



KERN & Sohn GmbH

Ziegelei 1
D-72336 Balingen-Frommern
Postfach 40 52
72332 Balingen

Tel. 0049 -[0]7433-9933-0
Fax. 0049 -[0]7433-9933-149
e-mail: info@kern-sohn.com
Web: www.kern-sohn.com

Installation information Display devices

KERN KMB/KMS/KMT-TM

Version 2.0 01/2007



KMB/KMS/KMT-TM-BA-e-0720
ME-Nr. 22017065

Contents

1	Important information	2
1.1	Product range.....	2
1.2	Documentation	2
1.3	Safety and environment	2
2	Attaching weighing platforms	3
2.1	Instructions on weighing cells	3
2.1.1	Cells with or without SENSE lines	3
2.1.2	Attaching weighing platforms with several weighing cells	3
2.2	Preparing the connecting cable for the weighing platform	3
2.3	Attaching the weighing platform to the terminal	4
3	Configuring the terminal	5
3.1	Calling up the menu and entering the password	5
3.2	Calling up the service level of certified scales	5
3.3	Summary of menu blocks of the service level	6
3.4	Admissibility for certification (SCALE → Metrology)	7
3.5	Selecting the scale to be configured (SCALE → Scale 1)	7
3.6	Calling up the value of the A/D converter (SCALE → Ramp)	7
3.7	Serial number of the terminal (SCALE → SNR)	7
3.8	Entering the configuration data (SCALE → Scale Build)	8
3.8.1	Defining the type of scale (SCALE → Scale Build → Scale Type)	8
3.8.2	Setting the basic unit (SCALE → Scale Build → Basic Unit)	8
3.8.3	Setting the scale capacity (SCALE → Scale Build → Scale Capacity)	9
3.8.4	Selecting the resolution (SCALE → Scale Build → Resolution)	9
3.9	Setting the Geo value (SCALE → Geo)	9
3.10	Linearization with calibration (SCALE → Lin-Cal)	10
3.11	Basic calibration (SCALE → Cal)	11
3.12	Activating the control mode (SCALE → Control)	11
3.13	Settings for the zero point (SCALE → Zero)	11
3.13.1	Setting the zero capturing range (SCALE → Zero → Zero Capture)	12
3.14	Saving the settings and exiting the menu (End)	12
3.13.2	Moving the calibration zero point (SCALE → Zero → Set Zero)	12
4	Table of Geo values	13
5	Setting up a weighing system and technical data	14
5.1	Selecting the weighing cell(s)	14
5.2	Measuring ranges of the terminal	16
5.3	Technical data	17
6	Event and error messages	18

1 Important information

Please read this installation information carefully and observe all instructions! Please contact the Sales Office if there are items which are missing or have been wrongly delivered, or if you encounter any other problems with the terminal. These instructions are intended for those who have a basic but adequate knowledge of the design of weighing systems.

1.1 Product range

The **OptionPac** is a special equipment for the terminals. It may contain various options such as extra interfaces or battery operation. The OptionPac also has an optional analog interface so that a second weighing platform can be connected. If an OptionPac has been ordered, then this will be fitted with the required options and mounted on the base of the terminal. Other accessories available can be found in the enclosed operating instructions.

1.2 Documentation

These instructions only describe the installation of the terminal and its adjustment to the weighing platform to be used. Operating the terminal and adjusting it to operating and process conditions are described in the operating instructions delivered with the terminal.

1.3 Safety and environment



Do not use the terminal in a **hazardous area** (except those versions specially marked for this).

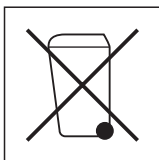
Although the terminals have **IP65** protection, they may not be used in areas where there is **risk of corrosion**. The terminal must never be flooded or submerged in liquid!



Before connecting to the power supply, ensure that the local line voltage is the same as the voltage stated on the rear of the scale. If these differ, the terminal must not be connected (please contact your local Sales Office).

If the **power cable** is damaged, then the weighing system should not be operated. The cable must therefore be regularly checked.

Using the Spider terminal in **food processing**: Those parts in contact with foodstuffs have smooth surfaces and are easy to clean. The materials used in their construction do not crack and contain no harmful substances. A **protective** (optional) **cover** is recommended when using the terminal in food processing. This must be cleaned regularly. Damaged or dirty protective covers should be replaced immediately.



Please note all current environmental directives when **disposing of the terminal**. **Battery-powered** terminals: The battery contains heavy metals and therefore must not be disposed of as normal waste! Please observe local regulations when disposing of environmentally harmful materials.

2 Attaching weighing platforms

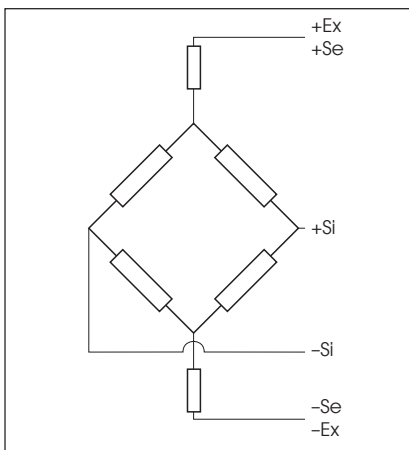
All analog weighing platforms can be attached to the terminals if they are conform to the required specifications (see chapter 5). Two different weighing platforms can be attached if the terminal also has an OptionPac with an analog option. Compact two-scale systems can therefore be constructed using just one terminal.

2.1 Instructions on weighing cells

2.1.1 Cells with or without SENSE lines

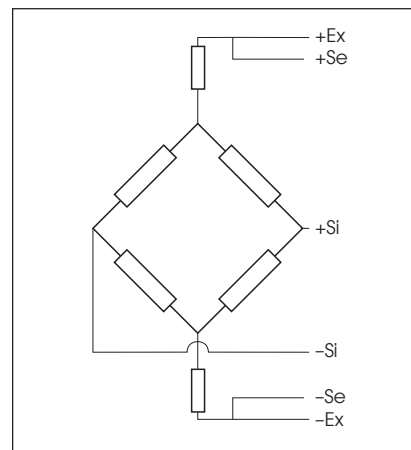
In the case of cells without SENSE lines, the connections "+Ex" (Excitation) and "+Se" (Sense) or "-Ex" and "-Se" must be short-circuited at the connection or the terminal in the OptionPac.

Cells without SENSE lines



Cells with SENSE lines

(required for certifiable weighing systems)

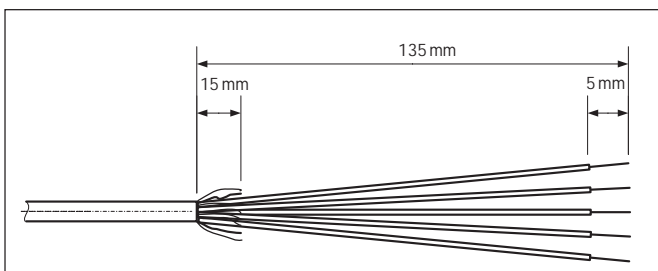


2.1.2 Attaching weighing platforms with several weighing cells

Up to 4 weighing cells can be connected in parallel to a terminal. These weighing cells can be connected in the usual way using a junction box.

The sum of the rated capacities of the individual cells corresponds to the total capacity of the weighing system. When entering the weighing capacities in the menu-driven dialog (chapter 4), the values should be selected so that the individual cells are not overloaded!

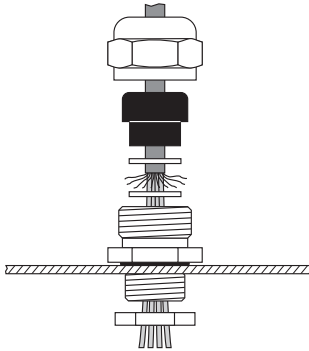
2.2 Preparing the connecting cable for the weighing platform



Remove the insulation as shown on the left.

Note: For connecting to the analog option, only 100 mm of cable insulation should be removed.

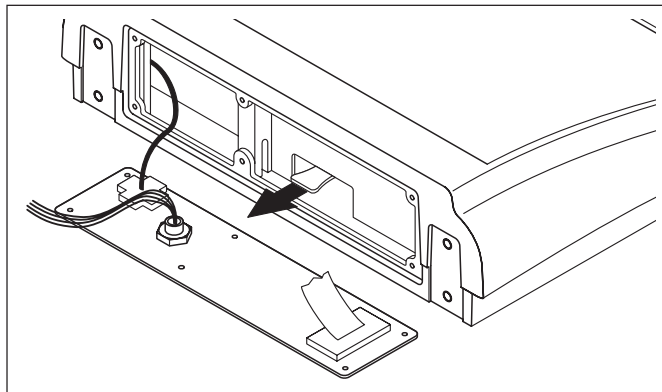
2.3 Attaching the weighing platform to the terminal



Before assembling, the terminal must first be disconnected from the power supply!

Undo the gland nut of the heavy gauge cable gland and remove this together with the black crimping ferrule and the two washers. Undo the rear cover plate of the terminal (6 Torx T20 screws) and fold down carefully (cable connections!).

Mount the nut, crimping ferrule and the washer with the larger hole on the connecting cable of the weighing platform. Flange the shield of the cable slightly and place the second washer over it. Insert the cable through the heavy gauge cable gland of the terminal.



Remove the green plug from the terminal. The plug connector is fitted with a latch to simplify plugging in and out. The diagram opposite shows the position of the connector in the terminal.

Secure the individual strands of the connecting cable on the connector. The pin assignment is shown in the diagram opposite.

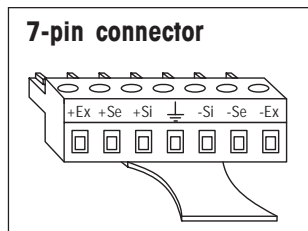
The connectors are marked as follows:
Si = Signal, Ex = Excitation, Se = Sense.

The 7-pin connector also has a terminal for signal ground in the center. The signal ground can be led either to this signal ground terminal or else connected to the shield of the cable (see description and diagram above).

Attach the connector to the terminal. **Caution: When inserting the connector, ensure that it is centered exactly in the connector socket. If the connector is skew, then not all pins are in contact!**

Reassemble the rear cover plate of the terminal. Note that the connecting cable of the weighing platform is not crimped!

Tighten the nut of the heavy gauge cable gland. Ensure that the shield of the cable is held firmly between the two washers.



3 Configuring the terminal

The configuration data of the weighing system must be known before the terminal can be configured (see chapter 5). The IND4.. terminal has a service level for entering configuration data as well as for calibrating and linearization of the weighing system. This level is protected by a password. The menus of the service level are used in exactly the same way as those for the operator and for the supervisor (see operating instructions).

3.1 Calling up the menu and entering the password

The service level of the menu is protected by a special password (key sequence).

code

Press and hold down the **PRINT** key until the prompt to enter the password appears.
Note: For certifiable scales, direct access is denied to the service level. In this case, carry out the procedure in chapter 3.2.

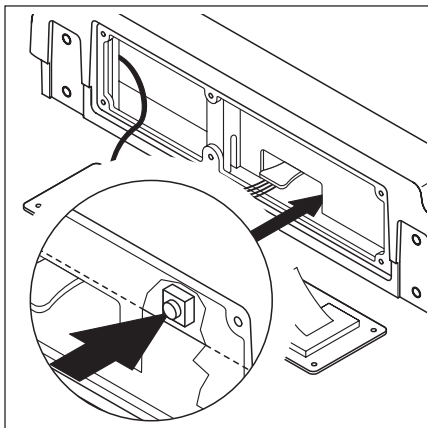
Immediately enter the service password **→0← PRINT →0← PRINT**.

SCALE

The first menu block ("SCALE") is shown once the password has been entered.

3.2 Calling up the service level of certified scales

Due to metrological regulations, direct access is blocked to the service level of certified or certifiable scales. Carry out the following procedure to call up the service level of such a scale:



Switch off the terminal (do not isolate from the power supply!).

Undo the rear cover plate of the terminal (6 Torx T20 screws) and fold down carefully (cable connections!).

Important: The seal must be broken to remove the rear cover plate. Once the seal is broken, the scale must be recertified by an approved certification center and a new seal applied before it can be used again as a certified scale!

The **service switch** (push button) must first be pressed to call up the service level. This is recessed and located next to the connector for the weighing platform (see opposite figure). Use a suitable object or instrument to press down the switch (the blunt tip of a pencil is recommended). **Note:** Before pressing the service switch, the **ON/OFF** switch of battery-operated terminals must first be switched on.

The terminal is switched on by pressing the switch, and the first block of the menu ("SCALE") is shown in the display. All menu blocks of the service level are now accessible.

Reassemble the rear cover plate of the terminal.

3.3 Summary of menu blocks of the service level

The complete menu is available including those menu blocks to which operators and supervisors have access. The following summary shows only those **menu blocks of the service level in the menu "SCALE"**. The rest of the menu is described in the operating instructions.

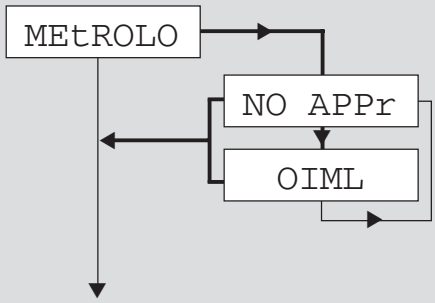
Display	Remarks
	<p>Service level in menu block "SCALE":</p> <p>Determining the admissibility for certification —> chapter 3.4</p> <p>Selecting the scale to be configured (for two-scale system only, i.e. blocks only appear if an analog option is available) —> chapter 3.5</p> <p>Display of deflection of A/D converter ("ramp") —> chapter 3.6</p> <p>Calling up/changing the serial number —> chapter 3.7</p> <p>Entering the configuration data —> chapter 3.8</p> <p>Setting the Geo value —> chapter 3.9</p> <p>Linearization with calibration —> chapter 3.10</p> <p>Basic calibration —> chapter 3.11</p> <p>Activating the control mode —> chapter 3.12</p> <p>Settings for the zero point —> chapter 3.13</p>

Navigating the menu:

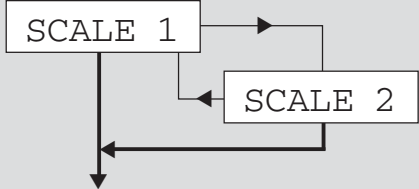
In the following section, the arrows indicate how to operate the menu:

- Pressing the **PRINT** key ("YES")
- Pressing the **TARE** key ("NO")
- Pressing the **ON/OFF** key jumps to the end of the menu ("End")
- Pressing the **+0←** key jumps backwards through the menu

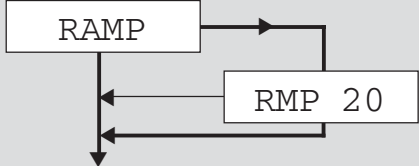
3.4 Admissibility for certification (*SCALE* → *Metrology*)

Display	Remarks
	<p>Setting the admissibility for certification:</p> <p>Scale not certifiable.</p> <p>Scale certifiable to OIML.</p> <p>Caution: When a scale is declared certifiable, then certain settings are no longer available. Direct access to the menu for the service technician is also blocked (see chapter 3.2)!</p>

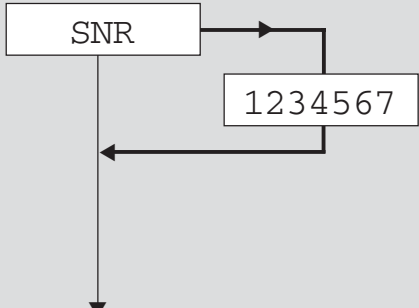
3.5 Selecting the scale to be configured (*SCALE* → *Scale 1*)

Display	Remarks
	<p>This option is only available for two-scale systems, i.e. the terminal is fitted with an analog option for connecting to a second weighing platform and the analog interface is activated (see chapter 2.4)!</p> <p>Scale 1 should be configured.</p> <p>Scale 2 (connected to the analog option) should be configured.</p> <p>Identical menu blocks are available in the service level for both scales. These are described in the following chapters.</p>

3.6 Calling up the value of the A/D converter (*SCALE* → *Ramp*)

Display	Remarks
	<p>Displaying the analog/digital converter deflection ("ramp") as a percentage.</p> <p>This value determines whether the weighing cell is operating correctly. Scales with identical and correctly functioning weighing cells have roughly the same ramp value. This value is dynamic and changes as the load itself changes.</p>

3.7 Serial number of the terminal (*SCALE* → *SNR*)

Display	Remarks
	<p>Displaying or changing the serial number of the terminal. Note: The number should be changed or re-entered only when necessary (e.g. after installing a new terminal board).</p> <p>For KMT-TM terminals, the serial number can be entered via the numeric keyboard. For KMB-TM / KMS-TM terminals, press the TARE key. The first digit flashes and can now be changed using the TARE and ←0← keys. Confirm the new digit with the PRINT key. The second digit now flashes and can be changed in the same way. This same procedure is used for all digits (total of 7 digits).</p>

3.8 Entering the configuration data (*SCALE* → *Scale Build*)

Display	Remarks
<pre> graph TD A[SCAL.bLd] --> B[SCAL.tYP] B --> C[bAS.UNIt] C --> D[SCL.CAP] D --> E[RESOL.] E --> A </pre>	<p>Entering configuration data</p> <p>Defining the type of scale → chapter 3.8.1</p> <p>Specifying the basic units → chapter 3.8.2</p> <p>Specifying the capacity of the weighing system → chapter 3.8.3</p> <p>Selecting the resolution → chapter 3.8.4</p>

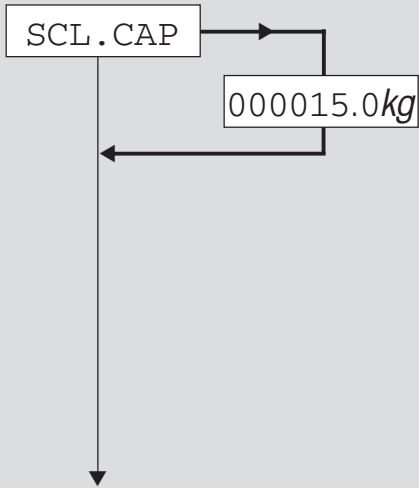
3.8.1 Defining the type of scale (*SCALE* → *Scale Build* → *Scale Type*)

Display	Remarks
<pre> graph TD A[SCAL.tYP] --> B[SINGLE.R] B --> C[2MULt.IN] C --> D[2MULt.RN] D --> E[3MULt.IN] E --> F[3MULt.RN] F --> A </pre>	<p>Defining the scale type</p> <p>“Single Range”: for the single range scale.</p> <p>“Multi Intervall”: scale with one coarse range and 1 movable fine range. Automatic switching between ranges in both directions.</p> <p>“MultiRange”: scale with one coarse range and 1 fixed fine range. Automatic switching to the coarse range. Returning to the fine range on reaching zero.</p> <p>“Multi Intervall” scale with a coarse range and 2 movable fine ranges.</p> <p>“MultiRange” scale with one coarse range and 2 fixed fine ranges.</p>

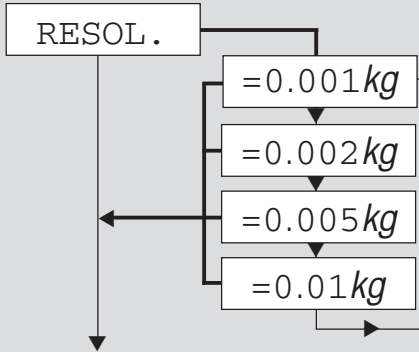
3.8.2 Setting the basic unit (*SCALE* → *Scale Build* → *Basic Unit*)

Display	Remarks
<pre> graph TD A[bAS.UNIt] --> B[g] B --> C[kg] C --> D[oz] D --> E[lb] E --> F[t] F --> A </pre>	<p>Setting the basic unit for entries in the service level.</p> <p>Gram</p> <p>Kilogram</p> <p>Ounce</p> <p>Pound</p> <p>Metric ton</p>

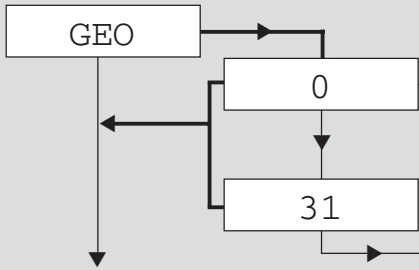
3.8.3 Setting the scale capacity (*SCALE* → *Scale Build* → *Scale Capacity*)

Display	Remarks
	<p>Entering the scale capacity (in the preset basic unit).</p> <p>For KMT-TM terminals, the capacity can be entered via the numeric keyboard. For KMB-TM / KMS-TM terminals, press the TARE key. The first digit flashes and can now be changed using the TARE and →0← keys. Confirm the new digit with the PRINT key. The second digit now flashes and can be changed in the same way. This same procedure is used for all digits (total of 7 digits).</p> <p>For a multirange scale (see chapter 3.8.1), this block is separately available for each weighing range ("SCL.CAP 1" to "SCL.CAP 3", depending on the number of ranges). The additional blocks for capacity are each shown after the block for "Resolution". The upper limit is entered for each weighing range. Example when using a 30 kg dual-range scale: "SCL.CAP 1" = 15 kg, "SCL.CAP 2" = 30 kg. In this example, the ranges switch over from fine to coarse at 15 kg.</p>

3.8.4 Selecting the resolution (*SCALE* → *Scale Build* → *Resolution*)

Display	Remarks
	<p>Selecting the resolution (in the preset basic unit).</p> <p>The resolutions available depend on the capacity of the scale system. The diagram opposite provides an example.</p> <p>For a multirange scale (see chapter 3.8.1), this block is separately available for each weighing range ("RESOL. 1" to "RESOL. 3", depending on the number of ranges). The additional blocks for resolution are each shown after the appropriate block for entering the capacity ("SCL.CAP 1" to "SCL.CAP 3").</p>

3.9 Setting the Geo value (*SCALE* → *Geo*)

Display	Remarks
	<p>Setting the Geo value.</p> <p>With the Geo value, the scale system can be adjusted to local gravitational conditions. This value can be altered by pressing the TARE and →0← keys (range 0 – 31). The table for Geo values is given in chapter 4.</p>

3.10 Linearization with calibration (SCALE → Lin-Cal)

Display	Remarks
<pre> graph TD LIN_CAL[LIN - CAL] --> 3_POINT[3 POINT] LIN_CAL --> 5_POINT[5 POINT] 3_POINT --> ZERO[- 0 -] 5_POINT --> ZERO 5_POINT --> 15kg[15.000kg] 15kg --> 12kg[12.000kg] 15kg --> 4kg[4.000kg] 12kg --> 4kg ZERO -.-> doneE[doneE] 15kg -.-> doneE 12kg -.-> doneE 4kg -.-> doneE </pre>	<p>Linearizing the scale system with simultaneous calibration. Calibration is carried out purely theoretically to compensate for shifts in the full load when linearizing. The loads applied are checked ($\pm 5\%$) and thus a basic calibration must first be carried out (chapter 3.11).</p> <p>Apply preload, if applicable, then select the type of linearization/calibration and confirm with the PRINT key:</p> <ul style="list-style-type: none"> – 3-point linearization (standard for 0%, 50% and 100% of the full load). – 5-point linearization (standard for 0%, 25%, 50%, 75% and 100% of the full load). <p>After confirming the type of linearization, the display flashes while the scale automatically determines the zero point. This zero point determination can be skipped by pressing the TARE key in which case the existing zero point is used as the reference point. This is especially useful for a large scale if test weights have already been applied and which must be removed in order to determine the zero point.</p> <p>The scale prompts for a weight (half load for 3-point linearization or quarter load for 5-point linearization). Change weight, if desired (values available depend on the capacity of the weighing system).</p> <p>By applying the weight and confirming with the PRINT key, the first point is thus linearized. The scale then prompts for other weights (the number of weights depends on the type of linearization selected), which may be changed as required. At the last linearization point, the scale is also calibrated. The linearization/calibration can be exited at any time by pressing the ON/OFF key.</p> <p>The scale indicates that the linearization/calibration procedure is completed once all points have been linearized.</p>

3.11 Basic calibration (SCALE → Cal)

Display	Remarks
<pre> graph TD CAL --> PRELOAD PRELOAD --> 6000kg[6.000kg] 6000kg --> 5000kg[5.000kg] 6000kg --> 2000kg[2.000kg] 5000kg --> donE 2000kg --> donE CAL --> donE PRELOAD --> donE </pre>	<p>The basic calibration corresponds to the calibration function for the user (however, the user cannot set the preload).</p> <p>Apply the preload and confirm with the PRINT key. If a test weight is already on the scale, the preload measurement can be skipped by pressing the TARE key. The existing zero point is then used as the reference point. This is especially useful for a large scale if test weights have already been applied and which must be removed in order to determine the preload.</p> <p>The scale prompts for a calibration weight corresponding to the nominal capacity of the weighing system.</p> <p>Change calibration weight, if desired (values available depend on the capacity of the weighing system).</p> <p>Apply the selected weight and confirm with the PRINT key. (The calibration can be exited at any time by pressing the ON/OFF key).</p> <p>Calibration is completed.</p>

3.12 Activating the control mode (SCALE → Control)

Display	Remarks
<pre> graph TD CONTROL --> 7246[7.246] 7246 --> CONTROL </pre>	<p>Activating the control mode.</p> <p>The control mode displays the current weighing result at high resolution (but without weighing unit). This enables the scale, for example, to be checked after calibration and/or linearization.</p>

3.13 Settings for the zero point (SCALE → Zero)

Display	Remarks
<pre> graph TD ZERO --> ZCAPt[Z - CAPt] ZERO --> SEtZERO[SEt.ZERO] ZERO --> AZM[AZM] ZERO --> Exit[] </pre>	<p>Settings for the zero point</p> <p>Z - CAPt → Setting the zero capturing range → chapter 3.13.1</p> <p>SEt.ZERO → Moving the calibration zero point → chapter 3.13.2</p> <p>AZM → This menu block also includes the block for automatic zero point correction. It is also available to the user and is thus not described here (see operating instructions).</p>

3.13.1 Setting the zero capturing range (SCALE → Zero → Zero Capture)

Display	Remarks
	<p>Setting the zero capturing range (when switching on and via the key).</p> <p>Zero capturing range -2% to +18%</p> <p>Zero capturing range -2% to +2% (mainly for certifiable scales)</p> <p>The zero capturing range is set at the expense of the nominal capacity of the scale. If the capacity of the scale should be fully used, then the zero capturing range can be reduced to -2% to +2%.</p>

Zero)

3.13.2 Moving the calibration zero point (SCALE → Zero → Set)

Display	Remarks
	<p>Moving the calibration zero point is required: when an auxiliary preload is used or the scale cannot be calibrated with the current preload (e.g. roller track) because the values are outside the zero capturing range (in this case, the scale cannot be started). The appropriate preload must be applied to the scale in order to carry out a "Set Zero". The zero point for calibration by the user is moved to the new value, as is the zero capturing range.</p> <p>Carry out or cancel moving of the calibration zero point.</p> <p>If, after exiting the menu, the display indicates underload or overload, the terminal should be switched off and on again.</p>

3.14 Saving the settings and exiting the menu (End)

Display	Remarks
	<p>This menu block is entered directly from any point in the menu by pressing the key!</p> <p>Save modified settings by pressing the key or discard them by pressing the key.</p> <p>The scale returns to weighing mode.</p>

4 Table of Geo values


Northern or southern geographical latitude in degrees and minutes	Height above sea level in meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height above sea level in feet										
0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	
1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730	
0° 0' - 5° 46'	5	4	4	3	3	2	2	1	1	0	0
5° 46' - 9° 52'	5	5	4	4	3	3	2	2	1	1	0
9° 52' - 12° 44'	6	5	5	4	4	3	3	2	2	1	1
12° 44' - 15° 6'	6	6	5	5	4	4	3	3	2	2	1
15° 6' - 17° 10'	7	6	6	5	5	4	4	3	3	2	2
17° 10' - 19° 2'	7	7	6	6	5	5	4	4	3	3	2
19° 2' - 20° 45'	8	7	7	6	6	5	5	4	4	3	3
20° 45' - 22° 22'	8	8	7	7	6	6	5	5	4	4	3
22° 22' - 23° 54'	9	8	8	7	7	6	6	5	5	4	4
23° 54' - 25° 21'	9	9	8	8	7	7	6	6	5	5	4
25° 21' - 26° 45'	10	9	9	8	8	7	7	6	6	5	5
26° 45' - 28° 6'	10	10	9	9	8	8	7	7	6	6	5
28° 6' - 29° 25'	11	10	10	9	9	8	8	7	7	6	6
29° 25' - 30° 41'	11	11	10	10	9	9	8	8	7	7	6
30° 41' - 31° 56'	12	11	11	10	10	9	9	8	8	7	7
31° 56' - 33° 9'	12	12	11	11	10	10	9	9	8	8	7
33° 9' - 34° 21'	13	12	12	11	11	10	10	9	9	8	8
34° 21' - 35° 31'	13	13	12	12	11	11	10	10	9	9	8
35° 31' - 36° 41'	14	13	13	12	12	11	11	10	10	9	9
36° 41' - 37° 50'	14	14	13	13	12	12	11	11	10	10	9
37° 50' - 38° 58'	15	14	14	13	13	12	12	11	11	10	10
38° 58' - 40° 5'	15	15	14	14	13	13	12	12	11	11	10
40° 5' - 41° 12'	16	15	15	14	14	13	13	12	12	11	11
41° 12' - 42° 19'	16	16	15	15	14	14	13	13	12	12	11
42° 19' - 43° 26'	17	16	16	15	15	14	14	13	13	12	12
43° 26' - 44° 32'	17	17	16	16	15	15	14	14	13	13	12
44° 32' - 45° 38'	18	17	17	16	16	15	15	14	14	13	13
45° 38' - 46° 45'	18	18	17	17	16	16	15	15	14	14	13
46° 45' - 47° 51'	19	18	18	17	17	16	16	15	15	14	14
47° 51' - 48° 58'	19	19	18	18	17	17	16	16	15	15	14
48° 58' - 50° 6'	20	19	19	18	18	17	17	16	16	15	15
50° 6' - 51° 13'	20	20	19	19	18	18	17	17	16	16	15
51° 13' - 52° 22'	21	20	20	19	19	18	18	17	17	16	16
52° 22' - 53° 31'	21	21	20	20	19	19	18	18	17	17	16
53° 31' - 54° 41'	22	21	21	20	20	19	19	18	18	17	17
54° 41' - 55° 52'	22	22	21	21	20	20	19	19	18	18	17
55° 52' - 57° 4'	23	22	22	21	21	20	20	19	19	18	18
57° 4' - 58° 17'	23	23	22	22	21	21	20	20	19	19	18
58° 17' - 59° 32'	24	23	23	22	22	21	21	20	20	19	19
59° 32' - 60° 49'	24	24	23	23	22	22	21	21	20	20	19
60° 49' - 62° 9'	25	24	24	23	23	22	22	21	21	20	20
62° 9' - 63° 30'	25	25	24	24	23	23	22	22	21	21	20
63° 30' - 64° 55'	26	25	25	24	24	23	23	22	22	21	21
64° 55' - 66° 24'	26	26	25	25	24	24	23	23	22	22	21
66° 24' - 67° 57'	27	26	26	25	25	24	24	23	23	22	22
67° 57' - 69° 35'	27	27	26	26	25	25	24	24	23	23	22
69° 35' - 71° 21'	28	27	27	26	26	25	25	24	24	23	23
71° 21' - 73° 16'	28	28	27	27	26	26	25	25	24	24	23
73° 16' - 75° 24'	29	28	28	27	27	26	26	25	25	24	24
75° 24' - 77° 52'	29	29	28	28	27	27	26	26	25	25	24
77° 52' - 80° 56'	30	29	29	28	28	27	27	26	26	25	25
80° 56' - 85° 45'	30	30	29	29	28	28	27	27	26	26	25
85° 45' - 90° 00'	31	30	30	29	29	28	28	27	27	26	26

5 Setting up a weighing system and technical data

Before setting up a weighing system with the terminal, its basic data must first be determined. These data are to be entered into the service level of the menu (chapter 3). The typical procedure for setting up a scale system is shown below as follows.

5.1 Selecting the weighing cell(s)

The following data must be known in order to determine the capacity of the weighing cell:

- **Scale capacity:** This generally corresponds to the heaviest load that is to be weighed with the weighing system.
- **Preload:** This is the total weight of all parts applied to the weighing cell. This includes the upper part of the weighing platform, the weighing pan and all other components such as a roller track, a fixed weighing container, etc.
- **Total zero setting range:** This consists of the switch-on zero setting range (+18/-2% or $\pm 2\%$, selected in the menu) and the zero setting range (2%) that the user has available with the  key. The total zero setting range is thus either 20% or 4% of the weighing capacity.

The sum of the weighing capacity, preload and total zero setting range thus gives the total capacity of the weighing cell required. An additional safety margin should also be included in order to prevent weighing cells from being overloaded.

Total capacity of weighing cell(s) = scale capacity + preload + total zero setting range + safety margin

For **systems with several weighing cells**, the total theoretical capacity is divided by the number of cells (max. 4) in order to determine the capacity of the individual cell. A sufficient safety margin is especially important if the scale is heavily loaded in the cornerload range so that the load is no longer evenly distributed over all cells.

For **systems with lever mechanisms**, the total theoretical capacity is divided by the transmission ratio of the lever system in order to determine the capacity of the cell.

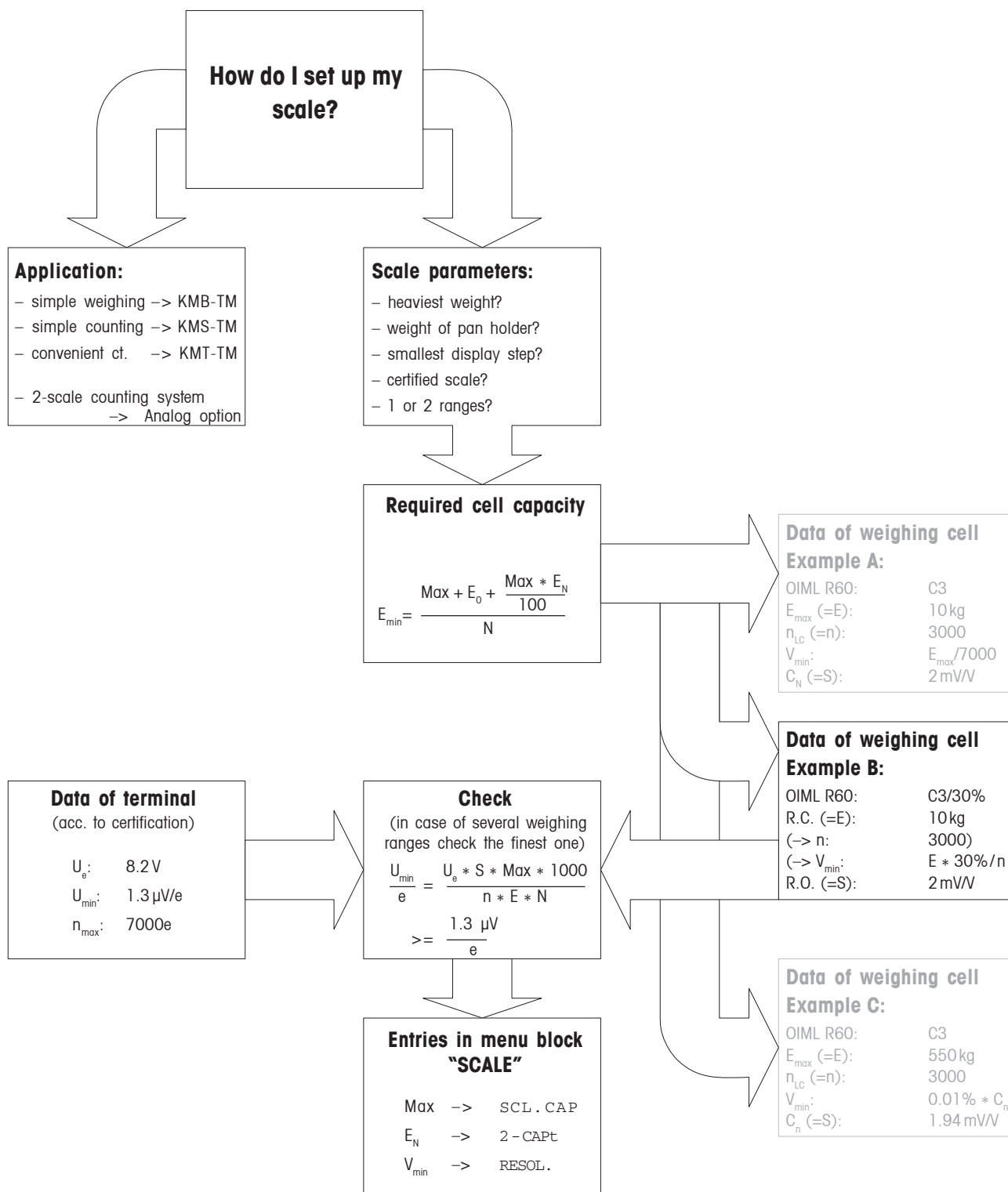
When selecting the weighing cell(s), other parameters are also to be taken into account. These include:

- the smallest display step desired
- requirements for admissibility for certification
- number and type of weighing ranges

The terminal supplies a **voltage** of 8.2 V to the weighing cell(s). The **maximum weighing signal** is determined by multiplying the power supply voltage by the sensitivity of the weighing cell:

Sensitivity of the cell	2 mV/V	3 mV/V
Power supply voltage	8.2 V	8.2 V
Max. weighing signal ¹⁾	16.4 mV	24.6 mV ¹⁾
Min. weighing signal per display step (for certifiable scales)	1.3 μ V/e	1.3 μ V/e

¹⁾ Only 20 mV measurable by the A/D converter, so that scale capacity is only max. 81% of the cell capacity.

**Key:**

Max [kg]: weighing range

N: no. of weighing cells

 E_0 [kg]: preload (weight of pan holder, container, etc.) E_N [%]: zero setting range (2%) + zero capturing range
(+18/-2% or $\pm 2\%$) = 20% or 4% E_{\min} [kg]: required load capacity per weighing cell U_e [V]: power supply from terminal

S [mV/V]: cell output signal

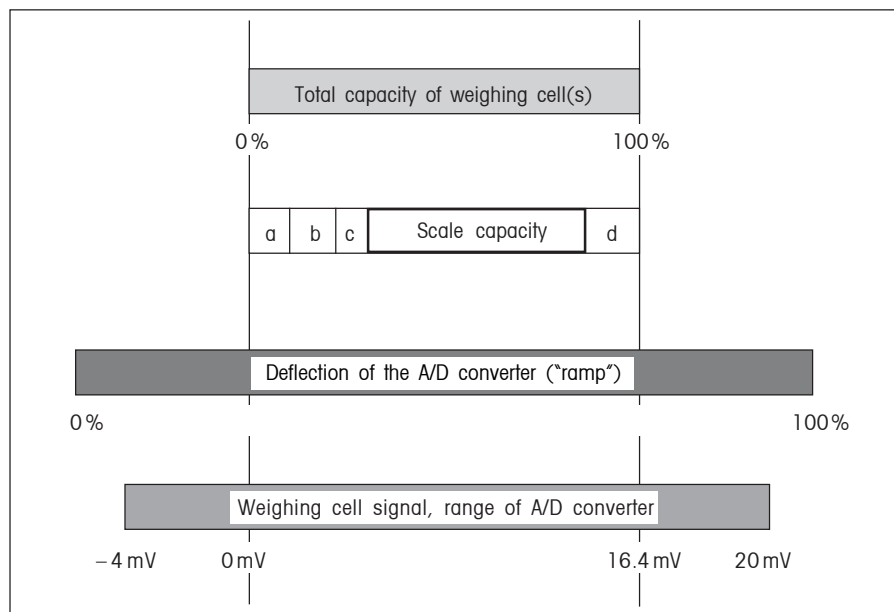
n [e]: resolution

E [kg]: load capacity of selected weighing cell

 U_{\min} [$\mu\text{V}/e$]: minimum voltage per verification interval n_{\max} [e]: maximum resolution V_{\min} [g]: display step

5.2 Measuring ranges of the terminal

When setting up a weighing system, consider the measuring ranges of the terminal according to the summary given below.



- a:** Total preload applied to weighing cell when calibrating (upper part of platform, weighing pan, roller track, etc.)
- b:** Switch-on zero capturing range: +18/-2% or $\pm 2\%$ of weighing capacity (menu option)
- c:** Zero setting range with $\boxed{\rightarrow 0 \leftarrow}$ key: $\pm 2\%$ of weighing capacity (fixed)
- d:** Safety margin

5.3 Technical data

Only those specifications needed for using this installation information are shown below. The other technical data are given in the operating instructions.

Data for the terminal	
Resolution	300 000 points for non-certifiable applications 7 000 points for certifiable applications
Weighing ranges	Up to 3 weighing ranges defined in the menu, incl. movable or fixed fine ranges. For certifiable/certified applications, the minimum voltage per verification scale interval (1.3 µV/e) must be maintained or the resolution must not exceed 7 000e.
Calibration	Basic calibration and calibration during linearization
Linearization	3-point or 5-point with simultaneous calibration
Zero setting range (→0← key)	2% of max. defined useful load, cannot be altered
Autozero range	2% of max. defined useful load, cannot be altered
Switch-on zero setting range	−2% ... 18% or −2% ... 2% of max. defined useful load (menu option)
Linearity	0.01% of the max. defined useful load
Units	g, kg, lb, oz, t
Display steps	1, 2, 5 x 10 ⁿ (menu option)
Cell power supply	8.2V
Scope of delivery	Terminal with power cable and local connector Installation information for Spider terminal and operating instructions for Spider scale Options: OptionPac with integrated analog option and other options
Requirements for the weighing cell	
Nominal load	0.1 ... 999 999.9 (g, kg, lb, oz, t)
Admissible impedance	80 Ohm ... 1000 Ohm Measure between Si+ and Si− or Ex+ and Ex− while weighing cell is disconnected
Differential signal	−1 mV ... 25 mV (see example below)

Example for calculating the differential signal:

Data of the weighing cell: sensitivity of 2 mV/V and cell capacity of 100 kg

Calculating the **differential signal for nom. load** (60 kg): $2 \text{ mV/V} \cdot 8.2 \text{ V} \cdot 60 \text{ kg}/100 \text{ kg} = 9.84 \text{ mV}$

Calculating the **differential signal for half load** (30 kg): $2 \text{ mV/V} \cdot 8.2 \text{ V} \cdot 30 \text{ kg}/100 \text{ kg} = 4.92 \text{ mV}$

Requirements for certifiable scales

- Certifiable weighing cell with SENSE lines (6 wires), sensitivity of the cell of 2 mV/V or 3 mV/V.
- The scale must be configured in the service level of the menu as certifiable (see chapter 3).
- Approved markings from the manufacturer.

6 Event and error messages

Overload: Reduce the load on the scale or reduce the preload.

Underload: Place the weighing pan on the scale and ensure it can move freely.

Result not stable: Always appears when not stable (when zeroing, taring, etc.). If the scale still does not become stable after a long time, check the environmental conditions. If necessary, change the setting of the vibration adapter or use the dynamic weighing function.

Function not allowed: The requested function cannot be executed because it is not allowed at the time of the request.

Zeroing not possible: Make sure that zeroing is being performed in the allowed range and not with overload or underload. Note: The message `LnoJ` also appears if it is attempted to tare certified scales with minus values (this is not allowed).

Reference weight too low: The weight on the pan is too low to use as a valid reference for piece counting. Place a larger number of reference pieces on the weighing pan.

No valid value from reference scale: Only occurs when piece counting on a 2-scale system. Check cable connecting the scales and check interface settings.

Not calibrated/adjusted: Disconnect the power supply plug and reconnect it (or if the scale is battery-operated, switch it off and then on again). If the message appears again, calibrate/adjust the scale.

Reference piece weight too low: When determining the reference, the resulting weight of a single piece is below the allowable limit. Piece counting is not possible for such pieces.

Unstable weight value when determining reference: When determining the reference for piece counting, the weight value did not become stable and the scale cannot determine the reference piece weight. Check the environmental conditions. If necessary, change the setting of the vibration adapter.


Input error for target value or tolerances: The value entered is invalid, enter another value.

Setting the reference piece weight is not allowed: Do not define a reference piece weight while a weight totaling is in process.

Switching over the weighing unit is not allowed (totaling): Do not switch over the weighing unit while a weight totaling is in process.

Printout not yet complete: Repeat the desired action after the current printout is complete.

Changing the weighing unit not allowed (dynamic weighing): Do not change the weighing unit while you are dynamic weighing.

EAROM checksum error: Disconnect the power supply plug and reconnect it (or if the scale is battery-operated, switch the scale off and then on again). If the message re-appears, press the  key continuously. The display shows "Flush" and then the scale is restarted. After start-up, the scale shows "Error 6" (missing calibration data). All scale data must be re-entered and the scale recalibrated.

Konformitätserklärungen

Declaration of conformity for apparatus with CE mark

Konformitätserklärung für Geräte mit CE-Zeichen

Déclaration de conformité pour appareils portant la marque CE

Declaración de conformidad para aparatos con marca CE

Dichiarazione di conformità per apparecchi contrassegnati con la marcatura CE




English	We hereby declare that the product to which this declaration refers conforms with the following standards.
Deutsch	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.
Français	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.
Español	Manifiestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las normas siguientes
Italiano	Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.

Scale Series: BTBP/BTSP/BTTP/ITB/ITS/ITT
Plattform line: TP
Terminal: KMB-TM, KMS-TM, KMT-TM

Mark applied	EU Directive	Standards	Approval/ Test- certificate N°
CE	73/23/EEC 93/68/EEC Low Voltage	EN61010-1	
CE	89/336/EEC 93/68/EEC 92/31/EEC EMC	EN61326-1 EN61000-3-2 EN61000-6-1 0,5µV/e (3V/m) EN61000-6-2 1,3µV/e (10V/m)	
CE [year] 1) [code] M	90/384/EEC 93/68/EEC Non automatic weighing Instruments 1), 2), 3)	EN45501 1), 2), 3)	T6189 1), 2) TC7089 1), 2)

- 1) applies only to certified balances
gilt nur für geeichte Waagen
valable uniquement pour les balances vérifiées
sólo aplicable a balanzas verificadas
la dichiarazione vale solo per le bilance omologate
- 2) valid only for KMB-TM/KMS-TM/KMT-TM terminals in connection with approved load cells
nur gültig für KMB-TM/KMS-TM/KMT-TM Terminals in Verbindung mit zugelassenen Lastzellen
valable uniquement pour les terminaux KMB-TM/KMS-TM/KMT-TM en liaison avec des cellules de charge homologuées
sólo válido para terminales KMB-TM/KMS-TM/KMT-TM en combinación con células de carga aprobadas
valido solo per terminali KMB-TM/KMS-TM/KMT-TM in collegamento con celle di carico approvate
- 3) valid only for TP weighing platforms in connection with an approved weighing indicator
nur gültig für TP Wägebrücken in Verbindung mit einem zugelassenen Waagenterminal
valable uniquement pour les plates-formes TP en liaison avec un terminal de pesée homologué
sólo válido para plataformas de pesaje TP en combinación con un terminal de balanza aprobado
valido solo per basamenti TP in collegamento con un terminale di pesata approvato

Scale Series: BTEP

Mark applied	EU Directive	Standards	Approval/ Test-certificate N°
	73/23/EEC 93/68/EEC Low Voltage	EN60950-1	
	89/336/EEC 93/68/EEC 92/31/EEC EMC	EN61326-1 Kl.B EN61000-3-2 EN61000-3-3	
	90/384/EEC 93/68/EEC Non automatic weighing instruments 1)	EN45501 1)	T7092 1) TC7091 1)

- 1) applies only to certified balances
gilt nur für geeichte Waagen
valable uniquement pour les balances vérifiées
sólo aplicable a balanzas verificadas
la dichiarazione vale solo per le bilance omologate

English



Weighing instruments verified at the place of manufacture bear the preceding mark on the packing label and a green M-sticker on the descriptive plate. They may be set to work immediately.



Weighing instruments which are verified in two steps has no green "M" on the descriptive plate, bear the aforementioned identification on the packing label. The second step of the verification must be carried out by the W&M authorities.

The first step of the verification has been carried out in the manufacturing company. It comprises all tests according EN45501-8.2.2. In regards to scales with analog connection to the weighing-platform, a weighing test according to EN45501-3.5.3.3 must be carried out additionally. This test is not necessary if the terminal bears the serial-number of the weighing-platform.

Deutsch



Werksgeeichte Waagen tragen vorstehendes Kennzeichen auf dem Packetikett und eine grünen M-Kleber auf dem Eichschild. Sie dürfen sofort in Betrieb genommen werden.



Waagen die in zwei Schritten geeicht werden und kein grünes "M" auf dem Eichschild haben, tragen vorstehendes Kennzeichen auf dem Packetikett. Der zweite Schritt der Eichung ist durch den Eichbeamten durchzuführen.

Der erste Schritt der Eichung wurde im Herstellerwerk durchgeführt. Er umfaßt alle Prüfungen gemäß EN45501-8.2.2. Bei Waagen mit analogen Wägebrückenanschluss muß zusätzlich die Richtigkeit gemäß EN45501-3.5.3.3 geprüft werden. Diese Prüfung ist nicht notwendig, wenn das Terminal die Serien-Nr. der Wägebrücke trägt.

Français



Les instruments de pesage vérifiés en usine sont identifiés par un M sur leur emballage et par un sticker M vert sur la plaque d'identification. Ils peuvent être utilisés après leur installation.



Les instruments de pesage vérifiés en deux étapes portent l'identification M barré sur leur emballage. La seconde étape de la vérification doit être effectuée par l'assistant technique de l'administration des poids et mesures.

La première étape de la vérification a été effectuée en usine. Cela comprend tous les essais suivant la norme EN45501-8.2.2. Pour les instruments de pesage avec une connexion analogique à la plate-forme de pesage, un essai de pesage suivant la norme EN45501-3.5.3.3 doit être effectué en plus. Cela n'est pas nécessaire si le terminal porte le numéro de la plate-forme de pesage.

Español



Las básculas verificadas en origen llevan esta indicación en la etiqueta del embalaje y con la etiqueta M sobre fondo verde en la placa de características pueden ser utilizadas inmediatamente.



Básculas cuya verificación se realiza en dos fases llevan esta indicación en la etiqueta del embalaje. La segunda fase de la verificación debe ser realizada por el asistente técnico de la oficina de contraste.

La primera fase de la verificación ha sido realizada en origen. Incluye todos los ensayos según la norma EN45501-8.2.2. Para las básculas con plataforma de pesaje con salida analógica debe realizarse además el ensayo según EN45501-3.5.3.3. Este ensayo no es necesario si el terminal lleva el número de la plataforma de pesaje.

Italiano



Le bilance verificate in fabbrica portano questo contrassegno sull'etichetta dell'imballo e con il siglio M su sfondo verde sulla targhetta metrologica possono essere messe in uso immediatamente.



Le bilance che vengono verificate in due fasi, portano questo contrassegno sull'etichetta dell'imballo. La seconda fase della verifica deve essere eseguita dal dal servizio assistenza tecnica dell'ufficio di pesi e misure.

La prima fase della verifica è stata eseguita dal produttore e comprende tutte le prove previste dalla norma di riferimento EN45501-8.22. Riguardo le bilance con connessione analogica a piattaforma di pesata, una ulteriore prova deve essere eseguita in accordo alla norma EN45501-3.5.3.3. Questa prova non è necessaria se il terminale porta il numero di serie della piattaforma.

Netherlands



In de fabriek geijkte weegschalen dragen dit kenteken op het emballage-etiket en een groene M-sticker op het ijklablel.
Deze kunnen meteen in gebruik genomen worden.



Bij weegschalen die in twee stappen geijkt moeten worden en geen groene "M" op het ijklablel hebben, staat dit kenteken op het emballage-etiket.
De tweede stap van de ijking moet door het ijkeuzen uitgevoerd worden.

De eerste stap van de ijking werd in de fabriek uitgevoerd. Deze stap omvat alle tests overeenkomstig EN45501-8.2.2. Bij weegschalen met een analoge weegbruggeaansluiting moet aanvullend de nauwkeurigheid overeenkomstig EN45501-3.5.3.3 getest worden.
Deze controle is niet nodig als de terminal het serienummer van de weegbrug heeft.

Date: 03.01.2007

Signature:

Gottl. KERN & Sohn GmbH
Management

Notice

Certified balances and balances used for legal applications have the EU type approval. The year of the initial verification is shown next to the CE mark. Such balances are verified in the factory and carry the „M“ mark on the actual balance and the packaging. The year of initial verification is shown next to the CE mark. The GEO value of verified balances explains for which location of use the balance has been verified. This GEO value is shown on the balance itself and on the packing. Further details see GEO value table.

Hinweise

Für geeichte/eichpflichtige Waagen liegt eine EU Bauartzulassung vor. Das Jahr der ersten Eichung ist neben dem CE Zeichen aufgeführt. Solche Waagen sind ab Werk geeicht und tragen die Kennzeichnung „M“ auf dem Gerät selbst und auf der Verpackung. Der GEO-Wert gibt bei vom Hersteller geeichten Waagen an, für welchen Aufstellungsort die Waage geeicht ist. Dieser GEO-Wert befindet sich auf der Waage sowie der Verpackung. Genaueres ist der GEO-Wert-Tabelle zu entnehmen.

Remarques

Les balances vérifiées/admissibles à la vérification font l'objet d'une approbation de modèle UE. L'année de la vérification primitive est indiqués à côté de la marque CE. Ces balances sont vérifiées d'origine et portent la marque „M“ sur l'appareil lui-même et sur l'emballage. Le valeur GEO indique le lieu d'utilisation pour lequel la balance été vérifiée. Ce valeur GEO se trouve sur la balance ainsi que sur l'emballage. Veuillez trouver plus de détails dans le tableau GEO.

Notas

Las balanzas verificadas/verificables cuentan con una aprobación de modelo UE. El año de la primera verificación está indicado al lado del distintivo CE. Estas balanzas están verificadas en fábrica y llevan la designación „M“ sobre el propio aparato y sobre el embalaje. El valor GEO indica el lugar de ubicación por lo cual la balanza está verificado. El valor se encuentra sobre la balanza así como sobre el embalaje. Por favor toman demßas detalles de la tabla GEO.

Avvertenza

Per le bilance approvate esiste un'approvazione CE del tipo. L'anno della prima verifica è indicato a fianco della marcatura CE. I tipi marcati con un contrassegno „M“ su sfondo verde peino possono essere impiegati da subito. Il coefficiente GEO di bilance omologate indca per quale luogo la bilancia è stata omologata. Questo coefficiente GEO si trova sulla bilancia e sull'imballo. Ulteriroi informazioni vedi tabella coefficiente GEO.

GEO-WERT-Tabelle / GEO-value table

geographische Breite /geo- graphical latitude				Höhe über Meer in Metern / altitude					
				0-650	650-1300	1300-1950	1950-2600	2600-3250	
0°	0'	-	9°	52'	4 / 5	3 / 4	2 / 3	1 / 2	0 / 1
9°	52'	-	15°	6'	5 / 6	4 / 5	3 / 4	2 / 3	1 / 2
15°	6'	-	19°	2'	6 / 7	5 / 6	4 / 5	3 / 4	2 / 3
19°	2'	-	22°	22'	7 / 8	6 / 7	5 / 6	4 / 5	3 / 4
22°	22'	-	25°	21'	8 / 9	7 / 8	6 / 7	5 / 6	4 / 5
25°	21'	-	28°	6'	9 / 10	8 / 9	7 / 8	6 / 7	5 / 6
28°	6'	-	30°	41'	10 / 11	9 / 10	8 / 9	7 / 8	6 / 7
30°	41'	-	33°	9'	11 / 12	10 / 11	9 / 10	8 / 9	7 / 8
33°	9'	-	35°	31'	12 / 13	11 / 12	10 / 11	9 / 10	8 / 9
35°	31'	-	37°	50'	13 / 14	12 / 13	11 / 12	10 / 11	9 / 10
37°	50'	-	40°	5'	14 / 15	13 / 14	12 / 13	11 / 12	10 / 11
40°	5'	-	42°	19'	15 / 16	14 / 15	13 / 14	12 / 13	11 / 12
42°	19'	-	44°	32'	16 / 17	15 / 16	14 / 15	13 / 14	12 / 13
44°	32'	-	46°	45'	17 / 18	16 / 17	15 / 16	14 / 15	13 / 14
46°	45'	-	48°	58'	18 / 19	17 / 18	16 / 17	15 / 16	14 / 15
48°	58'	-	51°	13'	19 / 20	18 / 19	17 / 18	16 / 17	15 / 16
51°	13'	-	53°	31'	20 / 21	19 / 20	18 / 19	17 / 18	16 / 17
53°	31'	-	55°	52'	21 / 22	20 / 21	19 / 20	18 / 19	17 / 18
55°	52'	-	58°	17'	22 / 23	21 / 22	20 / 21	19 / 20	18 / 19
58°	17'	-	60°	49'	23 / 24	22 / 23	21 / 22	20 / 21	19 / 20
60°	49'	-	63°	30'	24 / 25	23 / 24	22 / 23	21 / 22	20 / 21
63°	30'	-	66°	24'	25 / 26	24 / 25	23 / 24	22 / 23	21 / 22
66°	24'	-	69°	35'	26 / 27	25 / 26	24 / 25	23 / 24	22 / 23
69°	35'	-	73°	16'	27 / 28	26 / 27	25 / 26	24 / 25	23 / 24
73°	16'	-	77°	52'	28 / 29	27 / 28	26 / 27	25 / 26	24 / 25
77°	52'	-	85°	45'	29 / 30	28 / 29	27 / 28	26 / 27	25 / 26