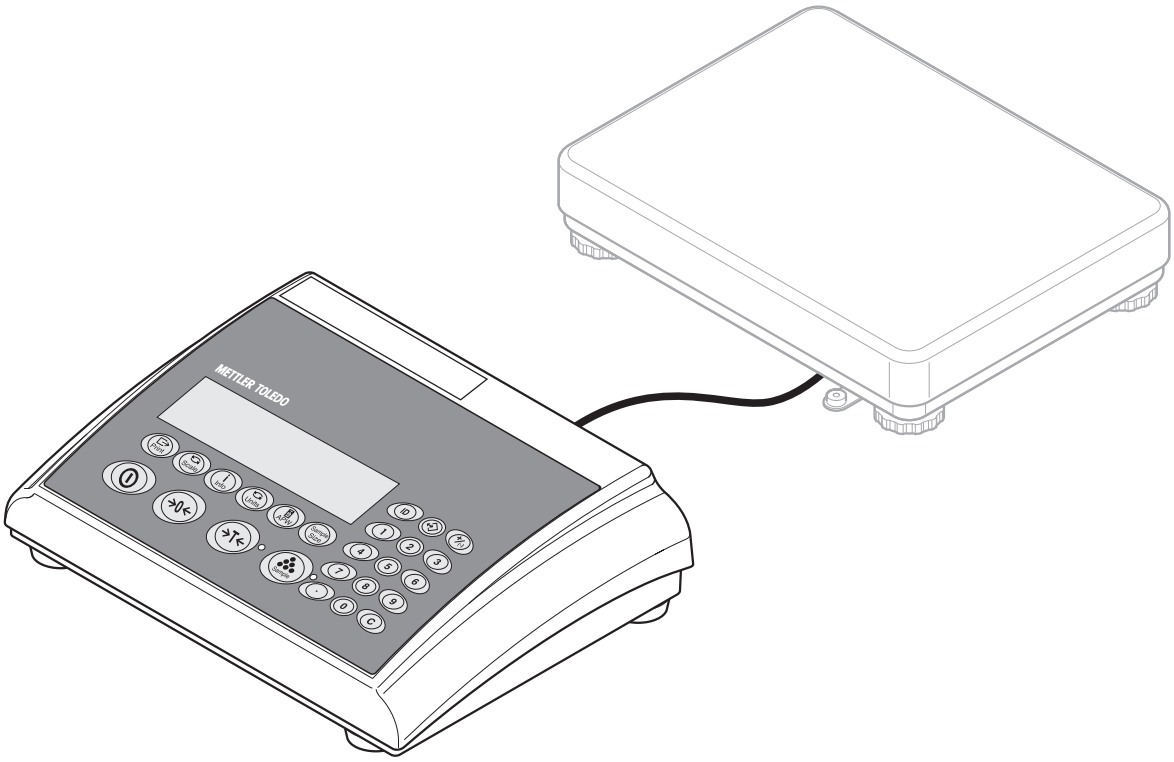
User manual

METTLER TOLEDO

METTLER TOLEDO
Weighing terminal IND445



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1 Introduction

1.1 Safety instructions

CAUTION!

Do not use IND445 in hazardous areas!

Our product range includes special devices for hazardous areas.

DANGER!

Electric shock hazard!

▲ Always pull out the mains plug before any work on the device.

DANGER!

Electric shock hazard if the mains cable is damaged!

▲ Check the mains cable for damage regularly and replace it immediately if it is damaged.

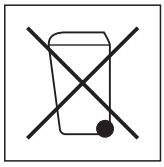
▲ On the rear side of the device, maintain a clearance of at least 1.2" (3 cm) in order to prevent the mains cable bending too much.

CAUTION!

On no account open the device!

The warranty is void if this stipulation is ignored. The device may only be opened by authorized persons.

▲ Call METTLER TOLEDO Service.



Disposal

➜ Observe the valid environmental regulations when disposing of the scale.

If the device has a rechargeable battery:

The battery contains heavy metals and therefore must not be disposed of with normal waste.

➜ Observe the local regulations for disposing of environmentally hazardous materials.

Note **Use with foodstuffs**

Parts coming into contact with foodstuffs have smooth surfaces and are easy to clean. The materials used do not splinter and are free of harmful substances.

With foodstuffs, it is recommended to use the protective cover, see section 7.2 Accessories.

➜ Clean the protective cover regularly and carefully.

➜ Replace damaged or very dirty protective cover immediately.

1.2 Description

METTLER TOLEDO weighing platforms can be connected to the terminal IND445 without any problems.

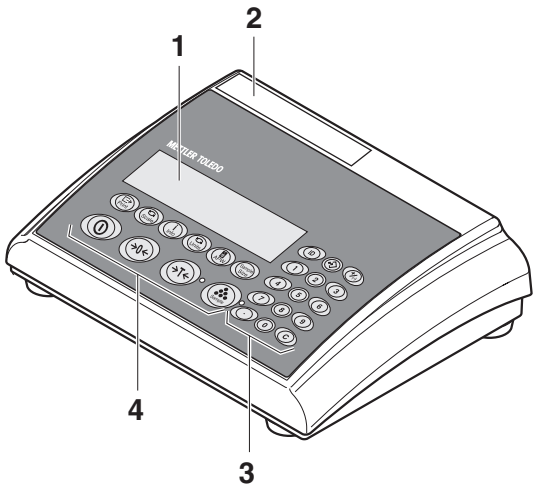
The power supply is carried out via a built-in power supply device or an external battery.

One of the following options can also be ordered:

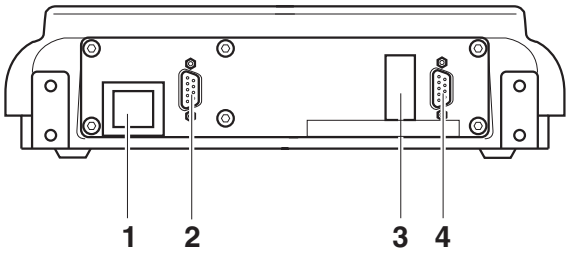
- Additional interface RS232 or RS485
- Ethernet interface
- USB interface
- Digital I/O
- OptionBox for
  - AccuPac
  - Analog second scale interface

1.2.1 Overview

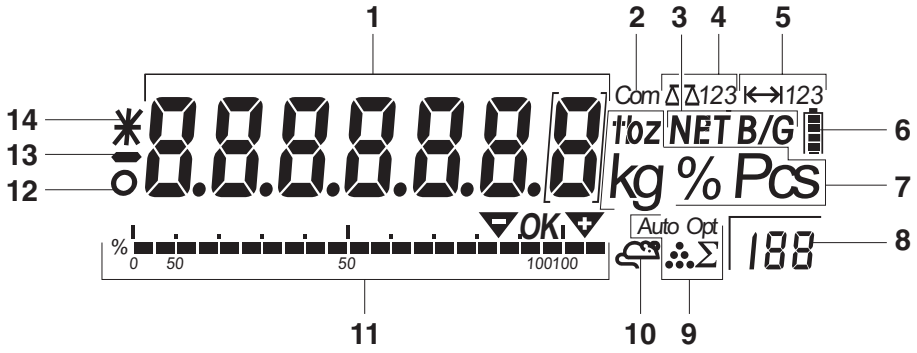
1 Display
2 Specifications, rating plate
3 Numerical keys
4 Function keys



1 Power supply connection
2 Weighing platform connection
3 Optional interface
4 RS232 interface



1.2.2 Display



1 7-segment display, 7 digits, with decimal point

2 Active interface

3 Symbol for displaying gross and net values

4 Active scale

5 Weighing range display

6 Battery charge level; only present on scales with a battery

7 Weight units

8 Selected reference quantity

9 Symbols for optimizing the average piece weight and accumulating

10 Symbol for dynamic weighing

11 Graphic display of the weighing range, display for checkweighing

12 Stability monitor (goes out when a stable weight value is reached)

13 Sign

14 Identification for changed or calculated weight values, e.g. higher resolution, minimum weight not reached

1.2.3 Keypad

Main functions

Key	Function in operating mode	Function in the menu
	Switching device on / off, abort	To the last menu item –End–
	Setting scale to zero	Scrolling back
	Taring scale The LED next to the key flashes when the key must be pressed, if the operator guidance is activated in the menu.	Scrolling forward
	Determining average piece weight and displaying the number of pieces The LED next to the key flashes when the key must be pressed, if the operator guidance is activated in the menu.	No function
	Transfer key Long key press: Calling up menu	Activating menu item Accepting selected setting

Additional functions

Key	Function
	Switching the scale
	Info key: Calling up additional information, e.g. gross weight, average piece weight, higher resolution …
	Switching weight unit
	Entering average piece weight
	Selecting reference quantity
	Entering identification
	Memory

Key	Function
	Sign; adding/subtracting
	Clear key
Keys 0 ... 9 and decimal point	Numerical keys for entering weight values, identifications ...

1.3 Putting into operation

For startup, connect the terminal to an analog METTLER TOLEDO weighing platform.

1.3.1 Connecting the power supply

CAUTION!

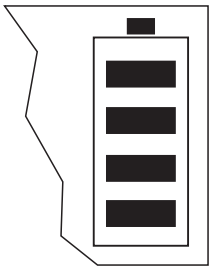
Before connecting the scale to the mains, check whether the voltage value printed on the rating plate corresponds with the local mains voltage.

▲ Never connect the device if the voltage value printed on the rating plate is different to the local mains voltage.

➜ Plug the mains plug into the socket.

After connection, the device performs a self-test. When the zero display appears, the device is ready to weigh.

➜ Calibrate the device in order to obtain the greatest possible precision, see Section 4.3.2.



Terminals with AccuPac can work independently from the mains for approximately 30 hours in normal operation. A prerequisite for this is that the background lighting is switched off and that no peripheral devices are connected.

The battery symbol indicates the present charging level of the battery. 1 segment corresponds to approx. 25 % capacity. When the symbol flashes the battery must be charged (min. 4 hours). The charging period is extended if work is continued during charging. The battery is protected against overcharging.

Note The battery's charging capacity can be reduced under continuous mains operation.

➜ To maintain the charging capacity, after a maximum of 4 weeks discharge the battery completely before recharging it.

2 Operation

2.1 Switching on and off

Switching on

➜ Press ⏻.

The scale conducts a display test. When the weight display appears, the scale is ready to weigh.

Switching off

➜ Press ⏻.

Before the display goes out, `-OFF-` appears briefly.

2.2 Zeroing / Zero point correction

Zeroing corrects the influence of slight changes on the load plate.

Manual

1. Unload scale.
2. Press →0←.

   The zero display appears.

Automatic

In the case of scales that cannot be certified, the automatic zero point correction can be deactivated in the menu or the amount can be changed.

As standard, the zero point of the scale is automatically corrected when the scale is unloaded.

2.3 Simple weighing

1. Place weighing sample on scale.
2. Wait until the stability monitor ○ goes out.
3. Read weighing result.

2.4 Weighing with tare

2.4.1 Taring

➜ Place the empty container on the scale and press →T←.

The zero display and the symbol **NET** appear.

The tare weight remains saved until it is cleared.

2.4.2 Clearing the tare

➜ Press C.

The symbol **NET** goes out, and the scale goes to gross mode.

If `A.CL-tr` is activated in the menu, the tare weight is automatically cleared as soon as the scale is unloaded.

2.4.3 Automatic taring

Prerequisite

`A-tArE` is activated in the menu, the symbol **T** flashes in the display.

➜ Place the container or packaging material on the scale.

The packaging weight is automatically saved as the tare weight, the zero display and the symbol **NET** appear.

2.4.4 Numerical tare weight entry

1. Enter the known tare weight numerically and press →T←.

   The entered weight is automatically saved as the tare weight, the symbol **NET** and the tare weight with a minus sign appear.

2. Place the filled container on the scale.

   The net weight appears in the display.

2.4.5 Taring by calling up a saved tare value

IND445 have a total of 100 memory locations for frequently used tare values, average piece weights, target weights and target quantities. In the factory setting, the memory locations 01 to 40 are reserved for tare values. The saved tare values are also preserved when the scale is switched off.

Saving tare weights

1. Determine the tare weight in one of the ways described earlier.
2. Enter the memory location number (factory setting: 1 ... 40) and keep ⇔ pressed until the confirmation appears in the display, e.g. `tArE.12`.

Note If a tare weight had already been saved under the selected memory location, the message `rEPLACE` appears in the display.

- To save the new tare weight, press Print. The old tare weight is overwritten.
- To abort the save process, press →T←. The previous memory location assignment remains valid.

Calling up tare weights

➜ Enter the number of the memory location with the required tare weight (factory setting: 1 ... 40) and press ⇔ briefly.

The selected tare value is loaded from the memory and appears briefly in the display. The scale tares with the selected tare value and then displays the current net weight.

Clearing saved tare weights

1. Enter the number of the memory location with the tare weight to be cleared (factory setting: 1 ... 40) and press ⇔ briefly.

   The saved tare value is displayed.
2. Press C within 2 seconds.

   `CLEArED` briefly appears in the display. The saved tare value is cleared.

2.4.6 Chain tare

Prerequisite

The tare function `CHAIn.tr` is activated in the menu.

With this function it is possible to tare several times if, for example, cardboard is placed between individual layers in a container.

1. Place the first container or packaging material on the scale and press →T←.

   The packaging weight is automatically saved as the tare weight, the zero display and the symbol **NET** appear.
2. Weigh the weighing sample and read/print out the result.
3. Place the second container or packaging material on the scale and press →T← again.

   The total weight on the scale is saved as the new tare weight. The zero display appears.
4. Weigh the weighing sample in the second container and read/print the result.
5. Repeat the last two steps for other containers.

2.5 Displaying the capacity available

The scale has a graphic display of the scale capacity available. The bar indicates how many per cent of the scale capacity is already occupied and what capacity is still available. In the example, approx. 65 % of the scale capacity is occupied.

2.6 Dynamic weighing

With the dynamic weighing function, it is possible to weigh restless weighing samples such as live animals. If this function is activated, the symbol appears in the display.

With dynamic weighing, the scale calculates the mean value from 56 weighing operations within 4 seconds.

With manual start

Prerequisite

`AVErAGE -> MAnuAL` is selected in the menu.

The weighing sample must be heavier than 5 scale divisions.

1. Place the weighing sample on the scale and wait until it has stabilized.
2. Press Print to start dynamic weighing.

   During dynamic weighing, horizontal segments appear in the display, and the dynamic result is then displayed with the symbol *****.
3. Unload the scale to be able to start a new dynamic weighing operation.

With automatic start

Prerequisite

`AVErAGE -> AUtO` is selected in the menu.

The weighing sample must be heavier than 5 scale divisions.

1. Place the weighing sample on the scale.

   The scale starts the dynamic weighing automatically.

   During dynamic weighing, horizontal segments appear in the display, and the dynamic result is then displayed with the symbol *****.

2. Unload the scale to be able to perform a new dynamic weighing operation.

2.7 Weighing-in to a target weight and checkweighing

The terminal IND445 allows the weighing-in of goods to a particular target weight within defined tolerances. With this function it is possible to check whether weighed materials are within a defined tolerance range.

The terminal IND445 has a total of 100 memory locations for frequently used tare values, average piece weights, target weights and target quantities. In the factory setting, the memory locations 81 to 90 are reserved for target weights. The saved target weights are also preserved when the terminal is switched off.

2.7.1 Saving target weights

1. Enter the memory location number (factory setting: 81 ... 90) and keep ⇔ pressed until the confirmation `tArGEt` appears in the display.
2. Enter the target weight in the defined unit, e.g. 1.5 kg, and confirm with Print.

   The display `tOLER` appears and **+** flashes.
3. Enter the upper tolerance in the displayed weight unit, e.g. 0.1 kg, and confirm with Print:

   -or-

   ➜ Press Print, enter the upper tolerance range in per cent and confirm with Print.

   The display `tOLEr` appears and **–** flashes.
4. Enter the lower tolerance accordingly.

   The scale returns to weighing mode.

Note If a target weight had already been saved under the selected memory location, the message `rEPLACE` appears in the display.

- To save the new target weight, press Print. The old target weight is overwritten.
- To abort the save process, press →T←. The previous memory location assignment remains valid.

2.7.2 Calling up target weights

➜ Enter the number of the memory location with the required target weight (factory setting: 81 ... 90) and press ⇔ briefly.

The selected target weight and the tolerances are loaded from the memory and appear briefly in the display. The scale is now ready for weighing-in or checkweighing.

2.7.3 Weighing-in

1. Place the empty container on the scale and tare.
2. Fill the container with the weighing sample.

The dispensing process can be followed in the graphic display. The 50 % marking is on the far left here, so that more display segments are available for precise filling between 50 % and 100 %.

As long as the lower tolerance is not reached, the minus tolerance mark is displayed.

If the weight of the weighing sample is within the defined tolerance, the mark **OK** is visible and a short beep sounds if activated in the menu.

When the plus tolerance mark appears, the weight is above the permissible tolerance.

2.7.4 Checkweighing

1. Place the weighing sample on the scale.

2. Use the displayed mark to check whether the weighing sample is below, within or above the defined tolerance.

2.7.5 Clearing the saved target weights

1. Enter the number of the memory location with the target weight to be cleared (factory setting: 81 ... 90) and press ⇔ briefly.

   The saved target weight is displayed.

2. Press C within 2 seconds.

   `CLEArED` briefly appears in the display. The saved target weight is cleared.

2.8 Working with identifications

Weighing series can be assigned 2 identification numbers ID1 and ID2 with up to 40 characters that are also printed out on the protocols.

If for example a customer number and an article number are assigned, it can be clearly seen on the protocol which article was weighed for which customer.

2.8.1 Entering identification

1. Enter identification and press (ID).

   `IdENt 1` appears in the display.

2. If the entered identification is to be saved as ID1, press (Print). If the entered identification is to be saved as ID2, first press (→T←), and then press (Print).

   The scale returns to weighing mode.

2.8.2 Displaying identification

➜ Displaying ID1: Briefly press (ID) once.

The number currently assigned to the ID1 appears in the display. If no ID1 was assigned, `no Id` appears.

➜ Displaying ID2: Briefly press (ID) twice.

The number currently assigned to the ID2 appears in the display. If no ID2 was assigned, `no Id` appears.

2.8.3 Clearing identifications

1. Briefly press (ID) once to display ID1 or briefly press (ID) twice to display ID2.
2. Press (C) for as long as the identification is displayed.

   The clearing is briefly confirmed with the message `CLEArEd`.

2.9 Printing results

If a printer or computer is connected to the scale, the weighing results can be printed out or sent to a computer.

➜ Press (Print).

The display contents are printed out and transferred to the computer. See Section 8.2 for sample protocols.

2.10 Displaying info

Up to 13 different values to be displayed can be configured in the menu for the key (i Info).

Depending on the configuration in the menu, see Section 4.4.5, the following values can be stored in any order (for example):

- Net quantity
- Gross weight
- Average piece weight
- Average piece weight, higher resolution
- Counting accuracy

1. Press (i Info).
   The first value is displayed.
2. Press (i Info) again.
   The next value is displayed.
3. Repeat as often as necessary until the weight display appears again.

Note If (i Info) is not pressed again within 5 seconds, the scale automatically changes to the weight display, even if all information has not yet been queried.

2.11 Switching scales

If a second scale or a weighing platform is connected, e. g. via the optional analog second scale interface, the currently active scale is shown in the display.

The second scale can be operated in exactly the same way as the first scale.

➜ Press (Scale).
   The display changes from one scale to the other.

2.12 Accumulating

The terminal IND445 can accumulate weight values or pieces. Individual items can also be subtracted.

A connected printer offers you the possibility of generating a printout for each individual item and/or a complete printout. For settings in the menu, see Section 4.4.2.

2.12.1 Accumulating items

1. Place the first item on the scale and press (+/-) .

   The weight value or the number of pieces are saved and, if necessary, printed out.

2. Unload scale.
3. Place the next item on the scale and press (+/-) again.

   The weight value and the number of pieces of the next item are added to those of the previous one.

4. Unload scale.
5. Repeat steps 3 and 4 for all other items.

2.12.2 Subtracting items

1. Place the item on the scale, press and hold down (+/-) .

   The weight value or the number of pieces are subtracted and, if necessary, printed out.

2. Unload scale.

2.12.3 Completing accumulating

➜ When the last item has been accumulated, press (C) .

The "Final Printout" is produced. The sum memory and the item counter are cleared. The scale is ready for the next totalising process.

2.12.4 Calling up sum information

If the key (i Info) is assigned accordingly, the number of items, the net sum, the gross sum and the number of pieces of the current item can be called up via this key, see Section 4.4.5.

2.13 Cleaning

CAUTION!

Electric shock hazard!

▲ Before cleaning with a damp cloth, pull out the mains plug to disconnect the unit from the power supply.

Other cleaning information:

- Use damp cloths.
- Do not use any acids, alkalis or strong solvents.
- Do not clean using a high-pressure cleaning unit or under running water.
- Follow all the relevant instructions regarding cleaning intervals and permissible cleaning agents.

3 Counting

The terminal IND445 has additional functions for piece counting. The relevant settings in the menu are described in Section 4.4.1.

3.1 Counting parts into a container

1. Place the empty container on the scale and press →T←.

   The container is tared and the zero display appears.

2. Put the number of pieces displayed above the key Sample Size on the scale and press Sample.

   The scale determines the average piece weight and then shows the number of pieces preset.

3. Add more parts to the container until the required number of pieces is reached.

4. When the piece counting is completed, press the key C to clear the result.

   The scale is ready for the next weighing or counting.

Note

- The average piece weight remains saved in the factory setting until a new average piece weight is determined.
- With Units it is possible to switch between the number of pieces and the weighing units preset.
- Depending on the assignment, it is possible to display the average piece weight, i. e. the weight of an individual reference unit, with i Info.
- If `A.CL-APW ON` is set in the menu, the average piece weight is automatically cleared after each counting operation. The average piece weight must be determined again for the next counting operation.
- If `ACCurCY ON` is set in the menu, the accuracy achieved is briefly shown after the number of pieces is determined.

3.2 Counting parts out of a container

1. Place the full container on the scale and press →T←.

   The container is tared and the zero display appears.

2. Remove the number of pieces displayed above the key Sample Size and press Sample.

   The scale determines the average piece weight and then shows the number of pieces removed, together with a minus sign.

3. Remove more parts from the container until the required number of pieces is reached.

3.3 Counting with operator guidance

The terminal IND445 has 2 LEDs on the right next to the keys →T← and Sample. A flashing LED requests the relevant action and, if applicable, confirmation with the key. A corresponding setting in the menu enables the work sequence for counting to be defined.

3.3.1 First taring, then counting

Prerequisite

`PrOMPt -> tAr-SPL` is set in the menu. The LED next to the key →T← flashes when the load is taken off the scale.

1. Place the empty container on the scale and press →T←.

   The container is tared, the zero display appears and and the LED next to the key Sample flashes.

2. Place the number of pieces displayed via the key Sample Size into the container.

   The scale automatically determines the average piece weight and the weight display changes to **PCS**.

3. Fill the container with the material being counted.

3.3.2 First specifying a reference, then taring

This mode is particularly suitable when counting out of a full container.

Prerequisite

`PrOMPt -> SPL-tAr` is set in the menu. The LED next to the key Sample flashes when the scale is relieved.

1. Place the number of pieces displayed via the key Sample Size on the scale.

   The scale automatically determines the average piece weight, the weight display changes to **PCS** and the LED next to the key →T← flashes.

2. Take the reference parts off the scale and place a (full) container on the scale.
3. Press →T←.

   The container is tared and the zero display appears.

4. Count the material out of the container.

3.3.3 Hands free

In this mode, no keys need to be pressed on the scale, which leaves the hands free for handling the material being counted.

Prerequisite

`PrOMPt -> hAndSFr` is set in the menu. The LED next to the key →T← flashes when the scale is relieved.

1. Place an empty container on the scale.

   The container is automatically tared, the zero display appears and the LED next to the key Sample flashes.

2. Place the number of pieces displayed above the key Sample Size into the container.

   The scale automatically determines the average piece weight and the weight display changes to **PCS**.

3. Fill the container with the material being counted.

3.4 Counting with variable reference quantity

Prerequisite

`VAr-SPL ON` must be set in the menu.

1. Place any number of reference parts on the scale.
2. Enter the number of reference parts with the numerical keypad and press Sample Size.

   The scale determines the average piece weight and then shows the number of pieces.

The rest of the counting process is as described earlier.

3.5 Counting with minimum accuracy

The item `Min.rEFW` in the menu allows to preset a minimum accuracy of 97.5 %, 99.0 % or 99.5 %. On the basis of this, the scale calculates the minimum reference weight necessary to reach the defined accuracy.

1. Place the reference parts on the scale and press Sample.
2. If the average piece weight is not sufficient to ensure the desired accuracy, `Add x` **PCS** appears.
3. Add the displayed number of pieces.

   The scale then automatically determines the average piece weight with the larger reference quantity.

The rest of the counting process is as described earlier.

3.6 Reference optimization

3.6.1 Automatic reference optimization

`rEF.OPt -> AUtO` must be set in the menu for this. The symbol **Auto Opt** appears in the display.

1. Place the reference parts on the scale and press (Sample).
2. Place additional reference parts, max. the same number as for the first reference determination, on the scale.

   The scale automatically optimises the average piece weight with the larger number of reference parts.

The rest of the counting process is as described earlier.

Note The reference optimization can be performed several times.

3.6.2 Manual reference optimization

`rEF.OPt -> MAnuAL` must be set in the menu for this.

1. Place the reference parts on the scale and press (Sample).
2. Place additional reference parts, max. the same number as for the first reference determination, on the scale and press (Sample).

   The scale optimises the average piece weight with the larger number of reference parts.

The rest of the counting process is as described earlier.

Note The reference optimization can be performed several times.

3.7 Counting with automatic reference determination

Prerequisite

`A-SMPL ON` is set in the menu.

➜ Place the number of pieces displayed above the key (Sample Size) into the container.

The scale automatically determines the average piece weight and then shows the quantity.

The rest of the counting process is as described earlier.

3.8 Counting with a known average piece weight

➜ Enter the known average piece weight via the numerical keypad and press (APW).

The scale changes the unit to PCS.

The rest of the counting process is as described earlier.

3.9 Counting by calling up a saved average piece weight

The terminal IND445 has a total of 100 memory locations for frequently used tare values, average piece weights, target weights and target quantities. In the factory setting, the memory locations 41 to 80 are reserved for average piece weights. The saved average piece weights are also preserved when the terminal is switched off.

3.9.1 Saving average piece weights

1. Determine the average piece weight in one of the ways described earlier.
2. Enter the memory location number (factory setting: 41 ... 80) and keep ⇔ pressed until the confirmation appears in the display, e.g. `APW.41`.

Note If an average piece weight had already been saved under the selected memory location, the message `rEPLACE` appears in the display.

- To save the new average piece weight, press Print. The old average piece weight is overwritten.
- To abort the save process, press →T←. The previous memory location assignment remains valid.

3.9.2 Calling up average piece weights

➜ Enter the number of the memory location with the required average piece weight (factory setting: 41 ... 80) and press ⇔ briefly.

The selected reference value is loaded from the memory and appears briefly in the display. The scale determines the number of pieces with the selected reference value.

3.9.3 Clearing saved average piece weights

1. Enter the number of the memory location with the average piece weight to be cleared (factory setting: 41 ... 80) and press ⇔ briefly.

   The saved average piece weight is displayed.
2. Press C within 2 seconds.

   `CLEArED` briefly appears in the display. The saved average piece weight is cleared.

3.10 Counting by calling up a saved target quantity

The terminal IND445 has a total of 100 memory locations for frequently used tare values, average piece weights, target weights and target quantities. In the factory setting, the memory locations 91 to 100 are reserved for target quantities. The saved target quantities are also preserved when the terminal is switched off.

3.10.1 Saving target quantities

1. Enter the memory location number (factory setting: 91 ... 100) and keep ⇔ pressed until the confirmation `tARGEt` appears in the display.
2. Enter the target quantity and confirm with Print.

   The display `tOLEr` appears and **+** flashes.
3. Enter the upper tolerance in pieces and confirm with Print.

   The display `tOLEr` appears and – flashes.
4. Enter the lower tolerance accordingly.

   The scale returns to weighing mode.

Note If a target quantity had already been saved under the selected memory location, the message `rEPLACE` appears in the display.

- To save the new target quantity, press Print. The old target quantity is overwritten.
- To abort the save process, press →T←. The previous memory location assignment remains valid.

3.10.2 Calling up target quantities

➜ Enter the number of the memory location with the required target quantity (factory setting: 91 ... 100) and press ⇔ briefly.

The selected target quantity and the associated tolerances are loaded from the memory and appear briefly in the display.

3.10.3 Counting in to target quantities

1. Place the empty container on the scale and tare.
2. Specify a reference.
3. Fill the container with the material being counted.

The counting-in process can be followed in the graphic display. The 50 % marking is on the far left here, so that more display segments are available for precise filling between 50 % and 100 %.

As long as the lower tolerance is not reached, the minus tolerance mark is displayed.

If the counted-in number of pieces is within the defined tolerance, the mark **OK** is visible and a short beep sounds if activated in the menu.

When the plus tolerance mark appears, the number of pieces is above the permissible tolerance.

3.10.4 Clearing saved target quantities

1. Enter the number of the memory location with the target quantity to be cleared (factory setting: 91 ... 100) and press ⇔ briefly.

   The saved target quantity with tolerances is displayed.

2. Press C within 2 seconds.

   `CLEArED` briefly appears in the display. The saved target quantity is cleared.

3.11 Counting with two scales

For piece counting, it is possible to connect a second scale or weighing platform, e. g. a floor scale for counting a large number of pieces via the optional analog second scale interface.

The necessary settings for the application and interface parameters are described in the Sections 4.4.1, 4.6.1 and 4.6.4.

3.11.1 Counting with a reference scale

Prerequisite

The connected second scale is configured as reference scale.

1. Place the reference parts on the reference scale and press Sample.

   The scale determines the average piece weight and changes to the display in pieces (PCS).

2. Place the parts to be counted on the first scale.

   The total quantity is displayed.

Note

- If `tOtAL-Ct` -> `bULK` is set in the menu, only the number of pieces on the bulk scale is displayed.
- If `tOtAL-Ct` -> `bOtH` is set in the menu, the reference quantity is added to the bulk quantity.

3.11.2 Counting with a bulk scale

Prerequisite

The connected second scale is configured as bulk scale.

1. Place the reference parts on the first scale and press (Sample).

   The scale determines the average piece weight and changes to the display in pieces (PCS).

2. Place the parts to be counted on the bulk scale.

   The total quantity is displayed.

Note

- If `tOtAL-Ct` -> `bULK` is set in the menu, only the number of pieces on the bulk scale is displayed on the bulk scale.
- If `tOtAL-Ct` -> `bOtH` is set in the menu, the reference quantity is added to the bulk quantity.

3.11.3 Counting with an auxiliary scale

Note This configuration allows counting of diverse parts, for example very small parts on one scale and large parts on the other scale.

Prerequisite

The connected second scale is configured as an auxiliary scale. The scale doesn't change automatically but only after pressing the (Scale) key.

1. Activate the appropriate scale.
2. Place the reference parts on this scale and press (Sample).

   The scale determines the average piece weight and changes to the display in pieces (PCS).

3. Place the parts to be counted on the same scale.

   The number of pieces is displayed.

4 Settings in the menu

Settings can be changed and functions can be activated in the menu. This enables adaptation to individual weighing requirements.

The menu consists of 6 main blocks containing various submenus on several levels.

4.1 Operating the menu

4.1.1 Calling up the menu and entering the password

The menu differentiates between 2 operating levels: Operator and Supervisor. The Supervisor level can be protected by a password. When the device is delivered, both levels are accessible without a password.

Operator menu

1. Press (Print) and keep it pressed until `COdE` appears.
2. Press (Print) again.

   The menu item `tErMINL` appears. Only the submenu `dEVICE` is accessible.

Supervisor menu

1. Press (Print) and keep it pressed until `COdE` appears.
2. Enter the password and confirm with (Print).

   The first menu item `SCALE` appears.

Note No supervisor password has been defined when the device is first delivered. Therefore respond to the password inquiry with (Print) when you call up the menu for the first time.

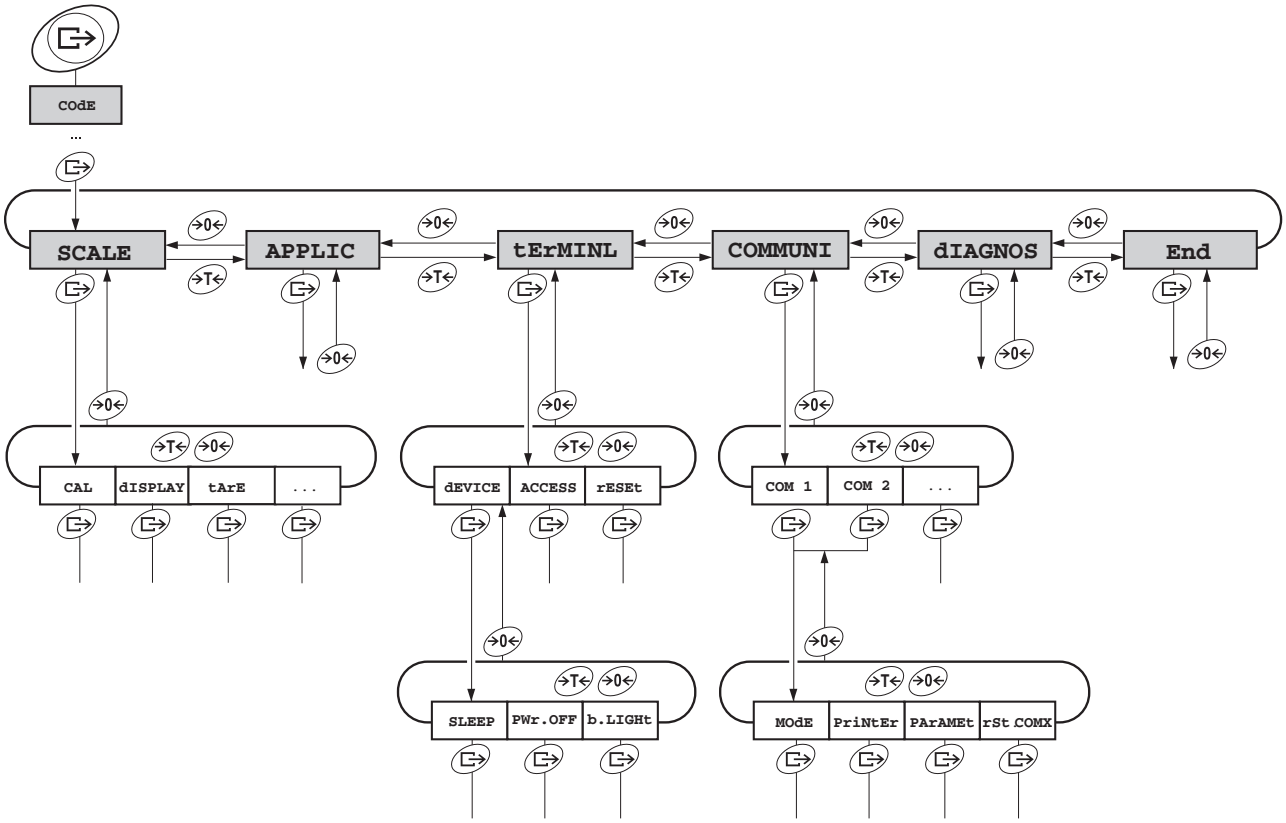
If a password has still not been entered after a few seconds, the scale returns to weighing mode.

Emergency password for Supervisor access to the menu

If a password has been issued for Supervisor access to the menu and you have forgotten it, you can still enter the menu:

➜ Press (→0←) 3 times and confirm with (Print).

4.1.2 Selecting and setting parameters



Scrolling on one level

➜ Scroll forward: Press →T←.

➜ Scroll back: Press →0←.

Activating menu items/ accepting selection

➜ Press Print.

Exiting menu

1. Press ⏻.
   The last menu item END appears.
2. Press Print.
   The inquiry SAVE appears.
3. Confirm inquiry with Print to save the settings and return to weighing mode.
   -or-

➜ Press →T← to discard changes and return to weighing mode.

4.2 Overview

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	tArE	A-tArE	ON, **OFF**			35
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		A.CL-tr	ON, **OFF**			
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		rEF.OPt	**OFF**, AUtO, MAnuAL			
		A-SMPL	ON, **OFF**			
		A.CL-APW	ON, **OFF**			
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		PWr OFF	**YES**, NO			
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			A.Print			
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			CONt.OLd			
			dIAL.OLd			
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				tArE	ON, OFF	
				nEt	ON, OFF	
			dt-G	GrOSS	ON, OFF	
				tArE	ON, OFF	
				nEt	ON, OFF	
			COnt-Wt			
			COnt-Ct			
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			2nd.dISP			
			rEF			
			bULK			
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				Add LF	0 … 9	
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	LiSt					
	LiSt2					
	LiSt.M					
	WOrK.tim	timE	SHOW.tIM			
		WEIGH	SHOW.WGH			
	rESEt.AL	SUrE?				

4.3 Scale settings (SCALE)

4.3.1 SCALE1/SCALE2 – Selecting scale

This menu item only appears if an analog second scale or a weighing platform is connected.

4.3.2 CAL – calibration (adjustment)

This menu item is not available for certified scales without internal calibration weight.

CAL	1. Unload scale. 2. Activate menu item CAL with Print. The scale determines the zero point. –0– appears in the display. The calibration weight to be placed on the scale then flashes in the display. 3. If necessary, change the weight value displayed with →T←. 4. Place the calibration weight on the scale and confirm with Print. The scale calibrates with the calibration weight loaded. After calibration is completed, –donE– appears briefly in the display, and the scale automatically returns to weighing mode.

4.3.3 DISPLAY – weighing unit and display accuracy

UNIt1	Select weighing unit 1: g, kg, oz, lb, t
UNIt2	Select weighing unit 2: g, kg, oz, lb, t
rESOLU	Select readability (resolution), model-dependent
UNt.rOLL	When UNT.rOLL is switched on, the weight value can be displayed in all available units with Units.
Notes	• On certified scales, resolutions that deviate from the scale definition are displayed without a weighing unit and with the symbol *****. • On dual-range/dual interval scales, resolutions marked with **I<–> 1/2I** are divided up into 2 weighing ranges / intervals, e.g. 2 x 3000 d.

4.3.4 TARE – tare function

A-tArE	Switching on/off automatic taring
CHAIn.tr	Switching on/off chain tare
A.CL-tr	Switching on/off automatic taring with automatic clearing of the tare weight when the load is removed from scale

4.3.5 ZERO – automatic zero update

AZM	On certified scales, this menu item does not appear. Switching on/off automatic zero update and selecting zeroing range. Possible settings: OFF; 0.5 d; 1 d; 2 d; 5 d; 10 d

4.3.6 RESTART – automatic saving of zero point and tare value

ON/OFF	When the Restart function is activated, the last zero point and tare value are saved. After switching off / on or after a power interruption, the device continues to work with the saved zero point and tare value.

4.3.7 FILTER – adaptation to the ambient conditions and the weighing type

VIbrAt	Adaptation to the ambient conditions
LOW	• Very steady and stable environment. The scale works very quickly, but is very sensitive to external influences.
MEd	• Normal environment. The scale operates at medium speed.
HIGH	• Restless environment. The scale works more slowly, but is insensitive to external influences.
PrOCESS	Adaptation to the weighing process
UNIVEr	• Universal setting for all weighing samples and normal weighing goods
dOSING	• Dispensing liquid or powdery weighing samples

StAbILI	Adjusting the weighing speed
FASt	• The scale operates very fast.
StAndrd	• The scale operates at medium speed.
PrECISE	• The scale operates with the greatest possible reproducibility.
	The slower the scale works, the greater the reproducibility of the weighing results.

4.3.8 MIN.WEIG – minimum weight

This menu item appears only if the service technician has saved a minimum weight.

ON/OFF	Switching minimum weight function on/off If the weight on the scale falls below the stored minimum weight, an * appears on the display in front of the weight indicator.

4.3.9 RESET – resetting scale settings to factory settings

SUrE?	Confirmation inquiry • Reset the scale settings to factory settings with Print • Do not reset scale settings with →T←

4.4 Application settings (APPLICATION)

4.4.1 COUNT – settings for counting

PrOMPt	Operator guidance
OFF	• No operator guidance
tAr-SPL	• The scale first requests the tare weight, then the reference parts. The tare weight must be confimed with the corresponding key.
SPL-tAr	• The scale first requests the reference parts, then the tare weight. The reference parts must be confirmed with the corresponding key.
hAndSFr	• The scale first requests the tare weight, then the reference parts. The tare weight and reference parts do not have to be confirmed, the hands are free for handling the material to be counted.
VAr-SPL	Adaptation of the reference quantity
ON	• The reference quantity can be changed in operating mode
OFF	• Counting only with defined reference quantities
Min.reFW	Monitoring the minimum reference weight
OFF	• No monitoring of the minimum reference weight
97.5, 99.0, 99.5	• Monitoring the minimum reference weight so that a counting accuracy of 97.5 %, 99.0 % or 99.5 % is achieved

rEF.OPt	Optimizing the average piece weight
OFF	• No reference optimization
AUtO	• Automatic reference optimization
MAnuAL	• Manual reference optimization
A-SMPL	Automatic determination of the average piece weight
ON	• After taring, the average piece weight is determined with the next weight placed on the scale and the displayed reference quantity
OFF	• No automatic determination of the average piece weight
A.CL-APW	Automatic clearing of the average piece weight
ON	• When the load is taken off the scale after a counting operation, the average piece weight is automatically cleared. The next counting operation begins with determining the average piece weight again.
OFF	• The average piece weight must be cleared manually by pressing C
ACCurCY	Displaying the counting accuracy
ON	• After the average piece weight is determined, the counting accuracy that can be achieved is shown briefly in the display.
OFF	• No counting accuracy display
tOtAl.Ct	Counting on two scales
bULK	• Display number of pieces for the parts on the bulk scale only
bOth	• Display number of pieces for all parts on the bulk and the reference scale

4.4.2 ACCUMULATION – totalising

PrINt	Configure printout for accumulation
COM 1/COM 2	Select interface for the connected printer / computer
LOt.PrINt	• Printout for each individual item
FIN.PrINt	• Printout only at the end of accumulation
SUMMArY	• Additional printout of the individual items after completion of accumulation
rEACH Z	Reach a stable zero point between two items
ON	• All load must first be removed from the scale before accumulation of the next item is possible
OFF	• No load removal requested between two items

4.4.3 CHECKWEIGHING

bEEPEr	Setting the beep for checkweighing
ON	• A short beep sounds when the target value is reached
OFF	• No beep

SP.tOL-	Limit for activation of the I/O relay box. The value to be entered is the percentage proportion of the lower tolerance of the target weight / target quantity. EXAMPLE Target weight:2000 g tOLER+:2010 g tOLER-:1990 g SP.tOL-:010 (%) The relay box is not activated until 199 g (= 10 % of 1990 g) is reached.
SENd.MOd	Defines the form in which the scale sends information to the I/O relay box
CONtINU	• Information is permanently sent
StAbLE	• Information is only sent if the weight value is stable

4.4.4 MEMORY – configuring memory

CONFIG	Configuring the memory partitions.
40-40-10	IND445 have a total of 100 memory localizations that can be assigned to tare values, average piece weights, target weights and target quantities. Factory settings: • 40 memory locations for tare values (01-40) • 40 memory locations for average piece weights (41-80) • 10 memory locations with target weights (81-90) • 10 memory locations with target quantities (91-100) The first target weight is called up e.g. with memory address No. 81. Changing the range for the memory locations: 1. Enter the new range and separate each range with a point (e. g. 30.30.20). The last range is automatically calculated. If an invalid entry is made, NOt.ALLO is shown in the display. Since only some of the entered values can be shown in the display, the display can be moved to the right with the aid of the →T← key. **Note** ➜ After every new partitioning, always check the memory values and adjust if necessary!
CLEAr.M	Clearing all memories.

4.4.5 INFO-KEY – assignment of the Info key

INFO1	
NOt.USEd	• Info space not occupied
PCS NEt	• Displays net weight in counting
GrOSS	• Displays gross weight
tArE	• Displays tare weight
APW	• Displays average piece weight
HIGHrES	• Shows display with a higher resolution
ACCUrCY	• Displays counting accuracy
n	• Displays number of totalised items
G tOtAL	• Displays gross sum
N tOtAL	• Displays net sum
PCS.tOtL	• Displays sum of pieces
tArGEt	• Displays target value and tolerances
dAtE	• Displays date
timE	• Displays time
INFO2 ... INFO13	As per INFO1

4.4.6 AVERAGE – determining the average weight for an unstable load

OFF	Calculating average weight switched off
AUtO	Calculating average weight with automatic start of the weighing cycle
MAnuAL	Calculating average weight with manual start of the weighing cycle via Print

4.4.7 RESET – resetting application settings to factory settings

SUrE?	Confirmation inquiry • Reset the application settings to factory settings with Print • Do not reset the application settings with →T←

4.5 Terminal settings (TERMINAL)

4.5.1 DEVICE – Sleep mode, energy-saving mode and display backlighting

SLEEP	This menu item only appears on devices in mains operation. When SLEEP is activated, the scale switches off display and backlighting after the time period set when not in use. The display and backlighting are switched on again at the press of a key or if the weight changes. Possible settings: OFF, 1 min, 3 min, 5 min
PWr OFF	This menu item only appears on devices in battery operation. When PWr OFF is activated, the device switches itself off automatically after approx. 3 minutes when not in use.
b.LIGHt	Switching the display backlighting on/off. On scales with a battery, the background lighting switches itself off automatically if there has been no activity on the scale for 5 seconds.
DAtE.tim	Setting date and time
DAtE.FOr	• Select type of date setting: EU or US
DAtE	• Enter the date in the selected format
tIME	• Enter the time
AM.PM	• Select AM/PM
bEEP	Switching beep on/off
ON	Switching on beep on each key press
OFF	Switching off beep on each key press
Note	This menu item is accessible without a Supervisor password.

4.5.2 ACCESS – password for Supervisor menu access

SUPErVI	Password entry for Supervisor menu access
ENtER.C	Request to enter password ➜ Enter the password and confirm with Print
rEtYPE.C	Request to repeat the password entry ➜ Enter the password again and confirm with Print
Notes	• The password can consist of up to 4 characters. • The key Print must not be part of the password. It is required for confirming the password. • The key →0← may only be used in combination with another key. • If you enter an impermissible code or make a typing error in the repetition, COdE.Err. appears in the display.

4.5.3 RESET – resetting terminal settings to the factory settings

SUrE?	Confirmation inquiry • Reset terminal settings to the factory settings with Print • Do not reset the terminal settings with →T←

4.6 Configuring interfaces (COMMUNICATION)

4.6.1 COM1/COM2 -> MODE – operating mode of the serial interface

Print	Manual data output to the printer with Print
A.Print	Automatic output of stable results to the printer (e. g. for series weighing operations)
CONtINU	Ongoing output of all weight values via the interface
dIALOG	Bi-directional communication via MT-SICS commands, control of the scale via PC
CONt.OLd	As per CONtINU, see above, but with 2 fixed blanks in front of the unit (compatible with Spider 1/2/3)
dIAL.OLd	As per dIALOG, see above, but with 2 fixed blanks in front of the unit (compatible with Spider 1/2/3)
dt-b GROSS tArE nEt	DigiTOL-compatible format. • Transfer of the gross weight, identified with "G" • Transfer of the tare weight • Transfer of the net weight
dt-G	As per dt-b, see above, gross weight identified with "G"
COnt-Wt	TOLEDO Continuous mode
COnt-Ct	TOLEDO Continuous mode, transfer of the number of pieces
bArc.rd	For connecting a serial bar code reader (automatically activates the 5-V voltage supply at Pin 9)
2nd.dISP	For connecting a second display (automatically activates the 5-V voltage supply at Pin 9)
rEF	Data transfer from the reference scale (automatic switchover)
bULK	Data transfer from the quantity scale (automatic switchover)
AuXILIA	Data transfer from the reference or quantity scale (manual switchover)

4.6.2 COM1/COM2 -> PRINTER – settings for protocol printout

This menu item only appears if the mode "Print" or "A.Print" is selected.

tEmPLat	Selecting protocol printout
StdArd	• Standard printout
tEmPLt1	• Printout in accordance with Template 1
tEmPLt2	• Printout in accordance with Template 2
ASCi.FmtT	Selecting formats for the protocol printout
LINE.Fmt	• Line format: MULtI (multi-line) or SINGLE (single-line)
LENGtH	• Line length: 0 ... 100 characters, appears only with line format MULtI
SEPArAt	• Separator: , ; . / \ _ and space; appears only with line format SINGLE
Add LF	• Line feed: 0 ... 9

4.6.3 COM1/COM2 -> PARAMET – communication parameter

bAUd	Selecting baud rate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 baud
PAritY	Selecting parity: 7 none, 8 none, 7 odd, 8 odd, 7 even, 8 even
H.SHAKE	Selecting Handshake: NO, XONXOFF, nEt422, nEt485 (network operation as per RS485 standard via the optional RS422/RS485 interface, only for COM1)
NET.Addr	Assigning network address: 0 ... 31, only for NET 485
ChECSuM	Activating checksum byte (appears only in TOLEDO Continuous mode)
Vcc	Switching 5V voltage, e.g. for a bar code reader, on / off

4.6.4 COM1/COM2 -> RESET COM1/RESET COM2 – resetting serial interface to factory settings

SUrE?	Confirmation inquiry • Reset terminal settings to the factory settings with (Print) • Do not reset the interface settings with (→T←)

4.6.5 OPTION – configuring options

If no option is installed or is not yet configured, `N.A.` appears in the display.

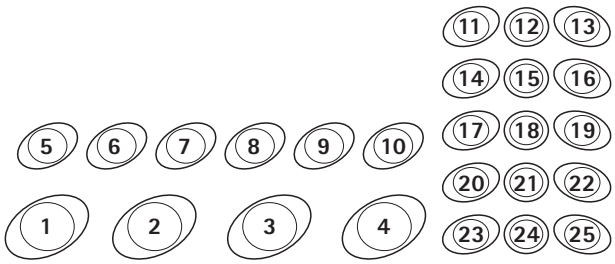
`EtH.NEt`	Configuration of the Ethernet interface
`IP.AddrS`	• Enter IP address
`SUBNEt`	• Enter Subnet address
`GAtEWAY`	• Enter Gateway address
`USb`	Configuration of the USB interface
`USb TEST`	• Test of the USB interface. After the test has been passed, `rEAdY` appears in the display.
`diGitAL`	Configuration of the digital inputs/outputs
`IN 1 ... 4`	Configuring inputs 1 … 4
`OFF`	• Input not assigned
`ZErO`	• Key →0←
`tArE`	• Key →T←
`PriNt`	• Key Print
`CLEAr`	• Key C
`SPL.SIZE`	• Key Sample Size
`SCALE`	• Key Scale
`inFO`	• Key Info
`UNIt`	• Key Units
`totAL+`	• Key +/(-), short press of key
`totAL-`	• Key +/(-), long press of key
`OUT 1 ... 4`	• Configuring outputs 1 … 4
`OFF`	• Output not assigned
`StAbLE`	• Stable weight value
`bEL.MIN`	• Minimum weight not reached
`AbV.MIN`	• Minimum weight reached or exceeded
`bEL.tOL`	• Tolerance not reached
`AbV.tOL`	• Tolerance exceeded
`GOOd`	• Weight within the tolerance
`UNdErLd`	• Insufficient load
`OVErLd`	• Overload
`StAr`	• Changed/calculated value

ANALOG	Configuration of the analog second scale interface
Mode	Operating mode of the second scale
rEF	• Second scale can only be used to determine the average piece weight
bULK	• Second scale can only be used as bulk scale
AuXILIA	• No difference between reference and bulk scale, all functions available on the scale selected
BYPASS	• Second scale interface not assigned

4.6.6 DEF.PRN – configuring templates

tEMPLt1/tEMPLt2	Selecting Template 1 or Template 2
LINE 1 ... 20	Select line
NOt.USEd	• Line not used
HEAdEr	• Line as header. The contents of the header must be defined via an interface command, see Section 5.1.
dAtE	• Date
timE	• Time
SCALE.NO	• Scale number
GROSS	• Gross weight
tArE	• Tare weight
nEt	• Net weight
APW	• Average piece weight
rEF Ct	• Reference quantity
PCS	• Pieces
tArGEt	• Target value
dEVIAt	• Deviation from the target value
ACC.NEt	• Totalised net weight
ACC.GrS	• Totalised gross weight
ACC.PCS	• Totalised number of pieces
ACC.LOt	• Totalised no. of items
StARLN	• Line with ***
CrLF	• Line feed (blank line)
F FEEd	• Page feed

4.7 Diagnosis and printing out of the menu settings (DIAGNOS)

tESt SC External	Testing scale with external calibration weight 1. The scale checks the zero point. –0– appears in the display. The test weight flashes in the display. 2. If necessary, change the weight value displayed with →T←. 3. Put the calibration weight on the scale and confirm with Print. 4. The scale checks the calibration weight put on them. 5. After the test is completed, the deviation from the last calibration briefly appears in the display, ideally *d=0.0g, after which the scale changes to the next menu item KboArd.
KboArd PUSH 1 ... 25	Keyboard test • Press the keys in the following order:  If the key works, the scale changes to the next key. **Note** You cannot abort the keyboard test! If you have selected the menu item KboArd, you must press all keys.
dISPLAY	Display test: The scale displays all functioning segments
SNr	Display of the serial number
SNr2	Display of the serial number of scale 2. This menu item only appears if an analog second scale is connected.
LiSt	Printout of a list of all menu settings
LiSt2	Printout of a list of all menu settings of scale 2. This menu item only appears if an analog second scale is connected.
LiSt.M	Printout of a list of all values and settings in the memory
WOrK.tim timE SHOW.tim WEIGH SHOW.WGH	Display of the operating time of the scale and the number of weighing operations performed • Operating time in hours, e.g. 56 h • Number of weighing operations, e.g. 135

rESEt.AL SUrE?	Resetting all menu settings to the factory settings Confirmation inquiry • Reset all menu settings to the factory settings with (Print) • Do not reset the menu settings with (→T←)

5 Interface description

5.1 SICS interface commands

The terminal IND445 supports the command set MT-SICS (METTLER TOLEDO **S**tandard **I**nterface **C**ommand **S**et). With SICS commands, it is possible to configure, query and operate the terminal from a PC. SICS commands are divided up into various levels.

For further information about the MT-SICS commands set, see MT-SICS Manual (Order No. 22 011 459) or contact METTLER TOLEDO Customer Service.

5.1.1 Available SICS commands

	Command	**Meaning**
LEVEL 0	@	Reset the scale
	I0	Inquiry of all available SICS commands
	I1	Inquiry of SICS level and SICS versions
	I2	Inquiry of scale data
	I3	Inquiry of scale software version
	I4	Inquiry of serial number
	S	Send stable weight value
	SI	Send weight value immediately
	SIR	Send weight value repeatedly
	Z	Zero the scale
	ZI	Zero immediately
LEVEL 1	D	Write text into display
	DW	Weight display
	K	Keyboard check
	SR	Send and repeat stable weight value
	T	Tare
	TA	Tare value
	TAC	Clear tare
	TI	Tare immediately

	Command	Meaning
LEVEL 2	C2	Calibrate with the external calibration weight
	C3	Calibrate with the internal calibration weight
	I10	Inquire or set scale ID
	DAT	Inquire or set current date
	I11	Inquiry of scale type
	P100	Print out on the printer
	P101	Print out stable weight value
	P102	Print out current weight value immediately
	PWR	Power On/Off
	SIRU	Send weight value in the current unit immediately and repeat
	SIU	Send weight value in the current unit immediately
	SNR	Send stable weight value and repeat after every weight change
	SNRU	Send stable weight value in the current unit and repeat after every weight change
	SRU	Send weight value in the current unit and repeat
	ST	After pressing the Transfer key, send the stable weight value
	SU	Send stable weight value in the current unit
	TIM	Inquire or set the time
	TST2	Start test function with external weight
	TST3	Start test function with internal weight
LEVEL 3	I12	ID1
	I13	ID2
	PW	Average piece weight
LEVEL SPECIAL	CLR	Clear
	DS	Short beep
	I31	Header for the printout
	ICP	Send configuration of the printout
	LST	Send menu settings
	M01	Weighing mode
	M02	Stability setting
	M03	Autozero function
	M19	Send calibration weight
	M21	Inquire/set weight unit
	P	Print text
	P130	Weight value, unit and price
	PCS	Number of pieces

	Command	Meaning
	PM	Set values for checkweighing
	PRN	Print out at every printer interface
	REF	Average piece weight
	RST	Restart
	SFIR	Send weight value immediately and repeat quickly
	SIH	Send weight value immediately in high resolution
	SWU	Switch weight unit
	SX	Send stable data record
	SXI	Send data record immediately
	SXIR	Send data record immediately and repeat
	U	Switch weight unit

5.1.2 Requirements for communication between scale and PC

- The scale must be connected to the RS232, RS485, USB or Ethernet interface of a PC with a suitable cable.
- The interface of the scale must be set to "Dialog" mode, see Section 4.6.1.
- A terminal progam must be available on the PC, e.g. HyperTerminal.
- The communication parameters baud rate and parity must be set in the terminal program and on the scale to the same values, see Section 4.6.3.

5.1.3 Notes on network operation via the optional interface RS422/485

Up to 32 scales can be networked with the optional RS422/485 interface. In network operation, the scales must be addressed from the computer before commands can be sent and weighing results received.

Description of the steps	Host	Direction	Scale
1. Host addresses the scale, e.g. with the address 3A hex.	<ESC> 3A	——>	
2. Host sends a SICS command, e.g. SI	SI <CRLF>	——>	
3. The scale confirms receipt of the command and sends the address back		<——	<ESC> 3A
4. The scale responds to the command and returns control of the bus to the host		<——	S_S____45.02_kg <CRLF>

5.2 TOLEDO Continuous mode

5.2.1 TOLEDO Continuous commands

The scale supports the following input commands in TOLEDO Continuous mode:

Command	Meaning
P <CR><LF>	Print out the current result
T <CR><LF>	Tare the scale
Z <CR><LF>	Zero the display
C <CR><LF>	Clear the current value
Tx.xxx <CR><LF>	Define tare

5.2.2 Output format in TOLEDO Continuous mode

Weight values are always sent in the following format in TOLEDO Continuous mode:

	Status			**Field 1**						**Field 2**							
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
STX	SWA	SWB	SWC	MSD	–	–	–	–	LSD	MSD	–	–	–	–	LSD	CR	CHK

Field 1	6 digits for the weight value that is sent without a decimal point and unit
Field 2	6 digits for the tare weight that is sent without a decimal point and unit
STX	ASCII characters 02 hex, characters for "start of text"
SWA, SWB, SWC	Status words A, B, C, see below
MSD	Most significant digit
LSD	Least significant digit
CR	Carriage Return, ASCII characters 0D hex
CHK	Checksum (2-part complement of the binary sum of the 7 lower bits of all previously sent characters, incl. STX and CR)

Status word A								
		Status Bit						
Function	**Selection**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Decimal position	X00	0	1			0	0	0
	X0					0	0	1
	X					0	1	0
	0.X					0	1	1
	0.0X					1	0	0
	0.00X					1	0	1
	0.000X					1	1	0
	0.0000X					1	1	1
Numerical increment	X1			0	1			
	X2			1	0			
	X5			1	1			

Status word B	
Function / value	**Bit**
Gross / net: Net = 1	0
Sign: Negative = 1	1
Overload = 1	2
Movement = 1	3
lb/kg: kg = 1	4
1	5
Powerup = 1	6

Status word C	
Function / value	**Bit**
0	0
0	1
0	2
Print request = 1	3
Extended = 1	4
1	5
Manual taring, only kg = 1	6

6 Event and error messages

Error	Cause	Remedy
Display Dark	• Back lighting set too dark	➜ Set back lighting (`b.LIGHt`) brighter
	• No mains voltage	➜ Check mains
	• Unit switched off	➜ Switch on unit
	• Mains cable not plugged in	➜ Plug in mains plug
	• Brief fault	➜ Switch device off and back on again
Insufficient load L - - - - J	• Load plate not on the scale	➜ Place load plate on the scale
	• Weighing range not reached	➜ Set to zero
Overload r - - - - 7	• Weighing range exceeded	➜ Unload scale
		➜ Reduce preload
- - - - - -	• Result not yet stable	➜ If necessary adjust vibration adapter or weigh dynamically
- - no - -	• Function not permissible	➜ Unload scale and set to zero
r - no - 7 L - no - J	• Zeroing not possible with overload or insufficient load	➜ Unload scale
Err 4	• Average piece weight too low	➜ Select and place larger number of reference parts on the scale
Err 5	• No valid value from the reference scale	➜ Check cable connection between the units
		➜ Check interface settings
Err 6	• No calibration	➜ Unplug the mains plug then plug it back in; switch unit off and then back on in battery mode
		➜ Calibrate scale
		➜ Call METTLER TOLEDO Service
Err 7	• Average piece weight too low	➜ Counting is not possible on this scale with this average piece weight

Error	Cause	Remedy
Err 9	• Unstable weight value when referencing	➜ Ensure stable surroundings ➜ Ensure that the weighing pan is freely movable ➜ Adjust vibration adapter
Err 14	• Impermissible target value or impermissible tolerance	➜ Repeat input with permissible values
Err 15	• Setting the average piece weight impermissible during weight accumulating	➜ End weight accumulating ➜ Reset average piece weight
Err 16	• Switching the weighing unit impermissible during weight accumulating	➜ End weight accumulating ➜ Switch weighing unit
Err 17	• Printout not yet ended	➜ End printout ➜ Repeat required action
Err 18	• Switching the weighing unit impermissible during dynamic weighing	➜ End dynamic weighing ➜ Switch weighing unit
Err 53	• EAROM checksum error	➜ Unplug the mains plug then plug it back in; switch unit off and then back on in battery mode ➜ Call METTLER TOLEDO Service
Reference optimization not possible oPtErr	• The total weight of the reference parts exceeds 4 % of the scale capacity • No additional parts were put on the scale for manual reference optimization	➜ Put on fewer reference parts ➜ Put on reference parts for optimization ➜ Call METTLER TOLEDO Service
Weight display unstable	• Restless installation location • Draft • Restless weighing sample • Contact between weighing pan and/or weighing sample and surroundings • Mains fault	➜ Adjust vibration adapter ➜ Avoid drafts ➜ Dynamic weighing ➜ Remedy contact ➜ Check mains

Error	Cause	Remedy
Incorrect weight display	• Incorrect zeroing	➜ Unload scale, set to zero and repeat weighing operation
	• Incorrect tare value	➜ Clear tare
	• Contact between weighing pan and/or weighing sample and surroundings	➜ Remedy contact
	• Scale tilted	➜ Level scale

7 Technical data and accessories

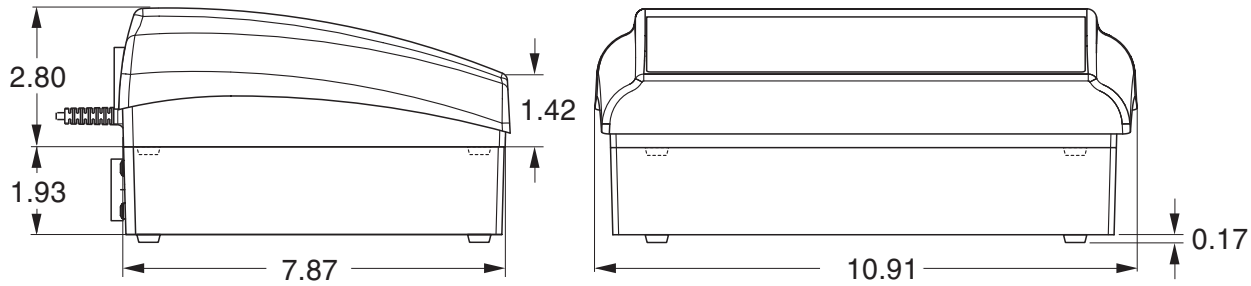
7.1 Technical data

7.1.1 General data

IND445	
Applications	• Weighing • Dynamic weighing • Counting with fixed or variable reference quantity • Counting with reference and bulk scale • Accumulating • Numerical definition of tare weights, average piece weights and reference quantities • 100 memory locations for tare weights, average piece weights, target weights and target quantities • Checkweighing and weighing-in to target weight/target quantity
Settings	• Resolution selectable • Weighing unit selectable: g, kg, oz, lb, t • Taring function: manual, automatic, chain tare • Automatic zero point correction when the scale is switched on and during operation • Filter for adapting to the ambient conditions (vibration adapter) • Filter for adapting to the weighing type, e.g. dispensing (weighing process adapter) • Switch-off function, sleep mode for mains-operated devices, energy-saving mode for battery operation • Display lighting • Handsfree mode for counting without touching any keys • Add mode for determining the piece weight when counting • Reference optimization • Programmable memories and identifications • Date and time • Signal tone • Graphic display of the weighing range
Display	• LCD (liquid crystal display), digits 0.63" (16 mm) high, with back lighting
Keypad	• Pressure point membrane keypad • Scratch-proof labeling

IND445		
Housing	• Diecast aluminum housing • Dimensions, see Page 57	
Protection Class (IEC 529, DIN 40050, EN60529)	• IP65 (not with Ethernet interface)	
Mains connection	Direct connection to the mains (MAINS supply voltage fluctuations up to ±10% of the nominal voltage): • 120 V, 60 Hz, 90 mA • 100 V, 50/60 Hz, 90 mA For battery operation: • Connection via mains adapter: 90 – 264 V, 47 – 63 Hz, 300 mA • Infeed on the unit: 24 V, 1.3 A	
Battery operation	If the voltage supply is interrupted, the unit automatically switches over to battery operation	
Ambient conditions	• Use • Altitude • Temperature • Overvoltage category • Contamination level • Relative humidity	Indoor use only up to 2000 m –10 .. +40 °C / 14 .. 104 °F II 2 Maximum relative humidity 80 % for temperatures up to 31 °C / 88 °F, decreasing linearly to 50 % relative humidity at 40 °C / 104 °F
Interfaces	• 1 RS232 interface integrated • 1 other optional interface possible	
Resolution of the analog second scale interface	• 300000 points in noncertified configuration • 10000 points in certified configuration	
Supply of the weighing cell	• 8.2 V	

7.1.2 Dimensions



Dimensions in inches

7.1.3 Net weights

	without battery	**with OptionPac (incl. battery)**
IND4..	5.2 lb (2.4 kg)	9.6 lb (4.4 kg)

7.1.4 Interface connections

The terminal can be fitted with a maximum of 2 interfaces. The following combinations are possible:

COM1	**COM2**	**Note**
RS232	–	
RS232	RS232	
RS485	RS232	COM1 can be optionally operated as RS422 or RS485
RS232	Ethernet	
RS232	USB	
RS232	Digital I/O	
RS232	Analog second scale interface	

7.1.5 Assignment of the interface connections

Pin	RS232 (COM1/ COM2)	RS422 (4-wire, COM1)	RS485 (2-wire, COM1)	Digital I/O (COM2)	Analog Interface
1	–	–	–	GND	+ Excitation (+8.2 VDC)
2	TxD1/2	TxD1–	TxD1–/RxD1–	OUT0	+ Sense
3	RxD1/2	RxD1–	–	OUT1	Shield
4	–	–	–	OUT2	– Sense
5	GND	GND	GND	OUT3	– Excitation (GND)
6	–	–	–	IN0	–
7	–	TxD1+	TxD1+/RxD1+	IN1	+ Signal
8	–	RxD1+	–	IN2	– Signal
9	VCC	VCC	VCC	IN3	–

7.2 Accessories

Designation	Order number
Protective cover for IND4..	21 255 045
Wallmount for IND4..	22 010 045
Second display	21 302 875
RS232 cable for second scale, 39.37" (1.8 m) long	21 252 588
RS232 cable for PC, 39.37" (1.8 m) long	00 410 024

8 Appendix

8.1 Safety checks

The terminal IND445 has been tested by accredited inspection bodies. It has passed the safety checks listed below and carries the relevant test symbols. Production is subject to production monitoring by the inspection offices.

Country	**Test symbol**	**Standard**
Canada USA	C US	CAN/CSA-C22.2 No. 1010.1-92 UL Std. No. 61010A-1
Other countries	**CB Scheme** (no identification)	IEC/EN61010-1:2001

8.2 Sample protocols

Weighing with tare

```
G          0.1085 kg
T          0.0145 kg
N          0.0940 kg
```

Dynamic weighing

```
Dyn WT     43.52 kg
T           3.78 kg
```

Printout with header

```
METTLER TOLEDO
www.mt.com


G          0.1085 kg
T          0.0145 kg
N          0.0940 kg
```

G = Gross weight

N = Net weight

T = Tare

Dyn WT = dynamically determined weight

Protocol of the scale settings (menu point `List`, see page 45)

```
SOFTWARE VER 5-2-1.04

SCALE
-------------
METROLO     :NO APPr
SNR         :0000000
Scale Build
 SCAL.TYP   :2MULT.RN
 BAS.UNIT   :g
 SCL.CAP1   :6000 g
 RESOL.1    :2 g
 SCL.CAP2   :15000 g
 RESOL.2    :5 g
GEO          :19
DISPLAY
 UNIt1      :g
 UNIt2      :t
 RESOLU     :2 g
 UNt.rOLL   :OFF
tArE
 A-TArE     :OFF
 CHAIn.tr   :ON
 A.CL-tr    :OFF
 PB.TArE    :ON
ZERO
 Z-CAPT     :-2 18
 AZM        :0.5 d
RESTART     :OFF
FILTER
 VIBRAT     :MED
 PROCESS    :UNIVEr
 StABILI    :StAnDrD
Min.WEiG
 SEt.VAL    :150.000 g
 ONOFF:OFF
```

```
APPLICATION
-------------
COUNT
 VAr-SPL     :ON
 Min.RefW    :99
 REF OPT     :OFF
 A-SMPL      :OFF
 A.CL-APW    :OFF
 ACCurCy     :ON
 tOtAL.Ct    :BULK
ACCUMULATION
 COM 1
  LOT.PRNT   :StdArd
  FIN.PRNT   :StdArd
  SUMMARY    :OFF
 COM 2
  LOT.PRNT   :StdArd
  FIN.PRNT   :StdArd
  SUMMARY    :OFF
 REACH Z     :ON
CHECKWEIGHING
 BEEPER      :ON
 SP.TOL -    :0 %
 SEND.MOD    :CONTINU
MEMORY       :10-10-50
INFO.KEY
  INFO.KEY1  :tArE
  INFO.KEY2  :GROSS
  INFO.KEY3  :APW
  INFO.KEY4  :HIGHRES
  INFO.KEY5  :ACCURCY
DYNAMIC      :OFF
```

```
TERMINAL
-------------
DEVICE
 SLEEP       :OFF
 B.LIGHt     :ON
DAtE.tim
 DAtE.FOr    :EU
 DAtE        :18.04.2004
 timE        :21:10:52
 BEEP        :OFF

COMMUNICATION
-------------
COM 1
 MODE        1:Print
 PriNtEr
  tEmPLat    1:StdArd
  ASCi.Fmt
   LINE.FMT  1:MULTI
   LENGtH    1:24
   ADD LF    1:0
 PARAMET
  BAUD       1:2400
  PAriTY     1:7 EVEn
  H.SHAKE    1:XONXOFF
  ChECSUM    1:OFF
  Vcc        1:OFF
COM 2
 MODE        2:DIALOG
 PARAMET
  BAUD       2:9600
  PAriTY     2:8 nonE
  H.SHAKE    2:XONXOFF
  ChECSUM    2:OFF
  Vcc        2:OFF
OPTION
 EtH.Net     :N.A.
 USB         :N.A.
 ANALOG      :N.A.
 DiGitAL     :N.A.
DEF.PrN
 tEmPLt1
 tEmPLt2
```

8.3 FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to both Part 15 of the FCC Rules and the radio interference regulations ot the Canadian Department of Communications. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the user manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Cet appareil a été testé et s'est avéré conforme aux limites prévues pour les appareils numériques de class A et à la partie 15 des règlements FCC et à la réglementation des radio-Interférences du Canadian Department of Communications. Ces limites sont destinées à fournir une protection adéquate contre les interférences néfastes lorsque l'appareil est utilisé dans un environnement commercial. Cet appareil génère, utilise et peut radier une énergie à fréquence radioélectrique; il est en outre susceptible d'engendrer des interférences avec les communications radio, s'il n'est pas installé et utilisé conformément aux instructions du mode d'emploi. L'utilisation de cet appareil dans les zones résidentielles peut causer interférences néfastes, auquel cas l'exploitant sera amené à prendre les dispositions utiles pour palier aux interférence à ses propres frais.

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