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Operating and Installation Instructions Display Unit

KERN KFE-TM

Version 1.3
06/2013
GB

KFE-TM-BA_IA-e-1313

GB

KERN KFE-TM

Version 1.3 06/2013

Operating and installation instructions
Display unit

English

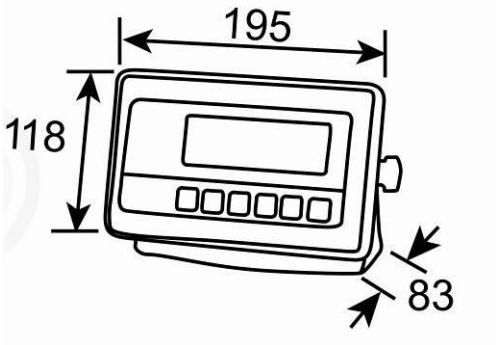
Contents

English

1 Technical data

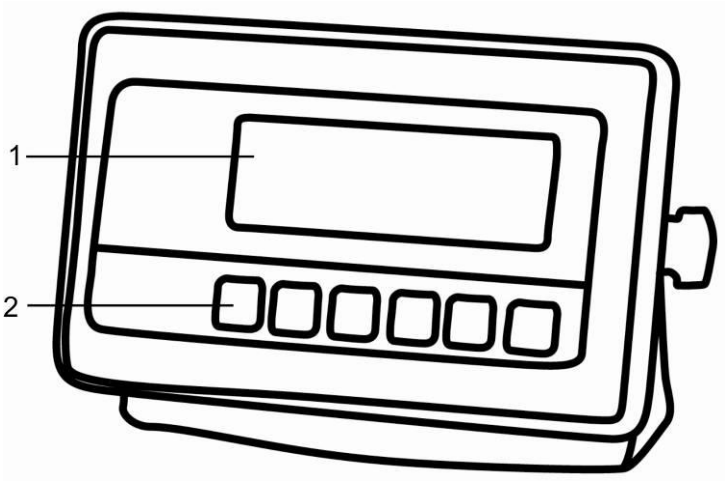
KERN	KFE-TM
Display	6-digit
Solution verifiable	6.000 e
Verification class	III
Weighing ranges	2
Divisions	1,2,5,…10, n
Display	LCD 22 mm digits with back lighting
DMS weighing cells	80-100 Ω. Max. 4 items per 350 Ω; Sensitivity 2-3 mV/V
Electric Supply	Input voltage 220 V – 240 V, 50 Hz
	Mains adapter secundary voltage 12V, 500 mA
Rechargeable battery (optional)	6 x 1.5 V, 4 Ah
	Service life – background illumination OFF 45 h
	Loading time 12 h
Admissible ambient temperature	-10°C – 40°C
Net weight	1.9 kg
Protection type	IP 65 as per DIN EN 60529

Dimensions:



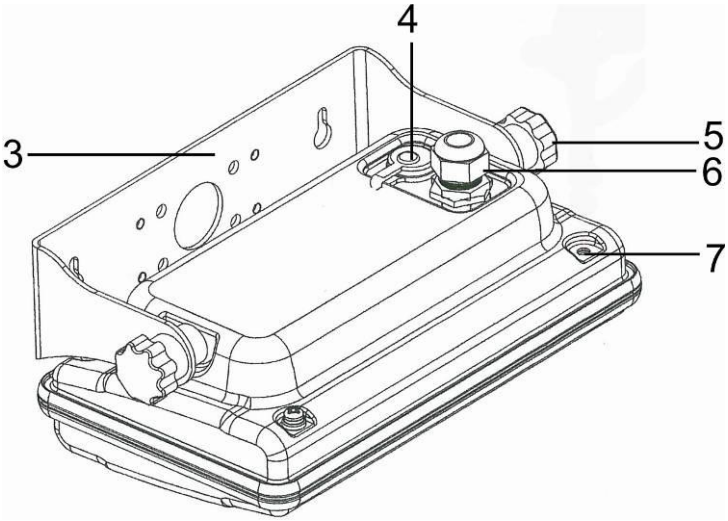
2 Appliance overview

Front view:



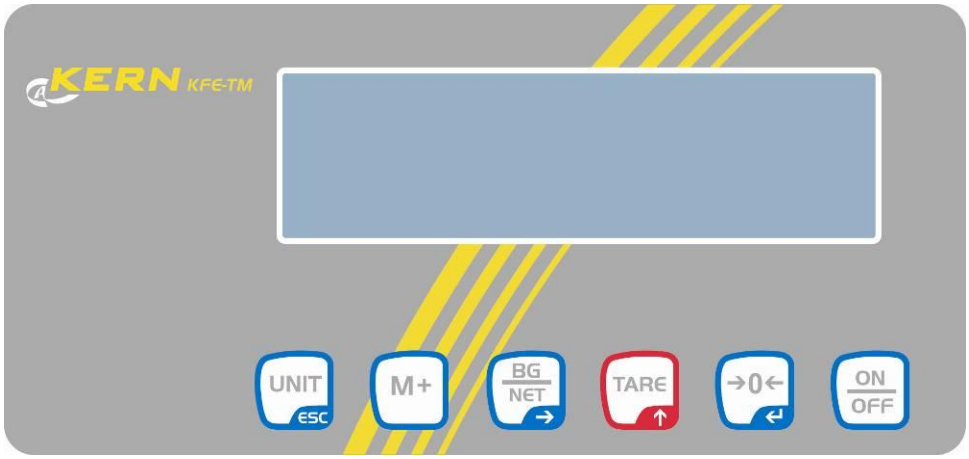
1. Weight display
2. Keyboard

Rear view:



3. Wall bracket
4. Connection power supply (mains adapter)
5. Fastening screws
6. Connection platform
7. Position of seal / housing screw

2.1 Keyboard overview

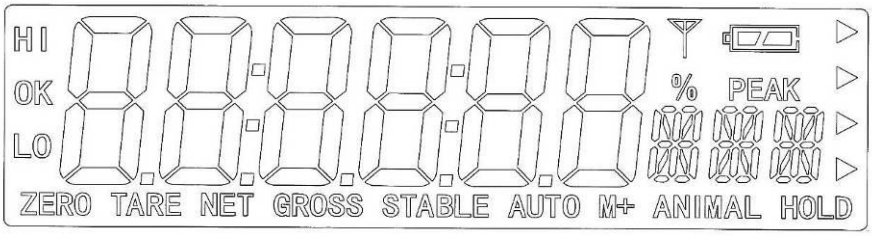


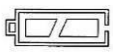
Key	Function
ON/OFF	• Turn on/off
→0←	• Zeroing
Navigation key ↵	• Confirm entry
TARE	• Taring
Navigation key ↑	• Scroll forward in menu • At numeric input increase flashing digit
M+	• Add weighing value to summation memory • Display sum total • Delete total added memory
BG/NET Navigation key →	• Change between gross ⇔ and net weight • Digit selection to the right
UNIT/ESC	• Switch-over weighing unit
ESC	• Back to menu/weighing mode

2.1.1 Numerical input via the navigation buttons

Key	Function
	Digit selection to the left
	Delete
	Digit selection to the right
	Increase flashing digit
	Terminate input

2.2 Overview of display



Display	Significance
HI OK LO	Status indicatoren for weighing with tolerance range HI: Weighed goods over default tolerance OK: Weighed goods within default tolerance OK: Load below specified tolerance
ZERO	Indicator zero display
TARE	Indicator for saved tare value
NET	The displayed weighing value is a net weighing value
GROSS	The displayed weighing value is a gross weighing value
STABLE	Stability display
AUTO	Function for „Automatic totalizing“ is activated
ANIMAL	Animal weighing mode is activated
	Charging status of rechargeable battery (optional)

3 Basic Information (General)

3.1 Proper use

The display unit acquired by you is used in combination with a weighing plate 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 display unit 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 display unit. (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 weighing plate, minus a possibly existing tare load, must be strictly avoided. Both, the weighing plate and 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
- The measuring system is overloaded

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.

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 such as the glass wind screen, the weighing platform, power unit etc. against shifting and damage.

English

6 Unpacking and installation

6.1 Installation Site, Location of Use

The display units are designed in a way that reliable weighing results are achieved in common conditions of use. Precise and fast work is achieved by selecting the right place for your display unit and your weighing plate.
On the installation site observe the following:

- Place the display unit and the weighing plate on a stable, even surface.
- Avoid extreme heat as well as temperature fluctuation caused by installing next to a radiator or in the direct sunlight;
- Protect the display unit and the weighing plate against direct draft from open windows or doors.
- Avoid jarring during weighing;
- Protect the display unit and the weighing plate 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 and installation

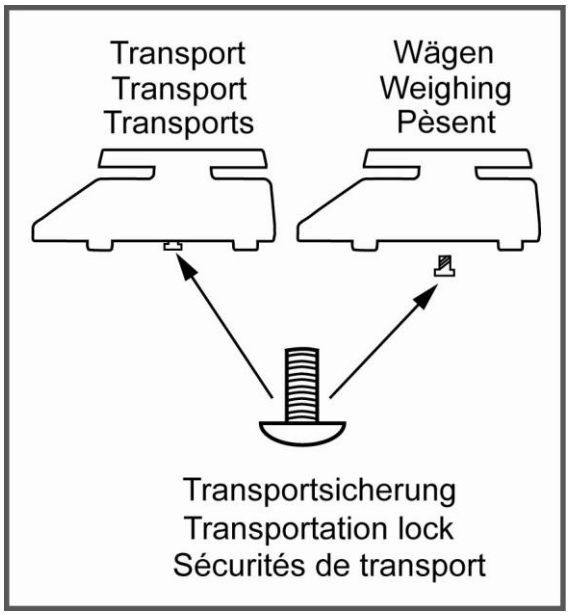
Take the display unit carefully out of its packaging, remove the plastic jacket and install it at the designated work space. Mount the display unit in a way that facilitates operation and where it is easy to see.

6.3 Scope of delivery / serial accessories:

- For display unit, see chapter 2
- Mains adapter
- Operating instructions

6.4 Transit Securing

Please note, if the display unit is used together with platform with transportation lock, this transportation lock must be released prior to use.
See operating instructions attached to the respective platform.



6.5 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.

6.6 Storage battery operation (optional)

Before the first use, the battery should be charged by connecting it to the mains power supply for at least 12 hours.
The appearance of the rechargeable battery symbol in the weight display indicates that the battery is almost exhausted. The unit will be ready for operation for approx. another 10 hours before switching off automatically. Charge the battery with the help of the supplied power pack.
The rechargeable battery symbol shows the charge status of the rechargeable battery:

- Voltage has dropped below prescribed minimum.
- Battery very low.
- Battery is completely discharged

English

6.7 Adjustment

As the acceleration value due to gravity is not the same at every location on earth, each display unit with connected weighing plate 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.

- The adjustment is locked for verified balances.

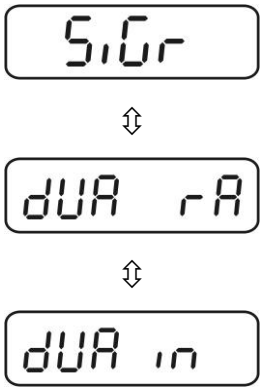
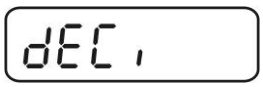
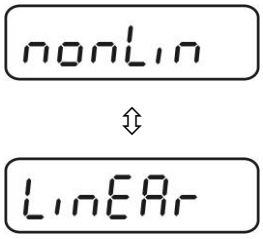
  In order to unlock the access, the seal must be destroyed and the jumper on the printed circuit board must be fitted (see chap. 6.9).

  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.

- 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.

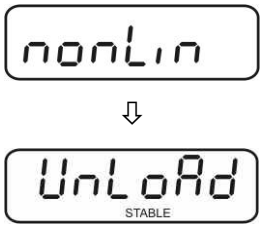
- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.

Call-up menu

⇨ In weighing mode press UNIT and M+ at the same time and the first menu block F0 H-L will appear.	
⇨ Press TARE repeatedly until ProG is displayed.	
⇨ Press →0←, password query Pin will appear.	
⇨ Press BG/NET, UNIT, →0← subsequently until the first menu item P1 SPEd is shown.	
⇨ Press TARE repeatedly until P2 nod is displayed.	
⇨ Confirm by →0←. ⇨ Press TARE repeatedly until the currently balance typ will be displayed. SiGr = Singel range dUA rA = Dual range dUA in = Multi interval	
⇨ Confirm by →0←.	
⇨ Press TARE repeatedly until CAL will be displayed.	
⇨ Confirm by →0← and select by TARE. nonLin = Justierung LinEAr = Linearisierung	

English

Procedure

⇨ Confirm menu setting nonLin by →0←. Ensure that there are no objects on the weighing plate. ⇨ Wait for stability display, then press →0←.	
⇨ The currently set adjustment weight will be displayed.	
⇨ Either use the displayed adjustment weight or change it with UNIT ESC, BG NET and TARE (numerical input see chapter 2.1.1), the active digit is flashing. ⇨ Confirm by →0←, „LoAd“ will be shown.	
⇨ Carefully place adjusting weight in the centre of the weighing plate. Wait for stability display, then press →0←.	
⇨ After the adjustment the balance will carry out a self-test. Remove adjusting weight **during** selftest, balance will return into weighing mode automatically. An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure.	

English

6.8 Linearization

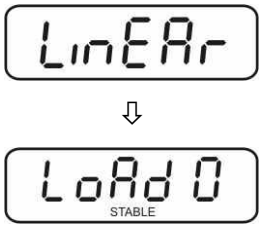
Linearity shows the greatest deviation of a weight display on the scale to the value of the respective test weight according to plus and minus over the entire weighing range.
If linearity deviation is discovered during a testing instrument control, you can improve this by means of linearization.

- Carrying out linearization is restricted to specialist staff possessing well acquainted with the workings of weighing scales.
- The linearisation is locked for verified weighing systems.

  In order to unlock the access, the seal must be destroyed and the jumper on the printed circuit board must be fitted (see chap. 6.9).

  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.
- The test weights to be used must be adapted to the weighing scale's specifications; see chapter 3.4 "testing instruments control".
- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.
- After successful linearization you will have to carry out calibration; see chapter "testing instruments control"

Procedure:



⇨ Call-up menu setting LinEAr, see chap. 6.7.

⇨ Acknowledge with →0←.
Ensure that there are no objects on the weighing plate.

⇨ Wait for stability display „STABLE", then press →0←. When "LoAd 1" is displayed, put the first adjustment weight (1/3 max) carefully in the centre of the weighing platform.

⇨ Wait for stability display „STABLE", then press →0←. When "LoAd 2" is displayed, put the second adjustment weight (2/3 max) carefully in the centre of the weighing platform.

English

⇨ Wait for stability display „STABLE“, then press →0←. When “LoAd 3“ is displayed, put the third adjustment weight (1/3 max) carefully in the centre of the weighing platform.

⇨ Wait for stability display „STABLE“, then press →0←.

⇨ After the adjustment the balance will carry out a self-test. Remove adjusting weight **during** selftest, the appliance will return into weighing mode automatically.

An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure.

English

6.9 Verification

General introduction:
According to EU directive 90/384/EEC or 2009/23EG 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

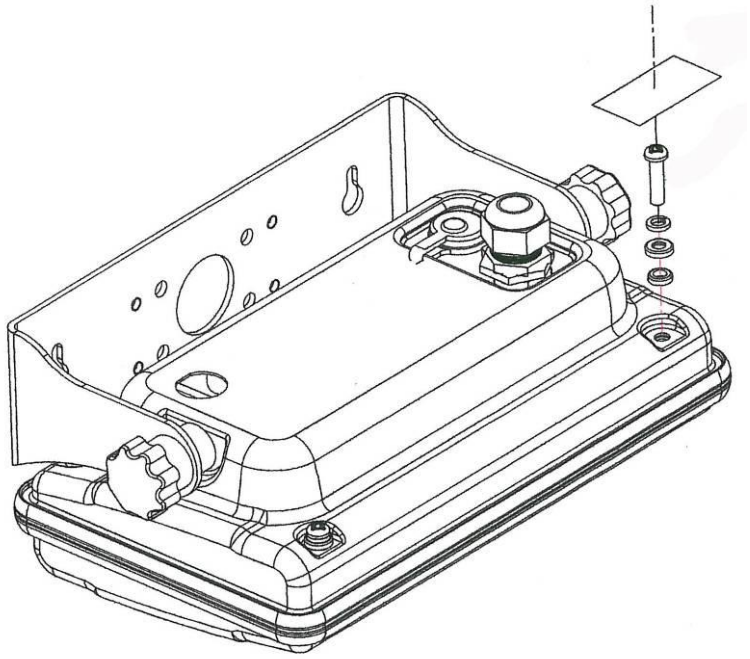
In cases of doubt, please contact your local trade in standard.

Verification notes:
An EU type approval exists for balances described in their technical data as verifyable. If a balance is used where obligation to verify exists as described above, it must 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!

Verification of the balance is invalid without the seal.
The seal marks attached on verified balances point out that the balance may only be opened and serviced by trained and authorised specialist staff. If the seal mark is destroyed, verification looses its validity. Please observe all national laws and legal regulations. In Germany a re-verification will be necessary.

Position of seals and jumper

Access to conductor plate:



⇨ Remove seal

⇨ Open display unit

⇨ For adjustment / access to the configuration menu the jumper „CAL“ must be fitted.

7 Operation

7.1 Start-up

⇨ Press ON/OFF and the instrument 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 ON/OFF and the display will disappear.

7.3 Zeroing

Resetting to zero corrects the influence of light soiling on the weighing plate.

⇨ To unload the weighing system

⇨ Press →0← and zero display as well as indicator **ZERO** will appear.

7.4 Simple weighing

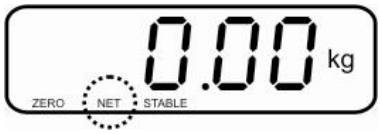
⇨ Place goods to be weighed on balance.
⇨ Wait until stability display **STABLE** appears.
⇨ Read weighing result.

Overload warning

Overloading exceeding the stated maximum load (max) of the device, minus a possibly existing tare load, must be strictly avoided. This could damage the instrument.
Exceeding maximum load is indicated by the display of “ol“, and an audio sound. Unload weighing system or reduce preload.

7.5 Weighing with taring

⇨ Deposit weighing vessel. After successful stop check press the TARE button. Zero display and indicator **NET** appear.



The weight of the container is now internally saved.

⇨ Weigh the material, the net weight will be indicated.
⇨ After removing the weighing container, the weight of the weighing container appears as negative display.
⇨ 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.
⇨ To change between gross weight and net weight, press BG/NET.
⇨ To delete the tare value, remove load from weighing plate and press TARE.

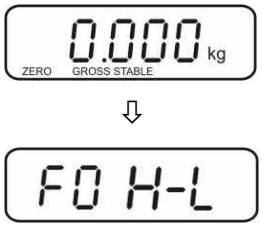
7.6 Weighing with tolerance range

You can set an upper or lower limit when weighing with tolerance range and thus ensure that the weighed load remains exactly within the set limits.
During tolerance controls such as dispensing, portioning or sorting the unit will indicate whether a value exceeds or falls short of limits with an optical [LO, OK, HI] as well as an audio signal according to the setting in the menu block “F4 oFF_BEEP“; see chapter 8.2.

Selectable mode	Description
bp 1	Acoustic signal switched off, only optical signal active [LO], [OK] or [HI]
bp 2	If load is within tolerance range, [ok] will be displayed and audio signal will be sounded.
bp 3	If the load is beyond the tolerance range [ok] will be shown and the audio signal will sound.

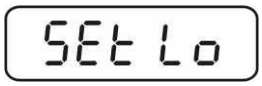
English

1. Call up menu



⇨ In weighing mode press UNIT ESC and M+ at the same time and the first menu block F0 H-L will appear.

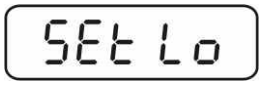
2. Set limit values



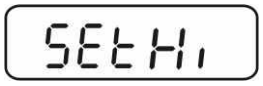
⇨ Keep on pressing →0← until the display used for entering the lower limit **SET LO** appears.

⇨ Press →0← and current setting will be displayed.

⇨ To enter the lower limit, e. g. 1000 Kg, press the navigation keys (See chpt. 2.1.1); the currently enabled digit will be flashing.

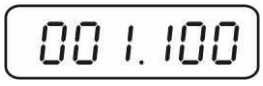


⇨ Confirm input by →0←.

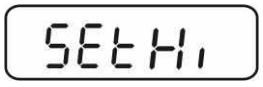


⇨ Select **SET HI** by pressing TARE.

⇨ Press →0← and the current setting for the upper limit will be displayed.



⇨ Press the navigation keys (See chpt. 2.1.1) to enter the upper limit, e.g. 1,100 kg; the currently enabled digit will be flashing.



⇨ Confirm input by →0←.

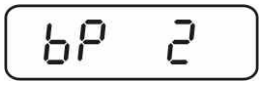
⇨ Press UNIT ESC and the unit will return to the menu

3. How to set tolerance weighing mode

⇨ Press TARE repeatedly until F4 oFF is displayed.

⇨ Acknowledge with →0←.

⇨ Press TARE repeatedly until **BEEP** is displayed.



⇨ Press →0← and current setting will be displayed.

⇨ Select desired setting (bp 1, bp 2, bp 3) with TARE and confirm by pressing →0←.

⇨ Press UNIT repeatedly to exit menu. The weighing system is in tolerance weighing mode, i.e. from here occurs the graduation if the weighed material is within the two tolerance limits.

4. Weighing with tolerance range

⇨ Tare when using a weighing container

⇨ Put on goods to be weighed, tolerance control is started

Load below specified tolerance	Load within specified tolerance	Load exceeds specified tolerance
		
The indicator [LO] is displayed	The indicator [OK] is displayed	The indicator [HI] is displayed

- The tolerance control is not active when the weight is under 20d.
- To delete limits, enter “00.000 kg“.

English

7.7 Manual totalizing

With this function the individual weighing values are totalized into the sum memory by pressing M+.

- Menu settings:
  „**F5 Prt“** ⇨ „**P prt“**, see chap. 8.2
  “**P4 CHk“** ⇨ „**mode 1“**, see chap. 11.4
- The totalizing function is not active when the weight is under 20d.

Add up:

⇨ Place weighing goods A.

Wait until the stability display **STABLE** appears, then press M+. The weighing value is saved.

⇨ Remove the weighed good. More weighed goods can only be added when the display ≤ zero.

⇨ Place goods to be weighed B.

Wait until the stability display appears, then press M+. The weighing value is added into the summation memory. Number of weighing, followed by the total weight will be displayed for 2 sec.

⇨ Add more weighed goods as described before.
Please note that the weighing system must be unloaded between the individual weighing procedures.

⇨ You can repeat this process 99 times until the capacity (max) of the weighing system is exhausted.

Display of the saved weighing data:

⇨ When zero is displayed press M+, the number of weighings followed by the total weight will be displayed for 2 sec.

Delete weighing data:

⇨ If you see a display of zero, press M+ and the number of weighing, followed by the total weight will be shown for 2 sec. Press M+ during this display.
The data in the summation memory are deleted.

English

7.8 Automatic adding-up

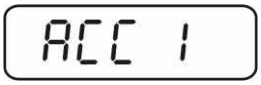
This function is used to issue and add individual weighing values automatically to the summation memory on unloading of weighing scale without pressing M+.

- Menu settings:
  „**F5 Prt“** ⇨ „**P prt“**, see chap. 8.2
  “**P4 CHk“** ⇨ „**mode 1“**, see chap. 11.4
- When function is activated, the indicator **AUTO** appears.

Add up:

⇨ Place weighing goods A.
After the standstill control sounds a signal tone.

⇨ Unload the weighing good, the weighing value is added into the summation memory.



More weighed goods can only be added when the display ≤ zero.

⇨ Place goods to be weighed B.
After the standstill control sounds a signal tone. Unload the weighing good, the weighing value is added into the summation memory. Number of weighing, followed by the total weight will be displayed for 2 sec.

⇨ Add more weighed goods as described before.
Please note that the weighing system must be unloaded between the individual weighing procedures.

⇨ You can repeat this process 99 times until the capacity (max) of the weighing system is exhausted.

- After the audio sound was sounded you can remove the load or add to it.
- Display and delete weighing data see chap. 7.7.

7.9 Animal weighing

The mean value function is suitable for weighing restless loads.

Menu setting:

P4 CHt ⇨ modE 2, see chap. 11.4

When function is activated, the indicator **ANIMAL** appears.

⇨ Place goods to be weighed on balance.

⇨ When the load has somewhat calmed down, you will hear an audio sound. The mean value achieved will be shown.

⇨ Whilst averaging is taking place you can add or remove loads as the measuring value will be constantly updated.

To disable the animal weighing function, return to weighing mode

Select menu setting P4 CHt ⇨ modE 1, see chpt. 11.4.

English

8 Menu

8.1 Navigation in the menu

Call up menu	⇨ In weighing mode press UNIT and M+ at the same time and the first menu block F0 H-L will appear.
Select menu block	⇨ With help of TARE, the individual menu blocks can be selected one after the other.
Select setting	⇨ Confirm selected menu item by pressing →0←. The current setting will be displayed.
Change settings	⇨ To change to the available settings, press the navigations keys as described in chpt. 2.1.1.
Acknowledge setting / exit the menu	⇨ Either save by pressing →0← or cancel by pressing UNIT.
Return to weighing mode	⇨ Press UNIT repeatedly to exit menu.

8.2 Overview

Menu block	Menu item	Available settings / explanation
F0 H-L Weighing with tolerance range	SET Lo	Upper limit value, input see chapter 7.6 (factory setting 000.000)
	SET Hi	Lower limit value, input see chapter 7.6 (factory setting 000.000)
F1 toL	to Clr	Not documented
	to P-C	Not documented
	to Prt	Not documented
F2 Unt Weighing Units		Factory setting „kg“, no further units available.
F3 ti Date/time	SET dA	Set date Press →0← and the currently set date (yy.mm.dd) will be displayed. To make changes, press the navigation keys as explained in chpt. 2.1.1.
	SET ti	Set time Press →0← and the currently set time (hh.m.ss) will be displayed. To make changes, press the navigation keys as explained in chpt. 2.1.1.

F4 oFF	Clock	Clk on	Display time switched on After 5 min without change of load the weight display passes to the time display.
		Clk of*	Display of time OFF
	bl	bk on	Background lighting of display is switched on permanently
		bk AU	Display background illumination off
		bk off	Automatic background illumination on when weighing pate is loaded or key pressed.
	bEEP see chpt 7.6	bp 1	Audio signal switched off during tolerance weighing
		bp 2	If load is within tolerance, [ok] will be displayed and audio signal will be sounded
		bp 3	If the load is beyond the tolerance range, [ok] will be shown and the audio signal will sound.
F5 PrE	P Prt	Manual totalizing, see chap. 7.7	
	P Cont	Not documented	
	Series	Not documented	
	ASK	Not documented	
	P cnt 2	Not documented	
	P Stab	A Not documented	
	P Auto	For automatic totalizing see chpt. 7.8.	
	Confirm selection by →0←, after that the following menu items are available.		
		b9600	Not documented
		Pr X	
		Lab X	
		Ty-tp	
		Ty 711	
		Lp 50	
F6 St	St on	Following tare ON	
	St off	Following tare OFF	
ProG	Pin	Access to configuration menu see chap. 11.4	

English

9 Service, maintenance, disposal

Before any maintenance, cleaning and repair work disconnect the appliance from the operating voltage.

9.1 Cleaning

- ⇨ Keep IP protection.
- ⇨ Clean the stainless-steel parts with a soft cloth soaked with a cleaning agent suitable for stainless steel.
- ⇨ For stainless steel parts do not use any cleaning agents which contain sodium hydroxide solution, acetic, hydrochloric, sulphuric or citric acid.
- ⇨ Do not use metal brushes or cleaning sponges of steel wool, as this causes superficial corrosion.

9.2 Service, maintenance

- ⇨ The appliance may only be opened by trained service technicians who are authorized by KERN.
- ⇨ Ensure that the balance is regularly calibrated, see chap. Testing instruments control.

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.

9.4 Error messages

Error message	Description	Possible causes
- - - - - **- - ol - -**	Maximum load exceeded	• Unload weighing system or reduce preload.
Err 1	Incorrect data input	• Follow format “yy:mm:dd“
Err 2	Incorrect time entry	• Follow format “hh:mm:ss“
Err 4	Zeroing range exceeded due to switching-on balance or pressing →0← (normally 4% max)	• Object on the weighing plate • Overload when zeroing
Err 5	Keyboard error	
Err 6	Value outside the A/D changer range	• Weighing plate not installed • Damaged weighing cell • Damaged electronics
Err 9	Stability display does not appear	• Check the environmental conditions.
Err 17	Taring range exceeded	• Reduce load
Fai l h / Fai l l	Adjustment error	• Repeat adjustment.
Ba lo / Lo ba	Battery very low	• Recharge battery

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

10 Instant help

In case of an error in the program process, briefly turn off the display unit 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 display unit is not switched on. • Mains power supply interrupted (mains cable defective). • 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)

11 Installing display unit / weighing bridge

Installation / configuration of the 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
Max. signal voltage	0 ~ 15 mV
Zeroing range	0 ~ 5 mV
Sensitivity	2-3 mV/V
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 platform in compliance with the required specifications.
The following data must be established before selecting a weighing 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 (± 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**

11.3 How to connect the platform

⇨ Disconnect device from mains.
⇨ Pull load cell cable into the display unit through the screwable cable attachment.
⇨ Weld the individual wires of the load cell cable to the printed circuit board, see fig. 1. Details can be seen in the technical data of the load cell.

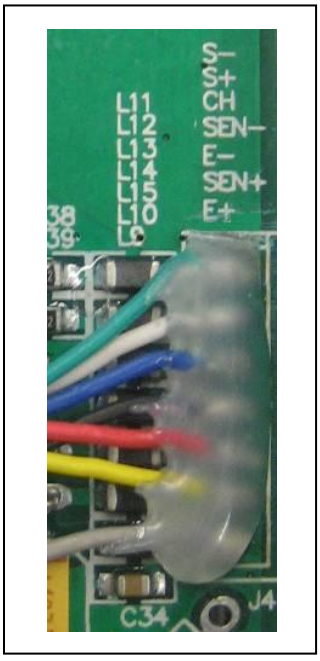


Fig. 1

11.4 Configure display unit

Call-up configuration menu:

⇨ In weighing mode press UNIT and M+ at the same time and the first menu block F0 H-L will appear.

⇨ Press TARE repeatedly until ProG is displayed.

⇨ Press →0←, password query Pin will appear.

⇨ Press BG/NET, UNIT, →0← subsequently until the first menu item PI SPEd is shown.

Navigation in the menu

⇨ With help of TARE, the individual menu items can be selected one after the other.

⇨ Confirm selected menu item by pressing →0←. The current setting will be displayed.

⇨ Switch into the available settings using TARE.

⇨ Either save by pressing →0← or cancel by pressing UNIT.

Press UNIT repeatedly to exit menu.

English

Configuration menu overview:

Menu block Main menu	Menu item Submenu		Available settings / explanation
P1 SPEd	SPd 15		Not documented
	SPd 30		
	SPd 60		
	SPd 7.5		
P2 mod	SiG rA	Single-range balance Confirm by →0←, after that the following menu items are available.	
		dEC i	Position decimal point available selection 0, 0.0, 0.00, 0.000, 0.0000
		inC inC 1	Readability/verification value selectable 1, 2, 5, 10, 20, 50
		inC 2	
		inC 5	
		inC 10	
		inC 20	
		inC 50	
		CAP	Balance capacity (max)
		Adjust weighing system according to configuration.	
		CAL nonLin	Adjustment, see chap. 6.7
		LinEAr	For linearisation see chapter 6.8

English

<table>
<tr><td rowspan="15"></td><td rowspan="15">dUA rA</td><td colspan="4">Dual range balance

Confirm by →0←, after that the following menu items are available.</td></tr>
<tr><td colspan="2">dEC i</td><td colspan="2">Position decimal point available selection 0, 0.0, 0.00, 0.000, 0.0000</td></tr>
<tr><td rowspan="7">inC</td><td rowspan="6">diU 1</td><td>inC 1</td><td rowspan="6">Readability / verification value for
1. Weighing range
Selectable 1, 2, 5, 10, 20, 50</td></tr>
<tr><td>inC 2</td></tr>
<tr><td>inC 5</td></tr>
<tr><td>inC 10</td></tr>
<tr><td>inC 20</td></tr>
<tr><td>inC 50</td></tr>
<tr><td rowspan="6">diU 2</td><td>inC 1</td><td rowspan="6">Readability / verification value for
2. Weighing range
Selectable 1, 2, 5, 10, 20, 50</td></tr>
<tr><td>inC 2</td></tr>
<tr><td>inC 5</td></tr>
<tr><td>inC 10</td></tr>
<tr><td>inC 20</td></tr>
<tr><td>inC 50</td></tr>
<tr><td rowspan="5"></td><td rowspan="2"></td><td rowspan="2">CAP</td><td>CAP 1</td><td colspan="2">Balance capacity (Max) 1st weighing range</td></tr>
<tr><td>CAP 2</td><td colspan="2">Balance capacity (Max) 2nd weighing range</td></tr>
<tr><td colspan="5">Adjust weighing system according to configuration.</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">CAL</td><td>nonLin</td><td colspan="2">Adjustment, see chap. 6.7</td></tr>
<tr><td>LinEAr</td><td colspan="2">For linearisation see chap. 6.8</td></tr>
</table>

English

	dUA in	Multi-interval balance Confirm by →0←, after that the following menu items are available.			
		dEC i		Position decimal point available selection 0, 0.0, 0.00, 0.000, 0.0000	
		inC	diU 1	inC 1 inC 2 inC 5 inC 10 inC 20 inC 50	Readability / verification value for 1. Weighing range Selectable 1, 2, 5, 10, 20, 50
			diU 2	inC 1 inC 2 inC 5 inC 10 inC 20 inC 50	Readability / verification value for 2. Weighing range Selectable 1, 2, 5, 10, 20, 50
		CAP	CAP 1	Balance capacity (Max) 1st weighing range	
			CAP 2	Balance capacity (Max) 2nd weighing range	
		Adjust weighing system according to configuration.			
		CAL	nonLin	Adjustment, see chap. 6.7	
			LinEAr	For linearisation see chapter 6.8	
P3 Pro	tri			Not documented	
	CoUnt			Internal A/D converter value	
	rESEt			Reset to default setting	
	GrA			Not documented	
P4 CHt	node 1			Weighing mode (tolerance weighing, totalizing)	
	node 2			Animal weighing mode	
	node 3			Not documented	
	node 4			Not documented	

12 Enclosure Declaration of conformity / Type approval / Test certificate

KERN & Sohn GmbH
D-72322 Balingen-Frommern
Postfach 4052
E-Mail: info@kern-sohn.de
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Declaration of conformity

EG-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 KFF-T; KFE-TM; SFE

EU Directive	Standards
2004/108/EC	EN55022: 2006 A1:2007 EN61000-3-3:1995+A1:2001+A2:2005 EN55024: 1998+A1:2001+A2:2003
2006/95/EC	EN 60950-1:2006 EN 60065:2002+A1:2006

Datum 08.04.2013
Date

Ort der Ausstellung 72336 Balingen
Place of issue

Signatur
Signature

Albert Sauter
KERN & Sohn GmbH
Geschäftsführer
Managing director

English

We help ideas meet the real world

EC Type-Approval Certificate

No. DK 0199.312

KFA.. / KFE.. / KFC..

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 KFA.. / KFE.. / KFC.. with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class III and IIII
Maximum capacity, Max: From 1 kg up to 199 950 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: $n \leq 6000$ for single-interval and $n \leq 2 \times 3000$ for multi-range and multi-interval (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 and WELMEC 2.1:2001.

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

The annex comprises 12 pages.

Issued on **2011-09-21**
Valid until **2021-09-21**

Signatory: J. Hovgård

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Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated KFA.. / KFE.. / KFC... It is a system of modules consisting of an electronic indicator, connected to a separate load receptor and peripheral equipment such as printers or other devices, as appropriate. The instrument is a Class III or IIII, self-indicating weighing instrument with single-interval, multi-range or multi-interval, an external AC mains adapter, and an internal rechargeable battery (optional).

The indicators consist of analogue to digital conversion circuitry, microprocessor control circuitry, power supply, keyboard, non-volatile memory for storage of calibration and setup data, and a weight display contained within a single enclosure.

The modules appear from the sections 3.1, 3.2.1 and 3.2.2; the principle of the composition of the modules is set out in the sections 6.1 and 10.

2. Description of the construction and function

2.1 Construction

2.1.1 Indicator

The indicator is specified in section 3.1.

Enclosures and keyboard

The indicators are housed in an enclosure made of either ABS plastic (model KFA-TM / KFC-TM) or stainless steel (Model KFE-TM).

The front panels of the indicator comprise of

- LCD display with backlight having appropriate state indicators and 6 digits (22 mm high)
- keyboard containing 5 keys used to enter commands or data into the weight indicator, plus a key for turning the indicator on/off. Each key is identified with a name and/or pictograph.

Electronics

The instruments use a single printed circuit board, which contains all of the instrument circuitry. The metrological circuitry for the models of weight indicator is identical.

All instrument calibration and metrological setup data are contained in non-volatile memory. The power supply accepts an input voltage of 9 - 12 VDC from the external power adapter, with input from 230 VAC 50 Hz. The indicator produces a load cell excitation voltage of 5 VDC.

2.1.2 Load receptors, load cells and load receptor supports

Set out in section 3.2.

2.1.3 Interfaces and peripheral equipment

Set out in section 4.

2.2 Functions

The weight indicating instruments are microcontroller based electronic weight indicators that require the external connection of strain gauge load cell(s). The weight information appears in the digital display located on the front panel and may be transmitted to peripheral equipment for recording, processing or display.

The primary functions provided are detailed below.

2.2.1 Display range

The weight indicators will display weight from –Max to Max (gross weight) within the limits of the display capacity.

2.2.2 Zero-setting

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

Semi-automatic zero-setting range: ±2 % of Max.
Automatic zero-tracking range: ±2 % of Max.
Initial zero-setting range: ±10 % of Max.

Zero-setting is only possible when the load receptor is not in motion.

2.2.3 Zero-tracking

The indicators are equipped with a zero-tracking feature which operates over a range of 4 % of Max and only when the indicator is at gross zero and there is no motion in the weight display.

2.2.4 Tare

The instrument models are provided with a semi-automatic subtractive tare feature activated using the "TARE" key.

When the tare function is active the "G/N" (BG) key will toggle the display between showing Net and Gross value.

2.2.5 Printing

A printer may be connected to the optional serial data port. The weight indicator will transmit the current to the printer when the "PRINT" key is pressed.

The printing will not take place if the load receptor is not stable, if the gross weight is less than zero, or if the weight exceeds Max.

2.2.6 Check weighing

The indicator can be set to check the actual weight against a high and a low limit by the user pressing "Unit" and "M+" key simultaneously and then setting the appropriate parameters.

2.2.7 Weighing unstable samples

The indicator has a special mode for weighing unstable samples. As this mode is a configuration mode switching between this mode and normal weighing mode is not possible, when the indicator is sealed.

2.2.8 Display test

A self-test routine is initiated by pressing the on/off key to turn the instrument off, then pressing it again to turn the instrument on. The test routine turns on and off all of the display segments and light indicators to verify that the display is fully functional.

2.2.9 Operator information messages

The weight indicator has a number of general and diagnostic messages which are described in detail in the user's guide.

2.2.10 Software version

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

The approved software version is 1.00.

2.2.11 Totalisation

The indicator can be configured with a totalisation function, adding actual weight display values to the memory when pressing "M+" key or automatic, if the equilibrium is stable.

The totalised value is a calculated value and shall be marked as such when printed.

2.2.12 Battery operation

The indicator can be operated from an internal rechargeable battery, if this option is installed.

3. Technical data

The KFA.. / KFE.. / KFC.. weighing instruments are composed of separate modules, which are set out as follows:

3.1 Indicator

The indicators have the following characteristics:

Type:	KFA-TM / KFE-TM / KFC-TM
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 µV
Excitation voltage:	5 VDC
Circuit for remote sense:	present on the model with 7-terminal connector
Minimum input impedance:	350 ohm
Maximum input impedance:	1200 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

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

3.1.1.1 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 Load receptors, load cells and load receptor supports

Removable platforms shall be equipped with level indicators.

3.2.1 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.

3.2.2 Platforms, weigh bridge platforms

Construction in brief	All-steel or steel-reinforced concrete construction, surface or pit mounted
Reduction ratio	1
Load cell	Load cell according to section 3.2.1
Drawings	Various

3.2.3 Bin, tank, hopper and non-standard systems

Construction in brief	Load cell assemblies each consisting of a load cell stand assembly to support one of the mounting feet bin, tank or hopper
Reduction ratio	1
Load cell	Load cell according to section 3.2.1
Drawings	Various

3.3 Composition of modules

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

3.4 Documents

The documents filed at DELTA (reference No. A530976) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

The interfaces are characterised “Protective interfaces” according to paragraph 8.4 in the Directive.

4.1.1 Load cell input

A 5-terminal connector or 7-terminal connector for the load cell is positioned on the back of the enclosure.

4.1.2 Other interfaces

The indicator may be equipped with one or more of the following protective interfaces located on the main board or on separate interface boards.

- RS-232C

The interfaces do not have to be secured.

4.2 Peripheral equipment

Connection between the indicator and peripheral equipment is allowed by screened cable.

The instrument may be connected to any simple peripheral device with a CE mark of conformity.

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 Totalised weight is not a legal value.

When using the totalisation function creating a sum of several weighing results, this sum is only informative, as it is not a legal value.

5.3 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 5.3.

An example of a declaration of conformity document is shown in section 10.

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 requires that a calibration jumper is installed on the main board.

Sealing of the cover of the enclosure - to prevent access to the calibration jumper and 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 (see figure 2, 4 and 6).

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:

- 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 Indicator

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 of the weight indicator.

8.1.2 Inscriptions

Manufacturer’s trademark and/or name and the type designation is located on the front panel overlay.

Indelibly printed on a brittle plastic sticker located on the front panel overlay:

- Max, Min, e =, accuracy class

On the inscription plate:

- Manufacturer’s name and/or logo, model no., serial no., type-approval certificate no., 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

9. Pictures

Figure 1a KFA-TM indicator without finalisation of front.

Figure 1b Finalisation of front for KFA-TM.

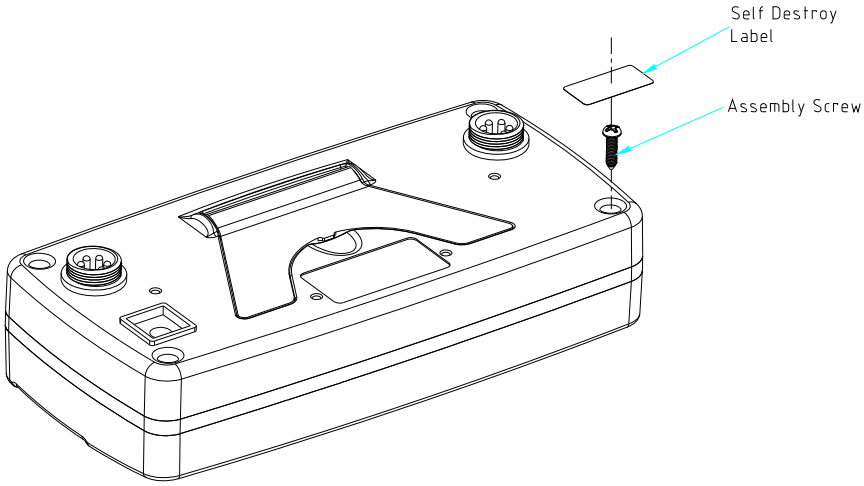

Figure 2 Sealing of KFA-TM indicator.

Figure 3a KFE-TM indicator without finalisation of front.

Figure 3b Finalisation of front for KFE-TM.

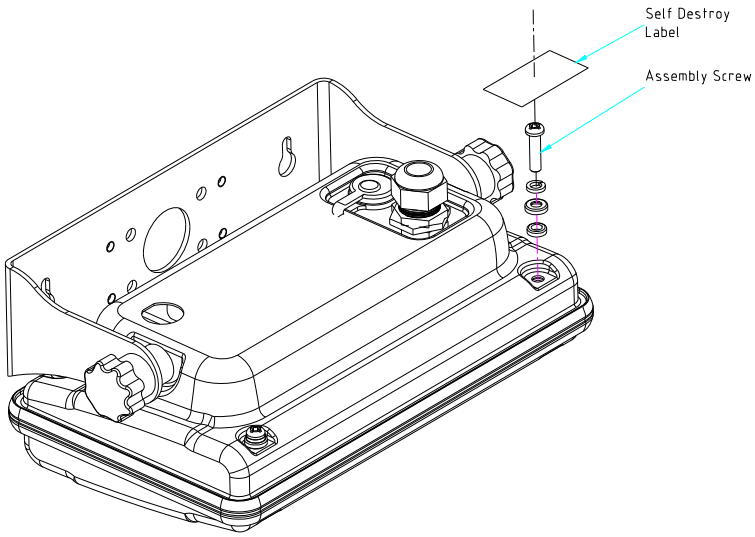

Figure 4 Sealing of KFE-TM indicator.

Figure 5a KFC-TM indicator without finalisation of front.

Figure 5b Finalisation of front for KFC-TM.

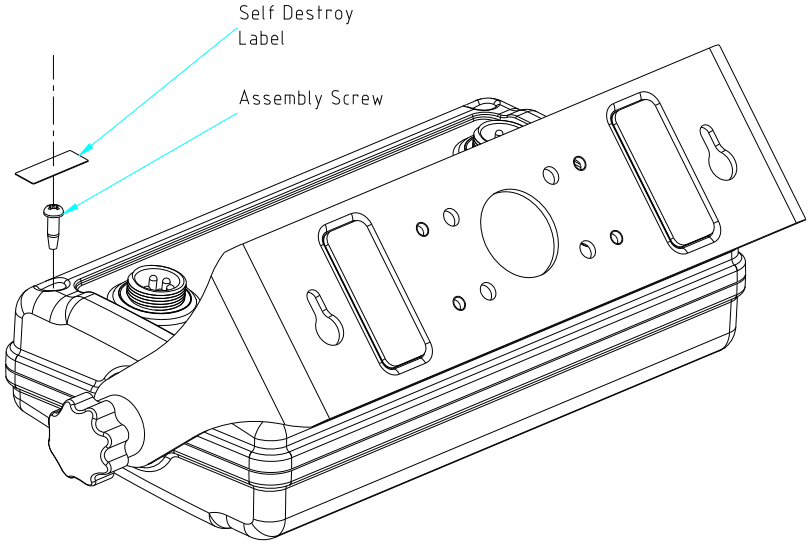

Figure 6 Sealing of KFC-TM indicator.

10. Composition of modules - illustrated

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, multi-interval

Certificate of EU Type-Approval N°: TAC: DK0199.312

INDICATOR	A/D (Module 1)	Type:	KFA-TM			
Accuracy class according to EN 45501 and OIML R76:		$Class_{ind}$ (I, II, III or IIII)			III	
Maximum number of verification scale intervals (n_{max} or lower):		n_{ind}			3000	
Fraction of maximum permissible error (mpe):		p_i			0,5	
Load cell excitation voltage:		U_{exc}	[Vdc]		5	
Minimum input-voltage per verification scale interval:		Δu_{min}	[µV]		1	
Minimum load cell impedance:		R_{Lmin}	[Ω]		350	
Coefficient of temperature of the span error:		Es	[% / 25°C]			
Coefficient of resistance for the wires in the J-box cable:		Sx	[% / Ω]			
Specific J-box cable-Length to the junction box for load cells		$(L/A)_{min}$	[m / mm²]	4		
Load cell interface:					6-wire (remote sense)	
Additive tare, if available:		T	[% of Max]		0	
Initial zero setting range:		IZSR	[% of Max]	-10	/	10
Temperature range:		T_{min} / T_{max}	[°C]	-10	/	40
Test report (TR), Test Certificate (TC) or OIML Certificate of Conformity					DK0199-R76-11.09	
LOAD RECEPTOR	(Module 2)	Type:				
Construction:					Platform	
Fraction of mp		p_2			0,5	
Number of loa		N			1	
Reduction rati	d transmitting device:	$R=F_M / F_L$			1	
Dead load of l	or:	DL	[% of Max]		6	
Non uniform d	of the load: (NUD = 0 is acceptable)	NUD	[% of Max]		20	
Correction fact	Q = 1 + (DL + T + IZSR + NUD) / 100				1,36	
LOAD CEL	ANALOG (Module 3)	Type:	L6E			
Accuracy class	to OIML R60	$Class_{LC}$ (A, B, C or D)			C	
Maximum num	l cell intervals:	n_{LC}			3000	
Fraction of mp		p_2			0,7	
Rated output (	:	C	[mV / V]		2	
Input resistanc	load cell:	R_{LC}	[Ω]		406	
Minimum load	ation interval: ($v_{min\%}$ = 100 / Y)	$v_{min\%}$	[% of Emax]		0,01	
Rated capacity		E_{max}	[kg]		100	
Minimum deac	tive: (E_{min} / E_{max}) * 100		[%]		0	
Minimum deac	ut return: ($DR_{\%}$ = 50 / Z)	$DR_{\%}$	[% of Emax]		0	
Temperature r		T_{min} / T_{max}	[°C]	-10	/	40
Test report (TF	Certificate (TC/OIML) as appropriate					
COMPLE GHING INSTRUMENT			Multi-interval			
Manufacturer:	KERN & Sohn	Type:	KFA..			
Accuracy class according to EN 45501 and OIML R76		$Class_{WI}$ (I, II, III or IIII)			III	
Fractions: $p_i = p_1^2 + p_2^2 + p_3^2$:		p_i			1,0	
Maximum capacity:		Max	[kg]	>>>>>>>>>>>>>>>>>>		60
Maximum capacity for each partial weighing range:		Max_1 / Max_2	[kg]	30		60
Number of verification scale intervals for each weighing range		n_1 / n_2		3000		3000
Verification scale interval for each weighing range		e_1 / e_2	[kg]	0,01		0,02
Utilisation ratio of the load cell		$\omega = (Max_1 / E_{max}) * (R / N)$		0,30		0,60
Input voltage (from the load cels):		$\Delta_u = C * U_{exc} * \omega * 1000 / n$	[µV/e]	1,000		2,00
Cross-section of each wire in the J-box cable:		A	[mm²]	>>>>>>>>>>>>>>>>>>		0,5
J-box cable-Length to the junction box for load cells		L	[m]	>>>>>>>>>>>>>>>>>>		0
Temperature range to be marked on the instrument	Not required	T_{min} / T_{max}	[°C]			
Peripheral Equipment subject to legal control:						

Acceptance criteria for compatibility				Passed, provided no result below is < 0		
$Class_{WI}$	<=	$Class_{ind}$ & $Class_{LC}$	(WELMEC 2: 1)	$Class_{WI}$:	PASSED	
p_i	<=	1	(R76: 3.5.4.1)	1 - pi =	>>>>>>>>>>>>>>>>>>	0,0
n_i	<=	n_{max} for the class	(R76: 3.2)	n_{max} for the class - n_i =	7000	7000
n_i	<=	n_{ind}	(WELMEC 2: 4)	n_{ind} - n_i =	0	0
n_i	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n_i =	0	0
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	3,6	<<<<<<<<<<<<<<<<<<
v_{min} - √N / R	<=	e_i	(R76: 4.12.3)	e_i - (v_{min} * √N / R) =	0,000	0,010
or (if v_{min} is not given)				Alternative solutions:	↑ ↓	
(E_{min} / n_{LC}) - (√N / R)	<=	e_i	(WELMEC 2: 7)	e_i - ((E_{min} / n_{LC}) * (√N/ R)) =		
Δu_{min}	<=	Δu	(WELMEC 2: 8)	$\Delta u - \Delta u_{min}$ =	0,00	1,00
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	>>>>>>>>>>>>>>>>>>	56
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	>>>>>>>>>	4
T_{range}	<=	T_{max} - T_{min}	(R76: 3.9.2.2)	(T_{max} - T_{min}) - T_{range} =		20
Q* Max * R / N	<=	E_{max}	(R76: 4.12.1)	E_{max} - (Q * Max * R / N) =	>>>>>>>>>>>>>>>>>>	18,4
$DR_{\%}$	<=	50 * e_i / Max	(WELMEC 2: 6b)	(50 * e_i / Max) - $DR_{\%}$ =	0,0083	<<<<<<<<<<<<<<<<<<
or (if DR% is not given)				Alternative solutions:	↑ ↓	
Max / e_i	<=	n_{LC}	(WELMEC 2: 6b)	n_{LC} - (Max / e_i) =		

Signature and date:

Conclusion . . . . . ***PASSED***

This is an authentic document made from the program:
"Compatibility of NAWI-modules version 3.2"

We help ideas meet the real world

TEST CERTIFICATE

No. DK0199-R76-11.10

Instrument type	**KFA-TM / KFE-TM / KFC-TM**
Test item device	Non-automatic Weighing Indicator
Issued by	**DELTA Danish Electronics, Light & Acoustics** EU - Notified Body No. 0199
In accordance with	Paragraph 8.1 of the European Standard on metrological aspects of non-automatic weighing instruments EN 45501:1992.
Fractional factor (p_i)	0.5 (refer to 3.5.4 of the standard).
Issued to	**KERN & Sohn GmbH** Ziegelei 1 D-72336 Balingen GERMANY
Manufacturer	KERN & Sohn GmbH
In respect of	A family of indicators tested as a module of a weighing instrument.
Characteristics	Suitable as a non-automatic weighing instruments with the following characteristics:

Self indicating with	single-interval, multi-range or multi-interval	
Accuracy class	III	IIII
Verification scale interval: e =	Max_i/n	Max_i/n
Maximum number of verification scale intervals: n =	6000 or 2×3000	1000 or 2×1000
Minimum input voltage per VSI:	1 µV	1 µV

The essential characteristics are described in the annex.

Description and documentation	The indicators are described and documented in the annex to this certificate.
Remarks	Summary of tests involved: See test reports referred in annex.

This test certificate cannot be quoted in an EU type approval certificate without permission from the holder of the certificate mentioned above.

The annex comprises 7 pages.

Issued on 2011-09-21

Signatory: J. Hovgård

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1. Name and type of instrument

The indicators KFA-TM / KFE-TM / KFC-TM are a family of weighing indicators suitable to be incorporated in a non-automatic weighing instruments, class III or class IIII, single-interval, dual-range or dual-interval.

2. Description of the construction and function

2.1 Construction

The electronic indicator consists of a single circuit board, SMD populated on both sides as the A/D-interface circuits, the microprocessor and the voltage regulation are placed on one side and the LCD display on the other side.

The LCD-display has indication for: stable, zero, gross, net, tare, and weight unit (kg, g, t), and 6 digits with a height of 22 mm.

The enclosure is made of stainless steel for the KFE-TM indicator or of ABS plastics for the KFA-TM and KFC-TM indicators.

The front of the enclosure has an on/off key plus 5 keys for operating the functions of the indicator.

All instrument calibration and metrological setup data are stored in the non-volatile memory.

The indicators are power supplied with 9-12 VDC - normally supplied by external 230 VAC to 12 VDC adapter. An optional internal battery can be factory installed.

Software

The software version is displayed during the start-up of the indicator.
The tested software version is 1.00.

Sealing

The configuration and calibration data can only be changed if the calibration jumper is installed on the circuit board.

2.2 Function

The devices are a microprocessor based electronic weighing indicators for connection of strain gauge load cells.

List of devices:

- Self-test
- Determination and indication of stable equilibrium
- Initial zero-setting ± 10 % of Max
- Semi-automatic zero-setting ± 2 % of Max
- Automatic zero-tracking ± 2 % of Max
- Indication of zero
- Semi-automatic subtractive tare
- Check-weighing

- Weighing unstable samples
- Totalisation

3. Technical data

3.1 Indicator

Type	KFA-TM / KFE-TM / KFC-TM
Accuracy class	III or IIII
Weighing range	Single-interval, multi-range or multi-interval
scale intervals (n)	6000 or 2×3000 for class III, 1,000 or 2×1000 for class IIII
Minimum input voltage per VSI	1 µV
Maximum capacity of interval (Max_i):	$n_i \times e_i$
Verification scale interval, e_i =	Max_i / n_i
Initial zero-setting range:	± 10 % of Max
Maximum tare effect:	100 % of Max
Fractional factor (pi)	0.5
Excitation voltage	5 VDC
Circuit for remote sense	Not active
Minimum input impedance	350 ohm
Maximum input impedance	1200 ohm
Connecting cable to load cell(s):	See Section 3.1.1
Supply voltage:	9-12 VDC
Operating temperature range	Min / Max = -10 °C / +40 °C
Peripheral interface(s)	See Section 4

3.1.1 Connecting cable between the indicator and the junction box for load cell(s), if any

3.1.1.1 4-wire system

Line	4 wires, shielded
Maximum length	The certified length of the load cell cable, which shall be connected directly to the indicator.

4. Interfaces

4.1 Load cell interface

Refer to section 3.1.1.

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

- There is a respective test certificate (EN 45501) or an OIML Certificate of Conformity (R60) issued for the load cell by a Notified Body responsible for type examination under the Directive 2009/23/EC.
- 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, section

11), and any particular installation requirements. A load cell marked NH is allowed only if humidity testing to EN 45501 has been performed.

- 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.
- The load transmission must conform to one of the examples shown in the WELMEC 2.4 Guide for load cells.

4.2 Peripheral interfaces

The indicator may be equipped with the following protective interfaces that have not to be secured.

- RS-232C

The peripheral interfaces are characterised “Protective interfaces” according to paragraph 8.4 in the Directive.

5. Conditions for use

Legal use of the indicator for automatic weighing or as counting device is not allowed with reference to this test certificate.

6. Location of seals and inscriptions

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. The seals shall be placed as shown in section 9.

Location of CE mark of conformity:

The CE mark of conformity is placed on the overlay on the rear side of the device.

Inscription near the display:

Max_i, Min_i, e_i

Inscription on the overlay:

Type, accuracy class, Temp. -10 °C / +40 °C, Certificate No. DK0199-R76-11.05.

Other inscriptions on the overlay:

Manufacturer’s name and/or logo, Part No, Supply voltage.

7. Tests

The indicator has been tested according to EN 45501 and WELMEC 2.1 Guide for testing of indicators.

Examination / tests

Temperature tests: 20 / 40 / -10 / 5 / 20 (tested at minimum input-voltage sensitivity)
Temperature effect on no-load indication (tested at minimum input-voltage sensitivity)
Stability of equilibrium
Repeatability
Warm-up time
Voltage variations
Short time power reductions
Electrical bursts
Electrostatic discharges
Immunity to radiated electromagnetic fields
Damp heat, steady state
Span stability
Checklist
Maximum load cell cable length and impedance of cable to load cell

The test item fulfilled the maximum permissible errors at all tests.

8. Documentation

Contents of the technical documentation held by the notified body (reference No. A530976):

8.1 Product specification

- Manuals and descriptions
- Drawings
- Etc.

8.2 Examination report

OIML R76 report no. DANAK-1911334, DANAK-1910859, DANAK-1910686, DANAK-1910568, DANAK-1910388 and NMi 709226.

8.3 Test results

See above test reports.

9. Pictures

Figure 1a KFA-TM indicator without finalisation of front.

Figure 1b Finalisation of front for KFA-TM.

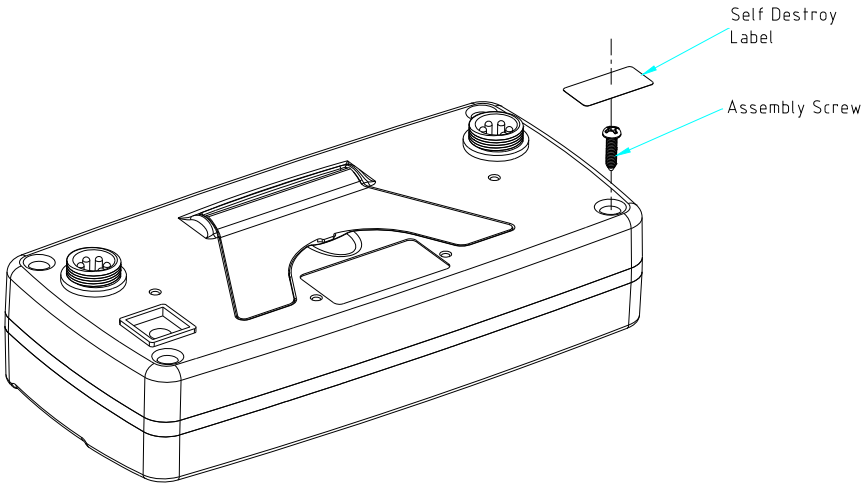

Figure 2 Sealing of KFA-TM indicator.

Figure 3a KFE-TM indicator without finalisation of front.

Figure 3b Finalisation of front for KFE-TM.

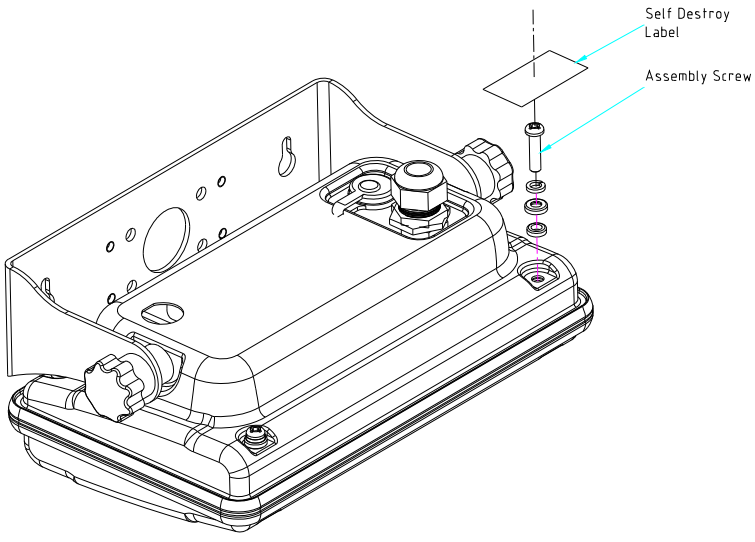

Figure 4 Sealing of KFE-TM indicator.

Figure 5a KFC-TM indicator without finalisation of front.

Figure 5b Finalisation of front for KFC-TM.

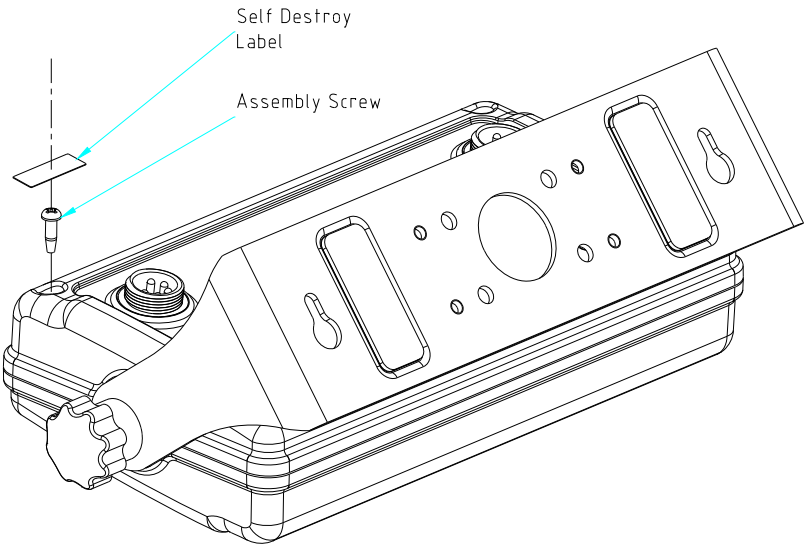

Figure 6 Sealing of KFC-TM indicator.