameter of a function • Shift and select number to be changed to the right
	• Parameter selection (scroll down) • Decreasing the value for selected numeral or number
	• Parameter selection (scroll up) • Increasing the value for selected numeral or number
	• Return to main menu • Shift and select number to be changed to the left
	• Confirm/save settings
	• Exit menu without saving

Storing / jumping back to weighing mode

Any changes made in the balance memory will only be saved when the storing process is complete.

To achieve this, press the  key several times until **"SAVE"?** appears.

Any changes carried out are stored by pressing the  key.

To cancel changes, press the  key.
Afterwards the balance automatically jumps back to weighing mode.

10 Weighing functions P6 func

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key. The balance will carry out a self-test	
⇨ Your balance is ready to weigh as soon as the "**0.00"** display appears.	**0.00 g**
⇨ Put on items to be weighed, weighed value is displayed. Wait until the stability display appears ▬◣. Read the weighing value.	**19.68 g**
⇨ To turn off the balance press the **ON/OFF** key	

10.1 Taring

The dead weight of any weighing container may be tared away by pressing a button, so that the following weighings show the net weight of the goods to be weighed.

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	
⇨ Your balance is ready to weigh as soon as the "**0.00"** display appears.	**0.00 g**
⇨ Put on items to be weighed, weighed value is displayed.	**19.68 g**
⇨ To start the taring process press the **TARE** key. The weight of the container is now saved internally.	**0.00 g**
⇨ Place the goods to be weighed into the tare container. Read the weight of the goods on the display.	**53.25 g**

The taring process can be repeated any number of times, e.g. when adding several components for a mixture (adding).
The limit is reached when the whole weighing range is exhausted.
After removing the taring container the total weight is displayed as negative display.

10.2 Standard weighing unit

Selected weighing unit will be retained even after disconnection from the mains.

Operation:	Display:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.00 g**
⇨ Press **F** key	**P1 CAL**
⇨ Press the **UNIT-**key several times until "**P5 Unit**" appears	**P5 unit**
⇨ Press **F** key	**P5.1 StUn**
⇨ **Press** the **F**-key again; the currently set weighing unit is flashing	**„g"** (example)
⇨ Press the **UNIT-**key repeatedly until the desired weighing unit appears. **[g] → [mg] → [ct] → [oz] → [ozt] → [dwt] → [t] → [mom]→ [G] → [g]** **Note:** In calibrated model selection is restricted to options **[g] → [mg]** and **→ [ct]**.	**mg** (example)
⇨ Confirm setting by pressing the **PRINT** key. Weighing balance returns to menu.	**P5.1 StUn**
⇨ Press the **TARE-**key repeatedly until **"SAVE"?** appears	**„SAVE"**
Store changes carried out by pressing the **PRINT** key. The balance returns to weighing mode; the display show the set weighing unit. The set weighing unit remains even after disconnection from the mains.	**0.0 mg**

10.3 Weighing units switch-over

A weighing unit may be changed by pressing the **UNIT-**key several times:

[g] → [mg] → [ct] → [oz] → [ozt] → [dwt] → [t] → [mom]→ [G] → [g]

Information:
In calibrated models selection is restricted to options **[g] →** and **[mg] → [ct]**.

The different weighing models have integrated different foreign weighing units.
For details please refer to chpt. 1, "Technical specifications".

10.4 Underfloor weighing

Objects unsuitable for placing on the weighing scale due to size or shape may be weighed with the help of the flush-mounted platform.
Proceed as follows:

- Switch off balance.
- Open the closing lid on the bottom of your balance.
- Suspend hook for underfloor weighing carefully and completely.
- Place your balance over an opening.
- Suspend the goods to be weighed from the hook and carry out the weighing.

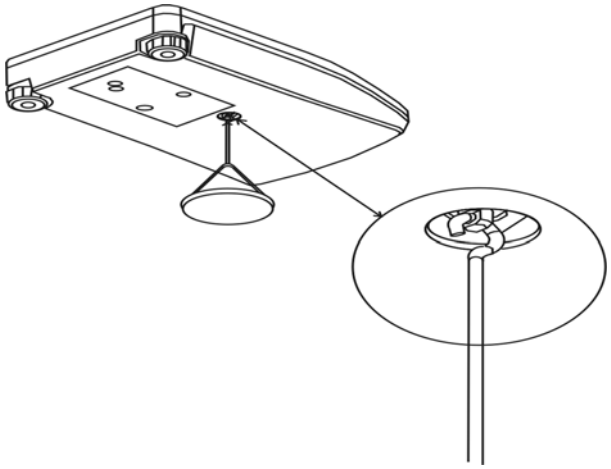


Fig. 1: Setup of balance for underfloor weighing

CAUTION

- **Always ensure that all suspended objects are stable enough to hold the desired goods to be weighed safely (danger of breaking).**
- **Never suspend loads that exceed the stated maximum load (max) (danger of breaking)**

Always ensure that there are no persons, animals or objects that might be damaged underneath the load.

NOTICE

After completing the underfloor weighing the opening on the bottom of the balance must always be closed (dust protection).

10.5 Selecting the operating mode

You can enable and disable functions in menu **"P6 Func"** which are then available to the user without having to go back to the menu each time. All activated operating modes can be called directly by pressing the ⇦ key.

Operation:	Display:	Description:
⇨ Turn on balance by pressing the **ON/OFF** key	**0.00 g**	
⇨ Press **F** key	**P1 CAL**	
⇨ Press the **UNIT**-key repeatedly until "P6 Func" appears.	**P6 Func**	
⇨ Press the **F**-key	**P6.1 Ffun**	
⇨ Press the **F**-key again	**ALL**	All operating modes enabled in menu P6.2 to P6.7 are callable by pressing the ⇦ key
⇨ Press the **UNIT**-Taste.	**PcS**	Parts counting
⇨ Press the **UNIT**-Taste.	**HiLo**	Tolerance weighing
⇨ Press the **UNIT**-Taste.	**PrcA**	Display of percentage
⇨ Press the **UNIT**-Taste.	**Prcb**	Percentage display via manual default
⇨ Press the **UNIT**-Taste.	**d_Co**	Density determination "solids"
⇨ Press the **UNIT**-Taste.	**d_Ll**	Density determination "liquids"

Confirm settings by pressing the **PRINT** key. Balance jumps back to sub-menu **6.1.Ffun**.

Is the parameter set to **ALL** in menu **6.1.Ffun**, access to the functions set to **YES** in the **P4FFunc** menu is available via the ⇦ key.
(see chpt. 10.5.1)

However, if in menu **6.1.Ffun** one of the above parameters is selected, e. g. **PcS,** the ⇦ key can merely be used to call just this particular menu item.

10.5.1 Settings for menu item P6.1 Ffun for „ALL“

This is where you select the menu items that will be from then on selectable via the key. **no** – Function not available.
YES – Function available.

Operation:	Display:
⇨ Selecting the menu item	**P6 Func**
⇨ Press the **F**-key	**P6.1 Ffun**
⇨ Press the **UNIT** key until the operating mode “piece counting” appears	**P6.2 PcS**
⇨ Press the **F-**key; the current setting: “no“ = deactivated, “yes“ = activated	**no**
⇨ To change the setting, press the **UNIT** key.	**YES**
⇨ Setting will be imported by pressing the **PRINT** key.	**P6.2 PcS**
⇨ Press the **UNIT** key until the operating mode “tolerance weighing” appears. Activation as described for piece counting	**P6.3 HiLo**

Please repeat this sequence of operations for any other operating mode available.

For this, press the **TARE** key repeatedly until **SavE ?** appears on the display. Store changes carried out by pressing the **PRINT** key.

11 General functions “P3 rEAd”

11.1 Filter settings

This menu item allows the balance to be set according to specific ambient conditions and measuring purposes.

Operation:	Display:
⇨ Menu call „**P3 rEAd**”: Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until “**P3 rEAd**“ appears.	**P3 rEAd**
⇨ Confirm by pressing the **F**-key; function **“P3.1 AuE“** appears.	**P3.1 AuE**
⇨ Press the **F**-key again; the current setting is flashing.	**FASt**
⇨ Use the **UNIT** key to select one of the filter settings below: **FASt** = Sensitive and fast (very quiet site) **StAnd** = Standard **Slouu** = Insensitive but slow (site exposed to vibration)	**StAnd**
⇨ Confirm setting by pressing the **PRINT** key. Weighing balance returns to menu.	**P3.1 AuE**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

11.2 Rest position display

Operation:	Display:
⇨ Call menu item ”**P3 rEAd**”: Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until “**P3 rEAd**“ appears.	**P3 rEAd**
⇨ Press **F** key	**P3.1 AuE**
⇨ Press the **UNIT**-key until “**P3. 2 ConF“** appears	**P3. 2 ConF**
⇨ Press the **F**-key; current setting is flashing	**FASt_rEL**
⇨ Use the **UNIT** key to select one of the filter settings below: **FASt_rEL** = rest position control fast **FASt** = rest position control fast and accurate **rEL** = rest position control accurate	**FASt**
⇨ Confirm setting by pressing the **PRINT** key. Weighing balance returns to menu.	**P3. 2 ConF**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

11.3 Auto Zero

This function is used to tare small variations in weight automatically.
In the event that small quantities are removed or added to the material to be weighed, incorrect weighing results can be displayed due to the “stability compensation“ in the balance. (e.g. slow flow of liquids from a container placed on the balance, evaporating processes).
When apportioning involves small variations of weight, it is advisable to switch off this function.

Operation:	Display:
⇨ Call menu item ”**P3 rEAd**”: Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT-**key repeatedly until “**P3 rEAd**“ appears.	**P3 rEAd**
⇨ Press **F** key	**P3.1 AuE**
⇨ Press the **UNIT**-key until „**P3.3 Auto“** appears.	**P3.3 Auto**
⇨ Press the **F**-key; current setting is flashing	**On**
⇨ Use the **UNIT** key to select one of the filter settings below: **on** = Auto zero function turned on **off** = auto zero function turned off	**OFF**
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P3.3 Auto**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

11.4 Changing readability – decimal place

Readability may be reduced by 1 digit on the weighing balances, as required. The last decimal place will be rounded and removed from the display.

Operation:	Display:
⇨ Call menu item ”**P3 rEAd**”: Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until “**P3 rEAd**“ appears.	**P3 rEAd**
⇨ Press **F** key	**P3.1 AuE**
⇨ Press the **UNIT**-key until „**P3.4 Ldi9“** appears.	**P3.4 Ldi9**
⇨ Press the **F**-key; current setting is flashing	**AlwAYS**
⇨ Use the **UNIT** key to select one of the filter settings below: **AlwAYS** =shows last decimal place **nEuEr** =does not show last decimal place **uu_StAb** =last decimal place only displayed at stable weighing values	**nEuEr**
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P3.4 Ldi9**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

12 Further useful functions “P7 othEr“

Here, you can set the parameters that influence the operation of the balance, such as background lighting and key sounds.

12.1 Display background illumination

Operation:	Display:
⇨ Calling menu item “**P7 othEr**”: Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until “**P7 othEr**“ appears.	**P7 othEr**
⇨ Press **F** key	**P7.1 bl**
⇨ Press the **F**-key; current setting is flashing	**On**
⇨ Use the **UNIT** key to select one of the filter settings below: **ON** = Background illumination on **OFF** = Background illumination off **Aut** = Backlighting automatically switched off 10 seconds after achieving stable weighing value	**OFF**
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P7.1 bl**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

12.2 Acoustic signal for key operation

Operation:	Display:
⇨ Calling menu item "**P7 othEr**": Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until "**P7 othEr**" appears.	**P7 othEr**
⇨ Press **F** key	**P7.1 bl**
⇨ Press the **UNIT**-key	**P7.2 bEEP**
⇨ Press the **F**-key; current setting is flashing	**On**
⇨ Use the **UNIT** key to select one of the filter settings below: **ON** = Acoustic signal turned on **OFF** = Acoustic signal turned off	**OFF**
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P7.2 bEEP**
⇨ Press the **TARE**-key repeatedly until "SAVE"? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

12.3 Printing balance parameters

Operation:	Display:
⇨ Calling menu item “**P7 othEr**”: Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until “**P7 othEr**“ appears.	**P7 othEr**
⇨ Press **F** key	**P7.1 bl**
⇨ Press the **UNIT**-key until “**P7.3 PrnS“** appears.	**P7.3 PrnS**
⇨ Press the **F**-key; output of balance parameter is achieved via RS 232 interface.	**P7.3 PrnS**
⇨ Press the **TARE**-key repeatedly until “SAVE“? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

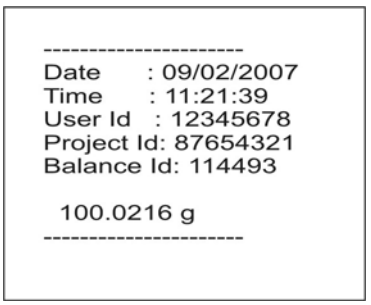
13 GLP/ISO log “P2 GLP“

Quality assurance systems require printouts of weighing results as well as of correct adjustment of the balance stating date and time and balance identification. The easiest way is to have a printer connected.

The content of the data output is determined in menu “P2 GLP“. All parameters set to “YES“ will be issued.
Examples:

P2 GLP

P2.1	uSr	|	max. 8 digits
P2.2	PrJ	|	max. 8 digits
P2.3	Ptin	|	YES
P2.4	PdAt	|	YES
P2.5	PuS	|	YES
P2.6	PPrJ	|	YES
P2.7	Pid	|	YES
P2.8	PFrn	|	YES



P2.8 PFrn: YES

Date :20.03.07
Time :11.31.07
UserID :Mustermann
Balance ID :180151

19.3406 g

P2.8 PFrn: no

Date :20.03.07
Time :11.31.07
UserID :Mustermann
Balance ID :180151

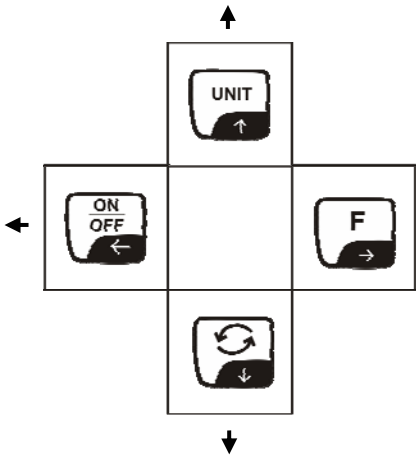
19.3406 g

Defination of a standard log:

Operation:	Display:
⇨ Call menu point „**P2 GLP**” : Press **F** key	**0.0000 g** ⇓ **P1 CAL**
⇨ Press the **UNIT**-key repeatedly until „**P2 GLP**“ appears.	**P2 GLP**
⇨ F -key. The menu item “**P2.1 Usr“** for entering the user name appears.	**P2.1 Usr**
⇨ Press the **F**-key; the first digit is flashing.	**_**
⇨ Enter user name or number (max. 8 digits) with the help of the arrow keys	Example: Data input: KERN Data output: **KERN**

Control via arrow keys:

- Increasing the value for selected numeral or number

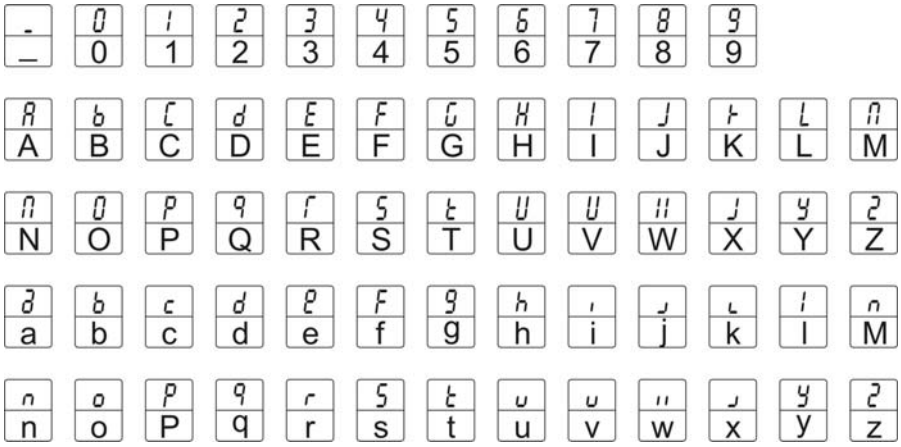


- Selection of the number to be changed to the left (the respective active position flashes)

- Selection of the number to be changed to the right (the respective active position flashes)

- Decreasing the value for selected numeral or number

Overview data input / data output:



⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P2.1 Usr**
⇨ Press the **UNIT**-key; the next menu item "**P2.2 PrJ**" used to enter project name appears.	**P2.2 PrJ**

⇨ Press the **F**-key; the first digit is flashing.	**_**
⇨ Press the arrow keys to enter project name or number (max. 8 digits).	
⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu.	**P2.2 PrJ**
⇨ Press the **UNIT-**key; the next menu item "**P2.3 Ptin"** used to display the time appears.	**P2.3 Ptin**
⇨ Press the **F**-key; current setting is flashing	**no**
⇨ Use the **UNIT** key to select one of the settings below: **no** = time not displayed **YES** = time displayed	**YES**
⇨ Confirm setting by pressing the **PRINT** key. Weighing balance returns to menu.	**P2.3 Ptin**
⇨ Press the **UNIT-**key; the next menu item "**P2.4 PdAt"** used to display the date appears.	**P2.4 PdAt**

Use the same steps to enter further GLP-Parameter.

Menu overview

P2.1	Usr |	_	[user]
P2.2	PrJ |	_	[project]
P2.3	Ptin |	YES/no	[printout time]
P2.4	PdAt |	YES/no	[printout date]
P2.5	PUSr |	YES/no	[printout user]
P2.6	PPrJ |	YES/no	[printout project]
P2.7	Pid |	YES/no	[printout serial number weighing balance]
P2.8	PFr |	YES/no	[frame printout]

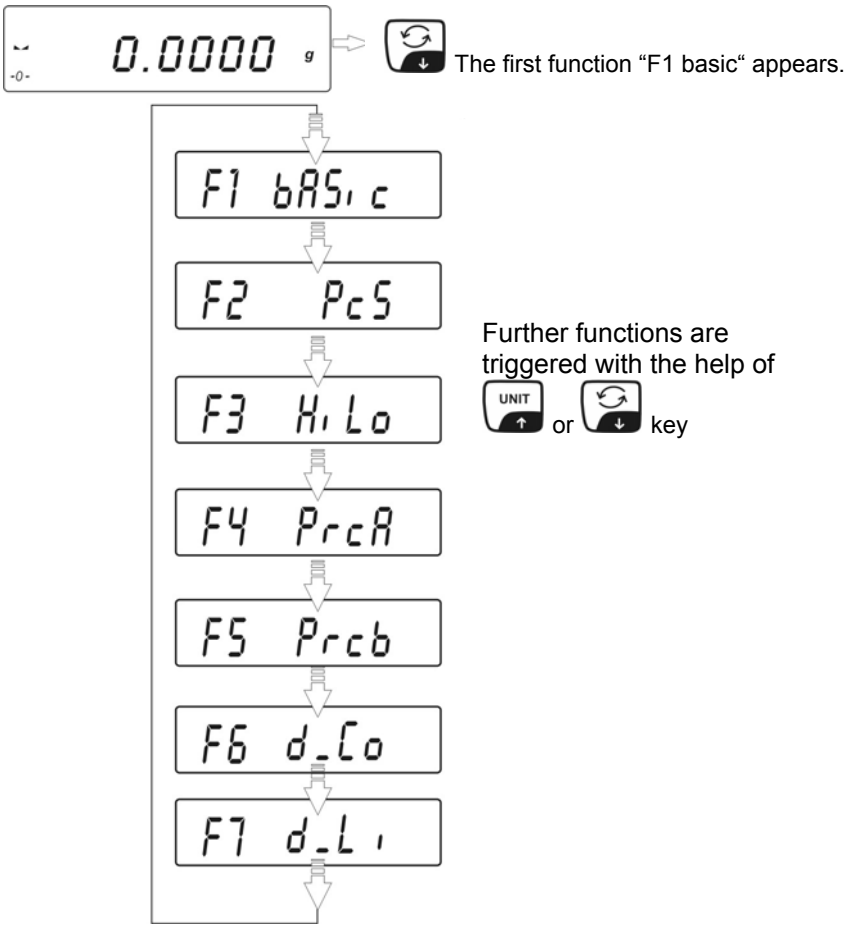
⇨ Press the **TARE**-key repeatedly until "SAVE"? appears.	**SAVE ?**
⇨ Any changes carried out are stored by pressing the **PRINT** key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.	**0.0000 g**

14 Operating modes “P6 Func“

The following operating modes may be enabled/disabled in this menu item:

- Parts counting
- Weighing with tolerance range
- Percent determination
- Density determination of solids/liquids

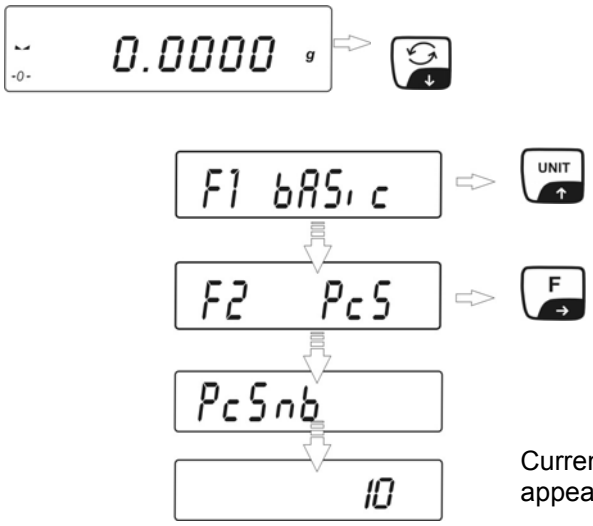
Call of operating modes (see also chpt. 10.5):



14.1 Parts counting

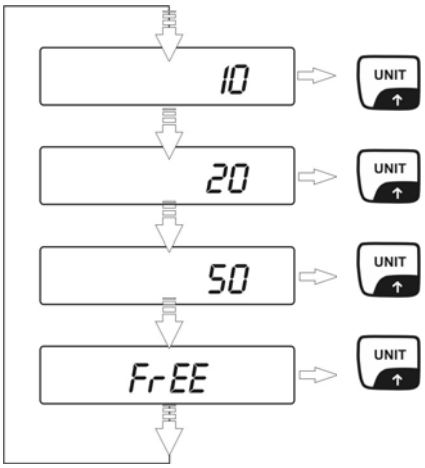
Before the balance can count parts, it must know the average part weight (i.e. reference). Proceed by putting on a certain number of the parts to be counted. The balance determines the total weight and divides it by the number of parts (the so-called reference quantity). Counting is then carried out on the basis of the calculated average piece weight.
As a rule:
The higher the reference quantity the higher the counting exactness.

- **Call add-up function**



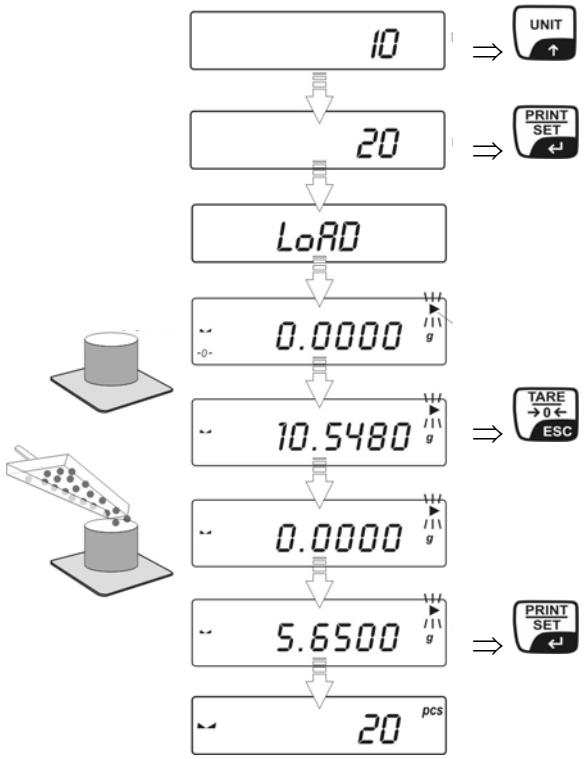
Press the **UNIT**-key to select the desired reference piece number.

- **Reference piece number 10, 20 or 50**



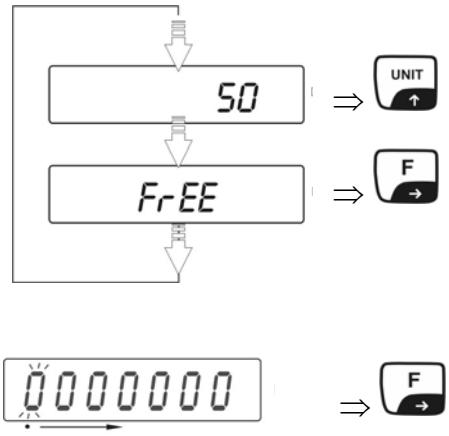
Confirm selected reference piece number by pressing the **PRINT**-key (e.g. 20)

- **Reference**
  Place as many pieces to add-up as required by the set reference piece number.



Remove reference weight. The balance is now in parts counting mode counting all units on the weighing plate.

- **for selection ”optional reference piece number“ FrEE**



  – Select the place to be changed by pressing the **F**-key

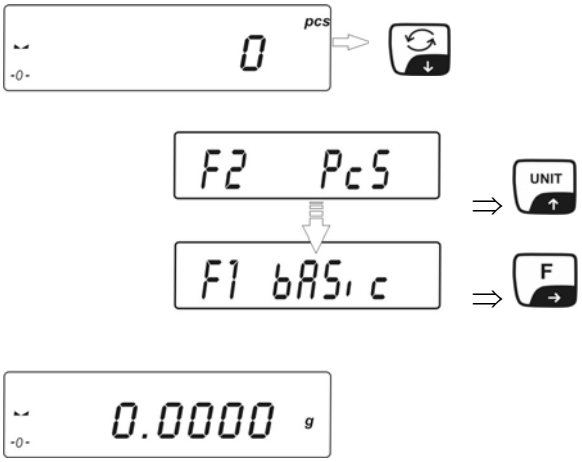
  – Select the digit by pressing the **UNIT**-key

– Confirm the entered reference piece number by pressing the **PRINT**-key
– "LoAd" appears on the display.

– Place as many counting parts on the balance as the set reference quantity requires, confirm by pressing the **PRINT** key.
Information:
If there is no load on the weighing plate when the **PRINT**-key is pressed, "**Er5 outr**" will appear briefly on the display before the display of the balance returns automatically to weighing mode.

– Remove reference weight. The balance is now in parts counting mode counting all units on the weighing plate.

- **Return to weighing mode**

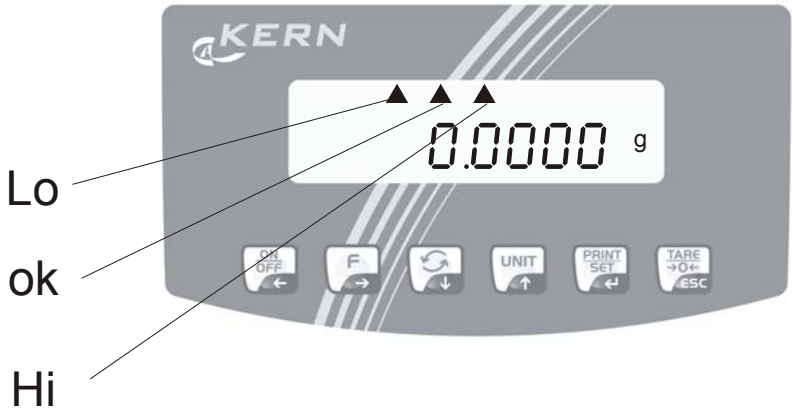


14.2 Weighing with tolerance range

For weighing with tolerance ranges you can enter individual upper and lower limits. For tolerance controls such as dosaging, apportioning or sorting the scale will display violated upper or lower limits and show the tolerance tag.

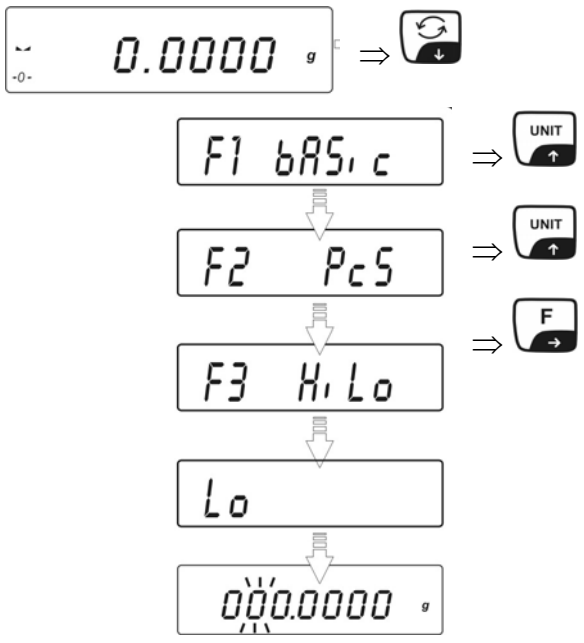
The triangular tolerance marker (▲) in the upper part of the display shows whether the goods to be weighed are within the two tolerance limits.
The tolerance marker is only in operation during operating mode tolerance weighing; it is otherwise not visible.

The tolerance marker provides the following information:

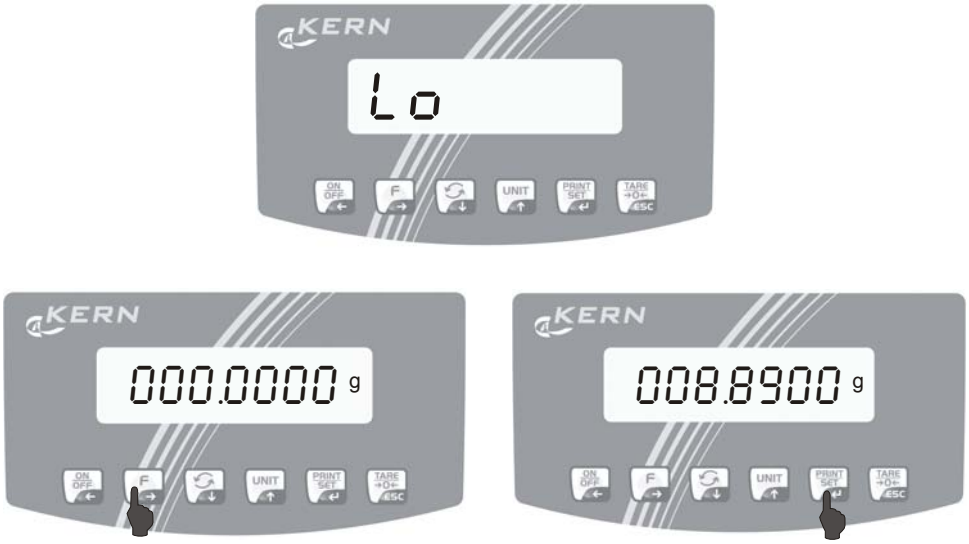


lo	Goods to be weighed below tolerance limit
ok	Goods to be weighed within tolerance range
Hi	Goods to be weighed above tolerance limit

- **Call function**

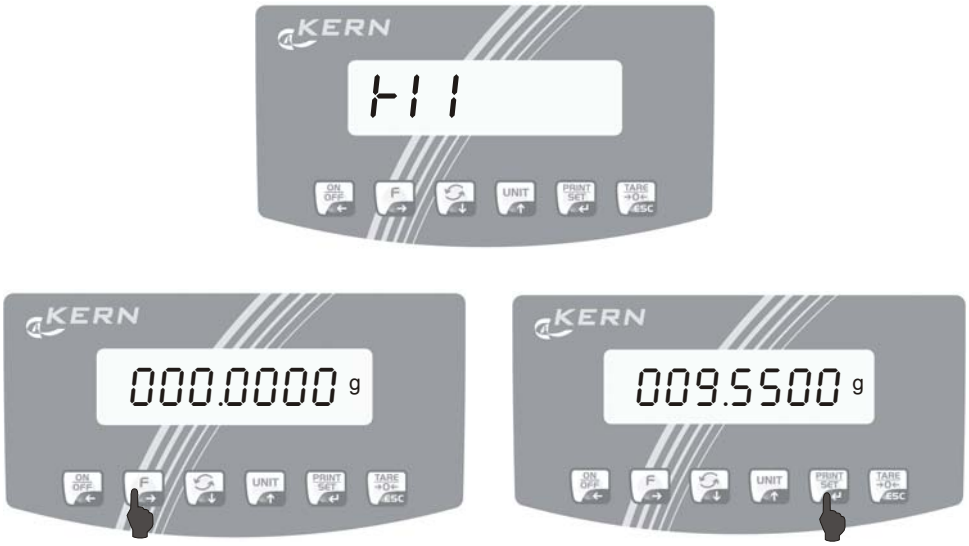


- **Setting the lower tolerance limit "Lo“**



  - Select the digit to be changed by pressing the **F**-key; each digit currently active will be flashing.
  - Select the digit by pressing the **UNIT**-key
  - Confirm the entered lower tolerance tag by pressing the **PRINT**-key.

- **Setting the upper tolerance limit “Hi“.**

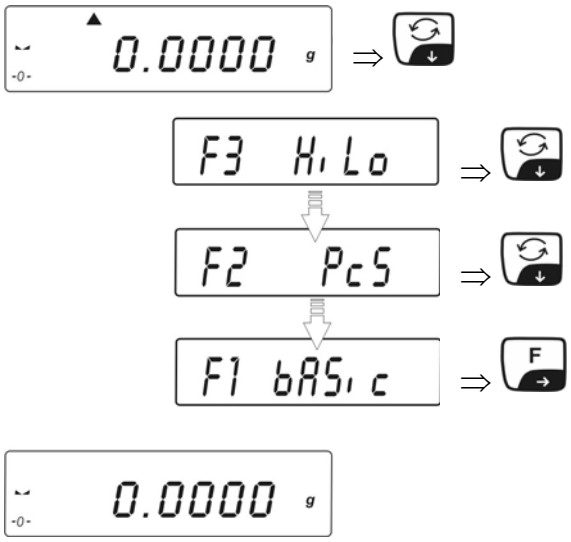


  - Select the digit to be changed by pressing the **F**-key; each digit currently active will be flashing.
  - Select the digit by pressing the **UNIT**-key
  - Confirm the entered lower tolerance tag by pressing the **PRINT**-key.

The balance is now in checkweighing mode Put on goods to be weighed, tolerance control is started

Information:
If invalid values are entered such as lower tolerance limit greater than upper tolerance limit, the balance will issue the error message "**Er8 outr**" and return automatically to weighing mode.

- **Return to weighing mode**

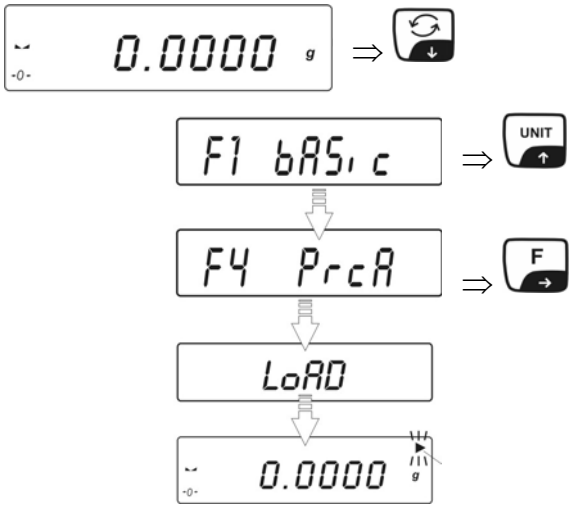


14.3 Percent determination

Percent determination allows weight display in percent, in relation to a reference weight.

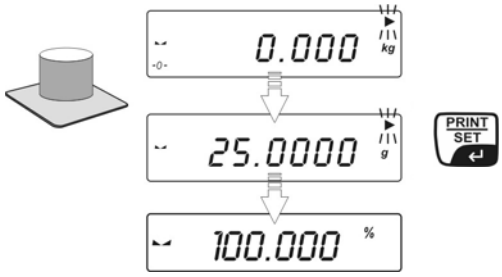
14.3.1 Determining the reference weight by weighing (function F4 PrcA)

- **Call function**



- **Make reference**

  - Place the reference weight
  - Confirm by pressing the **PRINT** key.

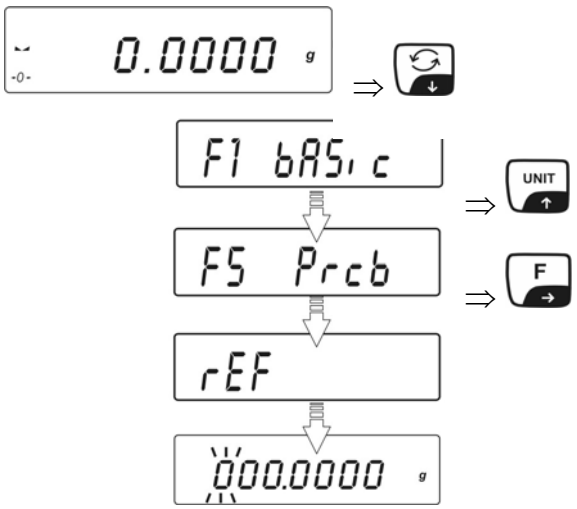


  - This weight is adopted as reference (100%).

Remove reference weight. The balance is now in percent determining mode Place the load on the balance; percentage value in relation to reference body is shown on display:

14.3.2 Determining the reference weight by entering numeric value (function F4 Prcb)

- **Call function**



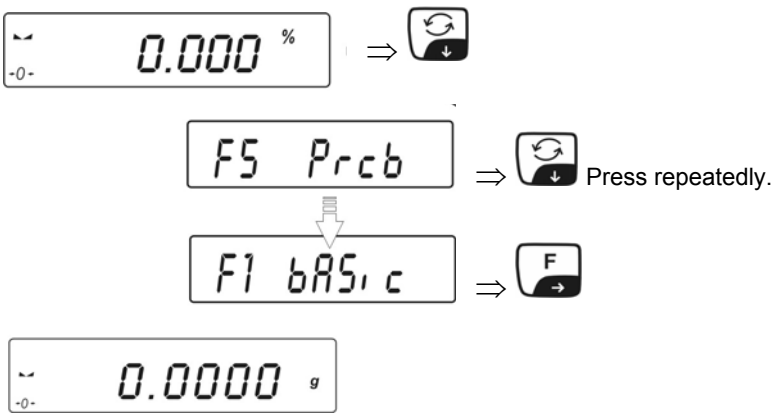
- **Make reference**
  - You will be asked to enter the reference weight by a flashing message.

  - Select the digit to be change by pressing the **F**-key; each time the currently active digit will be blinking.

  - Select the digit by pressing the **UNIT**-key
  - Confirm the entered reference weight by pressing the **PRINT**-key.

Now you can place the test objects onto the weighing plate; the percentage to the reference body is displayed

- **Return to weighing mode**



14.4 Density determination – functions “d_Co“ and “d_Li“

For procedure of density determination please see the operating instructions "Set density"

15 Data output RS 232C “P4 Print“

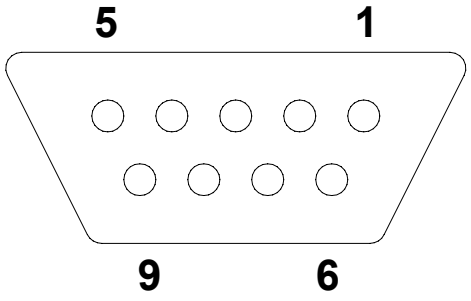
15.1 Technical data

- 8-bit ASCII Code
- 8 data bits, 1 stop bit, no parity bit
- Baud rate optional from 2400 - 19200 Baud
- For operation with interface faultless operation is only ensured with the correct KERN – interface cable (max. 2m)

Various transmission modes are available:

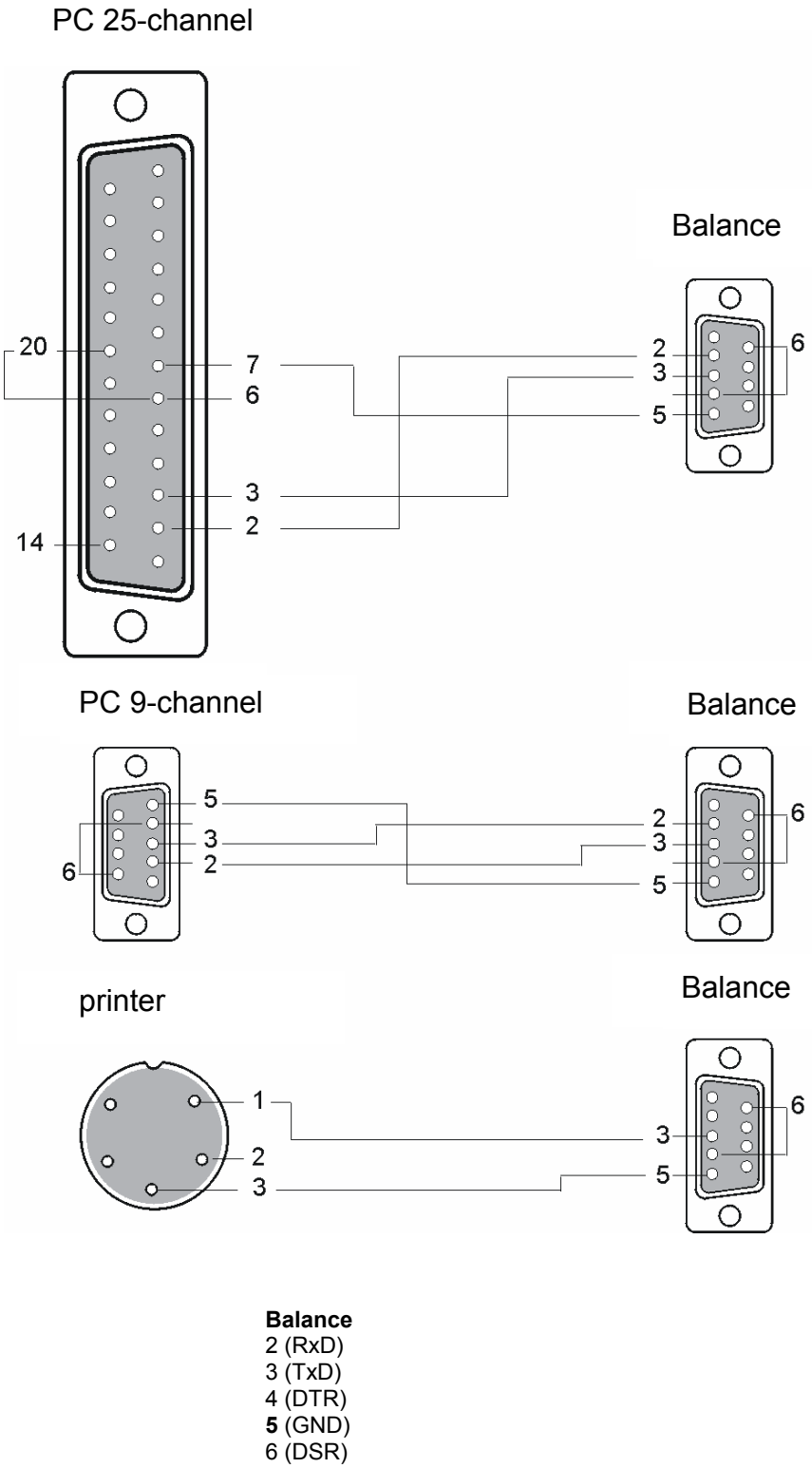
- Manually after pressing the **PRINT** key
- Continuously, according to setting
- Automatically according to stability display
- Prompted by external device
  (For remote control commands see chpt. 15.5))

15.2 Pin allocation of the balance output plug (front view)



Pin 2: Receive data
Pin 3: Transmit data
Pin 5: Signal ground

15.3 Interface cable



Balance
2 (RxD)
3 (TxD)
4 (DTR)
5 (GND)
6 (DSR)

15.4 Parameter for RS 232C interface

15.4.1 Navigation in the menu

⇨ Turn on balance by pressing the **ON/OFF** key

⇨ Press the **F**-key; first menu item "**P1 CAL"** appears.

⇨ Press the **UNIT-**key repeatedly until "**P4 Print**" appears.

⇨ Confirm by pressing the **F**-key; the first sub-menu for setting the Baud rate "**P4.1 b Aud"** appears.

⇨ Press and hold the **UNIT**-key until the selection you wish to use appears.
P4.1 b Aud →P4.2 b CntA →P4.3 b Cntb → P4.4 rEPL →P4.5 PStb →
P4.6 Lo→ P4.1 b Aud

⇨ Press the **F**-key again; the current setting is flashing.

⇨ Press the **UNIT-**key repeatedly until the desired setting appears(see chpt. 15.4.2).

⇨ Confirm settings by pressing the **PRINT** key. Weighing balance returns to menu. If desired, carry out settings for further menu items as described above.

⇨ Press the **TARE**-key repeatedly until "**SAVE**"? appears.

Store executed changes by pressing the **PRINT** -key. To cancel changes, press the **TARE** key. Afterwards the balance automatically jumps back to weighing mode.

15.4.2 Menu overview

Function **F**-key	**Choice** **UNIT**-key	**Description of options**
P4.1 b Aud	**2400**	2400 bps
	4800	4800 bps
	9600	9600 bps
	19200	19200 bps
P4.2 b CntA	**no**	Continuous output disabled in standard weighing unit, Output requires key operation
	yes	Continuous output in standard weighing unit

P4.3 b Cntb	**no**	Continuous output disabled in current weighing unit, Output requires key operation
	yes	Continuous output in current weighing unit
P4.4 rEPL Models in non-verificable setting only	**no**	Manual issue after pressing the PRINT key.
	yes	Automatic issue of first stable weighing value Sequence of operations: 1. Taring 2. Place weight, issue of first stable weighing value 3. Renewed output only possible after weight was removed. Condition: Display +/- 50 display steps from zero 4. Place next weight.
P4.5 PStb	**no**	Output even for unstable weighing value
	yes	Output for stable weighing value only
P4.6 Lo	**000,005**	Input minimum weight for automatic output:  • Select the place to be changed by pressing the **F**-key  • Select the digit by pressing the **UNIT**-key • Confirm by pressing the **PRINT** key Weighing value issued automatically if current weighing value exceeds entered minimum value. The next weighing value will not be issued unless the weighing value has meanwhile dropped below the entered weighing value.

15.5 Communication protocol / remote control commands

Instruction:	Meaning of Instruction:
Z	Set weight display at zero
T	Taring
S	Send weight value immediately
SI	Send stable weight value
SU	Send stable weighing value in current weighing value
SUI	Send weighing value immediately in current weighing unit
C1	Turn on continuous transmission in standard weighing unit
C0	Turn off continuous transmission in standard weighing unit
CU1	Turn on continuous transmission in current weighing unit
CO1	Turn off continuous transmission in current weighing unit
PC	Send all implemented instructions

Complete each instruction with **CR LF**.

15.5.1 Manual output

The user can start output manually by pressing the **PRINT**-key (for settings see chapter 15.4.2).

Data record format:

1	2	3	4 - 12	13	14 - 16	17	18
Stability indicator	Blank	Signs	Weight	Blank	Unit	CR	LF

Stability indicator	Space if stable, ? if not stable ^ if overload v if underload
Presign:	Space, if positive negative sign, if negative
Weight:	9 signs, right justified
Unit:	3 signs, left justified

15.5.2 PC controlled output

Response message of balance after remote instruction was sent:

XX_	Instruction:
XX_A CR LF	Instruction accepted; will be executed
XX_ I CR LF	Instruction received; impossible to carry out
XX_^ CR LF	Instruction received but *time overflow error* occurred
XX_v CR LF	Instruction received, but insufficient load
XX_E CR LF	Error during execution, timeout for stable weighing value exceeded

Data record format:

1 - 3	4	5	6	7	8 - 16	17	18 - 20	21	22
Remote control command	Blank	Stability indicator	Blank	mark	Weight	Blank	Unit	CR	LF

Instruction:	1. up to 3 signs
Stability indicator:	Space if stable, ? if not stable ^ if overload v if underload
Presign:	Space, if positive negative sign, if negative
Weight:	9 signs, right justified
Unit:	3 signs, left justified

15.5.3 Output of date/time

Output of date and time is enabled in menu item ”**P2 GLP**“:

- **PdAt – yes**
- **Ptin - yes**

16 Error messages

Er1 Hi	Initial weight error
Er2 nuLL	Value below allowed range
Er3 FuL1	Value above allowed range
Er4 FuL2	Weighing range exceeded
Er5 rout	Value outside allowed range e.g. tare value <= 0, Reference weight = 0
Er7 tout	Disconnecting time too short
Er8 outr	Input outside range e.g. for tolerance control: Input upper limit<lower limit
Er9 Lock	Function blocked
Er10 cal	Adjustment error e.g. incorrect adjustment weight}

17 Service, maintenance, disposal

17.1 Cleaning

Before cleaning, please disconnect the appliance from the operating voltage.

Please do not use aggressive cleaning agents (solvents or similar agents), but a cloth dampened with mild soap suds. Ensure that no liquid penetrates into the device and wipe with a dry soft cloth.
Loose residue sample/powder can be removed carefully with a brush or manual vacuum cleaner.

Spilled weighing goods must be removed immediately.

17.2 Service, maintenance

The appliance may only be opened by trained service technicians who are authorized by KERN.
Before opening, disconnect from power supply.

17.3 Disposal

Disposal of packaging and appliance must be carried out by operator according to valid national or regional law of the location where the appliance is used.

18 Instant help

In case of an error in the program process, briefly turn off the balance and disconnect from power supply. The weighing process must then be restarted from the beginning.

Help:

Fault	***Possible cause***
The displayed weight does not glow.	• *The balance is not switched on.* • *The mains supply connection has been interrupted (mains cable not plugged in/faulty).* • *Power supply interrupted.* • *(Rechargeable) batteries are inserted incorrectly or empty* • *No (rechargeable) batteries inserted.*
The displayed weight is permanently changing	• *Draught/air movement* • *Table/floor vibrations* • *Weighing plate has contact with other objects.* • *Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)*
The weighing result is obviously incorrect	• *The display of the balance is not at zero* • *Adjustment is no longer correct.* • *Great fluctuations in temperature.* • *Warm-up time was ignored.* • *Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)*

Should other error messages occur, switch balance off and then on again. If the error message remains inform manufacturer.