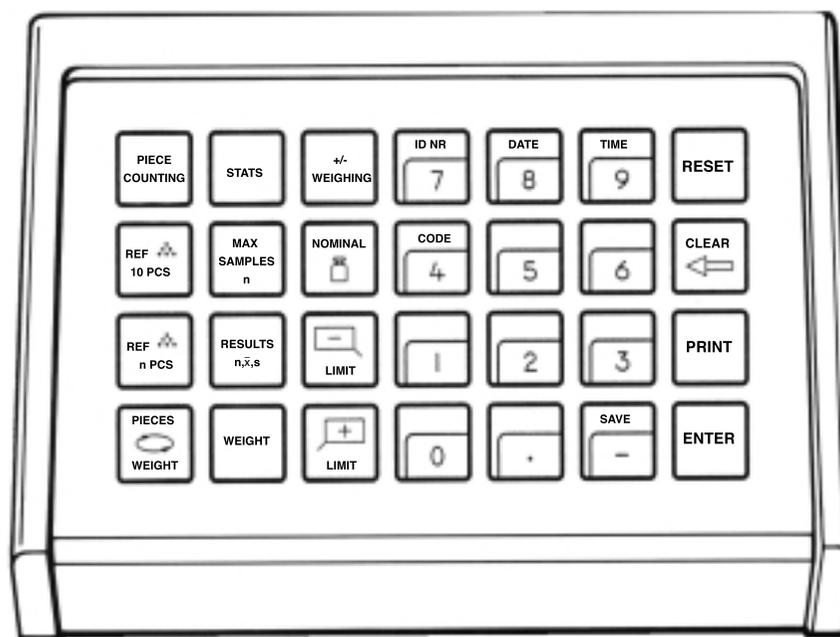


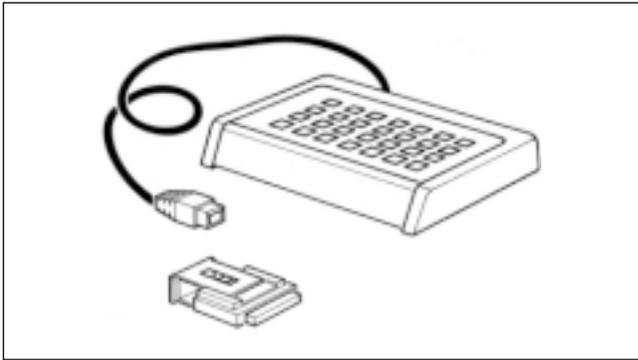
Operating instructions

METTLER TOLEDO ProPac-M



METTLER TOLEDO

The METTLER TOLEDO ProPac-M



The METTLER TOLEDO ProPac-M has been developed especially for use in the production sector. It comprises a terminal (input keypad) and a plug-in program cassette. Connected to METTLER TOLEDO balances employing M technology, the ProPac-M provides an extremely easy way of performing the three most commonly required tasks in production.

- +/- weighing: To check that weighed materials conform to a target weight with preset tolerances. Weighing towards zero is also possible. With target (nominal) weight setting, weighing-in aid (DeltaTrac) is activated.
- Piece counting: For counting or determining an unknown number of items with the aid of freely selectable reference piece numbers or a fixed quantity of 10.
- Statistics: For a number of weighed samples, the balance calculates the average weight and the standard deviation.

When METTLER TOLEDO balances of the SM series are used, there is a possibility to work with the SM terminal instead of the ProPac-M terminal. Further details are given in the Section "SM keypad" on pages 16 through 19.

To connect the terminal and other units

Two connection sockets at the rear of the balance are provided for the following units:

Socket "DATA I/ O": Units with RS232C or CL interface, e.g. GA44 Printer (for GA44 in the configuration register, section I-Face; select standard setting: S.Stb, b 2400 and interval 1 s)

Socket "GM": ProPac-M terminal and GM units with adapter plug

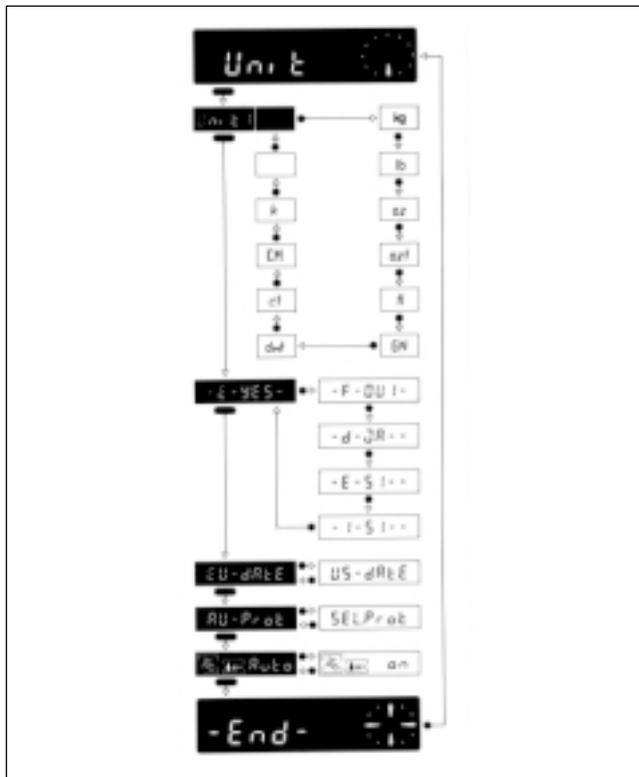
The coding pins in the sockets prevent improper connection.

To insert the program cassette

Insertion of the program cassette is described in the Operating Instructions of the balance used.

- Notes:**
- Before changing the program cassette, disconnect power cord of the balance (with SM balances, press key [OFF]).
 - Replace standard program cassette by ProPac-M cassette.
 - Please keep the standard cassette; it may be useful in subsequent use without the ProPac-M.

Configuration register with ProPac-M



The ProPac-M can be adapted to units specific to the application. In the section -Unit- of the configuration register (see Operating Instructions of the balance, "Configuration"), the following can be selected whatever the standard software of the balance:

Language: -E -Yes- = English (standard setting)
 -F -Oui- = French
 -d -Ja- = German
 -E -Si- = Spanish
 -I -Si- = Italian

Date: EU date = day, month, year (standard setting)
 US date = month, day, year

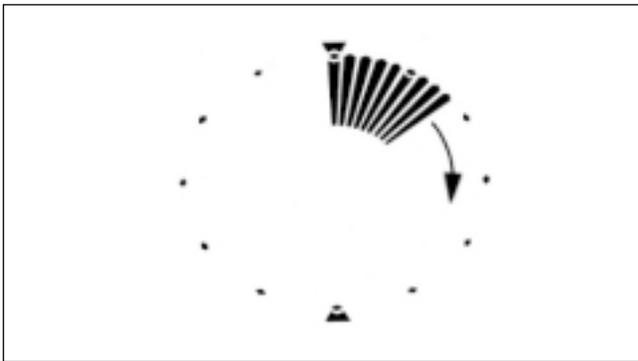
Printout: Au-Prot = printout automatic, depending on application (standard setting)
 SELProt = printout only with [PRINT] key

- Notes:**
- If the configuration register cannot be selected, check whether the jumper of the program cassette is in position "unsecured" (cf. Operating Instructions of the balance, "Configuration")
 - Reset does not reset language and date.

The METTLER DeltaTrac

With METTLER TOLEDO balances employing M technology, the DeltaTrac can be used as a weighing-in aid or as a dynamic graphic display. Depending on the application, the DeltaTrac displays “target weight” when the weight on the balance corresponds to the preset (keyed in) weight value or the piece number. The display has two accuracy ranges for coarse and fine weighing.

Operation of the DeltaTrac is illustrated here with a weighing to target weight in the application +/- weighing.

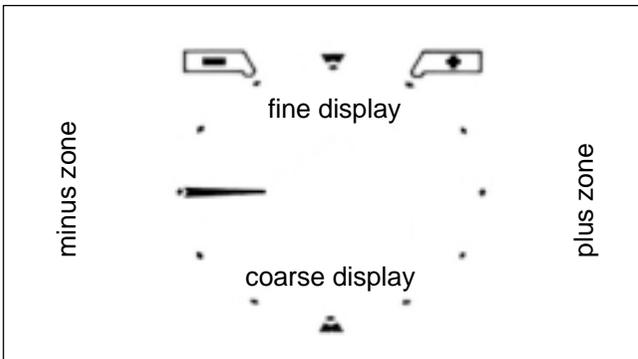


Dynamic graphic display

A container is placed on the balance and tared with the control bar.

The display continues to function as though the ProPac-M were not connected. It does not switch over until entries are made via the keypad in an application.

The segments of the dynamic graphic display show the container weight. The digital readout remains at zero (container tared).



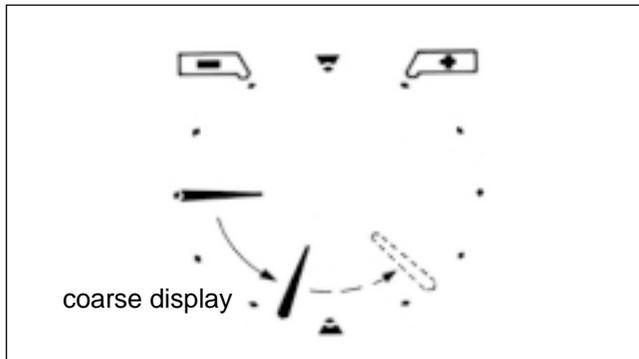
Weighing-in aid

The application +/- weighing is now selected and the target weight as well as the +/- tolerances are inputted. This alters the way in which the dynamic graphic display functions:

Tolerance markers are provided to the left and right of the 12 o'clock position. These indicate the chosen +/- tolerances.

The radial bars indicating the container weight are blanked out. A horizontal bar appears at the “9 o'clock” position as the coarse display. The 9 o'clock position is the zero position (no material has been weighed yet).

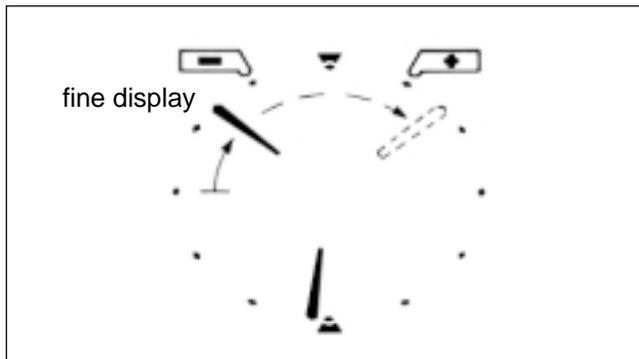
Think of the graphic display, which is like a clock face, as being divided into a lower and upper half. The lower half shows the coarse reading, the upper half is the fine readout. If the bars are in the left-hand half, the weight is below the target value. However, if the bars are in the right-hand half, the weight is above the target value.



Weighing-in, coarse (material to be weighed is added at a brisk rate)

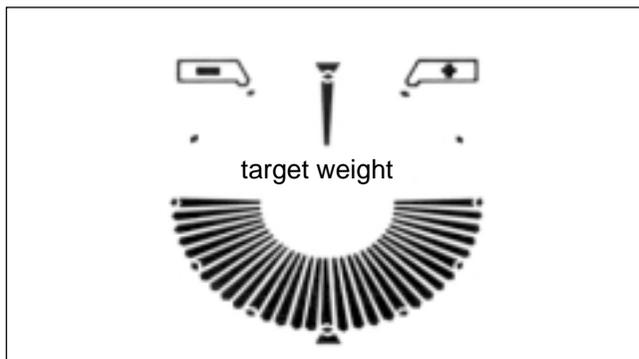
The bar previously pointing in a horizontal direction now rotates downwards. With 1/3 of the weight, it shows "8 o'clock", with 2/3 "7 o'clock". The target weight is reached when the bar points vertically downwards ("6 o'clock").

If more material is added (overfilling), the bar moves from the 6 o'clock position towards 3 o'clock (shown dashed in the illustration). The 3 o'clock position denotes 100% overfill. The bar remains in this position even if more material is added.



Weighing-in, fine

Depending on the minus tolerance inputted, the fine pointer also begins to move from the 9 o'clock position towards the 12 o'clock position when a certain fraction of the total weight is reached. One step of the pointer corresponds to 20% of the minus tolerance. In the 12 o'clock position, the target weight is reached. If still more material is added (overfilling), the fine pointer moves on towards the 3 o'clock position (shown dashed in the illustration). The 3 o'clock position signifies 3 times the plus tolerance. The fine pointer remains in this position even if filling continues. At the same time, the coarse pointer can move from 6 o'clock in the direction 3 o'clock.

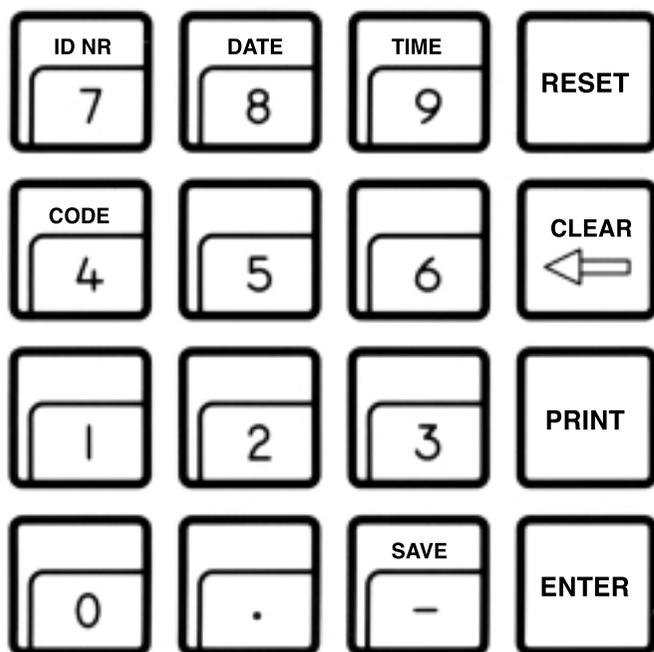


Weight OK

When the loaded weight lies within the tolerance limits and stability is achieved, all segments in the bottom half light up indicating "weight OK".

Functions of general system keys

If a printer is connected, the date, time, identification number and code, if inputted, are printed out at the top of the printout. On power failure, the printout inscription is cleared.



[ID NR] Begin entry of identification number with max. 7 digits and 6 decimal points (e.g. user or workstation).

[DATE] Begin date entry (always 6 digits). The calendar runs until a power failure occurs. Cleared by overwriting with "0".

[TIME] Begin time entry (00...24 h; 6 digits, hours, minutes, seconds). The clock runs until a power failure occurs. Cleared by overwriting with "0".

[CODE] Begin entry of the code number with max. 7 digits and 6 decimal points, e.g. to identify each weighing task of a series. Printed out immediately after entry and then cleared automatically.

[RESET] Clears all entries except for date and time.
[RESET] must always be pressed before a new weighing task.

[CLEAR] Clears the entry of the last numeric key pressed (numeric keypad), then the next to last, etc. provided [ENTER] has not yet been pressed.

[PRINT] Manual print command to print out entries or results which are not printed out automatically (by an application).

[ENTER] Concludes the numerical input on the numeric keypad.

[SAVE] Saves maximum 3 stored values to prevent loss on power failure. Use [SAVE] only if power failure likely. For details, see applications.

To enter values

Three steps are needed to enter values with the numeric keypad ([0] . . . [9], [·], [-]):

1. Select desired function
The selected function determines what type of value follows, e.g. a reference piece number or a target weight. The balance is now in the value entry mode. The keys [ID NR] [DATE] [TIME] and [CODE] have two functions: When pressed once, the appropriate function is selected. As pressing the keys activates the numeric keypad, the keys become numeric keys of this keypad.
2. Input the value on the numeric keypad
3. Press [ENTER] key
The value entry mode is terminated and the value assigned to the appropriate function.

Corrections

Wrong entries which have already been closed with [ENTER] must be corrected by reinputting them.

Entries not yet closed with [ENTER] can be cleared with [CLEAR].

Examples

To enter date (for EU date) e.g. 24.7.87

The keys mentioned should be pressed in the specified sequence:
[DATE] [2] [4] [0] [7] [8] [7] [ENTER]

To enter time e.g. 9.45.38

[TIME] [0] [9] [4] [5] [3] [8] [ENTER]

To enter a target weight in grams e.g. 83.5 g

[+/-WEIGHING] [NOMINAL 

To enter a reference piece number e.g. 27

[PIECE COUNTING] [REF...n PCS] [2] [7] [ENTER]

+/- Weighing (information)

Typical tasks and possibilities

- Weighing in to a target weight (without using the digital readout)
- Checkweighing for conformity to target weight with selectable +/- tolerances (filling process control)
- Quality control of finished parts (e.g. injection moldings, machined components) for defects or incompleteness

Specific key functions

Notes



Activates the application +/- weighing and the three related keys (indicated by LED). Cleared by [RESET] or by selection of another application. The weighing mode can be selected (cf. page 10).



Begin entering target weight via numeric keypad. Weighing-in aid DeltaTrac shows target weight with coarse and fine pointer.



Begin entering minus tolerance (in weight units). It corresponds to the pointer's travel from the minus tolerance marker to 12 o'clock. The fine pointer starts to move at three times the minus tolerance. 1 step of the fine pointer is equivalent to 20% of the minus tolerance.



Begin entering plus tolerance (in weight units). It corresponds to the pointer's travel from 12 o'clock to the plus tolerance marker and can be inputted independently of the minus tolerance. The fine pointer shows max. three times the plus tolerance, i.e. 3 o'clock. 1 step of the fine pointer corresponds to 20% of the plus tolerance.

- Additional conditions

Minimum entries: 0
Maximum entries: target weight for minus tolerance
balance capacity for plus tolerance

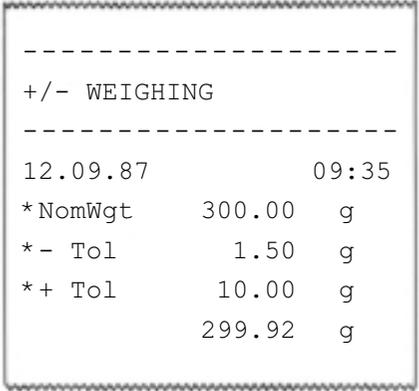
- Application, target weight and tolerance can be protected against power failure with [SAVE].
- Clearing of protected values with [RESET] [SAVE].
- Animal weighing is possible with the +/- weighing. Selection of animal weighing and start of the measuring cycle are described in the Operating Instructions of the balance.

Animal weighing with inserted ProPac-M cassette can not be triggered by the control bar (AM/ PM balances).

+/- Weighing (example)

Task: Fill to target weight 300 g, minus tolerance 1.5 g, plus tolerance 10 g, weight OK with double tolerance limits, printout when stable, date and time set

(Balance type PM4600 DeltaRange)

Procedure	Press keys	Display	Printout
Activate +/- weighing and select weighing mode	[+/- weighing] [5]	0.00 g 	Target weight and tolerances are printed out automatically 
Key in target weight (300 g)	[NOMINAL  <td>0.00 g </td>	0.00 g 	
Key in minus tolerance (1.5 g)	[-TOLERANCE] [1] [.] [5] [ENTER]	0.00 g 	
Key in plus tolerance (10 g)	[+TOLERANCE] [1] [0] [ENTER]	0.00 g 	
Place container on balance, tare	Control bar	0.00 g 	
Add material (slightly too little here)		297.24 g 	
Weight corresponds to target weight, weight OK lights up (bottom half of graphic display)		299.92 g 	

Weighing mode

The weighing mode can be selected immediately after selection of the application +/- weighing, provided no target weight has been inputted. It comprises two numbers. The possible values of these numbers, their significance and the acknowledgement in the balance display are shown in the following table.

Twelve weighing modes are available. The weighing mode can be protected against power failure with [SAVE].

Example: When the balance is unloaded, all weights should be transferred within the double tolerance limit.

Entry: [+/- weighing] [0] [5]

Display: P-O L-5
▼
await weight display

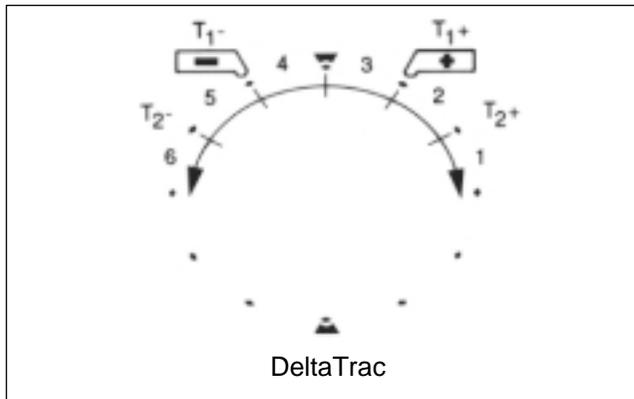
		Weight is accepted, provided it lies within the following limits:		
		single	double	triple
second number		tolerance limits		
first number/ entry		[3]	[5]	[6]
	when stable [clear]	weight display (default)	P-C L-5	P-C L-6
	on unloading [0]	P-O L-3	P-O L-5	P-0 L-6
	on unloading with item counter [1]	P-1 L-3	P-1 L-5	P-1 L-6
	in addition mode with item counter [2]	A-2 L-3	A-2 L-5	A-2 L-6

 Balance display to acknowledge your entry

GM54 Control

Direct attachment of the METTLER TOLEDO GM54 Output Module in the +/- weighing application is possible. The 8 passive digital outputs are always (independent of the selected weighing mode) controlled as follows:

0	SRE	Value is transferred
1	$x > T_{2+}$	Weight x greater than T_{2+}
2	$T_{1+} < x \leq T_{2+}$	Weight x between T_{1+} and T_{2+} or equal to T_{2+}
3	target value $\leq x \leq T_{1+}$	Weight x between target value and T_{1+} or equal to target value or T_{1+}
4	$T_{1-} \leq x < \text{target value}$	Weight x between T_{1-} and target value or equal to T_{1-}
5	$T_{2-} \leq x < T_{1-}$	Weight x between T_{2-} and T_{1-} or equal to T_{2-}
6	$x < T_{2-}$	Weight x less than T_{2-}
7		Value stable



T_{1+} : single, positive tolerance
 T_{1-} : single, negative tolerance
 T_{2+} : double, positive tolerance
 T_{2-} : double, negative tolerance

Piece counting (information)

Typical tasks and possibilities

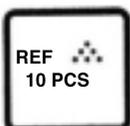
- Piece counting with fixed reference number of 10. Reference optimization possible.
- Piece counting with freely selectable reference number. Reference optimization possible.
- Switching from quantity to weight unit possible at any time.

Specific key functions

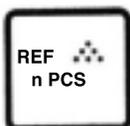
Notes



Activates the application piece counting and the three related keys (indicated by LED). Cleared by [RESET] or by selection of another application.



Sets the weight on the balance equal to 10 pieces and switches unit to Pcs.



Begin entering a reference piece number. Sets the weight on the digital readout equal to the reference quantity inputted with the numeric keypad and switches unit to Pcs.



Switch between current piece number and weight (in the selected weight unit).



When in piece counting mode, pressing the key [.] causes the current reference piece weight to appear for about 4 seconds.

- Additional conditions

Minimum reference weight = 10 digits, otherwise "Add" lights up
Minimum piece weight = 1/4 digit

- Application and reference piece number can be protected against power failure with [SAVE].
- Clearance of protected values with [RESET] [SAVE]
- Reference optimization

In order to improve the counting accuracy, it can be useful to optimize the reference piece weight, i.e. when working with low piece weights and a large number of pieces.

- Procedure:
- Determine reference piece weight with small number of pieces.
 - Place larger number of pieces on the balance; larger number is displayed.
 - Press [ENTER]. This optimizes the reference piece weight
 - Even greater piece numbers can now be counted.

Piece counting (example)

Task: Count 160 items into a container with reference optimization, reference = 5 items, time and date set,
reference piece weight = ? g (balance type PM4600 DeltaRange)

Procedure	Press keys	Display	Printout
Select application piece counting	[PIECE COUNTING]	0.00 g 	<div style="border: 1px dashed black; padding: 10px; margin: 10px auto; width: fit-content;"> <pre> ----- PIECE COUNTING ----- 12.09.87 10:15 Ref. Opt *Ref.-W 15.403 g out of 27 PCS ----- 12.09.87 10:19 *Ref.-W 15.403 g out of 27 PCS Count 160 PCS ----- </pre> </div>
Place container on balance, tare	Control bar	0.00 g 	
Place reference items in container (5 in this case)		75.92 g 	
Enter reference piece quantity	[REF n PCS] [5] [ENTER]	5 PCS 	
Increase piece number		27 PCS 	
Optimize reference weight	[ENTER]	27 PCS 	
Call up reference piece weight	[:]	15.403 g 	
Place items in container until piece number is reached	[PRINT]	160 PCS 	
Switch from piece number to weight	[PIECES/ WEIGHT]	2465.2 g 	

Statistics (information)

Typical tasks and possibilities

- Determining mean value (\bar{x}) from a number of weighed samples
- Determining standard deviation (s) from a number of weighed samples
- Choice of number of weighed samples as well as single or cumulative weighing mode

Specific key functions

Notes



Activates the application statistics and the 3 related keys (indicated by LED). Clearance by [RESET] or selection of another application. 2 weighing modes can be selected if sample number display is zero.



Begin entering maximum number of samples (sample number entry is not obligatory). When the inputted number of samples is reached, "End" lights up.



Press once to show the mean value \bar{x} .
Press twice to show the standard deviation s .
Press three times to show the sample number n .



When the sample number is displayed, the zero setting can be called up with the key [WEIGHT]. If the displayed value is not zero, tare.

- Weighing modes

[CLEAR] = single weighing (default)

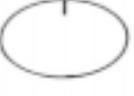
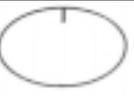
[2] = cumulative weighing (display: - - xy - - A)

- Animal weighing is possible with the statistics application. Selection of animal weighing and start of the measuring cycle are described in the Operating Instructions of the balance. (Difference: The animal weighing cannot be triggered via the control bar of the AM/ PM balances when the ProPac-M cassette is inserted.)
- The weight difference from previous mean value must be within $\pm 50\%$. If the weight is accepted, the sample number and weight OK display appear.
- Sample number 2...255
- Application and maximum sample number can be protected against power failure with [SAVE].
- Clearance of protected values with [RESET] [SAVE].

Statistics (example)

Task: Weighing series with 3 samples, single weighing mode, check zero setting, time and date set.

(balance type PM4600 DeltaRange)

Procedure	Press keys	Display	Printout
Select application statistics	[STATS]	--- 0 --- 	<pre> ----- STATS ----- 12.09.87 10:45 *Max. n 3 1 24.29 g 2 22.15 g 3 23.57 g *n 3 *Mean x 23.337 g *Std. s 1.089 g ----- </pre>
Key in maximum sample number (3)	[MAX SAMPLES n] [3] [ENTER]	--- 0 --- 	
Load 1st sample then remove		24.29 g  --- 1 ---	
Load 2nd sample then remove		22.15 g  --- 2 ---	
Check zero Tare if necessary	[WEIGHT] Control bar	0.03 g  0.00 g	
Load 3rd sample		23.57 g  --- 3 ---	
Remove 3rd sample		End 	
Call up result: - mean value - standard deviation - sample number	[RESULTS n, \bar{x} ,s] [RESULTS n, \bar{x} ,s] [RESULTS n, \bar{x} ,s]	23.337 g  S 1.089 g --- 3 ---	

Operation of METTLER TOLEDO SM balances with the SM terminal



In principle, the terminal of METTLER TOLEDO balances of the SM type allows the same commands to be executed as the ProPac-M terminal. After the values have been selected and saved, the ProPac-M terminal can thus be removed until a change in the setting is desired. The saving of entries and the alteration of the record inscription (date, time, code, identification number) can be effected only by use of the ProPac-M keypad, however.

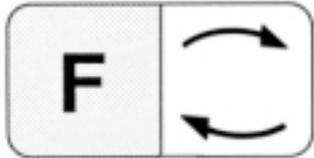
The following possibilities exist for work with the SM terminal:

- Only the application is saved with the [SAVE] key. The values of the functions can be changed with the SM terminal after removal of the ProPac-M terminal.
- The application and the values of the functions are saved with the key [SAVE]. The values of the functions can be displayed but no longer changed with the SM terminal.

Notes

- Values which are not saved with [SAVE] are lost when the balance is switched off or on power failure.
- If no values are saved before switching off the balance or before a power failure, the [F] key on the SM terminal has no function.
- Clearance of saved values is performed with the keys [RESET] [SAVE] of the ProPac-M terminal.

+/- Weighing with the SM terminal



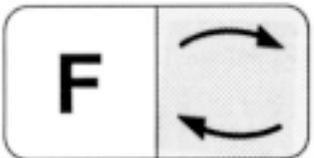
To begin an entry. The target weight appears on the digital readout, the minus or plus tolerance with the graphic display.

The target weight or the tolerance can be incremented by 1 digit (smallest display unit) by pressing the function key [F] briefly. If the function key [F] is pressed and held, the weight increases continuously.

The target weight or the tolerance can be decremented by 1 digit by pressing the switching key [↺] briefly. If the switching key [↺] is pressed and held, the weight is decreased continuously.

3 seconds after the last key operation, the displayed weight is accepted automatically. The entry can also be closed manually with the [PRINT] key.

Entry of the next function is started by pressing key [F] again.



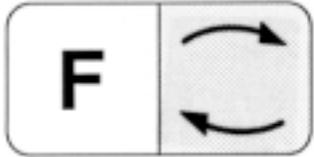
Switching between +/- weighing and weighing mode.

Corresponds to the [PRINT] key (in the enter mode of the [ENTER] key) of the ProPac-M terminal.

Notes

- If only the application is saved with [+/-weighing] [SAVE], target weight and tolerance can be changed as described.
- Without the ProPac-M, the weighing mode can no longer be changed.
- If the application together with target value and tolerance is saved, these can no longer be changed. The values appear on the display by pressing key [F], however.

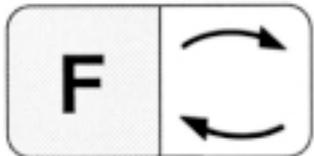
Piece counting with the SM terminal



Switching between current piece number and weighing mode (corresponds to key [PIECES/WEIGHT] of the ProPac-M keypad).



Corresponds to the key [PRINT] of the ProPac-M keypad.

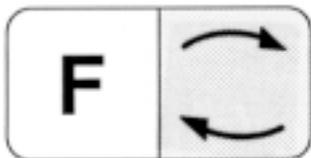


Sets the weight on the digital display equal to the saved reference piece number or 10 items (cf. Notes). The reference piece number can not be changed with the SM terminal.

Notes

- If only the application is saved with [PIECE COUNTING] [SAVE], the reference piece number is 10.
- If the application together with the reference piece number selected by you is saved, piece counting is performed with the saved value.
- On entry of the reference piece number selected, the balance must be loaded.

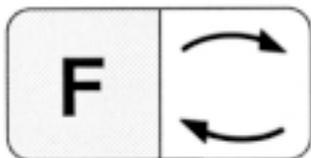
Statistics with the SM terminal



Switching between statistics and weighing mode.



Corresponds to the [PRINT] key of the ProPac-M keypad.



Corresponds to the [RESULTS n, \bar{x}, s] key of the ProPac-M keypad.

Notes

- If only the application is saved with [STATS] [SAVE], the maximum sample number is 255.
- If the application together with the sample number selected by you (Max n) is saved, the statistics are terminated when this value is reached and the results printed out.
- Without the ProPac-M, the weighing mode can no longer be changed.

Error messages

Err 0	Display/ calculation range exceeded	- Weighed number of items is larger than approx. 8'000'000 - Target weight or plus tolerance greater than balance capacity.
Err 1	Time for input or value transfer exceeded	Entry was not ended after approx. 30 seconds or a weight value needed for calculation has not been transferred.
Err 2	Input value too high	Target weight or plus tolerance greater than balance capacity.
Err 3	Piece weight too small	Piece weight smaller than 1/4 digit, or reference weight smaller than 10 digits.
Err 4	Tolerance too large	Minus tolerance or plus tolerance greater than target weight.
Err 5	Date or time not complete or implausible	Format for both entries: XX.XX.XX (6 digit) EU date: DD.MM.YY US date: MM.DD.YY
Err 8	Sample number too large	Sample number entry greater than 255.

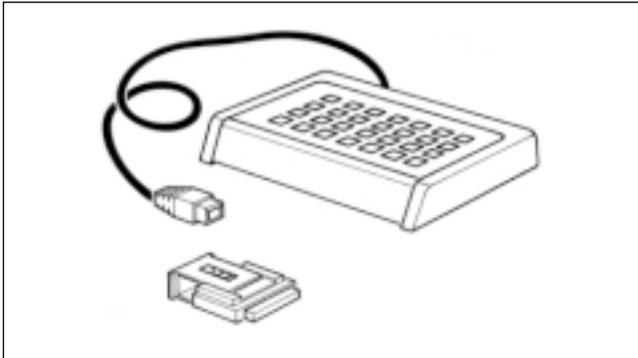
All these error messages are displayed for approx. 5 seconds. The balance then displays the weight again. The cause of the error display is ignored.

Other error messages do not originate with the ProPac-M and are explained in the Operating Instructions of the balance in question.

What's wrong if ...?

- | | |
|--|---|
| . . . - - - - - is displayed? | An entry is not yet possible since the system is still occupied with a printing task or is waiting for a stable weight value. |
| . . . Add is displayed? | In the determination of the reference piece weight, too few items were loaded and hence the accuracy of the counting results would be too low. |
| . . . the star in the top left of the display flashes? | The reference piece weight is between 1 and 1/4 digit. |
| . . . the counting system is in an indefinite condition? | Press [RESET] key, if necessary switch balance off then on. Inputs and printout parameters are cleared by this. |
| . . . the display does not react to weight changes on the pan? | System is in enter mode. Close with [ENTER] is expected or clear with [CLEAR]. |
| . . . the GA44 Printer prints only
🖨️🖨️🖨️🖨️? | Wrong baud rate (transmission speed) setting (see Operating Instructions of the balance). |
| . . . the GA44 Printer does not print every line in the record? | <ul style="list-style-type: none"> - The printing interval is set wrongly (correct setting is 1 second, see Operating Instructions of the balance). - The printing speed is too low. The time for 20 cm paper feed should be 23...27 seconds (see GA44 Operating Instructions) - Printout "Sel.Prot" in the configuration register section -Unit- is selected. Select "Au-Prot". |
| . . . the printer prints continuously or after every deflection of weighing pan? | Set configuration of the interface in accordance with the balance Operating Instructions to S.Stb (send stable values). |
| . . . no commands can be entered via terminal of the SM balance? | Entries not saved with [SAVE] are cleared on switching off the SM balance or on power failure. The entries must be reinputted via the ProPac-M keypad and saved. |

Overview METTLER TOLEDO Pacs



CalcPac-M

Allows further processing of weight values by calculation operations

CountPac-M

For demanding piece counting (with fixed and variable reference, tare preset, portion counting, totalization, etc.)

DataPac-M

Keypad which allows different inputs to the computer via a bidirectional data interface

GoldPac-M

Applications for jewelry (three units that can be called up, automatic reconciliation of weight values with inputted prices)

LabPac-M

Applications for the lab (differential weighing, % formula, net total)

PharmaPac-M

Applications for pharmaceutical products (piece counting, statistics, net total)

ProPac-M

Applications for production (piece counting, statistics, \pm control)

StatPac-M

For the statistical filling process control according to different tolerance systems and pharmacopy

XPac-M

Allows realization of customer-specific applications

**To give your METTLER TOLEDO product an assured future:
METTLER TOLEDO Service preserves the quality, measurement
accuracy and value of METTLER TOLEDO products for years to come.
Please send for full details of our attractive service conditions.
Thanks in advance**



P702162

Subject to technical changes and to the availability
of the accessories supplied with the instruments.

© Mettler-Toledo GmbH 1999 702162 Printed in Switzerland 9911/2.12

Mettler-Toledo GmbH, Laboratory & Weighing Technologies, CH-8606 Greifensee, Switzerland
Phone +41-1-944 22 11, Fax +41-1-944 30 60, Internet: <http://www.mt.com>