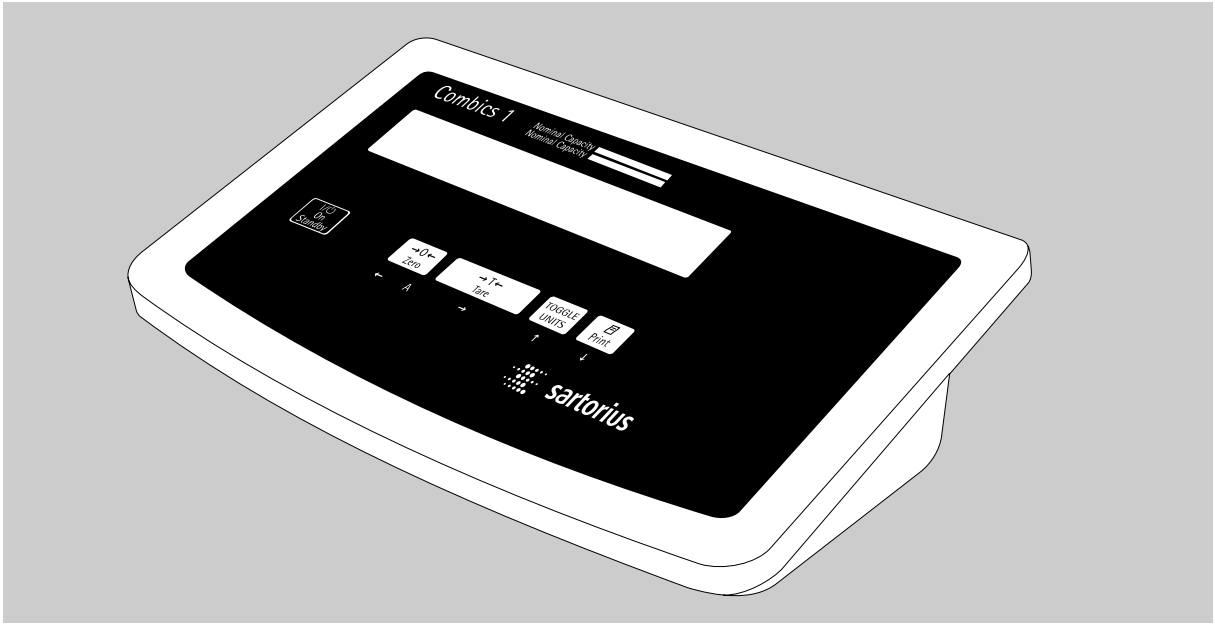
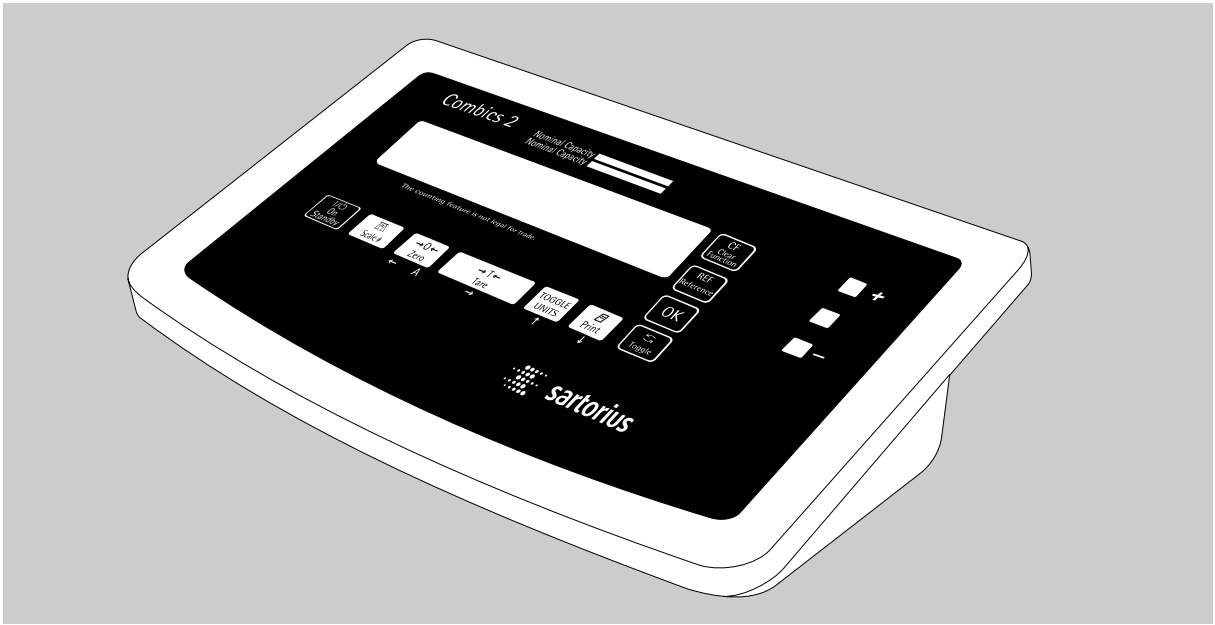
sartorius

Operating Instructions

Sartorius Combics 1 | Combics 2

Models CISL1U | CISL2U | CIS1U | CIS2U
Indicators





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Intended Use

Combics 1 and Combics 2 are rugged, easy-to-use indicators for the complex quality control tasks you perform every day:

- in the food industry
- in the pharmaceutical industry
- in the chemical industry
- in the electronics and metal-working industries

The Combics indicators meet the highest requirements placed on the accuracy and reliability of weighing results through the following features:

- Rugged construction and long service life (stainless steel housing)
- Easy to clean and disinfect
- Easy to operate, thanks to the following features:
  - large, backlit display segments
  - large keys with positive click action
- Can be operated independently of the weighing platform location
- Operating parameters can be password-protected
- Range of interfaces for flexible use

Combics 2 indicators speed up your routine procedures with:

- Fast response times
- Built-in application programs for
  - Counting
  - Neutral measurement
  - Weighing in percent
  - Averaging
  - Checkweighing
  - Classification
  - Net-total formulation
  - Totalizing
- Automatic initialization when you switch on the Combics
- Automatic taring when a load is placed on the weighing platform
- Optional: Control through an external computer

Symbols
The following symbols are used in these instructions:

● indicates required steps

○ indicates steps required only under certain conditions

> describes what happens after you have performed a certain step

– indicates an item in a list

⚠ indicates a hazard or important information

Consultation Service:

Customer Service:
1-800-635-2906×8272

Application Support:
1-800-635-2906×8288

Repair Service:
1-800-635-2906×8215

Contents

Warning and Safety Information

Combics complies with the European Council Directives as well as international regulations and standards for electrical equipment, electromagnetic compatibility, and the stipulated safety requirements.

● To prevent damage to the equipment, read these operating instructions thoroughly before using your Combics.

⚠ Do not use the equipment in a hazardous location.

⚠ The indicator may be opened only by authorized service technicians who have been trained by Sartorius and who follow Sartorius' standard operating procedures for maintenance and repair.

⚠ Make absolutely sure to unplug the indicator from power before you connect or disconnect any electronic peripheral devices to or from the interface port.

⚠ For plugable equipment, the socket outlet shall be installed near the equipment and shall be easily accessible.

⚠ If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

– Warning When Using Pre-wired RS-232 Connecting Cables! RS-232 cables purchased from other manufacturers often have incorrect pin assignments for use with Sartorius weighing systems. Be sure to check the pin assignments against the chart below before connecting the cable, and disconnect any lines identified differently from those specified by Sartorius.

– Use only extension cords that meet the applicable standards and have a protective grounding conductor.

– Disconnecting the ground conductor is prohibited!

– Note on installation:
The operator shall be responsible for any modifications to Sartorius equipment and must check and, if necessary, correct these modifications. On request, Sartorius will provide information on the minimum operating specifications (in accordance with the Standards for defined immunity to interference).

○ If there is visible damage to the equipment or power cord: unplug the equipment and lock it in a secure place to ensure that it cannot be used for the time being

Industrial protection ratings for the housing:
– CISL models are rated to IP44 (IP65 with option L1)
– CIS models are rated to IP67

– Connect only Sartorius accessories and options, as these are optimally designed for use with your Combics.

– Do not expose the indicator to aggressive chemical vapors or to extreme temperatures, moisture, shocks, or vibration.

– Clean your Combics only in accordance with the cleaning instructions (see "Care and Maintenance").

○ If you have any problems with your Combics:
contact your local Sartorius office, dealer or service center.

NEMA Protection rating on CIS models:
– Protection of the indicators according to NEMA is ensured only if the rubber gasket is installed and all connections are fastened securely (including the caps on unused sockets). Weighing platforms must be installed and tested by a certified technician.
– If you install an interface port or battery connector after setting up your Combics, keep the protective cap(s) in a safe place to be used for protecting the interface port or battery connector when not in use, or prior to shipment. This will protect the data interface or battery connector from vapors, moisture and dust or dirt.

Using the Equipment in Legal Metrology:
– When the indicator is connected to a weighing platform and the resulting weighing instrument is to be verified, make sure to observe the applicable regulations regarding verification. When connecting a Sartorius weighing platform, make sure to observe the permitted weighing ranges as listed in the Declaration of Conformity.

– If any of the verification seals are damaged, make sure to observe the national regulations and standards applicable in your country in such cases. In some countries, the verification will become null and void and the equipment must be re-verified.

Getting Started

The indicator is available in various versions. If you have ordered special options, the indicator will be supplied with these options premounted at the factory.

Storage and Shipping Conditions
Allowable storage temperature:
-10 ...+40°C (+14°F ... + 104°F)

- Unpackaged equipment may lose its accuracy when exposed to strong vibration. Excessive vibration may compromise the safety of the equipment.
- Do not expose the indicator unnecessarily to extreme temperatures, moisture, shocks, or vibration.

Unpacking

● After unpacking the equipment, please check it immediately for any visible damage.

○ If you detect any damage, proceed as directed in the chapter entitled "Care and Maintenance" under "Safety Inspection."

○ If you will need to ship your indicator later, save all parts of the packaging because only the original packaging provides the best protection for shipment.

○ Before shipping, be sure to disconnect all cables to prevent damage.

Warranty
Do not miss out on the benefits of our full warranty. Please contact your local Sartorius office or dealer for further information. If available, complete the warranty registration card, indicating the date of installation, and return the card to your Sartorius office or dealer.

Equipment Supplied
- Indicator
- Operating Instructions (this manual)
- Special accessories listed on the bill of delivery, if ordered

Setting Up the Indicator
The indicator is designed to provide reliable weighing results under normal ambient conditions. When choosing a location to set up your indicator, observe the following so that you will be able to work with added speed and accuracy:

- Avoid placing the indicator in close proximity to a heater or otherwise exposing the indicator to heat or direct sunlight.
- Protect the indicator from drafts that come from open windows or doors.
- Avoid exposing the indicator to extreme vibrations during weighing.
- Protect the indicator from aggressive chemical vapors.
- Do not expose the indicator to extreme moisture over long periods.

Turn off the power if you do not need to use the indicator with other equipment.

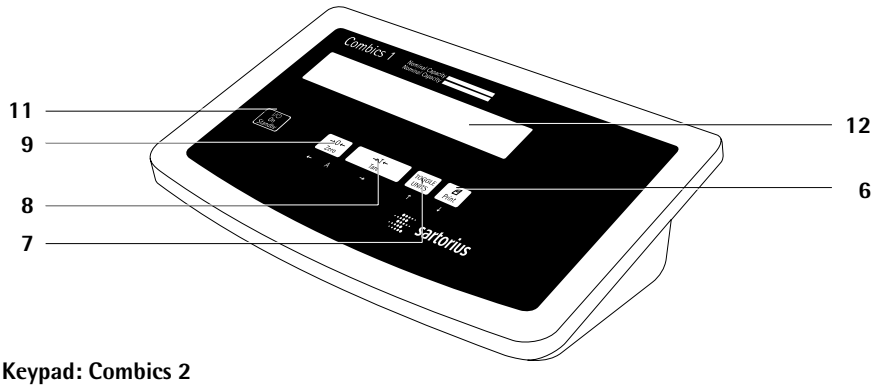
Note:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction 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. Changes or modifications not expressly approved by Sartorius AG could void the user's authority to operate the equipment.

Conditioning the Indicator:
Moisture in the air can condense on the surfaces of a cold indicator whenever it is brought to a substantially warmer place. If you transfer the indicator to a warmer area, make sure to condition it for about 2 hours at room temperature, leaving it unplugged from AC power. Afterwards, if you keep the indicator connected to AC power, the constant positive difference in temperature between the inside of the indicator and the outside will practically rule out the effects of moisture condensation.

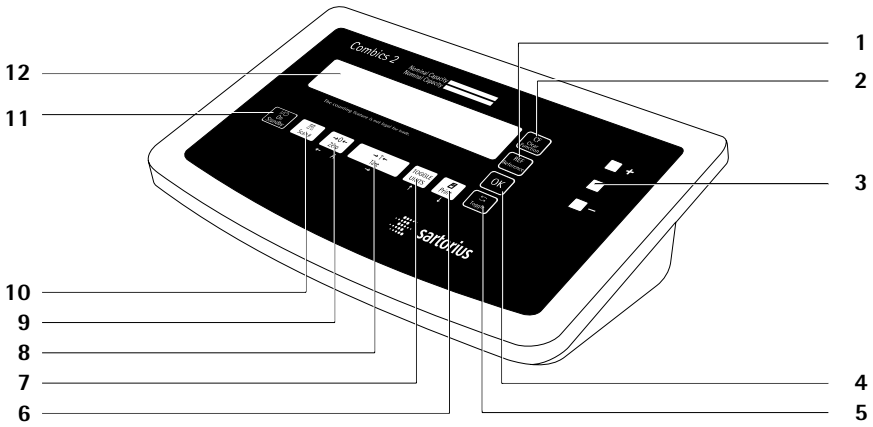
Seal on Indicators Verified as Legal for Trade:
EU legislation requires that a control seal be affixed to the verified device. The control seal consists of a sticker with the "Sartorius" logo. This seal will be irreparably damaged if you attempt to remove it. If the seal is broken, the validity of the version becomes null and void, and you must have your scale re-verified.

General View of the Equipment

Keypad: Combics 1



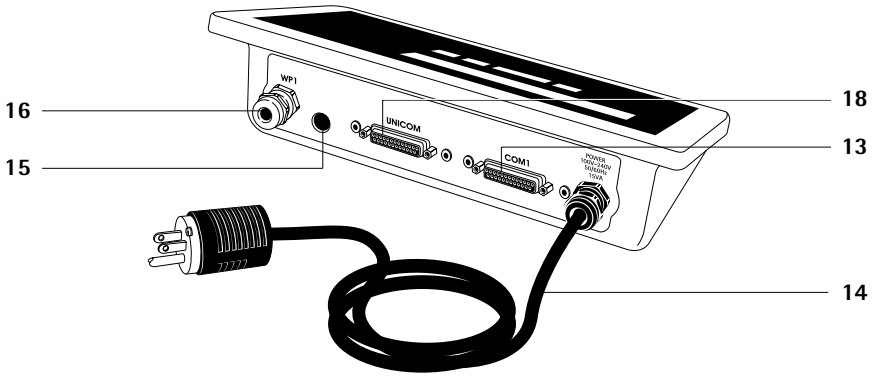
Keypad: Combics 2



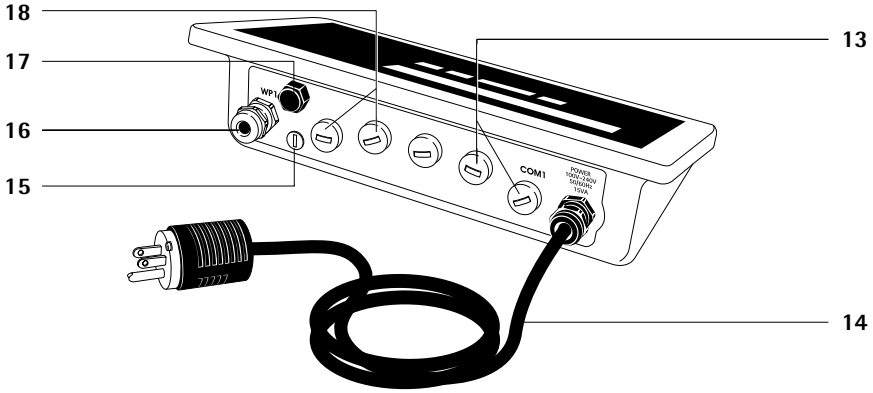
Display and Keypad

1 Select reference value (depending on the application)
2 "Clear" key
3 LEDs for checkweighing and classification
4 Store reference value (depending on the application)
5 Toggle to the application program | application-specific information
6 Data output
7 Gross/net; 2nd unit, 3rd unit or 10 × higher resolution (depending on the settings)
8 Tare
9 Zero
10 Toggle to different weighing platform
11 On/off key
12 Display (for a detailed view, see the chapter entitled "Operating Design")

Rear view: Model: CISL



Rear view: Model: CIS



Rear View

13 RS-232C "COM1" interface port (standard)
14 Power cord with U.S. plug
15 Menu access switch (standard operating mode or legal metrology mode)
16 Connector for weighing platform
17 Vent valve
Torque: 1.5 Nm
18 Second port ("UNICOM") for bar code scanner or external rechargeable battery pack (Combics 2 only: additional functions optional)

Installing the Weighing Platform

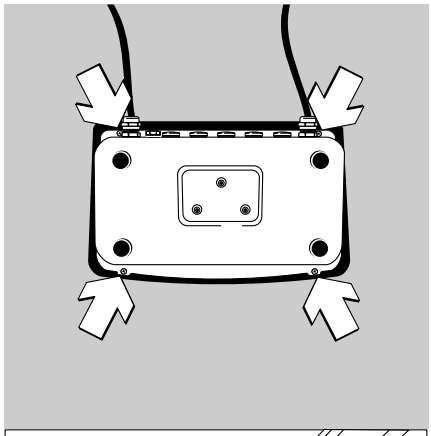
The connecting cable should be installed by a certified technician who has received special training from Sartorius.

⚠ Installation work that affects the NEMA rating must be performed with extreme care.

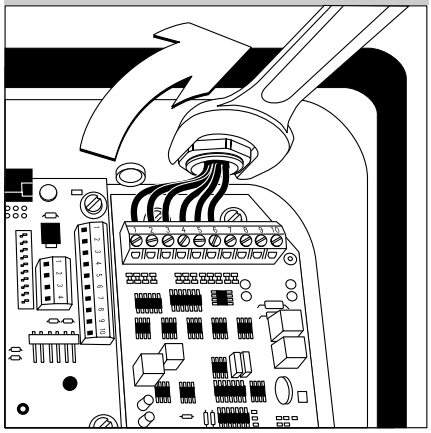
⚠ Any installation work that does not conform to the instructions in this manual will result in forfeiture of all claims under the manufacturer's warranty

⚠ Always make sure the equipment is disconnected from AC power before performing any installation, maintenance or repair work!

⚠ The cable gland (NEMA rating) is already installed on the indicator. Please use extreme caution when performing any work on the equipment that affects this cable gland.

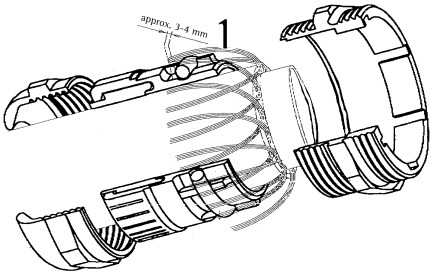


● To remove the front panel, remove the 4 screws (see illustration).

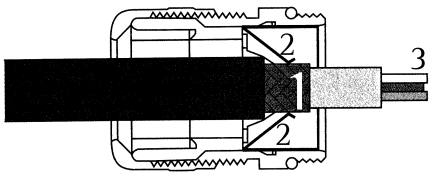


● Use the connecting cable from the weighing platform to connect the indicator.

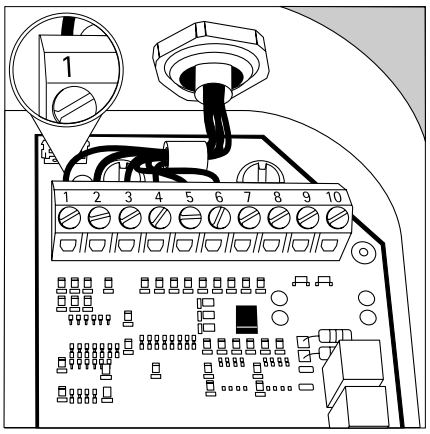
⚠ The cable gland (NEMA rating) is already installed on the indicator. Please use extreme caution when performing any work on the equipment that affects this cable gland. Use a torque wrench. Torque applied for this cable gland: 5 Nm.



● Strip off the insulation at the cable end and attach the cable as follows:
- Route the cable through the cable gland.
- Properly tighten the screw fasteners of the cable gland.
- Remove the casing from a section of the cable end (see illustration). The shield (1) must have contact with the clamps (2).



- Expose approximately 15 cm (6 inches) of the wires (3) for installation.
- Route the cable through the cable gland.
- Make sure the shield is in contact with the clamps because the cable is grounded by the shield.



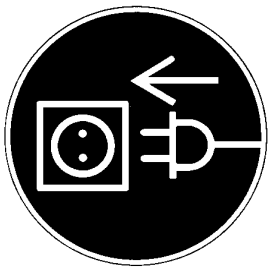
● Attach the cable to the weighing platform as follows:
– Expose approximately 5 cm (2 inches) of the wires for installation.
– Strip the casing from approximately 1 cm (1/2 inch) of the wires and attach ferrules to the wires.
– Install the ferrite ferrule over wires 1 to 6
– Securely attach the wires to the screw terminals.

Wiring Diagram

No.	Signal name	Meaning
1	BR_POS	Bridge supply voltage, positive
2	SENSE_POS	Sense (+)
		Bridge supply voltage
3	OUT_POS	Measuring voltage, positive
4	OUT_NEG	Measuring voltage, negative
5	SENSE_NEG	Sense (-)
		Bridge supply voltage
6	BR_NEG	Bridge supply voltage, negative

⚠Note:
Please refer to the data sheet or operating instructions for the load cell or weighing platform in question for details on the assignment of wire colors to signals. Disconnect any lines that are not used.

Weighing platform with 4-conductor technology:
⚠If a load receptor that uses 4-conductor technology is connected, connect wire 1 (BR_POS) to wire 2 (SENSE_POS) and wire 6 (BR_NEG) to wire 5 (SENSE_NEG).



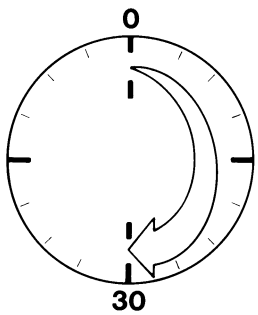
Connecting the Combics to AC Power
● Check the voltage rating and the plug design.

○ The indicator is powered through the pre-installed power cord. The power supply is built into the indicator, which can be operated with a supply voltage of 100V to 240V.
Make sure that the voltage rating printed on the manufacturer´s ID label is identical to that of your local line voltage. If the voltage specified on the label or the plug design of the AC adapter does not match the rating or standard you use, please contact your Sartorius office or dealer. The power connection must be made in accordance with the regulations applicable in the U.S.

● To power a protective class 1 device, plug the power cord into an electrical outlet that is properly installed with a protective grounding conductor.

Safety Precautions
If your local AC output does not have a protective grounding conductor, have a certified electrician install equivalent protection according to installation requirements. You may not neutralize the protective grounding effect by using an extension cord that lacks a protective grounding conductor.

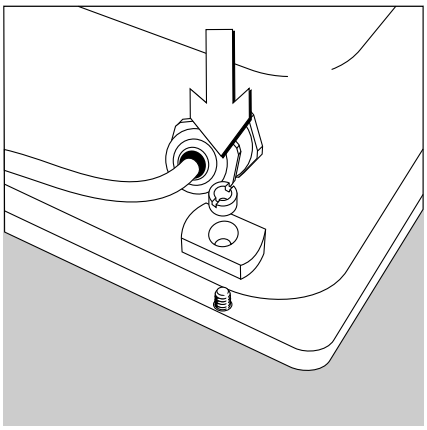
Connecting Electronic Peripheral Devices
● Make absolutely sure to unplug the device from AC power before you connect or disconnect a peripheral device (printer or PC) to or from the interface port.



Warmup Time
To deliver exact results, the device must warm up for at least 30 minutes after initial connection to AC power or after a relatively long power outage. Only after this time will the device have reached the required operating temperature.

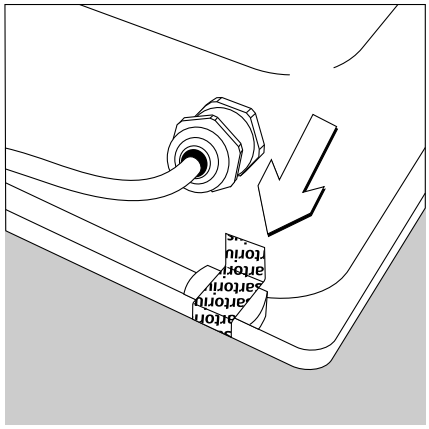
Using Equipment Verified as Legal for Trade Instruments:
○ Make sure to allow the equipment to warm up for at least 24 hours after initial connection to AC power or after a relatively long power outage.

⚠The indicator may be opened only by authorized service technicians who have been trained by Sartorius and who follow Sartorius' standard operating procedures for maintenance and repair.



Installing the Verification Adapter for Use in Legal Metrology
(on verfiable models only)

- Remove the nut located on the back of the indicator
- Use the slotted screw to install the adapter plate



- Place the verification seal over the adapter

Connecting the External Rechargeable Battery Pack (Accessory No. YRB10Z)

⚠ Disconnect the indicator from power (unplug the power cord from the wall socket)

- Installation
  CISL1 | CISL2 models: Connect the 25-pin D-Sub connector (connecting cable YCC02-RB01) from the battery pack to the second port ("UNICOM")
  CIS1 | CIS2 models: Please see "Pin Assignment Chart" in this manual (via connecting cable YCC02-RB02 or using option L2)

Operating the Battery Pack

– Hours of operation: up to 40, depending on the weighing platform connected; without options). The indicator automatically switches to the battery operating mode (DC) as soon as the mains power supply is cut off. It returns to the AC operating mode automatically when power is restored.

Display symbols:

Fully charged:

Completely drained:

Connecting a Bar Code Scanner (Accessory No. YBR02CISL)

⚠ Disconnect the indicator from power (unplug the power cord from the wall socket)

○ Installation
CISL2 models:

– Connect the 25-pin D-Sub connector from the battery pack to the second port ("UNICOM")
– To connect both the bar code scanner and the external battery pack: Use the YTC01 T-connector

CIS2 models: Please see "Pin Assignment Chart" in this manual (via connecting cable YCC02-BR02 or using option 118)

Operating Design

With Combics 1 you can collect weights from one weighing platform. With Combics 2 you can collect weights from two weighing platforms and use application programs to calculate and display weights.

All of the functions available in Combics 1 are also available in Combics 2.

Before you begin, you need to configure the Combics for your specific requirements. This is achieved by setting parameters in the operating menu (for example, to configure a connected printer). You can then begin operation, with functions active for storing and calculating weighing data.

The description of the operating design is divided into the following sections:

- Data Input
- Error Codes and Messages
- Display
- Saving Data
- Deleting Data
- Data Output

Data Input

There are a number of options for entering data:

- Through the keys (e.g., with the →0←, →T←, [TOGGLE UNITS] and [F] keys in the menu)
- Through the weighing platform (e.g., tare values)
- Through a bar code scanner (Combics 2 only)
- Through the digital input | output interface
- Through the COM port
- Through a foot or hand switch (optional)

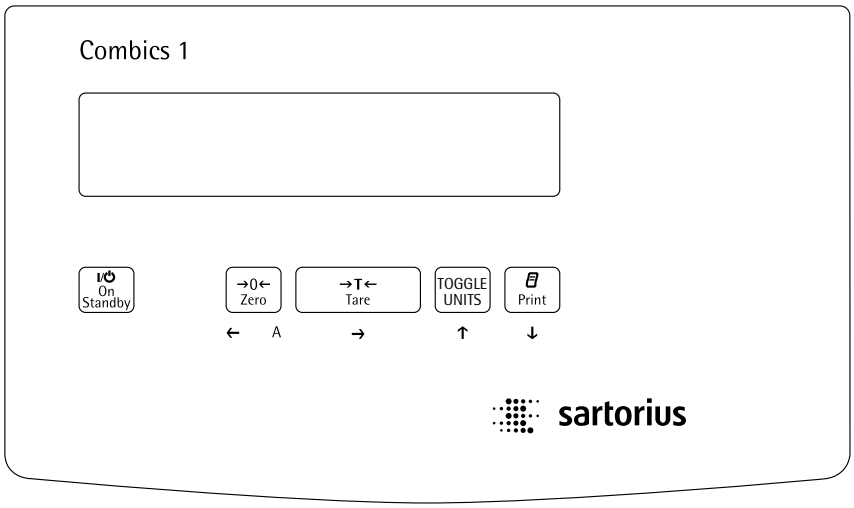
Keys

Only a few keys are required for operating the Combics. Some of the keys have a second function, activated by pressing and holding the key (longer than 2 seconds) as opposed to pressing the key briefly (less than 2 seconds).

The keys below the display are used during weighing (with the functions indicated on each key) and when configuring the operating menu (setting device parameters). The keys to the right of display are used for initializing applications (Combics 2 only).

The keys on the right next to the display are used for the following:

- To initialize an application (Combics 2 only)
- To toggle to the info mode (display application-specific information)



Operating Elements: Combics 1 (Combics 2: see next page)

Keys Below the Display

On/off
Turns the Combics on or off.
When the Combics is turned off, oFF is displayed.

Toggling the display between weighing platforms (Combics 2 only)
When two weighing platforms are connected, this key toggles the display between the platforms.

During weighing:

- Press briefly: Zero the indicator
- Press and hold: The audit trail counter will be displayed

In the operating menu:
Exit the current menu level and display the next higher level (unless you are already at the uppermost level)

During alphanumeric input in the operating menu:
- Press briefly:
  Activate the character to the left of the currently active character (When the first character is active: Exit the input mode without saving changes)
- Press and hold:
  Exit the input mode without saving changes

During weighing:
- Press briefly:
  Tare the weighing platform
- Press and hold:
  Activate calibration/adjustment

In the operating menu:
- Press briefly:
  Display the next lower menu level or Select and store a menu item
- Press and hold:
  Exit the operating menu

During alphanumeric input in the operating menu:
- Press briefly:
  Activate the character to the right of the currently active character (when the last character is active: store current input)
- Press and hold:
  Store current input and display the corresponding menu item

During weighing:
Changes the readout as follows, depending on menu setting:
- toggle weight unit (these “cycle” in the display 1st, 2nd, 3rd, 1st , etc.),
- toggle between gross and net, or
- toggle between standard and 10 x higher resolution

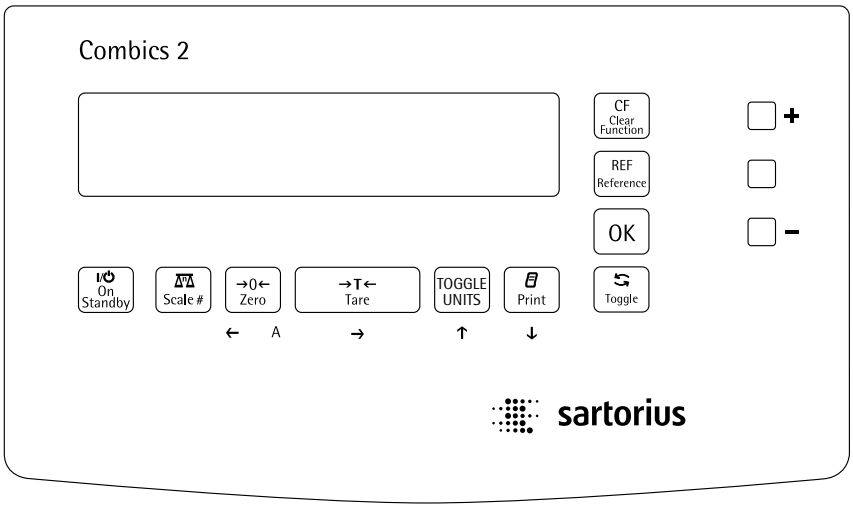
In the operating menu:
Show the next value on the same menu level (the display scrolls in one direction)

During alphanumeric input in the operating menu:
- If the cursor is on the 1st character and you have not changed it: this deletes the line of characters and inputs a zero
- If you have changed the displayed character: scroll forward (sequence: 0 to 9; decimal point; minus sign; Z to A; space)

During weighing:
- Press briefly: Print
- Press and hold: Print GMP footer

In the operating menu:
Print the menu settings starting from the active menu location, or print info data

During alphanumeric input in the operating menu:
- If the cursor is on the 1st character and you have not changed it: this deletes the line of characters and inputs a Zero
- If you have changed the displayed character: scroll back (sequence: space; A to Z; minus sign; decimal point; 9 to 0)



Operating Elements: Combics 2 (for Combics 1, see previous page)

Keys to the Right of the Display
CF REF OK

These keys are used for initializing applications, and are described in detail in the following chapters.

Input Through the Weighing Platform
You can store the weight on the weighing platform as a tare weight.

Input Through a Bar Sode Scanner (Combics 2 only)
You can use a bar code scanner to read in the reference weight for the active application (counting, weighing in percent, neutral measurement). Data input through the bar code scanner is handled by the Combics in the same manner as keypad input.
In general, you can use all bar code formats that are compatible with the connected bar code scanner.

Input Through the Digital Input/ Output Interface
There are four output control lines and one input line for use with the check-weighing and classification applications. You can assign one of the following functions to the input control line (configuration in the operating menu):

- key
- key (> 2 sec)
- →T← key
- →T← key (> 2 sec)
- TOGGLE UNITS key
- key
- OK key

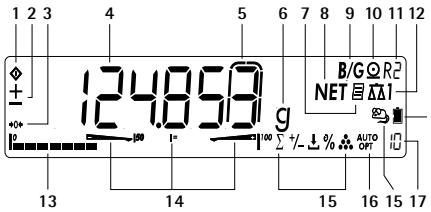
Input Through the COM Port
The Combics is equipped with an SBI interface for data transfer. You can define certain parameters for this interface (generate printout, time-dependent auto print, ID codes). This is a simple ASCII interface. The functions are described in detail in the chapter entitled “Operating the Combics,” under “Data Output Functions.” You can define parameters for the interface (resolution of the output, time-dependent automatic output, ID)

Error Codes and Messages
If a key is inactive, this is indicated as follows:
- The error code “-------” is displayed for 2 seconds. The display then returns to the previous screen content.
- An acoustic signal (double-beep) is emitted.

Dynamic errors are indicated by an error code (e.g. inF 09) until the error is corrected.
Temporary errors are indicated for 2 seconds.

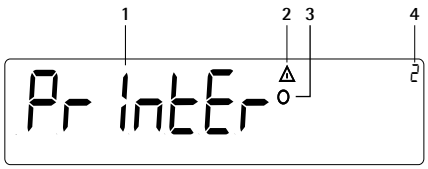
“Fatal” errors are displayed continuously (until you restart the Combics).

The same applies in all operating modes (weighing, application programs, operating menu).
Error codes and messages are described in detail in the chapter entitled “Error Codes and Messages.”



Display During the Weighing Mode (Example)

1 Symbol for the routine in progress
2 +/- sign for the value displayed
3 Indicates that the weighing platform has been zeroed
4 Weight or calculated value (main display)
5 This digit is not valid when the equipment is used in legal metrology
6 Weight unit of the value displayed
7 GMP printing mode active
8 Data in tare memory
9 Gross value shown in main display
10 Printing mode active
11 R1, R2 for multiple range mode
12 Active weighing platform (Combics 2 only)
13 Bar graph
14 Program symbols (for checkweighing, classification)
15 Application symbols (Combics 2 only)
16 Auto: Reaction of application program triggered by weight value; Opt: Reference sample updating was performed
17 Numeric display (e.g., reference value)
18 Battery symbol



Menu Display (Example)

1 Selected menu item (in this example, "Printer," for configuring the connected printer)
2 Indicates that the menu has submenu(s)
3 Indicates that this is the currently selected setting
4 Highest menu level

Display Modes

There are two display modes: one used during weighing and one when working with the operating menu.

Display During the Weighing Mode
The illustration above shows all of the main display elements and symbols shown during weighing.

Display of the Operating Menu
Weighing parameters are set by selection of menu items. The menus have a hierarchical structure comprising several levels. The first level shows abbreviations indicating:

- Application (APPL) (Combics 2 only)
- Current function of Fn key (Fn-tEY)
- Information (InFo)
- Setup (SEtuP)
- Language (LAnG)

Some of the parameters are configured according to number code. For details on these number codes, see the chapter entitled "Settings."

Saving Data

The parameters you select in the operating menu remain stored after you turn off the Combics.
Combics 2 only: All of the application parameters stored (e.g., reference value) are available when you turn the Combics on again. These parameters are overwritten only when

- you turn off the Combics first, then back on again
- you return to the originally selected application from a different one (such as from counting to averaging; when you switch back to counting, the parameters previously saved for counting are available again).

You can restrict access to the Setup menu by assigning a password. The password is configured in the Setup program, under: SEtuP PASSWord

Deleting Data

Changing a Single Character
Press →0← or →T← to activate the desired character and then press [TOGGLE UNITS] or [⌫] to change it.

Deleting Characters
You can delete an entire group of characters (such as the password) by pressing the [⌫] key, if the cursor is on the first character and you have not yet made any changes.
Then you can exit the data input mode (press →T← twice or hold this key down for more than 2 sec.) or enter a new group of characters.

Cancel Data Input
Press the →0← key repeatedly until you exit the data input mode or press the →0← key for more than 2 sec.

Clearing the Memory
Press CF to delete stored initialization data.

Data Output Functions

You can choose from four forms of data output:

- Printer
- Digital I/O interface
- COM port
- LEDs

Printer

You can connect one or two strip printers or one or two label printers to the Combics. If you use a YDP02, YDP03, or Universal printer, you can configure certain parameters for the printer (such as baud rate, parity, stop bits, handshake mode and data bits).

The printout can be formatted by the user. The printout should be formatted only after the desired application has been configured, as some of the printout positions are application-dependent.

The printout consists of 2 user-definable header lines, as well as lines for date and time (Combics 2 only), initialization data (only when using applications; Combics 2), serial number and results.

Press the [F] key to print the settings of the current menu level on a strip printer or a universal printer. All submenus under the current menu level are included on the printout.

Combics 2 only: For the Totalizing and Net-total Formulation applications, you can also configure printouts of total (results) and individual or component values.

With a strip printer, universal printer or a label printer, you can define whether the printout includes a GMP header and GMP footer (field for operator signature). With a label printer, this function requires the menu setting for ISO/GMP printouts: Always for one measurement result (7.11.2). GMP stands for Good Manufacturing Practice.

Digital Input/Output Interface

The digital I/O interface is supported by the Checkweighing and Classification applications.

Checkweighing

Four data outputs transfer the following information on the weight values: “less than,” “equal to,” “greater than” and “set.” You can define whether the output lines are always active, or are activated only at stability, only within the checkweighing range, only within the checkweighing range at stability, or not at all (“off”); please see page 53.

Classification

Four data outputs transfer the following information on the weight values: “less than”, “equal to”, “greater than” and “set”. You can define whether the output lines are always active, or are activated only at stability (or are “off”); please see page 59.

For the checkweighing and classification applications, you can configure the “Set” output as:

- Indicator and weighing platform ready to operate, or
- “Set” if you are using the Checkweighing application or “exceed a minimum load” if you are using the Classification application.

In all other applications and for Combics 1, the “set” output indicates that the indicator is ready to operate.

COM Port

The Combics is equipped with an SBI interface for data transfer. You can define certain parameters for this interface (generate printout, time-dependent auto print, ID codes).

This is a simple ASCII interface. The functions are described in detail in the chapter entitled “Operating the Combics,” under “Data Output Functions.”

LEDs

The Combics 2 has 3 LEDs on the right side of the display window. These are for use with the Checkweighing and Classification applications. This check-weighing display shows the relationship of the current weight value to the tolerance limits in checkweighing; with the classification application, they indicate how the weight value is classified.

Settings

Purpose
You can configure your Combics to meet individual requirements by entering user data and setting selected menu parameters in the Setup menu. The menu is a combination of text levels and numeric codes.

Features
The parameters are combined in the following groups (highest text menu level):
- Application programs "APPL."
- Key assignments [TOGGLE UNITS] "Fn-tEY"
- Device parameters "SEtuP"
- Device information "InFo"
- Language for calibration and adjustment record "LAnG."

You can display, enter or change the following parameters:
- Application programs "APPL."
  In addition to running the weighing application, Combics 2 can calculate the weighing data using the following applications:
- Counting
- Neutral measurement
- Averaging (animal weighing)
- Checkweighing
- Classification
- Weighing in percent
- Net-total formulation
- Totalizing

Function: Key assignments [TOGGLE UNITS] "Fn-tEY"
- Gross/net toggling "Gro nEt"
- Toggle between the 1st, 2nd and 3rd weight units (are cycled in the display)
- 10-fold increased resolution "rES 10"

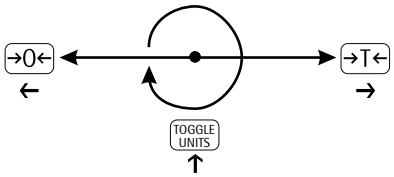
- Device parameters "SEtuP"
  Device configuration, i.e., to meet individual requirements by selecting predefined menu parameters in the Setup menu. The device parameters are combined in the following groups :
- Weighing platform "WP- 1"
- Interfaces (Con 1 and optional un 1Con)
- Digital control lines "CtrL In"
- Bar code "bArCodE"
- Printout "PrtProt"
- Extra functions; see "Operating the Combics" (ut 1L 1t)
- Time "t IME"
- Date "dAtE"
- Setting a user password "CodE"

- View device information "InFo" (serial number, etc.)

- Language for calibration and adjustment record "LAnG."
  Select a language. The rest of the menu is language independent.

Functions of the Keys when Configuring the Menu
Access the menu:
Turn the Combics off and then on again by pressing [I/⏻]; while all segments are displayed, press the [→T←] key briefly.

Navigating in the menu:



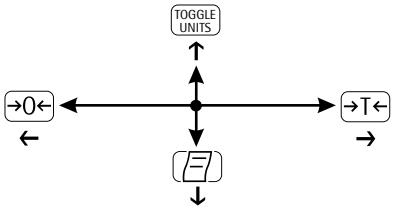
- Scroll numbers upwards ↑:
  Press the [TOGGLE UNITS] key

- Scroll to the left ←: Press the [→0←] key

- Change and store settings:
  Press the [→T←] key

- Exit the menu:
  Press and hold [→T←] (> 2 sec)

During alphanumeric input in the operating menu:



- Scroll numbers upwards ↑ (0, 1, 2, 3, etc.): Press the [TOGGLE UNITS] key

- Scroll downwards ↓ (A, B, C, etc.):
  Press the [🖹] key

- To advance to the next position:
  press [→T←]

- To return to the previous position,
  press [→0←]

- Exit without saving changes when the first character is active:
  Press the [→0←] key

- Exit the menu without saving changes:
  Press and hold the [→0←] key (> 2 sec)

- Confirm input: Press the [→T←] key when the last character is active, or press and hold (> 2 sec)

- Confirm currently active character and move cursor 1 position to the right:
  Press the [→T←] key briefly

- Move cursor 1 position to the left:
  Press [→0←] briefly

Print Parameter Settings:
Generate a printout of the settings on the current menu level:
Press the [🖹] key

> Printout (example)
The maximum width of this printout is 20 characters.

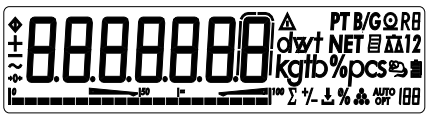
```
--------------------
MENU
        SETUP
WP1
--------------------
  1
   1.1
                1.1.2
                1.2.1
...

  1.18
   1.18.1
    CAL.
          50.00
```

etc.

Navigating in the Operating Menu (Examples)
Example: Adapting the Combics to the place of installation, menu code 1. 1. 4, “Extreme vibration”, for weighing platform WP1 (in this example, using the Combics 2).

[I/⏻]

Turn on the Combics



While all segments are lit, press the [→T←] key

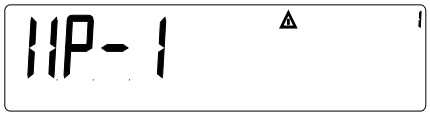
[→T←]

Display for selecting the application APPL is shown

[TOGGLE UNITS]

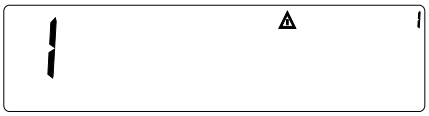
View device parameters SEtuP
(press [TOGGLE UNITS] repeatedly until SEtuP is displayed)

[→T←]



Confirm SEtuP device parameters
If necessary: Enter the password: press [TOGGLE UNITS] repeatedly, confirm with [→T←] , etc.

[→T←]

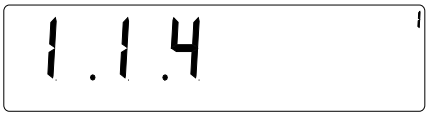


Confirm weighing platform IIP 1

[→T←] [→T←]

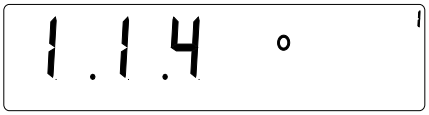
Show menu item (“Normal vibration”)

[TOGGLE UNITS] [TOGGLE UNITS]



Select menu item 1. 1. 4, “Extreme vibration”

[→T←]



Save menu item 1.1.4

→0←

Return to next higher menu level

To continue: TOGGLE UNITS

Change other menu settings if desired

→T← Press and hold (> 2 sec)

Exit the operating menu

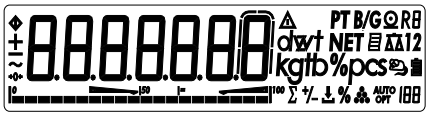
Defining Password Protection for the Menu

You can define a password to protect the application program settings "APPL" and the device parameters "SEtuP" from unauthorized changes. To do this, enter a password known only to authorized personnel. Without the password, only a few of the menu items can be accessed ([TOGGLE UNITS] key, Info, language).

Example: Enter, change or delete the password "ABC1".

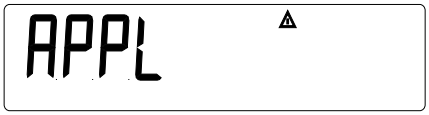
I/⏻

Turn on the Combics



While all segments are lit, press the →T← key

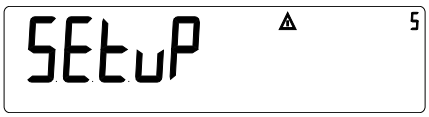
→T←



Display for selecting the application APPL is shown

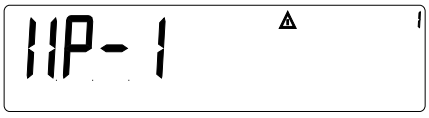
TOGGLE UNITS TOGGLE UNITS

View device parameters setup
(Combics 2: Press [TOGGLE UNITS] repeatedly until SEtuP is displayed)



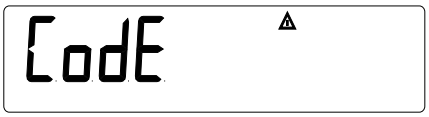
→T←

Confirm SEtuP device parameters



Press repeatedly: TOGGLE UNITS

Display the user password
(Press [TOGGLE UNITS] repeatedly until CodE is displayed)



→T←

Show user password menu item

(F) (F); confirm with →T←,

Set password “ABC1”:
- to enter letters, press (F)

Repeatedly: (F); confirm with →T←,

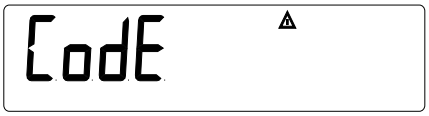
- to enter numbers, press [TOGGLE UNITS]
(Press [TOGGLE UNITS] or (F) repeatedly until the desired character is displayed)

Repeatedly: (F); confirm with →T←,
TOGGLE UNITS TOGGLE UNITS, confirm with →T←

- To delete an existing password, enter an “underline” character (“_”) by pressing [TOGGLE UNITS] and (F) and then press →T← to confirm

→T←

Store the password



→0←

Return to next higher menu level

To continue: TOGGLE UNITS

Change other menu settings if desired

→T← Press and hold (> 2 sec)

Exit the operating menu

Operating Menu Overview (Parameters)

= Setting | function on Combics 2 only
* Factory setting
√ User-defined setting

1st level Display	2nd level Display	3rd level Display	Function
Menu			
APPL			**Application Programs**
			Weighing
	3. 5.		Minimum load for automatic taring
		3. 5. 1	1 digit
		3. 5. 2	2 digits
		3. 5. 3	5 digits
		3. 5. 4 *	10 digits
		3. 5. 5	20 digits
		3. 5. 6	50 digits
		3. 5. 7	100 digits
		3. 5. 8	200 digits
		3. 5. 9	500 digits
		3. 5.10	1000 digits
	3. 7.		Automatic tare: 1st weight tared
		3. 7. 1 *	Off
		3. 7.	On
	9.1.		Factory settings (default) of all application programs
		9.1.1	Yes
		9.1.2	No*
	*		**Counting**
	3. 5.		Minimum load for automatic taring and automatic printout
		3. 5. 1	1 digit
		3. 5. 2	2 digits
		3. 5. 3	5 digits
		3. 5. 4 *	10 digits
		3. 5. 5	20 digits
		3. 5. 6	50 digits
		3. 5. 7	100 digits
		3. 5. 8	200 digits
		3. 5. 9	500 digits
		3. 5.10	1000 digits
	3. 6.		Minimum load for initialization
		3. 6. 1 *	1 digit
		3. 6. 2	2 digits
		3. 6. 3	5 digits
		3. 6. 4	10 digits
		3. 6. 5	20 digits
		3. 6. 6	50 digits
		3. 6. 7	100 digits
		3. 6. 8	200 digits
		3. 6. 9	500 digits
		3. 6.10	1000 digits
	3. 7.		Automatic tare: 1st weight tared
		3. 7. 1 *	Off
		3. 7. 2	On
	3. 8.		Application started automatically and most recent application data loaded when Combics switched on
		3. 8. 1	Automatic (on)
		3. 8. 2 *	Manual (off)

- ⁂ * **Counting**
  - 3. 9. Resolution for calculation of average piece weight
    - 3. 9. 1 * Display accuracy
    - 3. 9. 2 Display accuracy + 1 decimal place
    - 3. 9. 3 Display accuracy + 2 decimal places
    - 3. 9. 4 Internal resolution
  - 3.11. Storage parameter
    - 3.11. 1 * With stability
    - 3.11. 2 With higher stability
  - 3.12. Reference sample updating
    - 3.12. 1 Off
    - 3.12. 3 * Automatic
  - 3.13. Reference scale
    - 3.13. 1 * Off
    - 3.13. 2 To weighing platform WP-1
    - 3.13. 3 To weighing platform WP-2
  - 9. 1. Restore factory settings of all application programs
    - 9. 1. 1 Yes
    - 9. 1. 2 * No
- ⁂ ⊓ **Neutral Measurement**
  - 3. 5. Minimum load for automatic taring and automatic printout
    - 3. 5. 1 1 digit
    - 3. 5. 2 2 digits
    - 3. 5. 3 5 digits
    - 3. 5. 4 * 10 digits
    - 3. 5. 5 20 digits
    - 3. 5. 6 50 digits
    - 3. 5. 7 100 digits
    - 3. 5. 8 200 digits
    - 3. 5. 9 500 digits
    - 3. 5.10 1000 digits
  - 3. 6. Minimum load for initialization
    - 3. 6. 1 * 1 digit
    - 3. 6. 2 2 digits
    - 3. 6. 3 5 digits
    - 3. 6. 4 10 digits
    - 3. 6. 5 20 digits
    - 3. 6. 6 50 digits
    - 3. 6. 7 100 digits
    - 3. 6. 8 200 digits
    - 3. 6. 9 500 digits
    - 3. 6.10 1000 digits
  - 3. 7. Automatic tare: 1st weight tared
    - 3. 7. 1 * Off
    - 3. 7. 2 On
  - 3. 8. Application started automatically and most recent application data loaded when Combics switched on
    - 3. 8. 1 Automatic (on)
    - 3. 8. 2 * Manual (off)
  - 3. 9. Resolution for calculation of reference value
    - 3. 9. 1 * Display accuracy
    - 3. 9. 2 Display accuracy + 1 decimal place
    - 3. 9. 3 Display accuracy + 2 decimal places
    - 3. 9. 4 Internal resolution

Neutral Measurement

- 3.10. Decimal places for display of results
  - 3.10. 1 * None
  - 3.10. 2 1 decimal place
  - 3.10. 3 2 decimal places
  - 3.10. 4 3 decimal places
- 3.11. Storage parameter
  - 3.11. 1 * With stability
  - 3.11. 2 With higher stability
- 3.13. Reference scale
  - 3.13. 1 * Off
  - 3.13. 2 To weighing platform WP-1
  - 3.13. 3 To weighing platform WP-2
- 9. 1. Restore factory settings of all application programs
  - 9. 1. 1 Yes
  - 9. 1. 2 * No

Averaging (Animal Weighing)

- 3. 5. Minimum load for automatic taring and automatic printout
  - 3. 5. 1 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 * 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum load threshold for starting application automatically
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic tare: 1st weight tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Application started automatically and most recent application data loaded when Combics switched on
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 3.18. Start averaging
  - 3.18. 1 * Manual
  - 3.18. 2 Automatic

Averaging (Animal Weighing)

- 3.19. Animal activity
  - 3.19. 1 0.1 % of the animal/object
  - 3.19. 2 * 0.2% of the animal/object
  - 3.19. 3 0.5 % of the animal/object
  - 3.19. 4 1% of the animal/object
  - 3.19. 5 2% of the animal/object
  - 3.19. 6 5% of the animal/object
  - 3.19. 7 10% of the animal/object
  - 3.19. 8 20% of the animal/object
  - 3.19. 9 50% of the animal/object
  - 3.19.10 100 % of the animal/object
- 3.20. Automatic printout
  - 3.20. 1 * Off
  - 3.20. 2 On
- 3.21. Display of results static after unloading platform
  - 3.21. 1 * Fixed display until unload threshold reached
  - 3.21. 2 Fixed display until [⇆] key pressed
- 9. 1. Restore factory settings of all application programs
  - 9. 1. 1 Yes
  - 9. 1. 2 * No

Checkweighing

- 3. 5. Minimum load for automatic taring
  - 3. 5. 1 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 * 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 7. Automatic tare: 1st weight tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Application started automatically and most recent application data loaded when Combics switched on
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 4. 2. Checkweighing range
  - 4. 2. 1 * 30 to 170%
  - 4. 2. 2 10% to unlimited
- 4. 3. Activate control line for “Set” as:
  - 4. 3. 1 * Set output
  - 4. 3. 2 Ready to operate
- 4. 4. Activate output ports
  - 4. 4. 1 Off
  - 4. 4. 2 Always activated
  - 4. 4. 3 Activate at stability
  - 4. 4. 4 * Activate when within checkweighing range
  - 4. 4. 5 Activate at stability and when within checkweighing range

+/-

Checkweighing

- 4. 5. Parameter input
  - 4. 5. 1 * Min, max, target
  - 4. 5. 2 Only target with percentage limits
- 4. 6. Automatic printout of results
  - 4. 6. 1 * Off
  - 4. 6. 2 On
  - 4. 6. 3 Only OK values
  - 4. 6. 4 Only not-OK values
- 9. 1. Restore factory settings of all application programs
  - 9. 1. 1 Yes
  - 9. 1. 2 * No

+/- CL

Classification

- 3. 5. Minimum load for automatic taring and automatic printout
  - 3. 5. 1 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 * 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum load for setting the lower limit for “class 1”
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic tare: 1st weight tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Application started automatically and most recent application data loaded when Combics switched on
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 4. 3. Activate control line for “Set” as:
  - 4. 3. 1 * Set output
  - 4. 3. 2 Ready to operate
- 4. 7. Activate output ports
  - 4. 7. 1 Off
  - 4. 7. 2 Always activated
  - 4. 7. 3 * Activate at stability
- 4. 8. Number of classes:
  - 4. 8. 1 * 3 classes
  - 4. 8. 2 5 classes
- 4. 9. Parameter input
  - 4. 9. 1 * Weight values
  - 4. 9. 2 Percentage

+/- CL		**Classification**
	4.10.	Automatic printout of results
	4.10. 1 *	Off
	4.10. 2	On
	9. 1.	Restore factory settings of all application programs
	9. 1. 1	Yes
	9. 1. 2 *	No
%		**Weighing in Percent**
	3. 5.	Minimum load for automatic taring and automatic printout
	3. 5. 1	1 digit
	3. 5. 2	2 digits
	3. 5. 3	5 digits
	3. 5. 4 *	10 digits
	3. 5. 5	20 digits
	3. 5. 6	50 digits
	3. 5. 7	100 digits
	3. 5. 8	200 digits
	3. 5. 9	500 digits
	3. 5.10	1000 digits
	3. 6.	Minimum load for initialization
	3. 6. 1 *	1 digit
	3. 6. 2	2 digits
	3. 6. 3	5 digits
	3. 6. 4	10 digits
	3. 6. 5	20 digits
	3. 6. 6	50 digits
	3. 6. 7	100 digits
	3. 6. 8	200 digits
	3. 6. 9	500 digits
	3. 6.10	1000 digits
	3. 7.	Automatic tare: 1st weight tared
	3. 7. 1 *	Off
	3. 7. 2	On
	3. 8.	Application started automatically and most recent application data loaded when Combics switched on
	3. 8. 1	Automatic (on)
	3. 8. 2 *	Manual (off)
	3. 9.	Resolution for calculation of the reference value
	3. 9. 1 *	Display resolution
	3. 9. 2	Display accuracy + 1 decimal place
	3. 9. 3	Display accuracy + 2 decimal places
	3. 9. 4	Internal resolution
	3.10.	Decimal places for display of percentage
	3.10. 1 *	None
	3.10. 2	1 decimal place
	3.10. 3	2 decimal places
	3.10. 4	3 decimal places
	3.11.	Storage parameter
	3.11. 1 *	With stability
	3.11. 2	With higher stability
	3.13.	Reference scale
	3.13. 1 *	Off
	3.13. 2	To weighing platform WP-1
	3.13. 3	To weighing platform WP-2
	3.15.	Display of calculated value
	3.15. 1 *	Residue
	3.15. 2	Loss

- % **Weighing in Percent**
  - 9. 1. Restore factory settings of all application programs
    - 9. 1. 1 Yes
    - 9. 1. 2 * No

- ⭳ **Net-total Formulation (2nd Tare Memory)**
  - 3. 5. Minimum load for automatic taring and automatic printout
    - 3. 5. 1 1 digit
    - 3. 5. 2 2 digits
    - 3. 5. 3 5 digits
    - 3. 5. 4 * 10 digits
    - 3. 5. 5 20 digits
    - 3. 5. 6 50 digits
    - 3. 5. 7 100 digits
    - 3. 5. 8 200 digits
    - 3. 5. 9 500 digits
    - 3. 5.10 1000 digits
  - 3. 6. Minimum load for storage/transfer of values
    - 3. 6. 1 * 1 digit
    - 3. 6. 2 2 digits
    - 3. 6. 3 5 digits
    - 3. 6. 4 10 digits
    - 3. 6. 5 20 digits
    - 3. 6. 6 50 digits
    - 3. 6. 7 100 digits
    - 3. 6. 8 200 digits
    - 3. 6. 9 500 digits
    - 3. 6.10 1000 digits
  - 3. 7. Automatic tare: 1st weight tared
    - 3. 7. 1 * Off
    - 3. 7. 2 On
  - 3.17. Printout of individual component data when value stored in totalizing memory
    - 3.17. 1 Automatic printout of results off
    - 3.17. 2 * Generate printout with complete standard configuration each time OK is pressed
    - 3.17. 3 Generate printout with complete standard configuration only once when OK is pressed
  - 9. 1. Restore factory settings of all application programs
    - 9. 1. 1 Yes
    - 9. 1. 2 * No

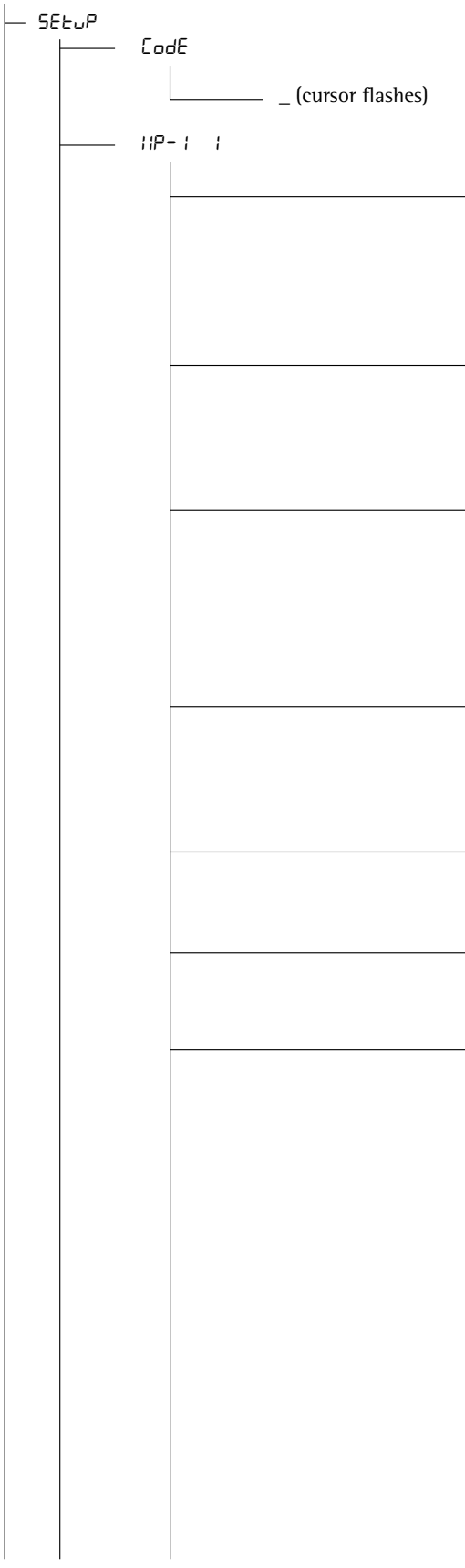
- Σ **Totalizing**
  - 3. 5. Minimum load for automatic taring and automatic printout
    - 3. 5. 1 1 digit
    - 3. 5. 2 2 digits
    - 3. 5. 3 5 digits
    - 3. 5. 4 * 10 digits
    - 3. 5. 5 20 digits
    - 3. 5. 6 50 digits
    - 3. 5. 7 100 digits
    - 3. 5. 8 200 digits
    - 3. 5. 9 500 digits
    - 3. 5.10 1000 digits
  - 3. 6. Minimum load for automatic storage/transfer of values
    - 3. 6. 1 * 1 digit
    - 3. 6. 2 2 digits
    - 3. 6. 3 5 digits
    - 3. 6. 4 10 digits
    - 3. 6. 5 20 digits
    - 3. 6. 6 50 digits
    - 3. 6. 7 100 digits
    - 3. 6. 8 200 digits
    - 3. 6. 9 500 digits
    - 3. 6.10 1000 digits

- Σ — **Totalizing**
  - 3. 7. — Automatic tare: 1st weight tared
    - 3. 7. 1* — Off
    - 3. 7. 2 — On
  - 3. 8. — Application started automatically and most recent application data loaded when Combics switched on
    - 3. 8. 1 — Automatic (on)
    - 3. 8. 2 * — Manual (off)
  - 3.16. — Automatic storage of value
    - 3.16. 1 * — Off
    - 3.16. 2 — On
  - 3.17. — Printout of individual component data when value stored in totalizing memory
    - 3.17. 1 — Automatic printout of results off
    - 3.17. 2 * — Print individual transaction by pressing OK
    - 3.17. 3 — Print components of transaction by pressing OK
  - 9. 1. — Restore factory settings of all application programs
    - 9. 1. 1 — Yes
    - 9. 1. 2 * — No

- Fn-tEy
  - oFF * — No [TOGGLE UNITS] Fn key function
  - Gro nEt — Gross/net toggling
  - 2. un it — Toggle between the 1st, 2nd and 3rd weight units
  - rES 10 — 10 × higher resolution
  - 3. un itS — Switch from 1st to 2nd to 3rd weight unit (press again to start over at 1st unit)

Function Key: Assignment [TOGGLE UNITS] Fn

⚠ Note:
Affix the enclosed adhesive label ([TOGGLE UNITS]) to the Fn key.



Device Parameters

Password prompt
(only when password is active: 2 sec. on)
Enter the password

Weighing Platform 1

Display designation of this menu level: 1
Adapting the scale to "very unstable" ambient conditions (adapt filter)
Minimum vibration
Normal vibration
Strong vibration
Extreme vibration

Application filter
Final readout
Filling mode
Low filtering
Without filtering

Stability range
¼ digit
½ digit
1 digit [1])
2 digits [1])
4 digits [1])
8 digits [1])

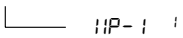
Stability delay
No delay
Short delay
Average delay
Long delay

Taring [1])
Without stability
After stability

Auto zero
On
Off

Weight unit 1 [2])
Long ton /o
Grams /g
Kilograms /kg
Carats /ct [1])
Pounds /lb
Ounces /oz
Troy ounces /ozt [1])
Hong Kong taels /tlh [1])
Singapore taels /tls [1])
Taiwanese taels /tlt [1])
Grains /GN [1])
Pennyweights /dwt [1])
Milligrams /mg [1])
Parts per pound //lb [1])
Chinese taels /tlc [1])
Mommes /mom [1])
Austrian carats /K [1])
Tola /tol [1])
Baht /bat [1])
Mesghal /MS [1])
Tons /t

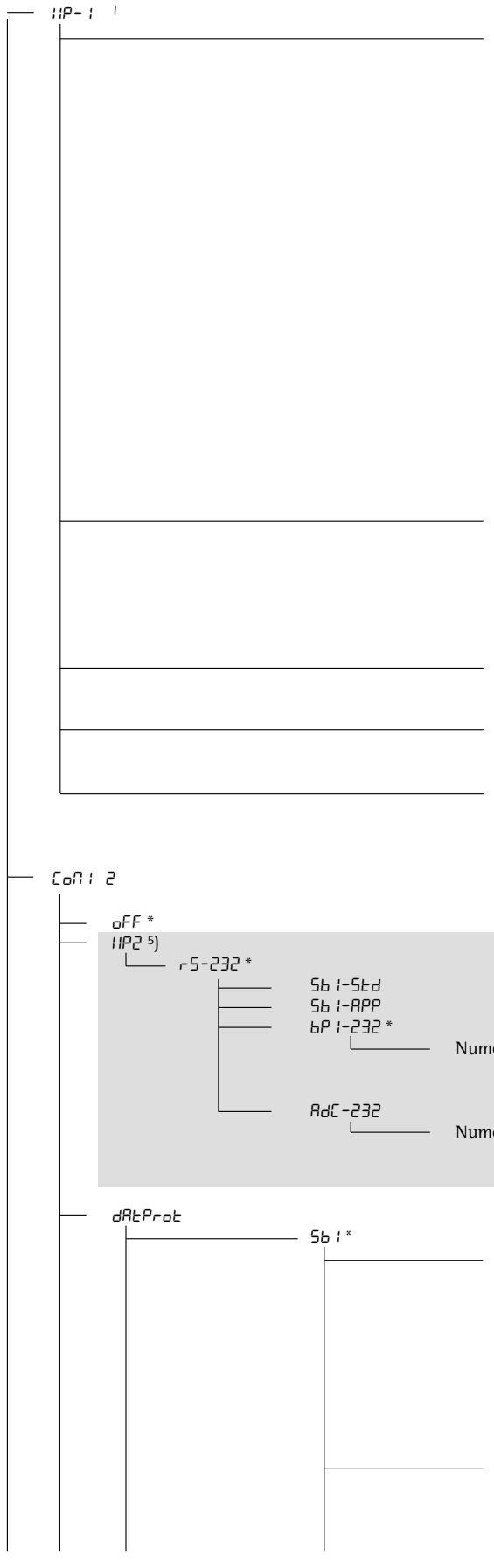
[1]) = not available on scales verified for use in legal metrology
[2]) = depends on type of weighing platform



Weighing Platform 1

1. 8.		Display accuracy 1
	1. 8. 1 *	All digits
	1. 8. 2	Reduced by 1 decimal place for load change
	1. 8. 3	Reduced by 1 decimal place [1])
	1. 8. 4	Reduced by 2 decimal places [1])
	1. 8. 5	Reduced by 3 decimal places [1])
1. 9.		Calibration, adjustment
	1. 9. 1 *	Ext. calibration/adjustment; default weights
	1. 9. 3	Ext. calibration/adjustment; weight can be selected under menu item 1.18.1
	1. 9.10	Key blocked
1.10.		Calibration/adjustment sequence
	1.10. 1	Calibration with automatic adjustment
	1.10. 2 *	Calibration with adjustment triggered manually
1.11.		Zero-setting range
	1.11. 1	1 percent/max. cap.
	1.11. 2 *	2 percent/max. cap.
1.12.		Initial zero-setting range
	1.12. 2	2 percent/max. cap.
	1.12. 3 *	5 percent/max. cap.
1.13.		Tare/zero at power on
	1.13. 1 *	On
	1.13. 2	Off; load previous tare value
	1.13. 3	Only zero at power on
1.15.		Calibration prompt
	1.15. 1 *	Off
	1.15. 2	Calibration prompt "$\overline{\Delta\Delta}$" flashes in the display
1.16.		Ext. calibration/adjustment [1])
	1.16. 1	Accessible
	1.16. 2 [2])	Blocked
1.18.		Enter calibration weight
	1.18. 1	External user-defined weight; enter value; e.g.: 10.000 kg

[1]) = not available on scales verified for use in legal metrology
[2]) = only on scales verified for use in legal metrology



Weighing Platform 1

Weight unit 2 [1])
- 3. 1. 1 Long ton /o
- 3. 1. 2 Grams /g
- 3. 1. 3 Kilograms /kg
- 3. 1. 4 Carats /ct [2])
- 3. 1. 5 Pounds /lb
- 3. 1. 6 Ounces /oz
- 3. 1. 7 Troy ounces /ozt [2])
- 3. 1. 8 Hong Kong taels /tlh [2])
- 3. 1. 9 Singapore taels /tls [2])
- 3. 1.10 Taiwanese taels /tlt [2])
- 3. 1.11 Grains /GN [2])
- 3. 1.12 Pennyweights /dwt [2])
- 3. 1.13 Milligrams /mg [2])
- 3. 1.14 Parts per pound //lb [2])
- 3. 1.15 Chinese taels /tlc [2])
- 3. 1.16 Mommes /mom [2])
- 3. 1.17 Austrian carats /K [2])
- 3. 1.18 Tola /tol [2])
- 3. 1.19 Baht /bat [2])
- 3. 1.20 Mesghal /ms [2])
- 3. 1.21 Tons /t

3. 2. Display accuracy 2
- 3. 2. 1 * All digits
- 3. 2. 2 Reduced by 1 decimal place for load change
- 3. 2. 3 Reduced by 1 decimal place
- 3. 2. 4 Reduced by 2 decimal places
- 3. 2. 5 Reduced by 3 decimal places

3. 3. Weight unit 3 [1])
- Numeric menu as for weight unit 2

3. 4. Display accuracy 3
- Numeric menu as for display accuracy 2

9. 1. **Restore Factory Settings for WP-1 Numeric Menu**
- 9. 1. 1 Yes
- 9. 1. 2 * No

Interface 1

Display designation of this menu level: 2

Off

Weighing Platform 2 [5])

RS-232
- Sb1-Std SBI standard version
- Sb1-APP SBI for legal metrology
- bP1-232 * xBPI-232 [1])
  - Numeric menu as for WP-1 ...
  - 1. 1. ...
  - 1. 9. 4 Internal calibration/adjustment
- AdC-232 ADC-232 [1])
  - Numeric menu as for WP-1 ...
  - 1. 1. ...
  - 1. 9. 4 Internal calibration/adjustment

Data protocol

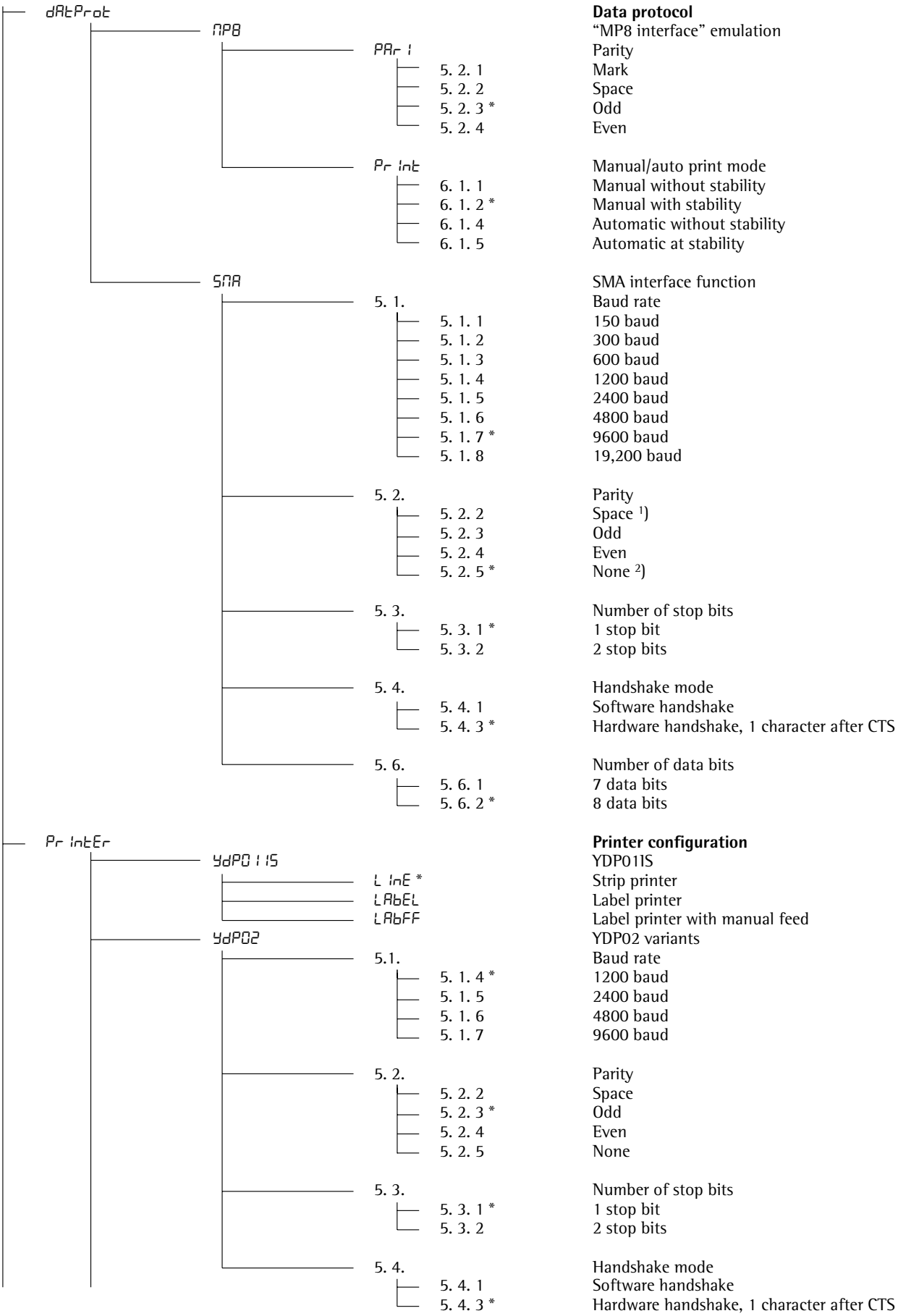
Sb1 * SBI standard version

5. 1. Baud rate
- 5. 1. 1 150 baud
- 5. 1. 2 300 baud
- 5. 1. 3 600 baud
- 5. 1. 4 * 1200 baud
- 5. 1. 5 2400 baud
- 5. 1. 6 4800 baud
- 5. 1. 7 9600 baud
- 5. 1. 8 19,200 baud

5. 2. Parity
- 5. 2. 2 Space [3])
- 5. 2. 3 * Odd
- 5. 2. 4 Even
- 5. 2. 5 None [4])

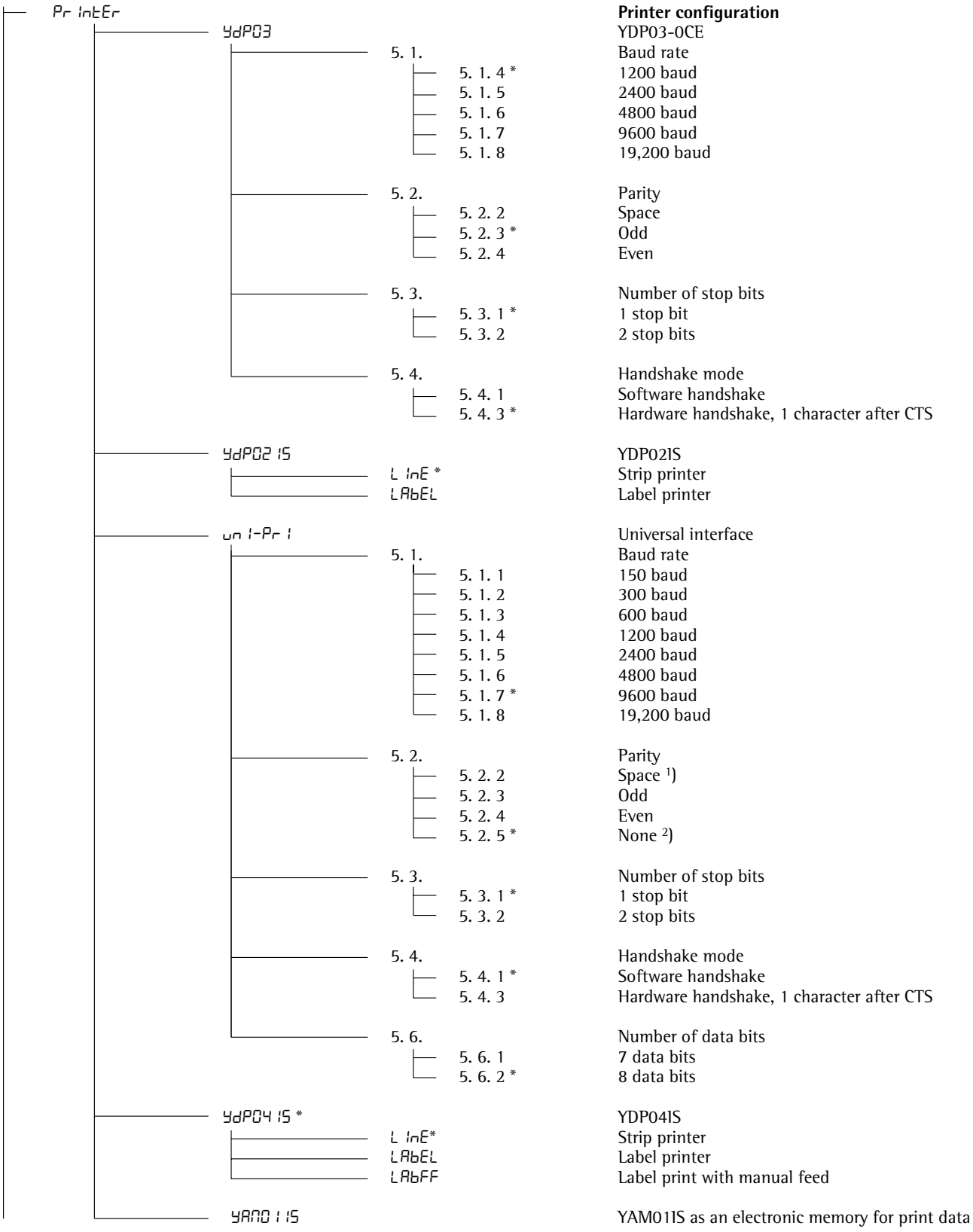
[1]) = depends on type of weighing platform
[2]) = not available on scales verified for use in legal metrology
[3]) = not with setting 5. 6. 2 (8 bits)
[4]) = not with setting 5. 6. 1 (7 bits)
[5]) = not permitted in legal for trade applications

- dAtProt — **Data protocol**
  - Sbi * — SBI standard version
    - 5. 3. — Number of stop bits
      - 5. 3. 1 * — 1 stop bit
      - 5. 3. 2 — 2 stop bits
    - 5. 4. — Handshake mode
      - 5. 4. 1 — Software handshake
      - 5. 4. 3 * — Hardware handshake, 1character after CTS
    - 5. 6. — Number of data bits
      - 5. 6. 1 * — 7 data bits
      - 5. 6. 2 — 8 data bits
    - 6. 1. — Manual/automatic data output
      - 6. 1. 1 — Manual without stability
      - 6. 1. 2 * — Manual with stability
      - 6. 1. 4 — Automatic without stability
      - 6. 1. 5 — Automatic with stability
      - 6. 1. 7 — Printout for computer (PC)
    - 6. 3. — Automatic printout of data output
      - 6. 3. 1 * — 1 display update
      - 6. 3. 2 — 2 displayupdates
      - 6. 3. 4 — 10 display updates
      - 6. 3. 7 — 100 display updates
    - 7. 2. — Data output: Line format for printout
      - 7. 2. 1 — For raw data: 16 characters
      - 7. 2. 2 * — For other applications: 22 characters
    - 9. 1. — Restore factory settings of the numeric menu for COM1: SBI
      - 9. 1. 1 — Yes
      - 9. 1. 2 * — No
  - bPi-232 — xBPI-232
  - MP8 — “MP8 interface” emulation
    - ProG — Program selection
      - P 3- 1- 1 — MP8: 3-1-1
      - ...
      - P 3- 1-9 — MP8: 3-1-9
      - P 3-2- 1 — MP8: 3-2-1
      - ...
      - P 3-2-9 — MP8: 3-2-9
      - P 3-3- 1 — MP8: 3-3-1
      - ...
      - P 3-3-9 — MP8: 3-3-9
    - Ind. 2 — Index 2
      - 1 2 . 1 — Ind. 2.1
      - 1 2 . 2 — Ind. 2.2
      - 1 2 . 3 — Ind. 2.3
      - 1 2 . 4 — Ind. 2.4
    - bAud — Baud rate
      - 5. 1. 1 — 150 baud
      - 5. 1. 2 — 300 baud
      - 5. 1. 3 — 600 baud
      - 5. 1. 4 * — 1200 baud
      - 5. 1. 5 — 2400 baud
      - 5. 1. 6 — 4800 baud
      - 5. 1. 7 — 9600 baud

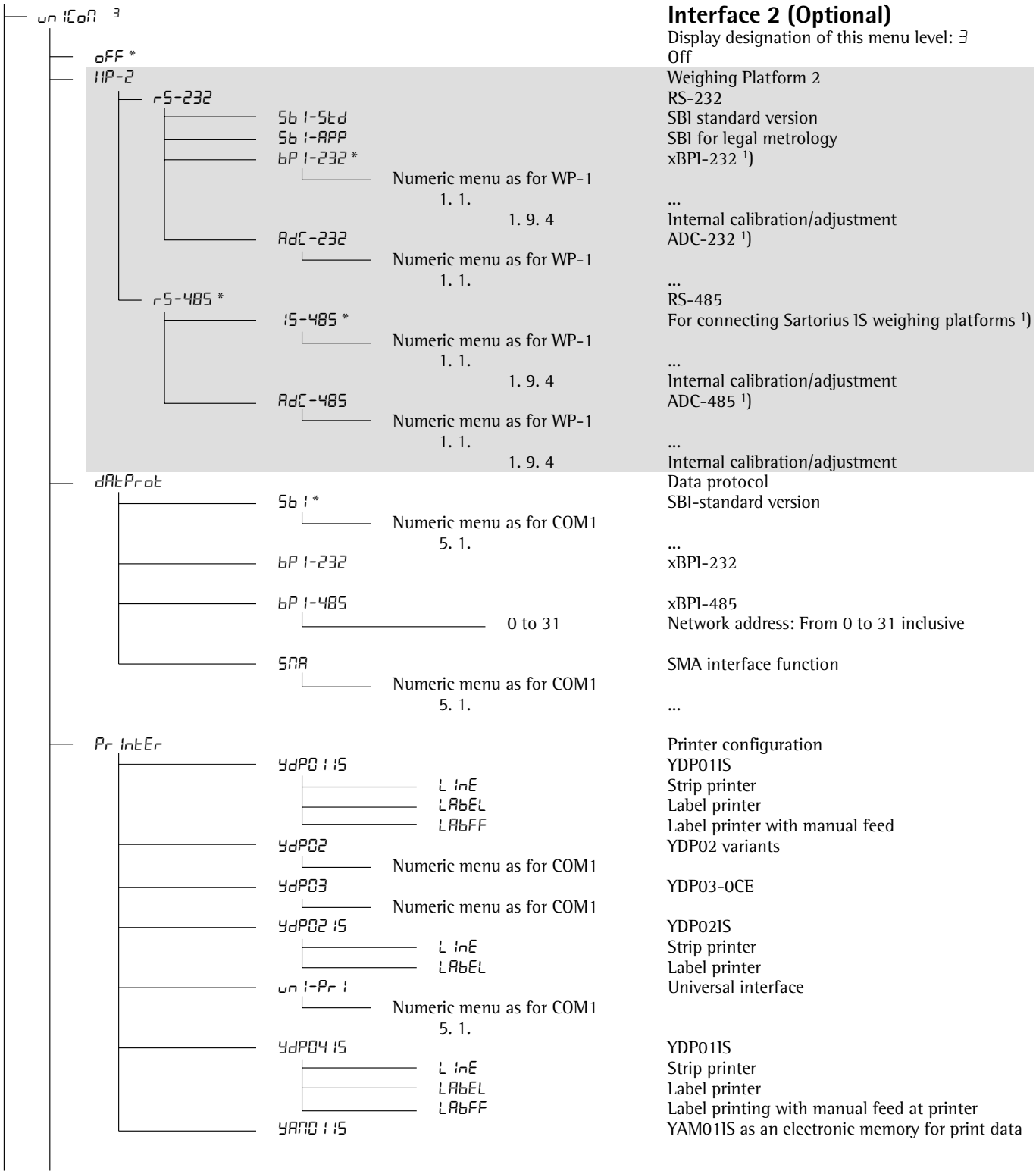


1) not with setting 5. 6. 2. (8 bits)

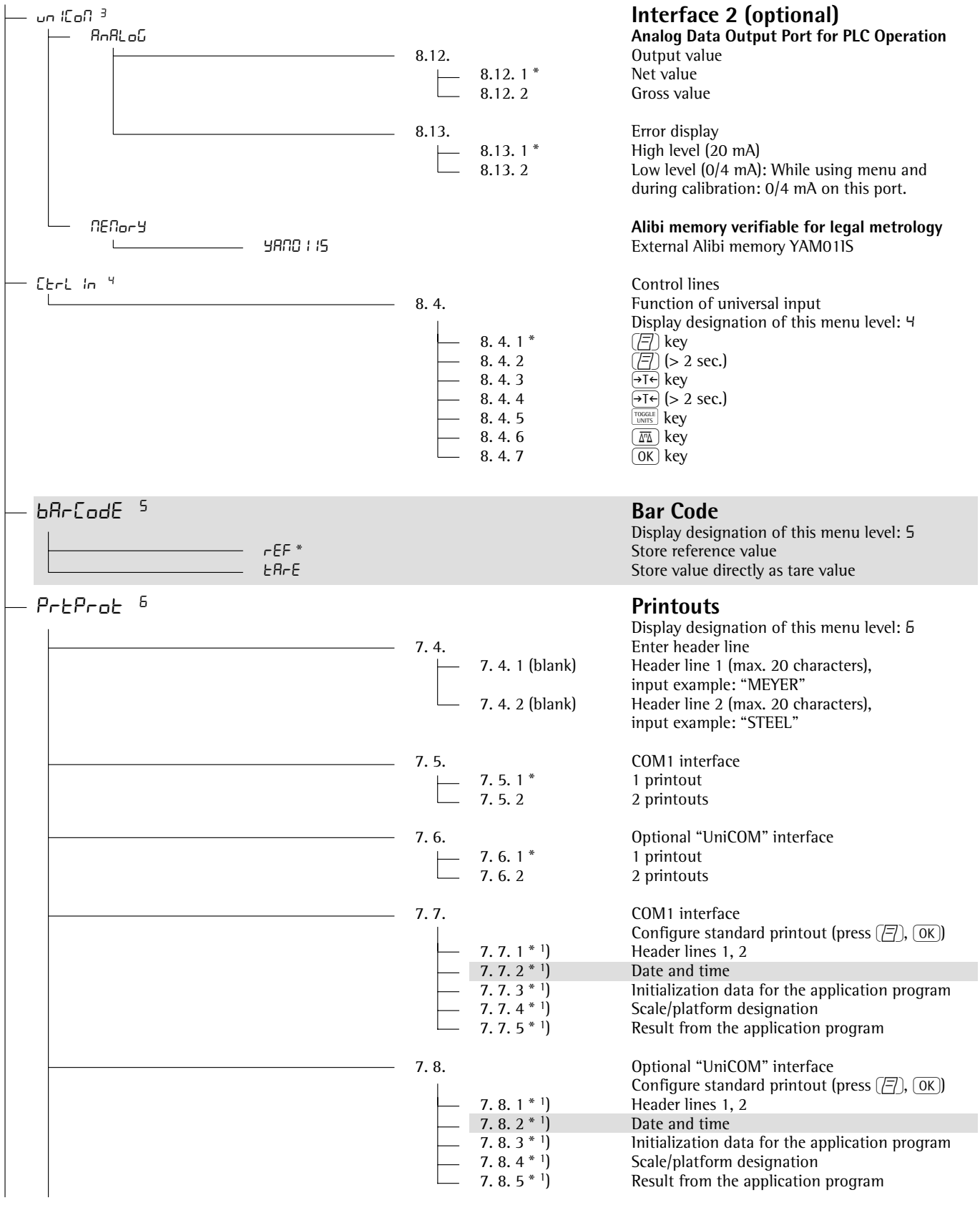
2) not with setting 5. 6. 1 (7bits)



1) = not with setting 5. 6. 2 (8 bits)
2) = not with setting 5. 6. 1 (7 bits)



1) = menu depends on connected scale or weighing platform



Interface 2 (optional)

Analog Data Output Port for PLC Operation

8.12. Output value
- 8.12. 1 * Net value
- 8.12. 2 Gross value

8.13. Error display
- 8.13. 1 * High level (20 mA)
- 8.13. 2 Low level (0/4 mA): While using menu and during calibration: 0/4 mA on this port.

Alibi memory verifiable for legal metrology

YAM01IS External Alibi memory YAM01IS

Control lines

8. 4. Function of universal input
Display designation of this menu level: 4
- 8. 4. 1 * (F) key
- 8. 4. 2 (F) (> 2 sec.)
- 8. 4. 3 →T← key
- 8. 4. 4 →T← (> 2 sec.)
- 8. 4. 5 TOGGLE UNITS key
- 8. 4. 6 Δ% key
- 8. 4. 7 OK key

Bar Code

Display designation of this menu level: 5

rEF * Store reference value

tArE Store value directly as tare value

Printouts

Display designation of this menu level: 6

7. 4. Enter header line
- 7. 4. 1 (blank) Header line 1 (max. 20 characters), input example: “MEYER”
- 7. 4. 2 (blank) Header line 2 (max. 20 characters), input example: “STEEL”

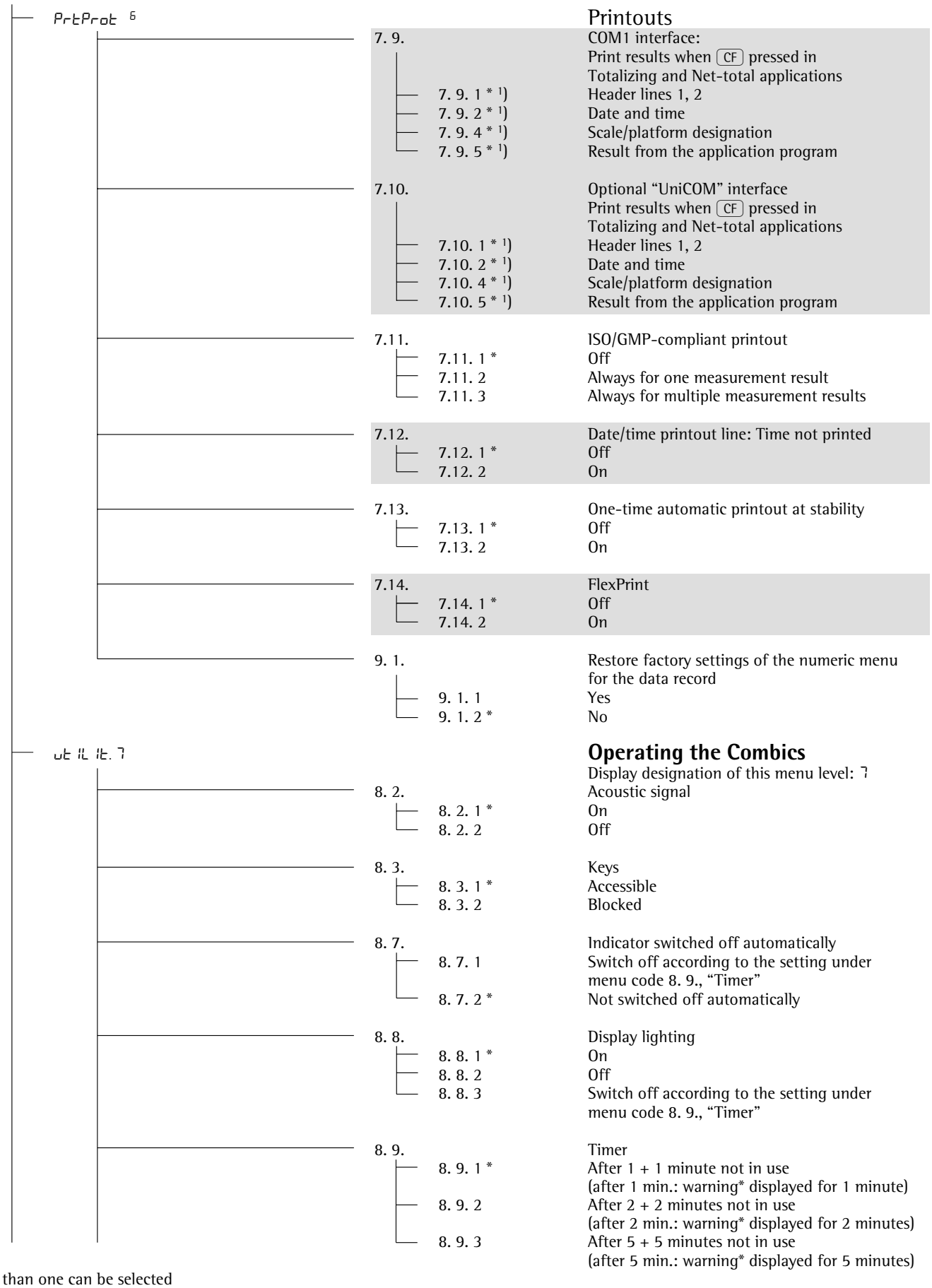
7. 5. COM1 interface
- 7. 5. 1 * 1 printout
- 7. 5. 2 2 printouts

7. 6. Optional “UniCOM” interface
- 7. 6. 1 * 1 printout
- 7. 6. 2 2 printouts

7. 7. COM1 interface
Configure standard printout (press (F), OK)
- 7. 7. 1 * 1) Header lines 1, 2
- 7. 7. 2 * 1) Date and time
- 7. 7. 3 * 1) Initialization data for the application program
- 7. 7. 4 * 1) Scale/platform designation
- 7. 7. 5 * 1) Result from the application program

7. 8. Optional “UniCOM” interface
Configure standard printout (press (F), OK)
- 7. 8. 1 * 1) Header lines 1, 2
- 7. 8. 2 * 1) Date and time
- 7. 8. 3 * 1) Initialization data for the application program
- 7. 8. 4 * 1) Scale/platform designation
- 7. 8. 5 * 1) Result from the application program

1) More than one can be selected



Printouts

7. 9. COM1 interface:
Print results when CF pressed in Totalizing and Net-total applications
- 7. 9. 1 * 1) Header lines 1, 2
- 7. 9. 2 * 1) Date and time
- 7. 9. 4 * 1) Scale/platform designation
- 7. 9. 5 * 1) Result from the application program

7.10. Optional “UniCOM” interface
Print results when CF pressed in Totalizing and Net-total applications
- 7.10. 1 * 1) Header lines 1, 2
- 7.10. 2 * 1) Date and time
- 7.10. 4 * 1) Scale/platform designation
- 7.10. 5 * 1) Result from the application program

7.11. ISO/GMP-compliant printout
- 7.11. 1 * Off
- 7.11. 2 Always for one measurement result
- 7.11. 3 Always for multiple measurement results

7.12. Date/time printout line: Time not printed
- 7.12. 1 * Off
- 7.12. 2 On

7.13. One-time automatic printout at stability
- 7.13. 1 * Off
- 7.13. 2 On

7.14. FlexPrint
- 7.14. 1 * Off
- 7.14. 2 On

9. 1. Restore factory settings of the numeric menu for the data record
- 9. 1. 1 Yes
- 9. 1. 2 * No

Operating the Combics

Display designation of this menu level: 7

8. 2. Acoustic signal
- 8. 2. 1 * On
- 8. 2. 2 Off

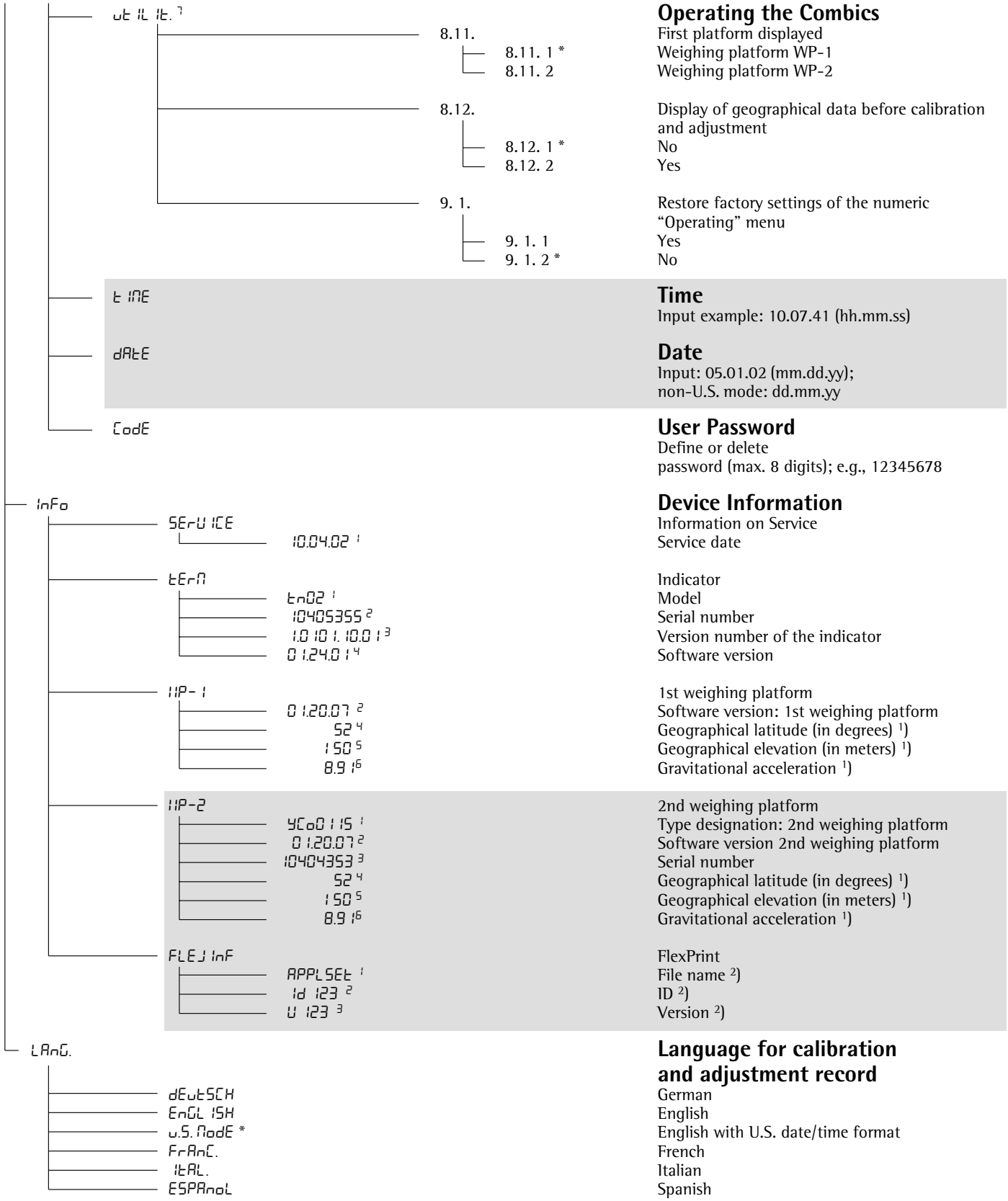
8. 3. Keys
- 8. 3. 1 * Accessible
- 8. 3. 2 Blocked

8. 7. Indicator switched off automatically
- 8. 7. 1 Switch off according to the setting under menu code 8. 9., “Timer”
- 8. 7. 2 * Not switched off automatically

8. 8. Display lighting
- 8. 8. 1 * On
- 8. 8. 2 Off
- 8. 8. 3 Switch off according to the setting under menu code 8. 9., “Timer”

8. 9. Timer
- 8. 9. 1 * After 1 + 1 minute not in use (after 1 min.: warning* displayed for 1 minute)
- 8. 9. 2 After 2 + 2 minutes not in use (after 2 min.: warning* displayed for 2 minutes)
- 8. 9. 3 After 5 + 5 minutes not in use (after 5 min.: warning* displayed for 5 minutes)

1) More than one can be selected



Operating the Combics

First platform displayed
Weighing platform WP-1
Weighing platform WP-2

Display of geographical data before calibration and adjustment
No
Yes

Restore factory settings of the numeric "Operating" menu
Yes
No

Time

Input example: 10.07.41 (hh.mm.ss)

Date

Input: 05.01.02 (mm.dd.yy);
non-U.S. mode: dd.mm.yy

User Password

Define or delete
password (max. 8 digits); e.g., 12345678

Device Information

Information on Service
Service date

Indicator
Model
Serial number
Version number of the indicator
Software version

1st weighing platform
Software version: 1st weighing platform
Geographical latitude (in degrees) [1])
Geographical elevation (in meters) [1])
Gravitational acceleration [1])

2nd weighing platform
Type designation: 2nd weighing platform
Software version 2nd weighing platform
Serial number
Geographical latitude (in degrees) [1])
Geographical elevation (in meters) [1])
Gravitational acceleration [1])

FlexPrint
File name [2])
ID [2])
Version [2])

Language for calibration and adjustment record

German
English
English with U.S. date/time format
French
Italian
Spanish

* Warning: "ΔΔ 12" flashes on the display
[1]) Outputs either latitude and altitude or gravitational acceleration, depending on settings before verification.
[2]) The three parameters are displayed for each file loaded.

Weighing Mode

Weighing ⚖

The basic weighing function is available at all times.

Features:
- Zeroing the weighing platform
- Taring the weighing platform
- Automatic taring (can be combined with other applications, such as Counting, for example)
- Toggling the display, depending on menu settings, between:
  - the 1st, 2nd and 3rd weight units (are cycled in the display)
  - gross and net, or
  - normal and increased (10-fold) display resolution
- Automatic printing
- GMP-compliant printout

Factory settings:

- Minimum load: 10 digits (3.5.4)
- Automatic tare: Off (3.7.1)
- Automatic printing: Off (7.13.1)

Automatic Taring
The first weight on the weighing platform that exceeds the preset minimum load is stored in the tare memory at stability.
The values for subsequent loads are stored as weight values.
The weighing platform returns to the initial state when the load is less than 50% of the minimum load.

Automatic Printing
The first weight value that exceeds the preset minimum load is printed automatically.

Device Parameters

Password
You can assign a password to protect parameter settings for applications (Combics 2 only) and for device setup (SEtuP CodE) from unauthorized changes.

For a detailed description, see the section on “Defining Password Protection for the Menu” in the “Settings” chapter.

Acoustic Signal
An acoustic signal is sounded when you press a key. If the key in question is allowed at the time it is pressed, the signal is a single beep. If it is not allowed, a double-beep sounds and the key does not trigger any function. In the Setup program you can select from the following options:
- Acoustic signal: on (8.2.1)
- Acoustic signal: off (8.2.2)

Keys
You can block the keys to prevent keypad input and commands:
- Keys accessible (8.3.1)
- Keys blocked (8.3.2)

Automatic Power-off
You can configure the power-off mode to define whether the Combics:
- Shuts off automatically after a selected period of time elapses (8.7.1)
- Does not shut off automatically (8.7.2)

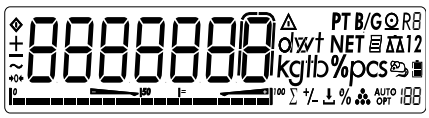
You can configure the timer to define whether the Combics:
- Shuts off after 2 minutes (8.9.1)
- Shuts off after 4 minutes (8.9.2)
- Shuts off after 10 minutes (8.9.3)

Display Lighting
You can define whether the display lighting is:
- On (8.8.1)
- Off (8.8.2)
- Shut off automatically after the selected time period has elapsed (8.8.3)

First Platform Displayed
(Combics 2 only)
You can define which weighing platform shows the first weight value when you switch on the Combics:
- Weighing platform WP1 (8.11.1)
- Weighing platform WP2 (8.11.2)

Example
Switch on the Combics 2; zero the platform; tare the container weight; fill container; toggle display to gross weight, second weight unit, or 10-fold increased resolution

Switch on the Combics

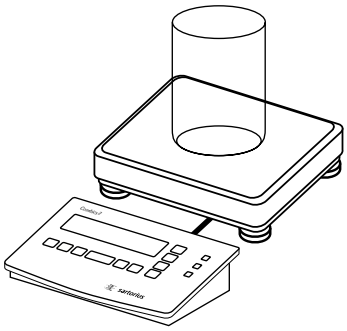


All segments are lit for approx. 1 second (display check)

Display when the weighing platform is not loaded

Zero the platform

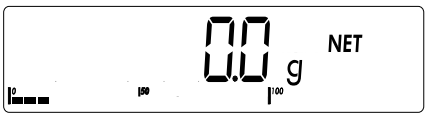
Display when the weighing platform is not loaded



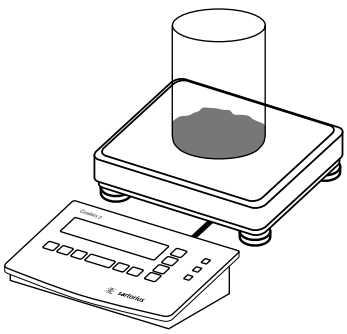
Place container on platform

Container weight is displayed

Tare the platform



Display for tared weighing platform with empty container



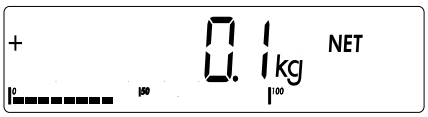
Fill container (in this example, 120.2 g)

Display for tared platform with filled container

Fn

Toggle the display; depending on the settings, the display now shows either

The gross weight on the platform
(in this example, 50 g container weight + 120.2 g substrate), or



Net weight in the second weight unit (in this example, kg), or

Net weight with 10-fold increased resolution

TOGGLE UNITS

Toggle back to previous display
(The "10-fold increased resolution" display switches back to the previous display after 10 seconds)

Previous display

Print data record

```
--------------------
24.02.2002     15:10
Model CW2P1-30ED-LCE
Ser.no.     12345678
Vers.    1.1007.12.1
BVers.      01-25-01
--------------------
     EISENSCHMIDT
     GOETTINGEN
24.02.2002     15:10
--------------------

G#     +    170.2 g
T      +     50.0 g
N      +    120.2 g
--------------------

--------------------
24.02.2002     15:11
Name:

--------------------
```

Start of GMP header (only if "GMP-compliant printout" is configured)

End of GMP header

Start of GMP footer (only if "GMP-compliant printout" is configured)

End of GMP footer

Calibration and Adjustment

Purpose

The accuracy of weighing results must be carefully controlled. This is achieved through calibration and adjustment. Calibration technically means to determine the difference between the weighing instrument readout and the actual weight on the platform to determine the accuracy. This does not involve making any changes in the weighing platform.
Adjustment means to bring a weighing instrument to the level of accuracy required for its use.

Configuring Functions for Use of the Weighing Platform in Legal Metrology (for service personnel only)

Proceed as follows to use the Combics in legal metrology:

– Block external adjustment

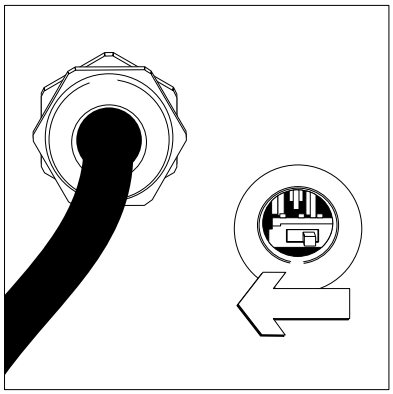
Preparation

● Remove the covering panel on the left-hand side of the back of the indicator.

● Move the switch to the right.

> Switch on the left:
For legal metrology (external adjustment blocked)
(Factory setting on verified models)

> Switch on the right: External adjustment accessible



Features

Which of the following features are available depends on the connected weighing platform:

– External calibration/adjustment with the default weight value or standard weight (1.9.1) (not available on verified weighing platforms)

– External calibration/adjustment with a user-defined weight (1.9.3) (not available on verified weighing platforms)

– Internal adjustment for an IS platform configured as IIP2 (1.9.4)

– Block the function of the →T← key when pressed > 2 seconds to prevent use of the functions described above (1.9.10)

– Calibration followed by automatic adjustment (1.10.1) (not available on verified weighing platforms)

– Calibration, optionally followed by (manually triggered) adjustment (1.10.2) (not available on verified weighing platforms)

– Calibration prompt: flashing ΔΔ symbol (1.15.2). If more than one platform is connected, the platform number is also displayed.

– Block external calibration/adjustment (1.16.2)

– No external adjustment on verified weighing platforms

– Altitude and degree of latitude or gravitational acceleration displayed after CAL is shown when the calibration procedure is started, if these values have been entered in the Combics by service personnel and are supported by the connected platform.
For each of these parameters, the term is displayed first (ALt Itud, LAt Itud, or GrAU ItY) for approx.
1 second, and then the corresponding value is displayed continuously until you press →T←.

Preparation

● Press the I/⏻ key to switch on the Combics

● While the self-test of the display segments is running, press the →T← key

● Open the Setup menu:
Press the [TOGGLE UNITS] key twice

● Select the Setup menu: Press the →T← key

● Select weighing platform 1 (by pressing →T←)

With the Combics 2, you have the option of selecting weighing platform 2:

– Select Con- I or on ICon (depending on which interface the second platform is connected to)
– Select IIP-2
– Press →T← twice

1 Weighing platform parameters
- 1.1 ... 1.8
- 1.9 Calibration function
  - 1.9.1 External calibration/ adjustment with default weight
  - 1.9.3 External calibration/ adjustment with user-defined weight
  - 1.9.4 Internal adjustment (for WP2 only)
  - 1.9.10 Block the function of →T← key when pressed > 2 sec.
- 1.10 Calibration/adjustment sequence
  - 1.10.1 Calibration/adjustment in one operation
  - 1.10.2 Calibration; adjustment triggered manually
- 1.11 ... 1.14
- 1.15 Calibration prompt
  - 1.15.1 Off
  - 1.15.2 On
- 1.16 External calibration/adjustment
  - 1.16.1 Accessible
  - 1.16.2 Blocked
- 1.18 Enter calibration weight
  - 1.18.1 User input

● Save settings and exit Setup:
Press and hold the →T← key

Example
External calibration and manual adjustment with default weights

Settings in the Setup menu:
1.9.1; 1.10.2; 1.16.1

Please see the ”Preparation” section on the previous page

→0←

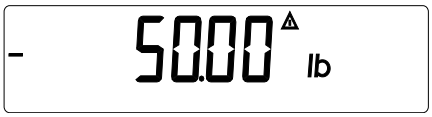
Unload and zero the weighing platform

Press and hold →T←

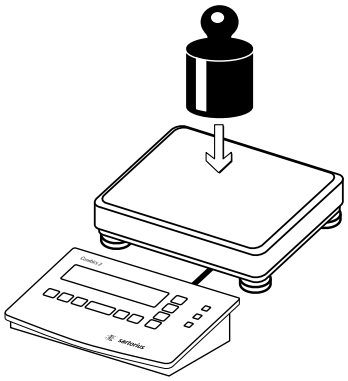
Start calibration (e.g., when calibration prompt flashes: ΔΔ)

This is displayed for 2 seconds

If the setting SEtuP: uL IL It.: 8. 12.2 is selected, the display now shows ALt Itud for 1 second, followed by the corresponding value. Press →T← to confirm; then LAt Itud is displayed for 1 second followed by the value. If the gravitational acceleration has been entered as a valid parameter, then this value is displayed rather than the altitude and latitude.



You are prompted to place the required weight on the platform (e.g., 10 kg)



Position the calibration weight on the weighing platform

The difference between the weight value and the true mass is displayed, with +/– sign.

```
External calibration
Targ. +      50.00 lb
Diff. -       0.01 lb
-----------------------
```

If you press →0← to cancel calibration without performing adjustment, a printout is generated

→T←

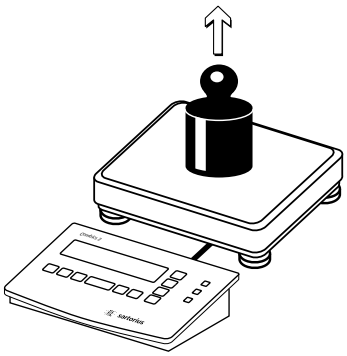
Activate adjustment (press the →0← key to cancel calibration/adjustment)

The calibration weight is displayed at the conclusion of adjustment

Continued on next page

```
--------------------
14.01.2002     13:00
Model CW2P1-30ED-LCE
Ser.no.      12345678
Vers.    1.1007.12.1
BVers.       01-25-01
--------------------
External calibration
Targ.  +   50.00 lb
Diff.  -    0.01 lb
External adjustment
Diff.  +    0.00 lb
--------------------
14.01.2002  13:02
Name:

--------------------
```

A GMP-compliant printout is generated



Unload the weighing platform

Audit Trail Counter

Purpose

Automatic tracking of changes in calibration and weighing parameters by two independent counters. Counter data is saved in an EEPROM. This memory retains the counts throughout the lifetime of the component.

To display the two counters, press and hold down the →0← key for more than 2 seconds. First, "Weighing parameter change counter" will be displayed for 3 seconds on the weight display (identified by a "P"). Then "Calibration parameter change counter" will be displayed for another 3 seconds (identified by a "C"). The indicator will exit the information display mode automatically after 6 seconds.

Calibration Parameter Change Counter

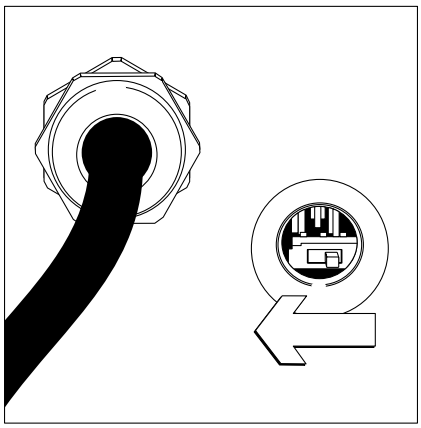
Features:

- Counter capacity limited to 9,999
- Counter is set to "C 0000" when initialized by hardware
- Counter cannot be reset
- Counter is automatically updated (incremented) when:
  - calibration/adjustment and linearization have been successfully completed
  - The user, calibration, adjustment or linearization weight has changed (menu code item 1.18.)
  - A change in the following parameters is detected:
    Function of the CAL key (menu code item 1.9.)
    Zero-setting range (menu code item 1.11.)
    Initial zero-setting range (menu code item 1.12.)
    The parameters listed above are reset to the defaults (menu code setting 9.1.1)

Weighing Parameter Change Counter

Features:

- Counter capacity limited to 9,999
- Counter is set to "P 0000" when initialized by hardware
- Counter cannot be reset
- Counter is automatically updated (incremented) when:
  - A change in the following parameters is detected:
    Ambient conditions / level of vibration (menu code item 1.1.)
    Application filter (menu code item 1.2.)
    Stability range (menu code item 1.3.)
    Taring (menu code item 1.5.)
    Auto zero (menu code item 1.6.)
    Weight unit 1 (menu code item 1.7.)
    Weight unit 2 (menu code item 3.1.)
    Weight unit 3 (menu code item 3.3.)
    The parameters listed above are reset to the defaults (menu code setting 9.1.1)
  - The [TOGGLE UNITS] key is switched to or from the 10 times higher resolution
  - The automatic tare mode for applications is activated or de-activated (menu code item 3.7.)
  - The application parameters are reset to the defaults (menu code setting 9.1.1)



Function of the Menu Access Switch

When the "Trade" configuration is active and the menu access switch is in the "open" position,

> ⚠ is shown on the display

> The "!" symbol is shown in place of the weight unit on the printout

Counting ⁂
When the Counting application is selected, you can determine the number of parts that each have approximately equal weight.

Features:
- Store reference weight from the load on the weighing platform
- Enter reference weight using a bar code scanner
- Enter tare weight using a bar code scanner
- Automatic reference sample updating (user-definable)
- Counting with 2 weighing platforms
- Toggle the display between piece count and weight by pressing [⇆]
- Info mode

Factory settings:
- Minimum load for automatic taring and automatic printout: 10 digits (3.5.4)
- Minimum load for automatic initialization: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Application started automatically with most recent initialization data when Combics switched on: Off (manual start) (3.8.2)
- Resolution for reference weight calculation: Display resolution (3.9.1)
- Storage parameter: At stability (3.11.1)
- Reference sample updating: Automatic (3.12.3)
- Reference platform: Off (3.13.1)
- Reference sample quantity: 10

Before the quantity on the platform can be calculated, the average piece weight must be entered in the application. There are 2 ways to do this with the Combics:

- By placing the number of parts defined as the reference sample quantity on the weighing platform and pressing [OK] to calculate and store the average piece weight.

  The reference sample quantity is shown in the numeric display.

  How the reference weight is calculated depends on the resolution specified in the Application settings (3.9). It is either rounded off in accordance with the display resolution, or stored with 10-fold or 100-fold resolution, or with the maximum internal resolution of the weighing platform. Press the [REF] key to change the reference sample quantity; then continue as described above.

- By entering the reference piece weight (i.e., the weight of one piece) using a bar code scanner. In this case, the value is stored automatically without pressing [OK].

  The value for the reference sample quantity remains active in the reference memory until you overwrite it or until you select a different application. It also remains stored after you switch off the Combics.

Storage Parameter
The reference weight is stored when the platform has stabilized. “Stability” is defined as the point at which fluctuation of a measured value lies within a defined tolerance range. The narrower the tolerance range, the more stable the platform is at “stability”. This setting is also applied when you zero the weighing platform.

You can set the parameter for “Stability at initialization” to “At stability” (normal tolerance range) or “At higher stability” (limited tolerance range).

If you select “higher stability”, the average piece weight stored will be more accurate and the results more reproducible, but the response time of the weighing platform might be longer.

Minimum Load
The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring and automatic printout; 3.6: minimum load for automatic initialization).
You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the scale divisions in the connected weighing platform. If the division of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g (= 1000 divisions = 1000 digits) on the weighing platform for initialization.

If the division of the connected platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

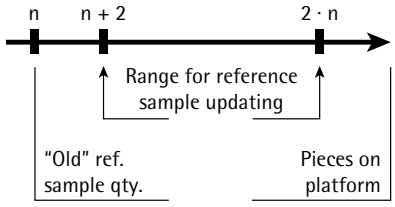
You can increase the resolution for determining the reference weight by changing the Application settings for resolution (3.9) to use display resolution + 1 decimal place, display resolution + 2 decimal places, or internal resolution. With the setting for "Display resolution + 1 (2) decimal place(s)", the resolution of the net value is increased by one or two decimal places; "Internal resolution" uses the maximum resolution available in the weighing platform.

Once the limit is exceeded by the load, initialization can begin. If the load on platform is too light for initialization, the following will occur when you try to initialize the application:

- The error InF 29 is displayed.
- A warning signal (double-beep) is emitted
- The weighing platform is not initialized
- The preset reference sample quantity is stored

Reference Sample Updating
In the Application settings under 3.12, you can define whether the reference sample is updated automatically. Reference sample updating is performed automatically only when the following 6 criteria are met:

1. Menu item 3.12.3 is selected in the Application setup menu
2. The current piece count must exceed the original piece count by at least two
3. The current piece count is less than twice the original piece count (does not apply to the first update if the piece count is entered using a bar code scanner).



4. The current piece count is less than 100.
5. The internally calculated piece count (such as 17.24 pcs) differs by less than ± 0.3 pcs from the whole number (17 pcs in this example).
6. The weighing platform is stable in accordance with the defined stability parameter.

If automatic reference sample updating is selected in the Application settings and the piece count (pcs) is displayed, the AUTO symbol is displayed in addition to the Counting symbol (⁂). If the reference sample has been updated, OPT is displayed continuously next to the "AUTO" symbol. During a reference sample updating operation, both OPt and the current reference sample quantity are shown briefly in the main display.

At the conclusion of reference sample updating, a beep is sounded and the new reference weight and reference sample quantity are stored. You can view these values when the weighing platform is in Info mode.

Counting with Two Weighing Platforms
You can use two weighing platforms simultaneously with the Counting application. When using two platforms, you can choose from the following operating modes:

- Counting with two platforms of the same type
- Counting with one reference platform and one weighing platform

Counting with Two Platforms
Use this mode to count different types of sample material with different weights. For example, count the lighter-weight pieces on one platform and the heavier pieces on the other. After starting a counting routine on one platform, press ⚖ to toggle to the other platform, re-initialize the application and begin a new counting operation.

You can define which of the two platforms is active when the Combics is switched on (8.11). This setting is independent of automatic initialization of the Counting application.

Counting with One Reference Platform and One Weighing Platform
In this mode, the reference platform is a high-resolution weighing platform with a relatively low maximum capacity. The other platform is used for counting large amounts, and has a high capacity with a relatively low resolution.

This allows you to both determine the reference sample quantity with high resolution; i.e., very precisely, and to count large amounts of parts, without requiring an expensive high-resolution, high-capacity weighing platform.

The system toggles automatically to the reference platform for initialization (rEF is displayed). Following initialization, the system toggles to the counting platform.

The system does **not** toggle automatically for automatic reference sample updating; the update is based on whichever platform is active.

Preparation

- Press the [I/⏻] key to switch on the Combics
- While all segments are lit, press the [→T←] key
- Open the numeric menu: Press the [→T←] key twice

3 Application parameters

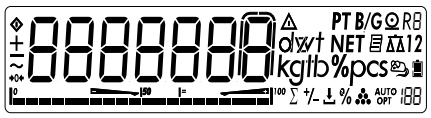
- 3.5 Minimum load for automatic taring and automatic printing
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for automatic initialization
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Application started automatically with most recent initialization data when Combics switched on
  - 3.8.1 On (automatic start)
  - 3.8.2 Off (manual start)
- 3.9 Resolution for calculation of reference value
  - 3.9.1 Display resolution
  - 3.9.2 Display resolution + 1
  - 3.9.3 Display resolution + 2
  - 3.9.4 Internal resolution
- 3.11 Storage parameter
  - 3.11.1 At stability
  - 3.11.2 At higher stability
- 3.12 Reference sample updating
  - 3.12.1 None
  - 3.12.2 Automatic
- 3.13 Reference platform
  - 3.13.1 Off
  - 3.13.2 WP1
  - 3.13.3 WP2

- Save settings and exit Setup: Press and hold the [→T←] key

Example
Determine piece count; menu setting: weigh in the defined reference sample quantity with the minimum load set to 100 digits

Configure Settings

I/⏻ — Switch on the Combics



While all segments are lit, press the →T← key

→T←

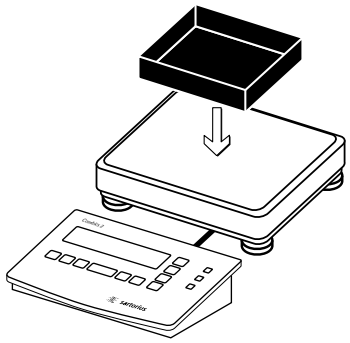
Display for selecting the application is shown

Open Application selection *APPL*
Select parameter 3.6.7

Symbol for Counting: ⁂
100 digits: Parameter 3.6.7

Press and hold →T← — Exit Application settings menu

Operation

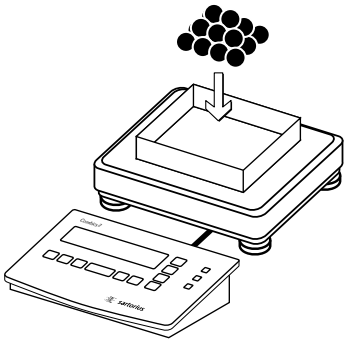


Place empty container on the platform

→T←

Tare the weighing platform

Press REF (repeatedly, if necessary) — to set the desired reference sample quantity (in this example, 20)



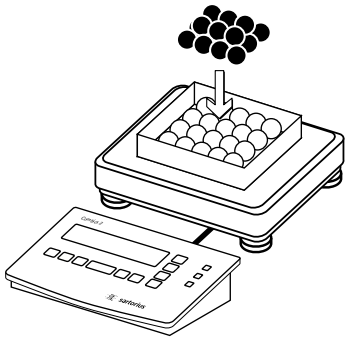
Place the corresponding number of pieces in the container

OK

Confirm reference weight

If the weight is too light, an error code appears in the main display *InF 29*

Reduce the minimum load setting (3.6) or
increase the reference sample quantity and the number of parts in the container



Add more parts to the container (in this example, 18 pcs)

OPt is displayed when automatic reference sample updating is performed

Print the results

```
G#    +      610.0 g
T     +      200.0 g
N     +      410.0 g

Qnt              38 pcs
--------------------
```

Neutral Measurement ⁂ ⌐∩

When the Neutral Measurement application is selected, you can use your weighing platform to measure the length, surface and volume of parts that have roughly the same specific weight. The **o** symbol is displayed as the weight unit .

Features:

- Store reference weight from the value on the weighing platform
- Enter the reference weight using a bar code scanner
- Enter the tare weight using a bar code scanner
- Toggle the display between measured value and weight by pressing ⇆.
- Info mode

Factory settings:

- Minimum load for automatic taring and automatic printing: 10 digits (3.5.4)
- Minimum load for automatic initialization: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Application started automatically with most recent initialization data when Combics switched on: Off (manual start) (3.8.2)
- Resolution for reference weight calculation: Display resolution (3.9.1)
- Decimal places displayed: None (3.10.1)
- Storage parameter: At stability (3.11.1)
- Reference platform: Off (3.13.1)
- Reference value: 1

In order to calculate the length, surface or volume of a given sample, the average weight of a reference quantity of the sample material must be known (in the example below, the reference is 1 meter of electrical cable). There are 2 ways to enter this reference weight in the Combics weighing platform:

- By placing the number of parts defined as the reference sample quantity on the weighing platform and pressing OK to calculate and store the average piece weight.

  The reference unit value is shown in the numeric display.

  How the reference weight is calculated depends on the Application setting for resolution (3.9). It is either rounded off in accordance with the display resolution, or stored with 10-fold or 100-fold resolution, or with the maximum internal resolution of the weighing platform. Press the REF key to change the reference weight; then continue as described above.

- By entering the reference weight (i.e., the weight of 1 unit) using a bar code scanner. In this case, the value is stored automatically without pressing OK.

  The value for the reference weight remains active in the reference memory until you overwrite it or until you select a different application. It also remains stored after you switch off the Combics.

Storage Parameter

The reference weight is stored when the platform has stabilized. “Stability” is defined as the point at which fluctuation of a measured value lies within a defined tolerance range. The narrower the tolerance range, the more stable the platform is at “stability”. This setting is also applied when you zero the weighing platform.

You can set the parameter for “Stability at initialization” to “At stability” (normal tolerance range) or “At higher stability” (limited tolerance range).

If you select “higher stability”, the reference weight stored will be more accurate and the results more reproducible, but the response time of the weighing platform might be longer.

Minimum Load
The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring and automatic printing; 3.6: minimum load for automatic initialization).
You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the scale divisions in the connected weighing platform. If the division of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g (= 1000 divisions = 1000 digits) on the weighing platform for initialization.

If the division of the connected platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

You can increase the resolution for determining the reference weight by changing the Application settings for resolution (3.9) to use display resolution + 1 decimal place, display resolution + 2 decimal places, or internal resolution. With the setting for "Display resolution + 1 (2) decimal place(s)", the resolution of the net value is increased by one or two decimal places; "Internal resolution" uses the maximum resolution available in the weighing platform.

Once the limit is exceeded by the load, initialization can begin. If the load on platform is too light for initialization, the following will occur when you try to initialize the application:

- The error InF 29 is displayed.
- A warning signal (double-beep) is emitted
- The weighing platform is not initialized
- The preset reference value is stored

Neutral Measurement with Two Weighing Platforms
You can use two weighing platforms simultaneously with the Neutral Measurement application. When using two platforms, you can choose from the following operating modes:
- Neutral Measurement with two platforms of the same type
- Neutral Measurement with one reference platform and one weighing platform

Neutral Measurement with Two Platforms of the Same Type
Use this mode to measure different types of sample material with different weights. For example, measure the lighter-weight samples on one platform and the heavier samples on the other. After starting a measuring routine on one platform, press ⚖ to toggle to the other platform, re-initialize the application and begin a new measuring operation.

You can define which of the two platforms is active when the Combics is switched on (8.11). This setting is independent of automatic initializiation of the Neutral Measurement application.

Neutral Measurement with One Reference Platform and One Weighing Platform
In this mode, the reference platform is a high-resolution weighing platform with a relatively low maximum capacity. The other platform is used for measuring large amounts, and has a high capacity with a relatively low resolution.

This allows you to both determine the reference sample quantity with high resolution; i.e., very precisely, and to measure large amounts of parts, without requiring an expensive high-resolution, high-capacity weighing platform.

The system toggles automatically to the reference platform for initializiation (rEF is displayed). Following initialization, the system toggles to the measuring platform.

Preparation
- Press the I/⏻ key to switch on the Combics
- While all segments are lit, press the →T← key
- Open the numeric menu: Press the →T← key twice

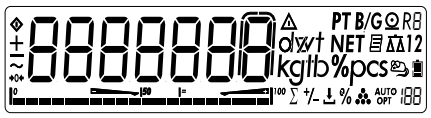
3 Application parameters
- 3.5 Minimum load for automatic taring and automatic printout
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for automatic initialization
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Application started automatically with most recent initialization data when Combics switched on
  - 3.8.1 On (automatic start)
  - 3.8.2 Off (manual start)
- 3.9 Resolution for calculation of reference value
  - 3.9.1 Display resolution
  - 3.9.2 Display resolution + 1
  - 3.9.3 Display resolution + 2
  - 3.9.4 Internal resolution
- 3.10 Decimal places displayed
  - 3.10.1 None
  - 3.10.2 1 decimal place
  - 3.10.3 2 decimal places
  - 3.10.4 3 decimal places
- 3.11 Storage parameter
  - 3.11.1 At stability
  - 3.11.2 At higher stability
- 3.13 Reference platform
  - 3.13.1 Off
  - 3.13.2 WP1
  - 3.13.3 WP2

- Save settings and exit Setup: Press and hold the →T← key

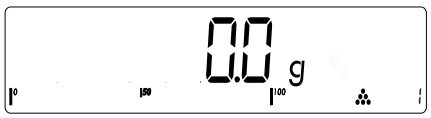
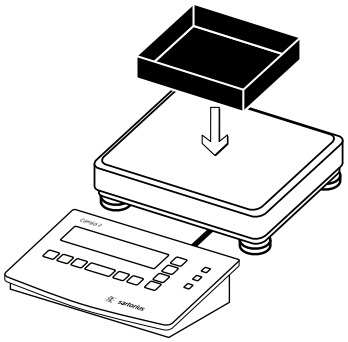
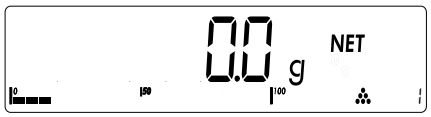
Operating the Combics 2

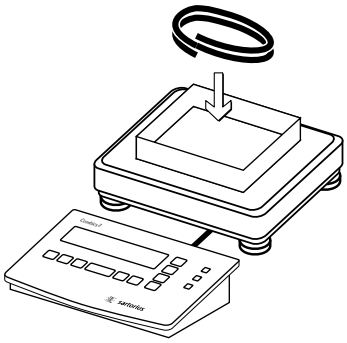
Example
Determine the length of an amount of electrical cable after weighing in the defined reference unit value

Configure Settings

I/⏻	Switch on the Combics
	While all segments are lit, press the →T← key
→T←	
	Display for selecting the application is shown
Open Application selection *APPL* Select Neutral Measurement	Symbol for Neutral Measurement: ⁂ ⌐∩
→T← (press and hold)	Exit Application selection

Operation

	
	Place empty container on the platform
→T←	Tare the weighing platform
	
Press REF (repeatedly, if necessary)	to set the desired reference value (in this example, 2)



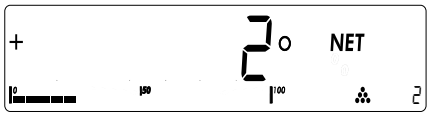
Place the corresponding unit in the container

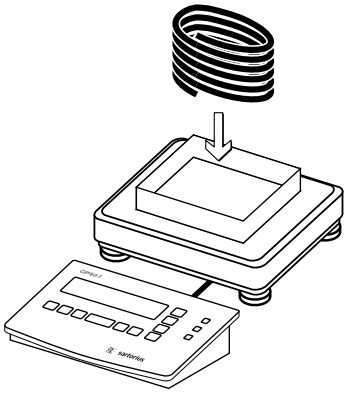
OK

Confirm the reference weight

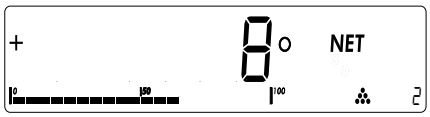
If the weight is too light, an error code appears in the main display *InF 29*

Reduce the minimum load setting (3.5) or
increase the reference sample value setting and the number of units in the container





Remove the reference material and place the sample to be measured on the weighing platform (in this example, 8 units)



Print the results

```
G#    +    734.1 g
T     +    200.0 g
N     +    534.1 g

Qnt         8 o
--------------------
```

Checkweighing +/-
When the Checkweighing application is selected, you can check whether sample weights correspond to a given target weight or lie within a given tolerance range. The tolerance range is defined as either an absolute value or a percentage with upper and lower limits. The result is displayed in the main indicator, in the bar graph and by a color-coded LED.

Features:

- When switched on, the application starts automatically with the previous initialization data
- The target value can be taken over as a weighed value from a weighing platform or scale and the tolerance limits selected from a predefined list (0.1%, 0.2%, 0.5%, 1%, 1.5%, 2%, 3%, 5%, 10%) as a deviation from the target value in percent.
- The target value, the lower tolerance limit (minimum) and the upper tolerance limit (maximum) can be taken over as weighed values from a weighing platform or scale
- The input of the target value and tolerance limits can be checked by the application program i.e. upper limit ≥ target value ≥ lower limit ≥ 1 digit
- Check range is either between 30% and 170% of the target value, or 10% to infinity
- Automatic taring
- Automatic printout
- Press the [⇆] key to toggle between the weight display mode and the tolerance limit display mode. The tolerance limit display indicates “LL” (too low) or “HH” (too high) for values outside the limits.
- Digital I/O interface
- Info mode displays the limits that have been set

Factory settings:

- Minimum load for automatic taring: 10 digits (3.5.4)
- Automatic taring (first weight tared): off (3.7.1)
- When switched on, the application starts automatically with the previous initialization data: manual (off) (3.8.2)
- Checkweighing range: 30% to 170% (4.2.1)
- Switch control line “SET” to: Output “SET” (4.3.1)
- Control lines: Switch to checkweighing range (4.4.4)
- Parameter input: Target value only with limits in percent (4.5.2)
- Automatic printout: off (4.6.1)

To use the checkweighing function, you must first enter a target value. The current value on the weighing platform is compared to this value. The target value also has a tolerance range which can be entered either as an absolute value or percentage; see Settings (4.5):

- Entering the tolerance range as an absolute value (weight value): Start initialization by pressing [OK], the middle segments of the bar graph flash. Enter the target value and store by pressing [OK].
  When the bar graph segment for the lower limit flashes, enter the weight for the lower limit and store by pressing [OK].
  When the bar graph segment for the upper limit flashes, enter the weight for the upper limit and store by pressing [OK].
- Entering the tolerance range in percent: A percentage for the limit appears in the numeric indicator and the percent sign is additionally displayed. You can change this value by pressing [REF] (0.1%, 0.2%, 0.5%, 1%, 1.5%, 2%, 3%, 5%, 10%). Store the desired value by pressing [OK].
  While entering the target value, the percentage can still be changed by pressing [REF]. The middle bar graph segments flash. Enter the target value and store by pressing [OK].

Minimum Load
The minimum load at initialization is set in the application setup program (3.5 Minimum load for automatic taring and automatic printout). You can choose from the following 10 accuracy levels:

1 digit (no minimum capacity)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The “digits” here refer to the scale divisions of the connected weighing platform. If the division of the connected platform is 1 g, and 1000 digits are required, you must place at least 1000 g (= 1000 scale divisions) on the weighing platform for initialization.
If the division of the connected weighing platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

Display Modes
The result of a measurement is displayed in the weight display mode or tolerance limit display mode. You can toggle between the two display modes by pressing ⇆.

- Weight Display Mode
  The weighed values are always shown on the main display, even if the corresponding results are over or under the tolerance limits.

  In the bar graph, the symbols for lower limit, target value and upper limit are displayed.

  The corresponding LED lights up:
  Yellow: Weighing result > upper tolerance limit
  Green: Weighing result lies within the tolerance limit
  Red: Weighing result < lower tolerance limit

  If no LED lights up:
  - the application is not yet completely initialized, or
  - weighing result lies outside of the check range, or
  - weighing platform has not reached stability

- Tolerance Limit Display Mode

  The same as the weight display mode, but:
  - LL appears on the main indicator when the weighing result is less than the lower tolerance limit
  - HH appears on the main indicator for weighing result is greater than the upper tolerance limit

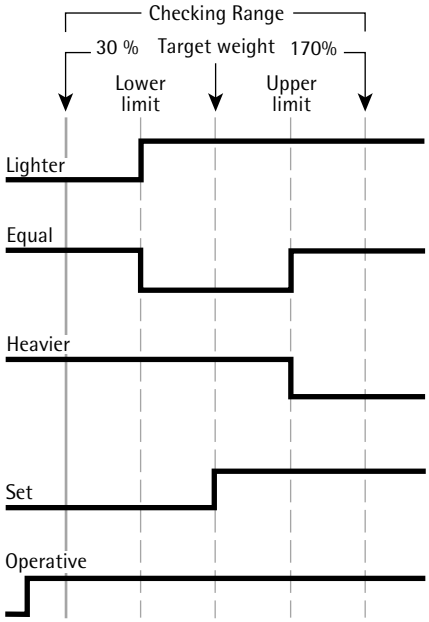
- Bar Graph
  The bar shows a logarithmic display of the current load if the weight is anywhere from 0 to the minimum load, and a linear display for weights beyond that range.

Digital I/O Interface
The digital I/O interface is supported by the Checkweighing application. Four data output ports relay the following information (see diagram):
- Lighter
- Equal
- Heavier
- Set
  The "Set" output normally changes its voltage level when the load is near the target weight. Alternatively, the "Ready-for-Use" function (4.3.2) can be assigned to this output.

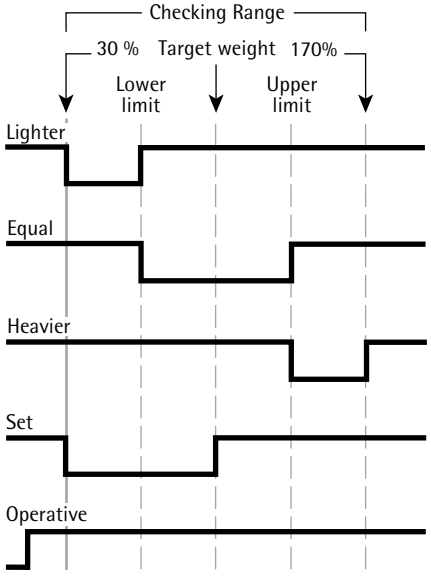
  In the application program, you can define whether these control ports are:
- deactivated (4.4.1)
- always activated (4.4.2)
- activated at stability (4.4.3)
- activated within the check range (4.4.4)
- activated at stability within the check range (4.4.5)

  For example, this enables you to show the weighed or measuring result on a simple external indicator, similar to the 3 LEDs on the Combics 2.

  All data output ports have a high voltage level when:
- The application has not been initialized
- The weighing platform is not at stability and the menu setting "at stability ..." (4.4.3 and 4.4.5) was selected
- The load is not within the check-weighing range (4.4.4)



Digital I/O Interface
Control line "SET": set and control lines: always/always at stability



Digital I/O Interface
Control line "SET": set and control lines: within the check range/within the check range at stability

Setup

- Turn on the Combics by pressing I/⏻
- While all segments are lit, press the →T← key
- Select the Numeric menu: press the →T← key 2 x

3 Application Parameters

- 3.5 Minimum capacity for automatic taring and for automatic printout
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Automatic start mode: When switched on, the application starts automatically with the previous initialization data:
  - 3.8.1 Automatic mode (On)
  - 3.8.2 Manual mode (off)

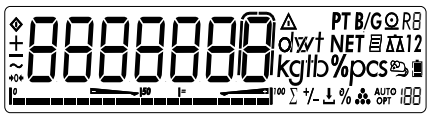
4 Application Parameters 2

- 4.2 Check range
  - 4.2.1 30% to 170%
  - 4.2.2 10% to infinity
- 4.3 Switch control line “SET” to
  - 4.3.1 Output “SET”
  - 4.3.2 Ready
- 4.4 Control Lines
  - 4.4.1 Off
  - 4.4.2 Always activated
  - 4.4.3 Activated at stability
  - 4.4.4 Activated within check range
  - 4.4.5 Activated at stability within the check range
- 4.5 Parameter Input
  - 4.5.1 Min, max, target value
  - 4.5.2 Target value only with limits in percent
- 4.6 Automatic Printout
  - 4.6.1 Off
  - 4.6.2 On
  - 4.6.3 Only if within the tolerance limits
  - 4.6.4 Only if outside the tolerance limits

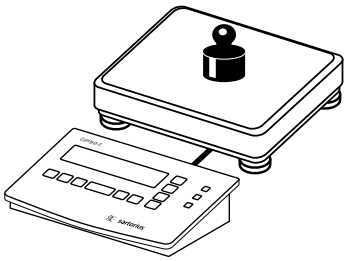
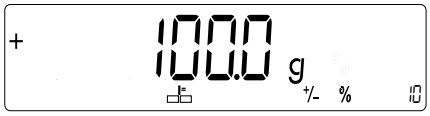
- Store settings and exit setup: press and hold the →T← key

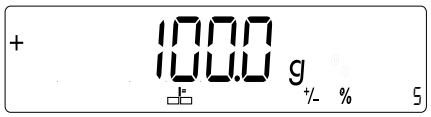
Example
Initialize checkweighing by storing a weighed value as the target value, tolerance limit display mode in percent

Configuring the Scale

I/⏻	Switch Combics on
	While all segments are lit, press the →T← key
→T←	
	The display for selecting the application appears
Select application *APPL* Select Checkweighing	Symbol for Checkweighing: ±
If desired, change the configurations in the Setup menu:	see the paragraph “Setup” on the previous page
Press and hold →T←	to exit the application

Weighing Mode

CF	Delete previously selected initialization, if necessary
	Place a sample on the weighing platform for target value (here: 100.0g)
	The weight of the sample is indicated (percentage for limit value, here: 10%)
OK	Start initialization (enter target value and limits)
	The middle bar graph segments flash
Press REF (repeatedly, if necessary)	to set the desired percentage for the tolerance limits (minimum, maximum)



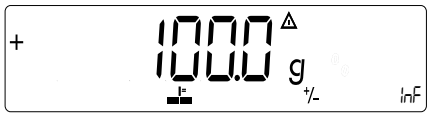
The middle bar graph segments flash, percentage for limits (in this example: 5%)

OK

The weight of the sample is stored as the target value.
The percentage is stored for the tolerance limits (minimum, maximum).

Press and hold the key

to view the stored results if desired (Info mode)



The target value is displayed

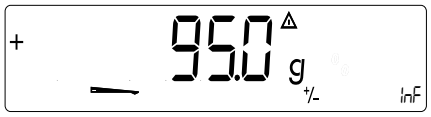
Press

to display the percentage for tolerance limits if desired.

The percentage for the tolerance limits is displayed.

Press

to display the lower tolerance limit (minimum) if desired.



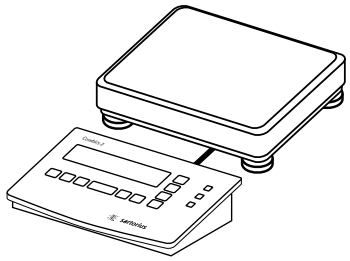
The minimum is displayed.

Press

to display the upper tolerance limit (maximum) if desired or

Press and hold down

to exit the menu target value, minimum and maximum (exit Info mode)



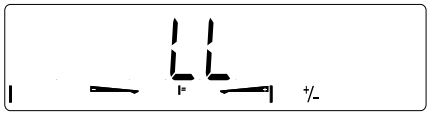
Remove the load from the weighing platform

The weighed value appears in the main indicator, the bar graph segments are not lit up.

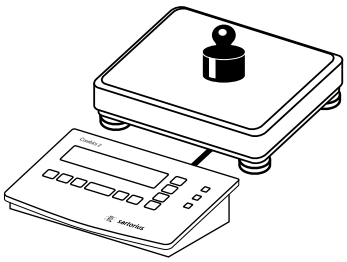
Example: Checkweigh a sample with an unknown weight in the tolerance limit display mode.

If desired, 

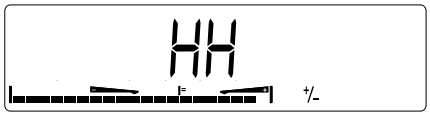
if the weight display mode is activated, toggle to the tolerance limit display mode



The weighing platform is unloaded and LL (weight too light) appears on the main display (in the tolerance limit display mode only)



Place a sample of unknown weight on the weighing platform



If the weight is greater than the maximum, HH (weight too heavy) is indicated (in the tolerance limit display mode only).

If the weight is within the tolerance range (here: 103.2 g), the weighed value is indicated (in the tolerance limit display mode only)

Print a data record

Data record

```
     EISENVATER
     GOETTINGEN
19.03.2002      15:43
--------------------
Setp   +     100.0 g
Min    +      95.0 g
Max    +     105.0 g

G#     +     103.2 g
T      +       0.0 g
N      +     103.2 g

Lim    +      3.20 %
Diff.W+       3.2 g
--------------------
```

Target value
Minimum
Maximum

Gross weight
Tare weight
Net weight

Deviation from target value* in percent
Absolute deviation from target value

* If the weight is less than the minimum `Stat LL` appears here
If the weight is greater than the maximum `Stat HH` appears here

Classification %- CL
When the Classification application is selected, you can determine whether the weight of a given sample lies within the limits of a defined weight class.

Features:
- Configure 3 or 5 classes
- Define contiguous classes
- Define classes that cover the entire weighing range of the weighing platform
- Range below the specified minimum load is designated "Class 0"
- Define the upper limit of a given class by storing weight on platform or by entering a weight value and a percentage
- Show the current weight in the main display as a weight value or as belonging to a certain class
- Current load additionally designated in the display by 1 LED (when using 3 classes) or 2 LEDs (when using 5 classes)
- Toggle the display between weight and class by pressing ⇆.
- Digital I/O interface
- Info mode shows class delimiters

Factory settings:
- Minimum load for automatic taring and automatic printing: 10 digits (3.5.4)
- Minimum load for setting the lower limit of class 1: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Application started automatically with most recent initialization data when Combics switched on: Off (manual start) (3.8.2)
- Activate control line for "Set" as: Set output (4.3.1)
- Control lines: Activate at stability (4.7.3)
- Number of classes: 3 (4.8.1)
- Parameter input: Weight values (4.9.1)
- Automatic printout of results: Off (4.10.1)
- Default percentage: 10%

To use the Classification application, you need to enter the delimiters that separate one class from another.

- The lower limit of Class 1 is defined by the preset minimum load. Weight values below the minimum load are classified as belonging to Class 0, in part to prevent an unloaded weighing platform from displaying a value that designates a class.

  There are two ways to enter the delimiters for Classes 1 through 3 (or through 5):

- By storing the load on the platform: Define each upper limit (except that of the highest class), by placing a load of the corresponding weight on the weighing platform and pressing OK. The bar graph and the numeric display show which limit is currently being configured.
  Each time you store a value for an upper limit, the Combics checks whether the value is equal to or greater than the upper limit of the next lower class. If the value is invalid, an acoustic signal is sounded and the limit must be entered again.

- By entering a percentage: Define the upper limit of Class 1 by placing the corresponding weight on the platform and pressing OK. This value is equal to 100%.
  The upper limit of Class 2 is equal to 100% plus the percentage you select by pressing REF and a number (1, 2, 5, 10, 15, 30, 50, 70, 100, 150, 199%).

  Example: A load of 100 g is stored from the weighing platform as the upper limit of Class 1. The value 15% is then entered, defining the upper limit of Class 2 as 115 g.

  In this case, the weight ranges when working with 3 classes are:
  Class 0: up to the minimum load
  Class 1: Minimum load – 100 g
  Class 2: 100 g – 115 g
  Class 3: 115 g – maximum load

  With 5 classes, the weight ranges are:
  Class 0: up to the minimum load
  Class 1: Minimum load – 100 g
  Class 2: 100 g – 115 g
  Class 3: 115 g – 130 g
  Class 4: 130 g – 145 g
  Class 5: 145 g – maximum load

Minimum Load
The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring and automatic printing; 3.6: minimum load for setting the lower limit of Class 1). You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the scale divisions in the connected weighing platform. If the division of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g
(= 1000 divisions = 1000 digits) on the weighing platform for initialization.

If the division of the connected platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

You can increase the resolution for determining the reference weight by changing the Application settings for resolution (3.9) to use display resolution + 1 decimal place, display resolution + 2 decimal places, or internal resolution. With the setting for "Display resolution + 1 (2) decimal place(s)", the resolution of the net value is increased by one or two decimal places; "Internal resolution" uses the maximum resolution available in the weighing platform.

Once the limit is exceeded by the load, initialization can begin. If the load on platform is too light for initialization, the following will occur when you try to initialize the application:

- The error InF 29 is displayed.
- A warning signal (double-beep) is emitted
- The weighing platform is not initialized

Display
The result of a given measurement is shown as either a weight value or the class number. You can toggle between these two display modes by pressing [⇆].

- Weight display when working with 3 classes:

  The current weight is shown in the display; for example: 108.723 g
  Class 1 Bar graph:
  Numeric display: 1
  LED: red is lit
  Class 2 Bar graph:
  Numeric display: 2
  LED: green is lit
  Class 3 Bar graph:
  Numeric display: 3
  LED: yellow is lit

- Weight display when working with 5 classes:

  The current weight is shown in the display; for example: 108.723 g

  Class 1 Bar graph:
  Numeric display: 1
  LED: red is lit
  Class 2 Bar graph:
  Numeric display: 2
  LED: red and green are lit
  Class 3 Bar graph:
  Numeric display: 3
  LED: green is lit
  Class 4 Bar graph:
  Numeric display: 4
  LED: green and yellow are lit
  Class 5 Bar graph:
  Numeric display: 5
  LED: yellow is lit

- Display of classes when working with 3 classes

  The current class is shown in the display; for example: CLASS 1 and the bar graph indicates the current weight. The LEDs are lit as follows:
  Class 1 red
  Class 2 green
  Class 3 yellow

- Display of classes when working with 5 classes

  The current class is shown in the display; for example: CLASS 1 and the bar graph indicates the current weight. The LEDs are lit as follows:
  Class 1 red
  Class 2 red and green
  Class 3 green
  Class 4 green and yellow
  Class 5 yellow

Digital I/O Interface
The Classification application supports the digital input/output interface. There are 4 control lines, or outputs, which are activated as follows (see also the diagram below):

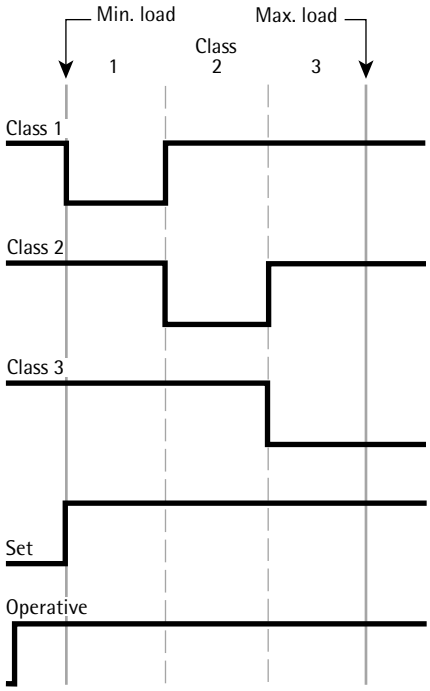
- Lighter
- Equal
- Heavier
- Set

The "Set" line usually indicates that the minimum load is exceeded. In the Application settings, you can assign the function "Operative" (4.3.2) to this line.

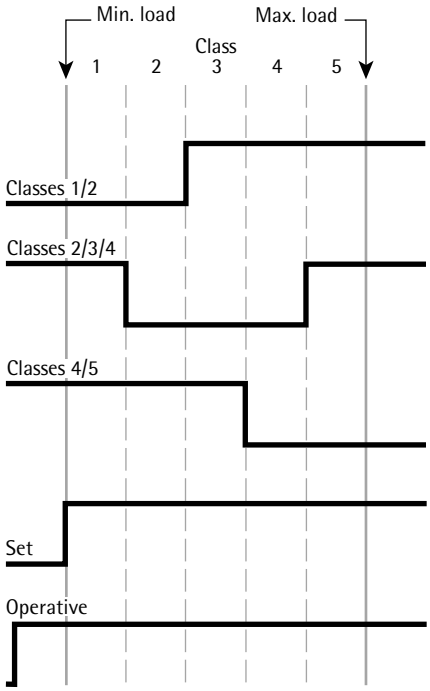
In the Application settings, you can define whether these control lines are

- Off (4.7.1)
- Always activated (4.7.2)
- Activated at stability (4.7.3)

This makes it possible to connect a simple indicator for weighing or calculation results, similar to the 3-segment checkweighing display on the Combics 2, for example, or to control automated processes.



Digital I/O Interface:
Control lines when working with 3 classes



Digital I/O Interface:
Control lines when working with 5 classes

Preparation

- Press the [I/⏻] key to switch on the Combics
- While all segments are lit, press the [→T←] key
- Show application settings: Press the [TOGGLE UNITS] key
- Open the numeric menu: Press the [→T←] key twice

3 Application parameters

- 3.5 Minimum load for automatic taring and automatic printing
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for setting the lower limit of Class 1
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Application started automatically with most recent initialization data when Combics switched on
  - 3.8.1 On (automatic start)
  - 3.8.2 Off (manual start)

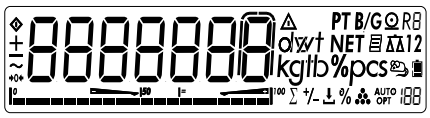
4 Application parameters 2

- 4.3 Activate control line for “Set” as
  - 4.3.1 “Set” output
  - 4.3.2 Operative
- 4.7 Control outputs
  - 4.7.1 Off
  - 4.7.2 Always activated
  - 4.7.3 Activated at stability
- 4.8 Number of classes
  - 4.8.1 3 classes
  - 4.8.2 5 classes
- 4.9 Enter parameters for Classification as
  - 4.9.1 Weight values
  - 4.9.2 Percentages
- 4.10 Automatic printout of results
  - 4.10.1 Off
  - 4.10.2 On

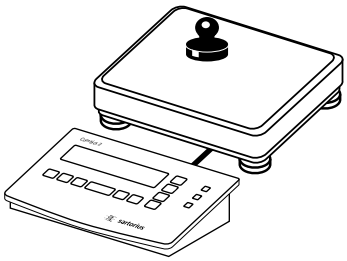
- Save settings and exit Setup: Press and hold the [→T←] key

Example
Initializing the Classification application by storing weight values for 5 classes

Configure Settings

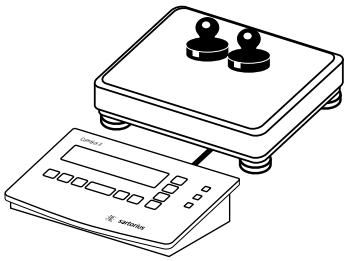
I/⏻	Switch on the Combics
	While all segments are lit, press the →T← key
→T←	
	Display for selecting the application is shown
Open Application selection *APPL* Select Classification	Symbol for Classification: +/- *CL*
Application settings: 4.8.2, 4.9.1	Please see the “Preparation” section on the previous page
→T← (press and hold)	Exit Application selection

Operation

CF	Delete existing initialization data
	Place weight for upper limit of Class 1 on platform (in this example, 10 g) The minimum load has already been configured in the Application menu
	Upper limit for Class 1 is displayed
OK	Toggle to Classification input. Now you can store weight values as class delimiters
	The readout shows the current weight and the first four segments of the bar graph flash

OK

Store limit for Class 1

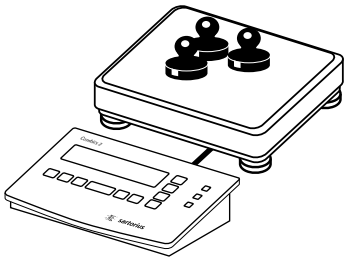


Place the weight for Class 2 on the platform (in this example, 20 g)

The readout shows the current weight and the “minus” indicator for the bar graph flashes

OK

Store limit for Class 2

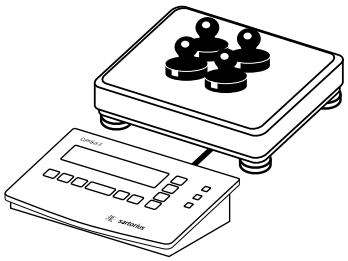


Place the weight for Class 3 on the platform (in this example, 30 g)

The readout shows the current weight and the four segments around the “=” sign of the bar graph flash

OK

Store limit for Class 3



Place the weight for Class 4 on the platform (in this example, 40 g)

The readout shows the current weight and the “plus” indicator for the bar graph flashes

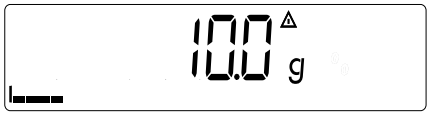
OK

Store limit for Class 4 as the last upper limit

The display shows which class the current weight is in

Press and hold 

View class delimiters (Info mode)



Upper limit of Class 1 is displayed

Press 

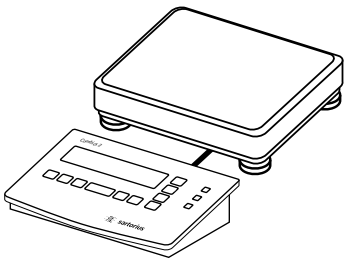
View upper limit of Class 2

Upper limit of Class 2 is displayed

View next upper limit or

Press and hold 

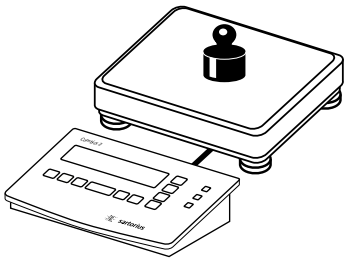
Exit the Info mode



Unload the weighing platform

The main display shows the weight values and the numeric display shows (Class) “0”

Example:
Determine the class of a given weight



Place a load of unknown weight on the platform

The display shows which class the weight falls into; in this example, Class 2 (10 g – 20 g)

Toggle to weight display

The weight of the load is shown (in this example, 17.3 g)

Printout

```
      PET SHOP
      GOETTINGEN
05.03.2002      09:43
--------------------
Lim1   +      10.0 g
Lim2   +      20.0 g
Lim3   +      30.0 g
Lim4   +      40.0 g

G#     +      17.3 g
T      +       0.0 g
N      +      17.3 g

Class              2
--------------------
```

Weighing in Percent %
When the Weighing in Percent application is selected, you can use your weighing platform to obtain weight readouts in percent which are in proportion to a reference weight. **%** is displayed as the weight unit.

Features:
- Store reference weight from the value on the weighing platform
- Enter the reference weight using a bar code scanner
- Enter tare weight using a bar code scanner
- Toggle the display between percentage and weight by pressing [⇆]
- Show percentage as loss or residue
- Values displayed with up to 3 decimal places
- Info mode

Factory settings:
- Minimum load for automatic taring and automatic printing: 10 digits (3.5.4)
- Minimum load for automatic initialization: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Application started automatically with most recent initialization data when Combics switched on: Off (manual start) (3.8.2)
- Resolution for reference weight calculation: Display resolution (3.9.1)
- Decimal places displayed for percentage: None (3.10.1)
- Storage parameter: At stability (3.11.1)
- Reference platform: Off (3.13.1)
- Display calculated value as: Residue (3.15.1)
- Reference percentage: 100

To determine the weight of a sample relative to a reference weight, you must enter the reference weight in the weighing platform. There are 2 ways to do this with the Combics weighing platform:

- By placing the amount of reference material on the weighing platform specified by the reference percentage and pressing [OK] to calculate and store it.

  The reference percentage is shown in the numeric display.

  How the reference weight is calculated depends on the resolution specified in the Application settings (3.9). It is either rounded off in accordance with the display resolution, or stored with 10-fold or 100-fold resolution, or with the maximum internal resolution of the weighing platform. Press the [REF] key to change the reference weight; then continue as described above.

- By entering the reference weight (in this example, the weight of 1 unit) using a bar code scanner. In this case, the value is stored automatically without pressing [OK].

  The value for the reference weight remains active in the reference memory until you overwrite it or until you select a different application. It also remains stored after you switch off the Combics.

Storage Parameter
The reference weight is stored when the platform has stabilized. “Stability” is defined as the point at which fluctuation of a measured value lies within a defined tolerance range. The narrower the tolerance range, the more stable the platform is at “stability”. This setting is also applied when you zero the weighing platform.

You can set the parameter for “Stability at initialization” to “At stability” (normal tolerance range) or “At higher stability” (limited tolerance range).

If you select “higher stability”, the reference weight stored will be more accurate and the results more reproducible, but the response time of the weighing platform might be longer.

Minimum Load
The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring and automatic printing; 3.6: minimum load for initialzation). You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The “digits” here refer to the scale divisions in the connected weighing platform. If the division of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g (= 1000 divisions = 1000 digits) on the weighing platform for initialization.

If the division of the connected platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

You can increase the resolution for determining the reference weight by changing the Application settings for resolution (3.9) to use display resolution + 1 decimal place, display resolution + 2 decimal places, or internal resolution. With the setting for “Display resolution + 1 (2) decimal place(s)”, the resolution of the net value is increased by one or two decimal places; “Internal resolution” uses the maximum resolution available in the weighing platform.

Once the limit is exceeded by the load, initialization can begin. If the load on platform is too light for initialization, the following will occur when you try to initialize the application:

- The error InF 29 is displayed.
- A warning signal (double-beep) is emitted
- The weighing platform is not initialized
- The preset reference percentage is stored

Weighing in Percent with Two Weighing Platforms
You can use two weighing platforms simultaneously with the Weighing in Percent application. When using two platforms, you can choose from the following operating modes:
- Weighing with two platforms of the same type
- Weighing with one reference platform and one weighing platform

Weighing in Percent with Two Platforms
Use this mode to weigh different types of sample material with different weights. For example, weigh the lighter-weight samples on one platform and the heavier samples on the other. After starting a weighing routine on one platform, press [⚖] to toggle to the other platform, re-initialize the application and begin a new weighing operation.

You can define which of the two platforms is active when the Combics is switched on (8.11). This setting is independent of automatic initializiation of the Counting application.

Weighing in Percent with One Reference Platform and One Weighing Platform
In this mode, the reference platform is a high-resolution weighing platform with a relatively low maximum capacity. The other platform is used for weighing large amounts, and has a high capacity with a relatively low resolution.

This allows you to both determine the reference sample quantity with high resolution; i.e., very precisely, and to weigh large amounts of parts, without requiring an expensive high-resolution, high-capacity weighing platform.

The system toggles automatically to the reference platform for initializiation (rEF is displayed). Following initialization, the system toggles to the higher-capacity platform.

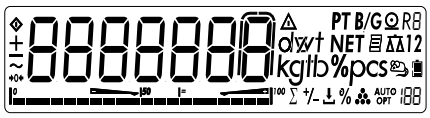
Preparation
- Press the [I/⏻] key to switch on the Combics
- While all segments are lit, press the [→T←] key
- Open the numeric menu: Press the [→T←] key twice

3 Application parameters
- 3.5 Minimum load for automatic taring and automatic printing
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for automatic initialization
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Application started automatically with most recent initialization data when Combics switched on
  - 3.8.1 On (automatic start)
  - 3.8.2 Off (manual start)
- 3.9 Resolution for calculation of reference value
  - 3.9.1 Display resolution
  - 3.9.2 Display resolution + 1
  - 3.9.3 Display resolution + 2
  - 3.9.4 Internal resolution
- 3.10 Decimal places displayed for percentage
  - 3.10.1 None
  - 3.10.2 1 decimal place
  - 3.10.3 2 decimal places
  - 3.10.4 3 decimal places
- 3.11 Storage parameter
  - 3.11.1 At stability
  - 3.11.2 At higher stability
- 3.13 Reference platform
  - 3.13.1 Off
  - 3.13.2 WP1
  - 3.13.3 WP2
- 3.15 Display calculated value as:
  - 3.15.1 Residue
  - 3.15.2 Loss

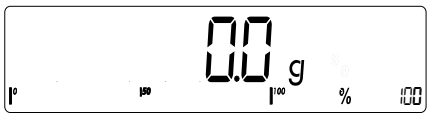
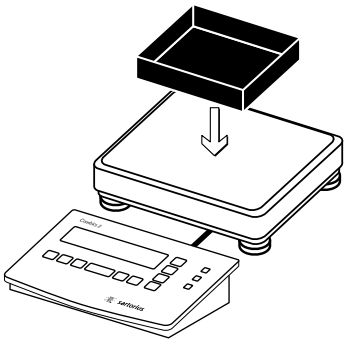
- Save settings and exit Setup: Press and hold the [→T←] key

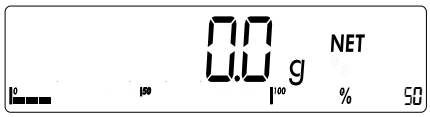
Example
Weighing in percent after weighing in the defined reference amount

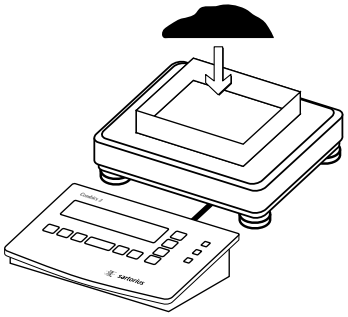
Configure Settings

I/⏻	Switch on the Combics
	While all segments are lit, press the →T← key
→T←	
	Display for selecting the application is shown
Open Application selection *APPL* Select Weighing in Percent	Symbol for Weighing in Percent: **%**
→T← (press and hold)	Exit Application selection

Operation

	
	Place empty container on the platform
→T←	Tare the weighing platform
	
Press REF (repeatedly, if necessary)	to set the desired reference percentage (in this example, 50)





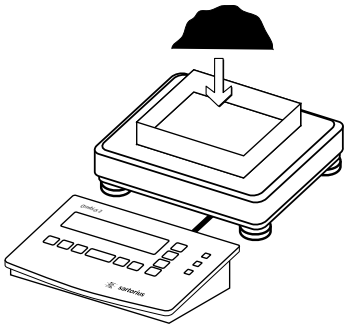
Place reference material corresponding to the reference percentage in the container

OK

Confirm the reference weight

If the weight is too light, an error code appears in the main display `inF 29`

Reduce the minimum load setting (3.5) or
increase the reference percentage and the amount of sample material in the container



Remove the reference material and place the sample to be measured on the weighing platform (in this example, 174 percent)

Print the results as

```
G#    +    0.641 kg
T     +    0.200 kg
N     +    0.441 kg

Prc        21.00 %
--------------------
```

residue, or

or

```
G#    +    0.641 kg
T     +    0.200 kg
N     +    0.441 kg

D          79.00 %
--------------------
```

loss.

Averaging (Animal Weighing)
When the Averaging application is selected, you can use your weighing platform for calculating weights as the average of a number of individual weighing operations. These individual operations are also known as "subweighing operations."

This application is used to determine weights under unstable ambient conditions or for weighing unstable samples (such as live animals).

Features:
- Manual start of averaging routine
- Automatic start of averaging routine
- Press the REF key to select the desired number of subweighing operations
- Toggle the display between result of the last measurement and weight by pressing ⇆.

Factory settings:
- Minimum load for automatic taring and automatic printing: 10 digits (3.5.4)
- Minimum load for automatic start: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Application started automatically with most recent initialization data when Combics switched on: Off (manual start) (3.8.2)
- Start of averaging routine: Manual (3.18.1)
- Deviation of successive subweighing operations: 0.2% (3.19.2)
- Automatic printout of results: Off (3.20.1)
- Display of results static when platform unloaded: Display fixed until unload threshold reached (3.21.1), or press CF and then OK to restart.
- Number of subweighing operations: 10

In order to calculate an average weight, you need to perform several subweighing operations. These are performed consecutively as soon as the weight of one sample differs from that of the previous sample by less than the preset deviation limit.
The value for this deviation is entered in the Application settings (3.19) as a percentage and is another parameter, in addition to the minimum load, for starting the averaging routine.
You can also define a minimum weight in the Application settings (3.6). This is especially helpful when using the "automatic start" function.
Whether averaging starts automatically or manually is also defined in the Application settings (3.18).

There are four modes for calculating average weights:

- Manual start with preset number of subweighing operations

  To use this mode, place the sample or animal on the weighing platform and press OK.

- Manual start with the number of subweighing operations entered manually

  To use this mode, place the sample/ animal on the weighing platform, press REF to select the number of subweighing operations (5, 10, 20, 30, 40 or 50) and then press OK.

- Automatic start with preset number of subweighing operations

  The subweighing operations begin when the weight of the sample/animal on the weighing platform exceeds the minimum load preset in the Application settings.

- Automatic start with the number of subweighing operations entered manually

  To use this mode, press REF and enter the number of subweighing operations before placing the sample or animal on the weighing platform.
  If the automatic taring function is active, the weight of the first load is stored as the tare value, and averaging begins only when the second load is placed on the weighing platform (provided this weight exceeds the preset minimum load).
  The number of subweighs remains active in the reference memory, and is automatically loaded when you select Averaging again after having used another application. It also remains stored after you switch off the Combics.

Minimum Load
The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring and automatic printing; 3.6: minimum load for automatic start). You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the scale divisions in the connected weighing platform. If the division of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g
(= 1000 divisions = 1000 digits) on the weighing platform for initialization.

If the division of the connected platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

Once the limit is exceeded by the load, initialization can begin. If the load on platform is too light for initialization, the following will occur when you try to initialize the application, the averaging routine does not start.

Display
The calculated average weight, together with the selected weight unit, is static in the main display. The ⚠ symbol is also displayed, and ▯ is shown in the numeric display.

Press [⇆] to toggle the display between the average weight and the current weight on the platform.

After unloading the platform (i.e., when the load is less than half the preset minimum load), the current weight is shown and the numeric display shows the selected number of subweighing values.

If the menu setting “Display remains static until [CF] is pressed” (3.21.2) is active, the average weight is still displayed after the platform is unloaded, until [CF] is pressed.

If both menu settings “Display remains static until [CF] is pressed” (3.21.2) and “Automatic (On)” (3.8.1) (for application start) are active, the average weight remains displayed after the platform is unloaded; when another weight is placed on the platform and the start criteria are met, the averaging routine starts automatically.

Preparation

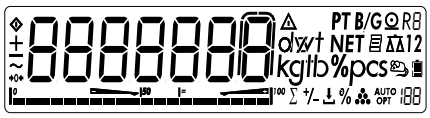
- Press the [I/⏻] key to switch on the Combics
- While all segments are lit, press the [→T←] key
- Open the numeric menu: Press the [→T←] key twice

3 Application parameters
- 3.5 Minimum load for automatic taring and automatic printing
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for automatic start
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Application started automatically with most recent initialization data when Combics switched on
  - 3.8.1 On (automatic start)
  - 3.8.2 Off (manual start)
- 3.18 Start of averaging
  - 3.18.1 Manual
  - 3.18.2 Automatic
- 3.19 Deviation of successive subweighing operations
  - 3.19.1 0.1 % of the animal/object
  - 3.19.2 0.2 % of the animal/object
  - 3.19.3 0.5 % of the animal/object
  - 3.19.4 1 % of the animal/object
  - 3.19.5 2 % of the animal/object
  - 3.19.6 5 % of the animal/object
  - 3.19.7 10 % of the animal/object
  - 3.19.8 20 % of the animal/object
  - 3.19.9 50 % of the animal/object
  - 3.19.10 100 % of the animal/object
- 3.20 Automatic printout of results:
  - 3.20.1 Off
  - 3.20.2 On
- 3.21 Display of results static when platform unloaded:
  - 3.21.1 Display remains static until unload threshold reached
  - 3.21.2 Display remains static until [CF] is pressed

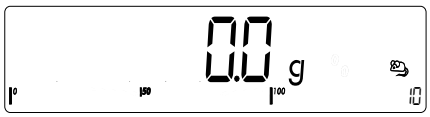
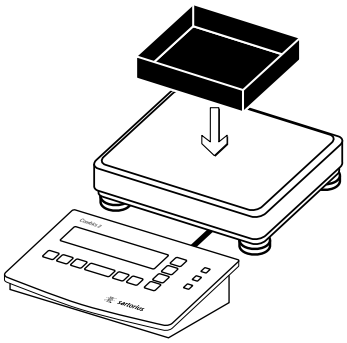
- Save settings and exit Setup: Press and hold the [→T←] key

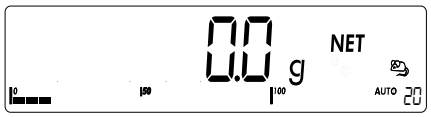
Example
Determining the average weight of mice, with manual start and 20 subweighing operations

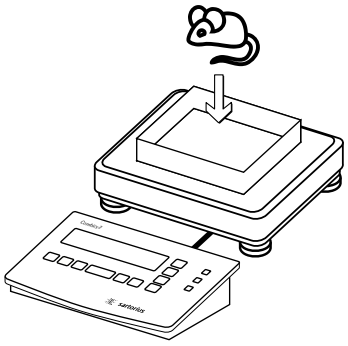
Configure Settings

I/⏻	Switch on the Combics
	While all segments are lit, press the →T← key
→T←	
	Display for selecting the application is shown
Open Application selection *APPL* Select Averaging	Symbol for Averaging:
→T← (press and hold)	Exit Application selection

Operation

	
	Place empty container on the platform
→T←	Tare the weighing platform
	
Press REF (repeatedly, if necessary)	to set the desired number of measurements (in this example, 20)





Place 1st animal in bowl

OK

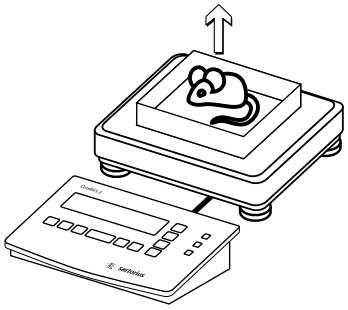
Begin averaging

The number of subweighing operations remaining is shown in the numeric display.

At the conclusion of the series, the calculated mean is displayed continuously together with the ⚠ symbol, until the platform is unloaded or CF is pressed.

Print the results

```
T     +  200.000 g
xNet  +   24.163 g
--------------------
```



Unload the scale (remove mouse from container)

Once the weighing platform is unloaded (i.e., load = less than 1/2 the minimum load), the current weight value is displayed.

Net-Total Formulation

When the Net-Total Formulation application is selected, you can weigh in different components up to a defined total. You can also print out the total weight and the individual weights of the components.

If the components are filled in separate containers, please use the Totalizing application (see page 71).

Features:

- Automatic or manual taring of first load on the platform
- Minimum load for automatic taring
- Maximum 199 components
- Current transaction number shown on the numeric display
- Press [⇆] to toggle the display:
  - In the component mode: Show the weight of the current component (shown approx. 1 second after it is stored, after which the platform is tared)
  - Additive mode: Show the previous weight plus the current component weight (shown approx. 1 second after it is stored, after which the platform is tared)
- Press and hold the [⇆] key to show precise content of component memory in the info mode
- Automatic or manual printout of individual component weights or set of component weights when value stored
- Toggle to second platform while calculation is performed for first platform

Factory settings:

- Minimum load for automatic taring and automatic printing: 10 digits (3.5.4)
- Minimum load for storing value: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Print individual or component weights when stored: Print the standard configuration every time by pressing [OK] (3.17.2)
- Restore factory defaults for Net-Total Formulation: No (9.1.2)

Minimum Load

The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring; 3.6: minimum load for storing value). You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The “digits” here refer to the weighing platform intervals in the connected weighing platform. If the interval of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g (= 1000 intervals = 1000 digits) on the weighing platform for the value to be stored.

Once the limit is exceeded by the load, initialization can begin. If the load on platform is too light for initialization, the following will occur when you try to initialize the application:

- The error InF 29 is displayed.
- A warning signal (double-beep) is emitted
- The value is not stored

Net-Total Formulation with 2 Weighing Platforms

This mode is used for weighing large and small components at the same time.

This makes it possible to toggle from the small-component platform to the large-component platform during measurement. Once you toggle to the large-component platform, the [→0←] and [→T←] keys are available until a component is stored. For example, you can tare a partially-filled container taken from the small-component platform on the large-component platform.

The content of the component memory in the small-component platform is transferred to the large-component platform, and the weight value is converted, if necessary, to the other weight unit. The Component and Additive display modes are both available in the large-component platform.

The readout from the active platform is stored in the component memory. The result is shown in the active weight unit; for example:

1243 g (from a platform with 1 division)
\+ 1.40 kg (from a platform with 5 divisions)
= 2.643 kg (calculated result)

When you press [CF] to stop a measurement series, the tare memories for both platforms are cleared, unless the large-component platform is an SBI instrument. In this case, the platform is only tared.

Preparation

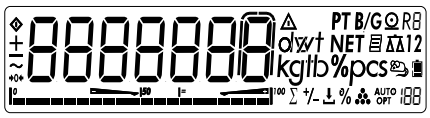
- Press the [I/⏻] key to switch on the Combics
- While all segments are lit, press the [→T←] key
- Open the numeric menu: Press the [→T←] key twice

3 Application parameters
- 3.5 Minimum load for automatic taring and automatic printing
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for storing value
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.17 Individual/component printout when value stored
  - 3.17.1 Printing function off
  - 3.17.2 Print standard configuration every time by pressing [OK]
  - 3.17.3 Print standard configuration once by pressing [OK]

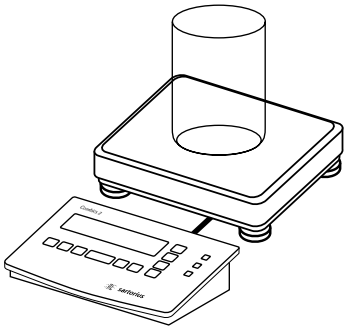
- Save settings and exit Setup: Press and hold the [→T←] key

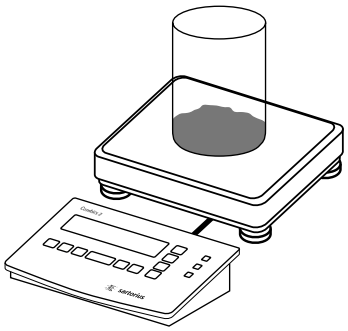
Example
Weigh in 3 components, then view total weight of components (Additive mode)

Configure Settings

I/⏻	Switch on the Combics
	While all segments are lit, press the →T← key
→T←	
	Display for selecting the application is shown
Open Application selection *APPL* Select Net-Total Formulation	Symbol for Net-Total Formulation: ⭳
Application settings: 3.5.1; 3.7.1; 3.17.3	Please see the “Preparation” section on the previous page
→T← (press and hold)	Exit Application selection

Operation

	Place container on platform
	Display shows container weight and prompt to add 1st component
→T←	Tare the weighing platform
	



Add the first component to the container (in this example, 68.3 g)

Weight of 1st component is displayed

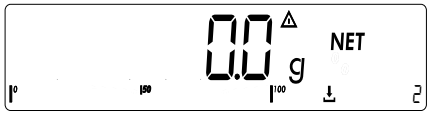
OK

Store weight of 1st component

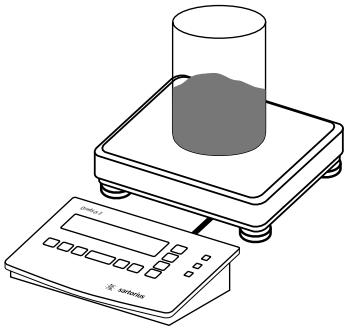
```
      EISENVATER
      GOETTINGEN
20.02.2002      15:10
--------------------
Cmp001        68.3 g
```

Printout of 1st component is generated
The header is printed only once

The currently active component weight is printed each time you press OK, as configured under 7.7.x or 7.8.x.



The platform is tared automatically and the transaction counter is increased by 1 (to “2”)



Add the second component to the container (in this example, 82.7 g)

Weight of 2nd component is displayed

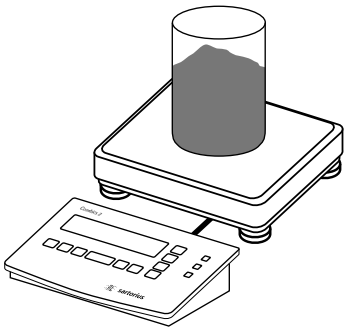
OK

Store weight of 2nd component

```
Cmp002        82.7 g
```

The component weight is printed

The platform is tared automatically and the transaction counter is increased by 1 (to “3”)



Add the third component to the container (in this example, 77.1 g)

Weight of 3rd component is displayed

OK

Store weight of 3rd component

```
Cmp003          77.1 g
```

The component weight is printed

Toggle to Additive mode to view the total weight of all 3 components

The total weight is shown

The platform is tared and the readout shows the stored weight plus the current weight

Toggle the display back to the Component mode to view the current weight

The platform is now ready for the 4th component

CF

End component weighing

A printout of the results is generated, as configured under 7.9.x or 7.10.x

```
Ser.no      12345678
n                  3
S-Comp+     400.0 g
Cont.T+      50.0 g
--------------------
```

Serial number
Number of components
Content of component memory
Content of tare memory (container weight)
Dotted line

Totalizing ∑
When the Totalizing application is selected, you can add weight values to the totalizing memory. The number of values added to the memory is also stored ("transaction counter").

Features:
- Maximum number of values added to memory: 199
- Values stored automatically after stability is reached and the minimum load is exceeded
- Accurate calculation of total of weight values from two weighing platforms
- Incomplete totalization stored in battery-backed memory
- Toggle display from current weigh to total weight: shows the value in totalizing memory plus the current weight; for filling to a defined total
- Press and hold ⇆ to display the value in totalizing memory (net, gross) in the Info mode, accurately calculated in the active weight unit.
- Toggle the display in Info mode between total weight and transaction counter by pressing ⇆; press and hold ⇆ to exit Info mode

Factory settings:
- Minimum load for automatic taring and automatic printing: 10 digits (3.5.4)
- Minimum load for automatic strorage of value: 1 digit (3.6.1)
- Automatic taring (first weight on platform tared): Off (3.7.1)
- Application started automatically with most recent initialization data when Combics switched on: Off (manual start) (3.8.2)
- Weights stored automatically: Off (3.16.1)
- Print individual/component weight when value stored in totalizing memory: Print individual transaction by pressing OK (3.17.2)

The Combics has a totalizing memory for net and gross values. There are two ways to store weight values in the totalizing memory:

- Manually, by pressing the OK key. The value is added to the value already stored, and the transaction counter value increases by one.

  When a value is added manually, the program does not check whether the platform has been unloaded since the last time the OK key was pressed.

- Automatically, when the weighing platform has stabilized and the minimum load is exceeded (Application setting 3.16.2).

  The weighing platform is considered to be unloaded when the load is less than 50% of the minimum load (3.6).

  The numeric display shows the transaction counter.

  Press the CF key to clear the totalizing memory. A printout is generated automatically.

  With 2 weighing platforms connected, you can add values from both platforms to the totalizing memory. The displayed result is accurately calculated in the active weight unit.

  Example: 1.243 kg (measured on a platform using 1 scale division) added to 1.40 kg (measured on a platform using 5 scale divisions) is displayed as 2.643 kg.

Minimum Load
The minimum load at initialization is configured in the Application settings (3.5: minimum load for automatic taring and automatic printing; 3.6: minimum load for automatic storage of value). You can choose from the following ten levels for this setting:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the scale divisions in the connected weighing platform. If the division of the connected platform is 1 g, for example, and 1000 digits are required, you must place at least 1000 g (= 1000 divisions = 1000 digits) on the weighing platform for initialization.

If the division of the connected platform is 5 g, you have to place at least 5000 g on the platform for initialization to achieve the number of digits required in the above example.

Once the limit is exceeded by the load, the platform is tared (3.5) or the weight is stored in totalizing memory (3.6).

Display
Toggle the display between current weight and total weight by pressing [⇆]. The numeric display shows the transaction counter.

When you have toggled to the total weight display, you can add the current weight on the weighing platform to the totalizing memory (manually by pressing [OK] or automatically, depending on the Application setting).

Press and hold the key [⇆] (> 2 sec) to toggle to the Info mode. The total of all gross values is displayed. Press [⇆] again to view the total of all net values. Press the [⇆] key again to show the transaction counter in the main display (in this example: n 15).
Press the [⇆] key again to return to the original status.
Press and hold the key [⇆] again to exit the Info Mode before the above sequence is completed.

Printout
In the Application settings you can configure whether a printout is generated manually, by pressing [⎙] (3.17.1), or automatically when a weight value is stored in the totalizing memory (3.17.2 or3.17.3).

When you generate a printout manually by pressing [⎙], the transaction counter value is not printed.

For automatic printouts, you can define whether a printout is generated after each individual transaction (3.17.2) or includes all totalized components (3.17.3).

Each printout starts with the header lines and the date and time, followed by a dotted line, before printing the gross, tare, net and transaction counter values.

The printout of components includes the header lines and date and time only on the first printout. Subsequent printouts include only the gross, tare, net and transaction counter values (as well as the serial number, if configured). The individual and component printouts are configured under 7.7 and 7.8.

The total data record is printed when you clear the totalizing memory. The total data record includes the data from the gross totalizing memory (***G**, the net totalizing memory (*** N**, the total transaction count (**n**) and a dotted line. This printout always includes the lines configured for Application settings 7.9.x and 7.10.x, regardless of whether individual or component printing is configured.

Preparation
- Press the [I/⏻] key to switch on the Combics
- While all segments are lit, press the [→T←] key
- Open the numeric menu: Press the [→T←] key twice

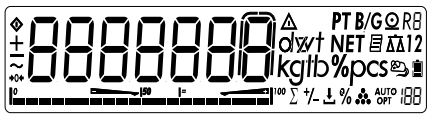
3 Application parameters
- 3.5 Minimum load for automatic taring and automatic printing
  - 3.5.1 1 digit
  - 3.5.2 2 digits
  - 3.5.3 5 digits
  - 3.5.4 10 digits
  - 3.5.5 20 digits
  - 3.5.6 50 digits
  - 3.5.7 100 digits
  - 3.5.8 200 digits
  - 3.5.9 500 digits
  - 3.5.10 1000 digits
- 3.6 Minimum load for automatic storage
  - 3.6.1 1 digit
  - 3.6.2 2 digits
  - 3.6.3 5 digits
  - 3.6.4 10 digits
  - 3.6.5 20 digits
  - 3.6.6 50 digits
  - 3.6.7 100 digits
  - 3.6.8 200 digits
  - 3.6.9 500 digits
  - 3.6.10 1000 digits
- 3.7 Automatic taring (first weight tared)
  - 3.7.1 Off
  - 3.7.2 On
- 3.8 Application started automatically with most recent initialization data when Combics switched on
  - 3.8.1 On (automatic start)
  - 3.8.2 Off (manual start)
- 3.16 Weight stored automatically
  - 3.16.1 Off
  - 3.16.2 On
- 3.17 Automatic individual or component printout when value stored
  - 3.17.1 Off
  - 3.17.2 Print individual transaction by pressing [OK]
  - 3.17.3 Print all components of transaction by pressing [OK]

- Save settings and exit Setup: Press and hold the [→T←] key

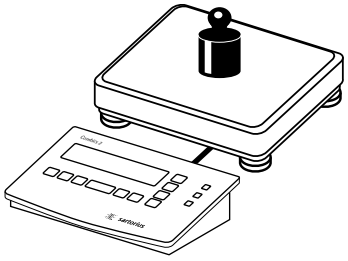
Operating the Combics 2

Example
Totalizing weight values with printout of components

Configure Settings

I/⏻	Switch on the Combics
	While all segments are lit, press the →T← key
→T←	
	Display for selecting the application is shown
Open Application selection *APPL* Select Totalizing	Symbol for Totalizing: ∑
Application settings: 3.17.3	Please see the “Preparation” section on the previous page
→T← (press and hold)	Exit Application selection

Operation

	1. Place weight on platform
	Weight value is displayed
OK	Store weight value in totalizing memory
	Main display: Current weight In the numeric display: Transaction counter (in this example: 1)

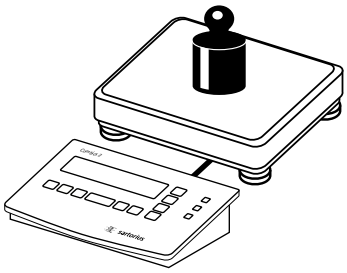
```
   Sartorius
   Goettingen
06.02.2002  12:15:03
--------------------
G#    +      102.9 g
T     +        0.0 g
N     +      102.9 g
n              1
```

Header line 1 (user-definable)
Header line 2 (user-definable)

Display the totalizing memory content plus the current weight

Display the current weight

The memory content plus current weight is displayed;
press  to toggle the display at any time.



Place second weight on platform

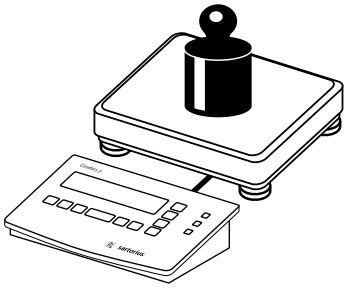
Current weight value is displayed

Store weight value in totalizing memory

The numeric display shows the transaction counter (in this example: 2).

```
G#    +    215.2 g
T     +      0.0 g
N     +    215.2 g
n              2
```

Component printout for the second transaction is generated



Place third weight on platform

Current weight value is displayed

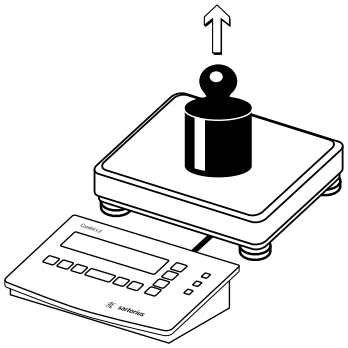
OK

Store weight value in totalizing memory

The numeric display shows the transaction counter (in this example: 3).

```
G#    +     400.1 g
T     +       0.0 g
N     +     400.109 g
n             3
```

Component printout for the third transaction is generated, as configured under 7.7.x or 7.8.x



Unload weighing platform

Display value in totalizing memory

Totalizing memory is displayed (calculated value: ⚠)

CF

If desired, end totalizing

```
*G    +     718.2 g
*N    +     718.2 g
n               3
--------------------
```

Total data record is printed, as configured under 7.9.x or 7.10.x

Data Output Functions

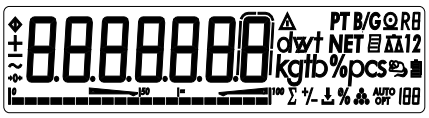
There are 3 options for data output:

- Output to the indicator
- Output to the COM1 interface
- Output to a UniCOM multifunction interface (optional)

These two interfaces can be configured in the Setup program for different output functions, such as connection to a printer or a second weighing platform (WP), or for data communication with a PC.

With the optional UniCOM multifunction interface installed, you can activate one of the following functions in addition to the COM1 interface:
- RS-232 interface
- RS-485/RS-422 interface
- Analog output (voltage/current interface)

Output to the Indicator (Weights and Calculated Values)



The indicator is divided into 8 sections. Information about the scale or weighing platform, the application being used and the sample weighed is output in the following sections:

Plus/minus Sign, Busy Symbol, Zero-setting Range
The following is displayed in this section of the indicator:

◇ – The busy symbol, as long as internal operations are being carried out at the press of a key

+ − – The plus/minus sign of the weight or other measured value

→0← – The zero-setting symbol: identifies “zero” as a weight value (after zeroing the scale or the active weighing platform)

Line for Measured Values/Results
The following is displayed in this section of the indicator:

5.234 – The current weight (on verified scales or platforms with e ≠ d, the last digit is bordered for identification as a legal value)

17.23 – Calculated values (only on Combics 2, e.g., for the Weighing in Percent application)

Unit
The following is displayed in this section of the indicator:

g – The current weight unit (such as “g”)

pcs – ID for additional units (only on Combics 2, e.g. for the Counting application)

Data in Tare Memory, Calculated Values, Identification of the Active Weighing Platform When Several Platforms Are Used
The following is displayed in this section of the indicator:

⚠ – Identification of calculated values (values not used in legal metrology)

B/G NET – Identification of the gross value or data in the tare memory (net value)

PT – Identification of manual tare input (via bar code scanner) for tare information

Δ̂Δ̂1 – Display of the active weighing platform when 2 platforms are connected (only for the Combics 2 model)
The display flashes when the weighing platform prompts isoCAL calibration and adjustment

Δ̂Δ̂12 – When the timer is active (menu code 8.9), this symbol flashes to indicate that one-half of the preset time period has elapsed.

Symbols for Printing, GMP Printout and Battery Charging Display
The following is displayed in this section of the indicator:

- Symbol for the current printing operation
- Symbol for activated GMP printout (only on Combics 2)
- Battery charging display: battery fully charged, battery drained

Bar Graph (only on Combics 2)
On the bar graph, a measured value is displayed either

- as a percentage of the maximum capacity of the scale or weighing platform (gross weight), or
- in relation to a target value, with the tolerance limits indicated

Application Symbols
The following is displayed in this section of the indicator:

R1 R2 – Display of the range on multiple range scales

- Symbol for the Animal Weighing application

Σ +/- % AUTO OPT 188 – Symbols for the Totalizing, Checkweighing, Net-Total Formulation, Weighing in Percent, Counting (with reference sample updating, if selected), and Neutral Measurement applications. The individual symbols are explained in more detail in the Application sections.

Interface Port

Purpose

There are two interface ports available with the Combics indicator:

- Standard COM1 data interface (built in)
- UniCOM universal interface (optional)

These two interfaces can be configured in the Setup program (see “Settings”) for different input/output functions, such as connection to a printer, Alibi memory, PC, checkweigher, second weighing platform, or for control command input (for example, using a foot switch). The optional UniCOM universal interface can be used for RS-232, RS-485 or RS-422 communication, or as a voltage/current interface for analog output. A bar code scanner (Combics 2 only) or an external battery pack can be conneced to the female UniCOM port (on CIS1 and CIS2 models, use the corresponding terminal screws).

Features

Built-in standard COM1 port and optional UniCOM universal port:

- CISL1 and CISL2 indicators (IP44 protection):
  Connect via a 25-contact D-Sub female connector.
  If you wish to connect a second peripheral device to the same interface port, you will need to use a T-connector (see “Accessories”).
- CIS1 and CIS2 indicators (IP65/67 protection):
  Route the connecting cable of the peripheral device via a cable gland into the indicator. Then connect the free ends of the cable using the terminal screws .
  If you wish to connect a second peripheral device to the same interface port, use a separate cable gland to route the connecting cable of this device into the indicator and connect the free ends of the cable using terminal screws.

⚠ **Warning When Using Pre-wired RS-232 Connecting Cables:**
The pin assignments in the RS-232 cables purchased from other manufacturers are often incompatible with Sartorius scales. Check the pin assignments against the chart before connecting the cable, and disconnect any lines that have a different assignment. Failure to do so may damage or even completely ruin your scale and/or peripheral device.

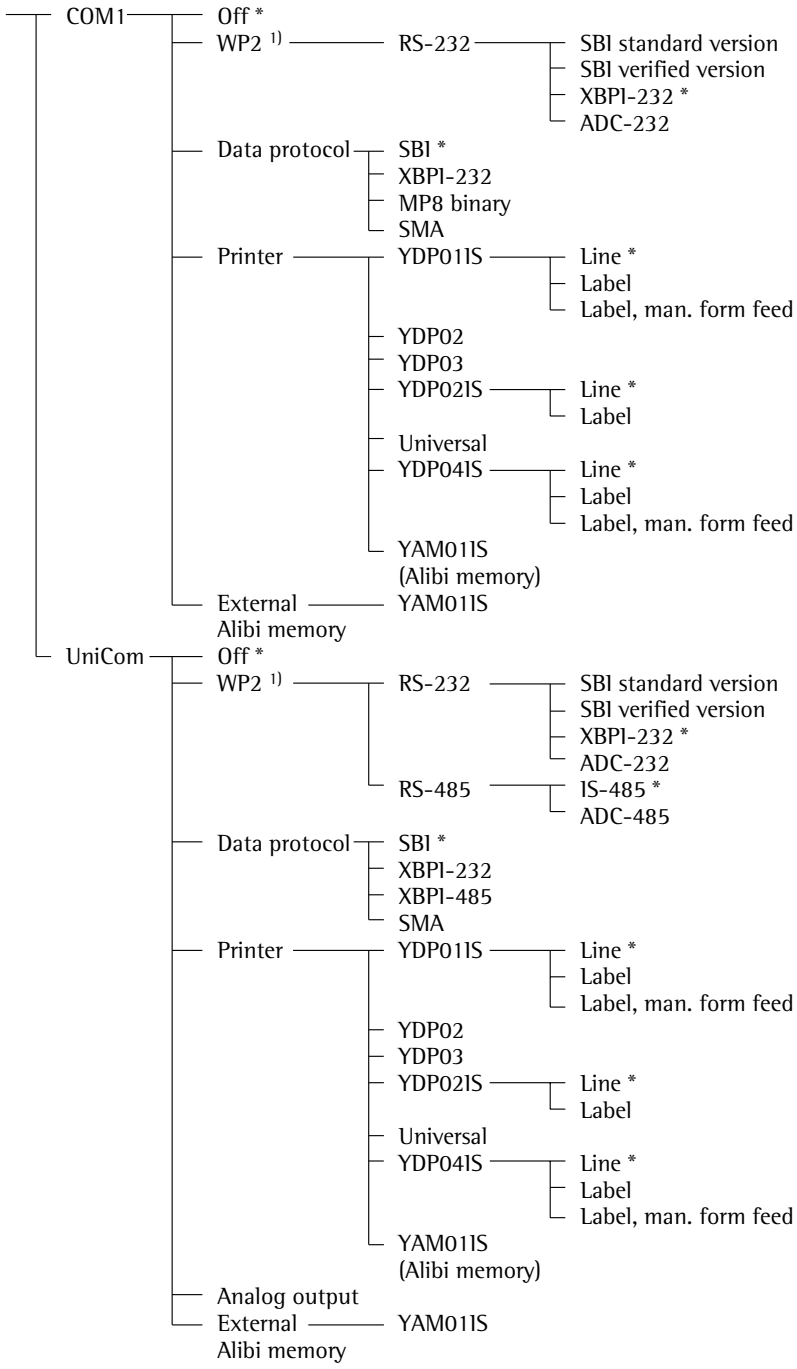
Specifications

Type of interface port:	Serial interface port
Operating mode:	Full duplex
Standard:	COM1: RS-232, UniCOM [1]: RS-232, RS-422/485,
Interface connector:	CISL1 and CISL2 indicators (IP44 protection): 25-contract D-Sub female connector CIS1 and CIS2 indicators (IP65/67 protection): The free ends of the cable are connected to terminal screws (terminal screws) inside the housing; the cable is routed into the housing via a cable gland.
Transmission rates:	150, 300, 600, 1200, 2400, 4800, 9600 and 19,200 baud (depending on the operating mode)
Number of data bits:	7, 8
Parity:	Space, odd, even, none (depending on the operating mode)
Number of stop bits:	1 or 2 stop bits
Handshake mode:	Software (XON/XOFF), hardware (1 character after CTS)
	Communication mode: SBI, xBPI-232 [2], xBPI-485 [1][2], MP8 binary [3], SMA Available printers: – YDP01IS – YDP01IS-Label – YDP02 – YDP03 – YDP02IS – YDP02IS-Label – Universal – YDP04IS – YDP04IS-Label – Alibi memory, YAM01IS
Network address [4]:	0, 1, 2, ..., 31
SBI: Manual printing:	Without stability, after stability, configurable printout
SBI: Automatic printing:	Without stability, at stability, time-dependent at user-defined intervals
SBI: Output format:	16 characters, 22 characters
Printout of application data:	Output of a configurable printout
Factory settings:	Depends on device configured; for example, “Data record”, “SBI”
Transmission rate:	1200 baud
Number of data bits:	7 bits
Parity:	Odd
Stop bits:	1 stop bit
Handshake:	Hardware handshake, 1 character after CTS
Activation of data output:	Print on request (manual) after stability
Time-dependent automatic printing:	1 display update
Output format:	22 characters

⚠ If necessary, use an external power source to power peripheral devices.

[1] optional universal data interface
[2] xBPI communication mode always set to 9600 baud, 8-bit, odd parity, 1 stop bit
[3] only the standard COM1 port
[4] Network address applies only to the xBPI communication mode

Analog UniCOM interface (optional)	
Standard:	4 to 20 mA, 0 to 20 mA, 0 to 5V
Power supply:	Internal or external
Factory settings:	4 to 20 mA, internal power supply
Interface connector:	CISL1 and CISL2 indicators (IP44 protection): 25-contract D-Sub female connector CIS1 and CIS2 indicators (IP65/67 protection): The free ends of the cable are connected to terminal screws inside the housing; the cable is routed into the housing via a cable gland.



* = Factory setting
1) only for Combics 2

Preparation

● For pin assignments, see the section entitled “Pin Assignment Chart.”

Options for Connecting Peripherals

You can connect the following printers to the standard COM1 port or the optional UniCOM universal port:

- YDP02 (user-definable settings of the interface parameters)
- YDP03 (user-definable settings of the interface parameters)
- YDP01IS (strip or label printer)
- YDP02IS (strip or label printer)
- YDP04IS (strip or label printer)
- Universal printer (user-definable settings of the transmission parameters)
- Alibi memory, YAM01IS

⚠ If necessary, use an external power source to power peripheral devices.

In addition, the following devices can be connected to the standard COM1 port:

- Foot switch / hand switch
- PC (RS-232 interface)
- 2nd weighing platform (only for Combics 2, RS-232 interface port)
- External checkweighing display (“traffic-light” display) via digital I/O (Sartorius standard)

The connector of the UniCOM universal port allows the following standard devices to be connected:

- A rechargeable battery pack
- A bar code scanner (only for Combics 2)

The following devices can be connected to the optional UniCOM universal port:

- Rechargeable battery pack
- PC (RS-232 interface)
- 2nd weighing platform (only for Combics 2, can be switched from the RS-232 to RS-485 mode)
- 2nd printer (external power source required)
- Remote display
- Bar code scanner / keyboard interface
- Digital I/O
- Current interface (0/4-20 mA)

Combics 2 enables a second weighing platform to be connected, either to the COM1 port or to the UniCOM universal port.

The standard COM1 port is operated in the RS-232 mode. The second weighing platform can be operated in any of the following modes:
- SBI
- xBPI-232 (factory setting)
- ADC-232

The optional UniCOM port can be operated either in the RS-232 mode or in the RS-485 mode. You can operate a second weighing platform in any of the following modes:
- SBI (RS-232 mode)
- XBPI-232 (RS-232 mode)
- ADC-232 (RS-232 mode)
- IS485 (RS-485 mode, xBPI communication mode, factory setting)
- ADC-485 (RS-485 mode)

The standard COM1 port or the universal UniCOM port or both can be used as printer ports.

The data record can be set to any of the following communication modes:
- SBI (factory setting)
- xBPI-232
- xBPI-485 (only optional UniCOM port)
- MP8-binary (only COM1 port)
- SMA

You can operate the COM1 port and the UniCOM port independently of one another (i.e., for transferring data and controlling equipment via a PC while simultaneously outputting data to the COM1 printer port).

In the SBI communication mode, you can control a display unit and a connected weighing platform by sending ESC commands from a PC to the communications port (COM1 or UniCOM). For further details, see the section entitled “Data Input Format” in this chapter.

Preparation
Configuring the Interface Port:
(The previous page shows a general view)

● Turn on the indicator: press [I/⏻]

> A self-test is run.

● While the self-test is running, press [→T←]

> Access the menu

● Select Setup (SEtuP): press [TOGGLE UNITS] several times

> SEtuP is displayed

● Open the Setup menu:
Press [→T←]

● Select the desired interface port (“COM1” or “UniCOM”):
press [TOGGLE UNITS] several times

> The selected interface port CoM- 1 or un 1Com is displayed

● Access the interface menu:
Press [→T←]

> For the COM1 and UniCOM ports, the following settings are possible (see overview on the previous page):

● Select the desired setting:

- Open the menu: press [→T←]
- Select setting: press [TOGGLE UNITS] (several times, if necessary)
- Confirm and save setting: press [→T←] The selected menu item is identified by a circle (*o*).
- To exit the menu item level and return to the next higher level, press [→0←]
- To exit the menu completely, press [→T←] for more than 2 sec.

Generating SBI Data Output

Under items 6.1 and 6.3 in the operating menu, you can define which data is output when an output command is received:
- The displayed value, with or without stability check
- Automatic printout of the displayed value with or without stability or time-dependent automatic data output.
- Output of a configurable printout defined using menu items 7.7.x to 7.10.x (see next page). You can configure your printout by putting together several blocks of information. Please refer to the section entitled “Configuring Printouts” in this chapter for detailed instructions and sample printouts.

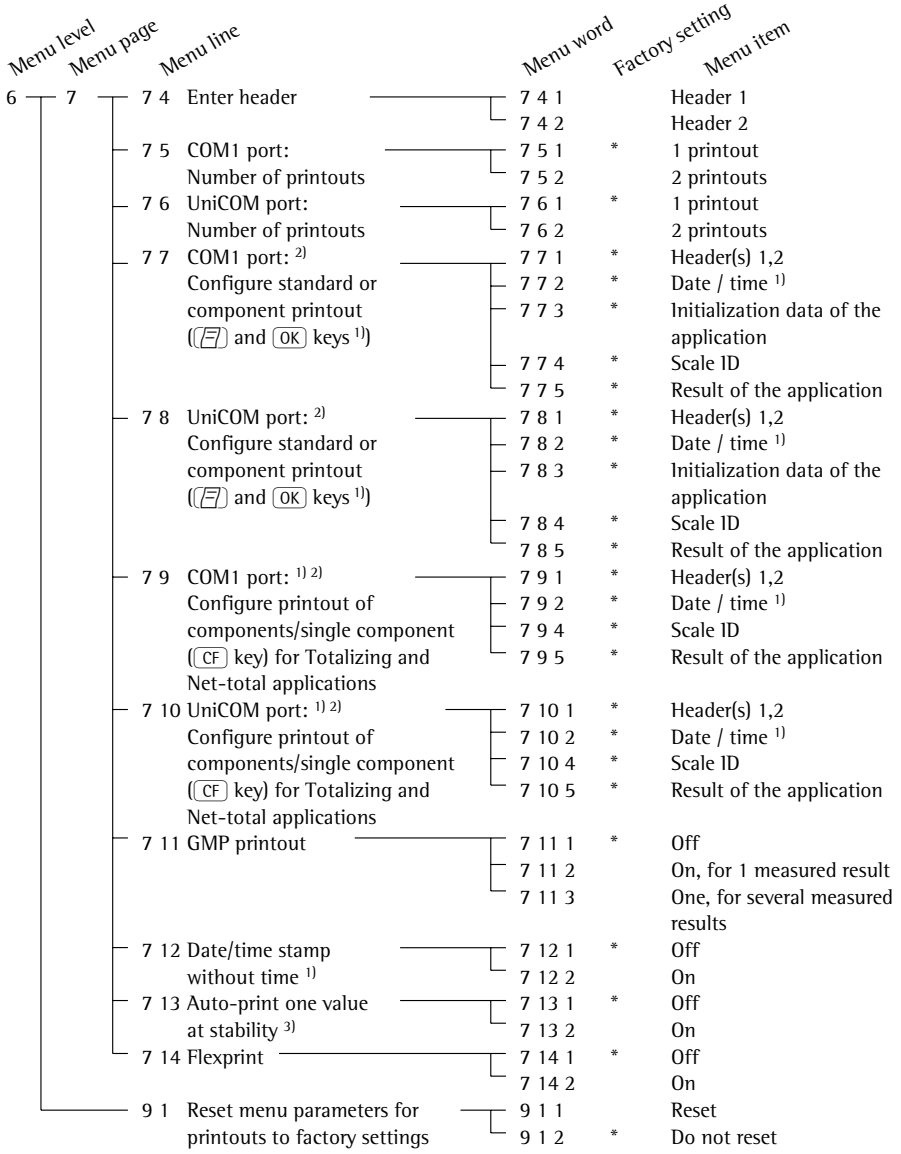
Unless you have selected a configurable printout (menu setting 6.1.7), the current value displayed on the indicator (weight with unit, calculated value, numeric or alphabetic ID) is output.

To configure the print mode, select the “Manual/automatic data output” setting in the interface configuration menu (menu item 6.1);
options include “Print on request”/ “Automatic printout”, either with or without the stability, and “Configurable printout” (6.1.7). If you select the time-dependent automatic output mode, you also need to define the number of display updates under menu item 6.3.

As a rule, data is output only when the scale has stabilized (factory setting). If you prefer to have data output without stability, you need to configure the print mode of the interface accordingly (menu item 6.1.1 or 6.1.4).

Line format:
A printed line can have up to 20 characters. The first 6 characters, called the header, identify the subsequent value. You can disable header printout, in which case a printed line contains up to 14 characters (menu item 7.2; factory setting: With header).

For more details, please see “Operating Menu Overview” in the chapter entitled “Settings.”



* = factory setting
1) = only for Combics 2
2) = several selections are possible
3) = when the minimum load is exceeded (menu item 3.5.x)

Printing

There are several actions that generate the command for outputting data to the printer port:

- Pressing the (F) key. If you are working with the operating menu, the menu settings are printed (see chapter entitled "Settings").
- Sending the SBI command "Esc k P _". Please see the section entitled "Data Input Format" in this chapter for details.
- In some applications, pressing a given key (e.g., to store a value or start a routine) also generates a print command. In this case, a configurable printout is generated with the application-specific data. For more details, refer to the descriptions of the applications and to the section entitled "Configuring Printouts", which contains sample printouts.

The ⊙ and ◈ symbols are displayed when data is being output to the printer port.

Line format:
One printed line consists of a maximum of 20 characters. The first 6 characters, called the 'header', identify the subsequent value.

Configuring Printouts

To configure a printout, access the numeric menu (level 6; see chart on the left). See the chapter entitled "Settings" for details on accessing the numeric menu.

You can configure a different printout for each port. Each printout is made up of various blocks of information, selected by activating or de-activating them in the menu:

- Headers: header 1, header 2
- Date, time (not for Combics 1)
- Dotted line and blank line (for the Weighing application).
  You cannot de-activate this block. It is printed to separate the first block from the ones that follow.
- Initialization data (e.g., reference sample quantity, reference piece weight) followed by a blank line.
  This block is not included on the printout of results from the Totalizing and Net-Total Formulation applications (menu items 7.9.x and 7.10.x).
- Serial number of the scale
- Results: Gross, tare, net values; blank line and application-specific result (e.g., piece count), followed by a dotted line.

Use the menu to select individual blocks of information (multiple selections possible; factory setting: all blocks). A block that you have not selected is omitted on the printout.

Information blocks
The individual blocks of information are shown below with detailed explanations. Samples of complete printouts are provided at the end of this section.

Block 1: Headers
You can define 2 headers, each with 20 characters per line (e.g., for printing your company's name).
The following characters are available: "0" to "9", "A" to "Z", "-" and " " (space). To input headers, select menu codes 7-4-1 (header 1) and 7-4-2 (header 2).
You need to activate printout of the headers to have these lines included on the printout. The following is an example of two header lines:

```
ACE HARDWARE
  GOETTINGEN
```

In this example, the company name is centered on the printout. This was achieved by entering blank spaces at the beginning and end of the text.

Block 2: Date/Time
When this block is activated for printing, the following is included on your printout (example):

```
21.01.2001      16:02
```

If you are using the Combics 1 indicator, this block is not available.

To obtain a standardized time stamp (e.g., for documentation within a completely automated system), you can suppress the printout of the time stamp in the "Date / time" information block. This function is controlled under menu code 7 –12, "Time not printed". The factory setting is "Off" (i.e., the time is included on the printout). If you select "On" for this menu item, the time stamp can be inserted by a higher-level controller or central computer to maintain consistent time stamping. This setting is especially important for communication with a PC.

Separating Block: Dotted line and blank line
This block is automatically inserted before further information blocks are printed.

```
--------------------
```

Block 3: Initialization Data
Which data is included in this block depends on the application. In the Weighing application, for example, this block is empty; in the Counting application, the reference sample quantity and the reference piece weight are printed. The block is terminated with a blank line. If the initialization data block is activated, the following is printed for the Counting application (example):

```
nRef          10 pcs
wRef  +    0.035 kg
```

Block 4: Serial Number of the Scale
If this is activated, the following information is printed (example):

```
Ser.no.    1234567890
```

Block 5: Results
Which data is included in this block depends on the application. If provided in the application, the gross, net and tare weights are usually printed, followed by a blank line. In the Counting application, the piece count is printed as the result. This block is terminated by a dotted line. If the results block is activated, the following is printed (example for the Counting application):

```
B#     +    1.402 kg
T      +    0.200 kg
N      +    1.202 kg

Qnt           34 pcs
--------------------
```

GMP Printout
Select the menu code for GMP-compliant printout (7-11) to add a GMP header and a footer bracketing the measured result on the printout. If the GMP printout is activated (factory setting: GMP printout de-activated), the symbol is displayed on the indicator until the printout is generated. You have a choice of the following settings:

- GMP printout off (factory setting)
- GMP printout for 1 measured result
- GMP format for several measured results

If you have activated the GMP printout, the GMP header is printed as soon as the request is received to print out the first measured value. The GMP footer is printed either after each measured result (GMP footer for 1 measured result; menu code setting 7.11.2) or after the last measured result of a series, when you press the key for more than 2 seconds (GMP for several measured results; menu code setting 7.11.3). In this case, the symbol remains displayed until the GMP footer is printed.

If you toggle to a different platform (only for Combics 2) while a GMP printout of several measured results is being generated, the GMP footer for the platform used up to that point is generated when you press . The GMP header for the other platform is included on the next printout generated.

A GMP-compliant printout is generated automatically at the conclusion of calibration/adjustment routines, as well as when you set or clear a preload.

If you use a label printer for GMP-compliant printouts, a single label might not be long enough for the data printed. Select menu item 7.11.3 to activate automatic "label feed" following each printout of a GMP header plus results.

The following page shows 3 samples of GMP headers and footers. On Combics 1 models, the date and time line is not included. Please refer to the following section, "Sample Printouts", for samples of complete printouts.

Weighing platform WP1:

`--------------------`	Dotted line
`14.01.2002  09:43`	Date/time [1]
`Model CW2P1-30ED-LCE`	Combics model
`Ser.no.  12345678`	Combics serial no.
`Vers.  1.1007.12.1`	Software release for applications
`BVers.  01-25-01`	Software release for basic version
`--------------------`	Dotted line

Weighing platform WP2 (xBPI protocol): [2]

`--------------------`	Dotted line
`14.01.2002  09:45`	Date/time [1]
`Model CW2P1-30ED-LCE`	Combics model,
`Ser.no.  12345678`	Combics serial no.
`Vers.  1.1007.12.1`	Software release for applications
`BVers.  01-25-01`	Software release for basic version
`Type  IS12000S`	Platform model
`Ser.No.  12345678`	Platform serial no.
`--------------------`	Dotted line

Weighing platform WP2 (SBI protocol): [2]

`--------------------`	Dotted line
`14.01.2002  09:45`	Date/time [1]
`Model CW2P1-30ED-LCE`	Combics model
`Ser.no.  12345678`	Combics serial no.
`Vers.  1.1007.12.1`	Software release for applications
`BVers.  01-25-01`	Software release for basic version
`Type  SBI`	(Platform model)
`--------------------`	Dotted line

GMP footer:

`--------------------`	Dotted line
`14.01.2002  09:45`	Date/time [1]
`Name:`	Field for operator signature
	Blank line
`--------------------`	Dotted line

[1] not on Combics 1 indicators
[2]) only for Combics 2 indicators

Sample Printouts

For details on the individual information blocks, see “Configuring Printouts” on the previous page. For details on configuring the header lines, refer to the section describing the application in question.

Weighing Application
There is no data for the “initialization data” block. If this block is activated for the printout, a blank line is output.

```
      HEADER1
      HEADER2
14.01.2002      09:43 [1]
--------------------

G#     +     1.402 kg
T      +     0.200 kg
N      +     1.202 kg
--------------------
```

With scale serial number

```
      HEADER1
      HEADER2
14.01.2002      09:43 [1]
--------------------

Ser.no.      80705337

G#     +     1.402 kg
T      +     0.200 kg
N      +     1.202 kg
--------------------
```

With date/time block; printout of time suppressed

```
      HEADER1
      HEADER2
14.01.2002             [1]
--------------------

G#     +     1.402 kg
T      +     0.200 kg
N      +     1.202 kg
--------------------
```

Counting Application
The block for initialization data contains the reference sample quantity and reference piece weight. The results block shows gross, net and tare weights, as well as the calculated piece count.

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
nRef             10 pcs
wRef   +      0.035 kg

G#     +      1.402 kg
T      +      0.212 kg
N      +      1.190 kg

Qnt              34 pcs
--------------------
```

Neutral Measurement Application:
The block for initialization data contains the reference number and reference weight. The results block shows gross, net and tare weights, as well as the calculated piece count.

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Ref               2 o
wRef   +      1.200 kg

G#     +     14.700 kg
T      +      0.300 kg
N      +     14.400 kg

Qnt              12 o
--------------------
```

Weighing in Percent Application:
The block for initialization data contains the reference percentage and reference weight. The results block shows gross, net and tare weights, as well as the percentage, shown as either the loss or the residual amount.

Percentage as residue

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
pRef            100 %
Wxx%   +      2.100 kg

G#     +      1.859 kg
T      +      0.200 kg
N      +      1.659 kg

Prc              79 %
--------------------
```

Percentage as loss

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
pRef            100 %
Wxx%   +      2.100 kg

G#     +      0.641 kg
T      +      0.200 kg
N      +      0.441 kg

D                21 %
--------------------
```

Checkweighing Application:
The block for initialization data contains the nominal, minimum and maximum weights. The results block always contains the gross, net and tare weights. The other results can be displayed in two ways:

- Result as weight:
  The deviation from the nominal weight is given both as a percentage and as an absolute (weight) value, whether the result lies within the “OK” range or not.
- Result in relation to configured thresholds:
  The deviation from the nominal weight is given both as a percentage and as an absolute (weight) value if the result lies within the “OK” range.
  If the result is outside the defined tolerance limits, the last line indicates the status is indicated as follows:
  “HH” = too heavy; “LL” = too light.

Result within “OK” range; “weight” or “threshold” printout

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Setp   +      1.300 kg
Min    +      1.235 kg
Max    +      1.365 kg

G#     +      1.312 kg
T      +      0.000 kg
N      +      1.312 kg

Lim    +       0.92 %
Diff.W+      0.012 kg
--------------------
```

Result outside “OK” range; “weight” printout

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Setp   +      1.300 kg
Min    +      1.235 kg
Max    +      1.365 kg

G#     +      1.200 kg
T      +      0.000 kg
N      +      1.200 kg

Lim    -       7.69 %
Diff.W-      0.100 kg
--------------------
```

Result outside “OK” range (too light); “threshold” printout

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Setp   +      1.300 kg
Min    +      1.235 kg
Max    +      1.365 kg

G#     +      1.200 kg
T      +      0.000 kg
N      +      1.200 kg

Stat       LL
--------------------
```

Result outside “OK” range (too heavy); “threshold” printout

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Setp   +      1.300 kg
Min    +      1.235 kg
Max    +      1.365 kg

G#     +      1.400 kg
T      +      0.000 kg
N      +      1.400 kg

Stat       HH
--------------------
```

Sorting Application:
The block for initialization data contains the die upper limits of Classes 1 through 4. The results block contains gross, net and tare weights, as well as the class that the sample belongs to (1 through 5, where Class 5 means that the upper limit of Class 4 was exceeded).

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Lim1   +    10.000 kg
Lim2   +    11.000 kg
Lim3   +    12.000 kg
Lim4   +    13.000 kg

G#     +     9.700 kg
T      +     0.000 kg
N      +     9.700 kg

Class              1[1)]
--------------------
```

[1)] Sample are sorted into 5 classes. Any weight that exceeds the upper limit defined for Class 4 is designated as Class 5, if the application is configured for 5 classes rather than 3.

Animal Weighing Application:
The block for initialization data contains the number of measurements used for averaging. The results block contains the tare weight and the mean value.

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
mDef               8

T      +     0.000 kg
x-Net  +     4.202 kg
--------------------
```

Net/Total Formulation Application:
The block for initialization data is blank. Which values are shown in the results block depends on the program operating status at the time of printing. The following options are available:

- Total/results (Press CF)
- Individual/components (Press OK to store component or ⎙ for an individual printout)

Total data record

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
n                  3
S-Comp+      3.400 kg
Cont.T+      0.200 kg
--------------------
```

Individual / component printout

If you press OK, the header is printed only once. Each component is printed automatically when you press OK to store it.
If you are using a label printer, make sure a single label is large enough for the list of all components. For printer models YDP01IS and YDP04IS, you can configure manual form feed in the operating menu. With the YDP02IS printer, form feed is automatic after each print command (fixed setting).

If an automatic printout is generated when you store a component, the component weight is equal to the current net weight. This is why components rather than net weights are printed.

Example with menu setting 3.17.3 active, and 3 components weighed (the total data record is shown above):

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Cmp001+      1.200 kg

Cmp002+      2.000 kg
```

Print 3rd component by pressing ⎙

```
G#     +     4.400 kg
T      +     0.200 kg
T2     +     4.200 kg
N      +     0.000 kg
```

Individual printout when storing a component in tare memory (by pressing OK).
Example: Print 2nd component

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
Cmp002+      1.000 kg
```

Individual printout of components by pressing ⎙
Example: Print 2nd component:

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
G#     +     2.400 kg
T      +     0.200 kg
T2     +     2.200 kg
N      +     0.000 kg
```

Totalizing Application:
There is no data for the “initialization data” block. If this block is activated for the printout, a blank line is output. Which values are shown in the results block depends on the program operating status at the time of printing. The following options are available:

- Results printout (press CF): Prints data in gross totalizing memory (“G”), net memory (“N”) and the number of transactions (“n”).
- Automatic standard/components printout (when OK is pressed)
- Manual standard/components printout (when ⎙ is pressed)

Whether an individual printout or a printout of all components is generated depends on the operating menu settings.
When the components printout is configured, the header is printed only once, followed by all components.
If you are using a label printer, make sure a single label is large enough for the list of all components. For printer models YDP01IS and YDP04IS, you can configure manual form feed in the operating menu. With the YDP02IS printer, form feed is automatic after each print command (fixed setting).

When “manual” printing is configured (print by pressing (⊟)), the transaction counter value is not included on the printout.

Printout of components
Example with 3 transactions:

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
G#     +     1.400 kg
T      +     0.200 kg
N      +     1.200 kg
n                1

G#     +     3.400 kg
T      +     0.200 kg
N      +     3.200 kg
n                2

G#     +     4.400 kg
T      +     0.200 kg
N      +     4.200 kg
n                3
```

Total data record (when CF pressed) with data as in printout above:

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------

*G           9.200 kg
*N     +     8.600 kg
n                3
--------------------
```

Individual printout when storing a component in tare memory (by pressing OK).
Example: Print 2nd transaction

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
G#     +     2.400 kg
T      +     0.200 kg
N      +     2.200 kg
n                2
```

Individual printout by pressing (⊟)
Example: Print 2nd transaction:

```
      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
G#     +     2.400 kg
T      +     0.200 kg
N      +     2.200 kg
```

GMP-compliant Printout
The GMP printout is made up of 3 areas (see also the section entitled “GMP Printout”, above):

- GMP header
- Printout of data record (e.g., from the Weighing application)
- GMP footer

Linearization record

```
--------------------
14.01.2002      13:00
Model CW2P1-30ED-LCE
Ser.no.       12345678
Vers.     1.1007.12.1
BVers.        01-25-01
--------------------

Linearization
Wt.1   +     20.00 lb
Wt.2   +     40.00 lb
Wt.3   +     60.00 lb
Wt.4   +     80.00 lb
             completed
--------------------
14.01.2002      13:02
Name:

--------------------
```

Calibration/adjustment record

```
--------------------
14.01.2002      13:50
Model CW2P1-30ED-LCE
Ser.no.       12345678
Vers.     1.1007.12.1
BVers.        01-25-01
--------------------

External calibration
Targ. +     50.00 lb
Diff. -      0.01 lb
External adjustment
Diff. +      0.00 lb
--------------------
14.01.2002      13:52
Name:

--------------------
```

‘Set preload’ record

```
--------------------
14.01.2002      13:50
Model CW2P1-30ED-LCE
Ser.no.       12345678
Vers.     1.1007.12.1
BVers.        01-25-01
--------------------

Set preload
             completed
--------------------
14.01.2002      13:52
Name:

--------------------
```

‘Clear preload’ record

```
--------------------
14.01.2002      13:50
Model CW2P1-30ED-LCE
Ser.no.       12345678
Vers.     1.1007.12.1
BVers.        01-25-01
--------------------

Clear preload
             completed
--------------------
14.01.2002      13:52
Name:

--------------------
```

Printout from Weighing application with multiple results
Example: 2 results:

```
--------------------
14.01.2002      09:43
Model CW2P1-30ED-LCE
Ser.no.       12345678
Vers.     1.1007.12.1
BVers.        01-25-01
--------------------

      HEADER1
      HEADER2
14.01.2002      09:43
--------------------
G#     +     2.400 kg
T      +     0.200 kg
N      +     2.200 kg
--------------------
      HEADER1
      HEADER2
14.01.2002      09:44
--------------------
G#     +     3.400 kg
T      +     0.300 kg
N      +     3.100 kg
--------------------
14.01.2002      09:45
Name:

--------------------
```

Data Output Format (Line Format)

You can output the values displayed in the line for measured values and the weight unit with or without a data ID code. Select menu item 7.2 to define whether the data ID code is included.

Examples:

```
      +      235 pcs     Without data ID code
Qnt   +      235 pcs     With data ID code
```

Settings:
7.2.1: without ID code
7.2.2: with ID code (factory setting).
Without a data ID code, the output line has 16 characters; with a data ID code, 22 characters.

Output Format with 16 Characters

Display segments that are not activated are output as spaces. Characters without a decimal point are output without a decimal point.

The following types of characters can be output, depending on their position in the output string:

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	-	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF

+-: Plus or minus sign
*: Space
D: Digit (or letter) as in the readout (up to 7 numbers plus decimal point)
U: Character for unit of measurement[1]
(1 to 3 letters followed by 0 to 2 spaces)
CR: Carriage return
LF: Line feed

[1] depends on scale type; e.g., not all units and characters are available on scales verified for use in legal metrology.

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	H	*	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	H	H	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	L	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	C	*	*	*	*	*	*	*	CR	LF

*: Space
– –: Final readout mode
H: Overload
HH: Overload in checkweighing
L: Underload
LL: Underload in checkweighing
C: Calibration/adjustment

Error Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	E	r	r	*	*	#	#	*	*	*	*	CR	LF
or	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CR	LF

*: Space
#: Error code number (2 or 3 digits)

Example: Output weight of+1255.7 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Position 1: Plus + or minus sign - or space
Position 2: Space
Position 3-10: Weight with decimal point; leading zeros are output as spaces
Position 11: Space
Position 12-14: Character for unit of measurement or space
Position 15: Carriage return
Position 16: Line feed

Data Output Format with 22 Characters

When data is output with an ID code, the 6-character code precedes the 16-character string described above. The code identifies the subsequent value.

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	I	I	I	I	I	I	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	I	I	I	I	I	I	-	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF

I: ID code character [1]. If the code has fewer than 6 characters, spaces are inserted for the remaining characters.
+-: Plus or minus sign
*: Space
D: Digit (or letter) as in the readout (up to 7 numbers plus decimal point)
U: Character for unit of measurement [1]
(1 to 3 letters followed by 0 to 2 spaces)
CR: Carriage return
LF: Line feed

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	S	t	a	t	*	*	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	H	*	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	H	H	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	L	L	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	C	*	*	*	*	*	*	*	CR	LF

*: Space
H: Overload
L: Underload
C: Calibration/adjustment
– –: Final readout mode
HH: Overload in checkweighing
LL: Underload in checkweighing

Error Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
		S	t	a	t	*	*	*	*	*	E	r	r	*	*	#	#	*	*	*	*	CRLF
or		S	t	a	t	*	*	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CRLF

*: Space
#: Error code number (2 or 3 digits)

ID code characters 1[1]	Meaning
G#	Gross value
N	Net weight
T	Application tare memory 1
T2	Application tare memory 2
Diff	Difference between maximum and minimum
Targ.	Exact calibration weight (value)
Nom.	Exact calibration weight with SBI output
nRef	Reference sample quantity
pRef	Reference percentage
wRef	Reference piece weight
Qnt	Result from Counting (piece count) and Neutral Measurement applications
mDef	Target value for Animal weighing
x-Net	Result from Animal weighing
Setp	Target value for Checkweighing
Diff.W.	Absolute difference (e.g., in kg) in checkweighing
Lim	Deviation in % in Checkweighing
Max	Upper limit for Checkweighing
Min	Lower limit for Checkweighing
Stat	Status
Classx	Sorting in classes
Limx	Class limits
D	Percentage (loss)
Prc	Percentage (residue)
Wxx%	Reference percentage weight
Cmpxxx	Component no. xxx
Cont.T	Contents of tare memory in Net-total Formulation
S-Comp	Total weight in Net-total Formulation
PT2	Preset tare
n	Transaction counter
*G	Sum of gross weights in Totalizing
*N	Sum of net weights in Totalizing
Ser.no	Serial number of platform or indicator

[1] depends on scale type; e.g., not all units and characters are available on scales verified for use in legal metrology.

Automatic Data Output (SBI)
You can have results of measurement printed automatically[1]. You can configure the autoprint function to print at certain intervals (measured in display updates[2]) and define whether printing is dependent on stability of the weighing instrument[3]. How often the display is updated depends on the operating status and model of the equipment.

Examples:

N + 153.00 g	Net weight
Stat	Display blank
Stat L	Display underload
Stat H	Display overload

Setting:
[1] [3] Automatic output without stability (menu item 6.1.4)
Automatic output with stability (menu item 6.1.5).
Factory setting: Manual with stability;
i.e., automatic output function off.
[2] Time-dependent output:
Intervals: 1, 2, 10 or 100 display updates
(menu item 6.3-x; x=1, 2, 4, or 7).
Factory setting: 6.3.1; 1 display update

Data Input Format

You can connect a computer to your indicator to send commands controlling scale functions and applications via the interface port. All commands use the same format, starting with the ESC character (ASCII 27) and ending with a carriage return (CR; ASCII 13) and a line feed (LF; ASCII 10). The total length of a command is anywhere from 4 characters (1 command character between the start and end described above) to 7 characters (4 command characters).

The table below shows the available command characters; each command must be flanked by the start and end characters as described above.
Example: the command character for output is "P" ("Output readout to port"). To trigger this command, send the string: "ESC P CR LF".

Character	Command
K	Weighing mode 1
L	Weighing mode 2
M	Weighing mode 3
N	Weighing mode 4
O	Block keys
P	Output readout to data interface
Q	Output acoustic signal
R	Unblock keys
T	Tare and zero (combination tare function)
f3_	Zero (see also the "kZE_" command)
f4_	Tare without zeroing (see also the "kT_" command)
i_	Information about the indicator Example of output: "CI2/012502/1" Meaning: Indicator: Combics 2, Software version: 012502, active weighing platform: 1
kF1_	Soft key F1: trigger [TOGGLE UNITS] key function
kF2_	Soft key F2: trigger [CF] key function (Combics 2 only)
kF3_	Soft key F3: trigger [REF] key function (Combics 2 only)
kF4_	Soft key F4: trigger [OK] key function (Combics 2 only)
kF5_	Soft key F5: trigger [⇆] key function (Combics 2 only)
kP_	Trigger [⎙] key function Output to printer port
kT_	Trigger [T] key function (tare)
kNW_	Trigger [⚖] key function (toggle weighing platforms)
kZE_	Trigger [→0←] key function (zero)
x1_	Output model designation of active weighing platform Example: "LP6200S-0CE"
x2_	Output serial no. of active weighing platform Example: "0012345678"
x3_	Output software version of active weighing platform Example: "00-20-04"
x4_	Output software version of indicator Example: "01-25-02"
x9_	Output serial no. of indicator Example: "0012345678"
x10_	Output model of indicator Example: "CW2P4-1500RR-LCE"
z1_	Activate input for printout header 1
z2_	Activate input for printout header 2

The "underline" character is ASCII 95.

Format for entering printout header lines: ESC z x a...a_CR LF where x=[header line] 1 or 2; a...a p to 20 characters text, followed by the carriage return and line feed characters.

Synchronization

Data is communicated between the indicator and a computer in the form of messages (telegrams) consisting of ASCII characters, transmitted via the interface. For error-free data communication, the settings for baud rate, parity, handshake mode and character format must be the same at both ends.

You can configure the interface settings in the Setup menu so that they match those of the computer. You can also define parameters in the indicator to make data output dependent on various conditions. Details on conditional data output are provided in the sections describing the application programs.

If you do not connect a peripheral device to the indicator interface port, this will not generate an error message.

Handshake

The scale interface (Sartorius Balance Interface = SBI) has transmit and receive buffers. You can define the handshake parameter in the Setup menu:

- Hardware handshake (CTS/DTR)
- Software handshake (XON, XOFF)

Hardware Handshake

With a 4-wire interface, 1 more character can be transmitted after CTS (clear to send).

Software Handshake

The software handshake is controlled via XON and XOFF. When a device is switched on, XON must be transmitted to enable any connected device to communicate.

When the software handshake is configured in the Setup menu, the hardware handshake becomes active after the software handshake.

The data transmission sequence is as follows:

```
Scale        --- byte --->   Computer
(trans-      --- byte --->   (receiving
mitting      --- byte --->   device)
device)      --- byte --->
             <-- XOFF ---
             --- byte --->
             --- byte --->
                  ...
              (Pause)
                  ...
             <-- XON ---
             --- byte --->
             --- byte --->
             --- byte --->
             --- byte --->
```

Transmitting Device

Once XOFF has been received, it prevents further transmission of characters. When XON is received, it re-enables the transmitting device to send data.

Receiving Device

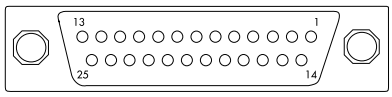
To prevent too many control commands from being received at one time, XON is not transmitted until the buffer is almost empty.

Pin Assignment Charts

Models CISL1 and CISL2 (IP44 protected):

Female Connectors COM1 and UniCOM:

25-contact D-Submini DB25S with screw lock hardware



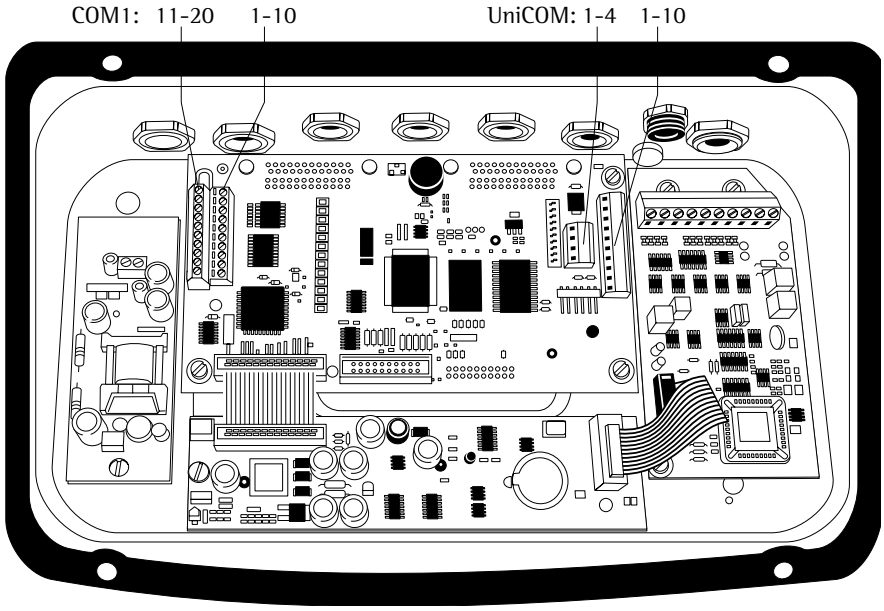
Front view

Male interface connector used (please use connectors with the same specifications):
25-pin D-Submini DB25, with integrated shielded cable clamp assembly (Amp type 826 985-1C) and fastening screws (Amp type 164868-1)

Pin assignments in COM1

Pin 1: Shield
Pin 2: Data output (TxD)
Pin 3: Data input (RxD)
Pin 4: Not connected
Pin 5: Clear to send (CTS)
Pin 6: Internally connected
Pin 7: Internal ground (GND)
Pin 8: Internal ground (GND)
Pin 9: Not connected
Pin 10: Not connected
Pin 11: +12 V for printer
Pin 12: RES_OUT\
Pin 13: +5 V
Pin 14: Internal ground (GND)
Pin 15: Universal switch
Pin 16: Control output “lighter”
Pin 17: Control output “equal”
Pin 18: Control output “heavier”
Pin 19: Control output “set”
Pin 20: Data terminal ready (DTR)
Pin 21: Ground (GND)
Pin 22: Not connected
Pin 23: Not connected
Pin 24: +15...25 V
Pin 25: +5 V

Models CIS1 and CIS2:
Terminals on the PCB



Pin assignments in UniCOM:
Connecting external battery pack/ bar code scanner [1] (optional UNICOM interface not installed)

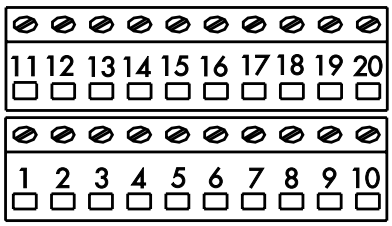
Pin 1: Shield
Pin 2: Not connected*
Pin 3: Not connected*
Pin 4: Internal ground (GND)
Pin 5: Not connected
Pin 6: Not connected*
Pin 7: Not connected*
Pin 8: Not connected*
Pin 9: Not connected*
Pin 10: Not connected*
Pin 11: +12 V for printer
Pin 12: RES_OUT\
Pin 13: +5 V Switch
Pin 14: Internal ground (GND)
Pin 15: Keyboard data
Pin 16: Not connected*
Pin 17: Not connected*
Pin 18: Not connected*
Pin 19: Keyboard clock
Pin 20: Not connected*
Pin 21: LINE_1_GND
Pin 22: LOW_BATT
Pin 23: BATT_ON_OFF
Pin 24: LINE_1_B
Pin 25: +5 V

[1] Combics 2 models only
* depends on the UniCOM used

Models CIS1 and CIS2 (IP65/67 protected):

Connecting open cable ends to the terminal screws in the indicator

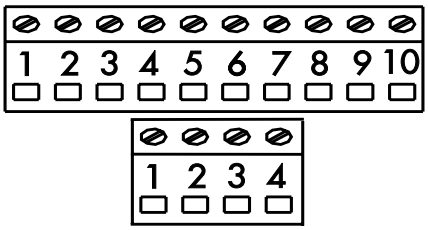
COM1 interface connection:



Top view

Terminal assignments

No. 1: Universal switch
No. 2: Control output “set”
No. 3: Control output “heavier”
No. 4: Control output “equal”
No. 5: Control output “lighter”
No. 6: Clear to send (CTS)
No. 7: Data output (TxD)
No. 8: Data input (RxD)
No. 9: Data terminal ready (DTR)
No. 10: Internal Ground (GND)
No. 11: LINE_A
No. 12: LINE_A
No. 13: GND_LINE_A
No. 14: GND_LINE_A
No. 15: +12 V for printer
No. 16: Reset_Out
No. 17: +5 V
No. 18: +5 V
No. 19: Ground (GND)
No. 20: Ground (GND)



Second connection: For connecting an external battery pack and a bar code scanner [1)]
(optional UNICOM interface not installed)

Top view

Terminal assignments in the 10-terminal strip

No. 1: Not connected*
No. 2: GND
No. 3: GND
No. 4: +5V switch
No. 5: Not connected*
No. 6: Keyboard clock
No. 7: Keyboard data
No. 8: Not connected*
No. 9: Not connected*
No. 10: Not connected*

Terminal assignments in the 4-terminal strip

No. 1: GND_LINE_B
No. 2: LINE_B
No. 3: LOW_BATT
No. 4: BATT_ON_OFF

Connecting Cables to Interfaces

Cables should be connected by a certified technician who has received specialized training from Sartorius.

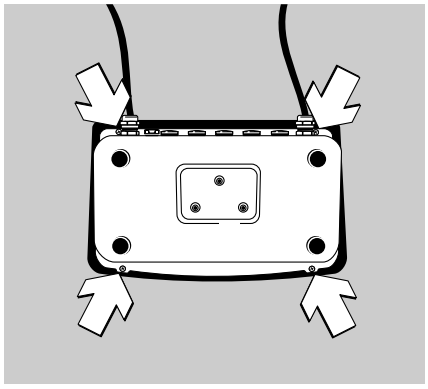
⚠ Make sure to disconnect the equipment from power before connecting cables.

⚠ Installation work that affects the IP65/67 protection rating must be performed with extreme care.

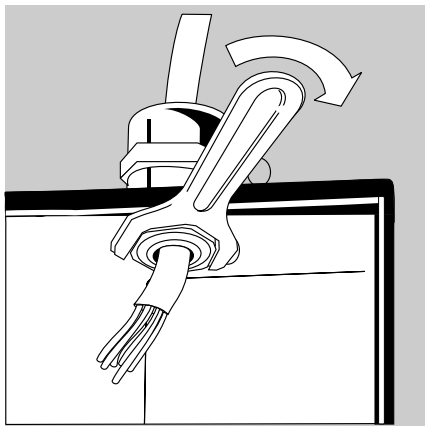
⚠ Any installation work that does not conform to the instructions in this manual will result in forfeiture of all claims under the manufacturer's warranty.

⚠ Always make sure the equipment is disconnected from power before performing any installation, maintenance or repair work.

⚠ An IP65/67-protected cable gland for connecting a weighing platform is installed on the indicator at the factory. Please use extreme caution when performing any work on the equipment that affects this cable gland. The other openings in the housing are sealed with protective caps.



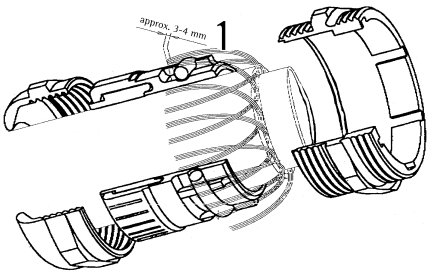
Remove the four screws and open the front panel.



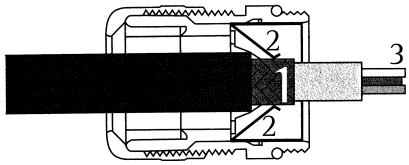
● Connect the cable from the peripheral device to the indicator.

⚠ A cable gland is installed on the indicator at the factory. Please use extreme caution when performing any work on the equipment that affects this cable gland. Use a torque wrench and apply 5 Nm torque to this cable gland.

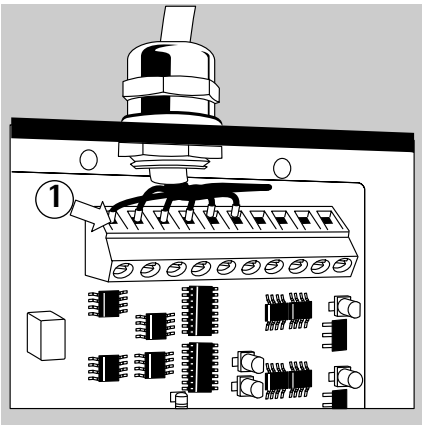
[1)] Combics 2 models only
* depends on the UniCOM used



- Connect the cable as follows:
- Route the cable through the cable gland.
- Tighten down the cable gland in accordance with the applicable regulations.
- Strip the casing from a section of the cable end (see illustration). The shield (1) must have contact with the clamps (2).



- Expose approximately 15 cm (6 inches) of the individually isolated wires (3) for installation.
- Route the cable through the cable gland.
- Make sure the shield is in contact with the clamps because the cable is grounded by the shield.

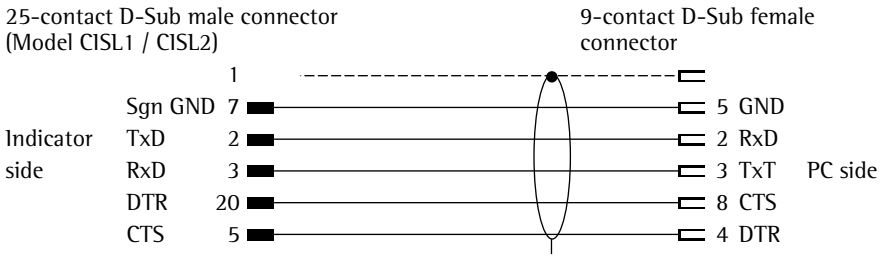


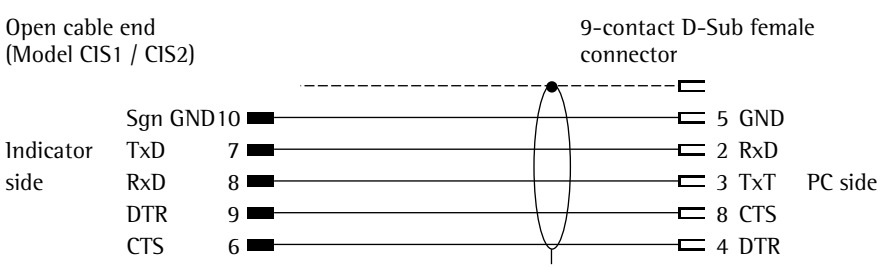
- Connecting the wires inside the indicator:
- Expose approximately 5 cm (2 inches) of the isolated wires for installation.
- Strip approximately 1 cm (1/2 inch) of the isolation from the wires and attach ferrules to the wires.
- Connect the wires securely in accordance with the terminal assignments.
- After you close the housing again, use a pressure gauge to check the integrity of the IP65/67 protection. For details, contact the Sartorius Service Center.

Cabling Diagram (Adapter Cable for PC)
(Model CISL1 / CISL2: Adapter cable 7357312, Model CIS1 / CIS2: Adapter cable YCC02-D9F6) Diagram for interfacing a computer to the indicator using the RS-232-C/V24 standard and cables up to 15 m (50ft) long.

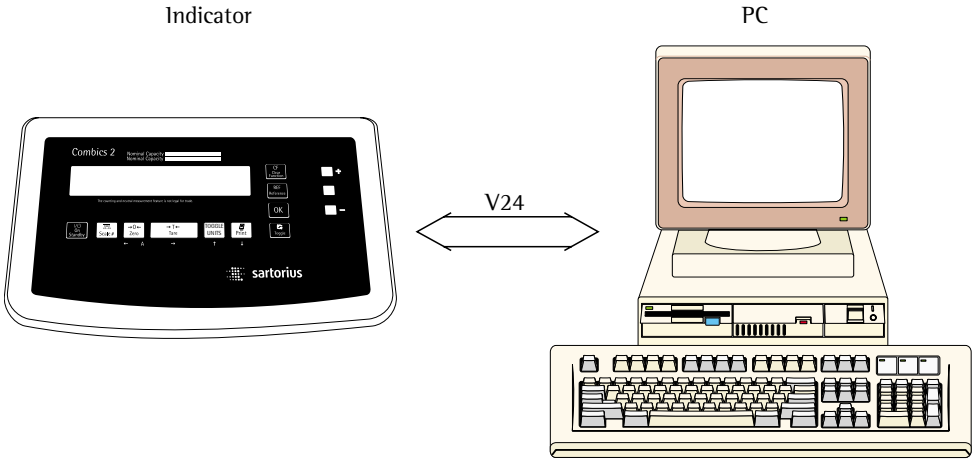
Cabling diagram

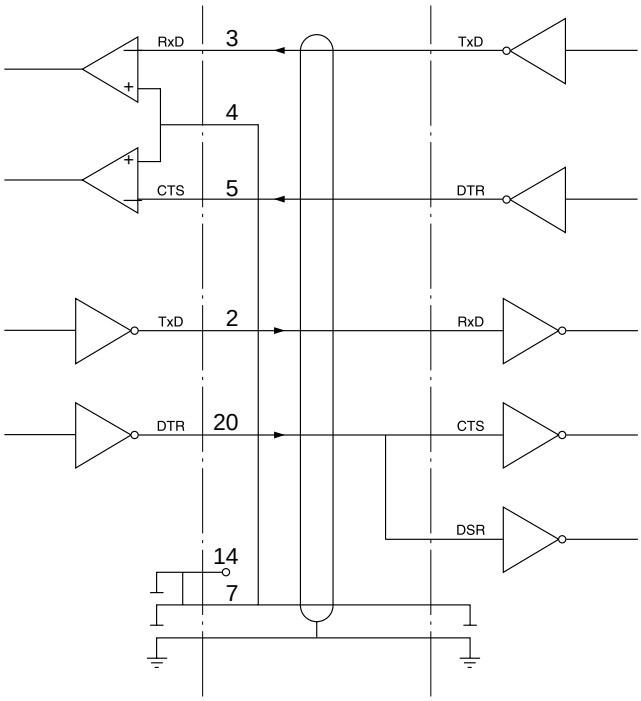
Connection assignments for the cable from the indicator to an RS-232 PC interface





Cabling Diagram (Adapter Cable for PC)





	PC	
25 pin	or	9 pin
2		3
20		4
3		2
5		8
6		6
7		5

Cable type: AWG 24 specification

Activating the Service Mode

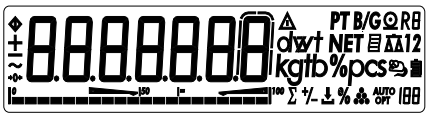
Purpose

The Service mode allows access to an extended menu. It is required in order to carry out the most important calibration and adjustment work on the Combics and on any connected weighing platform(s). When the Service mode is activated, an "S" appears in the upper right corner of the indicator. The Service mode is deactivated by restarting the indicator.

Setting up the Service Mode

I/⏻

Switch the Combics off and on again



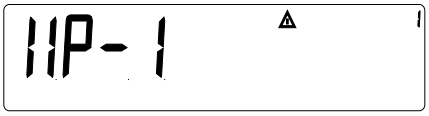
While the self-test of the indicator is running press the →T← key

TOGGLE UNITS TOGGLE UNITS

access the "Setup" menu

→T←

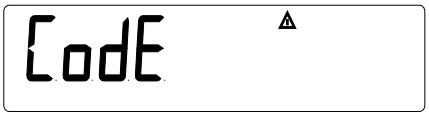
Select "Setup"



If a password is required at this point ("CODE" appears in the indicator for 2 sec, then the password prompt), proceed as described below ("The password prompt appears").

Press TOGGLE UNITS repeatedly

to access the "Code" menu



→T←

and confirm.

The password prompt appears.

Enter the service code (see Appendix)

→T←

and confirm.

The Service mode is activated: An "S" is displayed in the upper right corner of the indicator.

→0← →0←

Return to "Setup" in the Service mode .

Service Menu
When the Service mode is activated, the service technician can access additional menu items that are not visible when the Service mode is deactivated.

The following advanced functions are available:

In the text menu (Setup):
The following menu items are behind the menu items Date ("dAtE") and Code ("CodE"):
- Service date "S-dAtE"
- Memory number "MEM-no"
- Serial number of the Combics "SEr-no"

In the numeric menu:
The WP1 setup menu ("1P- 1") and the interfaces COM1 ("Con 1") and UniCOM ("1Un 1Con") is extended by the following additional setting options for configuring weighing platforms WP-1 ("1P- 1") and WP2 ("1P-2"):

- 1-9 Calibration/adjustment functions:
  - 1-9-5: Internal linearization (only for WP-2 connected to COM1 and UniCOM)
  - 1-9-6: External linearization with default weights
  - 1-9-7: External linearization with user-defined weights
  - 1-9-8: Set preload
  - 1-9-9: Clear preload

- 1-18 Enter the calibration and linearization weights:
  - 1-18-2: Enter Lin. weight 1
  - 1-18-3: Enter Lin. weight 2
  - 1-18-4: Enter Lin. weight 3
  - 1-18-5: Enter Lin. weight 4

- 1-19 Adjustment without weight (Enter the ID codes for the load cell(s):
  - 1-19-1: Nominal capacity
  - 1-19-2: Resolution
  - 1-19-3: Sensitivity in mV/V for cell 1 (or mean averaged over all cells)
  - 1-19-4: Sensitivity in mV/V for cell 2
  - 1-19-5: Sensitivity in mV/V for cell 3
  - 1-19-6: Sensitivity in mV/V for cell 4 In the case of several cells, either the individual values are entered in 1-19-3 ... 1-19-6 or the mean of all cells in 1-19-3.
  - 1-19-7: Store the values for 1-19

- 1-20 Place of adjustment (geographical latitude and altitude, alternatively the acceleration of gravity at the place of installation):
  - 1-20-1: Latitude in degrees
  - 1-20-2: Height in meters above sea level
  - 1-20-3: Acceleration of gravity
  - 1-20-4: Save values for 1-20

- 9-1 Factory setting / menu reset
  - 9-1-3: Load standard configuration
  - 9-1-4: Load verification configuration

- 11 Configuring the Analog/Digital Converter:

- 11-1 Classes:
  - 11-1-4: Class (III)*

- 11-2 1st weight unit (Copy from menu page 1-7):
  - 11-2-1: Long ton
  - 11-2-2: Grams
  - 11-2-3: Kilograms
  - ...
  - 11-2-21: Tons

- 11-3 Range selection:
  - 11-3-1: Single range scale
  - 11-3-2: Multi-division scale[1])
  - 11-3-3: Multiple range scale[1])

- 11-4 Metrological data for single range scale:
  - 11-4-1: Scale division d
  - 11-4-2: Verification scale division e
  - 11-4-3: Minimum capacity
  - 11-4-4: Maximum capacity

- 11-5 Metrological data for Multi-division scale:[1])
  - 11-5-1: Scale division d
  - 11-5-2: Verification scale division e
  - 11-5-3: Minimum capacity
  - 11-5-4: Range 1
  - 11-5-5: Range 2
  - 11-5-6: Range 3
  - 11-5-7: Maximum capacity

- 11-6 Metrological data for Multiple range scale:[1])
  - 11-6-1: Scale division d
  - 11-6-2: Verification scale division e
  - 11-6-3: Minimum capacity
  - 11-6-4: Range 1
  - 11-6-5: Range 2
  - 11-6-6: Range 3
  - 11-6-7: Maximum capacity

- 11-7 Lock units:
  - 11-7-1: Long ton
  - 11-7-2: Grams
  - 11-7-3: Kilograms
  - ...
  - 11-7-21: Tons

- 11-8 Calibration/adjustment unit:
  - 11-8-1: User-definable unit
  - 11-8-2: Grams
  - 11-8-3: Kilograms
  - ...
  - 11-8-21: Tons

- 11-10 Save A/D converter configuration data:
  - 11-10-1: Yes
  - 11-10-2: No*

- 12-1 Store platform serial number (verified platform connected at WP2):
  - 12-1-1: Store serial number
  - 12-1-2: Inactive (standard WP)*

[1]) Not permitted in legal for trade applications

* = Factory setting

Configuring the Analog/ Digital Converter

Purpose
Configure the analog/digital converter by selecting the required parameters in the Setup menu to adapt Combics for use with all commercially available strain-gauge load cells and analog Sartorius CAPP, CAPS, IWA, IU, IF platforms. Access to settings for A/D converter configuration is password-protected (Servicecode).

Features
With the menu access switch open, you can configure most of the following parameters:

- Toggling between weighing mode "standard" or "trade" (scale verified for use in trade/legal metrology)
- Verification scale division e
- Scale division d
- Minimum capacity
- Maximum capacity
- Maximum capacity for each weighing range
- Verification scale division e for each weighing range
- Available weight units

These parameters are not reset when you restore the factory settings.

Depending on the weighing mode selected, the configuration options for parameters not listed above are the same as they are in a corresponding Sartorius weighing instrument that cannot be switched between "standard" or "trade" modes.

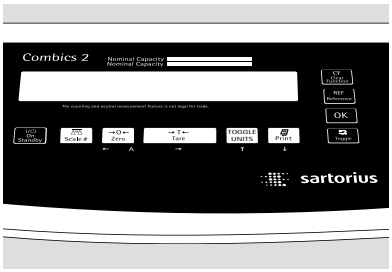
Note on Settings
Configure the A/D converter in the numeric menu (weighing platform 1: Level 1, weighing platform 2: Level 2 by selecting menu item 11-x). Please refer to the illustration on the next page. For accessing the numeric menu, also refer to the chapter entitled "Settings."

The A/D converter can be configured only in the Service mode.
Make sure you close the menu access switch after configuring the A/D converter; otherwise, "*H*" (too heavy) and "*L*" (too light) cannot be displayed.

Configure the maximum capacity for each weighing range in a suitable weight unit, without in decimal places. Select the desired weight unit under the 11-7 "Lock units" menu item. For purposes of display in the metrology line, the maximum capacity for all ranges must be configured so that they can be displayed with a maximum of four digits other than "0" for all accessible units.

The same applies to releasing and locking weight units 1 and 2. The weight unit selected for configuration cannot be excluded.

Testing and Configuration for Use in Legal Metrology
A metrology label is included in the equipment supplied with the Combics. After the A/D converter has been successfully configured, the metrological data for all of the ranges on the label can be keyed in. Attach the label below the display window and seal with the water-tight acetate overlay.



You additionally need to attach the label "The counting feature is not legal for trade" below the display window on Combics 2 indicators.

Under menu item 1-7, you can check to make sure that only permissible weight units are accessible.

Description of the Individual Menu Items
Menu item 9-1-3 / 9-1-4:
Select and load the configuration data

Before starting the actual A/D converter configuration, you must define whether the weighing platform is to be used in the "standard" mode or in the "trade" mode (scale verified for use in trade/ legal metrology):

- Standard configuration (Menu item 9-1-3)
  or
- Trade configuration (Menu item 9-1-4)

Menu item 11-1 (Class)

When using the "Standard configuration," this menu item is turned off.

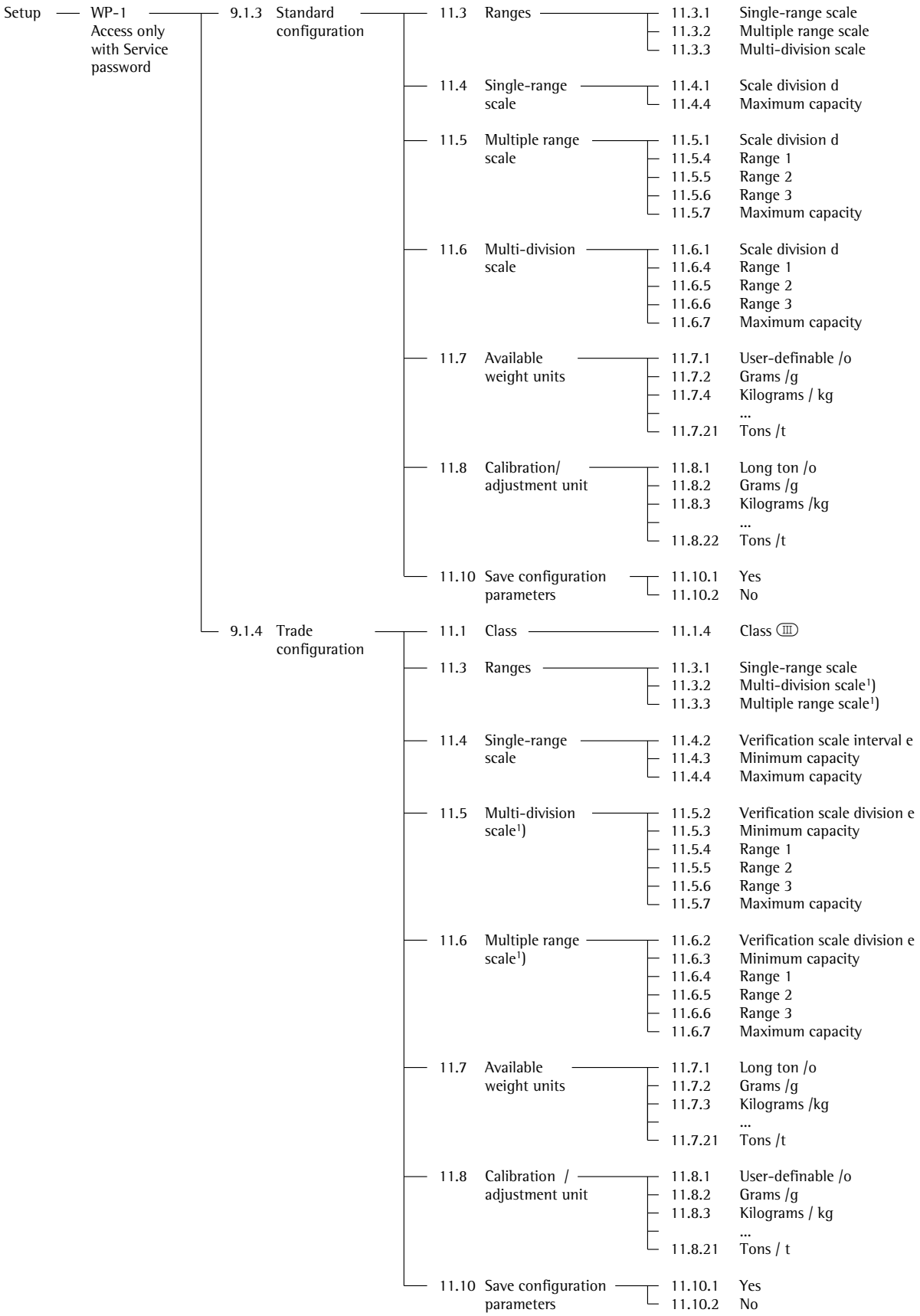
When using the "Trade configuration," (for weighing platforms scale verified for use in trade/legal metrology) only menu item 11-1-4 is displayed.

Accuracy class (III) is already selected; when you press →T← to select menu item 11-4-4, a circle ("*o*") is shown indicating that this setting is active.

Range Selection (menu item 11-3)

The weighing range of the weighing platform can be divided into one or multiple ranges as desired. This is established by selecting the menu item 11-3:

- Single range (11-3-1)
  The entire weighing range is divided into scale divisions which are dependent on the lowest scale division d and the maximum capacity. The readability for the entire weighing range is always the lowest scale division d.
- Multiple range scale (11-3-2)
  Scales with two or three weighing ranges. If the lower weighing range is exceeded, the scale switches to the higher weighing range (lower resolution) and remains there. You can only switch back to the lower weighing range (higher resolution), when the scale is completely unloaded, after pressing the →0← key.
- Multi-division scale (11-3-3)
  The "multi-division scale" function divides the weighing range into as many as 4 ranges with different readability. For the Trade configuration, this is permitted only in the accuracy class (III). The readability automatically adjusts each time the weight on the load receptor exceeds a defined range limit. When a weight causes the weighing instrument to change from a higher to a lower range, the higher resolution is automatically selected. After taring, the highest possible resolution of the first range is restored, even when the weighing platform is loaded.



[1]) not permitted for legal for trade applications

The ranges are divided as desired by selecting the assigned menu item with key [TOGGLE UNITS] and confirm with the →T← key. A circle (o) appears behind the selected menu item as a marker.

Scale Division d

The lowest scale division d indicates the weighing instrument's resolution. You can only enter it in the scale divisions 1, 2, 5, 10, 20 etc. If you have selected the "Trade" setting (accuracy class III) the lowest scale division d is not prompted because it is equal to the verification scale division e.

Verification Scale Division e

When "Standard configuration" is active, this menu item is not displayed.

The verification scale division e indicates the resolution of the weighing instrument in legal metrology. With accuracy class III, the verification e is the same as scale interval d. Thus, with class III, the lowest scale division d is not prompted.

Minimum capacity Min. cap.

When "Standard configuration" is active, this menu item is not displayed.

The minimum weight for weighing instruments of accuracy class III is 20 e.
Caution: The minimum capacity limits have the function of warning the equipment operator that loads below these limits lead to cumulative addition of the tolerances, which can result in significant errors of measurement. In Germany, for example, weighing below the minimum capacity is not permitted.

Range 1, Range 2, Range 3

Enter the limits for the individual ranges. When a given limit is exceeded, the accuracy changes.
The following applies for all limits:
Range 1 ≤ Range 2 ≤ Range 3 ≤ Max. cap.
Thus, you can divide the weighing range into 4 ranges. The display resolution changes in intervals of 1, 2, 5, 10, 20 etc. The lowest resolution is the lowest scale division d. Ranges you do not require should be set to 0.

Maximum capacity Max. cap.

The maximum capacity is the maximum load that may be placed on the weighing instrument. If the weight exceeds this capacity, the weighing instrument will display *H*.
The scale divisions are calculated from the maximum load and the lowest scale division d. In legal for trade applications, the number of verification scale divisions may not be greater than 10,000 e. In the "standard" weighing mode, as opposed to "trade," you can define a "SuperRange" to increase the permitted divisions:
For example, a maximum capacity of 5000 lb combined with a smallest division d of 0.01 lb, yields 5000 scale divisions. These parameters, however, may be influenced by physical limitations.

Lock units (menu item 11-7)

With this function, you can make particular weighing units inaccessible during weighing. Accessible units are marked by a circle (o) on the indicator (multiple range selection is possible).

Calibration/Adjustment Unit
(Menu item 11-8)

The calibration unit defines the weight unit with which calibration must be performed. This unit will be used even if a different unit has been selected for the weighing mode.

Store settings
(menu item 11-10)

Save the A/D converter configuration by selecting menu item 11-10-1.

Once these parameters have been configured, the A/D converter in conjunction with the weighing cell is defined as a weighing instrument. The A/D converter, in conjunction with the weighing platform, can now be used like any standard weighing platform.

In addition, the weight unit must be defined and the weighing platform adjusted (calibration/adjustment and linearization). For more detailed instructions, see the chapter entitled "Calibrating in the Service Mode."

Adjustment without Weights
(menu item 1-19)

The parameters for "Nominal capacity" in kg (menu item 1-19-1) (specification of the strain-gauge beam), "Resolution" in kg (menu item 1-19-2) and "Sensitivity" in mV/V (menu item 1-19-3) are converted to internal quantities. Once the A/D converter configuration data has been stored, these parameters can no longer be read out. For platforms with multiple load cells, the sensitivity of the additional cells is entered by selecting menu item 1-19-4 (cell 2) to menu item 1-19-6 (cell 4).
Save the entered data by selecting the menu item 1-19-7.

⚠ Important Note:
Please do not forget to set the menu access switch (15) to "locked" when you have finished configuring the A/D converter and performing the adjustment (calibration/adjustment and linearization).

Weighing results can no longer be influenced by the Combics after the A/D converter has been configured.
The range of available weighing instrument functions is defined in the A/D converter. The following functions, for example, can be activated:
- Read weighing results
- Tare
- Adjustment
- Read tare value
- Save/delete tare input

A/D Converter Configuration (Examples)

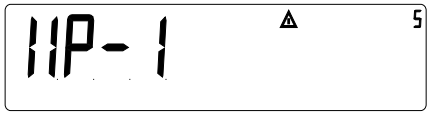
Example 1: Configuring the A/D Converter with a Weighing Platform Connected

Setup
(see also the chapter on “Operating the Combics”, section entitled “Calibration, Adjustment”)

- Remove the cap from the back on the left of the Combics housing.
- Move the switch to the right (toward the interface ports) (“accessible” position).
- Set to Service mode (see the corresponding section at the beginning of this chapter).

→T←

Select weighing platform “WP1”.



→T←

Activate the numeric menu.

Menu page “1” is displayed.

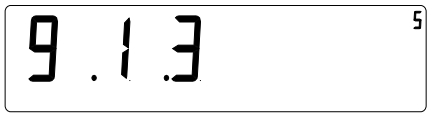
TOGGLE UNITS TOGGLE UNITS →T←

Activate menu line 9-1.

For navigating in the Operating Menu (Examples) see also chapter on “Operating Design.”

→T← TOGGLE UNITS

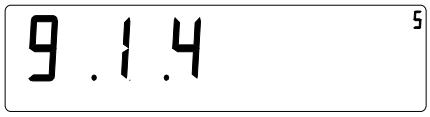
Select A/D converter configuration:



Standard configuration (menu item 9-1-3)

if necessary, TOGGLE UNITS

or (press key [TOGGLE UNITS] again)

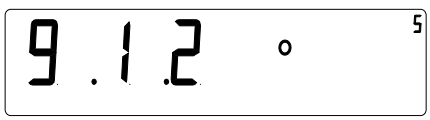


Configuration for using the scale in legal metrology (menu item 9-1-4).

→T←

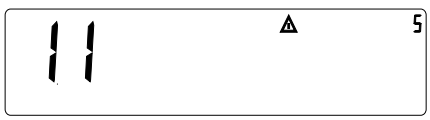
Confirm selected configuration.

The selected configuration is loaded.
For a short time, the “Busy” symbol appears on the indicator, then the program returns to indicator display of menu item 9-1-2 (“Set default: off ”, Factory setting).



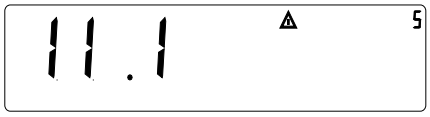
→0← →0← TOGGLE UNITS

Select menu page “11”.



→T←

Confirm selection.

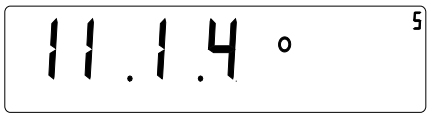


If the “Trade” configuration was activated, then at this point the menu line 11-1 (Select Class) is displayed.

Otherwise, i.e. in “Standard” configuration, this menu line is skipped and the menu line 11-2 (1st weight unit) is displayed. In this case, the user must use the [TOGGLE UNITS] key to select the menu line 11-3 and proceed as of described behind the figure in menu line 11-3.

→T←

If the Combics is to be configured for use in legal metrology (i.e., the “Trade” configuration was activated), the accuracy class is already configured (class Ⅲ)



The setting for menu item 11-1-4 for class Ⅲ is marked by a circle (*o*) on the indicator.

→0← TOGGLE UNITS TOGGLE UNITS

Select weighing range (menu line 11-3).

→T←

Confirm selection.

In the present example, the menu item 11-3-1 (“single range”) is pre-set.

If necessary, change the range selection with [TOGGLE UNITS] key:
11-3-2: Multiple range scale, 11-3-3: Multi-division scales.

if necessary, TOGGLE UNITS →T←

Select “Multiple range scale”, confirm selection.

or TOGGLE UNITS TOGGLE UNITS →T←

Select “Multi-division scale”, confirm selection.

For more detailed instructions on how to select the weighing range, see the section on “Description of the Individual Menu Items” at the beginning of this chapter.

→0←

Return to menu line 11-3.

TOGGLE UNITS

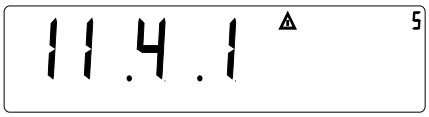
Enter the scale division, range limits (only required for multiple range scale or multi-division scale) and the maximum load:

Depending on the weighing range selected, the relevant menu line is displayed, i.e.
for “single range” (menu item 11-3-1): Input to menu page 11-4,
for “Multiple range scale” (menu item 11-3-2): Input to menu page 11-5,
for “Multi-division scale” (menu item 11-3-3): Input to menu page 11-6.
The other two menu lines are not accessible.

In the present example, 11-3-1 (single range) is active. Therefore, the program opened the menu line 11-4 for input. The menu lines 11-5 and 11-6 are not accessible.
If the “Trade configuration” is active (class Ⅲ), then the menu item for setting the scale division d is skipped in the submenus 11-4, 11-5 and 11-6 and the second menu item (for setting the verification scale division e) is opened, since e = d for these scales.
This menu item is described on the next page.

→T←

Open the first menu item.



Menu item 11-4-1 is displayed.
If the “Trade” configuration is active (class III), menu item 11-4-2 is shown (see the last paragraph on this page).

Activate the menu item.

The configuration for the scale interval d is displayed.
The flashing number marks the current cursor position. This marked number can be changed. The number in the entry field can be changed to the desired value by repeatedly moving the cursor and changing the respective number.

Navigation for Input
(For more details: see the chapter entitled “Operating Design”):

Exit an activated menu item without storing entry (For example in the case of an inadvertent selection): Press the →0← key.

Store displayed contents (in the present example d = 0.01 lb):
Press and hold the →T← key (> 2 sec.).

Move the cursor 1 position to the right (in the present example from the 1st zero to the decimal point): Press the →T← key. This confirms the character (number, minus sign or decimal point) at the previous cursor position. If the cursor is at the far right, pressing →T← confirms the input.

Move the cursor 1 position to the left: Press the →0← key. If the cursor is in the 1st position (all the way to the left), then you exit the menu item.

Delete the displayed contents and overwrite with your own input: press the [TOGGLE UNITS] key. A zero is written in the first position.

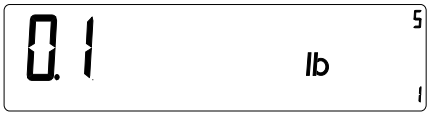
Every time the [TOGGLE UNITS] key is pressed, you scroll one page forward (1, 2 ... 9).
In the 1st position (all the way to the left), there is a minus sign “-” after the number “9” if you want to enter a negative number (... 8, 9, -, 1, 2 ...). In all other cursor positions, there is a decimal point “.” after the number “9” which can be selected (... 8, 9, ., 1, 2 ...).

Press the ⌐ key: Scroll backwards.
The same characters are available for selection as with the k key:
1st position: ... 1, 0, -, 9, 8, ..., all other positions: ... 1, 0, ., 9, 8, ...

Define the scale division d for the weighing instrument:

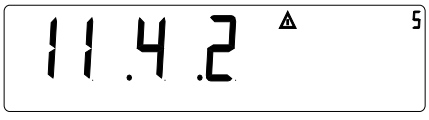
If the default value displayed (here: “0.001 kg”) corresponds with the desired scale division, then store the value by pressing the →T← key (2 sec.)

Otherwise use the [TOGGLE UNITS] and →T← keys (if necessary, also the →0← and ⌐) keys) to overwrite the default value and confirm by pressing the →T← key.



In the present example, the scale division d is set to 0.1 lb.

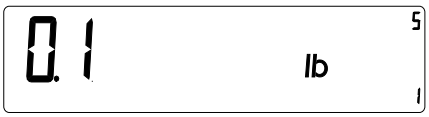
Confirm new setting.



If the “Trade configuration” is active (class III), this menu item is opened automatically (if “Multiple-range scale” is set: 11-5-2; with “Multi-division scale”: 11-6-2). If the “Standard configuration” is active, this item is not shown. See also the remarks on the previous page.

→T←

Show the configured verification scale division e.



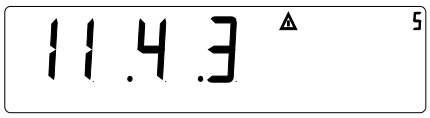
In accuracy class (III) the verification scale division e = d (see also the notes at the beginning of the section). That is why the program shows this as default value.

→0←

Confirm the verification scale division e.

TOGGLE UNITS →T←

When the “Trade configuration” is active, call up the menu item 11-4-3 (minimum capacity) (if “Multiple-range scale” is set: 11-5-3; with “Multi-division scale”: 11-6-3).
This menu item is not displayed when the “Standard configuration” is selected.



→T←

When the “Trade configuration” is selected, activate the menu item by pressing →T←, set the minimum capacity and confirm the entered value by pressing and holding the →T← key (> 2sec).

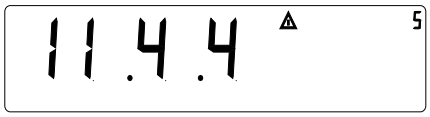
Example for Class (III): Minimum capacity = 20 × e = 2.0 lb

→T←

Confirm the new setting.

TOGGLE UNITS →T←

Open the next menu item. If “Single-range scale” is set, this is 11-4-4, the last menu item (maximum capacity).



If “Multiple-range scale” or “Multi-division scale” is set rather than the A/D converter setting “Single-range scale”, then the range delimiters must be entered under 11-5 (for the former) or 11-6 (for the latter). Each of these menu lines has 3 items to choose from, to set limits 1, 2 and 3. The last menu item (11-5-7 or 11-5-8) sets the maximum capacity.

→T←

Enter and save the desired maximum capacity.

In the present example, a maximum capacity of 300.0 lb was entered.

→T← press for longer than 2 sec.

Confirm the new setting.

→0←, press TOGGLE UNITS repeatedly

Save the configuration: Call up menu line 11-10.

→T←

Menu item 11-10-2 is currently active (“Do not save configuration”).

TOGGLE UNITS

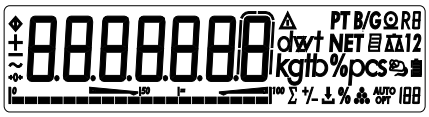
Select menu item “11-10-1” (“Save configuration”).

→T←

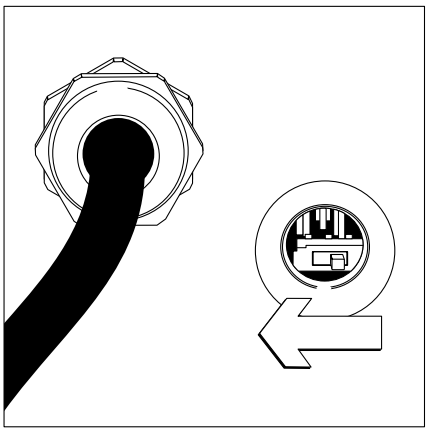
Save A/D converter configuration.

The settings for the A/D converter configuration are stored. For a short time, the “Busy” symbol appears on the indicator, then the Combics is restarted.

After the self-test when all segments are displayed, the Combics is in the weighing mode.



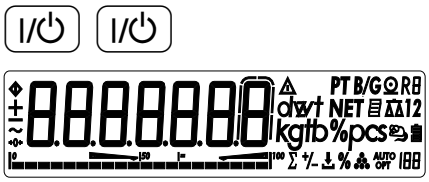
Adjust the scale: see the chapter entitled “Operating the Combics”, under “Calibration, Adjustment” or the Service Manual.



Following A/D converter configuration, change the menu access switch from “open” to “locked”:

- if necessary, remove the cap from the back on the left of the Combics housing.
- Move the switch to the left (to the “locked” position).

See also chapter entitled “Operating the Combics”, under “Calibration, Adjustment” or the Service Manual.



5

Turn the scale off and on again to restart it.
After the self-test, the scale is ready to operate.

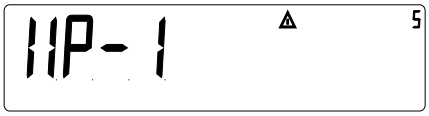
Example 2: A/D converter configuration with load cells connected

Setup
(see also the chapter entitled “Operating the Combics”, under “Calibration, Adjustment”)

- Remove the cap from the back on the left of the Combics housing.
- Move the switch to the right (“open” position).
- Service mode setting up (see corresponding section at the beginning of this chapter).

→T←

Select weighing platform “WP1”.



→T←

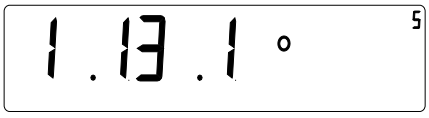
Call up the numeric menu

→T←

and confirm.

press TOGGLE UNITS repeatedly , →T←

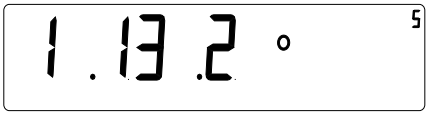
Call up menu line 1-13 (tare/zero at power on).



In the picture shown, the tare at power on is set: the menu item 1-13-1 is selected.

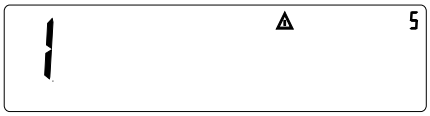
TOGGLE UNITS →T←

Switch off tare at power on: Call up menu item 1-13-2.



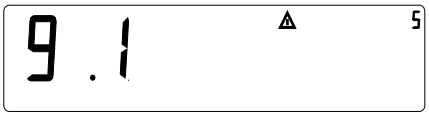
→T← →0← →0←

Save setting for menu item 1-13-2 and return to menu “1.”



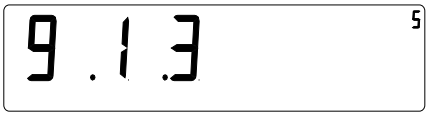
TOGGLE UNITS TOGGLE UNITS →T←

Call up menu 9-1 (factory setting / menu reset).



→T← TOGGLE UNITS

Select A/D converter configuration:

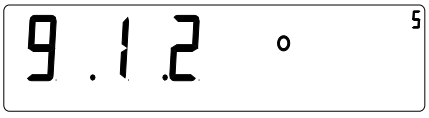


Call up “Standard menu”. If the “Trade configuration” is active, the scale cannot be adjusted without weights by entering the load cell data.

→T←

confirm selection.

The selected configuration is loaded.
For a short time, the “Busy” symbol appears on the indicator, then the program returns to indicator display of menu item 9-1-2 (“Set default: off”, factory setting).



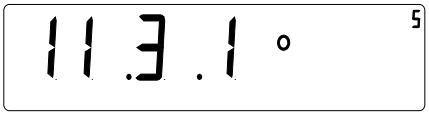
→0← →0← TOGGLE UNITS

Select menu page 11:

Configuration: range selection (single range, multiple range scale, multi-division scale), scale division d and maximum capacity Max. cap. (if necessary, also enter range limits).

→T← TOGGLE UNITS →T←

Activate menu item 11-3-1



In the present example, the menu item 11-3-1 (“single range”) is pre-configured.

If necessary, change the range selection by pressing the [TOGGLE UNITS] key:
11-3-2: Multiple range scale, 11-3-3: Multi-division scale.

If necessary, press TOGGLE UNITS →T←

to select “Multi-division scale”, confirm selection.

or TOGGLE UNITS TOGGLE UNITS →T←

to select “Multi-division scale”, confirm selection.

From more detailed explanations on selecting the range, please refer to the section entitled “Description of the Individual Menu Items” at the beginning of this chapter.

→0←

Confirm selection and return to the beginning of menu line 11-3.

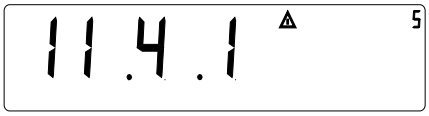
TOGGLE UNITS

Enter the scale division, range limits (only required in the multiple range or multi-division mode) and maximum capacity:

Depending on the weighing range selected, the relevant menu line is displayed, i.e.
for “single range” (menu item 11-3-1): Input to menu page 11-4,
for “Multiple range scale” (menu item 11-3-2): Input to menu page 11-5,
for “Multi-division scale” (menu item 11-3-3): Input to menu page 11-6.
The other two menu lines are not accessible.

In the present example , 11-3-1 (single range) is active. This is why the program opened menu line 11-4 for input. Menu lines “11-5” and “11-6” are not accessible.

Enter the scale division d:



Call up menu item 11-4-1.

Activate the menu item.

The configuration for the scale division d is displayed. The flashing number marks the current cursor position. This marked number can be changed.
The number in the input field can be changed to the desired value by repeatedly moving the cursor and changing the respective number

Navigation for Numeric Input
For more details, see Example 1 and the chapter entitled “Operating Design”.

Define the scale division d for the scale:

If the default value displayed (here: “0.005 lb”) corresponds with the desired scale division, store the value by pressing the →T← key (press for longer than 2 sec.)

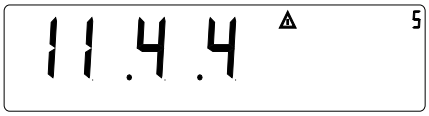
Otherwise use the [TOGGLE UNITS] and →T← keys (if necessary, also the →0← and (⌸)) keys to overwrite the default value and confirm by pressing the →T← key.

In the present example, the scale division d was set to 0.01 lb.

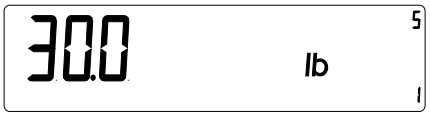
Confirms the new setting.

TOGGLE UNITS TOGGLE UNITS TOGGLE UNITS →T←

Call up the menu item 11-4-4 (maximum capacity).



enter and save the desired maximum capacity.
The maximum capacity is generally less than the nominal load defined for the load cells (entered under menu item 1-19-1), as the load cell usually carries additional weight (such as weighing plattform).



In the present example, a maximum capacity of 30.0 lb was entered.

Confirms the new setting.

If, instead of the A/D converter configuration, the configuration “single range”, “multiple range” or “multi-division mode” was selected, then the respective weighing range limit must be additionally entered into the assigned menu lines (11-5 for “multiple range scale” and 11-6 for “multi-division scale”). These menu lines thus contain 3 additional menu items (the limits for the ranges 1, 2 and 3)

→0←, press TOGGLE UNITS repeatedly →T←

Save configuration: Call up menu line 11-10.

Menu item 11-10-2 (“configuration not saved”) is pre-configured.

TOGGLE UNITS

Call up menu item 11-10-1 (“configuration saved”).

→T←

Save A/D converter configuration.

The settings for the A/D converter configuration are stored. For a short time, the “Busy” symbol appears on the indicator, then the program returns to indicator display of menu item, then Combics is restarted.
After the self-test (i.e. when all segments are displayed), the Combics is in the weighing mode.

Activate the Service mode again (see the corresponding section at the beginning of this chapter).

→T←

Select weighing platform “WP1”.

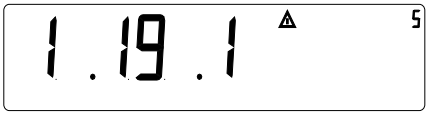
→T←

Call up the numeric menu.

Menu “1” is displayed.

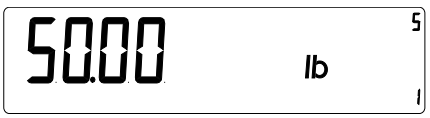
→T←, press TOGGLE UNITS →T← repeatedly

Call up menu line 1-19 (Adjustment without weight).



→T←

Activate menu item “1-19-1”.



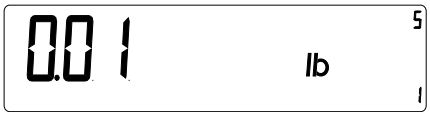
Enter the nominal capacity of the load cell(s), for example 50.00 lb.
On a weighing platform that consists of several load cells, the nominal capacity must be multiplied appropriately.
Example: The weighing platform consists of 4 load cells with 50 lb each. In this case, the nominal capacity (= maximum capacity) 4 × 50 lb = 200 lb.

→T←

Confirms the setting.

TOGGLE UNITS →T←

Activate menu item 1-19-2.



Enter the resolution (lowest scale division d) (For example 0.01 lb). This value must corresponed with the value entered under menu item 11-4-1 (and/or 11-5-1 or 11-6-1).

→T←

Confirms setting.

TOGGLE UNITS →T←

Activate menu item 1-19-3.

Enter the sensitivity of the load cells in mV/V (obtain data from the data sheet, for example). On a weighing platform that consists of several load cells, the sensitivity of load cell 1) should be entered here.
Example: The sensitivity of the load cell is 1.9440 mV/V.

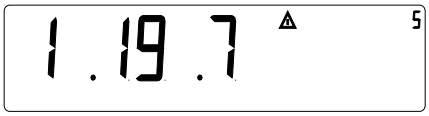
→T←

Confirms setting.

TOGGLE UNITS →T←
TOGGLE UNITS →T←
TOGGLE UNITS →T←
TOGGLE UNITS →T←

On a weighing platform that consists of several load cells, enter the sensitivity of the other load cells (max. 4 load cells) under the menu items 1-19-4 (for cell 2) to 1-19-6 (for cell 4). If there are less than 4 load cells for the corresponding menu items, enter the value “0.000”.

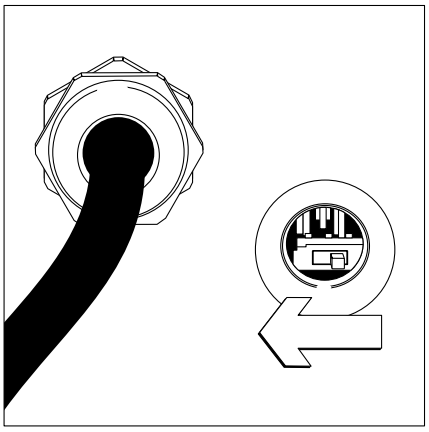
Call up menu item 1-19-7 (save values entered on menu page 1-19).



→T← →0← →0←

Save ID codes of the load cell(s), return to menu page “1.”

Set/delete preload: see corresponding section on the subsequent pages.
See also chapter entitled “Operating the Combics”, under “Calibration, Adjustment” or the Service Manual.
Restart: Switch the terminal off and on again.

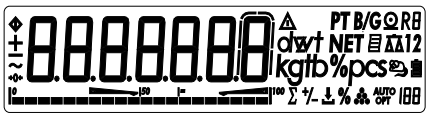


After completing the A/D converter configuration, move the menu access switch from the “open” to the “locked” position, as follows:

- Remove the cover plate from the back of the indicator housing
- Move the switch to the left (“locked”).

See also the “Calibration/Adjustment” section in the chapter entitled “Operating the Combics”, or refer to the service manual.

I/⏻ I/⏻



Turn the scale off and on again to restart it.
After the self-test, the scale is ready to operate.

Entering Geographical Latitude, Local Elevation and Acceleration of Gravity

Purpose
To perform an external adjustment of the weighing instrument at a place of adjustment that is not the same as the place of installation.

When a weighing instrument changes location and is used somewhere else, its sensitivity changes as well. The sensitivity is dependent on the acceleration of the earth's gravity, which in turn is affected by the geographical latitude and the elevation of the place of installation. In general, the acceleration of gravity increases in the direction of the poles (i.e. with increasing degree of latitude) and decreases the greater the distance is from the center of the earth (i.e. with increasing elevation).

If the precise location of the place of installation is known; i.e. its geographical latitude in degrees (northern or southern latitude) and the elevation in meters above sea level, then the weighing instrument can be adjusted at the factory in preparation for its future place of installation, provided that the geographical latitude and elevation at the place of adjustment are also known. Rather than the geographical latitudes and local elevations of the places of adjustment and installation, it is sufficient to know the acceleration of gravity at both the places.

The following data, describing the place of manufacture (Sartorius in Goettingen, Weender Landstrasse 94-108) is used as reference data:
- Geographical latitude: 51° 32' = 51.53 degrees
- Elevation: 151 m
- Acceleration of gravity: 9.811590 m/s^{-2}

If this reference data is stored in the indicator, the adjustment factor does not need to be corrected for the place of installation.

After closing the menu access switch, the geographical data is stored in the A/D converter.

The tolerance zones, e.g. for a scale with 3000 e, are ± 100 km for the latitude and ± 200 m for the elevation above sea level.

The following exception applies in Germany for scales with 3000 e:
If the latitude is set to 51,00° and the altitude 513 m above sea level, which corresponds to an acceleration of gravity of 9.810 m/s^{-2}, then the scale can be used anywhere in Germany ("Zone D").

These values are calculated for Germany based on a mean value for the Earth's acceleration. The greater the precision of the geographical data entered, the greater the precision achieved with the weighing instrument; the tolerance range, however, is also restricted accordingly (see above).

Procedure
The geographical data stored in the indicator at the factory applies to Germany ("Zone D") (see above).

Before adjusting the complete weighing system, make sure the geographical reference data stored in the indicator matches the values for the place of adjustment (whether at the factory or at the place of installation). If the values do not match, enter the latitude and elevation under menu items 1-20-1 and 1-20-2, or the acceleration of gravity under item 1-20-3. Then adjust the scale. If the place of adjustment is not the same as the place of use, enter the data describing the place of use. Following adjustment, close the menu access switch. The scale can now be used at the place of installation, or anywhere within a tolerance zone (see above) around the place of installation. If the scale is installed in Germany, you can enter the data for "Zone D" (51,00 degrees, 513 m above sea level). In this case, the scale can be used anywhere within Germany. This setting is recommended for weighing equipment dealers who do not need to know the exact geographical data when delivering to customers in Germany.

If a service technician performs a span adjustment (for example after one or more load cells have been replaced), it is conducted without changing the values stored in the menu items 1-20-1 and 1-20-2, or 1-20-3.

For this adjustment, either the geographical latitude and elevation (menu items 1-20-1 and 1-20-2) or the acceleration of gravity (menu item 1-20-3) for the place of installation must be entered. This data can be obtained from the relevant Cadaster Agency or the State Surveying Authorities.

The geographical data cannot be edited unless the menu access switch is open. If the indicator is part of a verified weighing system, the verification seal must be broken to change this data. Afterwards, the scale must be re-verified.

If the acceleration of gravity has been entered, then this value takes precedence over the geographical latitude and the elevation. When the menu item 1-20-1 is called up, the value "99999.99" is displayed; when the menu item 1-20-2 is called up, the value "9999999" is displayed. In the converse case (geographical latitude and local elevation were entered), the value "0.000000" is displayed for the menu item 1-20-3.

To display geographical data during the adjustment procedure, select menu item 8-12-2 (factory setting: 8-12-1; "Do not show geographical data"). With this setting active, the indicator shows which set of data is used for adjustment; either the latitude and elevation or the acceleration of gravity. Press [→T←] to confirm the data shown; or, if the data is invalid, press [→0←] to cancel the adjustment routine.

If the display of geographical data (menu item 18-12-2) is active, the adjustment procedure is as follows:
After starting the adjustment procedure "CAL" and when the data "local elevation" and "geographical latitude" is used, the word "ALt itud" appears for 2 seconds, followed by the settings for the elevation (in meters above sea level). Press [→T←] to confirm the data, or [→0←] to cancel the adjustment routine. Then, the word "LonG itud" appears for 2 seconds, followed by the settings for the geographical latitude in degrees. Press [→T←] to confirm the data, or [→0←] to cancel the adjustment routine. After this, the prompt to place the adjustment weight appears. If, instead of elevation and geographical latitude, the acceleration of gravity was entered, the word "GrAU itY" appears for 2 seconds after "CAL," followed by settings for the value for the acceleration of gravity. Press [→T←] to confirm the data, or [→0←] to cancel the adjustment routine.

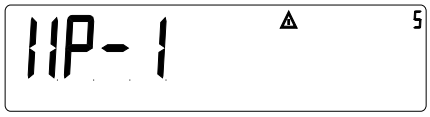
Enter the place of adjustment with subsequent external adjustment (Example)

Setup
(See also the chapter entitled “Operating the Combics”, under “Calibration, Adjustment”)

- Remove the cap from the back on the left of the Combics housing.
- Move the switch to the right (“accessible” position).
- Service mode setting up (see corresponding section at the beginning of this chapter.

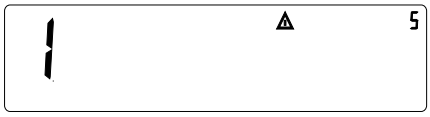
→T←

Select weighing platform “WP1”.



→T←

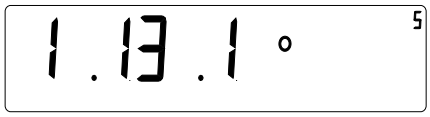
Call up the numeric menu.



Menu page “1” is displayed.

→T←, press TOGGLE UNITS, →T← repeatedly

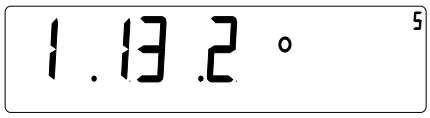
Call up menu line 1-13 (tare at power on / zeroing).



The picture shows that tare at power on is “on”: The menu item 1-13-1 is selected.

TOGGLE UNITS →T←

Turn tare at power on “off”: Call up menu item 1-13-2.

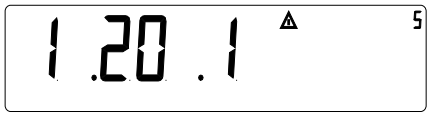


→T← →0←

Return to menu page 1-13.

press TOGGLE UNITS, →T← repeatedly

Select menu line 1-20 (Place of adjustment)



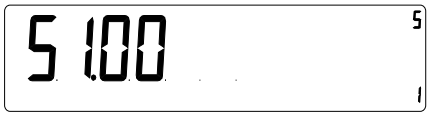
Menu item 1-20-1 (degree of latitude) is displayed.

If the geographical latitude and elevation of the place of installation are known, enter this data by selecting menu items 1-20-1 (degree of latitude) and 1-20-2 (elevation).
To enter the acceleration of gravity at the place of installation select menu item 1-20-3.
Any value entered for the acceleration of gravity under 1-20-3 takes priority over the pair of values “geographical latitude” and “elevation.”

→T←

Example: Enter geographical latitude and elevation.
Call up menu item 1-20-1 (degree of latitude).

In the example shown here, the parameter “acceleration of gravity” (menu item 1-20-3) has been entered. Therefore, the input fields for the menu items 1-20-1 and 1-20-2 are empty.



In the example shown here, the last geographical latitude entered was the setting for Germany (“Zone D”). The scale can be used anywhere in Germany with this setting, if the elevation entered under menu item 1-20-2 is 513 m above sea level.
Enter the required latitude as an absolute number (convert the angular minutes to decimal places). Press →T← to confirm the data entered.

→T← TOGGLE UNITS →T←

Call up menu item 1-20-2 (elevation of the place of installation).

The input field is empty because the parameter “acceleration of gravity” (menu item 1-20-3) has been entered.

In the example shown here, the last elevation entered was the setting for Germany (“Zone D”). The scale can be used anywhere in Germany with this setting, if the latitude entered under menu item 1-20-1 is 51.00.

Enter the elevation of the place of installation (in meters above sea level, and if necessary, the reference value “151”). The elevation may also be negative under certain circumstances, (for example, when the weighing instrument is being set up in a mine).
Confirm the entry by pressing the →T← key.

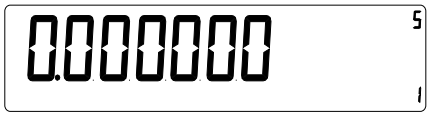
→T← TOGGLE UNITS TOGGLE UNITS

Call up menu item 1-20-4 to save the entries.

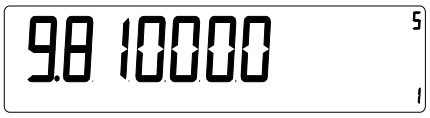
As an alternative to entering the geographical latitude and elevation of the place of installation, the value for the acceleration of gravity at the place of installation can be entered under menu item 1-20-3.

TOGGLE UNITS TOGGLE UNITS →T←

Example: Enter the acceleration of gravity at the place of installation.
Call up menu item 1-20-3 (acceleration of gravity).



In the example shown here, the parameters “geographical latitude” and “elevation” (menu items 1-20-1 and 1-20-2) were last entered. Therefore, the input field for this menu item is empty.



In the example shown here, the last value entered for acceleration of gravity was the setting for Germany (“Zone D”). The scale can be used anywhere in Germany with this setting, which is a mean value calculated for the whole of Germany.

Enter the acceleration of gravity at the place of installation (in m/s^{-2}, if necessary, reference value “9.811590”). Confirm the entry by pressing the →T← key.

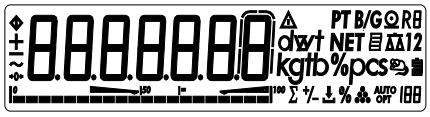
→T← TOGGLE UNITS

Call up menu item 1-20-4 to save the input.

The “Busy” symbol appears in the indicator as proof that the parameters entered have been stored.

I/⏻ I/⏻

Restart the scale: Switch the Combics off and on again.



After the self-test when all segments are displayed, the Combics is in the weighing mode.

Adjusting the scale:
See also chapter entitled “Operating the Combics”, under “Calibration, Adjustment.”

Configuring the Combics:
Menu item 1-9-1: External adjustment with default weight,
Menu item 1-10-1: Calibration / adjustment in one procedure,
Menu item 1-16-1: External adjustment / linearization accessible.

→0←

Unload and zero the scale.

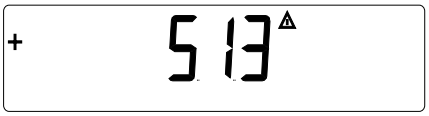
→T← hold

Start external adjustment.

This display appears for 2 seconds.

Example: The parameters “elevation of the place of installation” and “geographical latitude” are entered (menu items 1-20-1 and 1-20-2).

“ALt ltud” is displayed for 2 seconds.



The elevation of the place of installation entered in meters above sea level is displayed.
In this example, the display shows the elevation valid for Germany (“Zone D”).

→T←

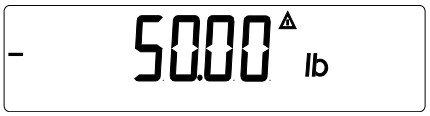
Confirm the displayed value or press →0← to cancel calibration/adjustment.

”LAt ltud” appears for 2 seconds on the indicator.

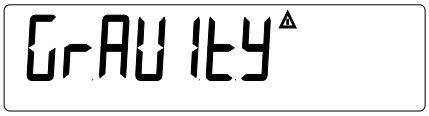
The geographical latitude of the place of installation entered in degrees (northern or southern latitude) is displayed.
In this example, the display shows the latitude valid for Germany (“Zone D”).

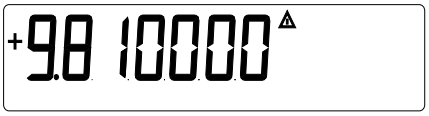
→T←

Confirm the displayed value or press →0← to cancel calibration/adjustment.



The prompt to place the calibration/adjustment weight appears (for example, 50 lb).
Please refer to the chapter entitled “Operating the Combics”, under “Calibration/Adjustment” for more details on the calibration/adjustment procedure.



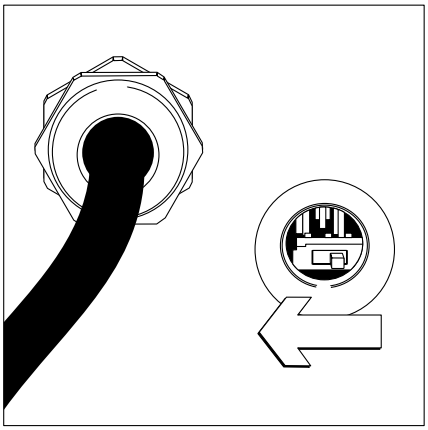


Instead of “ALt ltud” and “LAt ltud”, “GrAU ltY” is displayed for 2 seconds, if the acceleration of gravity was entered (under menu item 1-20-3) instead of elevation and geographical latitude (menu items 1-20-1 and 1-20-2).
The value entered for the acceleration of gravity at the place of installation (in m/s^{-2}) is displayed.
In this example, the display shows the acceleration of gravity valid for Germany (“Zone D”).

→T←

Confirm the displayed value for the acceleration of gravity.

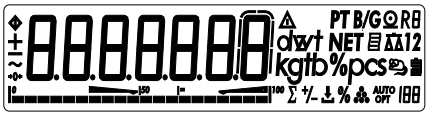
The prompt to place the calibration/adjustment weight appears (for example 50 lb).
For more details on the Calibration/adjustment procedure, please refer to the chapter entitled “Operating the Combics”, under “Calibration, Adjustment.”



After completing the A/D converter configuration, move the menu access switch from "open" to "locked":

- If necessary, remove the cap from the back on the left of the Combics housing.
- Move the switch to the left ("locked" position).
  See also the chapter entitled "Operating the Combics", under "Calibration, Adjustment" or the Service Manual.

Restart the scale: Switch the Combics off and on again.



After the self-test, the scale is ready to operate.

Error Codes and Messages

Error codes are shown in the main display. Err codes and messages are displayed continuously. InF messages are displayed for 2 seconds, after which the program then returns automatically to the weighing mode.

Error Code/Message Displayed	Cause	Solution
Err 101 - 104	Key is stuck Key pressed when switching on the Combics	Release key or Contact your local Sartorius Service Center
Err 320	Operating program memory (EEPROM) defective	Contact your local Sartorius Service Center
Err 335	Verified platform not compatible with terminal	Connect a compatible weighing platform
Err 340	Operating parameter (EEPROM) error	Turn the scale off, then back on again. If this error code remains displayed, please contact your local Sartorius Service Center
Err 341	Data lost from RAM, battery needs to be recharged	Leave the scale power on for at least 10 hrs.
Err 343	Loss of data in the memory area for transaction numbers in external Alibi memory modules	Contact your local Sartorius Service Center
InF 01	Data output not compatible with output format	Change the configuration in the Setup menu
InF 02	Calibration/adjustment condition not met, e.g., - the scale was not tared - the scale is loaded	Calibrate only when zero is displayed Press →T← to tare Unload the scale
InF 03	Calibration/adjustment could not be completed within a certain time	Allow the scale to warm up again and repeat the adjustment process
InF 06	Internal calibration weight defective	Contact your local Sartorius Service Center
InF 07	Function not allowed in scales verified for use in legal metrology	Contact your local Sartorius Service Center for information on having the settings changed
InF 08	The load on the scale is too heavy to zero the readout	Check whether “tare/zero with power on” is set (1.12)
InF 09	Taring is not possible when the gross weight is ≤ zero	Zero the scale
InF 10	Tare key is blocked when there is data in the tare memory	The data stored for the application program (Combics 2 only) must be deleted (clear the memory) before taring.
InF 22	Error in storing reference value, load is too light	Put a heavier sample on the scale
InF 23	Error in initializing an application	Contact your local Sartorius Service Center
InF 29	Minimum load not reached	Define a lower value for the minimum load (in the Application settings, under 3.6)
InF 71	Cannot store the current weight value (e.g., if control limits are too low or too high)	None
InF 72	Cannot store the current weight value (e.g., the transaction counter has reached its limit)	None
InF 73	Data not found or unreadable	Contact your local Sartorius Service Center
InF 74	Function is blocked (e.g., menu is locked)	None
InF 98	No weighing platform connected	Connect weighing platform
InF 99	No weighing platform connected	Connect weighing platform
noUP	No weighing platform connected	Connect weighing platform

Care and Maintenance

Service
Regular servicing by a Sartorius technician will extend the service life of your indicator and ensure its continued weighing accuracy. Sartorius can offer you service contracts, with your choice of regular maintenance intervals ranging from 1 month to 2 years.

The length of the service interval depends on the operating conditions at the place of installation and on your requirements.

Repairs
⚠ Disconnect defective equipment from power immediately (unplug the power cord from the wall outlet). Repair work must be performed by trained service technicians authorized by Sartorius and using original Sartorius parts. Any attempt by untrained persons to perform repairs may result in hazards for the user.
Note: In case of defects during the warranty period, please return the entire indicator to the factory.

⚠ If a cable or cable gland is defective or damaged, replace the entire assembly.

⚠ Do not open the indicator housing while the indicator is electrically charged (live). Wait at least 10 seconds after disconnecting the equipment from power before opening the housing. Because the fitting surfaces of the housing parts directly affect the IP protection rating, make sure to prevent any damage that would affect the seal when opening and closing the indicator housing.

Cleaning
The Sartorius Combics indicators are designed in compliance with directives of the EHEDG (European Hygienic Equipment Design Group) and in accordance with HACCP (Hazard Analysis and Critical Control Points) standards for prevention of contamination, which means they are particularly easy to clean and disinfect.

⚠ Disconnect from AC power: unplug the equipment from the wall outlet (mains supply) and disconnect the data cable (if connected).

⚠ Make sure that no liquid enters the indicator housing.

⚠ Do not use any aggressive cleaning agents (solvents or similar agents).

● Clean the indicator using a piece of cloth dampened with a detergent.

○ If used in the food industry, use a cleaning agent suitable for the working environment.

● After cleaning, wipe down the indicator with a soft, dry cloth.

⚠ Do not use jets of water or compressed air to clean the indicator.

Replacing the Dust Cover
> Replace damaged dust covers.

● Place the new dust cover on the indicator and press down on the front and back along the edges until the cover is firmly seated.

Safety Inspection
Safe operation of the device is no longer ensured when:

– there is visible damage to the device or the power cord

– the built-in power supply no longer functions properly

– the device has been stored for a relatively long period under unfavorable conditions (e.g., extreme moisture)

– the equipment has been subjected to rough handling during shipment

If there is any indication that safe operation of the device is no longer warranted:

● Disconnect from AC power: unplug the equipment from the wall outlet (mains supply)

> Lock the device in a secure place to prevent it from further usage.

● In this case, notify your nearest Sartorius Service Center.

Maintenance and repair work may be performed only by authorized Sartorius Service technicians who:

– have access to the required service and maintenance manuals

– have attended the relevant service training courses

⚠ The seals affixed to the equipment housing indicate that the equipment may be opened only by authorized service technicians, to ensure safe and trouble-free operation of the equipment and to maintain the conditions for warranty coverage.

Recycling

Sartorius products are packaged to ensure safe shipment using environmentally friendly materials. If you do not need to save the packaging after successful installation of the equipment, you should return it for recycling.

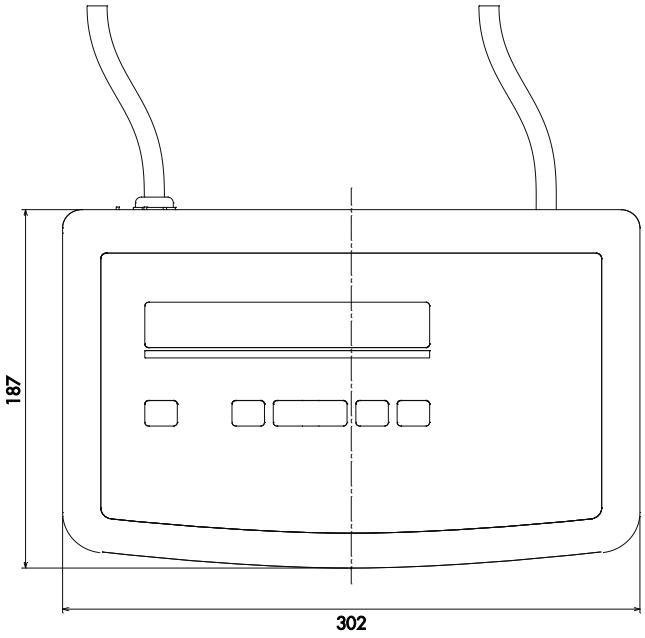
For information on recycling options, including recycling of old weighing equipment, contact your municipal waste disposal center or local recycling depot.

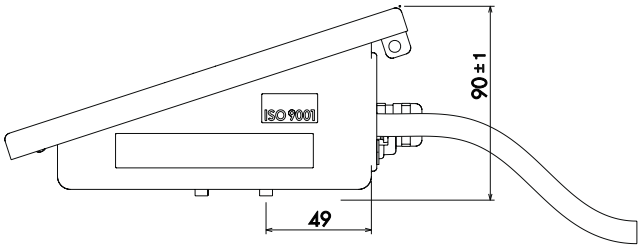
If the equipment contains batteries, remove them before disposal. Batteries are treated as hazardous waste and must be disposed of separately. Please contact your municipal waste disposal center for details.

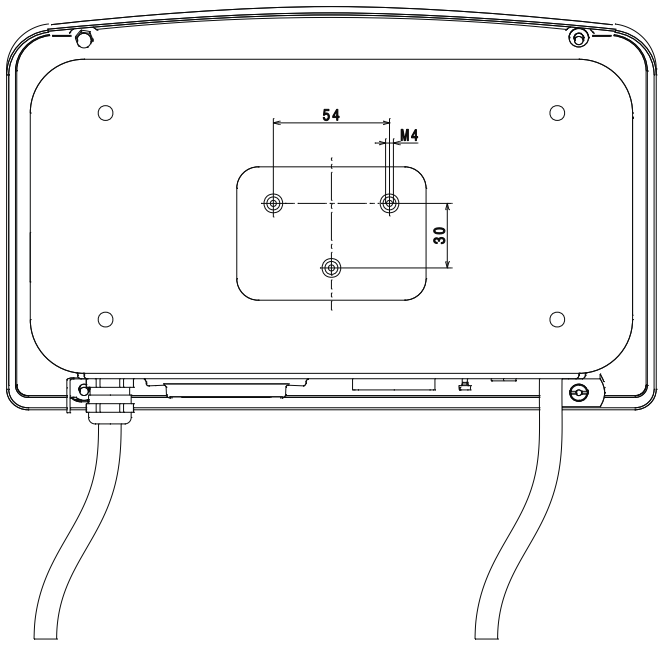
Specifications

When used in standard applications (as opposed to legal metrology):	
– Number of scale divisions	≤50,000 d
In legal metrology:	
Accuracy class	(III)
Number of verification scale divisions when used as	
– Single-range scale	≤10,000 e acc. to NIST
Load cell connection:	
– Supply voltage	9 V (± 4.5 V)
– Bridge impedance	83 Ω to 2000 Ω
– Available sensor technology	4- or 6-conductor technology
When used in legal metrology:	
– Available sensor technology	6-conductor technology
– Max. cable length per gauge	150 m/mm²
– Lowest permissible input signal	
for p_{ind} = 0.5	≥0.720 µV/e
for p_{ind} = 0.3	≥1.200 µV/e
Fraction of tolerance for this module:	
for Delta V_{min} ≥0.720 µV/e	0.5
for Delta V_{min} ≥1.200 µV/e	0.3
Measuring signal	0.45 mV to 36 mV
Measuring signal for prelaod (dead load)	0.45 mV to 6.3 mV
Measuring signal variation	4.5 mV to 29.7 mV
Measuring signal/verification scale division	0.72 µV/e1 to 0.75µV/e1
Sensitivity	4 million digits max. (internal)
Digital protective interface	acc. to OIML R76
Data interface	Bidirectional RS-232 interface with control outputs (standard equipment)
Additional data interface	optional
Display	20 mm LCD, 7-segment plus status ID symbols, backlit
Housing:	
– Material	AISI 304 stainless steel
– Dust and water protection acc. to NEMA	CISL1, CISL2: optional NEMA 4 CIS1, CIS2: NEMA 4x
Operating temperature range	-10°C to +40°C (+14 to + 104°F)
Power supply	100-240 VAC (-15/+10%), 50-60Hz, max. 17W / 23 VA optional 15,5-24 VDC (±10%), max. 12 W optional 13-17 VAC (±10%), 50-60 Hz, max. 12 W Optional battery pack: YBR10Z
Limitation of emissions	According to IEC 61326+A1; FCC Class B
Defined immunity to interference	According, IEC 61326+A1 industrial environments
Electrical safety	According to IEC 101-1, 3101-1, IEC 950, UL 1950

Dimensions (Drawings)





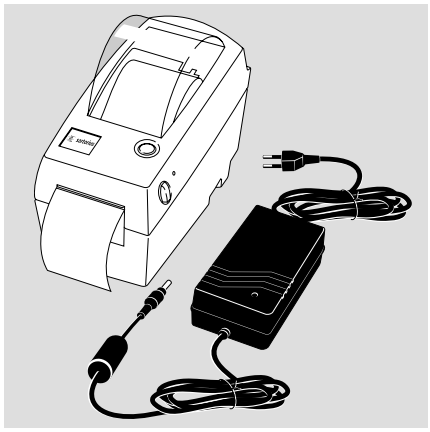


All dimensions are given in millimeters

Accessories

Product	Order No.
Dust covers (2 pcs)	YDC01CI
Interface module (RS-232) for UniCOM data interface	YDO01C-232
Interface module (RS-485/422) for UniCOM data interface	YDO01C-485
Analog current output, 0-20mA, 4-20mA, 0-10V, 16-bit	YDA01C-20MA

Legal for trade printer with functions for date, time and statistical evaluations; liquid-crystal display	YDP03-0CE
– Printer paper (5 rolls; length per roll: 50 m)	6906937
– Replacement ink ribbon cartridge for printer	6906918



Legal for trade strip and label printer with thermal print head, paper width 101 mm, with adapter cable (12-contact round male connector) and external power supply Adapter cable YCC01-01CISLM3 required for Combics model CISL indicator. Can only be used with customizable printout configuration tool option. Adapter cable YCC02-D09F6 required for Combics model CIS indicator.	
– With 120 V power supply (USA)	YDP12IS-0CEUV
– Printer paper (1 roll) for YDP02IS printer, 101 mm × 75 m, thermal sensitive paper	69Y03196
– Labels for YDP02IS printer, extra large, 101 mm × 75 m, 305 labels	69Y03195
Legal for trade strip and label printer with thermal print head, Paper width 60 mm, with adapter cable (12-contact round male connector) and external power supply. Adapter cable YCC01-01CISLM3 required for Combics model CISL indicator. Adapter cable YCC02-D09F6 required for Combics model CIS indicator.	
– With 120V power supply (USA)	YDP04IS-0CEUV
– Printer paper (3 rolls) for YDP02/04IS, 60 mm × 75 m, thermal sensitive paper	69Y03090
– Labels for YDP02/04IS printer, small, 58 mm × 30 mm, 1000 labels	69Y03092
– Labels for YDP02/04IS printer, medium, 58 mm × 76 mm, 500 labels	69Y03093
– Labels for YDP02/04IS printer, large, 58 mm × 100 mm, 350 labels	69Y03094
Cable for direct connection of YDP02IS/YDP04IS printer to Combics model CISL indicator	YCC01-01CISLM3

Product	Order No.
External rechargeable battery packup to 40 h operation, incl. charger	YRB10Z
External red/green/red display for Combics model CISL indicators	YRD11Z
Second display for Combics model CISL indicators*	YRD02Z
Remote display, 7-segment, up to 45 mm characters*	Information available on request
Bar code scanner, 120 mm scanning width, with cable for connection to Combics	
– for Combics model CISL	YRB02CISL
– with YCC02-R12F6 adapter cable for Combics model CIS	YBR02FC
Foot switch, incl. D-SUB 25-pin T-connector	YFS01
Hand switch, incl. D-SUB 25-pin T-connector	YHS02
External Alibi memory for electronic storage of weighing data	YAM01IS
Scanner for loading weighing data from YAM13IS Alibi memory cards (see below) to a PC	YAM02IS
Power supply for YAM01IS or YAM02IS Alibi memory	YAM11IS
Memory card YAM01IS Alibi memory	YAM13IS
Cable for connecting Combics indicator to YAM01IS Alibi memory	YCC01-10CIM3
Cable for connecting (D-SUB 9-pin) YAM01IS Alibi memory to a PC	69EM0012
Flexible formatting options for printouts (e.g., for bar codes with variable font size, graphics, etc.)	Information available on request
Sartorius WinScale Scale driver software for Windows 95/98/2000/NT. Displays the scale readout on your PC monitor and provides secure memory for storing data that is subject to legal control. YCC01-09ISM5 RS-232 connecting cable required (RS-485 cable available on request).	YSW03
SartoConnect data transfer software for connecting your Sartorius scale to a computer running Windows 95/98/NT. This software lets you load the data recorded by your scale in a PC application program such as MS Excel or Access. Includes a 1.5 m cable for connecting the scale to a PC (12-pin/9-pin)	
Installation kit for installing the Combics in a pit (with connecting hardware that lets you disconnect the indicator as desired)	YAS99I
IP65 upgrade kit for the IP44 protected Combics model CISL indicator	YAS01CISL
Retainer for wall mounting, stainless steel	YDH02CIS
Floor-mounted column	YDH03CIP
Floor-mounted column, stainless steel	YDH03CIS
Base for installing floor-mounted column	YBP03CIP
Base for installing floor-mounted column, stainless steel	YBP03CIS
Retainer plate	YDH12CWS

* not for use in legal metrology

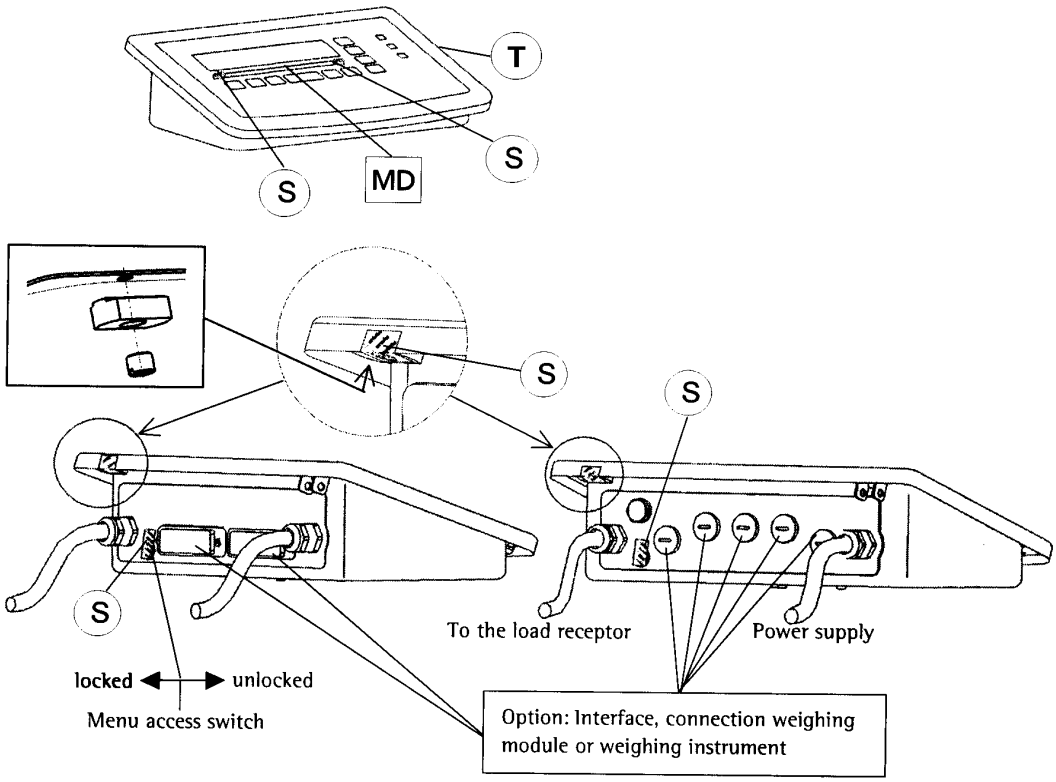
Product	Order No.
Retainer for bar code scanner, for attachment to floor-mounted column, bench stand or complete scale retainer	YBH01CWS
Plates for attaching printer to floor-mounted column or bench stand	YPP01CWS
Castor set (2 guide castors, 2 lockable castors) for YBP03CIP/S bench stand	YRO03CI
Anti-theft device	YTP01CI
24V industrial power supply module*	YAS02CI
Connecting cable (25-pin D-SUB) for YRB10Z battery pack (2m)	YCC02-RB01
Connecting cable with cable gland for YRB10Z battery pack (2m) (for Combics models CIS only)	YCC02-RB02
Connecting cable (25-pin D-SUB) for car battery (2 m)	YCC02-CB01
Connecting cable with cable gland for car battery für (2m) (for Combics models CIS only)	YCC02-CB02
Connecting cable with cable gland for YBR02FC bar code scanner (for Combics models CIS only)	YCC02-BR02
Connecting cable with cable gland 9-pin D-SUB male connector, 6m (for Combics models CIS only)	YCC02-D09M6
Connecting cable with cable gland, 9-pin D-SUB female connector, 6m (for Combics models CIS only)	YCC02-D09F6
Connecting cable with cable gland, 25-pin D-SUB female connector, 6m (for Combics models CIS only)	YCC02-D25F6
Connecting cable with cable gland, 12-pin round male connector, 6m (for Combics models CIS only)	YCC02-R12M6
Connecting cable with cable gland, 12-pin round female connector, 6m (for Combics models CIS only)	YCC02-R12F6
Cable for YDA01C-20MA power interface, with open cable ends e.g., 5 × = 5m*	6906926
Cable gland for Combics model CIS, IP65/67 protected (for Combics models CIS only)	YAS04CIS

Connecting an IS Weighing Platform to a Combics 2 Indicator
You can connect an IS weighing platform as WP2.

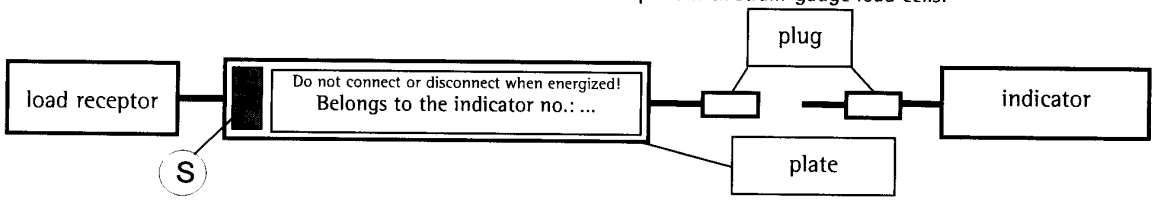
Characteristics:
- IS weighing platforms process weighing data independently of the indicator
- IS platforms can be internally adjusted
- ...-0CE models have a separate approval number, on a tag affixed to the cable
- Please observe the conditions described in the instruction manual for the platform connected

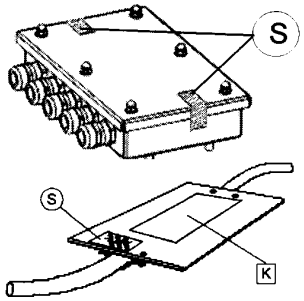
* not for use in legal metrology

Plates and Markings CIS1U / CIS2U / CISL1U / CISL2U



Alternative: Disconnectable connection between indicator and load receptors with strain-gauge load cells:





If there is a junction box between load receptor and electronic evaluation unit the junction has to be secured against inadmissible manipulation.

Alternative place for the Descriptive Plate of the weighing instrument
Handling in this case:
Affix the ID label of the weighing instrument to the delivered tag plate. Affix the ID tag plate to the data cable of the weighing module near the indicator. The verification officer or an authorized Sartorius representive must then seal the ID tag plate to the fastener.

(S) Protective mark

MD Metrological data: Max, Min and e

(T) Verificaton ID label for trade

Example of plate with model designation T

Labels for entering metrological data MD

Nominal Capacity _____

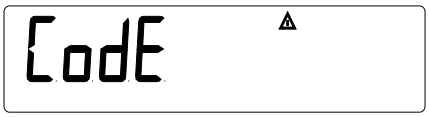
Nominal Capacity _____

Example:

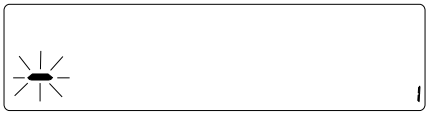
Nominal Capacity 10 Pounds

Nominal Capacity 4.5 kg / 4550 g

General Password



When you select “Setup”, the password prompt is displayed for 2 seconds.



The first character of the password flashes.

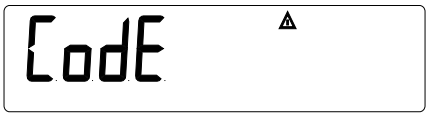
TOGGLE UNITS repeatedly , →T← ;
TOGGLE UNITS repeatedly , →T← ;
TOGGLE UNITS repeatedly , →T← ;
TOGGLE UNITS repeatedly , →T← ;
TOGGLE UNITS repeatedly, →T← ;
TOGGLE UNITS repeatedly, →T← ;
TOGGLE UNITS repeatedly, →T← ;
TOGGLE UNITS repeatedly, →T← ;

Entering the password:
- Press [TOGGLE UNITS] to select numbers and press →T← to confirm.
  Press either [TOGGLE UNITS] (to scroll through numbers from 0 up to 9) or ⌨ (to scroll from 9 down to 0) repeatedly until the desired number is displayed.

The password is shown on the display.

→T←

Confirm the password entered.



→0←

Exit current menu level

Press and hold →T← (> 2 sec.)

Store input and exit the Setup menu

General password:
40414243

Service password:
202122

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