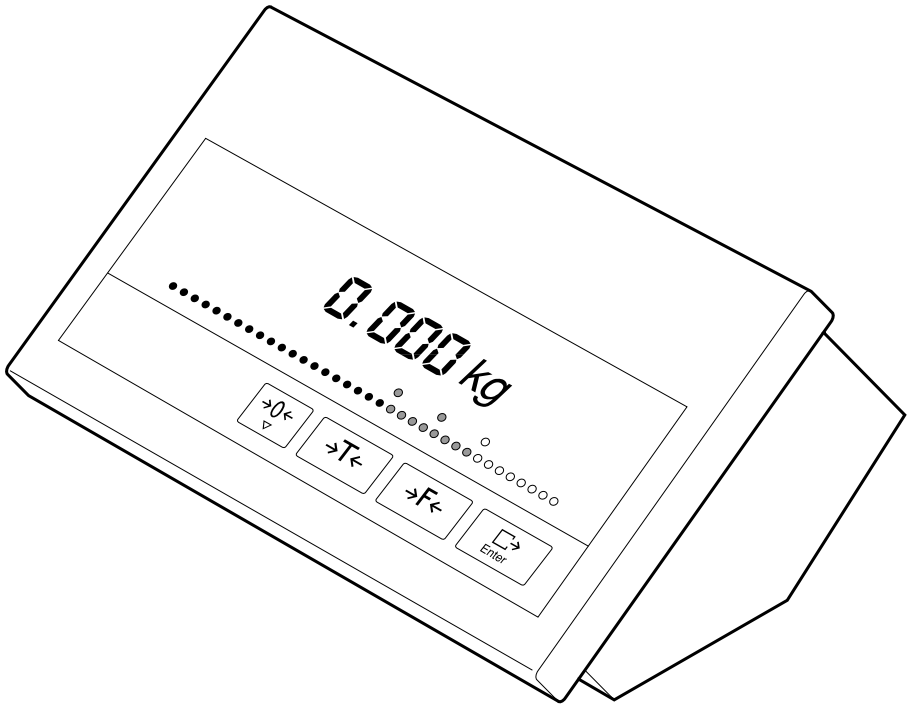
Operating instructions

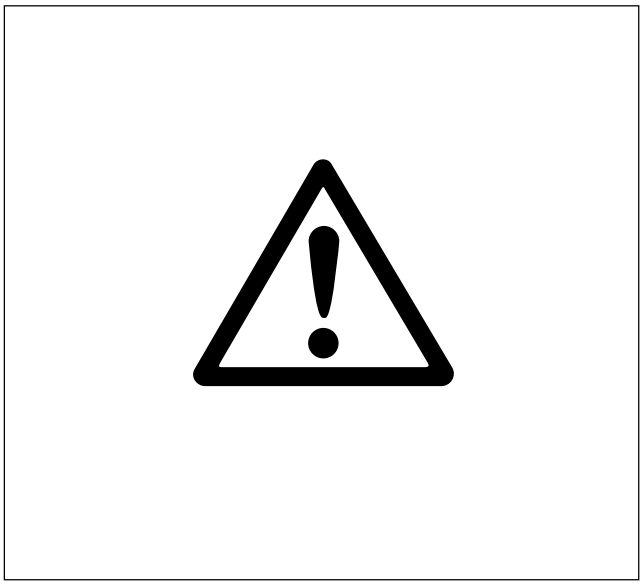
METTLER TOLEDO MultiRange ID1 Plus-A weighing terminal

METTLER TOLEDO



Contents Page

1 Cautionary notes



- ▲ Never operate the weighing terminal in hazardous areas. We offer instruments in our product range with the appropriate types of protection for use in hazardous areas.
- ▲ As the weighing terminal can be made dead only by disconnecting the power plug, it may be connected only to a readily accessible receptacle outlet in the vicinity of its location.
- ▲ Before putting into operation, ensure that the line voltage matches the voltage printed on the label on the weighing terminal.
- ▲ Attachment of the weighing platform to the weighing terminal only by authorized METTLER TOLEDO service or as described in these instructions.
- ▲ The weighing terminal may be opened only for attachment of the weighing platform and only by a qualified electrician.

2 Putting into operation

2.1 General information

Setting up and putting into operation of the weighing terminal and weighing platform is normally performed by the METTLER TOLEDO customer service.

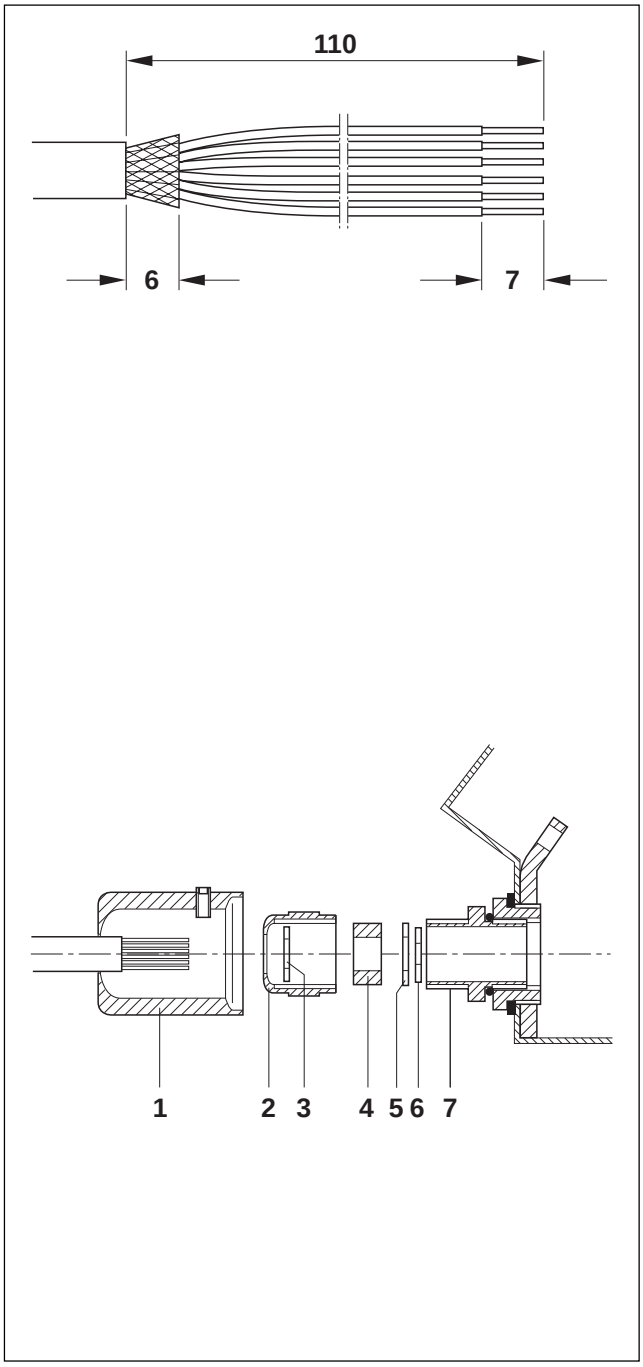
If you wish to install the weighing terminal yourself, follow the procedure described in these instructions.

If you wish to operate the already attached weighing platform in a configuration other than the standard configuration, you can change this setting in the service mode, see section 7. After a change in the configuration, the scale must be recertified, see section 2.4.

2.2 Attaching the weighing platform to the terminal

Opening terminal

- Disconnect power plug.
- Unscrew 2 screws on the underside of the cover at the front and lift off cover.
- Disconnect keypad cables and weighing platform cable on the main board on the right next to the display.
- Detach heavy gauge cable gland from power cable connection and push in power cable by about 5 cm.
- Unscrew 2 screws on the main board, lift main board out of the guide and place to the front.
- Remove locking pin of the sealing sleeve for the weighing platform connection and detach heavy gauge cable gland for the weighing platform connection.



Preparing weighing platform connection cable

- Remove approx. 110 mm insulation from cable ends.
- Shorten cable shield to 6 mm.
- Remove approx. 7 mm insulation from wire ends and twist together.
- Mount wire end ferrules and press tight with crimping tool.
  Caution
  The wire ends must not protrude beyond the wire end ferrules.

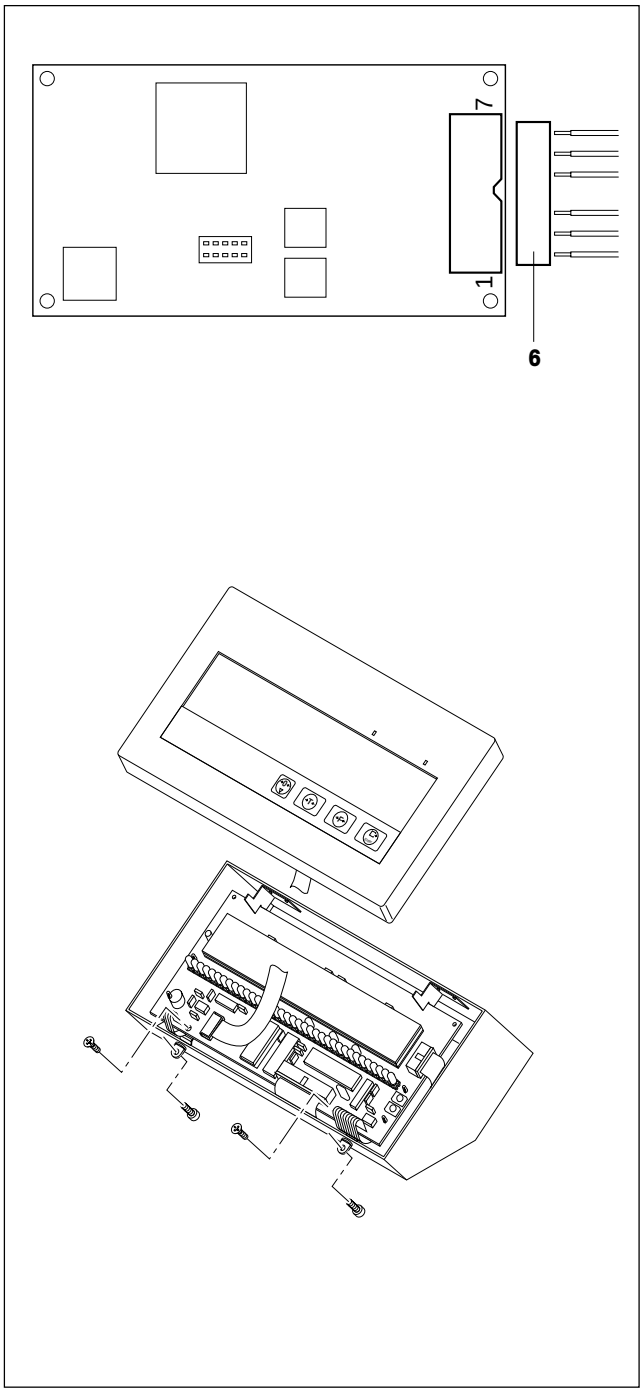
Attaching cable gland to the weighing platform cable

Note

Shielding measures against noise irradiation and noise emission are particularly important with long connection cables. The maximum interference immunity classes are achieved only with careful and correct installation and wiring of all attached peripheral devices and weighing platforms.

It is absolutely necessary to connect the screening expertly and on both sides. The CE-conformity of the whole system rests in the responsibility of the person who takes it into operation.

- Push sealing sleeve (1), compression nut (2), washer (3), molded seal (4) and contact washer with large hole (5) over the cable jacket.
  Caution
  If wires of the braided shield become loose, they must not come into contact with electrically conducting system parts.
- Unravel the exposed shield.
- Push molded seal (4) and contact washer (5) up to the edge of the cable jacket and lay shield in place.
- Push contact washer with small hole (6) over the wire leads so that the shield is between the two contact washers.
- If the shield wires are longer than the diameter of the contact washers, shorten shield wires to the diameter of the contact washers.
- Insert molded seal with cable in the anti-rotation element of the metal housing (7).
- Screw compression nut onto metal housing, but do not tighten it yet.



Connecting cable

- Disconnect connector (6) from analog board.
- Connect the conductors of the weighing platform cable to the connector terminals as follows:

Pin	Assign-ment	Color with METTLER TOLEDO analog weighing platforms		
		multiple cell version	single cell version	
		D...-T, N...-T RWM SPIDER large	DB...T DCC...T	SPIDER small
1	+ EXC	grey	blue	green
2	+ SEN	yellow	green	blue
3	+ SIG	white	white	red
4	–	–	–	–
5	– SIG	brown	red	white
6	– SEN	green	grey	brown
7	– EXC	blue	black	black

Note
If the cable of the weighing platform to be attached has only 4 wires, the following two pairs of terminals must be connected by a jumper:

- Terminals 1 and 2 (+EXC and +SEN)
- Terminals 6 and 7 (–SEN and –EXC)

- Plug connector into analog board.
- Tighten heavy gauge cable gland.
- Attach sealing sleeve and secure with locking pin. The sealing sleeve must turn easily.

Closing terminal

- Plug cable of analog board into main board.
- Pull power cable outward and tighten heavy gauge cable gland.
- Insert main board in the guide and install with 2 screws.
- Plug both keypad cables into main board.
- Mount cover and tighten with 2 screws on the underside of the cover at the front.

2.3 Connecting weighing terminal to power supply

- Ensure that the line voltage matches the voltage value on the model plate of the weighing terminal.
- Unload weighing platform.
- Connect weighing terminal to the power supply.
- Switch on weighing terminal: press any key.

2.4 Labels on weighing terminal and sealing

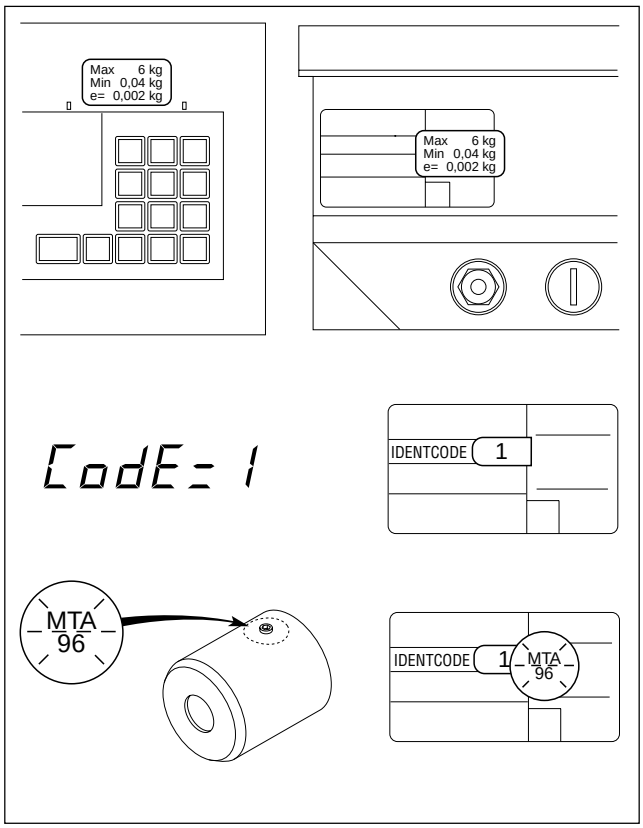
An identification code can be used with certified scales to check whether any alterations have been made to the weighing platform since the last certification. The identification code can be shown on the terminal at any time.

In the certification, the weighing terminal is provided with an identification code sticker which must match the identification code shown in the display. This identification code sticker is sealed with a verification mark. In addition, the weighing platform connection is sealed with a verification mark on the locking pin of the sealing sleeve.

Each time the configuration is changed, the displayed identification code increases and then no longer matches the affixed, sealed identification code; the certification is thus no longer valid.

Displaying identification code

- Press the [→0←] key until "CODE = ..." is displayed.
  With noncertified scales, no value is shown, but "CODE ===" appears.



Affixing configuration data plate

– On the cover.

– On the measurement data plate at the rear of the terminal.

Affixing identification code sticker

– On the measurement data plate at the rear of the terminal, with certified scales the affixed identification code must match the identification code shown by the terminal.

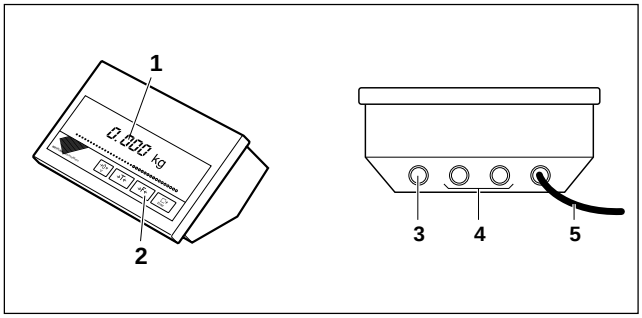
Affixing verification marks

– On the identification code.

– On the locking pin of the sealing sleeve.

3 Overview of instrument

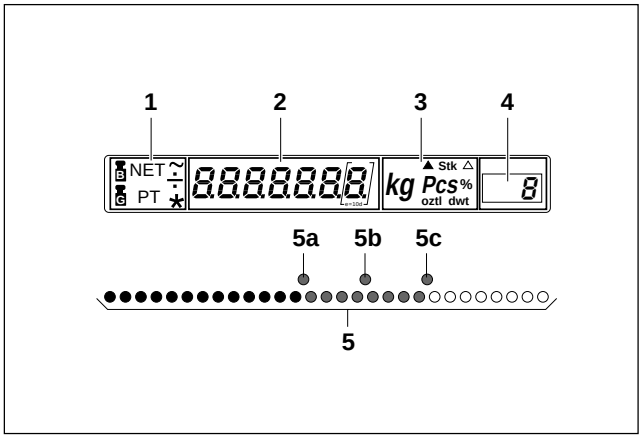
3.1 Layout of the weighing terminal



The weighing terminal comprises the following components:

1 Display unit
2 Keypad
3 Weighing platform connection
4 Cover for interface connections
5 Power cable

3.2 Display unit



The display unit comprises 5 display groups:

1 Field for display of the different weight statuses
2 7-place digital display
3 Field for display of the weight unit and special symbols
4 Field for display of the class
5 LED analog display for plus/minus weighing
5a/c Lower/upper tolerance marker
5b Target value marker

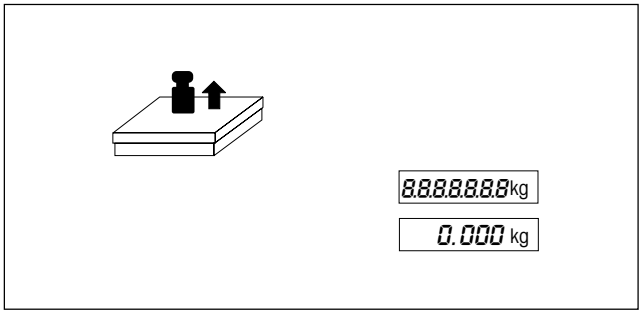
3.3 Keypad

Key	**Main function** Press key **briefly**	**Auxiliary function** Press key until **second** beep sounds	Press key until **third** beep sounds
Zeroing key/Test →0←	Manual zeroing of the scale	Display of the identification code Checking the calibration and the display unit	Switching off the terminal
Tare key/Tare-Recall	Taring of the scale NO key in the master mode	Display of the stored tare weight	On/off switching of automatic taring
Adjustment key →T←	In counting: Setting reference piece number In plus/minus weighing: Setting target/tolerance values		

Key	**Main function** Press key **briefly**	**Auxiliary function** Press key until **second** beep sounds	Press key until **third** beep sounds
Transfer key	Transfer of data to data interface YES key in the master mode		Selecting master mode
Entry key	Closing an entry		
Clear key Enter	Clearing total and item counter in formula weighing and totalization		
Function key →F←	Depending on assignment in the master mode:		
PLUSMIN	Enter target value and tolerances or limit 1 and limit 2 and start point of scale, or accept weighed values with an entry: cursor to right	Call up fixed target value memory	Assign value to fixed target memory
GROSS	Gross recall		
COUNT	Display of weight or piece number	Reference determination	Select reference piece number entry
FORMUL	Formula weighing	Display of weight, total or item counter	
TOTAL	Totalization	Display of weight, total or item counter	
UNIT	Unit switching	Selection of 2nd unit	Gross recall
DYNAMIC	Dynamic weighing		Set measurement time and data transfer
CONTROL	Weight display with normal or enhanced readability		

4 Operation

4.1 On/off switching of the scale



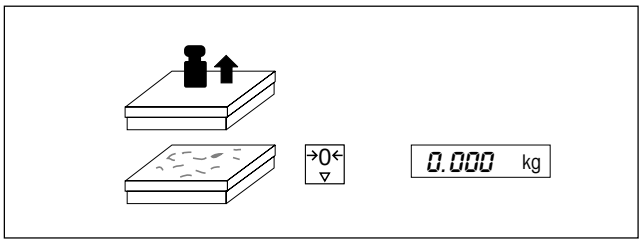
Switching on
- Unload weighing platform.
- Press any key and wait until "0.000 kg" appears in the display.

Switching off
Press and hold →0← until the display fades.

Automatic shutdown
The weighing terminal switches itself off automatically if no weighing has been performed for 10 minutes.
The automatic shutdown must be set to on in the master mode for this.

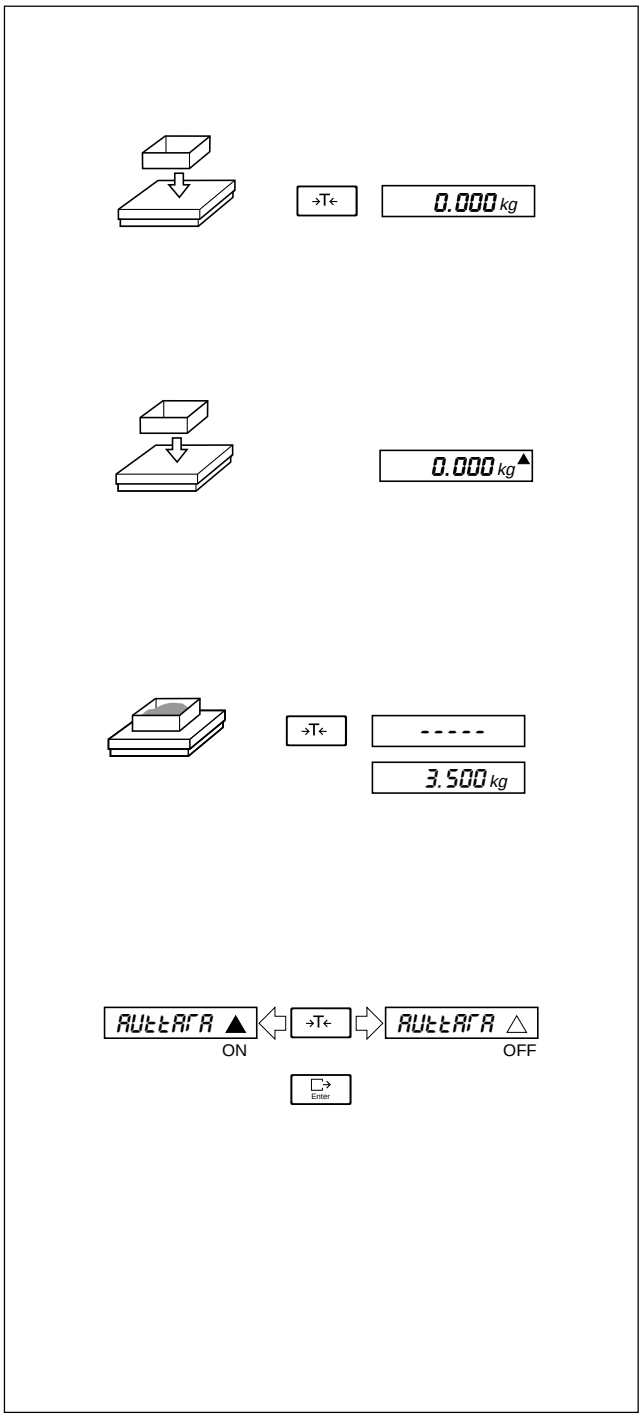
4.2 Zero setting

Zero setting is possible only within a certain range. If the range is exceeded owing to soiling, NO appears in the display. In such a case, clean the weighing platform or disconnect power plug and plug in again.



Zero setting
- Unload weighing platform.
- Press →0← key briefly.

4.3 Taring



Manual taring
- Load empty container.
- Press [→T←] key.

The weighing platform always stores just one tare value.

With the weighing platform unloaded, the stored tare value appears in the display with a negative sign.

Clearing the stored tare value
- Unload weighing platform and press [→T←] key.

Automatic taring
- Load empty container.
  Container is tared automatically.

If automatic taring has been set, this is indicated by the ▲ symbol. When the weighing platform is unloaded, the tare value is cleared.

Displaying the stored tare weight
- Press and hold [→T←] key until the display switches to "-----". Release key.
  The display shows the stored tare weight.
  After a few seconds, the display switches back to the normal weight display.

Switching automatic taring on/off
- Press and hold [→T←] key until AUTTARA appears in the display.
- Switch on/off with [→T←].
- Confirm with [Enter].

Meaning of the symbols

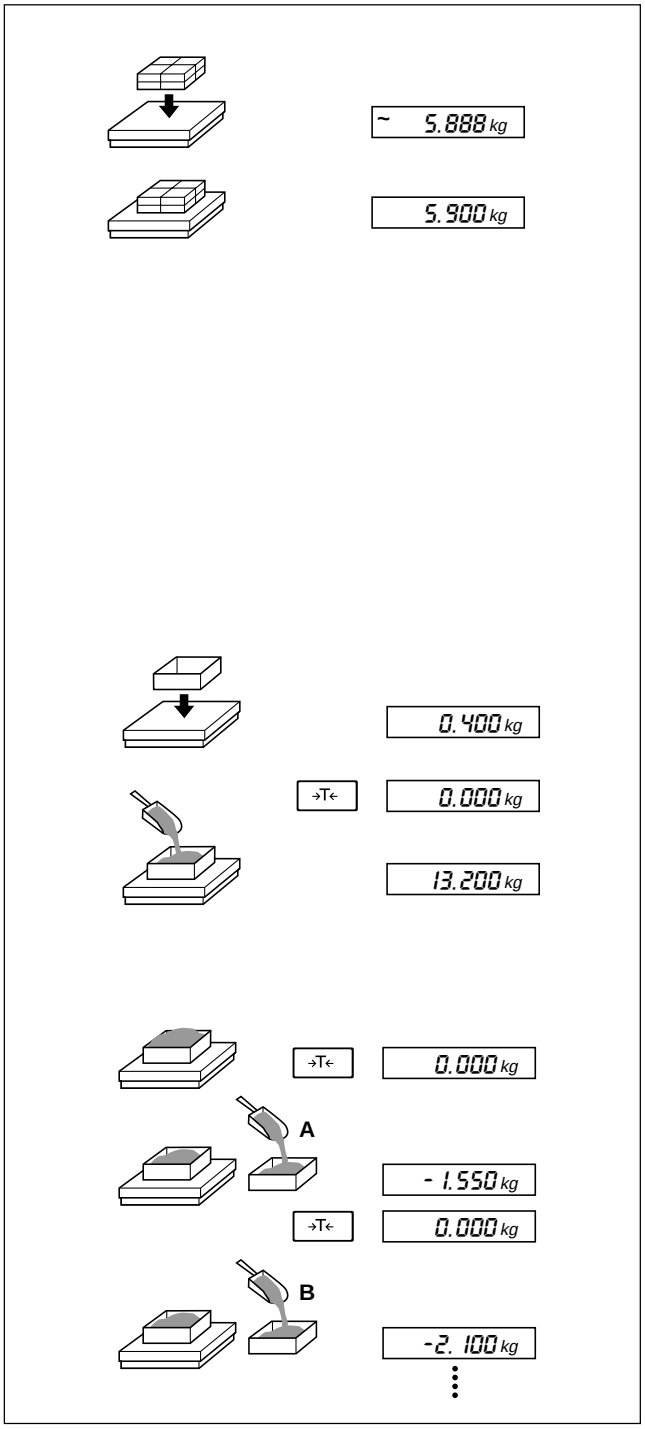
▲ automatic taring switched on

△ automatic taring switched off

Default setting: Automatic taring off.

When the weighing platform is unloaded, the tare value is cleared. If automatic taring is set, manual taring is no longer possible.

4.4 Weighing



Weighing
- Load weighing sample and wait for stability.
- Read off weight.

Meaning of the display symbols

~	Scale has not yet reached stability
NET	Net weight is displayed
–	Negative weight, e.g. in subtractive weighing

LED analog display

●●●●●●●●●●●●❍❍❍ Luminescent band or
❍❍❍❍❍❍❍❍❍❍❍●❍❍❍ luminescent dot

The row of light-emitting diodes is used as an analog overview scale. It indicates that part of the entire weighing range already in use.

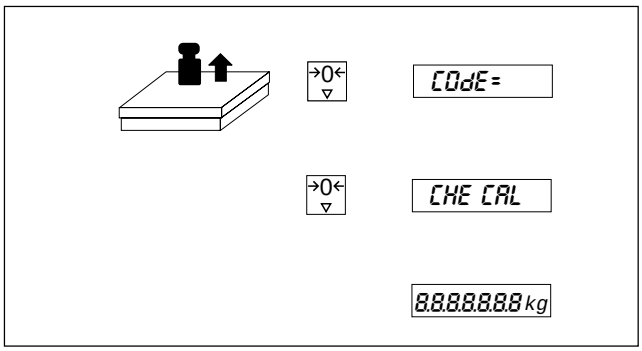
Weighing-in
- Load empty container.
- Tare.
- Add desired amount.

Subtractive weighing
- Tare full container.
- Remove desired amount.
- Tare.
- Remove a further quantity etc.

4.5 Testing the scale

Caution

▲ When testing the scale, avoid ambient conditions (vibrations, drafts) which could cause disturbance.
▲ In legal applications, the identification code shown in the display must match the code on the ident (identification) card.



- Unload weighing platform.
- Press →0← key until "CODE = " appears in the display.

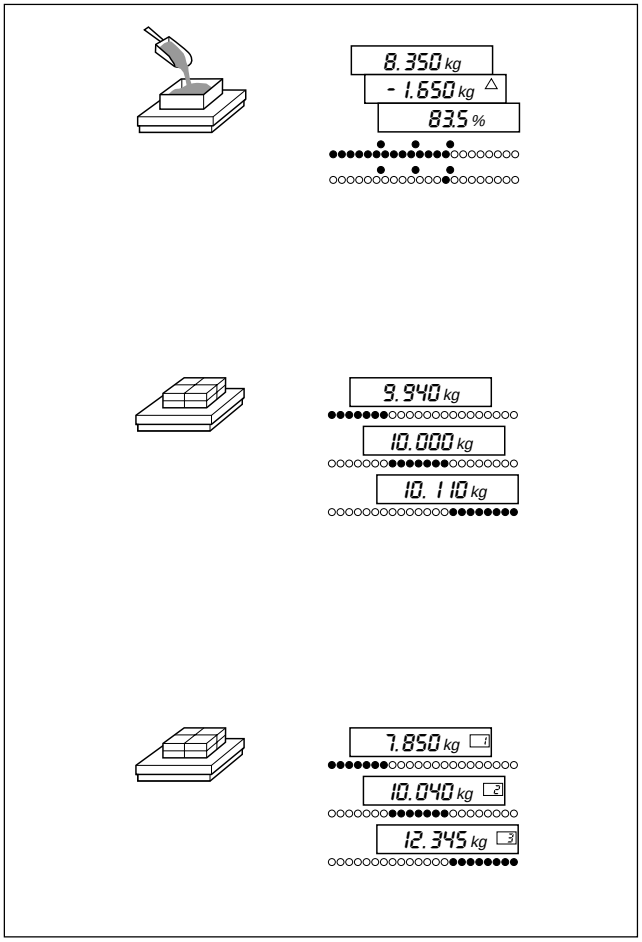
If a calibration error (CAL ERR) is shown during the internal test, repeat test. If the error message is again shown, contact customer service.

Internal test OK:
- All segments and light-emitting diodes light up briefly, the weighing platform then returns to the weighing mode.

5 Applications

5.1 Plus/minus weighing

In plus/minus weighing, three different applications can be selected in the master mode. Target values or class limit values in frequent use can be stored in the fixed value memories.



Weighing-in
Filling to a preset target weight.

Digital display shows
– actual weight,
– difference to target weight or
– actual weight in % of target weight.

LED analog display shows
– luminescent band or
– luminescent dot.

Checking
Testing whether the actual weight lies within preset tolerances of the target weight.

Digital display shows
– actual weight,
– difference to target weight or
– actual weight in % of target weight.

LED analog display shows
– too little, good, too much.

Classifying
Test objects are sorted into 3 weight classes.

Digital display shows
– actual weight with class No.

LED analog display shows
– class 1/class 2/class 3.

Accepting or entering values
All values can be taken over from a reference weight or entered by the numeric keypad.

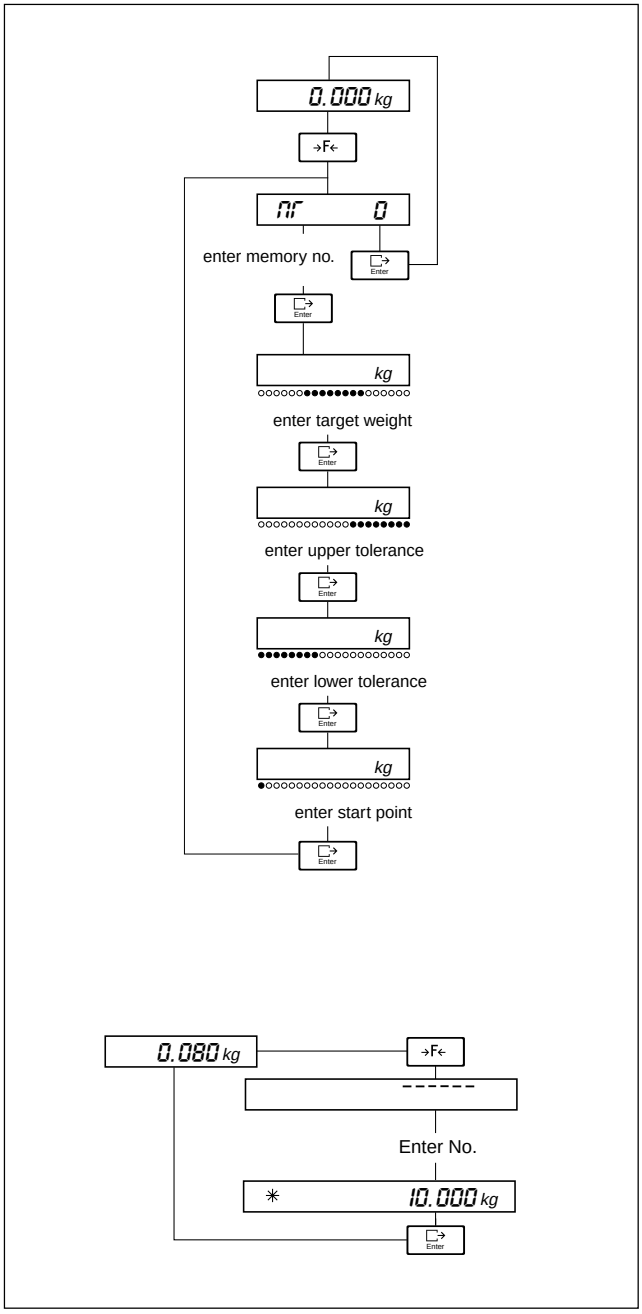
Accept weighed values of a reference weight: Use the function key to move the cursor to the extreme right until the weight unit flashes. Load weight.

5.1.1 Loading and recalling fixed value memories

There are 25 fixed value memories which can be employed for values in frequent use: for target values in weighing-in and checking, for class limit values in classifying.

Note

Switching to a different application clears the fixed value memories.



Loading fixed value memories

- Press function key until NR is displayed.

Entry for each fixed value memory (confirm entry each time with the enter key):

– Memory No. (1...25). If the memory is already occupied, the target weight is displayed with the symbol ✳. Activate the enter key for loading the fixed value memory or return to the number entry with the tare key.

– Target weight in weighing-in and checking.
Limit 1 in classifying.

– Upper tolerance in weighing-in and checking.
Limit 2 in classifying.

– Lower tolerance in weighing-in and checking.

– Start point in weighing-in.
In checking and classifying, the value entered in the master mode as zero limit will be used.

Entering values

→0← Move cursor one place to the left.

→F← Move cursor one place to the right.

→T← Increment number by 1.

Press and hold: Abort entry.

Recalling fixed value memories

Only occupied fixed value memories can be recalled, if the memories are not occupied NO is displayed.

- Press and hold the function key until the 2nd beep. The display switches to "- - - - -".
- Enter number of the fixed value memory.
The target value is displayed with the symbol ✳.
- Activate fixed value memory with the enter key or return to the number entry.

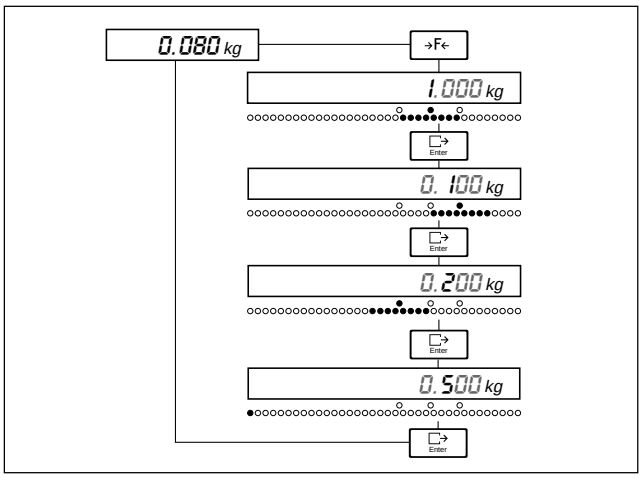
5.1.2 Plus/minus weighing: Weighing-in

"Weighing-in" is suitable for filling to a preset target weight. For this, the function key must be assigned in the master mode to the WEIGHIN application under PLUSMIN.

Entering target/tolerance values

Notes

– Tolerances must be entered as a difference to the target value.
  Example: Target value = 10.000 kg, tol (+) = 0.100 kg, tol (–) = 0.050 kg.
– For tolerances taken over from a reference weight, the difference to the target value is calculated internally.
  Example: Target value = 10.000 kg, tol (+) = 10.100 kg, tol (–) = 9.050 kg.
– The following must always hold for the target value, the upper and lower tolerance (tol (+) and tol (–)) and the scale start value: target value < maximum load, target value + tol (+) ≤ maximum load, tol(–) < target value and scale start value < tol (–).



- Press the function key.
- When the target value marker flashes, enter target value or accept weighed value, confirm with the enter key.
- When the upper tolerance marker flashes, enter upper tolerance or accept weighed value, confirm with the enter key.
- Enter lower tolerance in an analogous manner.
- When the first red LED flashes, enter start value of the LED analog display or accept weighed value, confirm with the enter key.

Weighing-in

Depending on the selected setting, the digital display shows the actual weight, the difference to the target weight or the actual weight in % of the target weight.

- For weighing-in, add weighing sample.

  Meaning of the LED analog display:

red LEDs	weight larger than start value, but below the tolerance
all green LEDs	weight within tolerance
2 green LEDs	target weight reached exactly
yellow LEDs	weight above tolerance

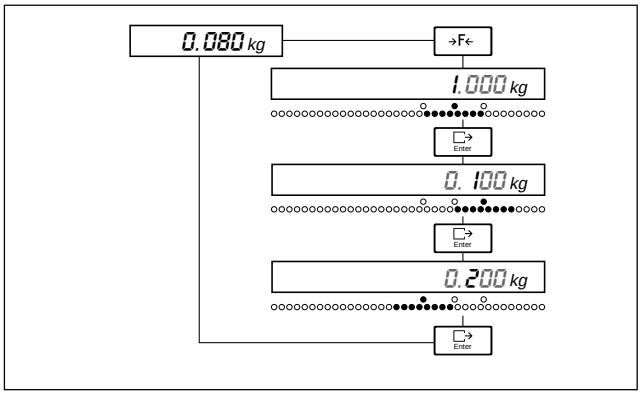
  The 3 additional LEDs mark the lower tolerance, target value and upper tolerance.

5.1.3 Plus/minus weighing: Checking

"Checking" is suitable for testing whether the actual weight lies within preset tolerances. For this, the function key must be assigned in the master mode to the CHECK application under PLUSMIN.

Entering target/tolerance values

Notes
- Tolerances must be entered as a difference to the target value (example, see section 5.1.2).
- The following must always hold for the inputted values: target value < maximum load, target value + tol (+) ≤ maximum load, tol (–) < target value and zero limit < tol (–).
- Weighed tolerances are taken over as absolute values, the tolerance as a difference is calculated internally (example, see section 5.1.2).



- Press the function key.
- When the target value marker flashes, enter target value or accept weighed value, confirm with the enter key.
- When the upper tolerance marker flashes, enter upper tolerance or accept weighed value, confirm with the enter key.
- Enter lower tolerance in an analogous manner.

Checking
Depending on the selected setting, the digital display shows the actual weight, the difference to the target weight or the actual weight in % of the target weight.

- For checking, add weighing sample.

  Meaning of the LED analog display:

red LEDs	weight larger than start value, but below the tolerance
all green LEDs	weight within tolerance
2 green LEDs	target weight reached exactly
yellow LEDs	weight above tolerance

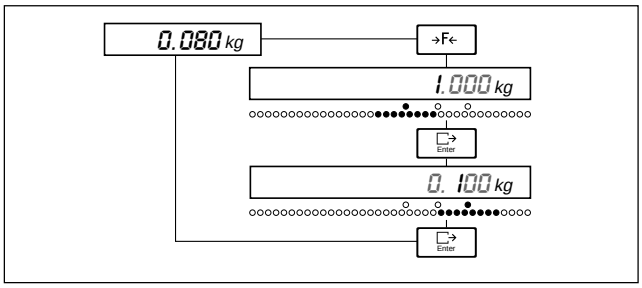
5.1.4 Plus/minus weighing: Classifying

"Classifying" is suitable for sorting the weighing sample into 3 weight classes. For this, the function key must be assigned in the master mode to the CLASS application under PLUSMIN.

The 3 weight classes are defined by the values zero limit, limit 1 and limit 2:
- Class 1: zero limit ≤ weight < limit 1
- Class 2: limit 1 ≤ weight < limit 2
- Class 3: limit 2 ≤ weight

Setting classes

Note
The following must hold for the inputted values: Zero limit < limit 1 < limit 2 < maximum load.



- Press the function key.
- When the lower tolerance marker flashes, enter limit 1 or accept weighed value, confirm with the enter key.
- Enter limit 2 at upper tolerance marker in an analogous manner.

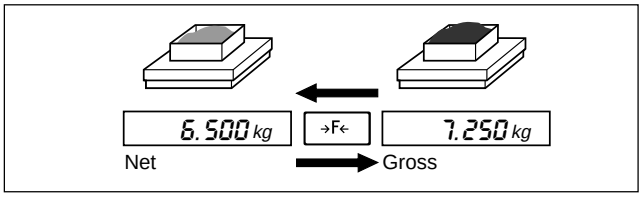
Classifying
The digital display shows actual weight and class.

- Add weighing sample for classifying.

  Meaning of the LED analog display:
  red LEDs Class 1
  green LEDs Class 2
  yellow LEDs Class 3

5.2 Gross recall

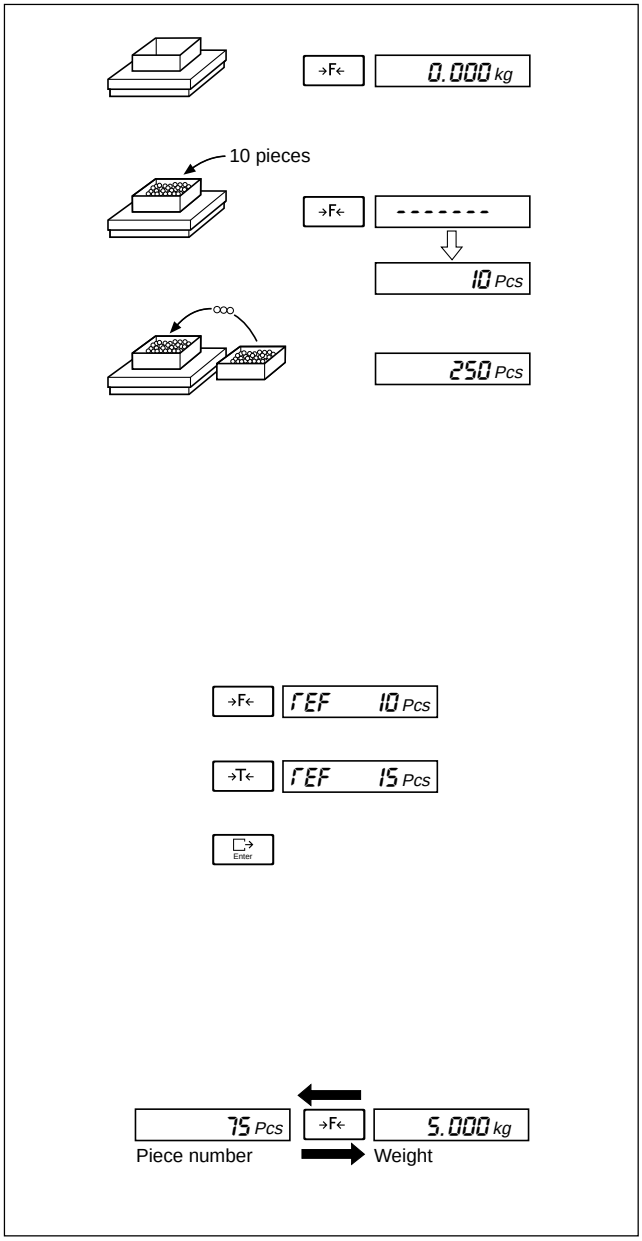
Requirements
- Function key has been assigned to GROSS in the master mode,
- a tare value is stored.



- Press and hold the function key.
  The gross weight is displayed. On release of the key, the net weight appears again.

5.3 Counting

Requirement
The function key has been assigned to COUNT in the master mode.



Counting-in (counting-out) with standard reference piece number (10 pieces)

- Tare empty (full) container.
- Add (remove) reference parts: Add (remove) 10 parts.
- Press the function key until the second beep.
- Add (remove) desired number.
  In counting-out, the piece number is shown with a negative sign.

If ADD appears in the display after the function key has been pressed:
Either

- for improved weighing accuracy, increase reference parts by the displayed number and press the function key again.

Or

- press the function key again directly.

Setting reference piece number
1-100 pieces can be set as a reference piece number (default setting is 10 pieces).

- Press and hold the [→F←] key until REF appears in the display.
- Set desired reference piece number by repeated pressing of the [→T←] key.
  Possible settings:
  1/2/3/4/5/10/12/15/20/25/30/40/50/100

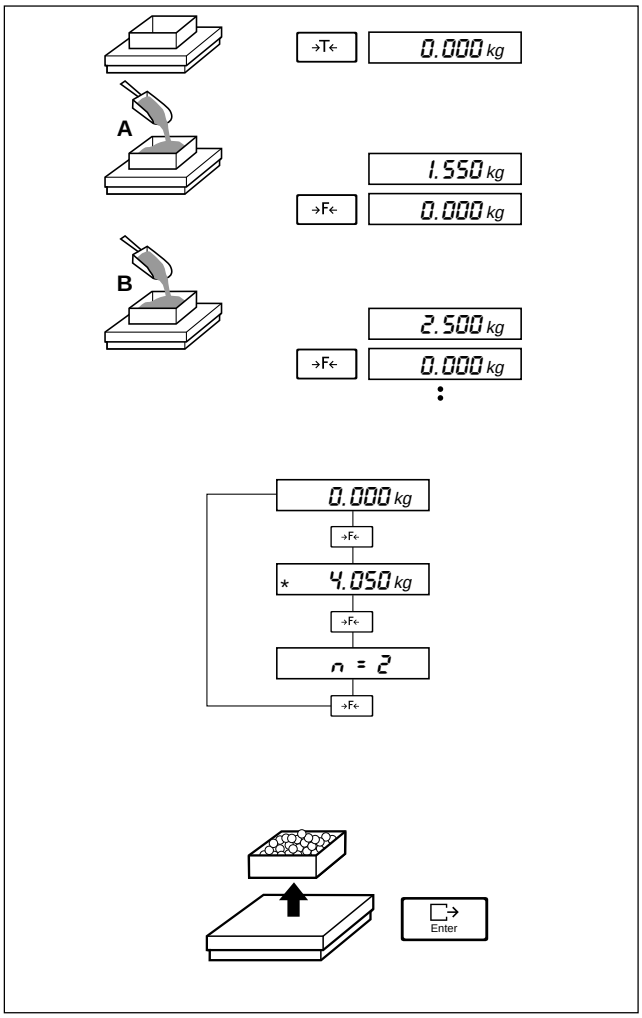
Store reference piece number:

- Press [Enter] key.

Switching piece number/weight
Press [→F←] key briefly.

5.4 Formula weighing

Requirement
The function key must be assigned to FORMUL in the master mode.



Formula weighing
- Tare empty container.
- Add first component.
- Press the function key briefly.
  The weight is stored. If the component weight is too low, NO appears in the display.
- Add second component, press the function key briefly, etc.

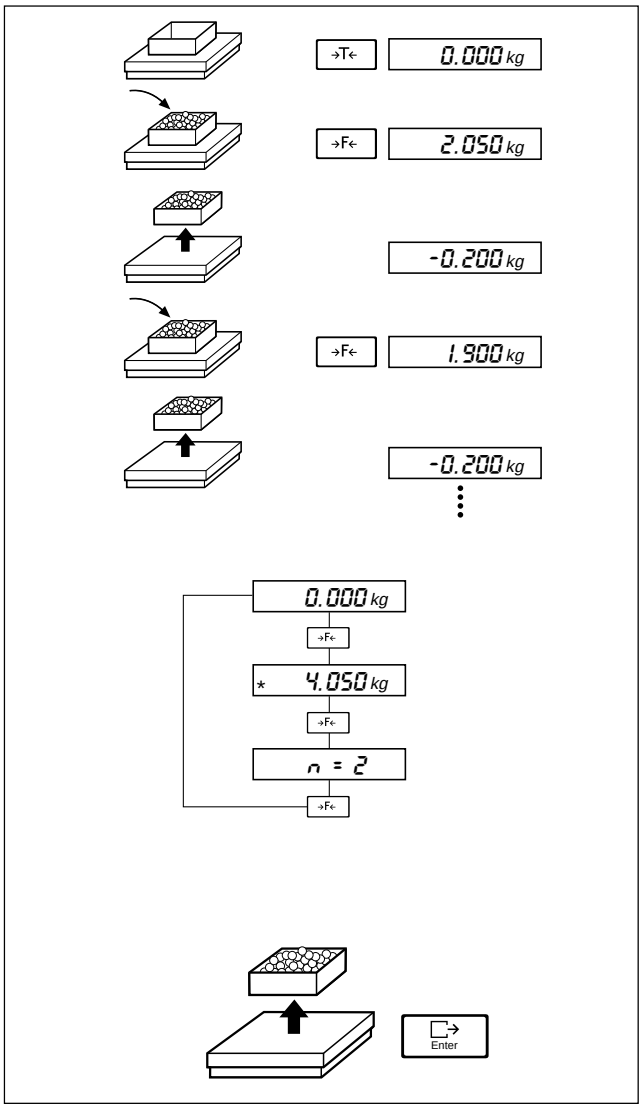
Displaying total weight and number
The function key can be used to switch the display between:
– the normal display
– the display of the total weight
  (preceded by: "✳")
– the display of the number
  (preceded by: "n = "; max. "n = 9999")

- Press and hold the function key until the 2nd beep. Repeat until the desired display appears.

Aborting formula weighing
= clearing total weight and number
- Unload weighing platform.
- Press [□→] key.

5.5 Totalization

Requirement
The function key must be assigned to TOTAL in the master mode.



Totalization
- Tare container.
  Before every weighing with a container having a different tare weight, retare.
- Load first item and press the function key briefly.
- Unload weighing platform.
- Load second item and press the function key briefly, etc.
  If an attempt is made to total the same item again, NO appears in the display.

Displaying total weight and number
The function key can be used to switch the display between:
– the normal display
– the display of the total weight
  (preceded by: "*")
– the display of the number
  (preceded by: "n = "; max. "n = 9999")

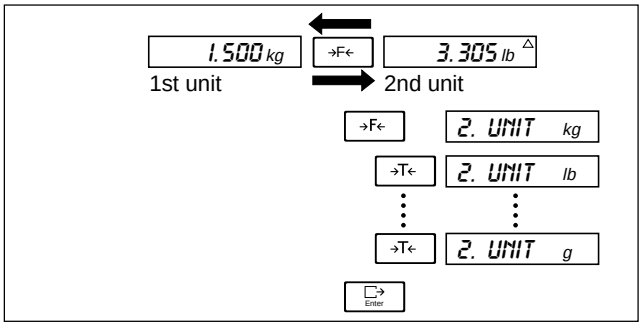
- Press and hold the function key until the 2nd beep. Repeat until the desired display appears.

Aborting totalization
= clearing total weight and number
- Unload weighing platform.
- Press [→] key.

5.6 Unit switching

When the scale is switched on, the 1st weight unit always appears.
Weight values in the 2nd unit are shown with the symbol Δ.
Possible units are kg, g, lb, oz, ozt, dwt.

Requirements
- The function key is assigned to UNIT in the master mode.
- Several weight units may be admissible, depending on the certification regulations of your country.



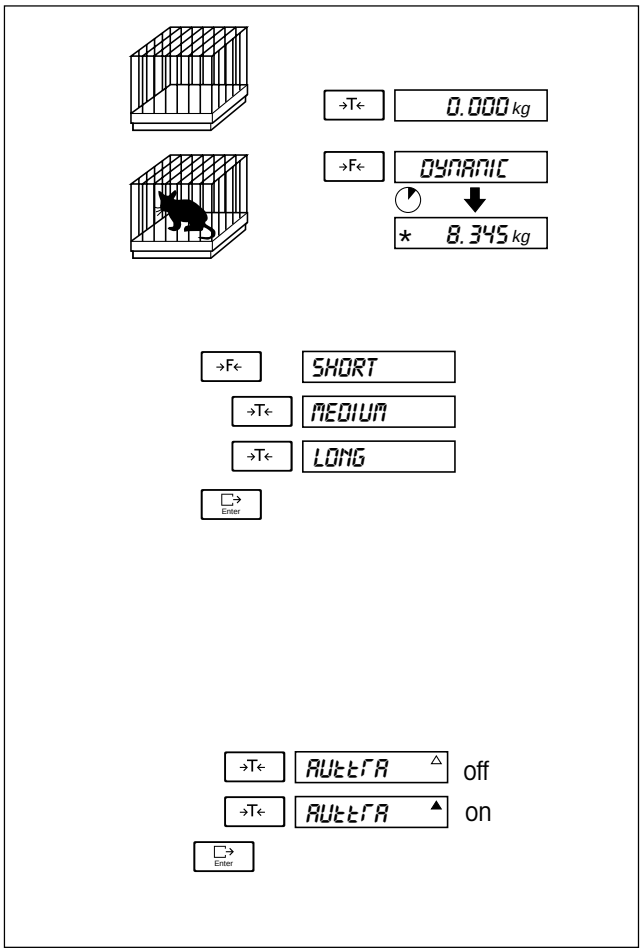
Switching unit
- Press the function key briefly.

Selecting the 2nd unit
- Press and hold the function key until the 2nd beep. The display switches to "2. UNIT".
- Press the tare key repeatedly until the display shows the desired second unit and confirm with the enter key.

5.7 Dynamic weighing

In dynamic weighing, the weight is displayed with the flashing symbol ✳; the display remains unchanged until a key is pressed.

Requirement
The function key is assigned to DYNAMIC in the master mode.



Dynamic weighing
- Tare empty container.
- Place unstable weighing sample in container and press [→F←] key briefly.
- Read off weight after elapse of measurement time.

Setting measurement time
The measurement time for calculation of an average weight value can be set to short, medium or long.
- Press and hold [→F←] key until the set measurement time appears in the display.
- Set desired measurement time by repeated pressing of the [→T←] key.
- Store measurement time: Press [□→] key.

Setting data transfer
With an attached serial interface, the [→T←] key can be used to select whether an automatic data transfer via the interface should follow the weighing.
- Press and hold [→T←] key until AUTTRA appears in the display.
- Change setting: Press [→T←] key briefly.
- Store selection: Press [□→] key.

5.8 Display with enhanced readability

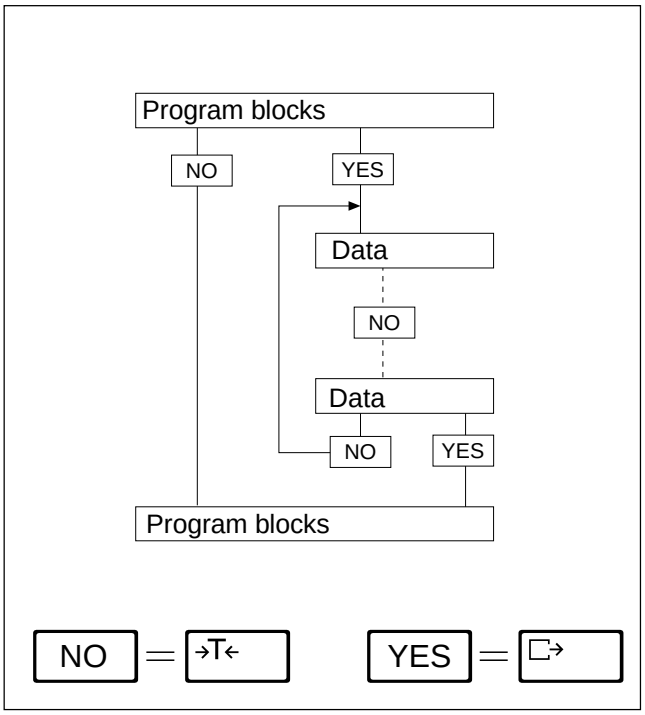
The weight display can be switched to enhanced readability with the function key.

Requirement
The function key must be assigned to CONTROL in the master mode.

Note
With enhanced readability, no weight unit is displayed.

6 Master mode

6.1 General information



The scale is provided with a general purpose configuration in the factory, i.e. the selected parameters are those most frequently used (default configuration).

If the default configuration does not suit your requirements, you have the possibility to match the scale to your individual application conditions and end uses.

Parameters are modified in the master mode, a master program in which you are offered a selection of different sets of data.

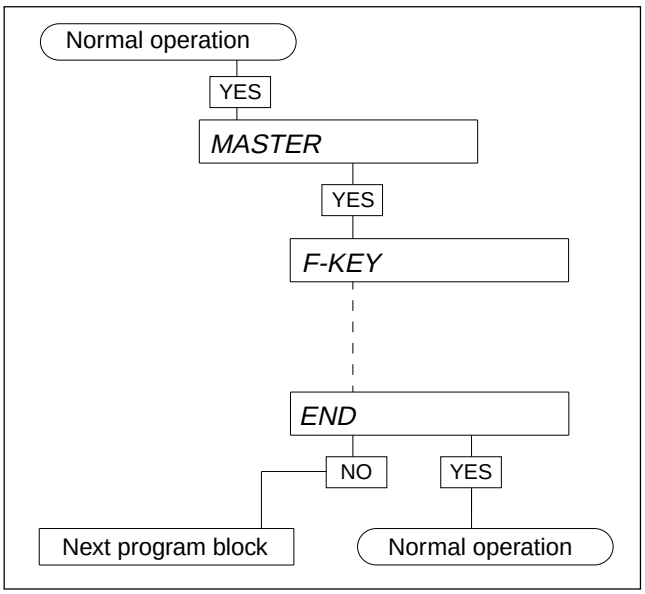
The master mode is divided into successive program blocks with each block allowing the change of one or more parameters.

Regard the program blocks of data shown in the display quite simply as options which you respond to with YES or NO.

Use the keys shown opposite for your replies; they are allocated the meaning YES and NO in the master mode.

With NO you skip the proffered blocks or data. At the end of a data series, you return to the first value displayed.

With YES you select the data shown or enter the displayed program blocks.



Entering the master mode

Press and hold the ⊏→ key until MASTER appears in the display.

Press the ⊏→ key again:
The first program block F-KEY appears in the display.

Exiting the master mode

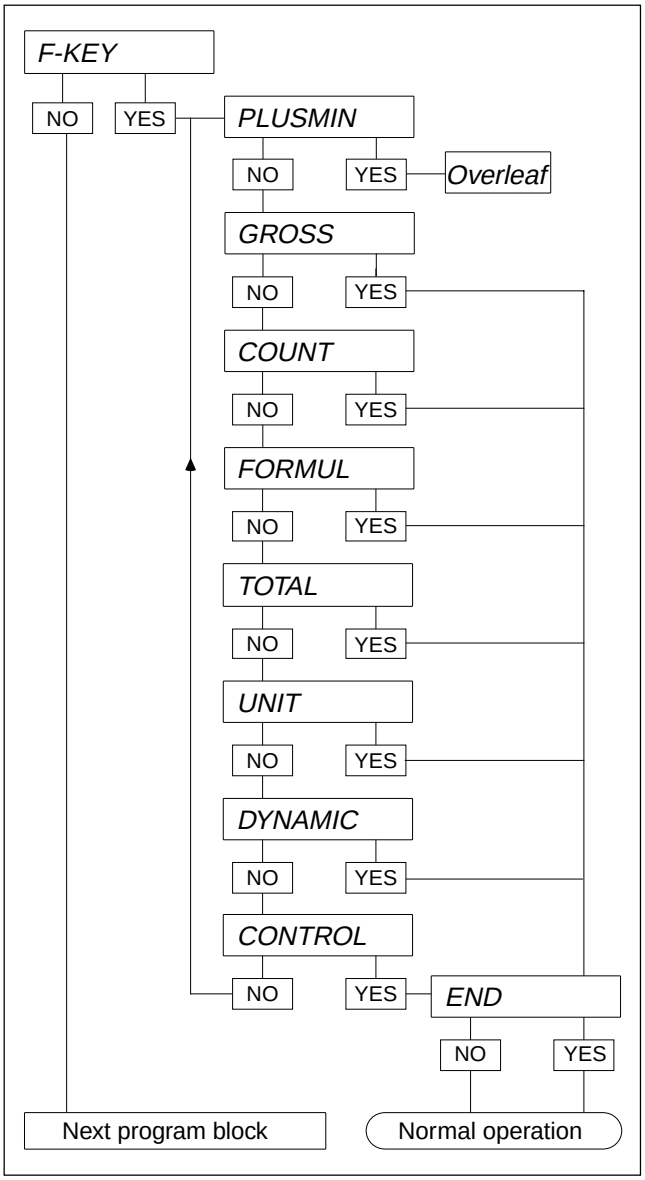
It is always possible to quit the master mode with YES when END appears in the display.
This is the case:

- after skipping the last program block;
- after selection of a value within a program block.

6.2 Overview of the master mode blocks

F-KEY	Assignment of the function key (6.2.1) The function key can be assigned one of the following functions: Plus/minus weighing, gross recall, piece counting, formula weighing, totalization, unit switching, dynamic weighing and control mode.
LED	Selecting type of analog display (6.2.2)
LANGUAG	Selecting the dialog language (6.2.3)
PRINTER	Configuring the printer (6.2.4 and operating instructions of the printer) This block appears only if a serial interface is fitted.
I-FACE	Configuring the interfaces (see interface description) This block appears only if a serial interface is fitted.
RESET	Resetting to default setting (6.2.5)
PROCESS	Matching the scale to the weighing sample (6.2.6)
VIBRAT	Matching the scale to the local conditions (6.2.7)
STABLE	Matching the stability detector (6.2.8)
UPDATE	Selecting the display speed (6.2.9)
AUTZERO	On/off switching of the autozero function (6.2.10)
RESTART	On/off switching of the restart function (6.2.11)
PWROFF	On/off switching of the automatic shutdown (6.2.12)
INFO	Display of the program number (6.2.13)
CONTROL	Testing the scale (6.2.14)
END	Exiting the master mode (6.2.15)

6.2.1 F-KEY – Assignment of the function key



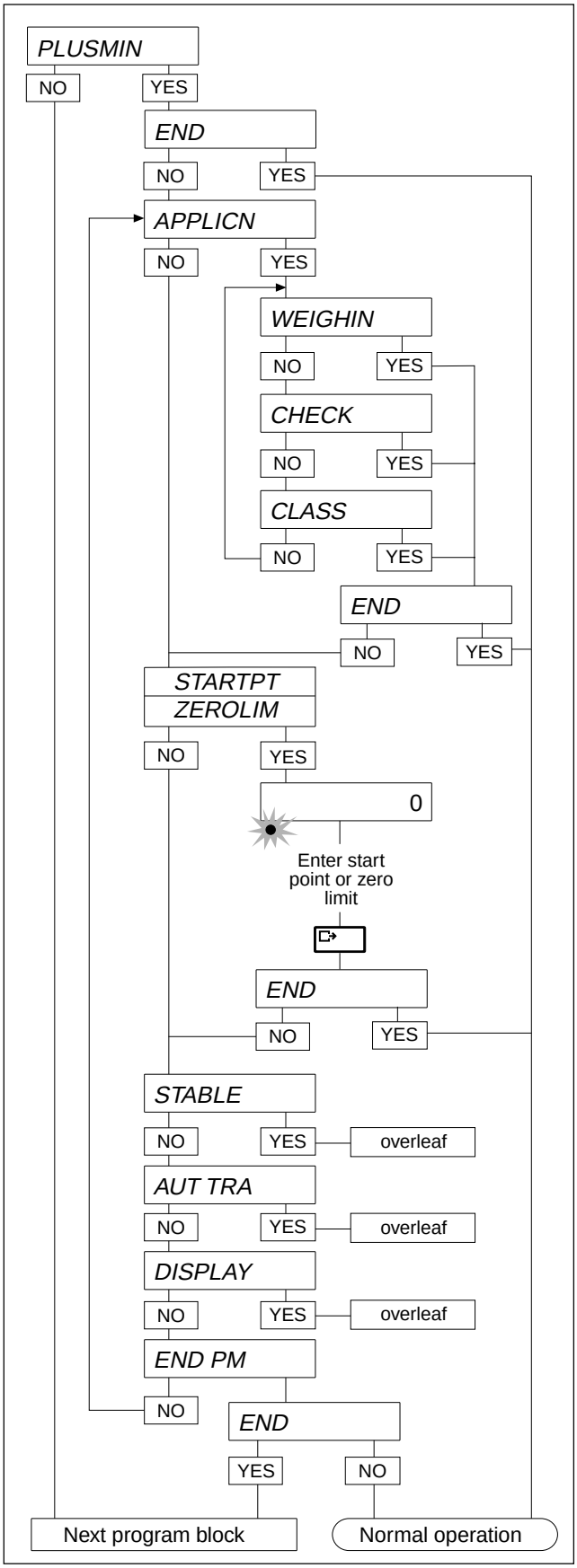
In this program block you can assign one of the following functions to the [→F←] key:

PLUSMIN	Plus/minus weighing
GROSS	Gross recall
COUNT	Piece counting
FORMUL	Formula weighing
TOTAL	Totalization
UNIT	Unit switching (with noncertified scales only)
DYNAMIC	Dynamic weighing
CONTROL	Display with higher resolution

You can activate the functions gross recall, piece counting, formula weighing, totalization, unit switching or control mode with YES.

Setting options for the "plus/minus weighing" function, see next page.

NO = [→T←] YES = [⊏→]



PLUSMIN – Plus/minus weighing

The following setting options are available with plus/minus weighing:

APPLICN – Selection of the application

Note

When the application is switched, the fixed value memories are automatically cleared!

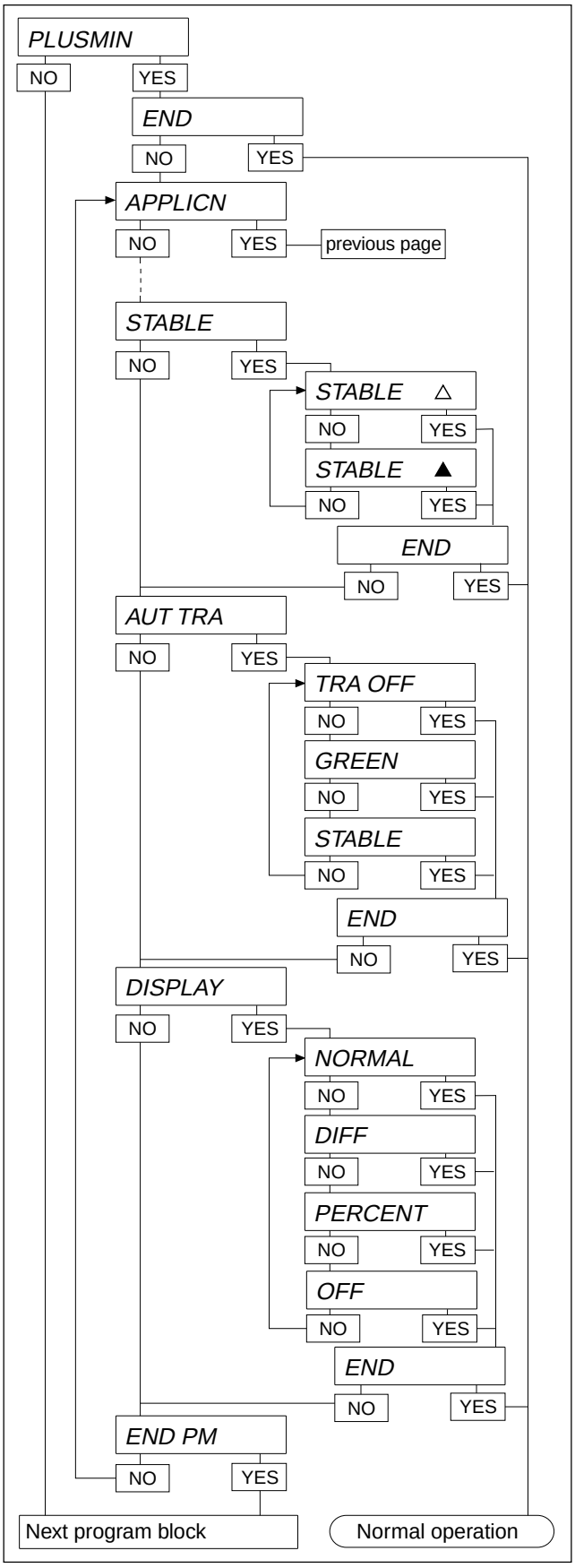
WEIGHIN	Weighing in to a target weight.
CHECK	Checking whether the test specimen lies within the tolerance.
CLASS	Classification of the test specimens into weight classes.

STARTPT	Start point of the LED display in weighing-in. Entry in % of the lower tolerance limit.
ZEROLIM	Minimum weight in checking and classifying. The LED does not become active until the weight is equal to or greater than the zero limit.

Entering start point or zero limit:

→0←	Cursor one place to left.
→F←	Cursor one place to right.
→T←	Increment number by 1.

The lower LED flashes during the entry.



STABLE – Stability-dependent LED display

In the checking and classifying applications this is used to select whether the LED analog display should be on permanently or only when the scale is stable.

STABLE △	LED display permanently on
STABLE ▲	LED display only on stability

AUT TRA – Automatic transfer

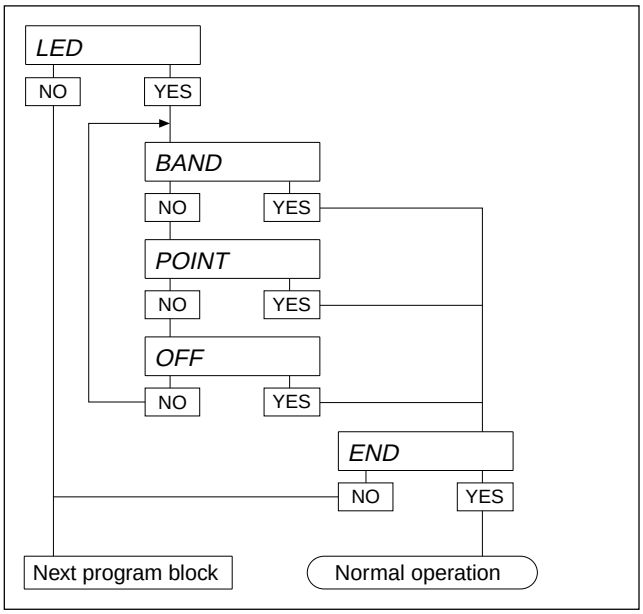
If a serial data interface is installed, an automatic transfer of weight values can be switched on in the checking and classifying applications.

TRA OFF	Switches off the automatic transfer of weight values in plus/minus weighing.
GREEN	Stable weight values that lie within the plus/minus tolerance are sent.
STABLE	Every stable weight value is sent.

DISPLAY – Digital display

NORMAL	Normal weight display.
DIFF	Display of the difference between target and actual value. The display shows the symbol △. This option does not appear in classifying.
PERCENT	Display of the weight value in percent of the target value. This option does not appear in classifying.
OFF	Digital display switched off, weight status display and LED analog display are active.

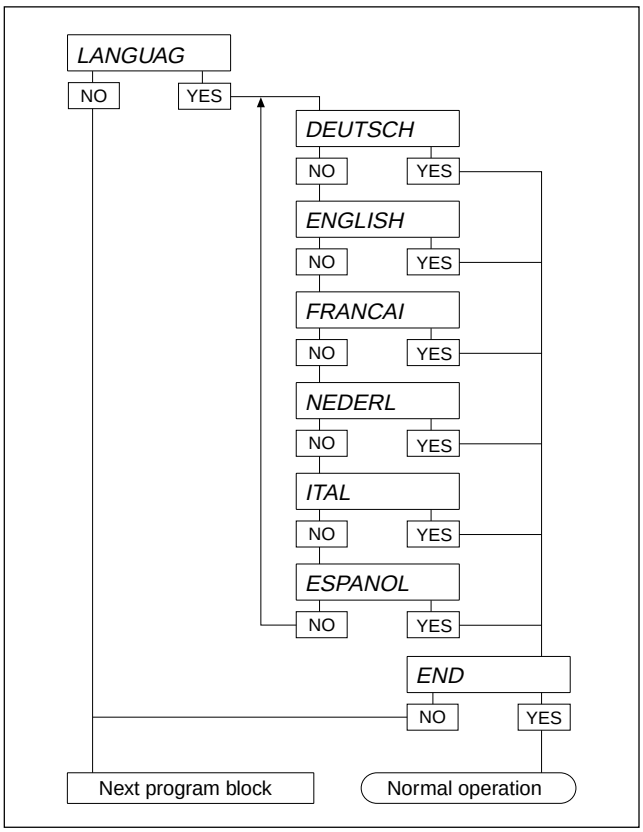
6.2.2 LED – Selecting the type of analog display



The selection applies to all operating modes except checking and classifying.

BAND	LED analog display in the form of an illuminated band.
POINT	LED analog display in the form of an illuminated point.
OFF	LED analog display switched off.

6.2.3 LANGUAG – Selecting the dialog language

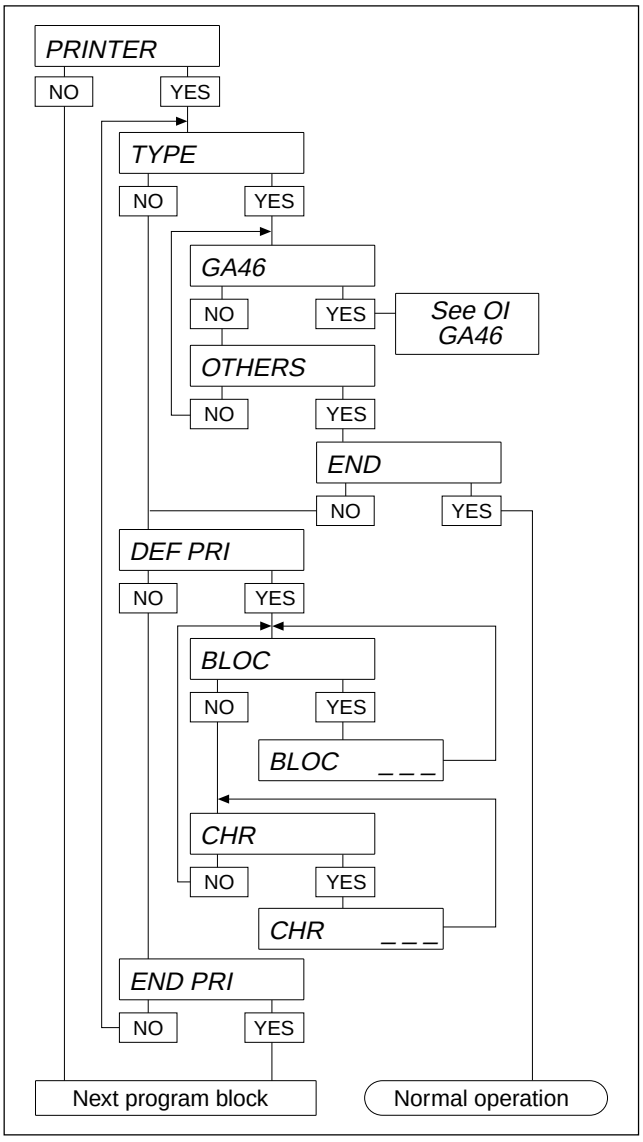


You can select the following dialog languages in the program block LANGUAG:

DEUTSCH	German
ENGLISH	English
FRANCAI	French
NEDERL	Dutch
ITAL	Italian
ESPANOL	Spanish

NO = →T← YES = ⇨

6.2.4 PRINTER – Configuring the printer



This block appears only if a serial interface is installed.
In the program block you select the printer and configure the printout.

TYPE – Selection of the printer

GA46 With this selection the correct transmission parameters for the GA46/GA46-W printer are set automatically.
If need be the contrast and resistance value must be set, see operating instructions of GA46/GA46-W.

OTHERS Setting for printers other than GA46/GA46-W. With this setting the transmission parameters must be set in the INTERFACE block.

DEF PRINT – Configuring the printout

BLOC Entry of the number of the application block to be printed out.

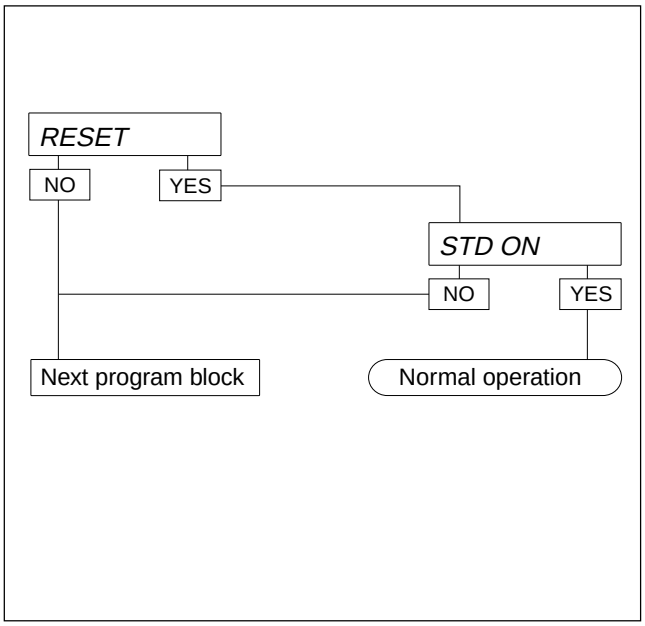
CHR Entry of the code of the characters to be printed out, see printer description.

Closing configuration

Enter BLOCK No. "00" and confirm with [□→] to move to the program block "END PRI".

NO = [→T←] YES = [□→]

6.2.5 RESET – Resetting to default setting

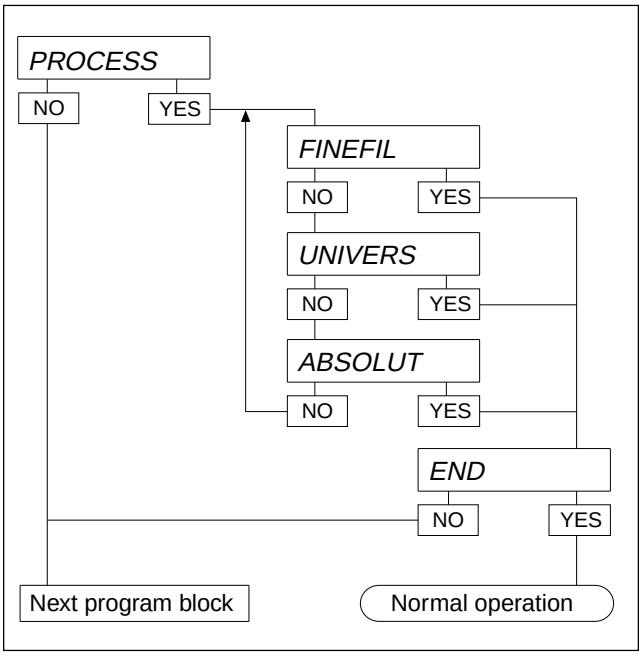


The program block RESET allows you to reset any parameters changed in the master mode to the default or standard factory settings at a keystroke.
For the default settings, acknowledge STD ON with YES.

Default setting

F-KEY	plus/minus weighing, application weighing-in, start point 50 %, automatic transfer off, display normal
LED	luminescent band
I-FACE	see interface description
PROCESS	universal
VIBRAT	normal
STABLE	2
AUTZERO	on
RESTART	off
PWROFF	off

6.2.6 PROCESS – Matching the scale to the weighing sample



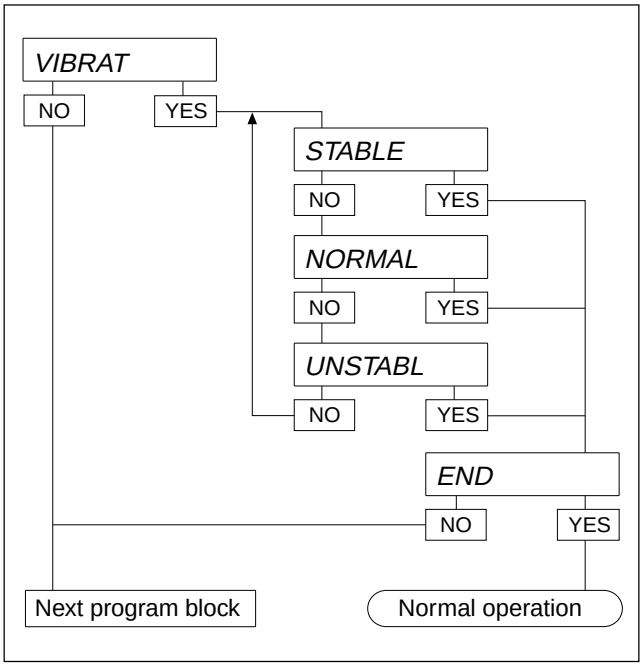
In this program block you can match the display of the weighing terminal to the weighing sample.

Setting options

FINEFIL	liquid or powdery weighing sample
UNIVERS	normal weighing sample
ABSOLUT	solids

NO = →T← YES = ⊏→

6.2.7 VIBRAT – Matching the scale to the surroundings

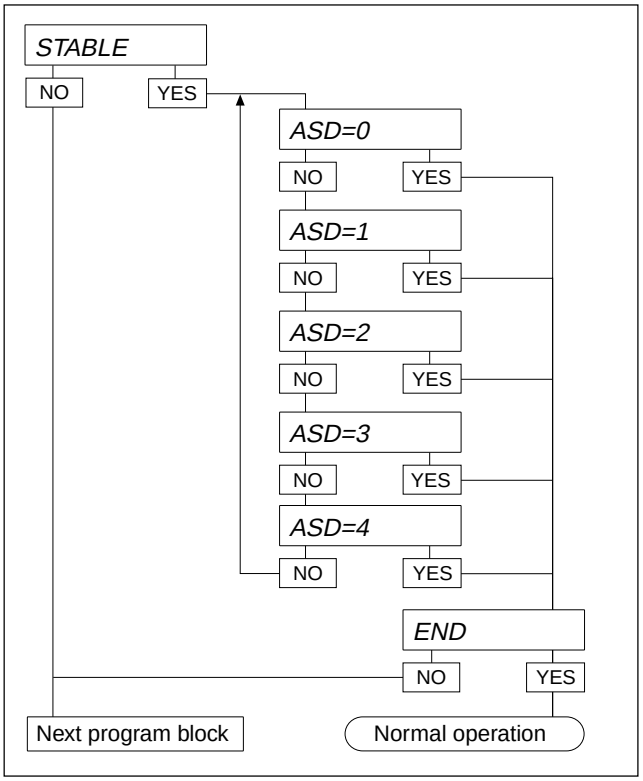


Depending on its location, the scale can be subjected to a lesser or greater extent to vibrations which are impossible to prevent. If this is the case, the program block VIBRAT offers the possibility to match the scale to the local vibrations.

Setting options

STABLE	Weighing station free from vibrations and stable. The scale operates very rapidly, but is relatively sensitive to external disturbances (e.g. building oscillations, vibrations).
NORMAL	Default setting for normal workstations.
UNSTABL	Building oscillations and vibrations exist. The scale operates more slowly, but is less sensitive.

6.2.8 STABLE – Matching the stability detector



In this block you can match the automatic stability detector to meet your individual requirements. The settings change the time taken by the weighing platform to recognize stability.

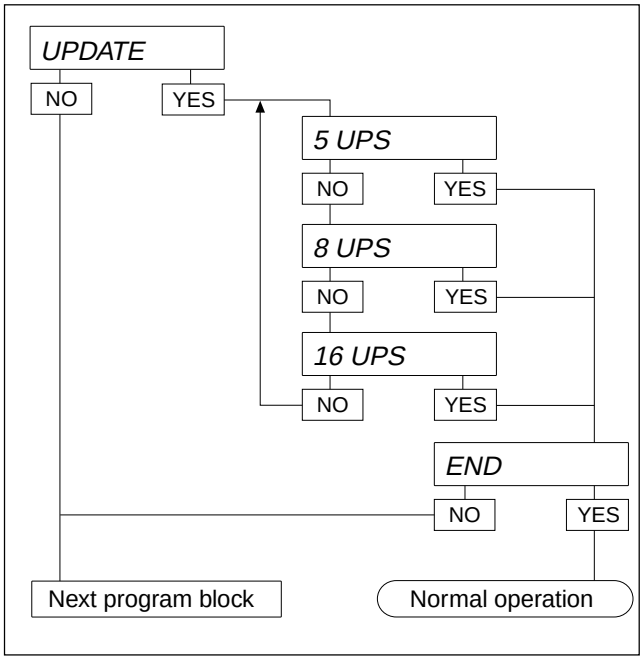
Setting	Weighing speed	Reproducibility
ASD = 0	Stability detector switched off	
ASD = 1	rapid	good
ASD = 2 (default)	▲	▼
ASD = 3	▲	▼
ASD = 4	slow	very good

Note

ASD = 0 is selectable only with noncertified scales.

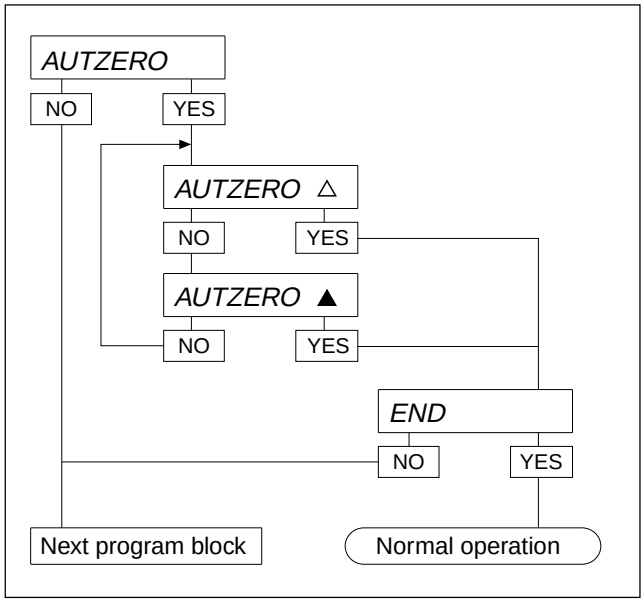
NO = →T← YES = ⇨

6.2.9 UPDATE – Selecting the display speed



The display update speed can be set stepwise in terms of the number of measured values per second (updates per second, UPS).
The greater the number of UPSs selected, the higher the display update speed.

6.2.10 AUTZERO – On/off switching of the autozero function



When the weighing platform is unloaded, the autozero function automatically compensates the weight of small amounts of dust or other contaminants. This block offers the possibility to switch the autozero correction on or off to suit your requirements.

Note

With certified scales, the autozero function is always switched on.

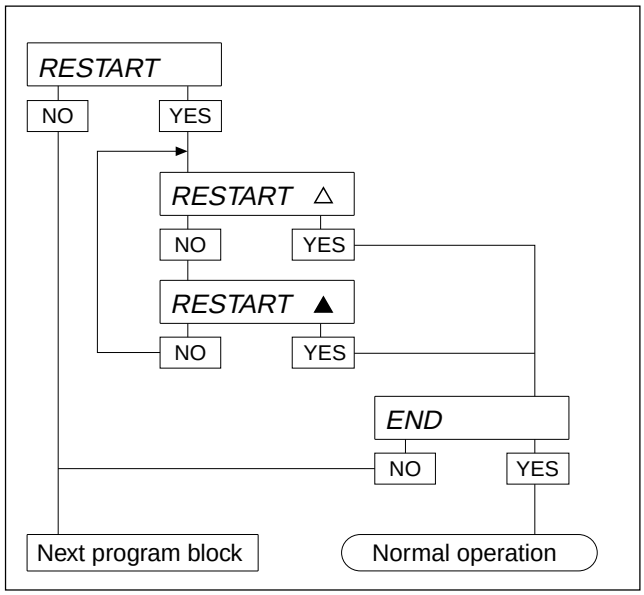
Meaning of the symbols

▲ AUTZERO on

△ AUTZERO off

NO = →T← YES = ⊏→

6.2.11 RESTART – On/off switching of the restart function



If the restart function has been activated, the zero point and tare value remain stored when the terminal is switched off. On switching on, in this case the scale shows the current weight and not zero.

The restart function is set to off in the factory.

The restart function can be activated only with a noncertified configuration. This program block is thus missing for certified scales.

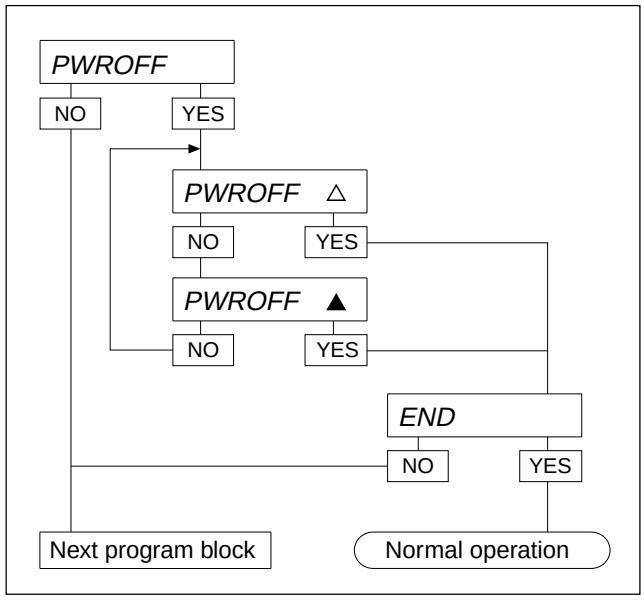
With weighing platforms of the T and M series, the RESTART block is missing.

Meaning of the symbols

△ RESTART off

▲ RESTART on

6.2.12 PWROFF – On/off switching of the automatic shutdown



If the automatic shutdown is activated, the scale switches itself off automatically when no weight has been loaded for 10 minutes.

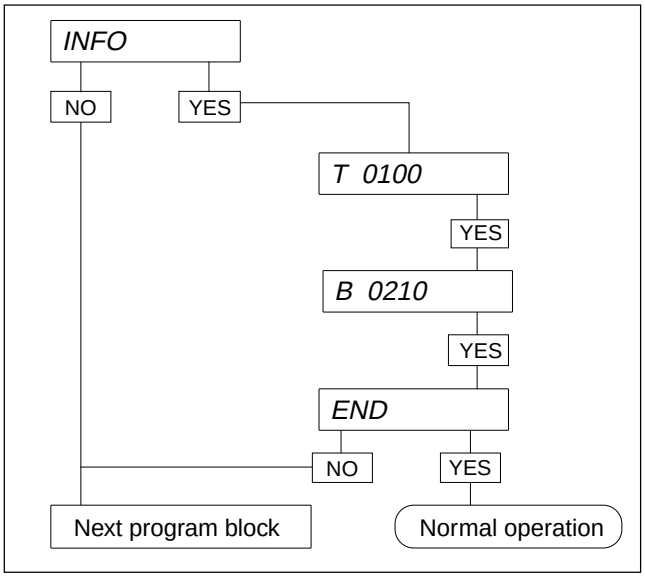
Meaning of the symbols

△ PWROFF off

▲ PWROFF on

NO = →T← YES = ⇨

6.2.13 INFO – Displaying the program number



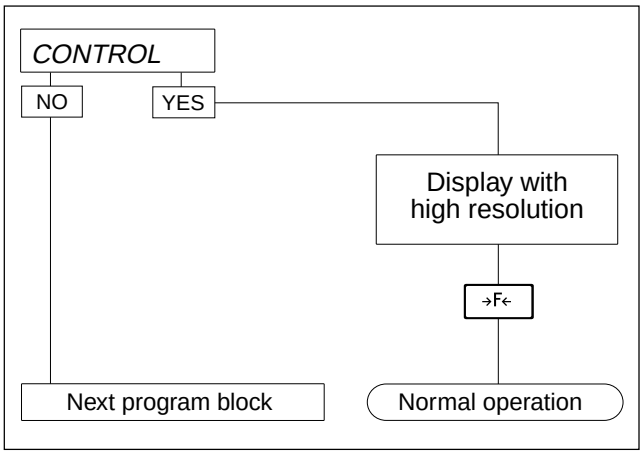
In the program block INFO you can have the instrument program numbers displayed (e.g., T 0100, B 0210).

Identification

T = weighing terminal number

B = weighing platform number

6.2.14 CONTROL – Testing the scale



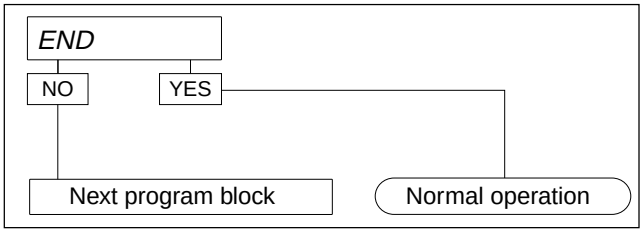
In the program block CONTROL, you can increase the resolution of the display for test purposes.

The program block does not appear with certified scales.

Your scale operates here with enhanced readability in the selected first weight unit.

Return to normal operation: Press [→F←].

6.2.15 END – Exiting the master mode



If you wish to change more data in the master mode, return from END to the first program block with NO.

If not, press YES to return to normal operation.

NO = [→T←] YES = [⊏→]

7 Service mode

7.1 General

The service mode is used for

– entry of the parameters specific to the weighing platform,
– calibration of the scale,
– setting the linearity,
– resetting the measuring cell parameters to the factory setting.

The service mode is divided into program blocks within which one or more parameters can be changed.

Caution

The parameters which can be changed in the service mode are protected by certification. If the scale is set to certified (APPROVE in the program block SCALE), the identcode (identification code) counter will be incremented by one when the altered parameters are stored. In the case of a certified scale, this corresponds to destruction of the certification seal. Recertification of the scale is then necessary.

Overview of the service mode

RETURN	Quit service mode without changing the set parameters and the identcode counter.
RESET	Reset weighing platform parameters to factory setting, see section 7.3.1.
NATION	Selection of the country. This automatically takes the certification regulations of the particular country into account.
SCALE	Entry of the parameters specific to the weighing platform: certifiability, type, maximum capacity and resolution, see section 7.3.2.
LINEA	Enter or calibrate linearity, see section 7.3.3.
CAL	Calibration of the weighing platform, see section 7.3.4.
SAVE	Storage of the selected configuration, see section 7.3.5.

7.2 Operation of the service mode

Selection of the program blocks in the service mode is the same as in the master mode.
The numeric keypad is not available in the service mode!

7.2.1 Entry into the service mode

- Press and hold the ⇨ key until MASTER appears in the display.
- Pess NO to reach the SERVICE display.
- Press YES to enter the service mode. The inquiry CODE appears.
- Enter code YES NO NO YES. The first service mode block RETURN appears.

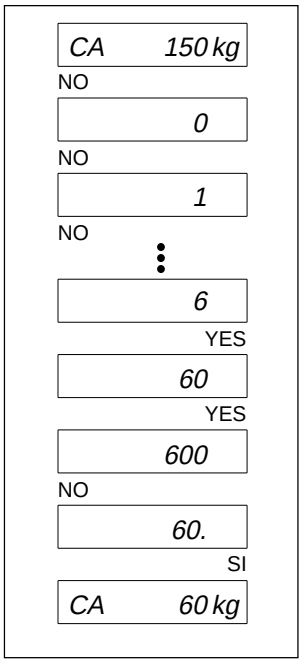
Caution

Entry of the code nullifies the certification validity of the scale!

7.2.2 Examples of numeric entries in the service mode

Only the two keys for YES and NO are active in the service mode, the numeric keypad is not available.

Example1: Entry of the maximum capacity 60 kg



The maximum capacity shown in the display does not correspond to the desired value. Reply with NO.

The digit 0 appears. Use NO to increment the first digit to the desired value.

6 is the desired 1st digit, confirm with YES.

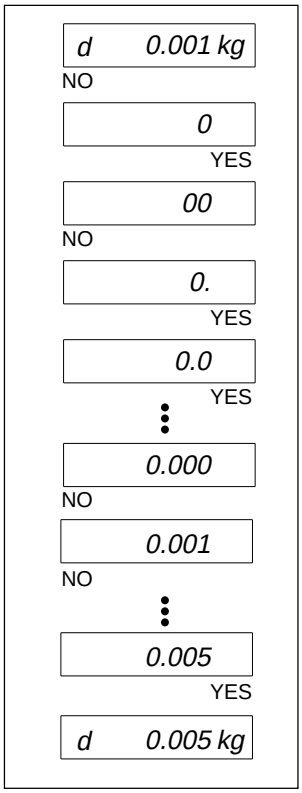
The digit 0 appears at the 2nd place. 60 is the desired value, confirm with YES.

A further place appears, but is not needed. Reply with NO.

60. is the desired value, confirm with YES.

For a check, the value of the maximum capacity just set now reappears.
Confirm with YES and proceed to the next program block.

Example 2: Entry of the resolution 0.005 kg



The resolution shown in the display does not correspond to the desired value. Reply with NO.

The digit 0 appears, confirm with YES.

Another 0 appears before the point, but is not needed. Reply with NO.

The decimal point appears, confirm with YES.

Press YES for additional places until the number of desired decimal places is reached.

Select the desired resolution with NO.

0.005 is the desired value, confirm with YES.

For a check, the value of the resolution just set now reappears.
Confirm with YES and proceed to the next program block.

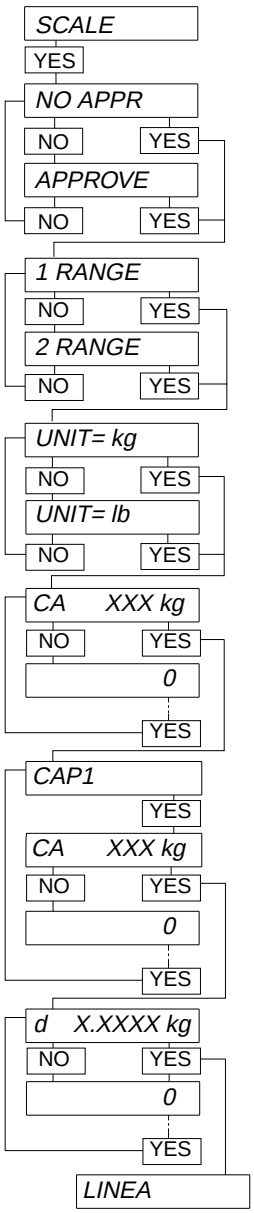
7.3 Settings in the service mode

7.3.1 RESET – Resetting to the factory setting

The service mode block RESET contains the following subpoints:

NO RES	Quit the service mode block without resetting the parameters.
RES ALL	Reset parameters specific to weighing platform to the factory setting.

7.3.2 SCALE – Selecting the parameters specific to the weighing platform



1. Select certification capability

NO APPR	Noncertified scale
APPROVE	Certified scale

2. Select number of weighing ranges

1 RANGE	Same resolution over the entire weighing range
2 RANGE	Two ranges with different resolution

3. Select unit

UNIT = kg	Display in kg
UNIT = lb	Display in lb, if allowed by metrological regulations.

4. Select maximum capacity

CA XXX kg	Maximum capacity currently set.
0	Enter desired maximum capacity and confirm, see section 7.2.2.

5. Define weighing ranges (with multirange scales only)

CAP1	Display for information: Weighing range 1.
CA XXX kg	Value currently set for the first weighing range.
0	Enter desired value for the first weighing range, see section 7.2.2.

6. Select resolution

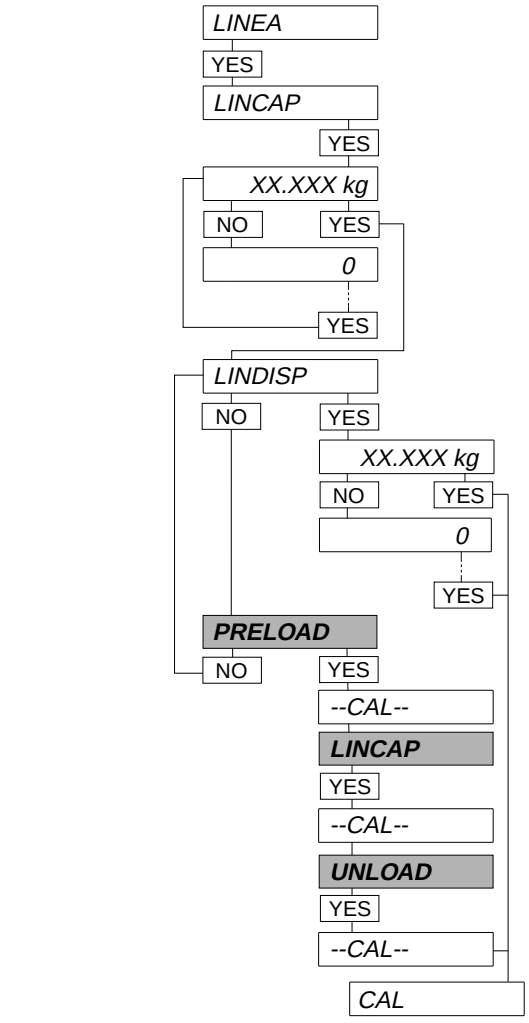
d X.XXXX kg	Resolution currently set for the first weighing range. With multirange scales, the resolution of the second weighing range is automatically determined by the weighing terminal.
0	Enter desired resolution for the first weighing range, see section 7.2.2.

Note

If one of the settings or their combination was inadmissible, the message ERR_Rx appears where x represents the weighing range. In this case, the program jumps back to step 1.

7.3.3 LINEA – Entering linearity

This service mode block can be used to compensate linearity errors.
The linearity is usually checked with half the maximum capacity.
When half the maximum capacity is loaded on the scale in normal operation, the scale should show exactly this value. If this is not the case, note the displayed value (linearity) so that it can be entered at the appropriate place in the service mode.



flashing display; prompt to load or unload the scale

1. Select linearization weight

LINCAP	Display for information: Linearization weight.
XX.XXX kg	Linearization weight currently set, e.g. half load.
0	Enter desired linearization weight, see section 7.2.2.

2. Linearization

a) via entry of the linearity

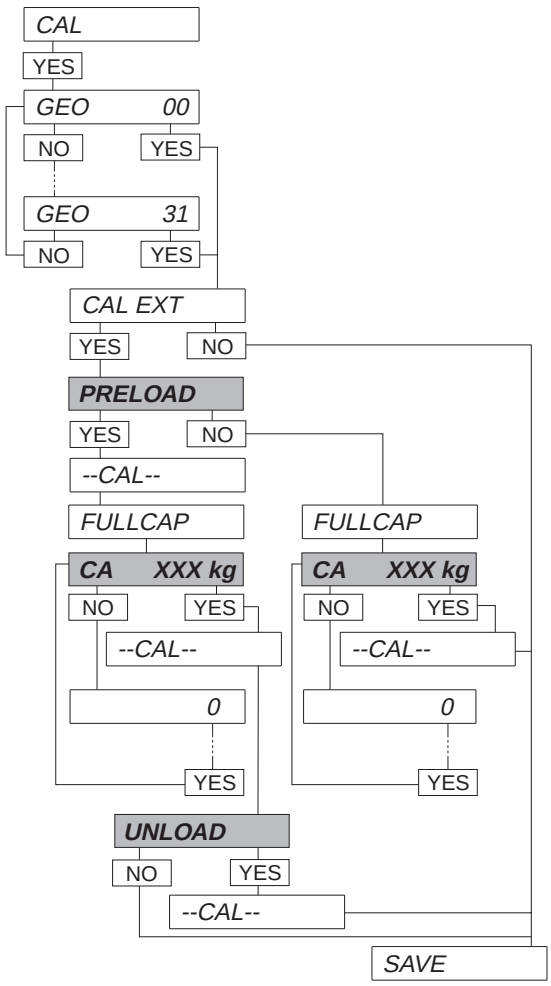
LINDISP	Display for information: Linearity.
XX.XXX kg	Accept displayed weight value if it matches the weight value displayed when the linearization weight was loaded.
0	Enter weight value displayed when the linearization weight was loaded.

or

b) by loading the linearization weight

PRELOAD	Unload scale and load preload, if used, confirm with YES.
LINCAP	Load linearization weight selected in step 1, confirm with YES.
UNLOAD	Unload scale, confirm with YES.

7.3.4 CAL – Calibrating weighing platform



1. Calibration using geo value

If weighing platform and weighing terminal have already been matched to each other (calibrated) in the factory, the calibration can be corrected by the geo value up to a resolution of 3000 d.
If a higher resolution is required or if the weighing platform and weighing terminal have not yet been matched to each other, the calibration must be performed with external weights.

GEO 00 — Select appropriate geo value. You will find the value appropriate to your country in the table in the appendix.

...

GEO 31

2. Calibration with an external weight

CAL EXT — If you wish to calibrate with an external weight, confirm with YES.

PRELOAD — Load preload and confirm with YES. If you do not wish to calibrate the zero point, reply with NO (e.g. for the stepwise calibration of hopper scales).

--CAL-- — The scale calibrates with preload if PRELOAD was confirmed with YES.

FULLCAP — Display for information: Maximum capacity.

CA XXX kg — Prompt to load and confirm the displayed maximum capacity.

or

0 — Enter desired maximum capacity.

--CAL-- — The scale calibrates with maximum capacity.

UNLOAD — Unload weighing platform and confirm with YES.
This prompt appears only if PRELOAD was answered with YES.

The calibration can be aborted at this point with NO, the program then jumps to the next service mode block SAVE.

--CAL-- — The scale calibrates with preload.

7.3.5 SAVE – Storing the selected configuration

SAVE — Storage of the selected configuration. The identcode counter is incremented by one. With certified scales, this corresponds to destruction of a certification seal. Recertification is then necessary.

Identcode counter at maximum

The identcode counter runs to 99. After this, additional certifiable configurations are not possible, the scale can be operated only in the noncertified configuration.

In this case, the following messages appear:

Error
ident

- Acknowledge error message.
  – The error message then appears in clear text.

8 Application blocks

With the weighing terminal, an information memory is called an application block. The application blocks are used for the storage of
- character strings, which are entered using the keypad,
- weighing data,
- calculated quantities.

Writing to and reading application blocks

If a serial interface is installed,
- the application blocks marked in the table overleaf can be written to via the data interface,
- all application blocks can be read via the data interface.

Command formats for reading and writing via the data interface

Reading

A	R		C_R	L_F

Example:

A	R	0 1 2	C_R	L_F

The number of the application block is specified as a three-place number with leading zeros.

After receipt of the AR command: The weighing terminal sends the contents of the specified application block to the peripheral device.

Format of the transmitted application block: See table "Response formats in reading".

Writing

A	W		_	Information	C_R	L_F

See table "Command formats in writing"

Number of the application block to be written to

Format of the written application block: See table "Command formats in writing".

	Application block No.	Contents of the application blocks	Comments
	002	Current program number	
	003	<STX>	For printer configuration
	004	<ETX>	
	006	<CR><LF>	
	007	Gross (2nd unit)	Only in work with 2 weight units
	008	Net (2nd unit)	
	009	Tare (2nd unit)	
	010	Weighing platform number	
	011	Gross (1st unit)	
	012	Net (1st unit)	
w	013	Tare (1st unit)	
	014	Display contents	
w	016	Dynamic result (1st unit)	Writing to application block 016 starts the weighing cycle
	017	Piece number	In counting
	018	Difference	In plus/minus weighing
	019	Percent	In plus/minus weighing (only with weighing-in and checking)
w	020	Target value – upper tolerance	Current values
		– lower tolerance – start point	In plus/minus weighing
w	021	Zero limit	In checking and classifying
	022	Component/item weight	In formula weighing and totalization
	023	Total weight	
	024	Component/item counter	
	025	Tare container	In formula weighing
w	026	For each memory:	25 fixed value memories
	...	target value – upper tolerance	
	...	– lower tolerance – start point	
w	050		
w	106	Output buffer of the I/O port	Only if interface 103 attached
	107	Input buffer of the I/O port	

w = writable blocks

Response formats in reading

No. **Response format**

002 | A | B | _ | I | T | 3 | s | - | 0 | - | 0 | - | 0 | 1 | 0 | 0 | C_R | L_F |

007 | A | B | _ | val. | _ | unit | C_R | L_F |
008 val. = 10-digit value (with sign and decimal point), right aligned;
009 unit = unit, 3 characters, left aligned

010 | A | B | _ | n2 | C_R | L_F |
n2 = 2 places

011 see 007
...
014
016

017 | A | B | _ | val. | _ | unit | C_R | L_F |
val. = 10-digit value (with sign and decimal point), right aligned;
unit = STK or PCS

018 see 007
019

020 In weighing-in

| A | B | _ | val. | _ | unit | _ | _ | val. | _ | unit | _ | _ | val. | _ | unit | _ | _ | val. | _ | unit | C_R | L_F |
target value tol. (+) tol. (–) start point

In checking:

| A | B | _ | val. | _ | unit | _ | _ | val. | _ | unit | _ | _ | val. | _ | unit | C_R | L_F |
target value tol. (+) tol. (–)

In classifying

| A | B | _ | val. | _ | unit | _ | _ | val. | _ | unit | C_R | L_F |
limit 1 limit 2

val. = 10-digit value (with sign and decimal point), right aligned;
unit = STK or PCS

022 see 007
023

024 | A | B | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | number | _ | C_R | L_F |
number = 3-digit, left aligned

025 see 007

026
...
050 see 020

107 | A | B | _ | 0 | 0 | 0 | 0 | _ | x | x | C_R | L_F |
x=0: no power supplied; x=1: power supplied

Command formats in writing

No. **Command format**

013 A W 0 1 3 _ val. _ unit C_R L_F

val. = 10-digit value (with sign and decimal point), right aligned;
unit = STK or PCS

016 A W 0 1 6 _ val. C_R L_F

val. = 7-digit value
Writing to application block 016 starts the weighing cycle.

020 In weighing-in

A B _ val. _ unit _ _ val. _ unit _ _ val. _ unit _ _ val. _ unit C_R L_F

target value tol. (+) tol. (–) start point

in checking:

A B _ val. _ unit _ _ val. _ unit _ _ val. _ unit C_R L_F

target value tol. (+) tol. (–)

In classifying:

A B _ val. _ unit _ _ val. _ unit C_R L_F

limit 1 limit 2

val. = 10-digit value (with sign and decimal point), right aligned;
unit = STK or PCS

021 see 013

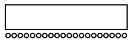
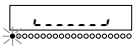
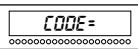
026 … 050 see 020

106 A W 0 5 6 _ 0 0 0 0 0 x x x C_R L_F

x=0: no power supplied; x=1: power supplied

9 Appendix

9.1 What if...?

Display	Cause	Rectification
 Display blank	• No line voltage • Terminal switched off • Power cable not plugged in • Brief disturbance • Automatic shutdown active • Display switched off in master mode	• Check power supply • Switch on • Plug in • Switch terminal off then on • Press any key
	Underload owing to • Load plate not in place • Preload not loaded • Weighing range not reached	 • Place load plate in position • Load preload • Zero
	Overload owing to • Weighing range exceeded • Weighing platform locked in place	 • Unload weighing platform • Release arrestment
 Display unstable	• Unstable location • Drafts • Unstable weighing sample • Contact between load plate or weighing sample and surroundings. • Line disturbance	• Match vibration adapter (master mode VIBRAT) • Avoid drafts • Use dynamic weighing operating mode • Eliminate contact • Check power supply
Wrong display	• Wrong zero setting of scale • Wrong tare value • Contact between load plate or weighing sample and surroundings • Scale at inclined angle	• Unload, zero and repeat weighing • Clear tare or enter correct tare • Eliminate contact • Level scale
	• Test cycle started	• Conclude test by pressing the test key
	• Zero setting outside zero setting range • Taring outside taring range • Zero setting with underload/overload • Recalled fixed target value memory not occupied in plus/minus weighing • Reference weight too low in counting • Weight less than 10 d in totalization • Item counter > 9999 • Deflection < 30 d in formula weighing • Component negative in formula weighing	 • Load fixed target value memory • Increase reference piece number • Increase weight • Clear total • Load weight • Increase component weight
No LED display	• LED analog display switched off	• Switch on LED analog display (master mode LED)
Red LEDs do not light up in checking and classifying	• Zero limit set larger than lower tolerance limit	• Set zero limit to lower value (master mode)

9.2 Cleaning

▲ Clean only outside of weighing terminal.
▲ Never use concentrated acids and alkalis, solvents or pure alcohol!

- Use a damp sponge for cleaning.
  Grease spots and obstinate dirt marks can be removed with commercial washing-up liquid or glass cleaning agents. The best agents are antistatic plastic cleaners and plastic preserving agents.

9.3 Technical data

Main data

Digital display for weight	High-intensity, 7-segment fluorescent display, green with integrated unit characters and status symbols for display of the operating mode, digit height 12.5 mm.
LED analog display	3-color light symbol display as light band or light spot display and for plus/minus weighing.
Keypad	Tactile touch membrane keypad with audio acknowledgment. Key distance 30 mm. Symbol inscription. 4 keys for weighing operation.
Display window	Scratch-proof safety glass or plastic.

Weighing functions

Taring	At a keystroke or automatic, by subtraction up to maximum capacity.
Zero set	Automatic or manual.
Gross select	Display of gross weight at a keystroke.
Unit select	Following weight units selectable at a keystroke: kg, g, lb, oz, ozt, dwt.
Dynamic weighing	Selectable: Cycle time (3 settings).
Stability detector	5 settings, with movement indicator.
Weighing process adapter	3 settings available to match the scale to the weighing sample.
Vibration adapter	3 settings available to match the scale to the ambient conditions.
Test	Test function to display the identification code.

Plus/minus weighing

Weighing in	Filling to a preset target weight.
Checking	Check whether test object is within preset tolerance.
Classifying	Sorting into 3 classes.

Counting functions

Piece number	Continuously updated display, max. 7 places.
Reference weight determination	Either from 10 pieces (standard reference piece number) or selectable: 1, 2, 3, 4, 5, 10, 12, 15, 20, 25, 30, 40, 50 or 100 pieces
Start of the counting process	At a keystroke with the possibility to switch to the current weight.

Formula weighing

Number of components	Maximum 9999 components
Component total	7 places

Totalization

Number of items	Maximum 9999 items
Item total	7 places
Dynamic result	Automatic totalization

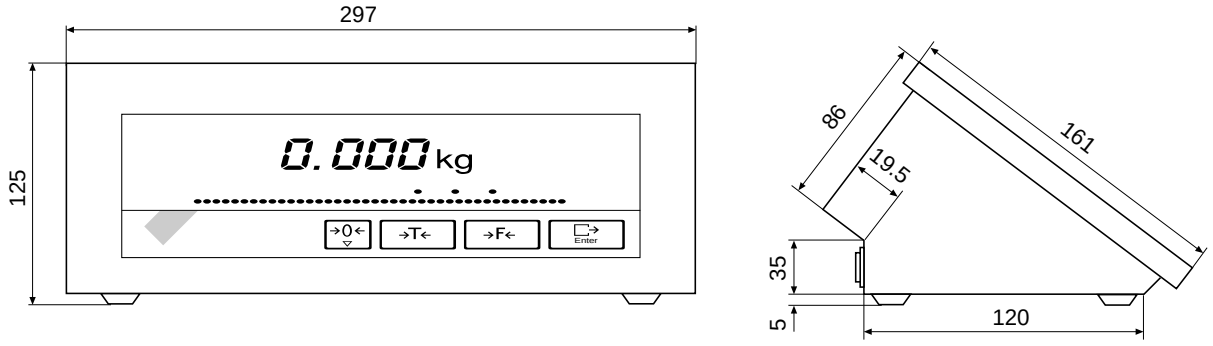
Scale attachment

Attachable weighing platforms	Strain gauge weighing platforms METTLER TOLEDO MultiRange with analog interface: types DB, DCC, D…T, N…T; strain gauge load mounts RWM; SPIDER weighing platforms
A/D converter	Resolution: certifiable max. 7500 e; noncertifiable max. 75000 d Strain gauge supply voltage: 8.75 V Limit value: 1.17 µV/e Max. line length: 100 m Stabilization time: typically 0.6 s Measured value update: selctable in steps, max. 16/s
Third-party scales	1-4 350 Ω weighing cells; 1-8 1000 Ω weighing cells Platform sensitivity: 0.4…3 mV/V Platform resistance: 0…1200 Ω

General data

Housing	All chrome-nickel steel DIN X5 CrNi 1810
Type of protection	Dust- and water-proof (spray water), in compliance with IP65 (IEC 529)
Power supply	115/230 V~; +10% - 15%; 50/60 Hz
Power cable	With grounding pin plug, length approx. 2.5 m
Power consumption	Approx. 25 VA
Admissible operating temperature	–10 °C to +40 °C
Weight	2.8 kg
Documentation supplied	Operating instructions

Dimensions



9.4 Optional equipment

	Order No.
Strip printer (alphanumeric thermal printer)	
GA46	505 471
GA46-W	505 799
Printer-terminal adapter for fastening the printer to the terminal	208 264
Interface 101*	
Retrofittable built-in interface for 20 mA current loop connection, bidirectional, 7-pin socket	505 237
Accessories CL 20 mA	
CL cable, 3 m	503 749
General purpose cable, 3 m	503 743
LX80/FX85 cable, 3 m	500 410
Mating connector, 7-pin	503 745
Interface 102*	
Retrofittable built-in interface for RS232C connection, bidirectional, 8-pin socket	505 238
Accessories RS232	
RS232 cable/DTE, 3 m	503 754
RS232 cable/PC, 3 m	504 374
RS232 cable/DCE, 3 m	503 755
RS232 cable/9-pin, 3 m	504 376
Mating connector, 8-pin	503 756
Interface 103	
Retrofittable built-in interface, digital inputs/outputs, 19-pin socket	505 239
Accessories I/O	
GD14 relay interface, for signal amplification	504 371
GD14 connection cable, 10 m	504 458
Mating connector, 19-pin	504 461
Interface 104*	
Retrofittable built-in interface for RS422/RS485 connection, bidirectional, 6-pin socket	506 847
Accessories RS422/RS485	
Cable with 6-pin connector and open end, 3 m	204 933
Mating connector, 6-pin	204 866
Analog cable with both ends open	
5 m	204 554
10 m	204 555
20 m	209 315
Wall bracket, for fastening the weighing terminal to the wall	
- black, plastic coated	504 129
- all stainless steel	504 130
Floor stand, for free standing weighing terminal	
- black, plastic coated	504 131
- all stainless steel	504 132
Stand base, for flexible installation of the floor stand	
- black, plastic coated	503 700
- all stainless steel	503 701
Protective cover, for covering the weighing terminal, set of 3	505 319

* only 1 serial interface retrofittable

9.5 Geo value table

Country		Geo value	Country		Geo value
A	Austria	19	MA	Morocco	13
AUS	Australia	12	MAL	Malaysia	5
B	Belgium	21	MEX	Mexiko	5
BR	Brazil	8	N	Norway	24
CDN	Canada	18	NL	Netherlands	21
CH	Switzerland	18	NZ	New Zealand	16
CO	Columbia	2	P	Portugal	15
D	Germany	20	PE	Peru	6
DK	Denmark	23	PRC	China	10
E	Spain	15	RA	Argentina	13
EC	Ecuador	1	RCH	Chile	12
ET	Egypt	11	RI	Indonesia	6
F	France	19	ROC	Taiwan	10
GB	Great Britain	21	ROK	South Korea	15
GR	Greece	15	S	Sweden	24
HK	Hong Kong	9	SA	Saudi Arabia	8
I	Italy	17	SF	Finland	24
IL	Israel	12	SGP	Singapore	5
IND	India	8	T	Thailand	6
IR	Iran	12	TA	Turkey	16
IRL	Ireland	22	USA	United States	16
IS	Iceland	26	YUG	Yugoslavia	18
J	Japan	14	YV	Venezuela	5
JOR	Jordan	11	ZA	South Africa	12
KWT	Kuwait	11			

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AT	**Mettler-Toledo Ges.m.b.H.**	1100 Wien	T 0043-1-604 19 80	F -604 28 80
AU	**Mettler-Toledo Ltd.**	Victoria 3207	T 0061-3-9646 45 51	F -9645 39 35
BE	**Mettler-Toledo S.A.**	1651 Lot	T 0032-2-334 02 11	F -378 16 65
CH	**Mettler-Toledo (Schweiz) AG**	8606 Greifensee	T 0041-1-944 45 45	F -944 45 10
CN	**Mettler-Toledo (Shanghai)Ltd.**	Shanghai 200233	T 0086-21-6485 0435	F -6485 3351
CZ	**Mettler-Toledo spol, s.r.o.**	120 00 Praha 2	T 0042-02-252 755	F -242 475 83
DE	**Mettler-Toledo GmbH**	35353 Giessen	T 0049-641-50 70	F -507 129
DK	**Mettler-Toledo A/S**	2600 Glostrup	T 0045-43 27 08 00	F -43 27 08 28
ES	**Mettler-Toledo S.A.E.**	08038 Barcelona	T 0034-93 223 22 22	F -223 02 71
FR	**Mettler-Toledo s.a.**	78222 Viroflay-Cedex	T 0033-1-30 97 17 17	F -30 97 16 00
HK	**Mettler-Toledo (HK) Ltd.**	Kowloon, Hongkong	T 00852-2744 1221	F -2744 6878
HR	**Mettler-Toledo d.o.o.**	100 10 Zagreb	T 00385-1-233 6317	F -233 6317
HU	**Mettler-Toledo Keresked. KFT**	1173 Budapest	T 0036-1-257 98 89	F -256 2175
IT	**Mettler-Toledo S.p.A.**	20026 Novate Milanese	T 0039-02-33 33 21	F -356 2973
JP	**Mettler-Toledo K.K.**	Osaka 540	T 0081-6-949 5917	F -949 5944
KR	**Mettler-Toledo (Korea)**	Seoul 135-080	T 0082-2-518 2004	F -518 0813
MY	**Mettler-Toledo (M)**	47301 Petaling Jaya	T 0060-3-703 2773	F -703 8773
NO	**Mettler-Toledo A/S**	1008 Oslo 10	T 0047-22-30 44 90	F -32 70 02
NL	**Mettler-Toledo B.V.**	4000 HA Tiel	T 0031-344-63 83 63	F -63 83 90
PL	**Mettler-Toledo Sp.z.o.o.**	02-929 Warszawa	T 0048-22-651 92 32	F -42 20 01
RU	**Mettler-Toledo AO**	101000 Moscow	T 007-095-921 92 11	F -921 63 53
SE	**Mettler-Toledo AB**	120 08 Stockholm	T 0046-8-702 50 00	F -642 45 62
SG	**Mettler-Toledo (S) Pte. Ltd.**	Singapore 139944	T 0065-778 67 79	F -778 66 39
SK	**Mettler-Toledo spol, s.r.o.**	831 03 Bratislava	T 00421-7-5227 496	F -5252 173
SL	**Mettler-Toledo d.o.o.**	1236 Trzin	T 061-162-1801	F -161-1789
TH	**Mettler-Toledo (Thailand)**	Bangkok 10310	T 0066-2-719 64 80	F -719 64 79
TW	**Mettler-Toledo (Taiwan)**	Taipei	T 00886-2-579 5955	F -579 5977
UK	**Mettler-Toledo Ltd.**	Leicester, LE4 1AW	T 0044-116-235 70 70	F -236 63 99
US	**Mettler-Toledo Inc.**	Columbus, Ohio 43240	T 001-614-438 4511	F -438 4755
US	**Mettler-Toledo Inc.**	Hightstown, NJ 08520	T 001-609-448 3000	F -586 5451
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