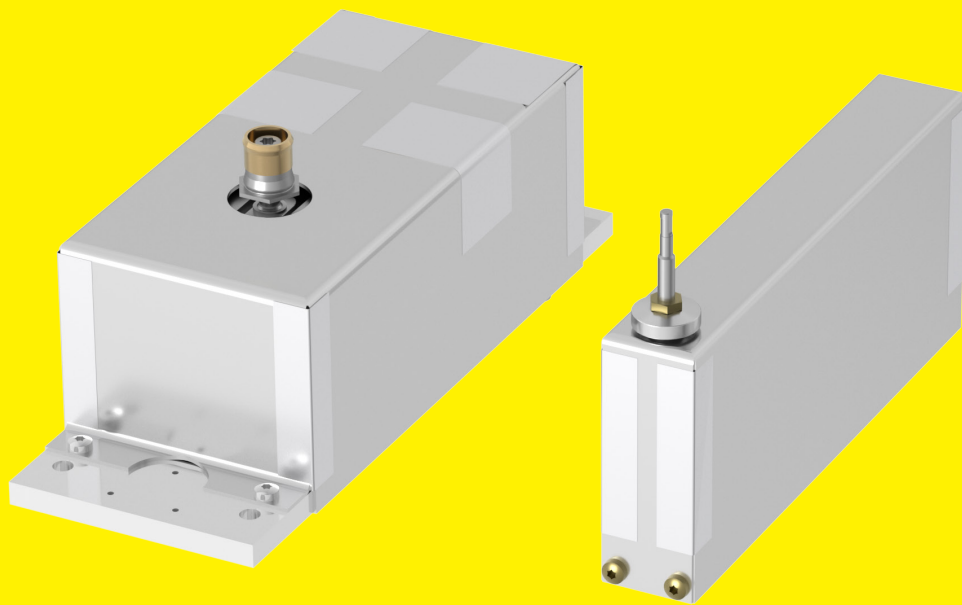


Operating Instructions

Weigh Cells

Model WZB54-L | WZB254-L | WZB254-LC | WZB553-L | WZB8202-L



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1 About these Instructions

1.1 Validity

These instructions are part of the device; they must be read in full and stored. These instructions apply to the following versions of the device:

Device	Model
Weigh Cells WZB	WZB54-L WZB553-L WZB254-L WZB254-LC WZB8202-L

1.2 Related Documents

- ▶ In addition to these instructions, please observe the following documents: Instructions for the associated devices, e.g., display unit, printer.

1.3 Target Groups

These instructions are addressed to the following target groups. The target groups must possess the knowledge specified below.

Target group	Knowledge and Qualifications
Operator	The operator is familiar with the device and the associated work processes. The operator understands the hazards which may arise when working with the device, and knows how to prevent them.*

* If a person in the target group operates the software interface of the device, they are also the "user".

1.4 Symbols Used

1.4.1 Warnings in Operation Descriptions

WARNING

Denotes a hazard that may result in death or severe injury if it is **not** avoided.

CAUTION

Denotes a hazard that may result in moderate or minor injury if it is **not** avoided.

NOTICE

Denotes a hazard that may result in property damage if it is **not** avoided.

1.4.2 Other Symbols Used

- ▶ Required action: Describes activities that must be carried out. The activities in the sequence must be carried out in succession.
- ▷ Result: Describes the result of the activities carried out.
- [] Refers to operating and display elements. Indicates status, warning, and error messages.

2 Safety Instructions

2.1 Intended Use

The weigh cell is intended to be used to weigh under difficult space conditions and for exact weight determination during ongoing production.

The weigh cell must be installed in a device or system, such as a measuring device or a production machine. The weigh cell must be secured to the device or system.

Weigh cells are additional devices for installation in other devices or systems. An EU Declaration of Conformity must be issued for the final device or system.

The optional display unit YRD01 can be connected to the weigh cell.

The device is intended exclusively for use in accordance with these instructions. Any other use is considered **improper**.

If the device and the accessories are not used properly: the protective systems of the device may be impaired. This can lead to unforeseeable personal injury or property damage.

2.1.1 Operating Conditions for the Device

The user of the weigh cell should take into account at least the following points with regards to the complete product with the installed weigh cell:

- Compliance with directives and standards for electrical equipment
- Electromagnetic compatibility of the complete device
- Compliance with mandatory safety regulations.
- Do **not** use this equipment in hazardous areas, zones exposed to explosive gases or dusts, nor areas exposed to potentially explosive materials.
- Do **not** unnecessarily expose the device to aggressive chemical vapors or to extreme temperatures, moisture, shocks, or vibration.

2.1.2 Modifications to the Device

The operator shall be responsible for any modifications to the equipment and for any connections of cables or equipment not supplied by Sartorius and must check and, if necessary, correct these modifications and connections.

Any improper handling, modifications or installation work will result in forfeiture of all claims under the warranty.

2.2 Qualifications of Personnel

Persons who do **not** possess adequate knowledge about how to use the device safely may injure themselves and other persons.

If a particular qualification is required for an activity: The target group will be specified. If **no** qualification is specified: The activity may be carried out by the “operator” target group.

2.3 Functionality of the Device Parts

Non-functioning device parts, e.g., as a result of damage or wear, can cause malfunctions. There is a risk of injury to persons.

- ▶ If device parts are **not** functional: Do **not** use the device.

3 Device Description

NOTICE

Improper modification of the device may result in damage to property.

► The user may only change screws in relation to the load receptor and the below-balance weighing!

3.1 Device Overview

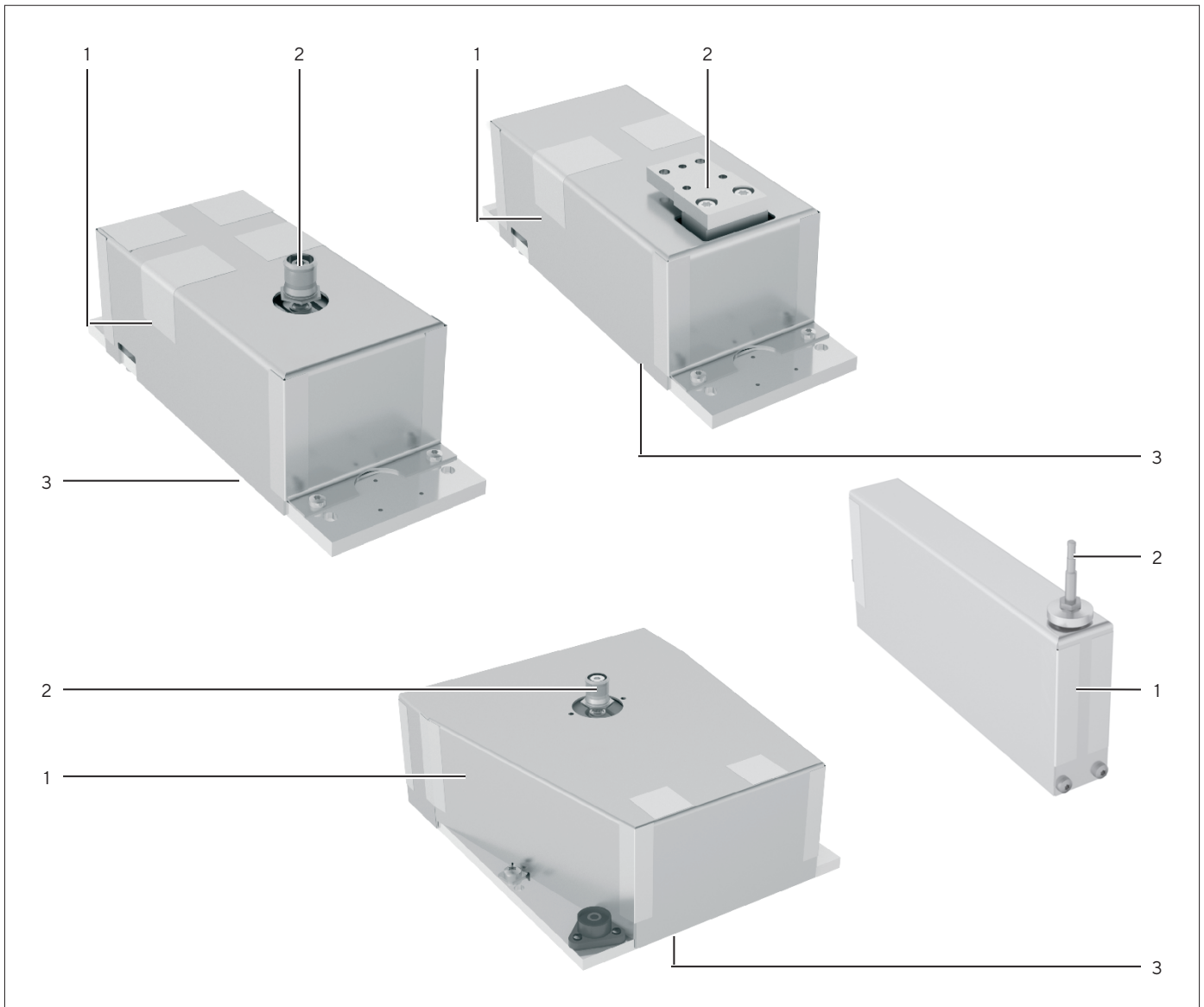


Fig.1: WZB254-L and WZB553-L (top left), WZB8202-L (top right), WZB54-L (bottom right), WZB254-LC (bottom left)

Pos.	Name	Description
1	Weigh cell	Weighing system in the aluminum housing
2	Load receptor	Holder for the customer-specific weighing pan
3	Hook for below-balance weighing	

3.2 Device Connections

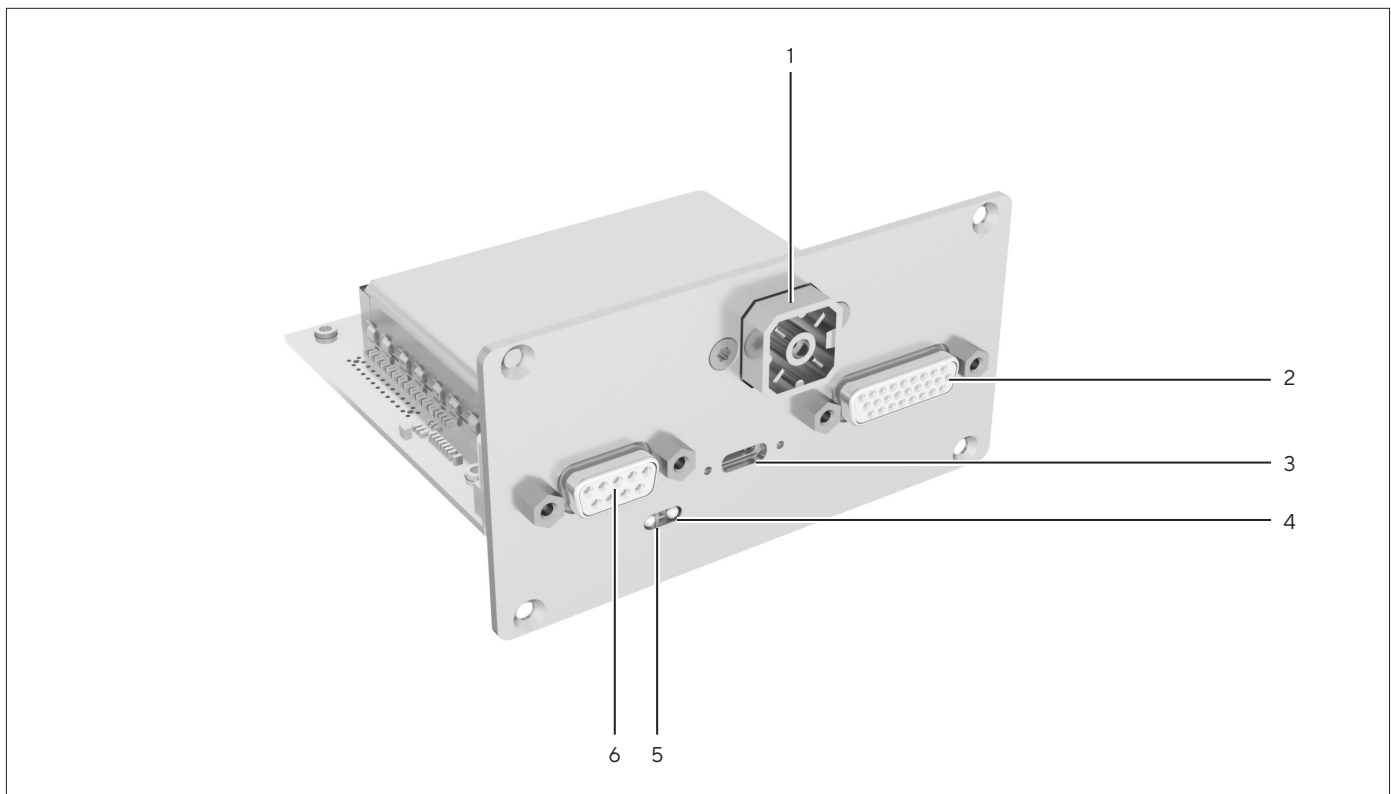


Fig.2: Electronics unit

Pos.	Name	Description
1	DC jack	
2	Female connector, weigh cell	
3	USB-C connection	Is screw-on.
4	Indicator light TxD and RxD	Flashes yellow during data transfer.
5	Power indicator light	<ul style="list-style-type: none"> – Illuminates in green when there is a power supply. – Illuminates in red if there is no weighing system.
6	RS232 connection	

3.3 System Description

The products are made up of two parts:

- Compact weigh cell, which must be secured at three points.
- Electronics unit

Weight can be determined in the tightest space using the compact weigh cells.

4 Operating Design

4.1 CAS Suite User Interface

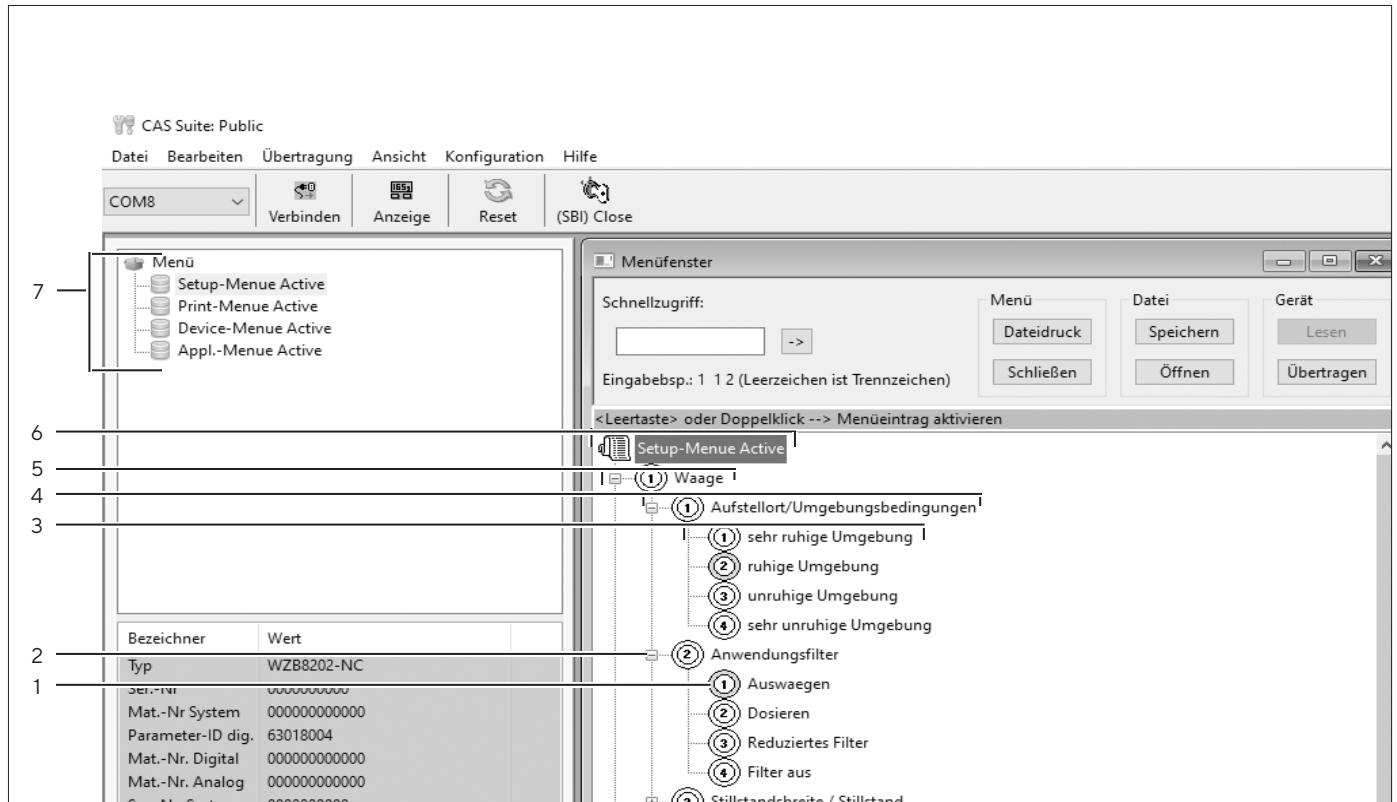


Fig.3: CAS Suite menu view

Pos.	Designation	Description
1	Code number	<ul style="list-style-type: none"> – There is a code number for each parameter. – If the number illuminates in green: This parameter is selected.
2	[+ -] button	To open (+) or close (-) a level.
3	Level 4	
4	Level 3	
5	Level 2	
6	Level 1	
7	Menu	

4.2 Menu Structure, Main Menu with CAS Suite

► Navigating in menus with the mouse button.

Level 1	Level 2	Description
Active setup menu	BALANCE	Set the functions of the device.
	General settings	Menu reset
Active print menu	Interface_1 (RS-232)	Define the parameters for the COM interface.
	Interface_2 (PC-USB)	Define the parameters for the USB interface.
	Additional functions	Define the functions of the operating display.
Active device menu	Communication parameter (SBI)	Configure the automatic data output.
	Print parameters	Perform the settings for the printout.
	PC direct parameter	Define the output format for the data exchange between the weigh cell and the PC
Active appl. menu	Weighing only	Determine the weight value of a sample. Activate the functions for all applications.
	Counting	Determine the number of parts that have approximately equal weight.
	Percent	Determine the percentage share of a sample based on a reference weight.
	Net total	Carry out the weighing of components for a mixture.
	Totalizing	Add weight values of independent weighing processes in a memory.
	Animal balance	Weigh unstable samples, e.g. animals. This program calculates the average of several measurement cycles.
	Calculation	Calculate the weight value using a multiplier or divisor, e.g. for determining the weight per unit area of paper.
	Density determination	Determine the density of solid samples based on the buoyancy method.

5 Installation

The weigh cells can be supplied in various designs. If options (special equipment) have been ordered, the desired options will be added to the cells in the plant.

NOTICE

Once the weigh cells have been removed from the packaging, they may lose accuracy and the safety of the device may be impaired if subjected to strong vibration.

- ▶ Do **not** expose the device to unnecessarily extreme temperatures, moisture, shocks, blows or vibration.
- ▶ It is a good idea to save the box and all parts of the packaging until you have successfully installed your equipment. Only the original packaging provides the best protection for shipment.
- ▶ Do **not** expose the equipment to gravitational acceleration in excess of 300 m/s² (unless additional equipment is installed on the load receptor).

5.1 Incoming Inspection

The customer shall inspect the product/service and packaging immediately upon delivery for proper functioning, completeness and absence of defects. This is to be performed in an incoming inspection within 10 days of delivery of the product or service. The incoming inspection must take place before installation into the equipment. Any obvious defects, errors, or incorrect delivery must be reported in writing. Defects detected at a later date must be reported in writing immediately upon detection.

Please consider subsequent commissioning carefully during the incoming inspection:

- We recommend performing a reproducibility test using an auxiliary draft shield to make sure there was no damage to the cells during transport. Sartorius PC configuration software can be used as a tool for this.

5.2 Scope of Delivery

Article	Quantity
Weigh cell	1
Electronics unit	1
Operating instructions (this document)	1
Power supply unit with country-specific power cord	1
If necessary, special accessories as listed on the bill of delivery or in accordance with any customer-specific agreement	

5.3 Unpacking

NOTICE

Additional equipment installed on the load receptor may impair the function.

The series approval and the specifications achieved for the entire system are the user's responsibility.

- ▶ Compare the specifications with the information from the "Technical Data" section.
- ▶ The weigh cell must be adjusted after transport.

The weigh cell is delivered in antistatic packaging along with its associated analog electronics.

The other electronic components are packaged separately on a base plate in an antistatic bag.

Procedure

- ▶ Unpack the device.
- ▶ Save all parts of the packaging in case they are needed for shipment. Only the original packaging will ensure safe transport.

5.3.1 Installation Instructions

During use, always ensure that the serial numbers of the weigh cell and electronics match!

The corresponding cable must be securely inserted into the electronics and screwed into place before initial startup.

The device is designed to deliver reliable weighing results when installed properly.

The device works precisely and quickly if the following points in particular are observed during system development and installation:

- Avoid exposure to extreme heat, e.g. from electronic components, heaters or sunlight.
- Protect the device from direct drafts.
- Avoid shocks and vibrations, e.g. from motors or valves, during weighing.
- Protect the device from aggressive chemical vapors.
- Do not expose to extreme moisture.
- Do not expose to magnetic influences.

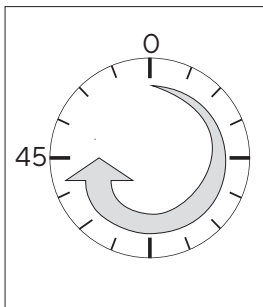
5.4 Acclimatization

When a cold device is brought into a warm environment: The temperature difference can lead to condensation from humidity in the device (moisture formation). Moisture in the device can lead to malfunctions.

Procedure

- ▶ Allow the device to acclimatize at the installation site (for the acclimatization duration see Chapter “14.7 Dimensions (Scale Drawings)”, page 50). The device must be disconnected from the power supply during that time.

5.5 Warm-up Time



After connection to the power supply, the warm-up time must be observed in order to comply with the information from the specifications. This will be influenced by the system used. A guide value for these weigh cells is around 45 minutes. However, this guide value must be verified by the user in the respective system/use situation.

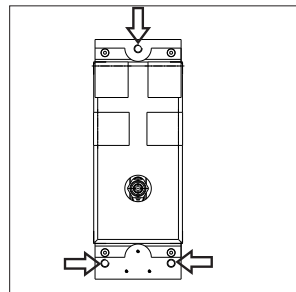
5.6 Securing the Weigh Cell

The weigh cell must be installed horizontally. The weigh cell must be secured to the system’s fastening frame.

Only for WZB8202-L model: If the weigh cell is exposed to eccentricity during operation, which may cause the weigh cell to tip: The weigh cell must be secured to a mounting plate. The mounting plate must be secured to the system’s fastening frame.

Procedure

- ▶ If the weigh cell is to be mounted on a mounting plate (only for WZB8202-L model):
 - ▶ Check that the dimensions of the mounting plate are correct for the weigh cell (for mounting plate dimensions see Chapter “Mounting Plate Dimensions for Model WZB8202-L”, page 41).
 - ▶ Insert three suitable screws into the weigh cell drill holes and secure the weigh cell to the mounting plate.
 - ▶ Secure the mounting plate to the system’s fastening frame.
- ▶ To connect the weigh cell to the system: Check that the dimensions of the system’s fastening frame are correct for the weigh cell (for weigh cell dimensions see Chapter “Dimensions (Scale Drawings)”, page 36).



- ▶ Insert three suitable (M6) screws into the weigh cell drill holes and connect the weigh cell to the system’s fastening frame.

5.7 Establishing the Weigh Cell – Electronics Unit Connection

NOTICE

Mixing up the weigh cell and electronics unit may result in property damage:

- ▶ Ensure that the serial numbers are the same.
- ▶ Only connect device parts that belong together.

Procedure

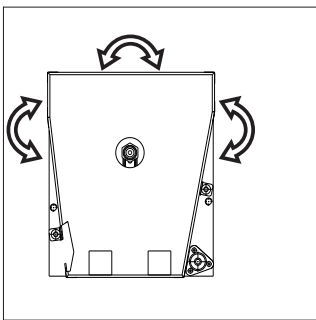
- ▶ Insert the plug of the connection cable into the socket of the electronics unit and weigh cell.

5.8 Leveling Weigh Cells (WZB254-LC)

Purpose

- To compensate for uneven areas at the place of installation.
- To ensure that the weigh cell is placed in a perfectly horizontal position for consistently reproducible weighing results.
- Always level the weigh cell again whenever it has been moved to a different location.

Procedure



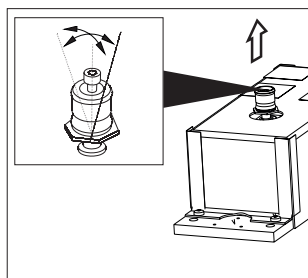
- ▶ Level the weigh cell using the foot screws. Turn the foot screws until the air bubble is centered in the level indicator.

5.9 Leveling the Load Receptor for User-specific Load Holder (WZB254-LC, WZB254-L, WZB553-L)

The models WZB254-L |LC and WZB553-L have the following features:

- Overload protection is available.
- Underweight protection is **not** available.

Procedure



- ▶ Remove the screw.

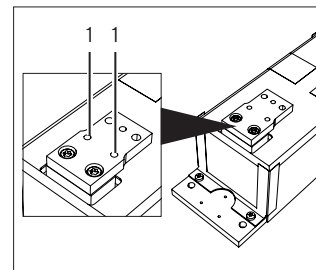
- ▶ Radially align and level the load receptor.
- ▶ Secure the load receptor again using the screw: Torque 1 Nm.

- ▶ Observe the maximum loads on the load receptor (see Chapter "5.12 Maximum Load on the Load Receptor", page 14).
- ▶ The load receptor can be completely dismantled when used with a user-specific load holder (see Chapter "14.7 Dimensions (Scale Drawings)", page 50).
- ▶ The user-specific load holder must be rigid.

5.10 Securing the User-specific Load Holder (WZB8202-L)

- The WZB8202 model has the following feature: There is **no** overload or underweight protection.

Procedure



- ▶ Screw the user-specific load holder onto the two threads (1) of the load receptor (for torques, see Chapter "5.12 Maximum Load on the Load Receptor", page 14).

- ▶ The user-specific load holder must be rigid and have a secure connection to the load receptor.

5.11 Connecting the Optional Display Unit

The YRD01 display unit can be connected while operation is ongoing (hot plug-in).

Procedure

- ▶ Insert the connection plug into the socket of the electronics unit.

5.12 Maximum Load on the Load Receptor

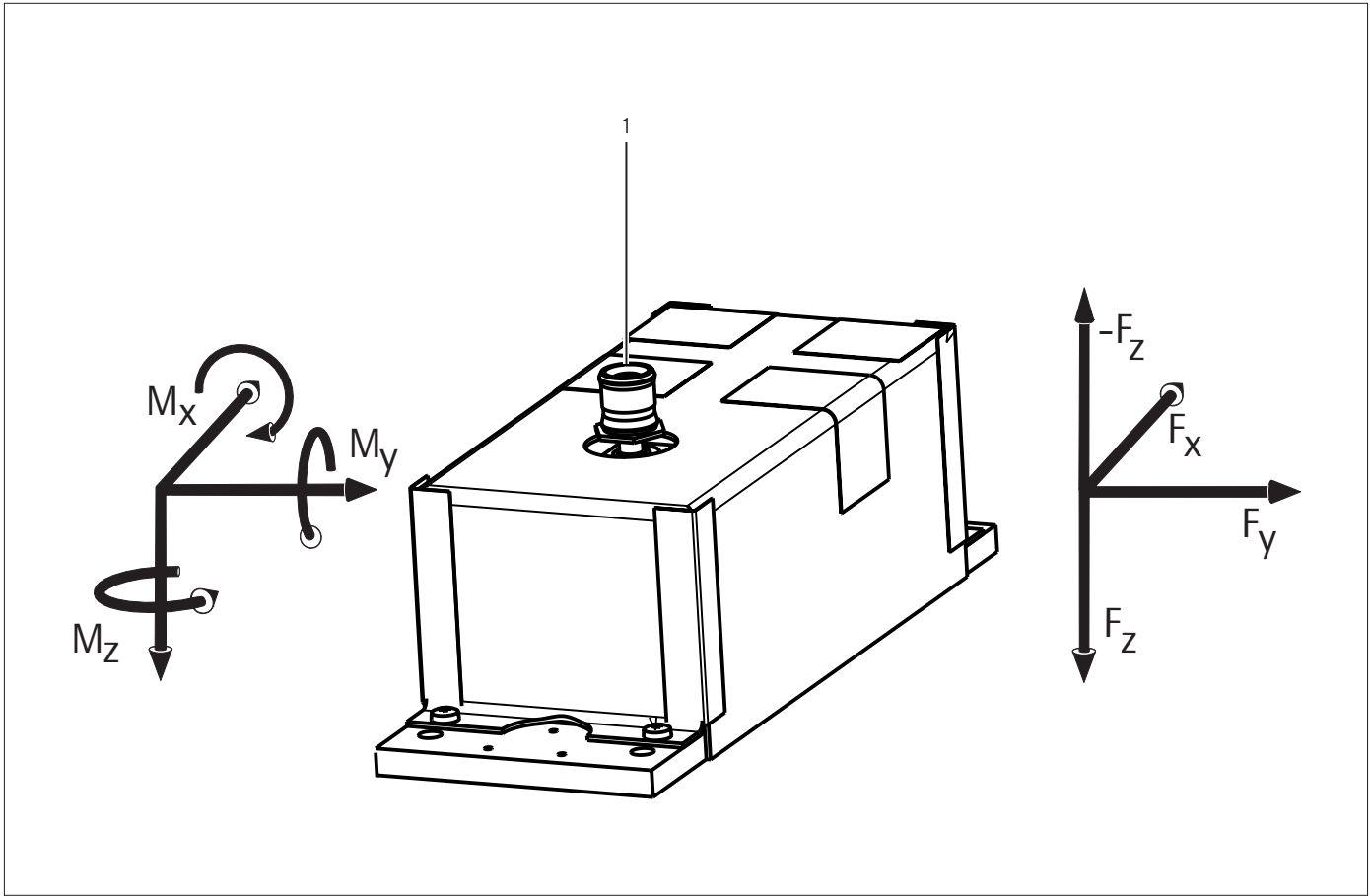


Fig.4: Maximum load on the load receptor

Pos.	Name	Description
1	Force holding point	

Model	Unit	WZB254-L	WZB254-LC	WZB54-L	WZB553-L	WZB8202-L
		Value	Value	Value	Value	Value
Maximum torques	Nm	0.8	0.8	0.1	0.8	8
Torque forces	Nm	1	1	0.5	1	3
+Fz	N	20	20	2	25	100
Maximum force opposite to direction of load (-Fz)	N	3	3	2	6	100
Maximum forces on force holding point (Fx, FY)	N	20	20	2	25	80

Either the maximum forces or torques may be present. If forces and torques occur at the same time, the sum of the percentage loads must not exceed 100%.
Higher loads may destroy the weigh cell.

Example

Weigh cell with load holder protruding to the front.

The torque M_y is the sum of the torque of the weight force M_{Load} , the torque of any possible overload that may be applied M_{Over} and the torque from the net weight M_{Cant} of the load holder.

The force F_z is made up of the weight force F_{Load} , the weight force of the cantilever F_{Cant} and the overload force F_{Over} .

How large can the maximum eccentric overload force F_{Over} be for a WZB254-L, with a load of $M_{Load} = 100$ g and a cantilever length L of 100 mm with a net weight of $M_{Cant} = 60$ g?

The percentage utilization of forces and torques that occur may not exceed a total of 100%.

$$1 = F_z / F_{zMAX} + M_y / M_{yMAX}$$

$$F_z = F_{Load} + F_{Cant} + F_{Over}$$

$$F_z = 1.57 \text{ N} + F_{Over}$$

$$M_y = M_{Load} + M_{Cant} + M_{Over}$$

$$M_y = 0.127 \text{ Nm} + F_{Over} \times 0.1 \text{ m}$$

$$1 = (1.57 \text{ N} + F_{Over} / 20 \text{ N} + (0.127 \text{ Nm} + F_{Over} \times 0.1 \text{ m} / 0.8 \text{ Nm}))$$

$$F_{Over} = 4.36 \text{ N}$$

However, the overload protection may be triggered even with smaller forces.

Load holders must generally be rigid and torsion-resistant. A test is recommended because there may be unwanted reactions on the control loop. The influences of drafts and the instructions for analytical weighing must be considered.

6 Getting Started

6.1 Installing the Power Supply Unit

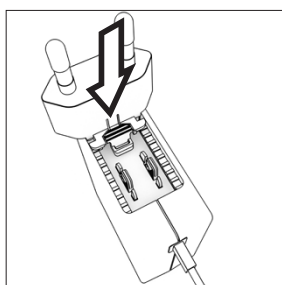
⚠ WARNING

Fatal electric shocks can be caused by using incorrect power plug adapters or improper use of the power plug adapters!

- ▶ Attach the country-specific power plug adapter to the power supply unit.
- ▶ Do **not** insert the power plug adapter into the socket without a power supply unit.

Item number on packaging	Power supply unit YEPS01-15VOH with connection cable and country-specific power plug adapters (packed in PE bag with printed country code, e.g. EU)
YEPS01-PS1	USA, Japan and Canada (US, JP+CAN), Europe and Russia (EU+RU), Great Britain (UK)
YEPS01-PS2	Argentina (AR), Brazil (BR), India (IN), South Africa (ZA)
YEPS01-PS3	China (CN), Australia (AU), Korea (KR)

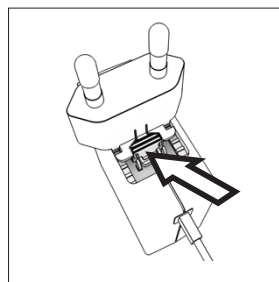
Procedure



- ▶ Select the country-specific power plug adapter. The power plug adapter must be suitable for use with the wall outlet at the installation site.
- ▶ Insert the power plug adapter into the power supply unit. The grooved button must be facing forwards.
- ▶ Push the power plug adapter as far as you can until it clicks into place.
- ▶ Check whether the power plug adapter is securely locked in place by pulling it gently.
- ▷ If the power plug adapter does **not** move: It is locked in place.

6.1.1 Dismantling the Power Plug Adapter

Procedure



- ▶ Press the grooved button from above and pull back on the power plug adapter.
- ▶ Push the power plug adapter out of the power supply unit and remove it.

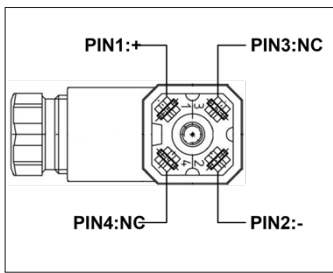
6.2 Connecting the Power Supply

Procedure

- ▶ ⚠ **WARNING** Serious injuries caused by using defective power supply cables! Check the power supply cable for damage, e.g., cracks in the insulation.
 - ▶ If required: Contact Sartorius Service.
- ▶ Check whether the country-specific power plug matches the power supplies at the installation site.
 - ▶ If required: Replace the country-specific power plug adapter.
 - ▶ If required: Contact Sartorius Service.
- ▶ **NOTICE** Damage to the device due to excessive input voltage! Check whether the voltage specifications on the manufacturer's ID label match those of the power supply at the installation site.
 - ▶ If the input voltage is too high: Do **not** connect the device to the power supply.
 - ▶ Contact Sartorius Service.
 - ▶ Only use original Sartorius AC adapters.
- ▶ Insert the right-angle plug of the power supply unit into the electronics unit and tighten the screw.
- ▶ Connect the mains plug to the wall outlet (supply voltage) at the installation site.
- ▷ After connecting the power supply: "Power" LED illuminates in green.
- ▷ The power supply is provided via the DC jack (Hirschmann plug).
- ▶ If the supply voltage specified or the plug design of the AC adapter do not match the local rating or standard, please contact your Sartorius office or dealer.

Optional Power Supply

If the power supply is established with anything other than the supplied power supply unit:



- ▶ **NOTICE** Risk of damage to the device due to the use of an unsuitable power supply unit. The power supply must be connected in accordance with the regulations applicable in your country.
- ▶ The device can be operated with a DC voltage of 12 V to max. 26 V.

7 System Settings

7.1 Performing System Settings

The weigh cell is supplied with default settings made in the factory. During the setup process, adjustments can be made based on the special requirements for use.

The following functions for the operating menu can be made using the Sartorius configuration software CAS Suite installed on a computer or with the optional YRD01 display unit:

- Read
- Modify
- Print
- Save

7.2 Synchronization

During data communication between weigh cell and computer, messages consisting of ASCII characters are transmitted via the interface. For error-free data exchange, parameters for baud rate, parity, handshake mode, and character format must be identical for both units.

Settings can be changed in the menu to customize the weigh cell.

7.3 Handshake

The weigh cell interface SBI (Sartorius Balance Interface) has transmit and receive buffers. Different handshake modes can be set in the weigh cell menu:

- Hardware handshake (CTS/DTR)
- Software handshake (XON, XOFF)
- No handshake

7.3.1 Hardware Handshake

When hardware handshake is configured on a 4-wire interface, one more character can be transmitted after CTS.

7.3.2 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.

7.4 Data Output After Print Command

The print command can be triggered by pressing a key (YRD01) or via a software command (Esc P).

7.5 Data Output Rates – Values per Second

Ambient Conditions	XBPI	SBI
(Filter Adjustment)	"Autoprint"	
Very stable (1.1.1.1)	20	20
Stable (1.1.1.2)	10	10
Unstable (1.1.1.3)	5	5
Very unstable (1.1.1.4)	2.5	2.5

7.6 Automatic Data Output

In “Automatic Printout” mode, data is output to the data interface without an extra print command.

- ▶ You can have synchronized data output automatically at defined display update intervals, with or without weigh cell stability. The time for an interval depends on the setting under “Ambient conditions” (code 1. 1. 1. x) and “Auto output cycle” (code 3. 1. 3. x). If the automatic data output is activated in the menu, it starts immediately after the balance is turned on. In the setup, you can also specify whether the automatic data output can be stopped and started with a “Print command” (key or via interface).

7.7 Adjustment

Procedure

- ▶ Perform adjustment functions:
 - Via control commands with Sartorius configuration software CAS Suite installed on a computer (see Chapter “8.6 “Calibration, Adjustment” Function via Interface RS232 (Examples)”, page 35)
 - With the optional YRD01 display unit

7.8 Below-balance Weighing

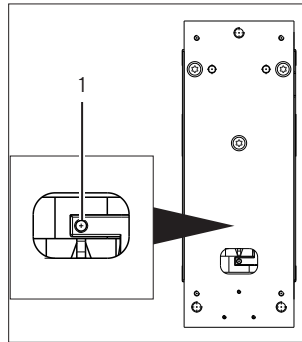
There is a below-balance weighing unit for weighing processes below the weigh cell (**not** for model WZB54-L).

7.8.1 Model WZB254-L, WZB254-LC, WZB553-L

The models WZB254-L |LC and WZB553-L have the following features:

- Overload protection is available.
- Underweight protection is **not** available.

Procedure

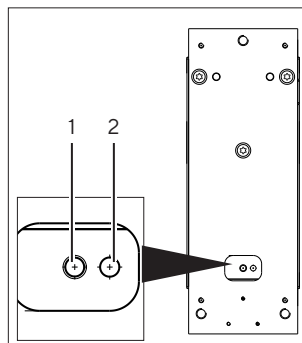


- ▶ Remove the aluminum adhesive.
- ▶ **NOTICE!** The screw-in torque may be a maximum of 0.8 Nm.
- ▶ **NOTICE!** The screw-in depth may not exceed 5 mm.
- ▶ Carefully screw in the customer-supplied load holder (1): The thread size is M3.

7.8.2 Model WZB8202-L

The WZB8202-L model has the following features: There is **no** overload or underweight protection.

Procedure



- ▶ Remove the aluminum adhesive.
- ▶ Carefully screw in the customer-supplied load holder on the M4 thread (1).
- ▶ If necessary, insert an anti-twist mechanism into the adjacent hole (2): Diameter 3.3 mm and depth 11 mm.
- ▶ Install a draft shield if necessary.

7.9 Parameter List

7.9.1 "Active Setup Menu" Menu

Level 1	Level 2	Level 3	Level 4	Codes
Active setup menu	Balance	Installation site/ ambient conditions	Very stable conditions	1.1.1.1
			<input type="radio"/> Stable conditions	1.1.1.2
			Unstable conditions	1.1.1.3
			Very unstable conditions	1.1.1.4
		Application filter	<input type="radio"/> Final readout	1.1.2.1
			Dosing	1.1.2.2
			Reduced filter	1.1.2.3
			Filter off	1.1.2.4
		Stability range/ stability	1/4 scale interval/maximum accuracy	1.1.3.1
			1/2 scale interval/very accurate	1.1.3.2
			1 scale interval/accurate	1.1.3.3
			<input type="radio"/> 2 scale interval/quick	1.1.3.4
			4 scale interval/very quick	1.1.3.5
			8 scale interval/very low	1.1.3.6
		Stability delay	Very short	1.1.4.1
			<input type="radio"/> Short	1.1.4.2
			Moderate	1.1.4.3
			Long	1.1.4.4
		Taring	Without stability	1.1.5.1
			<input type="radio"/> After stability	1.1.5.2
		Autozero	<input type="radio"/> ON	1.1.6.1
			OFF	1.1.6.2

= Factory setting

Level 1	Level 2	Level 3	Level 4	Codes		
Active setup menu	Balance	Weight unit	Available unit	1.1.7.1		
			<input type="radio"/> g, grams	1.1.7.2		
			Units: Kilogram to Newton	1.1.7.3		
					up to	1.1.7.23
			Accuracy	<input type="radio"/> All digits on	1.1.8.1	
				Last digit on/off during load change	1.1.8.2	
				Scale interval index +1	1.1.8.3	
				Scale interval index +2	1.1.8.4	
				Scale interval index +3	1.1.8.5	
				Last digit scale interval 1	1.1.8.6	
				Last digit off	1.1.8.7	
				10x resolution	1.1.8.14	
			Cal./adjust. function	<input type="radio"/> Ext. adjustment with default weight	1.1.9.1.	
				Ext. adjustment with user-defined weight	1.1.9.3.	
				Internal adjustment	1.1.9.4.	
				Ext. linearization with default weights	1.1.9.6.	
				Ext. linearization with user-defined weights	1.1.9.7.	
				Setting the Preload	1.1.9.8.	
				Deleting the Preload	1.1.9.9.	
				Cal. key/command blocked	1.1.9.10.	
				Selection list	2.1.9.12	
				Define internal weight (is blocked)	3.1.9.18	
			Adjustment process	<input type="radio"/> Adjust immediately	1.1.10.1.	
	Calibration before adjustment	1.1.10.2.				
	Zero range	<input type="radio"/> 2% of max load	1.1.11.2.			
		10% of max load	1.1.11.4.			
	Zero at power on	<input type="radio"/> 10% of max load	1.1.12.4.			
		100% of max load	1.1.12.7.			

* Only for LC models

○ = Factory setting

Level 1	Level 2	Level 3	Level 4	Codes
Active setup menu	Balance	Tare/zero at power on	<input type="radio"/> On	1.1.13.1.
			<input type="checkbox"/> Off	1.1.13.2.
		Output rate	<input type="radio"/> Normal	1.1.14.1.
			<input type="checkbox"/> Fast	1.1.14.2.
			<input type="checkbox"/> Slow, typ. 10 Hz	1.1.14.3.
			<input type="checkbox"/> Moderate, typ. 20 Hz	1.1.14.4.
			<input type="checkbox"/> Quick, typ. 25 Hz	1.1.14.5.
			<input type="checkbox"/> Very quick, typ. 50 Hz	1.1.14.6.
		<input type="checkbox"/> Maximum, typ. 100 Hz	1.1.14.7.	
	Auto. calibration/ISO-CAL	<input type="radio"/> Off	1.1.15.1.	
<input type="checkbox"/> Note		1.1.15.2.		
General settings	Menu reset	<input type="checkbox"/> Yes, load factory setting	1.9.1.1	
		<input type="radio"/> No, stand-by	1.9.1.2	

○ = Factory setting

7.9.4 "Active Print Menu" Menu

Level 1	Level 2	Level 3	Level 4	Codes
Active print menu	Communication parameters	Data Output	<input type="radio"/> Individual value without stability	3.1.1.1
			<input type="checkbox"/> Individual value after stability	3.1.1.2
			<input type="checkbox"/> Automatic, without stability	3.1.1.4
			<input type="checkbox"/> Automatic, after stability	3.1.1.5
		Cancel auto. output	<input type="radio"/> Cancel not possible	3.1.2.1
			<input type="checkbox"/> Cancel via print command	3.1.2.2
		Cycle automatic output	<input type="radio"/> Every value	3.1.3.1
			<input type="checkbox"/> Every 2nd value	3.1.3.2
		Output format	<input type="radio"/> 16 characters raw data	3.1.4.1
			<input type="checkbox"/> 22 characters with identification	3.1.4.2
	Print parameters	Printout	<input type="checkbox"/> Manual, without stability	3.2.1.1
			<input type="radio"/> Manual, after stability	3.2.1.2
			<input type="checkbox"/> Automatic, after load change	3.2.1.6
		Printout format	<input type="radio"/> Application, with identification	3.2.2.2
		Printout appl. parameters	<input type="checkbox"/> Off	3.2.3.1
			<input type="radio"/> All parameters	3.2.3.2
			<input type="checkbox"/> Only main parameters	3.2.3.3
		Printout GLP protocol	<input type="radio"/> Off	3.2.4.1
			<input type="checkbox"/> Only after cal./adjustment	3.2.4.2
			<input type="checkbox"/> Always on, with every manual print	3.2.4.3
PC direct parameter	Decimal separator	<input type="radio"/> Point	3.3.1.1	
		<input type="checkbox"/> Comma	3.3.1.2	
	Output Format	<input type="radio"/> Text and numerical value	3.3.2.1	
		<input type="checkbox"/> Numerical value only	3.3.2.2	

= Factory setting

7.9.2 “Active Device Menu” Menu

Level 1	Level 2	Level 3	Level 4	Codes
Active device menu	Interface_1 (RS232)	Data protocol	<input type="radio"/> SBI	2.1.1.1
			<input type="checkbox"/> XBPI	2.1.1.2
			<input type="checkbox"/> SBI 2nd display	2.1.1.4
			<input type="checkbox"/> Universal printer (YDP20)	2.1.1.7
			<input type="checkbox"/> Lab printer (YDP30)	2.1.1.8
		Baud rate	<input type="checkbox"/> 600 baud	2.1.2.3
			<input type="checkbox"/> 1200 baud	2.1.2.4
			<input type="checkbox"/> 2400 baud	2.1.2.5
			<input type="checkbox"/> 4800 baud	2.1.2.6
			<input checked="" type="radio"/> 9600 baud	2.1.2.7
			<input type="checkbox"/> 19200 baud	2.1.2.8
			<input type="checkbox"/> 38400 baud	2.1.2.9
			<input type="checkbox"/> 576000 baud	2.1.2.10
			<input type="checkbox"/> 115200 baud	2.1.2.11
			Parity	<input type="radio"/> Odd
		<input type="checkbox"/> Even		2.1.3.4
		<input type="checkbox"/> No parity		2.1.3.5
		Number of stop bits	<input checked="" type="radio"/> 1 stop bit	2.1.4.1
			<input type="checkbox"/> 2 stop bits	2.1.4.2
		Handshake	<input type="checkbox"/> Software handshake	2.1.5.1
			<input checked="" type="radio"/> Hardware handshake	2.1.5.2
<input type="checkbox"/> No handshake	2.1.5.3			
Number of data bits	<input checked="" type="radio"/> 7 data bits	2.1.6.1		
	<input type="checkbox"/> 8 data bits	2.1.6.2		

○ = Factory setting

Level 1	Level 2	Level 3	Level 4	Codes	
Active device menu	Interface_2 (PC-USB)	Data protocol	<input type="radio"/> SBI	2.2.1.1	
			<input type="checkbox"/> XBPI	2.2.1.2	
			<input type="checkbox"/> SBI 2nd display	2.2.1.4	
			<input type="checkbox"/> PC spreadsheet format	2.2.1.6	
			<input type="checkbox"/> Universal printer (YDP20)	2.2.1.7	
			<input type="checkbox"/> Lab printer (YDP30)	2.2.1.8	
			<input type="checkbox"/> PC text format	2.2.1.9	
			<input type="checkbox"/> Off	2.2.1.10	
			Baud rate	<input type="checkbox"/> 600 baud	2.2.2.3
				<input type="checkbox"/> 1200 baud	2.2.2.4
		<input type="checkbox"/> 2400 baud		2.2.2.5	
		<input type="checkbox"/> 4800 baud		2.2.2.6	
		<input checked="" type="radio"/> 9600 baud		2.2.2.7	
		<input type="checkbox"/> 19200 baud		2.2.2.8	
		<input type="checkbox"/> 38400 baud		2.2.2.9	
		<input type="checkbox"/> 576000 baud		2.2.2.10	
		<input type="checkbox"/> 115200 baud		2.2.2.11	
		Parity		<input checked="" type="radio"/> Odd	2.2.3.3
			<input type="checkbox"/> Even	2.2.3.4	
			<input type="checkbox"/> No parity	2.2.3.5	
		Number of stop bits	<input checked="" type="radio"/> 1 stop bit	2.2.4.1	
			<input type="checkbox"/> 2 stop bits	2.2.4.2	
		Handshake	<input type="checkbox"/> Hardware handshake	2.2.5.2	
			<input checked="" type="radio"/> No handshake	2.2.5.3	
		Number of data bits	<input type="checkbox"/> 7 data bits	2.2.6.1	
			<input checked="" type="radio"/> 8 data bits	2.2.6.2	

○ = Factory setting

Level 1	Level 2	Level 3	Level 4	Codes
Active device menu	Interface_2 (PC-USB)	Detected*	<input type="radio"/> None, printer, virt com., PC host, input device	2.2.7.1.
			Additional function	Menu
	<input type="checkbox"/> Menu read only	2.9.1.2		
	Keypad	<input type="radio"/> Keys available	2.9.3.1	
		<input type="checkbox"/> Keys blocked	2.9.3.2	
	Start-up behavior	<input type="checkbox"/> On/standby (without time)	2.9.6.3	
		<input type="radio"/> Automatic on	2.9.6.4	
	Display backlight	<input type="checkbox"/> Off	2.9.8.1	
		<input type="radio"/> On	2.9.8.2	

* Indicates which device connection is detected at the USB port. Only with YRD01. O = Factory setting

O = Factory setting

7.9.3 "Active Appl. Menu" Menu

Level 1	Level 2	Level 3	Level 4	Codes	
Active appl. menu	Weighing only	Unit Toggle	Off	4.1.1.1	
			<input type="radio"/> On	4.1.1.2	
	Counting	Resolution	<input type="radio"/> Display accuracy	4.3.1.1	
			10x	4.3.1.2	
		Reference updating	<input type="radio"/> Off	4.3.2.1	
			Automatic	4.3.2.2	
		Percent	Decimal places	Without decimal place	4.4.1.1
				<input type="radio"/> 1 decimal place	4.4.1.2
	2 decimal places			4.4.1.3	
	3 decimal places			4.4.1.4	
	Net total	Print-out component	Off	4.5.1.1	
			<input type="radio"/> On	4.5.1.2	
	Totalizing	Print-out component	Off	4.6.1.1	
			<input type="radio"/> On	4.6.1.2	
	Animal balance	Animal activity	Low	4.7.1.1	
			<input type="radio"/> Moderate	4.7.1.2	
			High	4.7.1.3	
		Start	Manual	4.7.2.1	
			<input type="radio"/> Automatic	4.7.2.2	

= Factory setting

Level 1	Level 2	Level 3	Level 4	Codes
Active appl. menu	Calculation	Method	<input type="radio"/> Multiplication	4.8.1.1
			<input type="checkbox"/> Division	4.8.1.2
		Decimal places	<input type="checkbox"/> Without decimal place	4.8.1.1
			<input type="radio"/> 1 decimal place	4.8.1.2
			<input type="checkbox"/> 2 decimal places	4.8.1.3
			<input type="checkbox"/> 3 decimal places	4.8.1.4
	Density deter- mination	Decimal places	<input type="checkbox"/> Without decimal place	4.9.1.1
			<input type="radio"/> 1 decimal place	4.9.1.2

○ = Factory setting

8 Operation

8.1 Notes on “Analytical Weighing” with Weigh Cells

8.1.1 Handling of Samples and Vessels

The sample should be acclimatized to the temperature of the weigh cell.

This is the only way to avoid measurement errors caused by air buoyancy and fluctuations resulting from convection currents across the surface of the sample.

These negative effects increase as the volume and/or surface area of the sample increases. For this reason, the size of the tare container should be appropriate for the sample.

Samples and vessels for weighing should **not** be touched by the operator’s hands. Since the hygroscopic effect of fingerprints and the effect of the hand’s temperature can influence the measurement results.

The sample must be applied carefully, e.g. manually using tweezers or automatically via a robot or a filling system.

When designing a draft shield device, steps must be taken to keep the increase in temperature within the weighing chamber to a minimum (e.g., using a bypass).

8.1.2 Weighing Electrostatically Charged Samples and Vessels

Significant measurement errors may occur when weighing electrostatically charged objects. This problem particularly involves samples that have extremely poor conductivity (glass, plastic, filters) since they can only discharge electrostatic – i.e., friction-induced – charges through the weighing pan over a relatively long period of time.

The result is a force acting between the charge on the sample and the permanently installed parts of the weigh cell. This causes the displayed weight value to fluctuate constantly.

Ionization can be applied to make the air around the sample conductive. This enables the charge to be compensated through the air, or discharged through the ground (grounded).

Aside from purely mechanical solutions (e.g., using a special weighing pan to shield the sample), bombarding the sample with ions of opposing polarity to neutralize the surface charge is one of the most effective methods for eliminating static electricity. We also supply corresponding components for installation in systems.

The area around the weigh cell (e.g. plastic parts) can also contain charges that negatively affect the accuracy of weighing results. Take appropriate steps (grounding) when designing draft shield devices.

The weigh cell base plate and the electronics base plate should be grounded via the screw connections.

8.1.3 Weighing Magnetic or Magnetizable Samples

It is technically **impossible** to avoid using magnetizable materials for the production of weigh cells. This is primarily because the operating principle of high-resolution weigh cells is based on compensation of the load through magnetic forces.

When weighing magnetic or magnetizable samples or vessels, interaction between the sample or vessel and the above-mentioned parts inside the weigh cell may have a distorting effect on the weighing results.

To keep such effects to a minimum, we recommend increasing the distance between the sample/container and the weighing system using a non-magnetic material. The force is reduced quadratically with the increase in distance.

Magnetizable/magnetized samples and the weigh cell interact with magnetic fields and with magnetizable or magnetized parts in the environment. The system can be shielded from external magnetic fields to some extent using (soft magnetic) plates.

8.1.4 Influence of Drafts

Depending on the size of the load holder and the sample, there may be an influence from drafts. Use an appropriate draft shield to reduce the influence.

Protect the weigh cell from drafts.

8.2 Operation with a Computer

The weigh cells are equipped with two data interfaces (RS232 and USB-C), to which a computer or another peripheral device can be connected.

You can use a computer to change, start, and monitor weigh cell functions.

Features

► See Chapter "14.4 Interfaces", page 48.

Parameter Factory Settings

Transmission rate:	9600 baud (RS232 = 2. 1. 2. 7 USB-C = 2. 2. 2. 7)
Parity	Odd (RS232 = 2. 1. 3. 3 USB-C = 2. 2. 3. 3)
Stop bits	1 stop bit (RS232 = 2. 1. 4. 1)
Handshake	Hardware handshake (RS232 = 2. 1. 5. 2) no handshake (USB-C = 2.2.5.3)
Communication mode	Individual value without stability (3. 1. 1. 1)

Preparation

► See Chapter "14.4 Interfaces", page 48 and Chapter "14.5 Cabling Diagram", page 49.

8.3 Output Format with 16 Characters (Compatibility with Current Weigh Cells)

Characters that are not visible in the display are output as spaces.

Possible characters depending on the output position

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+			A	A	A	A	A	A	A	*	E	E	E	CR	LF
or	-				*	*	*		
or	*		*	*	*	*	*	*	*	*						

* Space

CR: Carriage return

A: Displayed characters

LF: Line feed

E: Unit symbol

.: Decimal point

Special Outputs

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF
or	-					H	i	g	h							
or						L	o	w								
or				C	a	l	.	E	x	t	.					

* Space

High: Overload

Cal.Ext.: Adjustment, external

Low: Underweight

Error Message

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				E	r	r	*	#	#	#	*	*	*	*	CR	LF
			A	P	P	.	E	R	R**	*	*	*	*	*	CR	LF
			D	I	S	.	E	R	R**	*	*	*	*	*	CR	LF
			P	R	T	.	E	R	R**	*	*	*	*	*	CR	LF

* Space ###: Error code number

** For cause and solution, please refer to the “Error Codes” section

Example: Output of the weight value + 123.56 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	3	.	5	6	*	g	*	*	CR	LF
	+	*	*	1	2	3	.	5	[6]**	g	*	*	CR	LF

Position 1: “+” sign or space

Position 2: Space

Position 3 - 10: Weight value with decimal point; leading zeros are output as spaces

Position 11: Space

Position 12 - 14: Characters for unit of measure or space

Position 15: Carriage return

Position 16: Line feed

** For cause and solution, please refer to the “Error Codes” section

8.4 Output Format with 22 Characters (Compatibility with Current Weigh Cells)

In this case, a 6-character code precedes the 16-character output format. These six characters identify the subsequent value.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
K	K	K	K	K	K	+	*	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
*	*	*	*	*	*	-	*	*	*		
					*		*	*	*	*	*	*	*	*	*						

K: ID code character

E: Unit symbol

* Space

CR: Carriage return

A: Displayed characters

LF: Line feed

Example

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
N						+				1	2	3	.	5	6	*	g	*	*	CR	LF

Special Operation

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
											H	i	g	h							
											L	o	w								
									C	a	l	.	E	x	t	.					
* Space											High: Overload										
Cal.Ext.: Adjustment, external											Low: Underweight										

Error Message

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	*	#	#	#	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	A	P	P	.	E	R	R**	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	D	I	S	.	E	R	R**	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	P	R	T	.	E	R	R**	*	*	*	*	CR	LF
* Space											### Error code number										
** For cause and solution, please refer to the "Error Codes" section																					

8.4.1 Compatibility with Older WZ/WZA Weigh Cells

After the command "ESC s9_" is sent, the data input and output behaves as for older Sartorius WZ/WZA weigh cells (previous models).

Data Output Format

During output, in "SBI" operating mode 16 characters are output.

Example: + 253 pcs

Data Output Format with 16 Characters

Display segments that are dark are output as spaces. Display values without a decimal point are output without a decimal point.

The type of character that can be output depends on the character's position:

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	A	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
or	-		*	*	*		
or	*	*	*	*	*	*	*	*	*	*						

* Space

A: Digits of measurement value

E: Unit symbols

CR: Carriage return

LF: Line feed

Special Outputs

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	-	-	*	*	*	*	*	*	CR	LF
or							H	H								
or							L	L								
or							C									

* Space

--: Final readout

H: Overload

H H: Overload in checkweighing
(Function is only available during operation with the following peripheral devices:
optional display unit or YADO1IS software)

L: Underweight

L L: Underweight in checkweighing

C: Adjustment

Error Message

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CR	LF

* Space

Error number

Example: Output of the weight value + 255.7 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*		2	5	5	.	7	*	g	*	*	CR	LF
Position 1:	“+” sign, “-” sign, or space															
Position 2:	Space															
Position 3 - 10:	Weight value with decimal point; leading zeros are output as spaces															
Position 11:	Space															
Position 12 - 14:	Characters for unit of measure or space															
Position 15:	Carriage return															
Position 16:	Line feed															

Data Input Format

A computer connected via the data interface can send commands to the device to control device functions. These commands are control commands and may have various formats. Control commands have up to 26 characters. Each of these characters must be sent based on the setup configuration for data transmission.

Formats for Control Commands

Format 1	Esc	!	CR	LF		
Format 2	Esc	!	#	_	CR	LF
Esc:	Escape					
!:	Command character					
_:	Underscore (ASCII:95)					
CR:	Carriage return					
LF:	Line feed					
max:	Depends on command character, i.e. parameters: entry is truncated after the max. length and not rejected as when entered via the keyboard					

8.5 Commands (Data Input Format with Compatibility with Current Weigh Cells)

The computer connected via the data interface can send commands to the weigh cell to trigger functions. These commands are control commands and may have various formats. Control commands consist of up to 13 characters. Each of these characters must be sent based on the menu settings for data transmission.

Formats for Control Commands

Format 1	Esc	!	CR	LF		
Format 2	Esc	!	#	_	CR	LF
Esc:	Escape (optional)		CR: Carriage return			
!:	Command character		LF: Line feed			
_:	Underline					

Command character	Format 1
!	Meaning
?	Applying the internal adjustment weight ¹⁾
@	Lifting off the internal adjustment weight ¹⁾
K	Ambient conditions: Very stable
L	Ambient conditions: Stable
M	Ambient conditions: Unstable
N	Ambient conditions: Very unstable
O	Lock keypad
P	Print, trigger and block autoprint
R	Unlock keypad
S	Restart self-test
T	Zero tare command
U	Key TARE
V	Key ZERO
W	Adjustment (depending on menu presetting)
Z	Carry out internal adjustment ¹⁾

¹⁾ = Only for balances with internal motor weight unit

Command character	Format 2
!#	Meaning
f1_	Function key CAL
f2_	Function key ENTER
f3_	Key ZERO
f4_	Key TARE
s3_	Key CANCEL FUNCTION
x0_	Internal calibration ¹⁾
x1_	Print model type
x2_	Output serial no.
x3_	Output BAC software version (old notation)
x20_	Output BAC software version (new notation)

¹⁾ = Only for balances with internal motor weight unit

8.6 “Calibration, Adjustment” Function via Interface RS232 (Examples)

Purpose

Adjustment is the correction of the difference between the measured value displayed and the true weight (mass), or its reduction to an allowable level within maximum permissible error limits.

Characteristic

The adjustment process should only be started when

- the weigh cell is unloaded,
- the weigh cell is tared, and
- the weighing signal is stable.

The sensitivity of the weigh cell can be corrected a max. of 2%.

If these requirements are not met, the “Err 02” error message appears (see Chapter “10 Malfunctions”, page 44).

8.6.1 Internal Calibration/Adjustment

Requirements

- The application SETUP - Bal.Scal - CAL./ADJ. - Cal. Int. is set up.
- The weigh cell housing has a built-in motorized calibration/adjustment weight.

Procedure

- ▶ Select calibration: ESC Z command
- ▷ The internal calibration weight is automatically loaded
- ▷ The balance is calibrated
- ▷ When the setup is configured to “Calibration and adjustment in one,” the balance will be adjusted automatically
- ▷ The internal weight is removed from the weigh cell.

Performing Calibration and Adjustment Routines

The following settings can be configured:

- Calibration and adjustment are always one process (factory setting)
 - After calibration, the user has the option to quit the process without correction or to make an adjustment.
- If no deviations are found during calibration, the calibration/adjustment process can be exited after the calibration is completed.

Two keys are now active:

- Starting the adjustment: ESC f1_command
- Exiting the process: ESC s3_command

Procedure

- ▶ To tare the weigh cell: Select [ESC T] interface.
- ▷ The display shows 0.0000 g.
- ▶ To start the adjustment process: Select [ESC Z] interface.
- ▷ The display shows Cal.INT.
- ▷ The internal weight is applied automatically.
- ▷ The display shows CAL.RUN.
- ▷ Adjustment is executed.
- ▷ The display shows CAL.END.
- ▷ The internal weight is removed from the weigh cell
- ▷ The display shows 0.0000 g.

8.6.2 External Adjustment

Requirements

- The application SETUP - Bal.Scal - CAL./ADJ. - Cal. EXT. is set up.
- A weight value is preset at the factory (see Chapter “14 Technical Data”, page 47).

Procedure

- ▶ To tare the weigh cell: Select [ESC T] interface.
- ▷ The display shows 0.0000 g.
- ▶ To start the adjustment process: Select [ESC W] interface.
- ▷ The display shows Cal.EXT.
- ▷ Once you store the zero point, there is a flashing display prompt for the adjustment weight to be applied: - 50.0000 g.
- ▶ Apply the displayed adjustment weight (in this example: 50 g).
- ▷ If the “-” sign is displayed: The weight is too small.
- ▷ If the “+” sign is displayed: The weight is too big.
- ▷ If the adjustment weight is within the specified limits: The flashing stops.
- ▷ If the adjustment has been carried out:
 - ▷ The display shows Cal.END.
 - ▷ The adjustment weight appears: +50.0000 g.
- ▶ Remove the adjustment weight.
- ▷ The display shows 0.0000 g.

8.7 Basic Weighing Function

Features

- Tare weigh cell
- Output weight value

8.7.1 Activating the Weigh Cell

Procedure

- ▶ To activate the weigh cell:
 - Connect the weigh cells to the power supply.
 - Switch on via the optional YRD01 display unit.

8.7.2 Deactivating the Weigh Cell

Procedure

To deactivate the weigh cell:

- Disconnect the weigh cells from the power supply.
- If the “On/Standby” (2.9.6.3) switch-on procedure is selected in the device menu: Switch off via the optional YRD01 display unit.

8.8 Running Application (Example)

8.8.1 Determining the Weight Value

Procedure

- ▶ Switch on the weigh cell.
- ▷ The self-test is performed.
- ▷ The weigh cell carries out initial taring.
- ▶ Apply the sample vessel.
- ▷ The display shows a value.
- ▶ Tare the weigh cell.
- ▷ The display shows 0.0 g.
- ▶ Place the sample in the vessel.
- ▷ The display shows the value.
- ▶ Output weight value.

9 Optional YRD01 Display Unit

9.1 Operating Design

9.2 Operating Display in Weighing Mode

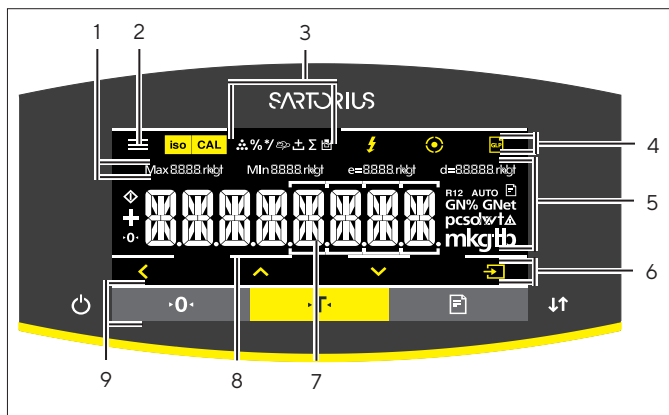


Fig. 5: Operating display in weighing mode (example)

Pos.	Designation	Description
1	Metrological data	
2	Menu	
3	Application overview	Displays the selected application program during operation.
4	Toolbar	
5	Weighing unit	Displays the selected unit, e.g., grams, [g].
6	Navigation bar	For navigation in the menu and system settings
7	Measurement display	
8	Visual touch feedback	
9	Toolbar	

9.3 Menu and System Settings Display

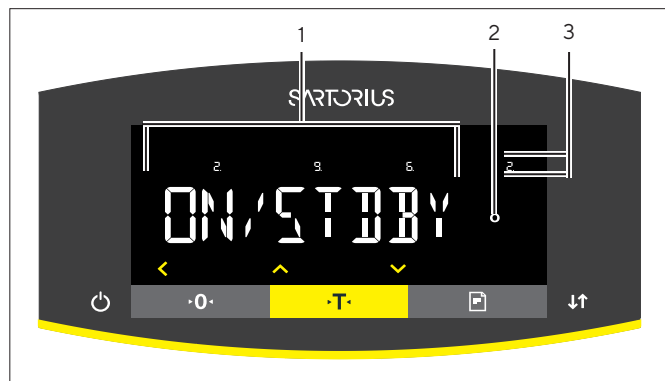
















Fig. 6: Menu and system settings display (example)

Pos.	Designation	Description
1	Menu or parameter entry	
2	[Selection] display	
3	Menu level	Shows the position of the displayed menu or parameter in up to 4 levels.

9.3.1 Buttons

Symbol	Designation	Description
	[On/Off] button	<ul style="list-style-type: none"> – When the button is pressed: Switches the operating display on. – If the button is held down: Switches the operating display off.
	[Menu] button	<ul style="list-style-type: none"> – When the button is pressed: The settings menu opens. – If the button is held down: It switches to version display.
	[Zero] button	Zeroes the device.
	[Tare] button	Starts taring.
	[Print] button	Exports the readouts to the integrated data interfaces.
	[Change] key	<ul style="list-style-type: none"> – If the key is briefly pressed: Sets the preload. – If the key is held down: Deletes the preload.
	[isoCAL] button	<p>If the button is flashing: Starts the isoCAL function.</p> <p>If the button is not flashing: Starts the set calibration and adjustment function.</p>
	[Adjust] button	Starts the set calibration and adjustment function.
	[GLP] button	Exits the GLP printout and starts printing the GLP footer.
	[Unit Toggle] button	<p>If the “Unit Toggle” function is active:</p> <ul style="list-style-type: none"> – If the button is held down: Accesses the “Unit Toggle” function menu. – When the button is pressed: Switches between the basic unit display and up to 4 other units.
	[Back] button	<ul style="list-style-type: none"> – In the menu: <ul style="list-style-type: none"> – When the button is pressed: Returns to the previous display. – If the button is held down: Saves the menu settings. – When entering digits: Selects the previous digit position. – For an active application: Exits the application and deletes the set reference value.
	[Up] button	<ul style="list-style-type: none"> – In the menu: Scrolls through the menu levels or the available parameters. – When entering digits: Increases the displayed value. – In the main display of an active application: Switches to the display of the current weight value/parameter.
	[Down] button	<ul style="list-style-type: none"> – In the menu: Scrolls through the menu levels or the available parameters. – When entering digits: Decreases the displayed value. – In the main display of an application that is not active: Accesses the display to set the reference values. – In the main display of an active application: Switches to the display of the current weight value/parameter.
	[Confirm] button	<ul style="list-style-type: none"> – In the menu: Accesses the displayed menu level or confirms the displayed parameter. – When entering digits: Selects the next digit position. – In the main display of an application that is not active: Starts the application process and saves the set reference value. – In the main display of an active application: Adopts the next component or the next parameter.

9.4 Displays in the Operating Display

Symbol	Designation	Description
	[Counting] display	Indicates that the “Counting” application is selected.
	[Percent weighing] display	Indicates that the “Percent weighing” application is selected.
	[Calculation] display	Indicates that the “Calculation” application is selected.
	[Animal weighing] display	Indicates that the “Animal weighing” application is selected.
	[Net total] display	Indicates that the “Net total” application is selected.
	[Totalizing] display	Indicates that the “Totalizing” application is selected.
	[Density determination] display	Indicates that the “Density determination” application is selected.
	[Busy] display	Indicates that the device is processing a command.
	[Sign] display	Indicates whether the value being displayed is positive or negative.
	[Zero] display	For some conformity-assessed devices: Indicates that the device has been zeroed.
	[AUTO] display	Indicates that the “Animal weighing” application starts automatically.
	[R12] display	Indicates the active range for multi-range balances.
	[Percent] display	Indicates that a percentage value is being displayed.
	[Net] display	Indicates that a net value is being displayed.
	[Gross] display	Indicates that a gross value is being displayed.
	[Selection] display	<ul style="list-style-type: none"> – In the menu: Identifies the selected parameter. – If the “Density determination” application is active: Indicates that a calculated value is being displayed.
	[Unit symbol] display	Indicates the set weight unit, e.g., [g] for “grams”.
	[Quantity] display	Indicates that a quantity is being displayed.
	Display [Invalid weight value]	<ul style="list-style-type: none"> – Indicates that the display does not contain a weight value, but is instead the calculated result of an application, e.g., for the “Animal weighing” application. – For conformity-assessed devices: Indicates a fault. The cause of this fault is displayed after pressing the [Unit Toggle] key.

9.5 Menu Structure, Main Menu with the YRD01 Display Unit

► Navigating the menus (see Chapter “9.6 Menu Navigation with YRD01 Display Unit”, page 41).

Level 1	Level 2	Description
SETUP	BALANCE	Set the functions of the device.
	GEN.SERV. “General services”	Reset the menu to factory settings.
DEVICE	RS-232 “RS232, 9-pin”	Define the parameters for the COM interface.
	USB “USB-C”	Define the parameters for the USB interface.
	Extras	Define the functions of the operating display.
DATA OUTP. “Data output”	COM. SBI “SBI communication”	Configure the automatic data output.
	PRNT.PAR. “Printout settings”	Perform the settings for the printout.
	PC.DIREC. “Direct transfer of data (PC)”	Define the output format for the data exchange between the weigh cell and the PC
APPLIC. “Applications”	WEIGH	Determine the weight value of a sample. Activate the functions for all applications.
	COUNT	Determine the number of parts that have approximately equal weight.
	PERCENT “Weghing in percent”	Determine the percentage share of a sample based on a reference weight.
	NET.TOT. “Net total”	Carry out the weighing of components for a mixture.
	TOTAL “Totalizing”	Add weight values of independent weighing processes in a memory.
	ANIMALW. “Animal weighing”	Weigh unstable samples, e.g. animals. This program calculates the average of several measurement cycles.
	CALC. “Calculation”	Calculate the weight value using a multiplier or divisor, e.g. for determining the weight per unit area of paper.
	DENSITY “Density determination”	Determine the density of solid samples based on the buoyancy method.
INFO “Device information”	VERSION “Version number”	Display the software version number.
	SER. NO. “Serial number”	Display the device’s serial number.
	Model	Display the device’s model designation.
LANGUAGE		Set the menu language of the operating display.

9.6 Menu Navigation with YRD01 Display Unit

Procedure



▶ To open the main menu: Press the [Menu] button.



▶ To display menu items or parameters of a level: Press the [Up] or [Down] button.



▶ To return to the next higher menu level or exit the menu: Press the [Back] button.



▶ To open a displayed menu level or a displayed parameter: Press the [Confirm] button.

9.7 Operation with Optional YRD01 Display Unit

Procedure

- ▶ Connect display unit to the weigh cell electronics using the supplied cable.

9.7.1 Calibrating and Adjusting Device with isoCAL Function

Triggers for the information on the isoCAL function are:

- The ambient temperature has changed since the last adjustment process.
- The interval time has been exceeded.

Requirements

- The information on the isoCAL function is set in the menu.
- The device is **not** located in the menu settings.

Procedure

- ▶ If the [isoCAL] button is flashing in the operating display: Press the [isoCAL] button.
- ▷ The isoCAL function starts.

9.7.2 Internally Calibrating and Adjusting the Device

Requirements

- The weighing pan is unloaded.
- The operating display shows a stable weight value.
- The internal calibration and adjustment function is set up.

Procedure

- ▶ Press the [Zero] button.
- ▶ Press the [Adjust] button.
- ▷ The current calibration | adjustment function is displayed.
- ▶ If the calibration with subsequent automatic adjustment function is selected:
 - ▷ The “CAL.RUN.” display appears in the operating display during the process.
 - ▷ The “CAL.END” display indicates the end of the adjustment process.
- ▶ If the calibration without subsequent automatic adjustment function is selected:
 - ▷ The calibration process is started.
 - ▷ The “CAL.RUN.” display appears in the operating display during the process.
 - ▷ The calibration error is displayed.
 - ▶ Press the [Confirm] button.
 - ▷ The adjustment process is performed.
 - ▷ The “CAL.END” display indicates the end of the adjustment process.

9.7.3 Externally Calibrating and Adjusting the Device

Material Calibration and adjustment weight

Requirements

- The weighing pan is unloaded.
- The operating display shows a stable weight value.
- The external calibration and adjustment function is set.
- The preset weight value for the adjustment weight or the user-defined weight value for the adjustment weight is selected.

Procedure

- ▶ Press the [Zero] button.
- ▶ Press the [Adjust] button.
- ▶ Place the indicated calibration and adjustment weight on the balance.
- ▷ The weight value is displayed.
- ▶ If the calibration with subsequent automatic adjustment function is selected and the adjustment weight placed on the device is within the specified limits:
 - ▷ The calibration | adjustment process starts.
 - ▷ If the "+" sign is displayed: The applied weight is too big.
 - ▷ If the "-" sign is displayed: The applied weight is too small.
- ▷ The "CAL.END" message indicates the end of the adjustment process.
- ▶ Remove the adjustment weight.
- ▶ If the calibration without subsequent automatic adjustment function is selected and the adjustment weight placed on the device is within the specified limits:
 - ▷ The calibration process will start.
 - ▷ If the "+" sign is displayed: The applied weight is too big.
 - ▷ If the "-" sign is displayed: The applied weight is too small.
 - ▷ The calibration error is stated.
 - ▶ Press the [Confirm] button.
 - ▷ The adjustment process is performed.
- ▷ The "CAL.END" message indicates the end of the adjustment process.
- ▶ Remove the adjustment weight.

9.7.4 Switching YRD01 On and Off

Procedure

- ▶ **⚠ CAUTION** Pointed or sharp-edged objects may damage the operating display!
- ▶ Only touch the operating display with your fingertips.
- ▶ To switch the device on: Press the [On/Off] button.
- ▶ To switch the device off: Press and hold the [On/Off] button.

9.7.5 Weighing

Procedure

- ▶ Zero the device. To do this, press the [Zero] button.
- ▶ If a vessel is being used for the sample:
 - ▶ Tare the device. To do this, press the [Tare] button.
 - ▶ Place the sample in the vessel.
- ▶ If **no** vessel is used for the sample: Place the sample on the weighing pan.
- ▷ The weight value is displayed depending on the selected application program

10 Malfunctions

10.1 Error Codes (YRD01 and SBI)

Error codes are displayed on the main display for approx. 2 seconds. The program then returns automatically to the previous mode.

Warning Message	Fault	Cause	Solution
APP.ERR.	The device has measured an invalid weight value.	The applied weight is too low.	Increase the applied weight to more than the minimum load.
		The weight value is negative.	
		No sample has been placed on the balance.	Place the sample on the balance.
DIS.ERR.	The value to be output cannot be shown in the operating display.	The data to be displayed is not compatible with the set display format.	Adjust the display settings in the menu, e.g. resolution, unit, decimal places.
HIGH or ERR 55	The device is overloaded.	The device's maximum weighing capacity has been exceeded.	Reduce the applied weight to below the device's maximum weighing capacity.
LOW or ERR 54	The modulation of the weighing converter inside the device is too low.	No weighing pan has been placed on the balance.	Insert the weighing pan into the device and switch the device off and on again.
		A previously forgotten weight was removed after starting the device.	
		An error exists in the weighing system or in the device electronics.	Contact Sartorius Service.
COMM.ERR.	The device is not receiving any weight values.	No communication exists between the display unit and the weigh cell.	Wait until the display unit restores the communication with the weigh cell.
			If the problem occurs again: Contact Sartorius Service.
PRT.ERR.	The [Print] key is locked.	The data interface for printout is set to xBPI mode.	Reset the menu to the factory settings.
			If the problem occurs again: Contact Sartorius Service.
SYS.ERR.	The system data is faulty.	A memory error exists in the display unit.	Switch the device off and on again.
			If the problem occurs again: Contact Sartorius Service.
ERR 02	The device cannot be adjusted when starting the adjustment function due to a zero point error.	The device was not zeroed before the adjustment process.	Zero the device. Check the preload and set if necessary.
		The device is loaded.	Remove the sample from the weighing pan.

Warning Message	Fault	Cause	Solution
ERR 03		Zero point error at the end of calibration	Check assembly conditions, observe warm-up time Repeat calibration
ERR 06		Int. adjustment weight defective or not available	Service
ERR 07		External adjustment is blocked. The access switch is closed.	Open the access switch and perform the adjustment.
ERR 08 <> zero range		Zeroing error (value outside of 2%)	Change work process
ERR 09 = 0 not permitted		Taring error (tare value = 0).	Change work process
ERR 10	Taring is not possible.	The device cannot be manually tared because an application program has the tare memory reserved.	To release the tare memory: Exit the application program with the [Back] button.
ERR 11	The weight value cannot be saved in the tare memory.	The weight value is negative or "zero".	Check the sample being weighed. Zero the device before placing the sample on the balance if necessary.
ERR 19 preload too heavy		Preload to be used is too big	Change preload value
ERR 30		Balance is in BPI mode.	Perform with service tool and the integrated "Close" function
ERR 32		The SBI buffer is overfull (there are more than 20 SBI commands waiting to be processed).	Only send an SBI command when the previous one has been processed.
ERR 50 or 53		Failure TC converter	Service
ERR 241		Checksum error	Service
ERR 243		Checksum error	Perform menu reset
ERR 245 or 247		Checksum error	Adjust the balance
ERR 249		Checksum error	Service
Weight value changes constantly		Unstable installation site (excessive vibration or draft)	Change installation site Changing Setup Configurations
		Foreign object is caught between weighing pan and housing	Remove the foreign object
The weight readout is obviously wrong		Balance not adjusted	Adjustment
		Not tared before weighing	Tare
Other error			Contact Sartorius Service: http://www.sartorius.com

11 Transport

11.1 Dismantling

Requirement

The device is switched off.

Procedure

- ▶ Remove the weigh cell from the system or the device.
- ▶ Disconnect all connected cables.

12 Storage and Shipping

12.1 Returning the Device and Parts

NOTICE

Unpacked weigh cells can lose their precision if subjected to extreme vibrations.

Excessive vibrations may compromise the safety of the device.

- ▶ **Do not** expose the device to unnecessarily extreme temperatures, moisture, shocks, blows or vibration.
- ▶ **Do not** expose the equipment to gravitational acceleration in excess of 300 m/s² (unless additional equipment is installed on the load receptor)

Defective devices or parts can be returned to Sartorius. Returned devices must be clean, decontaminated, and packed in their original packaging. Transport damage as well as measures for subsequent cleaning and disinfection of the device or parts by Sartorius are charged to the sender.

Requirement

The device is dismantled.

Procedure

- ▶ Contact Sartorius Service for instructions on how to return devices or parts (please refer to our website at www.sartorius.com for return instructions).
- ▶ Pack the device and its parts in their original packaging for return.
- ▶ **Do not** expose the equipment to gravitational acceleration in excess of 0 300 m/s² (unless additional equipment is installed on the load receptor).

13 Disposal

13.1 Information on Decontamination

The device does **not** contain any hazardous materials that necessitate special disposal measures. If the device has come into contact with hazardous substances: Steps must be taken to ensure proper decontamination and declaration.

Contaminated samples used during the process are potentially hazardous substances that could cause biological or chemical hazards.

If the device has come into contact with hazardous substances: Steps must be taken to ensure proper decontamination and declaration. The operating company is responsible for adhering to local government regulations on the proper declarations for transport and disposal and for the proper disposal of the device.

13.2 Dismantling

Procedure

- ▶ Remove the weigh cell from the system.

13.3 Disposing of the Device and Parts

The device and the device accessories must be disposed of properly by disposal facilities.

The packaging is made of environmentally friendly materials that can be used as secondary raw materials.

Procedure

- ▶ Dispose of the device. Follow the disposal instructions on our website (www.sartorius.com).
- ▶ Dispose of the packaging in accordance with local government regulations.

14 Technical Data

14.1 Ambient Conditions

	Unit	Value
Installation site: For indoor use only, max. height above sea level	m	3000
Temperature		
Environment (metrological data)	°C	+10 – +30
Environment	°C	+5 – +40
Storage and transport	°C	-10 – +60

14.2 Electrical Data

14.2.1 Power Supply Weigh Cell

	Unit	Value
Input voltage	V _{DC}	12 – 28
Power consumption, max.	W	2

14.2.2 Power Supply unit

	Unit	Value
Type: Sartorius power supply unit YEPS01-15V0H		
Primary		
Voltage	V _{AC}	100 – 240 (±10 %)
Frequency	Hz	50 – 60
Current consumption, maximum	A	0.2
Secondary		
Voltage	V _{DC}	15 (±5 %)
Current, maximum	A	0.53
Short-circuit protection		Electric
Protection class according to IEC 60950-1		II
Pollution level according to IEC 61010-1		2
Overvoltage category according to IEC 60664-1		II
Other data: See label on the power supply unit		

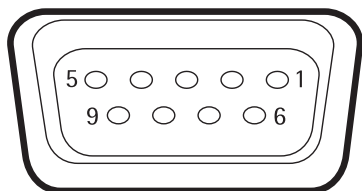
14.3 Warm-up Time

	Unit	Value
Installation site: For indoor use only, max. height above sea level	h	2

14.4 Interfaces

14.4.1 Specifications of the RS232 Interface

Type of interface: Serial interface	Interface operation: Full duplex
Level: RS232	Transmission rate: 600...115200 baud
Parity: Odd, even, none	Number of data bits: 7 or 8 bits
Character transmission: Start bit, 7-Bit ASCII, parity, 1 or 2 stop bits	
Handshake <ul style="list-style-type: none"> – For 2-wire interface: Software (XON XOFF) or none – For 4-wire interface: Hardware (CTS RTS) or none 	
Data output of balance/scale: 16 or 22 characters	
Connection: 9-pin D-Submini (DB9S) with screw lock hardware	
Maximum cable length: 15 m	
Pin assignment	Pin 1: VDC IN 12 – 26V Pin 2: Data output (TxD) Pin 3: Data input (RxD) Pin 4: Not assigned Pin 5: Internal ground Pin 6: Not assigned Pin 7: Clear to Send (CTS) Pin 8: Request to Send (RTS) Pin 9: Not assigned



14.4.2 Specifications for the USB-C Interface

Communication: USB UTL
Connectable devices: control and display unit YRD01 or PC

14.5 Cabling Diagram

For connecting a computer or other peripheral device to the balance/scale using the RS-232C/V24 protocol.

Do not connect any other pins to the cable connector of the balance/scale!

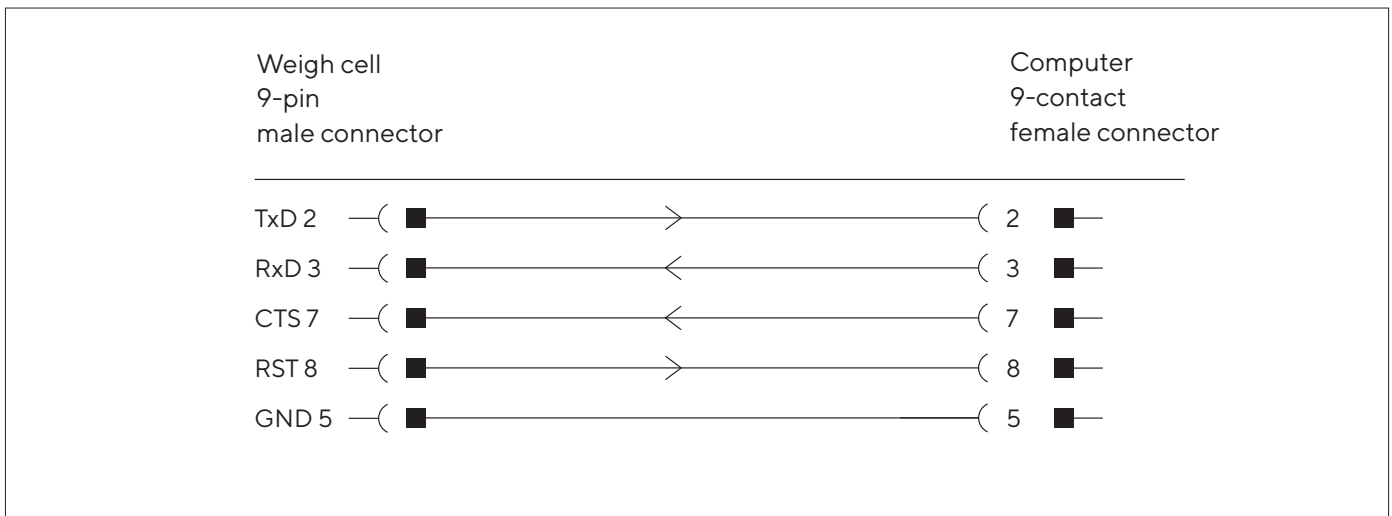


Fig. 7: Cable type: AWG 24 specification

14.6 Acclimatization before Power Supply

	Unit	Value
Acclimatization time	h	2

14.7 Dimensions (Scale Drawings)

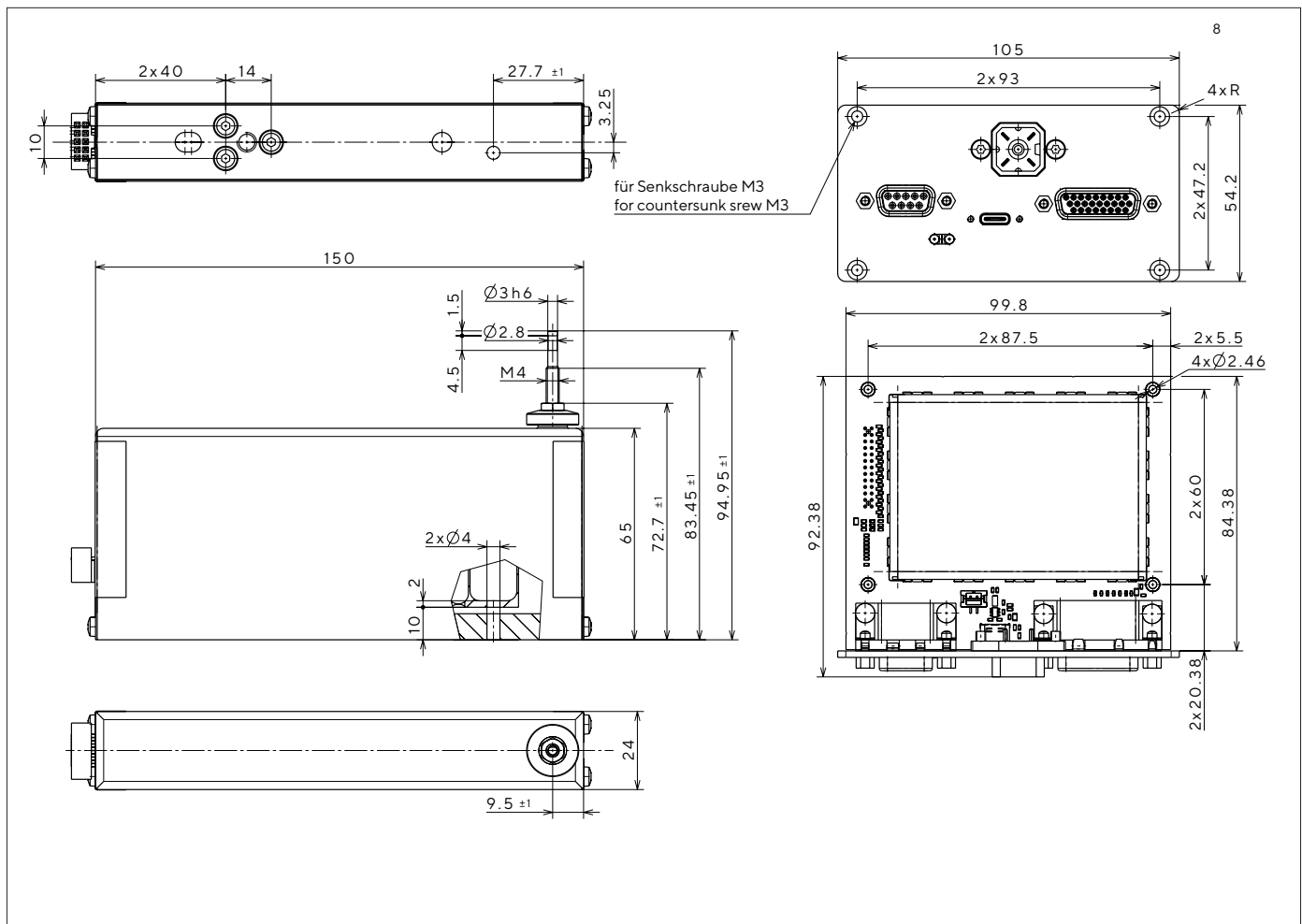


Fig. 8: Dimensions for model WZB54-L with electronics unit

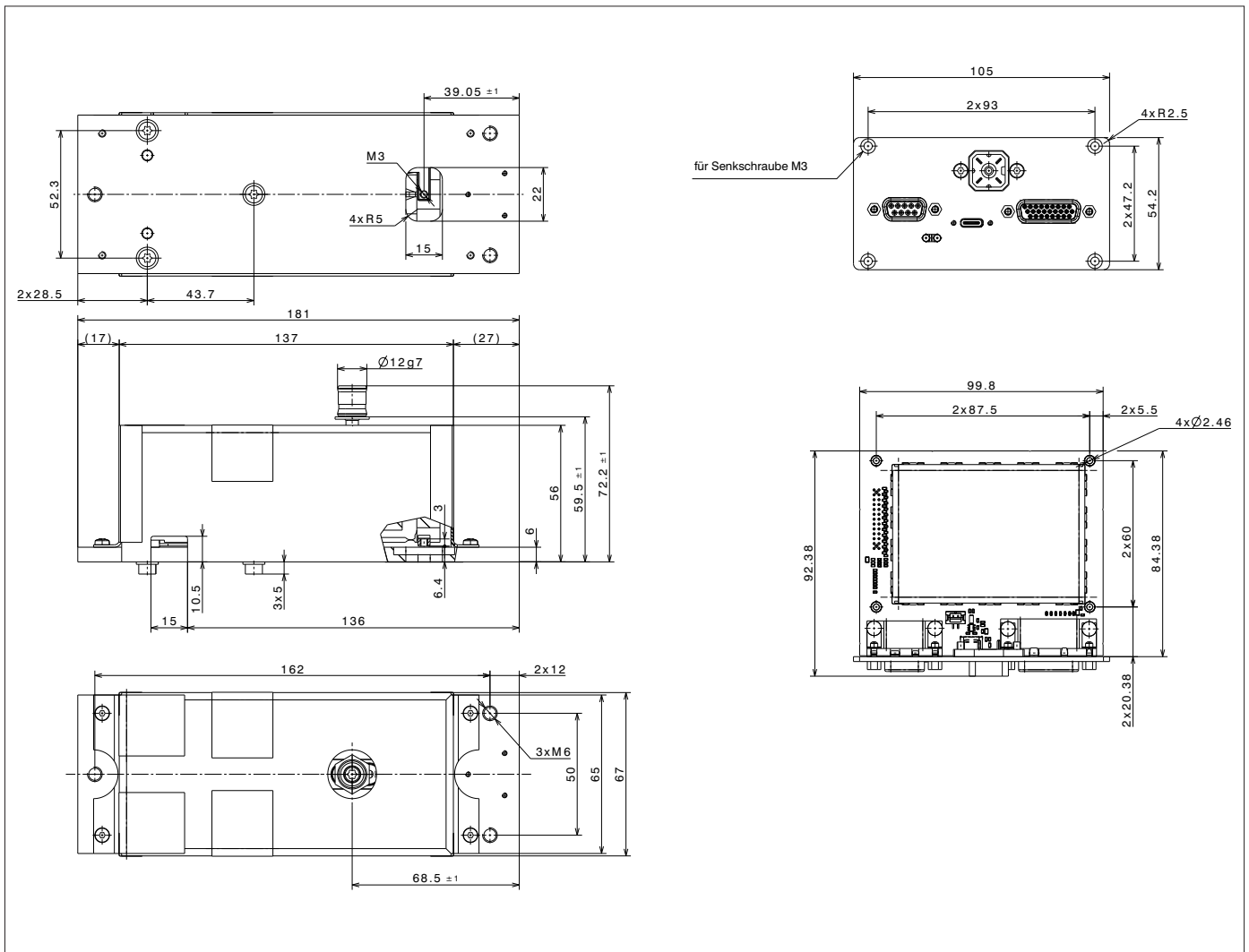


Fig. 9: Dimensions for models WZB254-L and WZB553-L with electronics unit

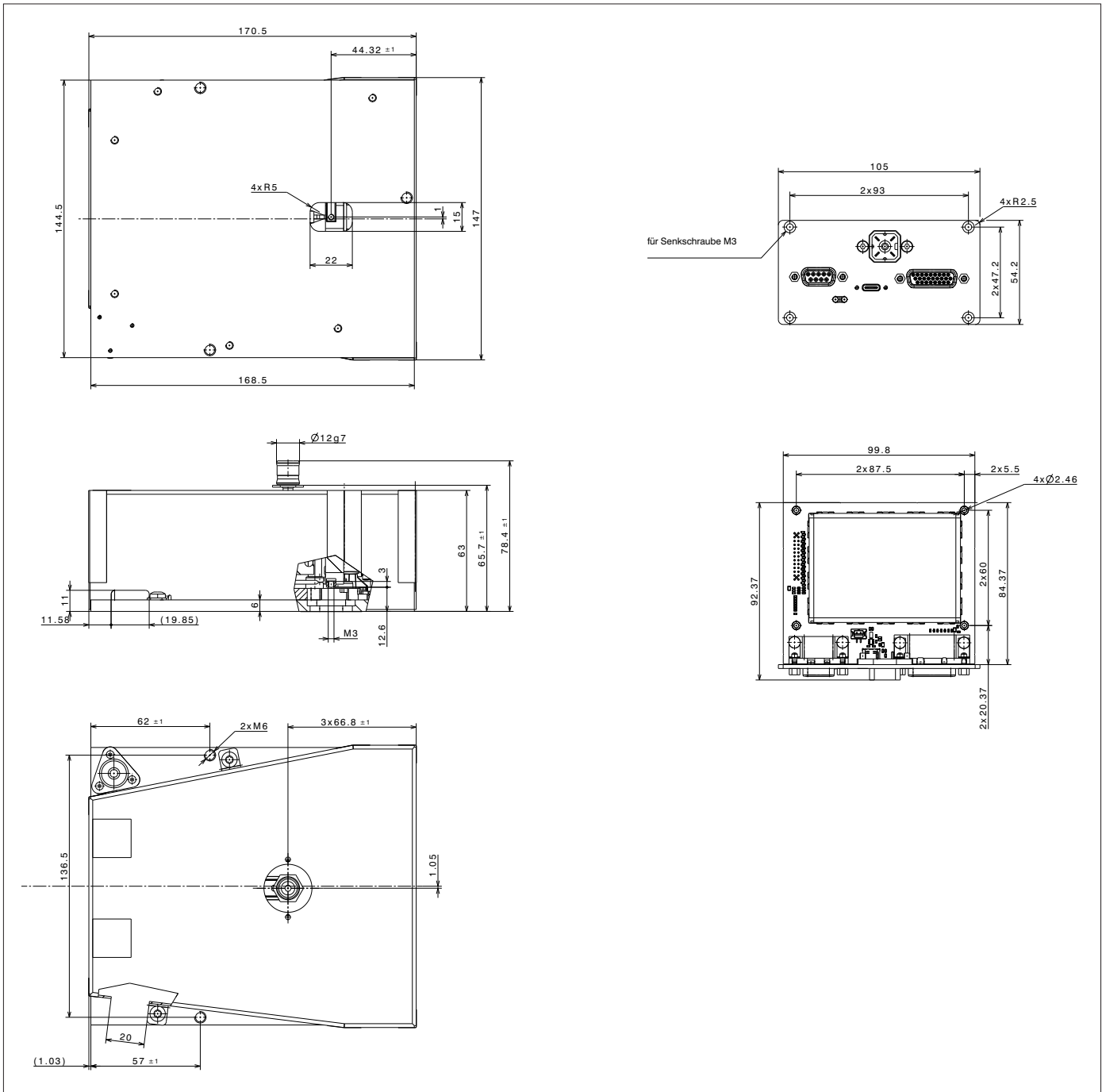


Fig.10: Dimensions for model WZB254-LC with electronics units

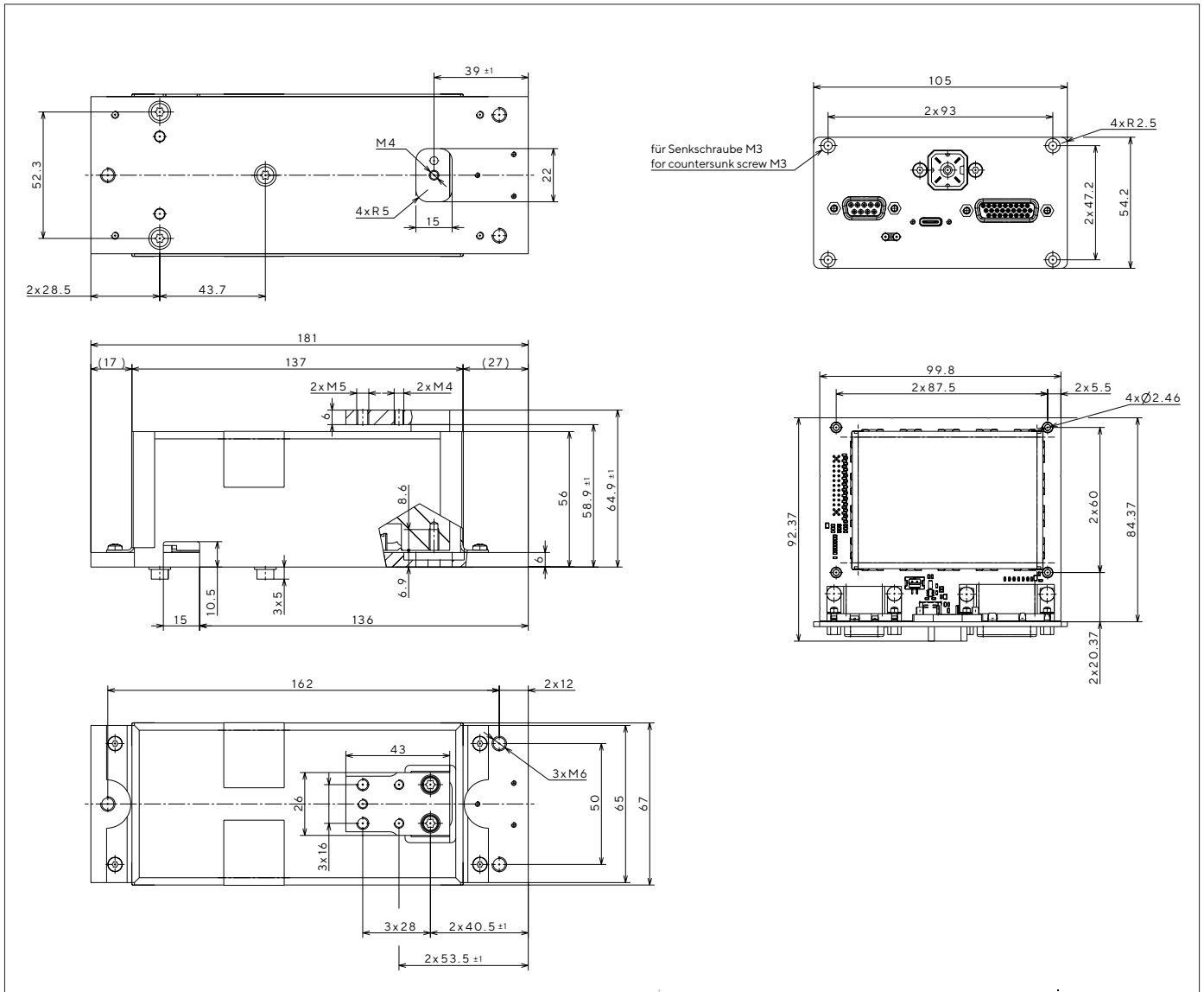


Fig.11: Dimensions for model WZB8202-L with electronics units

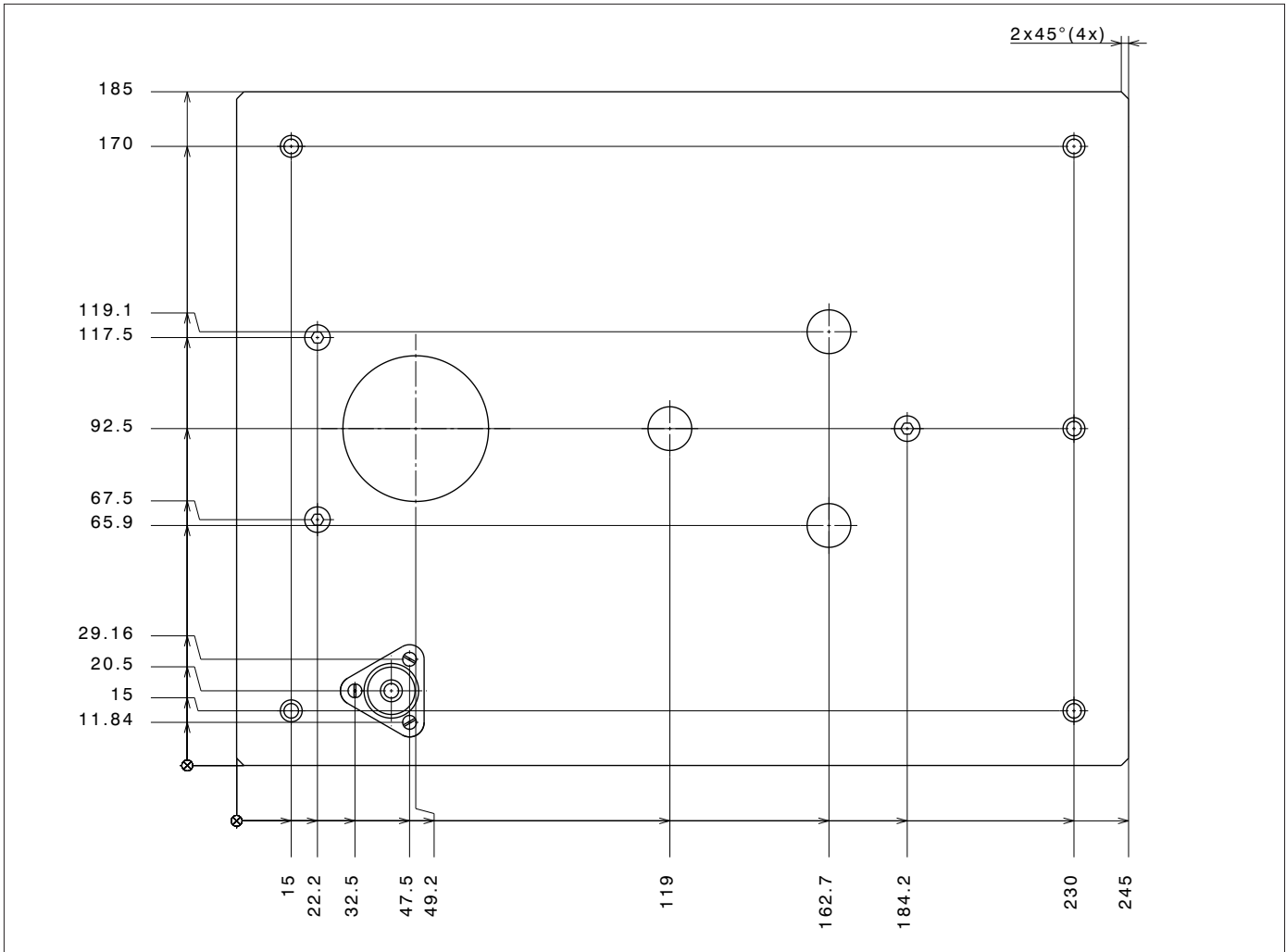


Fig.12: Mounting plate dimensions for model WZB8202-L

14.8 Metrological Data

Model		WZB54-L	WZB254-LC	WZB254-L	WZB553-L	WZB8202-L
	Unit	Value	Value	Value	Value	Value
Technology		EMK	EMK	EMK	EMK	EMK
Weighing Capacity	g	50	250	250	550	8200
Readability	g	0.0001	0.0001	0.0001	0.001	0.01
Preload on the load receptor	g	min. 5	0 - 10	0 - 10	0 - 50	0 - 500
Tare range (subtractive)	g	Over entire weighing range				
Repeatability (standard deviation)*	<±g	0.0002	0.0001	0.0001	0.001	0.01
Linearity	<±g	0.0002	0.0002	0.0002	0.002	0.02
Measurement time**	s	0.8	0.6	0.6	0.6	0.6
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels				
Operating temperature range	°C	+10 - +30 °C				
Allowable ambient operating temperature	°C	+5 - +40 °C				
Sensitivity drift within +10 - +30 °C	<±ppm/K	1 x 10 ⁻⁶	1 x 10 ⁻⁶	1 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶
External calibration weight (min. accuracy class)	g	10 (E2)	50 (E2)	50 (E2)	200 (F1)	2000 (F1)
Net weight, approx.	kg	0.39	2.0	0.95	0.95	0.95
Power Supply Ripple 50/60 Hz Power consumption	V _{DC}	min. 12 - 28 max., optimal 15 V (+15 % bis -10 %) 0.5 V _{ss} (voltage peak-to-peak) 2 W average (VDC 15V)				
Built-in interface		RS232/USB-C; 7-/8-bit; -even, -mark, -odd, -space; Transmission rates: 600 - 115200 baud, 1 or 2 stop bits, software/hardware handshake				

* Depends on system design

** The weighing time is the time period in which the measured value oscillates within a range of ±3x the standard range of the static end value. Test weight approx. 25% of max.

15 Accessories

15.1 Accessories

This table contains an excerpt of the accessories that can be ordered. For information on other products, contact Sartorius.

Artikel	Quantity	Order number
Display and display unit with cable (0.9 m) for connection to enclosed electronics module	1	YRD01
Free configuration software for settings, calibration/adjustment and setting the preload	1	CAS-Suite Public
Data cable RS232 (9-pin) > USB-A (> PC)	1.5 m	YCC-D09M-USB-A
Data cable RS232 25-pin (m)/9-pin (f), (>PC)	2.0 m	7357314
Data cable RS232 (9-pin) connector > RS232 (9-polig) connector	1.5 m	YCC-D09MF
Data cable USB-C > USB-A (> PC)	1.5 m	YCC-USB-C-A
AC adapter IP40 protection in accordance with VDE* 0470/529*	1	YEPS01-15VOH
Additional options and accessories available on request		

* VDE = Verband der Elektrotechnik, Elektronik, Informationstechnik
(Association for Electrical, Electronic & Information Technologies)

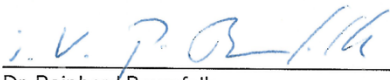

16 Sartorius Service

Sartorius Service is available should there be any queries regarding the device. Please visit the Sartorius website (www.sartorius.com) for information about the service addresses, services provided, or to contact a local representative.

When contacting Sartorius Service with questions about the system or in the event of malfunctions, be sure to have the device information, e.g., serial number, close at hand. This information can be found on the manufacturer's ID label.

17 Conformity Documents

17.1 Declaration of Incorporation

	Original	SARTORIUS
	<p>Einbauerklärung (Maschinenrichtlinie 2006/42/EG) Declaration of Incorporation (Machinery Directive 2006/42/EC)</p>	
Hersteller Manufacturer	<p>Sartorius Lab Instruments GmbH & Co. KG 37070 Goettingen, Germany</p> <p>erklärt in alleiniger Verantwortung, dass bei der unvollständigen Maschine <i>declares under sole responsibility that for the partly completed machinery</i></p>	
Geräteart Device type	<p>Wägezelle + Anzeigeeinheit Weighing cell + display unit</p>	
Baureihe Type series	<p>WZBa-L, WZBb-LC + YRDO1 a= 54, 553, 254, 8202 b = 254</p> <p>die folgenden grundlegenden Sicherheits- und Gesundheitsanforderungen nach Anhang I der oben genannten Richtlinie angewandt sind und eingehalten werden:</p> <ul style="list-style-type: none"> - Allgemeine Grundsätze, Nr. 1 - Nr. 1.1.2 <p><i>the following essential health and safety requirements set out in Annex I to the above Directive have been applied and complied with:</i></p> <ul style="list-style-type: none"> - <i>General principles, No. 1</i> - <i>No. 1.1.2</i> <p>Die speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt. Wir werden gegebenenfalls der zuständigen Behörde die vorgenannten speziellen technischen Unterlagen in elektronischer Form im pdf - Format übermitteln. <i>The specific technical documentation according to part B of Annex VII has been prepared. If necessary, we will provide the competent authority with the abovementioned specific technical documentation electronically in pdf format.</i></p> <p>Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn gegebenenfalls festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen dieser Richtlinie entspricht. <i>The partly completed machine may only be put into service if it has been determined that the machine in which the incomplete machine is to be installed complies with the provisions of this Directive.</i></p> <p>Die Person, die bevollmächtigt ist, die technischen Unterlagen zusammenzustellen / The person authorised to compile the technical file:</p> <p>Sartorius Lab Instruments GmbH & Co. KG Electronics & Product Compliance 37070 Goettingen, Germany</p> <p>Sartorius Lab Instruments GmbH & Co. KG Goettingen, 2022-10-13</p>	
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Masculine or feminine forms are used to facilitate legibility in these instructions and always simultaneously denote all genders.

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