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Operating and Installation Instructions Display Unit

KERN KMA-TM

Version 1.0
05/2013
GB



KMA-TM-BA_IA-e-1310



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Operating and installation instructions Display unit

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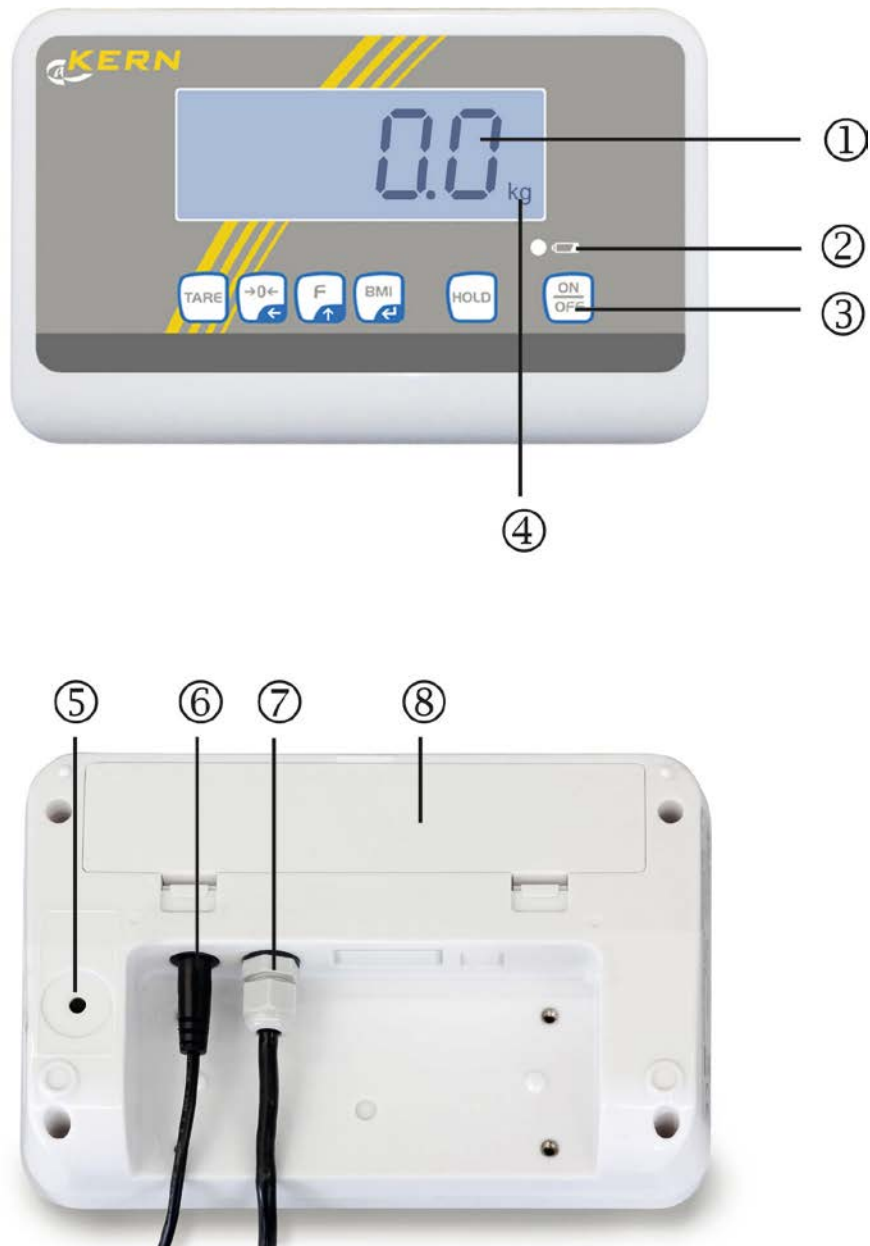
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1 Technical data





KERN	KMA-TM
Display	5 ½ - digit
Resolution verified	6.000
Resolution not verified	30.000
Divisions	1,2,5,...10n
Verification class	III
Weighing Units	kg
Functions	Data-Hold, BMI
Display	LCD 25 mm digits with back lighting
DMS weighing cells	80-100 Ω. Max. 4 item per 350 Ω; Sensitivity 2-3 mV/V
Range calibration	We recommend ≥ 50 % max.
Electric Supply	Input voltage 220 V – 240 V, 50 Hz
	Power pack secondary voltage 12V, 500mA
Dimensions (B x D x H) mm	195 x 118 x 83
Admissible ambient temperature	-10°C – 40°C
Net weight	1 kg
Medical product in accordance with 93/42/EEC	Class I when using as weighing system KERN MCC or KERN MPC

2 Appliance overview

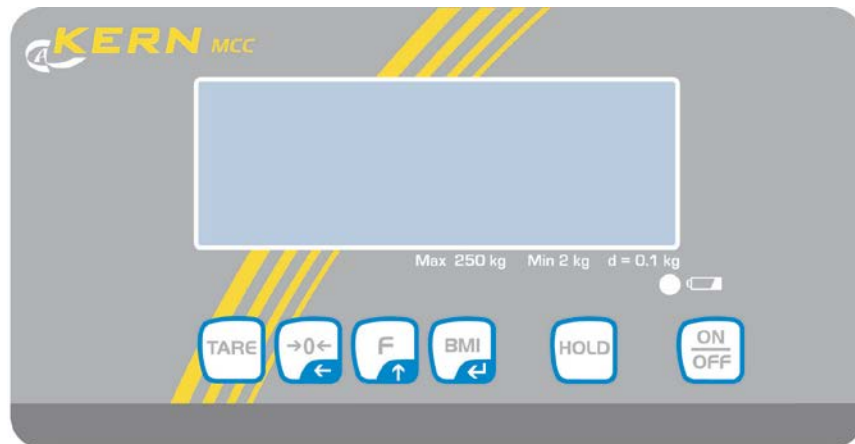








1. Weight display
2. Battery charge status
3. Keyboard
4. Weighing unit
5. Adjustment switch
6. Terminal power supply unit
7. Connection connecting cable „display unit - loading cell“
8. Battery compartment

2.1 Overview of display

Display	Description	Description
STABLE	Stability display	Scales are in a steady state
ZERO	Zeroing display	Should the balance not display exactly zero despite empty weighing plate, press the  button. Your balance will be set to zero after a short standby time.
NET	Net weight display	Illuminated when net weight is displayed Illuminated after weighing scale was tared
GROSS	Gross weight display	Illuminated when gross weight is displayed
HOLD	HOLD function	HOLD function active
BMI	BMI function	Illuminated while BMI function is enabled
	Rechargeable battery symbol	Lights when the voltage drops below the prescribed minimum.
		Lights when the rechargeable battery capacity is almost exhausted.
		Lights when the rechargeable battery is fully charged.

2.2 Keyboard overview



Key	Function
	Tare balance
	Weighing scale will be reset to „0.0“ For numeric entry: <ul style="list-style-type: none">• Change decimal place
	In menu: <ul style="list-style-type: none">• Call up menu• Select menu items For numeric entry: <ul style="list-style-type: none">• Increase numerical value
	Calculation of the Body Mass Index In menu: <ul style="list-style-type: none">• Confirm selection For numeric entry: <ul style="list-style-type: none">• Confirm numerical value
	Data-Hold function
	Turn on/off

3 Basic instructions

3.1 Proper use

The display unit acquired by you is used in combination with a load cell and serves to determine the weighing value of material to be weighed. It is intended to be used as a “non-automatic weighing system”, 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 weighing system for dynamic weighing. 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 display unit. (Example: Slowly draining fluids from a container on the balance.)

Do not leave permanent load on the load cell. This may damage the measuring system.

Impacts and overloading exceeding the stated maximum load (max) of the load cell, minus a possibly existing tare load, must be strictly avoided. The load cell or the display unit may be damaged during this process.

Never operate display unit in explosive environment. The serial version is not explosion protected.

Changes to the display unit's design are not permitted. This may lead to incorrect weighing results, safety-related faults and destruction of the display unit.

The display unit may only be operated in accordance with the described default settings. Other areas of use must be released by KERN in writing.

3.3 Warranty

Warranty claims shall be voided in case

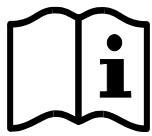
- Our conditions in the operation manual are ignored
- The appliance is used outside the described uses
- The appliance is modified or opened
- Mechanical damage or damage by media, liquids, natural wear and tear
- The appliance is improperly set up or incorrectly electrically connected
- Overload of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

3.4 Monitoring of Test Resources

In the framework of quality assurance the measuring-related properties of the display unit 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 display units' test substances and the test weights required for this. In KERN's accredited DKD calibration laboratory test weights and display units 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.
- ⇒ All language versions contain a non-binding translation. The original German is binding.

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 / return transport



- ⇒ Keep all parts of the original packaging for a possibly required return.
- ⇒ Only use original packaging for returning.
- ⇒ Prior to dispatch disconnect all cables and remove loose/mobile parts.
- ⇒ Reattach possibly supplied transport securing devices.
- ⇒ Secure all parts against shifting and damage.

6 Unpacking, Setup and Commissioning

6.1 Place of installation / place of operation

The display units 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 weighing system.

On the installation site observe the following:

- The weighing system must be levelled.
- Avoid **extreme heat as well as temperature fluctuation** caused by installing next to a radiator or in the direct sunlight;
- Protect the weighing system against direct draughts due to open windows and doors;
- Avoid jarring during weighing;
- Protect the display unit against high humidity, vapours and dust;
- Do not expose the display unit 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 display unit from packaging, remove plastic cover and place it in the designated work area.

and place it in the designated work area.

6.3 Scope of delivery

- Display Unit
- Mains adapter
- Operating instructions

6.4 Mains connection

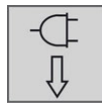


Terminal power supply unit

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.

The small sticker attached to the side of the display unit indicates the power port:



The LED remains illuminated as long as the weighing scale remains connected to the mains.

The LED display provides information about the battery's charging status.

green: Rechargeable battery completely reloaded


blue: Charging storage battery

6.5 Rechargeable battery operation



Open the battery compartment cover at the base of the display unit and connect the rechargeable battery pack.

Charge the battery for at least 12 hours before initial use.

The appearance of the symbol  in the weight display indicates that the battery packs is almost exhausted. The weighing scale will remain ready for operation for a few more minutes before switching off in order to save battery. Charge the battery pack.

 Voltage has dropped below prescribed minimum.

 Rechargeable battery very low.

 Rechargeable battery completely reloaded

If the balance is not used for a longer time, take out the battery pack and store it separately. Leaking liquid could damage the balance.

6.6 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. During this warming up time the balances must be connected to the power supply (mains, accumulator or battery) and be switched on.

The accuracy of the balance depends on the local acceleration of gravity. The value of gravity acceleration is shown on the type plate.


7 Operation

7.1 Start-up




⇒ Press , the appliance will carry out a self-test. As soon as the weight display appears, the instrument will be ready to weigh.

7.2 Switching Off

⇒ Press , the display will disappear.

7.3 Zeroing



⇒ Press , zero display as well as indicator **ZERO** will appear.

7.4 Weighing



⇒ Place goods to be weighed on balance.
⇒ Wait until stability display **STABLE** appears.




⇒ Read weighing result.

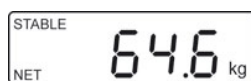
7.5 Taring



⇒ Put tare load.



⇒ Press , zero display as well as indicator will appear.




(example)

⇒ Load balance.
Wait until the standstill display „STABLE“ appears, then read the weighing result.

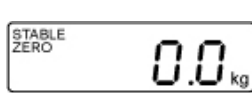
⇒ When the balance is unloaded the saved taring value is displayed with negative sign.


⇒ The taring process can be repeated any number of times. The limit is reached when the taring range capacity (see type plate) is full.

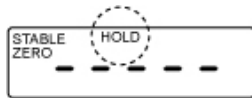
⇒ To delete the tare value, remove load from balance and press .


7.6 HOLD function

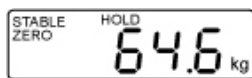
The balance has an integrated standstill function (mean value calculation). This allows correct weighing determination of a person although the latter is not keeping still on the seat surface.



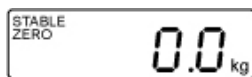
⇒ Start balance by pressing . Wait for stability display „STABLE“ to appear.



⇒ Press , in the display „-----“ will appear and the „HOLD“ symbol appears.




⇒ Place goods to be weighed on balance. After standstill control there sounds an acoustic signal, the weight value will be displayed.



After unloading the balance, the weighing value remains displayed for approx. 10 seconds, then the balance changes automatically into the weighing mode. The „HOLD“ symbol disappears.


7.7 See second decimal point (not verified value)

Press  and hold for about 2 s whilst weighed result is being shown. The second decimal place will be shown for approx. 5 s.

7.9 Calculation of the Body Mass Index

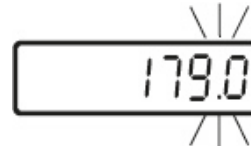
You need to know a person's body height before you can calculate the BMI for that person. This should be known.




⇒ Start balance by pressing 

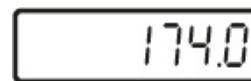




⇒ Place the person on the center of the weighing plate



⇒ Wait for stability display „STABLE to appear.


⇒ Press .
The most recently entered body height will be shown with the enable digit flashing.



⇒ To enter body height, press the  and  key.

⇒ Confirm entered value with .
The weighing scale is now in BMI mode and the BMI symbol will be appear and the kg display disappear.
The calculated BMI value will be displayed.



⇒ Return to weighing mode using .
The BMI symbol will disappear and the kg display will reappear.



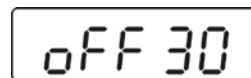
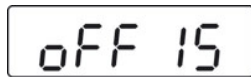
- Reliable calculation of BMI is restricted to a body height of 100 cm to 200 cm and a weight of >10 kg.
- If weighing has to take place under unsteady conditions, you can be stabilise the display by applying the Hold function.

7.9.1 Classification of BMI values


Weight classification for adults over 18 years of age using the BMI in accordance with WHO, 2000 EK IV and WHO 2004.


Categorie	BMI (kg/m ²)	Risk of diseases associated with overweight
Underweight	< 18.5	low
Normal weight	18.5 – 24.9	Average
Overweight	≥ 25.0	
Pre-adipose	25.0 – 29.9	A bit high
Adipose degree I	30.0 – 34.9	Increased
Adipose degree II	35.0 – 39.9	High
Adipose degree III	≥ 40	Very high

7.10 Automatic switch-off function „AUTO OFF“



⇒ In weighing mode, press  and the first function **[F1 OFF]** will be displayed.

⇒ Press , the current setting will be displayed, e.g. **[OFF 15]**

⇒ Press  repeatedly until the desired setting is displayed, e.g. **[OFF 30]**

[OFF 0]	AUTO-OFF function deactivated
[OFF 3]	AUTO-OFF after 3 minutes without changing the weight
[OFF 5]	AUTO-OFF after 5 minutes without changing the weight
[OFF 15]	AUTO-OFF after 15 minutes without changing the weight
[OFF 30]	AUTO-OFF after 30 minutes without changing the weight

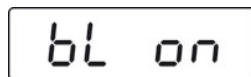
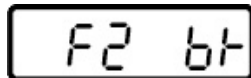


⇒ Confirm with , **[F1 OFF]** will be displayed





⇒ Return to weighing mode using 


7.11 Display background illumination



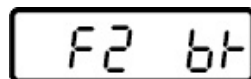
⇒ In weighing mode, press  and the first function **[F1 oFF]** will be displayed.


⇒ Press  repeatedly until **[F3 bk]** is shown.

⇒ Press , the current setting will be displayed, e.g. **[bL on]**


⇒ To select the desired setting, press 

bL on	Continuous background lighting
bL off	Background illumination off
bL AU	Automatic background illumination on when weighing surface is loaded or key pressed.



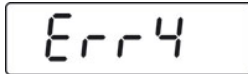
⇒ Confirm with , **[F3 bk]** will be displayed.



⇒ Return to weighing mode using 


8 Error messages

Display

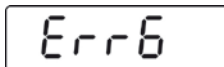


Description

Zero range exceeded

(on start-up or when pressing the  key)

- There is no weighing item on the load cell
- Overload during setting to zero
- Incorrect adjusting process
- Fault on load cell



Value outside the A/D converter range

- Damaged weighing cell
- Damaged electronics

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

9 Servicing, maintenance, disposal

9.1 Clean



- Before any maintenance, cleaning and repair work disconnect the appliance from the operating voltage.
- Do not use aggressive detergents (solvents or similar).

9.2 Servicing, maintenance

The appliance may only be opened by trained service technicians who are authorized by KERN.

Disconnect the device from mains before opening.

9.3 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.

10 Instant help

In case of a fault in the program sequence, the balance should be shortly switched off. The weighing process must then be restarted from the beginning.

Failure:

Possible causes:

The displayed weight does not glow.

- The display unit is not switched on.
- The mains supply connection has been interrupted (mains cable not plugged in/faulty).
- Power supply interrupted.
- Rechargeable battery inserted incorrectly or empty.
- No rechargeable battery inserted.

The displayed weight is permanently changing

- Draught/air movement
- Table/floor vibrations
- The load cell has contact with foreign 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.
- Weighing system is not levelled.
- 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.

11 Installation display unit



- Installation / configuration of a weighing system must be carried out by a well acquainted specialist with the workings of weighing balances.

11.1 Technical data

Supply voltage:	5 V/150mA
Resistance parameter	80 - 100 Ω , max 4 items per 350 Ω load cell

11.2 Weighing system design

The display unit is suitable for connection to any analogue load cell in compliance with the required specifications.

The following data must be established before selecting a load cell:

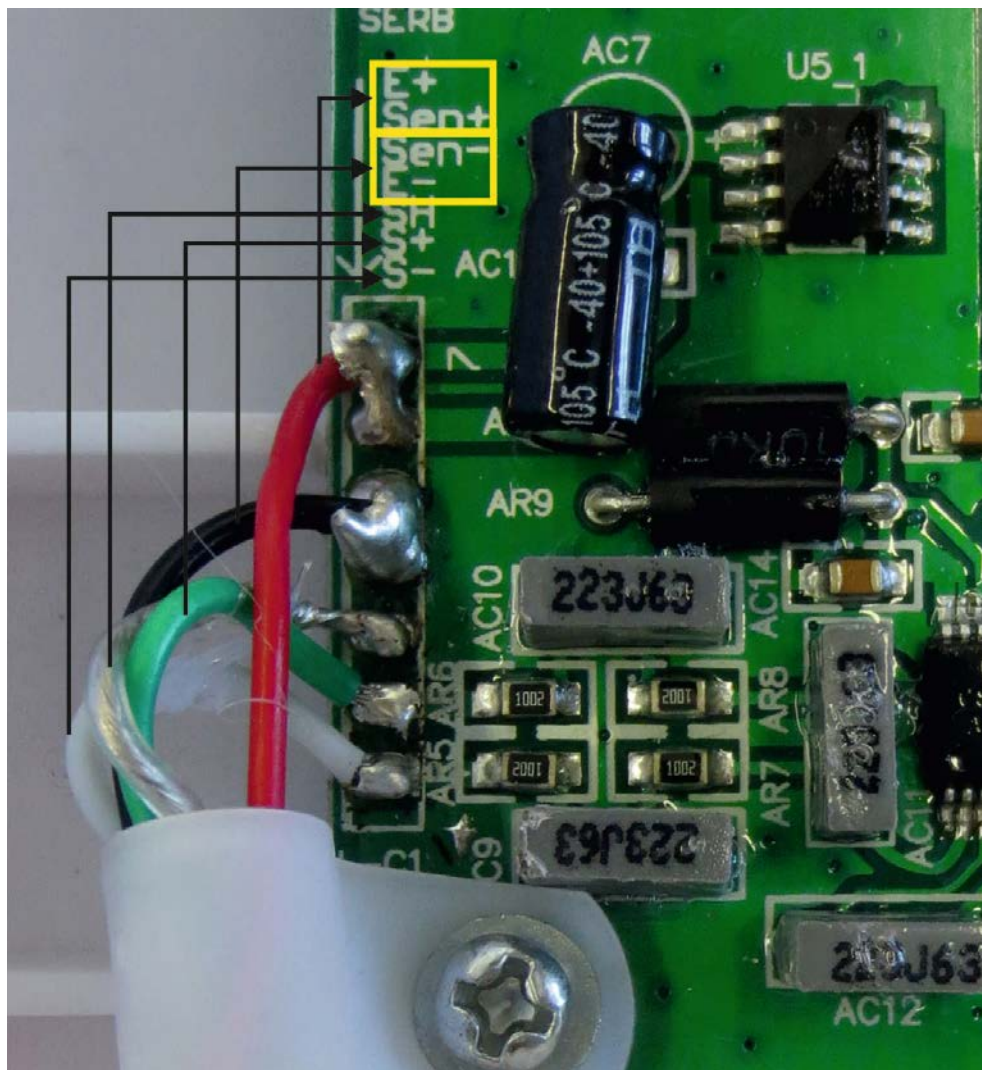
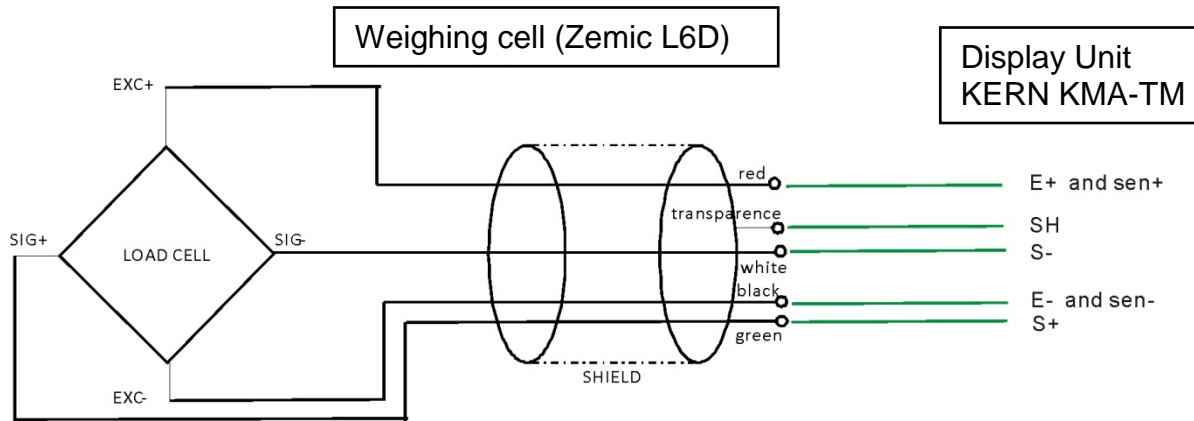
- **Weighing balance capacity**
This usually corresponds to the heaviest load to be weighed.
- **Preload**
This corresponds to the total weight of all parts that are to be placed on the weighing cell such as upper part of platform, weighing pan etc.
- **Total zero setting range**
This is composed of the start-up zero setting range ($\pm 2\%$) and the zero setting range available to the user via the ZERO-key (2%). The total zero setting range equals therefore 4 % of the scale's capacity.

The addition of weighing scales capacity, preload and the total zero setting range give the required capacity for the weighing cell.
To avoid overloading of the weighing cell, include an additional safety margin.

- **Smallest desired display division**
- **Verifiable, if required**

11.3 How to connect the platform

- ⇒ Disconnect the display unit from the power supply.
- ⇒ Solder the individual leads of the load cell cable onto the circuit board, see diagrams below.



11.4 Configure display unit









Access to service menu „tCH“ is locked in verified weighing systems. To disable the access lock, destroy the seal and actuate the adjustment switch. For position of adjustment switch, see chap. 12.




Attention:

After destruction of the seal the weighing system must be re-verified by an authorised agency and a new verification wire/seal mark fitted before it can be reused for applications subject to verification.

11.4.1 Navigation in the menu









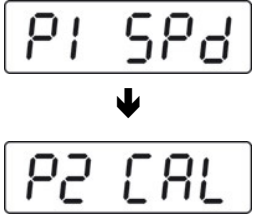







<p>Call up menu</p>	<p>⇒ In weighing mode, press  and the first function [F1 OFF] will be displayed.</p>
<p>Select function</p>	<p>⇒ With help of , the individual functions can be selected one after the other.</p>
<p>Change settings</p>	<p>⇒ Confirm selected function by . The current setting will be displayed.</p> <p>⇒ Select desired setting by  and confirm with , the balance returns to the menu.</p>
<p>Exit menu/ Return to weighing mode</p>	<p>⇒ Press , the balance will return to weighing mode.</p>

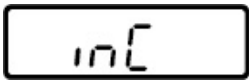




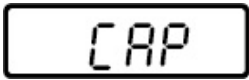













11.4.2 Menu overview

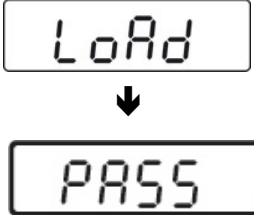


Function	Settings	Description
F1 oFF Automatic cutout Auto Off	oFF 0*	Automatic shutdown off
	oFF 3	Automatic shutdown after 3 sec
	oFF 5	Automatic shutdown after 5 sec
	oFF 15	Automatic shutdown after 15 sec
	oFF 30	Automatic shutdown after 30 sec
F2 bk Background illumination of display	bl on	Back lighting for display on
	bl oFF	Display background illumination off
	bl AU*	Backlighting for display will come on automatically as soon as the weighing scale is operated.
tCH Service menu	Pin	<p>If display shows "Pin" actuate adjustment switch.</p> <p>Then press , ,  subsequently.</p>
P1 Spd Display speed	SPd 7.5	Not documented
	SPd 15*	
	SPd 30	
	SPd 60	
P2 CAL Configuration	desc	Position decimal point, selectable 0, 0.0, 0.00, 0.000, 0.0000
	Inc	Readability, selectable div 1, div 2, div 5, div 10, div 20, div 50
	cap	Balance capacity (/max)
	cal	Adjustment, see chap. 16.1
P3 Pro	tri*	Not documented
	CoUnt	Internal A/D converter value
	rESEt	Reset weighing scale to factory setting
	SEtGrA	Not documented

* default setting

11.4.3 Carry out configuration

	<p>⇒ In weighing mode, press  repeatedly until [tCH] appears.</p>
	<p>⇒ Press , [Pin] is displayed</p> <p>⇒ For the access to the service menu press the adjustment switch, position see chap. 12.</p>
	<p>⇒ Press ,  and  one after the other, [P1 SPd] will appear</p>
	<p>⇒ Press , [P2 CAL] will be displayed</p> <p>⇒ Press , [dESC] is displayed</p>
	<p>⇒ Press , the currently set position of the decimal dot is displayed.</p> <p>Press  to select the desired setting. Selectable 0, 0.0, 0.00, 0.000, 0.0000.</p> <p>Confirm input with , the balance returns to the menu.</p> <p>⇒ Use  to select the next menu item [inC].</p>

	<p>⇒ Press , the currently set readability is displayed.</p> <p>Press  to select the desired setting. Selectable div 1, div 2, div 5, div 10, div 20, div 50</p> <p>⇒ Confirm input with , the balance returns to the menu.</p> <p>⇒ Use  to select the next menu item [CAP].</p>
	<p>⇒ Press , the currently set capacity (Max) is displayed. Use the navigation keys to select the desired setting</p> <p>Use  to select the digit to be changed, the active digit flashes.</p> <p>Use  to increase numeric value.</p> <p>⇒ Confirm input with , the balance returns to the menu.</p> <p>⇒ Use  to select the next menu item [CAL].</p>
	<p>Adjustment is required after entering configuration data!</p>
	<p>⇒ Confirm with , [UnLoAd] appears</p>
	<p>⇒ Ensure that there are no objects on the weighing pan.</p> <p>⇒ Wait for stability display "STABLE", then confirm with .</p>
 (example)	<p>⇒ The size of the currently set adjustment weight will be displayed.</p> <p>To change, select the digit to be altered by , and the numerical value by .</p> <p>⇒ Confirm with , [LoAd] appears.</p>

	<ul style="list-style-type: none"> ⇒ Place the adjustment weight carefully ⇒ Wait until stability display „STABLE“ appears ⇒ Confirm with  [PASS] is displayed.
	<p>After the adjustment the balance will carry out a self-test. Remove adjusting weight during selftest, balance will return into weighing mode automatically.</p> <p>An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure.</p> <p>An adjusting error or incorrect adjustment weight will generate an error message („Err 4“), repeat the adjustment process.</p>

12 Verification

General introduction:

According to EU directive 2009/23/EC 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 notes:

An EU type approval exists for balances described in their technical data as verifiable. If a balance is used where obligation to verify exists as described above, it must be verified and re-verified at regular intervals.

Re-verification of a balance is carried out according to the respective national regulations. For verification validity period, s. chap. 15.1.

The legal regulation of the country where the balance is used must be observed!



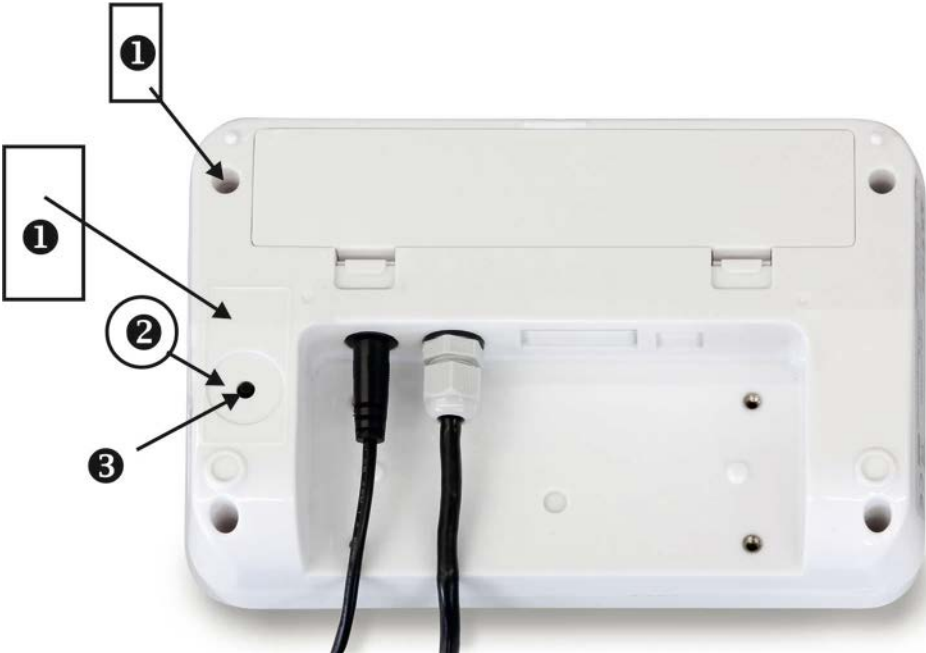
Verification of the balance is invalid without the seal.

The seal marks attached on balances with type approval point out that the balance may only be opened and serviced by trained and authorised specialist staff. If the seal mark is destroyed, verification loses its validity. Please observe all national laws and legal regulations. In Germany a re-verification will be necessary.

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**.

Position adjustment switch and seals:



- 1. Self-destroying seal mark
- 2. Cover
- 3. Adjustment switch

13 Adjustment

As the acceleration value due to gravity is not the same at every location on earth, each display unit with connected load cell 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 weighing system 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 display unit periodically in weighing operation.



- Prepare the required adjustment weight. The weight to be used depends on the capacity of the scale. Carry out adjustment as near as possible to the scale's maximum weight. Info about test weights can be found on the Internet at: <http://www.kern-sohn.com>.
- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.








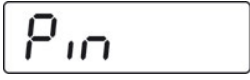



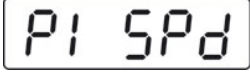













Access to service menu „tCH“ is locked in verified balances.

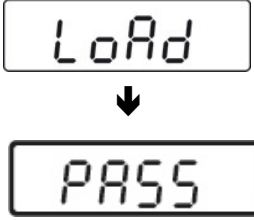


To disable the access lock, destroy the seal and actuate the adjustment switch. Position of the adjustment switch see chap. 12.

Attention:

After destruction of the seal the weighing system must be re-verified by an authorised agency and a new verification wire/seal mark fitted before it can be reused for applications subject to verification.

Procedure:

 <p style="text-align: center;">↓</p> 	<p>⇒ In weighing mode, press  repeatedly until [tCH] appears.</p>
	<p>⇒ Press , [Pin] is displayed</p>
	<p>Press ,  and  one after the other, [P1 SPd] will appear</p>
 <p style="text-align: center;">↓</p> 	<p>⇒ Press , „P2 CAL“ will be displayed</p> <p>⇒ Operate adjustment switch; for position see chap.12</p>
	<p>⇒ Press , [dESC] is displayed</p>
	<p>⇒ Press  repeatedly until [CAL] will be displayed.</p> <p>⇒ Confirm with , [UnLoAd] appears</p>
	<p>⇒ Ensure that there are no objects on the weighing pan.</p> <p>⇒ Wait for stability display "STABLE", then confirm with </p>
 <p>(example)</p>	<p>⇒ The size of the currently set adjustment weight will be displayed. The active digit is flashing.</p> <p>To change, select the digit to be altered by , and the numerical value by .</p> <p>⇒ Confirm with , [LoAd] appears.</p>

	<ul style="list-style-type: none"> ⇒ Place the adjustment weight carefully ⇒ Wait until stability display „STABLE“ appears ⇒ Confirm with  [PASS] is displayed.
	<p>After the adjustment the balance will carry out a self-test. Remove adjusting weight during selftest, balance will return into weighing mode automatically.</p> <p>An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure.</p> <p>An adjusting error or incorrect adjustment weight will generate an error message („Err 4“), repeat the adjustment process.</p>

14 Enclosure

Type Approval Certificate when using as weighing system KERN MCC or MPC



We help ideas meet the real world

EC Type-Approval Certificate

No. DK 0199.365 Revision 1

MBC / MPE / MPD / MPC / MCC

NON-AUTOMATIC WEIGHING INSTRUMENT

Issued by DELTA Danish Electronics, Light & Acoustics
EU - Notified Body No. 0199

In accordance with the requirements for the non-automatic weighing instrument of EC Council Directive 2009/23/EC.

Issued to Kern & Sohn GmbH
Ziegelei 1
D-72336 Balingen
GERMANY


In respect of Non-automatic weighing instrument designated MBC / MPE / MPD / MPC / MCC with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class III, single interval or multi-range (2 ranges)
Maximum capacity, Max: From 6 kg up to 250 kg
Verification scale interval: $e_i = \text{Max}_i / n_i$
Maximum number of verification scale intervals: $n_i = 3000$ (however, dependent on environment and the composition of the modules).
Variants of modules and conditions for the composition of the modules are set out in the annex.

The conformity with the essential requirements in annex 1 of the Directive is met by the application of the European Standard EN 45501:1992/AC:1993.

The principal characteristics and approval conditions are set out in the descriptive annex to this certificate.

The annex comprises 14 pages.

Issued on 2012-12-18
Valid until 2022-10-11


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Descriptive annex

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1. Name and type of instrument

The weighing instruments designated MBC, MPE, MPD, MPC and MCC are self-indicating computing scales of Class III with single interval or multi-range (2 ranges), an external AC mains adapter, and an internal rechargeable battery (optional).

The scales are intended for medical weighing.

The scales consist of analogue to digital conversion, microprocessor control, power supply, keyboard, non-volatile memory for storage of calibration and weight data, and a weight display contained within a single enclosure, however, the display part is placed on a post.

2. Description of the construction and function

2.1 Construction

Enclosure

The indicator part of the scales is housed in an ABS enclosure approximately 200 mm wide, 125 mm deep and 55 mm high.

There are two models of the housing depending on whether the indicator is placed on a pole (B) or not (A).

Keyboard

The keyboard of the scales contains 6 or 7 membrane keys – including On/Off - used to control the functions of the scale, except model MPD, which has no keyboard.

Display

The display of the scales comprises of a 6 digits 7-segment LCD display with backlight and appropriate status indicators.

Electronics

All the instruments use the same printed circuit board, a main board, which also includes the display components.

Models

Scale model	Product name	Max	e.	Load cell	E _{max}	Note
MBC	Baby scale	20 kg	10 g	L6D	30 kg	Without height measurement
						With MBC-A01 height measure
MBC	Baby scale	6 kg/15 kg	2 g/5 g	L6D	20 kg	Without height measurement
						With MBC-A01 height measure
MPE	Height scale	250 kg	100 g	L6E	300 kg	With height measurement
						Without height measurement
MPD	Step on scale	250 kg	100 g	L6E	300 kg	Step on, without keys
MPC	Wall mount personal scale	250 kg	100 g	L6E	300 kg	Wall mount, without pole
MCC	Wheel chair scale	250 kg	100 g	L6E3	300 kg	Wheel chair scale

The model names may be followed by alphanumeric characters for technical, legal or commercial characterization of the instrument.

Other models are allowed, if their technical data are in accordance with Chapter 3 and they fulfil the requirements in Sections 3.1 and 5.4.

2.2 Function

The weight indicating instruments are microcontroller based electronic scales with a digital display used to show weight and for some models height and BMI index depending on the current operating mode. The instruments are available for operation from mains at 230 VAC 50 Hz using an external AC/DC adapter or from an internal battery consisting of 6 rechargeable “AA” batteries.

The primary functions provided are detailed below.

2.2.1 Power-up

On power-up, the weight indicator will display of the software version for 2 seconds and then perform a display test. After that it will automatically establish the current weight as a new zero reference.

2.2.2 Test function

On power-up, the weight indicator will test all memory functions followed by a display test. The display test consists of counting down the numeric digits from 9 to 0 and turning all the indicators on.

2.2.3 Display range

The weight indicators will display weight from -Max (tare function) to Max +9e (gross weight).

2.2.4 Zero-setting

Pressing the ZERO key causes a new zero reference to be established and ZERO annunciator to turn on, indicating that the display is at the centre of zero.

Zero-setting range: $\pm 2\%$ of Max.

Initial zero-setting range: $\leq \pm 10\%$ of Max.

Zero-setting is only possible when the displayed weight is stable.

2.2.5 Zero-tracking

The indicators are equipped with a zero-tracking feature which operates over a range of $\pm 2\%$ of Max and only when the indicator is at gross zero and there is no motion in the weight display.

2.2.6 Tare

The instrument models are provided with a semi-automatic subtractive tare.

2.2.6.1 Semi-automatic tare


Pressing the TARE key will take the current weight as the tare weight. The weight display will automatically change to the net weight display mode and turn on the NET annunciator.

Consecutive tare operations are possible on all models.


The tare value can be cleared by pressing the TARE key, when there is no load on the load receptor. This tare entry cannot take place if the displayed weight is instable.


2.2.6.2 Drinking function (only model MBC)

The drinking function is a special tare function on the baby scale models.

Pressing the  (weigh before drink) button will turn the “DRINK” indicator and remember the

current baby weight as a tare value.

When the baby after having been drinking is placed on the load receptor again, a press on the  (weigh after drink) button will show the weight change of the baby between the two weighings.

Pressing the  key a second time will turn the drink function off.

2.2.7 HOLD

Pressing the HOLD key will turn on the “HOLD” indicator and the display will show “-----“ until a load has been placed on the pan and the weight signal is stable, at which time the display will show the detected stable weight. This weight will be locked in the weight display until 10 seconds after the load has been removed or the “HOLD” key has been pressed a second time. Either of them will turn the “HOLD” indicator off and unlock the weight display.

This feature is not to be used in trade applications, but may be convenient in clinical or health care weighing applications.

2.2.8 BMI (only models MPC, MPE and MCC)

The BMI key is used to access the Body Mass Index feature of the indicator. This allows the operator to enter the height of the person on the load receptor. When height is displayed the HEIGHT annunciator is on.

Pressing the F” key will calculate and display the Body Mass Index (BMI). Display of the BMI is indicated by turning the BMI annunciator on.

Pressing the BMI key again will return the scale to normal weighing mode.

2.2.9 Backlight

Pressing the menu key “F” gives access to set the backlight between Off (always off), On (always on) and Auto (on for a period of time after a change in weight).

2.2.10 Operator information messages

The weight display can show a number of general and diagnostic messages, which are described in detail in the User’s Guide.

2.2.11 Software version

The software revision level is displayed during the power-up sequence of the instrument.

The approved software versions are,

MBC:	v1.10
MPE:	v3.09
MPD:	v3.08
MCC/MPC:	v5.09

2.2.12 Battery operation

The scale can be operated from an internal battery. This battery consists of 6 “AA” size rechargeable batteries.

The weight indicator contains the circuitry necessary to recharge the battery when the indicator is connected to the mains power.

3. Technical data

3.1 Scales

The scales have the following characteristics:

Accuracy class:	III
Weighing range:	Single interval or multi-range (2 ranges)
Maximum number of Verification Scale Intervals:	≤ 3000 pr. interval/range
Maximum capacity (Max):	from 6 kg to 250 kg
Verification Scale Interval:	$e \geq 2$ g
Maximum tare effect:	-Max
Mains power supply:	9-12 VDC / 230 VAC, 50 Hz using external adapter
Operational temperature:	-10°C to +40 °C
Peripheral interface:	Set out in section 4

3.2 Indicators

The indicators have the following characteristics:

Accuracy class:	III and IIII
Weighing range:	Single-interval, multi-range (2 ranges) or multi-interval (2 partial intervals)
Maximum number of Verification Scale Intervals:	≤ 6000 (class III), ≤ 1000 (class IIII) for single-interval ≤ 3000 (class III), ≤ 1000 (class IIII) for multi-range and multi-interval
Maximum tare effect:	-Max within display limits
Fractional factor:	$p'i = 0.5$
Minimum input voltage per VSI:	1 μ V
Excitation voltage:	5 VDC
Circuit for remote sense:	present on the model with 7-terminal connector
Minimum input impedance:	87 ohm
Maximum input impedance:	1600 ohm
Mains power supply:	9 – 12 VDC / 230 VAC, 50 Hz using external adapter
Operational temperature:	-10 °C to +40 °C
Peripheral interface:	Set out in section 4

3.2.1 Connecting cable between the indicator and load cell / junction box for load cell(s)

3.2.1.1 4-wire system

Cable between indicator and load cell(s):	4 wires (no sense), shielded
Maximum length:	the certified length of the load cell cable, which shall be connected directly to the indicator.

3.2.1.2 6-wire system

Only to be used for indicator model with a 7-terminal connector for load cell.

Cable between indicator and junction box:	6 wires, shielded
Maximum length:	227 m / mm ²

3.3 Load cells

3.3.1 ZEMIC L6D and L6E load cells

The ZEMIC L6D C3 load cell and ZEMIC L6E C3 load cell shall be selected according to the table of models in section 2.1.

3.3.2 General acceptance of modules

Any load cell(s) may be used for instruments under this certificate of type approval provided the following conditions are met:

- 1) A test certificate (EN 45501) or OIML Certificate of Conformity (R60) respectively issued for the load cell by a Notified Body responsible for type examination under the Directive 2009/23/EC.
- 2) The certificate contains the load cell types and the necessary load cell data required for the manufacturer's declaration of compatibility of modules (WELMEC 2, Issue 5, 2009), and any particular installation requirements). A load cell marked NH is allowed only if humidity testing to EN 45501 has been conducted on this load cell.
- 3) The compatibility of load cells and indicator is established by the manufacturer by means of the compatibility of modules form, contained in the above WELMEC 2 document, or the like, at the time of EC verification or declaration of EC conformity of type.
- 4) The load transmission must conform to one of the examples shown in the WELMEC 2.4 Guide for load cells.

3.4 Composition of modules

In case of composition of modules, EN 45501 paragraph 3.5 and 4.12 shall be satisfied.

3.5 Documents

The documents filed at DELTA (reference No. T202965) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 RS-232

The scales may be equipped with a RS-232 interface for connection to peripheral equipment. This interface is characterised as a "Protective interface" according to paragraph 8.4 in the Directive.

4.2 USB

The height scale (MPE), the step on scale (MPD) and the personal scale (MPC) may be equipped with an USB interface for connection to peripheral equipment. This interface is characterised as a "Protective interface" according to paragraph 8.4 in the Directive.

The USB cable used for connection shall be less than 3 m long.

4.3 Peripheral equipment

The instrument may be connected to any simple printer with a CE mark of conformity by a screened cable.

5. Approval conditions

5.1 Measurement functions other than non-automatic functions

Measurement functions that will enable the use of the instrument as an automatic weighing instrument are not covered by this type approval.

5.2 Compatibility of modules

In case of composition of modules, WELMEC 2 (Issue 5) 2009, paragraph 11 shall be satisfied.

6. Special conditions for verification

6.1 Composition of modules

The environmental conditions should be taken into consideration by the composition of modules for a complete weighing instrument, for example instruments with load receptors placed outdoors and having no special protection against the weather.

The composition of modules shall agree with Section 5.2.

7. Securing and location of seals and verification marks

7.1 Securing and sealing

Seals shall bear the verification mark of a notified body or alternative mark of the manufacturer according to ANNEX II, section 2.3 of the Directive 2009/23/EC.

7.1.1 Indicator

Access to the configuration and calibration facility is achieved by pressing and releasing the internal calibration switch (accessed through a hole on the rear side of the indicator). This is accomplished by removing the seal from the rear of the indicator enclosure, remove the protecting cover plate, and pressing the calibration switch button.

Sealing of the access to the switch is accomplished by placing the cover plate over the switch and then sealing this plate with a sticker.

Sealing of the cover of the enclosure - to secure the electronics against dismantling/adjustment - is accomplished with a brittle plastic sticker. The sticker is placed so access to one of the screws of the enclosure is prohibited.

7.1.2 Indicator - load cell connector - load receptor

Securing of the indicator, load receptor and load cell combined is done in one of the following ways:

- Load cell cable is connected directly on the main board of indicator(no connector)
- Sealing of the load cell connector with the indicator by a lead wire seal
- Inserting the serial number of the load receptor as part of the principal inscriptions contained on the indicator identification label
- The load receptor bears the serial number of the indicator on its data plate.

7.1.3 Peripheral interfaces

All peripheral interfaces are “protective”; they neither allow manipulation with weighing data or legal setup, nor change of the performance of the weighing instrument in any way that would alter the legality of the weighing.

7.2 Verification marks

7.2.1 Indicator

A green M-sticker shall be placed next to the CE mark on the inscription plate.

The sticker with verification marks may be placed on or next to the inscription plate or on the front of the indicator.

7.2.2 Printers used for legal transactions

Printers covered by this type approval and other printers according to Section 4.2, which have been subject to the conformity assessment procedure, shall not bear a separate green M-sticker in order to be used for legal transactions.

8. Location of CE mark of conformity and inscriptions

8.1 Scale

8.1.1 CE mark

A sticker with the CE mark of conformity and year of production is located on the identification plate which is located on the enclosure.

8.1.2 Inscriptions

Located on the front panel overlay of the indicator:

- Max, Min, e =

On the inscription plate:

- Manufacturer's name and/or trademark, model no., serial no., type-approval certificate no., Max, Min, e =, accuracy class, temperature range, electrical data and other inscriptions.

8.1.2.1 Load receptors

On a data plate:

- Manufacturer's name, type, serial number, capacity

Left to the manufacturer choice as provided in Section 7.1.2:

- Serial no. of the indicator

8.1.3 Printers used for legal transactions

A printer connected to the scale shall according to Sections 4.2 and 5.3 not bear a separate green M-sticker in order to be used for legal transactions.

9. Pictures

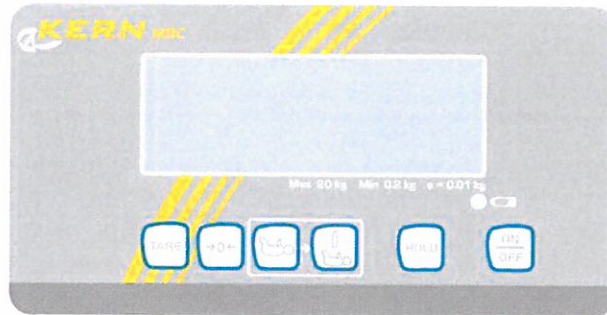


Figure 1 Front layout of indicator on MBC

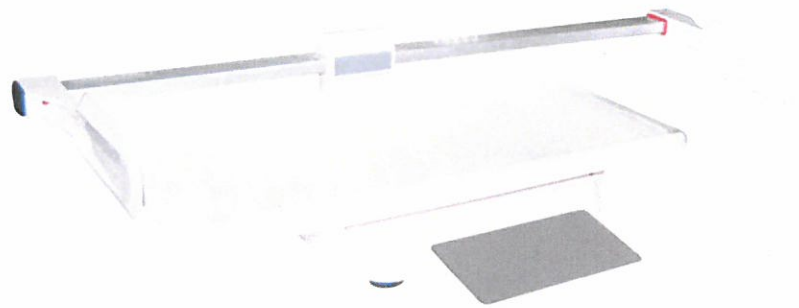


Figure 2 MBC scale with MBC-A01 (height measure).



Figure 3 MBC scale.

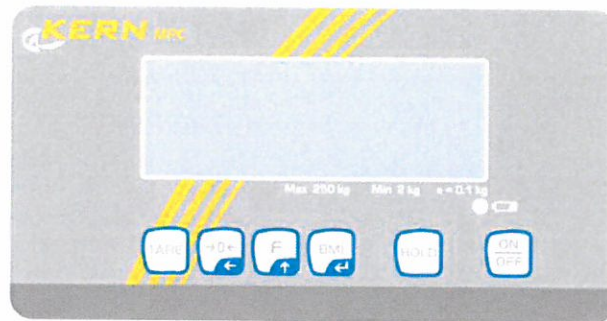


Figure 4 Front layout of indicator on MPC



Figure 5 MPC personal scale with wall mounted indicator.

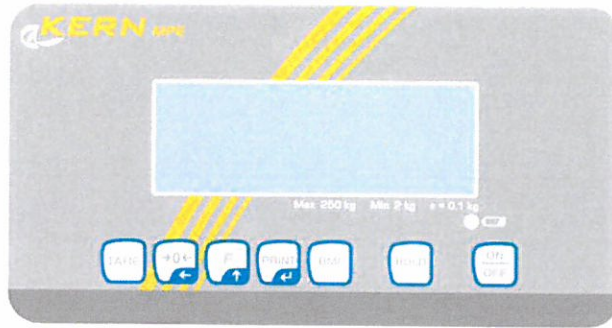


Figure 6 Front layout of indicator on MPE

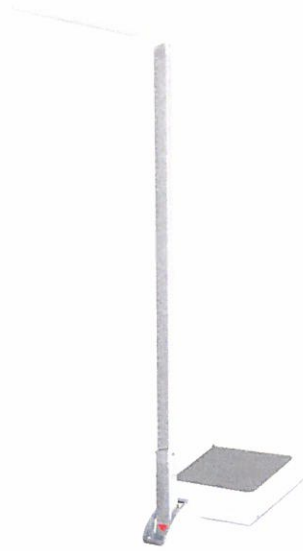


Figure 7 MPE personal scale with pole and height measure.



Figure 8 MPE personal scale with pole.

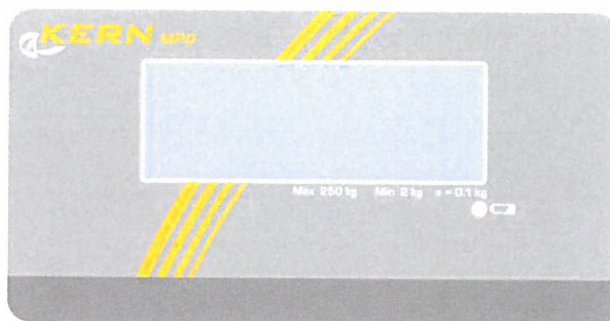


Figure 9 Front layout of indicator on MPD



Figure 10 MPD personal scale.

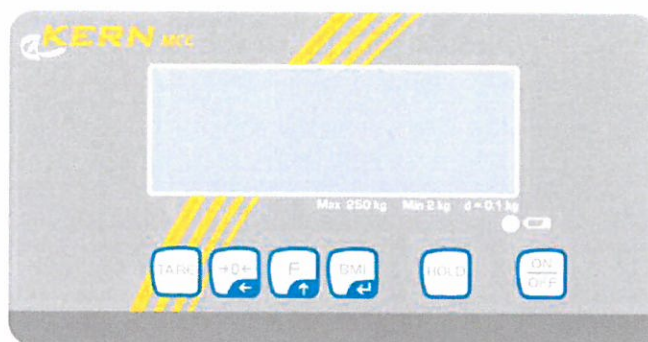


Figure 11 Front layout of indicator on MCC



Figure 12 MCC wheel chair scale

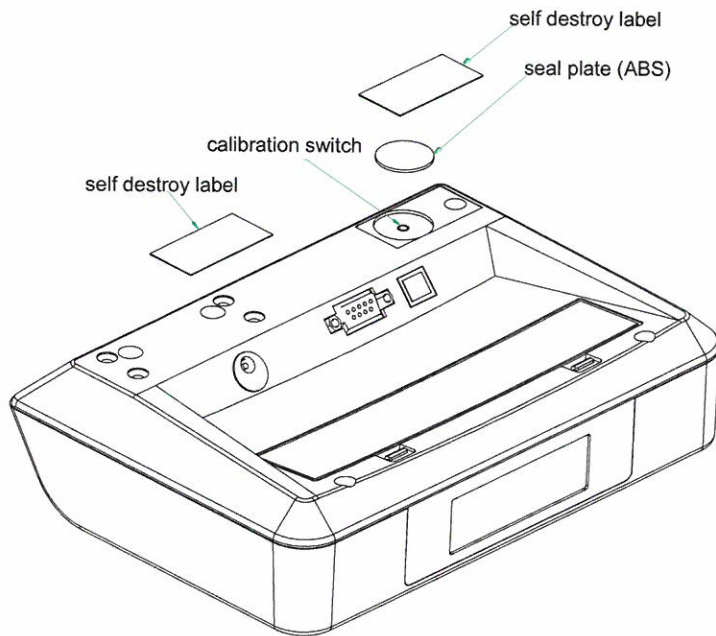


Figure 13 Sealing of indicator for model MPE.

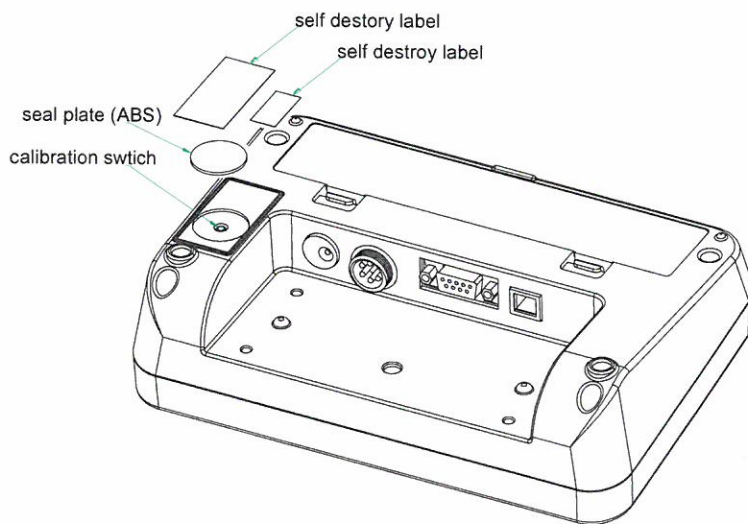


Figure 14 Sealing of indicator for model MBC / MPD / MPC / MCC.