Weigh Modules

WMC

METTLER TOLEDO

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1.2 Assembling the WMC Weigh Modules

The WMC weigh modules can be integrated into higher-level systems (machines, systems, etc.). Be sure to follow the tips in the following sections to select the optimal installation method.

1.2.1 Weigh unit installation

The weigh modules were designed to record weights very quickly and accurately under normal conditions and communicate the result using the integrated interface and/or display the result on a terminal. In practice, ambient conditions (vibration, oscillations, shocks, air movements and temperature changes) affect weighing time and achievable accuracy as well as the repeatability.

You can adjust various parameters on your weigh module. We recommend that you adjust the settings to the levels needed for your application; higher requirements increase the weighing time (period between the placement of the weight and the availability of a stable result). Filter settings must be stricter to compensate for unfavorable ambient conditions, this also has a negative impact on weighing time. **See** Configuring weigh module.

Therefore, be sure to note the following:

Note

- The location of the weigh unit should not be in areas that are exposed to drafts, direct sunlight, or severe temperature fluctuations.

  Make sure that any vibrations in the building are not transferred through the floor and to the weigh unit.
- Make sure that the weigh unit is as perfectly horizontal as possible.
- Mount the weigh unit on a base that is mechanically decoupled from the system and therefore free of shocks and vibration.
- Use the built-in precision level to achieve exact leveling.
  It is acceptable to have a unit that is not perfectly horizontal if its position is not altered after it has been adjusted, (e.g., if it is mounted in a fixed position in the system).
- Attach the weigh unit to the base across as wide an area as possible.
- Use the appropriate holes in the weigh unit base plate (4 × M3 screws, tightening torque 1.3 − 2 Nm).
- The base must be perfectly flat to avoid putting tension on the weigh unit base plate.
- Make sure that vibrations cannot be transferred across the connector cable between the weigh unit and the electronic unit.
- Make sure that the weigh unit housing is connected in an electrically conductive manner with the system.
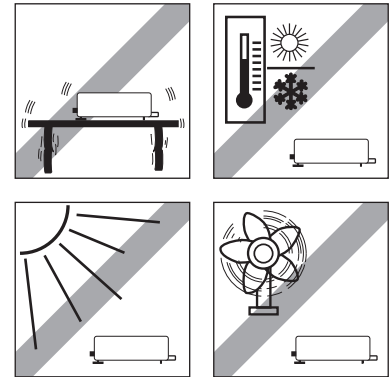
If your requirements are extremely demanding (short weighing time, high accuracy), we recommend that you try a test setup first and test the entire system under real-world conditions using various settings. This will allow you to tweak the system and optimize it bit by bit.

1.2.2 Levelling the weigh unit

Once the weigh unit has been set up at the desired location, the weigh unit must be horizontally aligned (leveled).

- The weigh unit is exactly horizontal when the air bubble is in the middle of the level glass.

1 Adjust the two leveling feet appropriately until the air bubble comes to rest exactly in the middle of the glass:
   Air bubble at "12 o'clock" turn both feet counterclockwise. Air bubble at "3 o'clock" turn left foot clockwise, right foot counterclockwise.
   Air bubble at "6 o'clock" turn both feet clockwise. Air bubble at "9 o'clock" turn left foot counterclockwise, right foot clockwise.

2 The weigh unit must be leveled and adjusted each time it is moved to a new location.
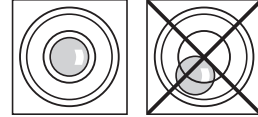
1.2.3 Electronic unit assembly and mounting

The electronic unit can be mounted in any position you wish. A mounting bracket and clip for attaching the unit to a DIN standardized rail are provided. Proceed as follows for mounting:

Note

The electronic unit meets the requirements for protection class IP40. If required, appropriate protective measures must be taken to protect the unit from dirt.

1 Remove the two existing screws from the bottom side of the electronic unit (Torx T-20).

2 Use the provided Torx T-20 countersunk head screws (1) to secure the mounting bracket.

3 Secure the clip (2) to the front face or underside of the mounting bracket.

4 Use the two provided M4 pan head screws (Torx T-20) to do so.
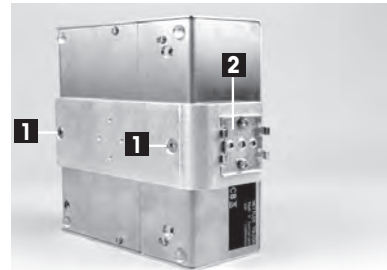
Note

The electronic unit can also be attached directly to a support (without the clip) via the M4 threads of the mounting bracket.

1.3 Install the weighing pan and the draft shield

The WMC weigh modules come with a weighing pan adapter and a standard weighing pan. The weighing pan adapter can either be fitted with the standard weighing pan or a customized setup.

1 Remove the white plastic cover (2) from the weighing unit.
   ⇨ The cover protects the weighing pan support (1) from damage during transport.
   ⇨ Keeps liquid from penetrating into the weighing unit during cleaning.
2 Keep the cover in a safe place!
3 Locate the bushing of the weighing pan adapter (3) on the pin of the weighing pan support (1).
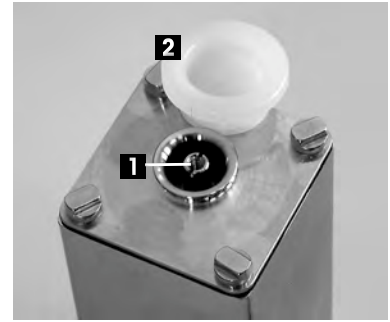
4 Put the standard weighing pan (4) onto the weighing pan adapter.
5 If you wish to use your own setup, place it directly on the weighing pan adapter.
   ⇨ The standard weighing pan is not needed in this case.

Dimensional drawings of both weighing pans are found in section Dimensions.

1 To ensure proper startup of the weigh module, the preload must not exceed 80% of the weighing range.
   ⇨ The weighing range will hence be reduced by the amount of the preload weight.
2 If the entire weighing range is required, the preload may not exceed 4 g (starting from standard weighing pan).
• Weight of weighing pan adapter: approx. 0.2 g
• Weight of standard weighing pan: approx. 1.1 g

Note
With high preload, the adjusting weight must be chosen accordingly. For adjusting purposes, it is preferable to convert the weighing unit back to its original state.

Note on overload protection
The weigh units of the WMC weigh modules have overload protection. The following limit values must not be exceeded:
• Vertical load: 1 kg (static load)
• Lateral load: 200 g (static load)
• Torsion: 0.3 Nm

1 Slide the draft shield (5) onto the weigh unit.

2 Press down on the two opposite corners until it engages with an audible "click".

Note

Instructions and precautions for custom weighing pan:

The weighing pan support (1) comes with a concentric M2 thread to attach a custom weighing pan. Note the following conditions so as to not damage the weigh unit:

- The tightening torque of the screw must not exceed 30 Ncm / 2.65 in lbs. Use Indicating Type Torque Screwdriver. (do NOT use click type). Observe also the tensile strength of the screw used. This is valid only for metallic counterparts.

- The screw must penetrate approx. 3 mm.

- Use only non-magnetic material for your weighing pan (eg nickel-chromium steel, titanium, brass, aliminum etc.).

- Switch off the weigh module before installing the weighing pan.

See section Dimensions for dimensions of your weighing pan.
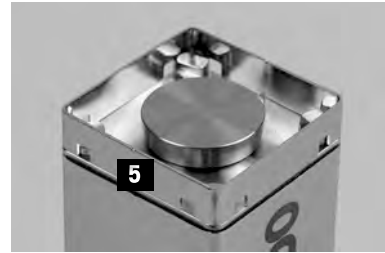
1.4 Connect weigh unit and electronic unit

The weigh unit housing has no plug or socket but a direct cable exit. Typically, the cable length is 3 m.

1 Connect the plug to the appropriate socket of the electronic unit.

2 Align the red dot of the plug with the red dot on the socket (1).

3 Push the plug into the socket.

⇨ A clicking sound confirms that the plug is locked in place.

1 Pull the sleeve (2) back to unlock the plug.

2 Pull the plug out of the socket.
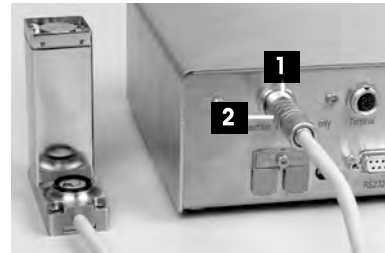
Note

Lay the cable so that no one will trip over it and so that no vibrations can travel up the cable and be transferred to the load cell.

1.5 Connect terminal and adjust settings

You'll need this section only if your weigh module was delivered with a terminal.

1.5.1 SWT terminal

1 Place the terminal on a flat surface with the display face down.

2 Press the two tabs (1) on the back of the terminal to open it.

3 Open the bottom of the terminal (2).

4   Feed the terminal cable through the cutout in the back of the terminal and plug in the jack (3).

5   Make sure that the strain relief (4) is inside the terminal.
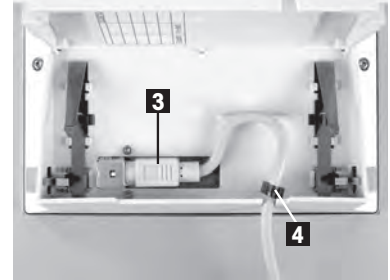
If you want to permanently affix the terminal to the electronic unit, you can also attach the terminal holder now:

6   Place the terminal holder (5) into the corresponding cutout on the bottom of the terminal.

7   Use the knurled screw (6) provided to secure it from the inside of the terminal.

8   Close the bottom of the terminal.

9   Push in the two side tabs to completely close the terminal.

    ⇨ You can also use the two side tabs to adjust the viewing angle of the terminal while it is in operation.

10 Press both buttons simultaneously and pull the top of the terminal gently upwards, or press it down until it clicks into the desired position.

11 You can choose from three different positions.

12 Remove the two screws (Torx T-20) in the bottom of the electronic unit and store them in a safe place.

13 Align the terminal holder exactly with the two bores and secure it with the Torx T-20 countersunk head screws (7).

14 Plug the terminal cable plug (8) into the appropriate jack on the back of the electronic unit and screw in to tighten.

15 Try to run the terminal cable as close as parallel as possible to the terminal holder.
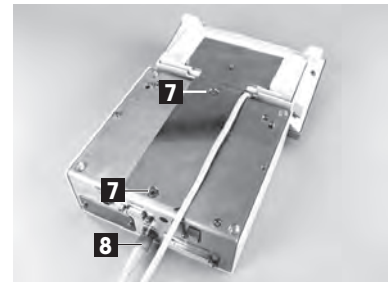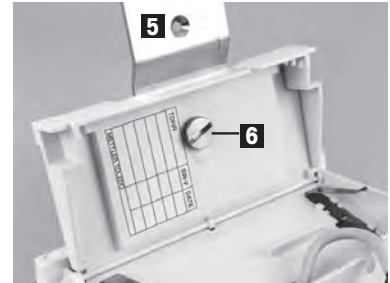
1.6 Connect the unit to the power supply

⚠ **WARNING**

Risk of electric shock

1   To connect the electronic unit, only use the supplied three-core power cable with equipment grounding conductor.

2   Only connect the electronic unit to a three-pin power socket with earthing contact.

3   Only standardized extension cable with equipment grounding conductor must be used for operation of the electronic unit.

4   Intentional disconnection of the equipment grounding conductor is forbidden.

The electronic unit for your weighing module is supplied with an AC adapter and a country-specific power cable. The AC adapter is suitable for use with the following voltage range:
100 – 240 VAC, 50/60Hz.

Note

• Check whether your local power supply falls within this range. If this is not the case, under no circumstances connect the electronic unit or the AC adapter to the power supply, but contact a METTLER TOLEDO representative.

- The power plug must be accessible at all times.
- Prior to use, check the power cable for damage.
- Route the cable in such a way that it cannot be damaged or cause a hindrance when working.
- Ensure that no liquid comes into contact with the AC adapter.

▪ Electronic unit is at the final location.

1 Connect the AC adapter (1) to the connection socket (2) at the rear of the electronic unit.

2 Tighten the connector to ensure a good connection to the electronic unit.

3 Connect the AC adapter (1) to the power supply.

⇨ The weighing module performs a self-test after connection to the power supply and is then ready to use.
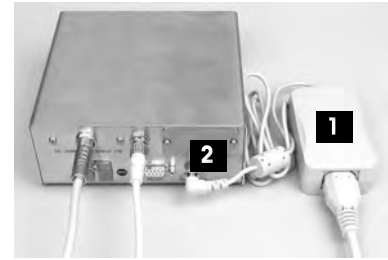
2 Configuring the Weigh Module

Once the weigh modules have been installed, they must be configured, i.e., prepared for operation. For weigh modules with a terminal connected, nearly all configuration work can be performed via the terminal. Weigh modules without a terminal are configured using MT-SICS commands issued from a host computer. An expansion of the MT-SICS command set is available for product-specific configuration work.

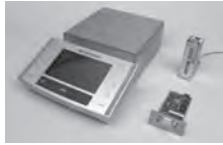All weigh modules come from the factory with a built-in RS232C interface. In addition, the modules can be equipped with a second optional interface that is inserted into the electronic unit, **see** [Accessories ▶ Page 38].

The procedure for configuring the weigh modules and interface functionality depends on how the individual weigh module is equipped. There are four possible configurations:

Configurations

	1 **Weigh module without terminal, with built-in RS232C standard interface**	**2** **Weigh module without terminal, with built-in RS232C standard interface and additional optional interface**	**3** **Weigh module with terminal and built-in RS232C standard interface**	**4** **Weigh module with terminal, built-in RS232C standard interface, and additional optional interface.**
Interface/ commands				
HOST interface	Built-in RS232C	Optional interface	Built-in RS232C (can be configured via the terminal for "host")	Choice of built-in RS232C or optional interface (the terminal can be used to configure one of the interfaces for the "host").
Setting interface parameters	via MT-SICS COM command	interface: Configured using SICS command COPT via the built-in RS232C. Built-in RS232C: via MT-SICS COM command.	Via terminal	Via terminal
FastHost commands (as per MT-SICS reference manual)	Available on host interface	Available on host interface	Available on built-in RS232C, assuming it is configured as host interface	Available on built-in RS232C, assuming it is configured as host interface
Note			When the terminal is removed, the system behaves like a weigh module without a terminal, with a RS232C standard interface (Configuration 1)	When the terminal is removed, the system behaves like a weigh module without a terminal, with a RS232C standard interface and additional optional interface (Configuration 2)

2.1 Preparatory steps for configuration

+T

For **weigh modules with terminal**, the configuration tasks described in the following sections are performed using the terminal. Therefore, no preparatory work is required; however, it is assumed that you have already familiar with how to operate the terminal and use the menu structure.

The menu options for configuring the weigh module are found in the system settings of the terminal.

The configuration tasks described in the following section are for weighing modules without a terminal. At the end of each section, you will see a note for users of weighing modules with terminals telling you where the equivalent settings can be found on the terminal.

–T

Weigh modules without a terminal are configured via the interface with MT-SICS commands. You'll need a host computer (PC) and a terminal program to do this.

Connect the host computer with the built-in RS232C standard interface to the weighing module. Set the communications parameters of the terminal program as follows:

Baud rate:	9600
Data bits:	8
Stop bits:	1
Parity:	None
End of line:	<CR><LF>
Handshake:	Xon/Xoff

These are the factory settings for the built-in RS232C standard interface on the weighing module.

The communication parameters of the RS232C standard interface can be changed with the command COM. Once you have made your changes, you must adjust the terminal program's communications parameters accordingly so that you can continue to communicate with the weighing module.

For weighing modules that have an additional optional interface, you can configure them using the COPT command. Only the RS232C standard interface supports the COPT command; therefore, for this configuration, the weighing module must first be connected with the host computer via the standard interface. Once you have configured your system, you can connect the host computer with the optional interface.

Note

If you have a terminal, you can connect it temporarily and configure the optional interface using the terminal. This is easier and faster than configuring it with the COPT command. Once you've configured the optional interface, you can disconnect and remove the terminal.

The next section describes the most important configuration task (user settings) with special consideration given to the expanded MT-SICS command set for weighing modules without a terminal.

For more information refer to the Reference Manual for MT-SICS Interface Commands, #11781363 (English). This can be downloaded from:

Documentation WMC   ▶ www.mt.com/ind-wmc-support

2.2 Configuring weigh module

It is recommended that the weigh modules are configured before they are used in order to achieve best weighing performance. The following sections provide information on the most important configuration tasks.

2.2.1 Adjusting weigh module

Following initial startup, the weigh module must be adjusted using an external weight. Various parameters can be set for the adjustment.

Weighing modul	MT-SICS command	Description
−T +T	C2	Use these commands for the adjustment and the corresponding settings.
	M19	Use an external adjustment weight, you can set its weight.

Note

The adjustment of the weigh module should be carried out if the system has not been used for a longer period. Allow time for the weigh module to warm-up, **see** [General data ▸ Page 21]. We recommend adjustment at intervals of max. 24 hours.

2.2.2 Set Readability

Readability refers to the smallest difference in weight that the weighing module can still measure and transmit via the interface and/or show on the display. The factory-set readability (= maximum possible number of places after the decimal point) can be reduced if necessary to shorten weighing time.

Weighing modul	MT-SICS command	Description
−T	RDB	Use this command to set readability.
	M23	Use this command to set how many digits of the weighing result should be displayed.
+T	None	Use the «**1/10d**» function key to set readability. **Note** Depending on your particular weighing module, you may have several of these function keys available, such as «**1/100d**» and «**1/1000d**».

2.2.3 Set stability criteria

The stability criterion specifies when a weighing result is considered stable. A stability criterion must also be fulfilled to perform the zeroing and taring functions. A separate stability criterion can be defined for every mode (weighing, zeroing, and taring). A value is considered to be stable when it moves within a defined bandwidth during a specified observation period. These two parameters (length of observation and bandwidth) define the stability criterion.

Weighing modul	MT-SICS command	Description
−T	USTB	Use this command to set stability criteria.

Weighing modul	MT-SICS command	Description
+T	None	Stability criteria settings (reading release) are part of the weighing parameters.
		On the SWT terminal, you'll find these settings in the system settings.

2.2.4 Activating and defining fixed filter

Use the M01 command to set the weighing type and the M02 command to set the ambient conditions, **see** [Adjustments to ambient conditions (Filter damping) ▶ Page 14]. These two settings determine the type and strength of signal filtering that will occur. With the M01 command you can choose out of two weighing types, **Sensor Mode** (command M01␣2) and **Universal** (command M01␣0).

Weighing modul	MT-SICS command	Description
−T	FCUT	For the **Sensor Mode** (command M01␣2) weighing type, the command offers an additional option for defining filter behavior.
		Filtering in **Sensor Mode** is chronologically linear (fixed, non-adaptive filter) and is appropriate if the weight readings need to be further processed.
		Note
		The command is only available for the **Sensor Mode** weighing type. The fixed filter is deactivated at the factory.
+T	None	The weighing type is part of the weighing parameters.
		On the SWT terminal, you'll find these settings in the system settings.
		The ambient conditions determine filter damping of the weighing signal. These two settings determine the filtering of the weighing signal.

2.2.5 Adjustments to ambient conditions (Filter damping)

Adjusting filter damping allows for the weigh module to be optimally adapted to ambient conditions. This setting determines how quickly the weigh module will react to a change in weight, but also how sensitive the module will be to outside disturbances. Strong filter damping will cause the module to react more slowly to small changes in weight, but it will also make it less sensitive to ambient conditions such as air movements and vibrations. In general, this also increases the measurement accuracy (repeatability). You can also control the measurement accuracy and the weighing time by changing the settings for stability criteria, **see** [Set stability criteria ▶ Page 13].

Weighing modul	MT-SICS command	Description
−T	M02	Use this command to adjust your system to ambient conditions (filter damping).
		Note
		If the **Sensor Mode** weighing type is active, and the FCUT command has been used to define a fixed filter, the ambient condition settings for the **Sensor Mode** will not take effect. In this case, the weigh signal is processed by the fixed filter.

Weighing modul	MT-SICS command	Description
+T	None	The adjusting the system to ambient conditions is part of the weighing parameters. On the SWT terminal, you'll find these settings in the system settings.

The following cut-off frequencies are associated with the `M02` command parameters:
(at `M01 2` and `FCUT` < 0.001 Hz):

M02 0	5 Hz
M02 1	0.65 Hz
M02 2	0.28 Hz
M02 3	0.15 Hz
M02 4	0.056 Hz

2.2.6 Setting the update rate for continuous weight transmission

For weighing applications such as dosing to a specified target weight, the weigh module must constantly record weight changes and forward the readings regardless of their stability to the dosing system so that it can control the dosing process. In such cases, you should activate the "send continuous mode" to ensure a continuous flow of weight readings and set the number of weight readings to be transmitted each second via the interface (update rate).

Weighing modul	MT-SICS command	Description
−T	SIR	Use this command to activate the "send continuous mode" mode.
	UPD	Use this command to set the number of weight readings to be transmitted per second. **Note** Update rate of up to 92 readings per second are possible (on both interfaces).
+T	None	Activate the "send continuous mode" and set the update rate as part of the interface definition in the system settings. Update rates of up to 23 readings per second are possible if a terminal is connected.

2.2.7 Recording user settings

The current user settings can be sent to the interface using the `LST` command.

Weighing modul	MT-SICS command	Description
⊟T	`LST`	Use this command to output a list of all user-specific settings.
		The following example shows such a list:
		`LST B I2 "WXS205S WXA-Bridge 220.00900 g"`
		`LST B I3 "1.30 18.6.8.1360.772"`
		`LST B I4 "BU0123456789"`
		`LST B C0 0 0 ""`
		`LST B C4 "0"`
		`LST B Cx "1"`
		`LST B COM 0 6 3 1`
		`LST B FCUT 0.000`
		`LST B I10 ""`
		`LST B M01 0`
		`LST B M02 2`
		`LST B M03 0`
		`LST B M17 00 00 00 0`
		`LST B M18 1`
		`LST B M19 200.00000 g`
		`LST B M20 200.00000 g`
		`LST B M21 0 0`
		`LST B M22 1 0 1.00000000E+00 "cu1" 1.00000001E-01`
		`LST B M22 2 0 1.00000000E+00 "cu2" 1.00000001E-01`
		`LST B M23 0`
		`LST B M31 0`
		`LST B M32 1 00 00 0`
		`LST B M32 2 00 00 0`
		`LST B M32 3 00 00 0`
		`LST B M33 0`
		`LST B M35 0`
		`LST B M67 50`
		`LST B RDB 5`
		`LST B TST0 0 ""`
		`LST B UPD 10.173`
		`LST B USTB 0 2.000 3.000`
		`LST B USTB 1 2.000 5.000`
		`LST A USTB 2 2.000 5.000`
		Note
		For reading and restoring the settings, use the "e-Loader" from METTLER TOLEDO.
+T	`None`	The system settings and the user-specific settings can be recorded. While viewing the system settings or user-specific settings, simply press the «🖶» key on the terminal. The current settings will be output via the interface.

2.2.8 Resetting user-specific settings to factory default

The current user-specific settings can be reset to the factory default using the `FSET` command.

Weighing modul	MT-SICS command	Description
⊟T	`FSET`	Use this command to reset

Weighing modul	MT-SICS command	Description
+T	None	On the SWT and PWT terminal, all settings can be reset in the system settings.

3 Weighing Operation

This section contains helpful tips for weighing operation and information on possible error messages. Weighing modules with terminals are operated using the terminal, and all error messages are displayed in plain English on the terminal.

–T Information in this section applies to users with **weighing modules without a terminal**. The MT-SICS commands listed here are only some of the available commands you can use in weighing operations.

For more information refer to the Reference Manual for MT-SICS Interface Commands, #11781363 (English). This can be downloaded from:

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3.1 Transmission of weight values

The weight values that are transmitted relate either to the zero point or to the point derived from the tare command, depending on whether the previous function executed was a reset to zero or taring.

Commands that are normally only completed when a stability criterion is met respond with an abort if the stability has not been achieved within the defined time limit (Timeout, command M67).

The following MT-SICS commands can be used to request weight results form the weigh module:

MT-SICS command	Descripiton
S	Transmit stable weight value
SI	Transmit weight value immediately (stable, not stable)
SNR	Transmit next stable weight value and repeat
SIR	Transmit weight value immediately and repeat (stable, not stable)

3.2 Operation limits

When operating WXS/WXT weighing module, the following operation limits have to be observed:

- The maximum permissible load on the weighing module is defined by the maximum capacity specification of the weighing module. This range includes the custom weighing platform (preload) plus the weighed object and the container.
- For environmental conditions. The specified metrological performance of the weighing module is ensured for the compensated temperature range (5 … 40 °C).

3.3 Taring function

In taring the weight value that relates to the current zero point is regarded as the tare weight and is transferred to the tare memory. At the same time, the current displayed weight value is reset to zero.

The following MT-SICS commands can be used to execute the tare function:

MT-SICS command	Descripiton
T	Adopt current stable weight value as tare weight
TI	Adopt weight value as tare weight immediately

Note

The taring functions cannot be executed if the current weight value is negative relative to the current zero point.

3.4 Zeroing functions

The reset function defines a new zero point (reference point), the current weight value is reset to zero and the tare memory is cleared. Depending on the configuration, the reset is performed automatically whenever the module is switched on or the stored value is used.

The following MT-SICS commands can be used to execute the reset (zero) function:

MT-SICS command	Descripiton
T	Adopt current stable weight value as zero point
ZI	Adopt the current weight value as the zero point immediately

Note

Make sure that a new zero point or a stored zero point is used, depending on the setting when the device is switched on.

3.5 Troubleshooting weigh module errors and malfunctions

Go through each of the steps offered here and try to remedy the problem yourself – it may be due to system settings. Never open the weighing module housing.

3.5.1 If your weigh module doesn't perform correctly until it has been powered up for quite a while

If the weighing module responds to transmission, taring, or zeroing commands with S␣I, T␣I or Z␣I for a long time after being powered up:

- Check ambient conditions.
- Check your zero after power-up by executing an SI command. If the weight reading deviates more than a few increments from zero, the unit was unable to get a stable reading upon being powered up, and was then unable to zero.
- Temporarily change your filter settings and/or your stability criterion for zeroing so that you can successfully zero the system with a Z command (response: Z␣A).
- If necessary, restore the filter settings **see** [Recording user settings ▶ Page 15].

3.5.2 If the weigh module does not transmit the expected weight readings

- Check the weighing module settings by using the LST command (inquire user settings).
- Run testing functions with the TST2 command (see the MT-SICS reference manual). The difference sent is the adjustment error, also called sensitivity deviation, that has developed as a result of drift since the last adjustment. The result should give you an idea of whether adjustment is needed.
  Note
  If the difference is in the hundreds of increments (digits), you should assume that the weighing module was never adjusted before, handled improperly, dropped, or suffered some other shock or blow. You should have a technician check the unit before you use it again.
- Switch the power off and back on and check the message that the interface sends after the weighing module's startup phase. If you see an error message instead of the serial number, contact your METTLER TOLEDO office.

If there is one of the following error on weight response perform the descript action:

- Error 10b – Check cable
- Error 14b – Check electronic box (wrong electronic box)
- Error 15b – Perform external adjustment

3.5.3 If the weigh module doesn't react to your commands at all

- Check to see that power is being supplied to your unit.
- Check your interfaces and interface parameter settings.

If you, or the person at your company responsible for maintaining the weigh module, cannot remedy the problem, please contact METTLER TOLEDO. Be sure to have the following information ready when contacting us:

- Your weigh module's current settings (`LST` command).
- Size of preload, if you're working with the adapter weighing pan and a custom setup for accepting objects to be weighed.
- Brief description of weighing application and the error or malfunction you are experiencing.

4 Technical Data

4.1 General data

> ⚠ **WARNING**
>
> **Risk of electric shock**
> Contact with parts that contain a live current can lead to injury and death.
> 1 Only use an approved AC/DC adapter with a current-limited SELV output.
> 2 Ensure correct polarity ⊖—◉—⊕

Power supply

AC adapter:	Primary: 100 – 240 V AC, -15%/+10%, 50/60 Hz Secondary: 12 V DC ±3%, 2.5 A (with electronic overload protection)
Cable for AC adapter:	3-core, with country-specific plug
Power feed-in at electronic unit::	12 V DC ±3%, 5 W, maximum ripple: 80 mVpp

Protection and standards

Overvoltage category:	II
Degree of pollution:	2
Protection:	In operation, the weigh unit is rated IP30. The electronic unit meets IP40. The SWT terminal is rated IP54.
Standards for safety and EMC:	See Declaration of Conformity
Range of application:	For use only in dry interior rooms. DO NOT OPERATE in hazardous areas!

Environmental conditions

Height above mean sea level:	Up to 4000 m
Ambient temperature:	5 to 40 °C
Relative air humidity:	Max. 80% at 31 °C, decreasing lineraly to 50% at 40 °C, non-condensing
Warm-up time:	At least 60 minutes after the weigh module has been connected to the power supply; the weigh module can be used immediately if it is turned on from standby mode (when operated with a terminal connected).

Materials

Load cell housing:	Polished chromium steel, X2CrNiMo17-12 (1.4404 resp. 316L),
Electronic unit housing:	Polished chromium steel, X2CrNiMo17-12 (1.4404 resp. 316L),
Terminal housing:	Painted die-cast zinc and plastic
Weighing pan:	Standard weighing pan: chromium steel, X2CrNiMo17-12 (1.4404 resp. 316L) Weighing pan adapter: plastic (PEEK CF30)

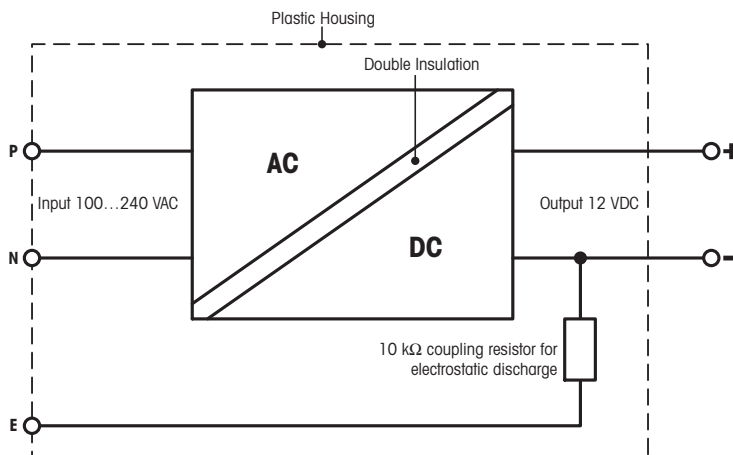## Detailed information on your METTLER TOLEDO power supply unit

METTLER TOLEDO weigh modules are shipped with an external power supply. In accordance with Class II protection, it is double-insulated and certified. It is equipped with functional grounding to ensure electro-magnetic compatibility (EMC). The ground connection has NO safety-related function. For more information on our products' conformity, refer to the Declaration of Conformity shipped with each product or download details from www.mt.com.

For testing in accordance with Directive 2001/95/EC, the power supply and weigh module should be treated as double-insulated Class II devices.

Therefore, grounding tests are not required. It is also unnecessary to conduct a grounding test between the protective ground of the power supply and a metallic surface on the weigh module housing.

Because precision weigh modules are sensitive to electrostatic discharge, a coupling resistor (typically 10kΩ is installed between the grounding conductor (at the power supply input) and the power supply output. See the equivalent circuit diagram for placement. This resistor is not part of the electrical safety plan; therefore, it does not need to be tested at regular intervals.

Equivalent circuit diagram

4.2 Model-specific Data

Parameter		WMC25-SH	WMC24-SH	WMC15-SH
Limit values				
Maximum capacity		21 g	21 g	11 g
Readability		0.01 mg	0.1 mg	0.01 mg
Repeatability [1] (at nominal load)	sd	0.02 mg (20 g)	0.1 mg (20 g)	0.02 mg (10 g)
Repeatability (at low load)	sd	0.012 mg (5 g)	0.08 mg (5 g)	0.012 mg (5 g)
	sd			
Linearity deviation		+/- 0.05 mg	± 0.2 mg	± 0.05 mg
Eccentricity deviation 2 mm offset		0.12 mg (10 g)	0.4 mg (10 g)	0.12 mg (5 g)
Sensitivity offset (test load)		$10 \times 10^{-6} \cdot R_{nt}$	$20 \times 10^{-6} \cdot R_{nt}$	$15 \times 10^{-6} \cdot R_{nt}$
Sensitivity temperature drift [2]		$0.0002\%/°C \cdot R_{nt}$	$0.0002\%/°C \cdot R_{nt}$	$0.0002\%/°C \cdot R_{nt}$
Sensitivity stability		$0.0001\%/a \cdot R_{nt}$	$0.0001\%/a \cdot R_{nt}$	$0.0001\%/a \cdot R_{nt}$
Typical values				
Repeatability	sd	0.01 mg	0.06 mg	0.01 mg
Linearity deviation		0.03 mg	0.13 mg	0.032 mg
Eccentric load deviation (test load)		0.08 mg (10 g)	0.24 mg (10 g)	0.08 mg (5 g)
Minimum weight (acc. to USP)		30 mg	180 mg	30 mg
Minimum weight (U=1%, k=2)		2 mg	2 mg	2 mg
Settling time [3] $3 \times sd$		0.7 s	0.6 s	0.6 s
Typical uncertainties & more				
Repeatability	sd	0.01 mg +0.000025% $\cdot R_{gr}$	0.06 mg+0.0001% $\cdot R_{gr}$	0.01 mg +0.00005% $\cdot R_{gr}$
Differential linearity deviation	sd	$\sqrt{(1.2 \times 10^{-8} mg \cdot R_{nt})}$	$\sqrt{(2 \times 10^{-7} mg \cdot R_{nt})}$	$\sqrt{(2.5 \times 10^{-8} mg \cdot R_{nt})}$
Differential eccentric load deviation (measured at)		$0.0004\% \cdot R_{nt}$	$0.0012\% \cdot R_{nt}$	$0.0008\% \cdot R_{nt}$
Minimum weight (acc. to USP)		30 mg+0.075% $\cdot R_{gr}$	80 mg+0.3% $\cdot R_{gr}$	30 mg+0.15% $\cdot R_{gr}$
Minimum weight (U=1%, k=2)		2 mg+0.005% $\cdot R_{gr}$	2 mg+0.005% $\cdot R_{gr}$	2 mg+0.01% $\cdot R_{gr}$
Interface update rate (max.)		23 weight values per second (with terminal), 92 weight values per second (without terminal)		
Weight of balance		0.415 kg	0.415 kg	0.415 kg
Dimensions of weigh unit				
Standard weighing pan, height × width × depth		73.35 × 25 × 65 mm		
Diameter of standard weighing pan		15 mm		
Diameter of weighing pan adapter		14 mm		

Legend

| sd	=	Standard deviation		Rnt	=	Net weight (sample weight)
Rgr	=	Gross weight		a	=	Year (annum)

[1] Applies only after adjustment at nominal capacity with an OIML E2 weight.

[2] Temperature range 10 … 30 °C.

[3] The time between placing the weighed object on the weigh module and indication of a stabilized weight value under optimal environmental conditions.

4.3 Key to types and list of available models

The type designation allows you to clearly identify your weighing module. The type designation can be found on the name plate for the load cell and the electronic unit.

$$\text{WMC} \; \square\square \; - \; \square\square \; / \; \square\square$$
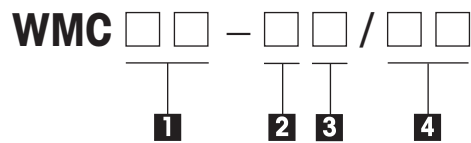
#	Designation	Configuration
1	**Maximum load/readability**	**For examples:** **25:** 20 g / 10 µg **15:** 10 g / 10 µg **24:** 20 g / 0.1 mg
2	**Version**	**S:** Single channel version **O:** Weigh unit only **E:** Electronic unit only
3	**Connection**	**H:** Horizontal cable exit
4	**Customer-specific version**	**For examples:** **01:** Customer A **02:** Customer AB

Note

The type designation always refers to the configuration as originally shipped. For example, if a weigh module has a terminal added to it later, the type designation printed on the name plate will no longer be correct. In this case, the terminal will check all weigh module components and use this information to generate a new type designation. This designation can be queried directly at the terminal or by using a software command.

List of available models

Model	Part No.
WMC25-SH	11149000
WMC15-SH	11149009
WMC24-SH	11149002

4.4 Dimensions

4.4.1 WMC weigh unit dimensional drawing (with draft shield)

4.4.2 Standard weighing pan dimensional drawing

4.4.3 Weighing pan adapter dimensional drawing
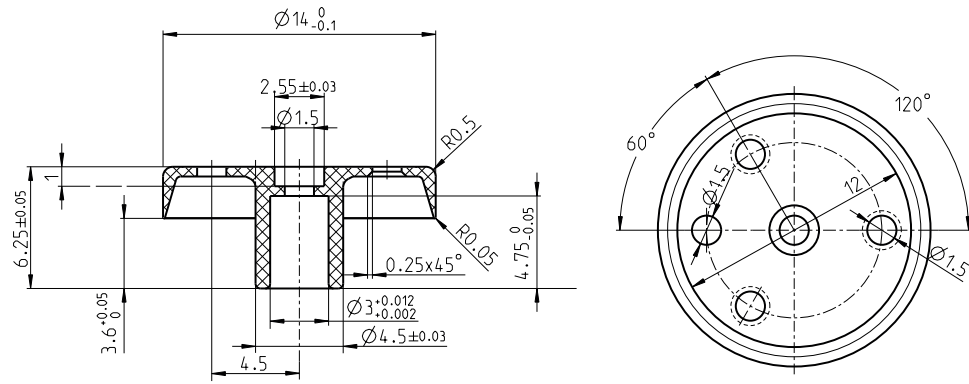
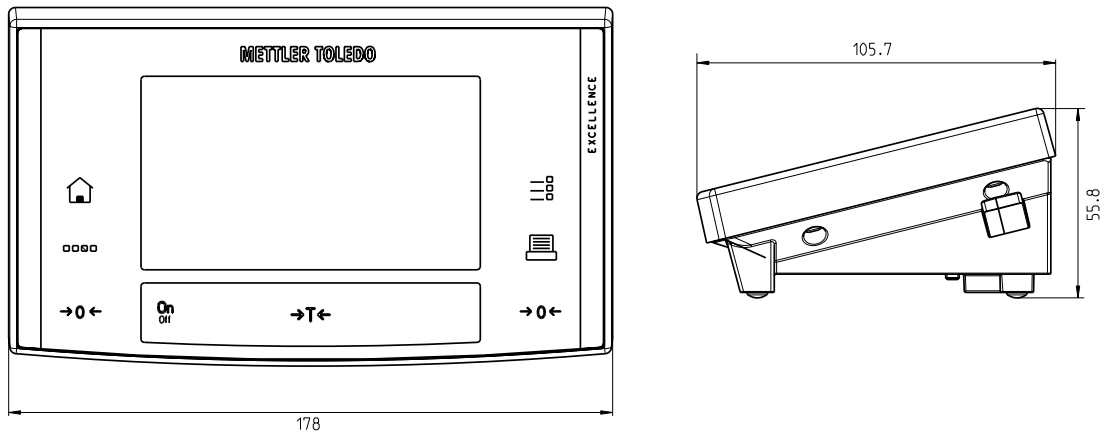### 4.4.4 Weighing pan support dimensional drawing
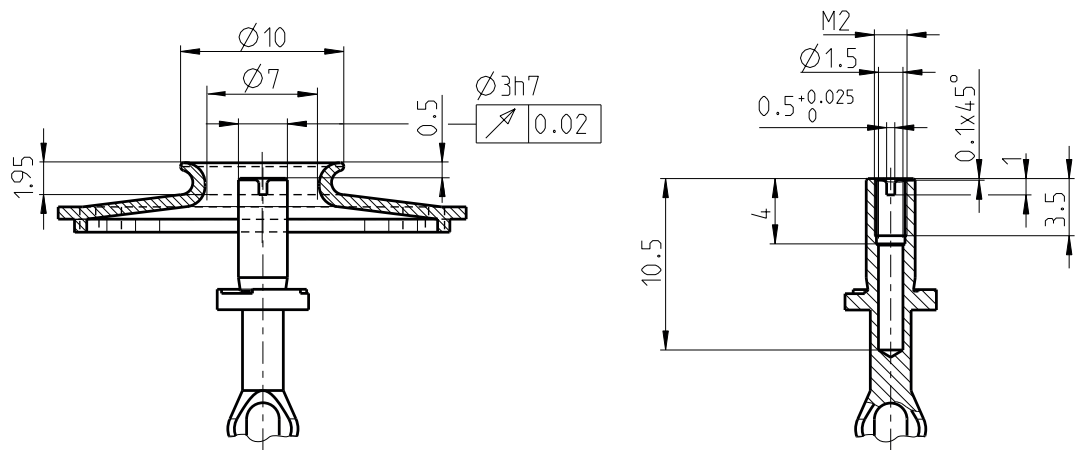
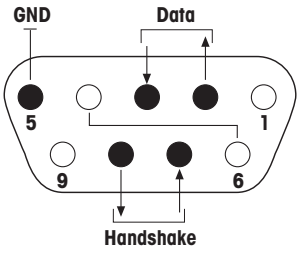### 4.4.5 Custom weighing pan drawing (limitations)
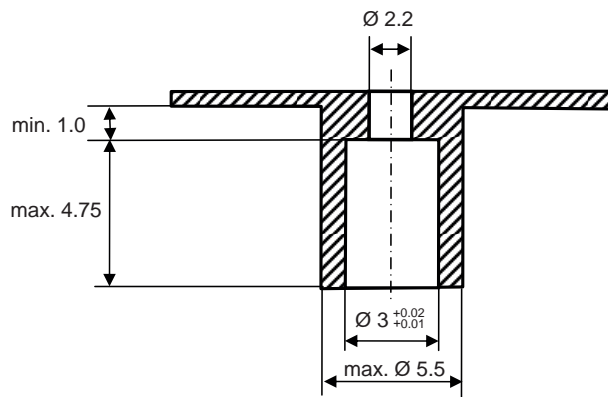
4.4.6 Electronic unit dimensional drawing (including mounting bracket)
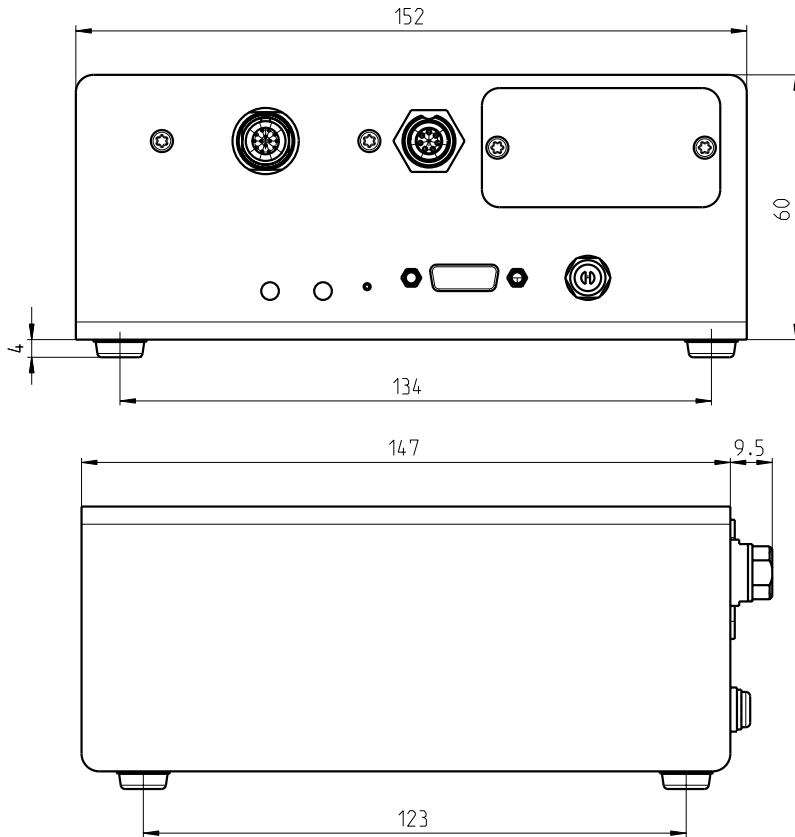
4.4.7 SWT terminal dimensional drawing

4.5 RS232C Interface (Standard Interface) Specifications

Interface type:	Voltage interface as per EIA RS-232C/DIN 66020 (CCITT V.24/V.28)
Max. cable length:	15 m
Signal level:	Outputs: +5 V ... +15 V (RL = 3 – 7 kΩ) –5 V ... –15 V (RL = 3 – 7 kΩ) · Inputs: +3 V ... 25 V –3 V ... 25 V
Connection:	D-Sub 9-pin female
Operating mode:	Full-duplex
Transmission mode:	asynchronous serial bit
Transmission code:	ASCII
Baud rates:	600, 1200, 2400, 4800, **9600**, 19200, 38400[1] (can be selected using interface commands)
Bits/parity:	7 Bit/Even, 7 Bit/Odd, 7 Bit/None, **8 Bit/None** (can be selected using interface commands)
Stop bits:	1 stop bit
Handshake:	None, **XON/XOFF**, RTS/CTS (can be selected using interface commands)
End of line:	**<CR><LF>**, <CR>, <LF> (can be selected using interface commands)

Pin 2: Transmission line for scale (TxD)
Pin 3: Receiving line for scale (RxD)
Pin 5: Signal ground (GND)
Pin 7: Clear to send (hardware handshake) (CTS)
Pin 8: Request to send (hardware handshake) (RTS)

[1] 38400 baud only possible:
- Weigh module without terminal, or
- Weigh module with terminal, only via the optional RS232C interface.

4.6 Specification for Aux Connections

You can plug the "**ErgoSens**" from METTLER TOLEDO or an external optical sensing device into the Aux 1 and Aux 2 jacks. This allows you to perform functions such as taring, zeroing, printing, etc (only together with terminal).
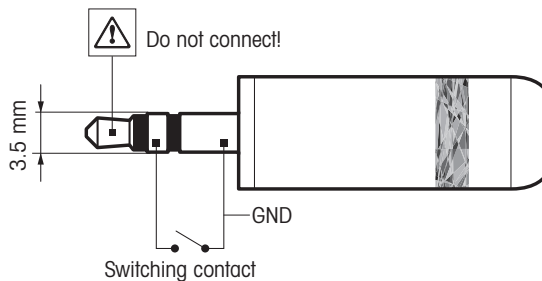
External wiring:

Connection	3.5 mm stereo jack
Electrical data	Max. voltage: 12 V Max. power: 150 mA

5 Wash-down Module

5.1 Introduction to the Wash-down Module

With the wash-down module the IP rating is increased to IP54 in operation and to IP56 for cleaning. Thus you can process dusty weighing goods or clean the weigh module with a water jet.

In order to achieve the higher IP rating, an air flow is directed through the wash-down head.

5.2 Wash-down Module / Accessories

Designation	Part No.	Content	Picture
Wash-down module Conversion kit	30236376	• Wash-down head • Weighing pan (adapter) • O-ring • Sealing gasket • 4 screws M2.5 (Torx T8)	
Stainless steel cover for easier cleaning of the weigh module	30252374	• O-ring • 4 screws M2.5 (Torx T8) to attach wash-down head	
Weighing pan adapter Can be used as weighing pan or as adapter for a customer specific weighing pan	30278648	• Weighing pan adapter	

5.3 Installation of the Wash-down Module

Note

To ensure that your weigh module will remain accurate, we recommend that the conversion is done by an authorized service technician.

Preconditions for a trouble-free conversion

- Clean and dust-free workbench
- Fastener to hold the weigh module in place
- Special screw driver or open-ended spanner (2.5 mm)
- Screw driver Torx (T8)

Removing the head of the WMC weigh module

1 Remove the draft shield (4).
2 Take off the weighing pan (1) and the weighing pan adapter (2) from the weighing pan support.
3 Remove the 4 screws (3) with the special screw driver or open-ended spanner (2.5 mm) and take off the cover (5).
4 Remove the sealing gasket (6) and dispose of it.
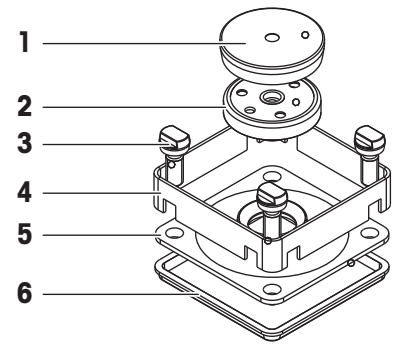
Installing the wash-down module

1 Place the new sealing gasket (9) delivered with the wash-down module on the weigh module.
2 Carefully place the wash-down head (8) on the housing.
3 Use the 4 Torx T8 screws (7) delivered with the wash-down module to attach the wash-down module on the housing. Tighten the screws equally with a torque of 0.5 Nm.
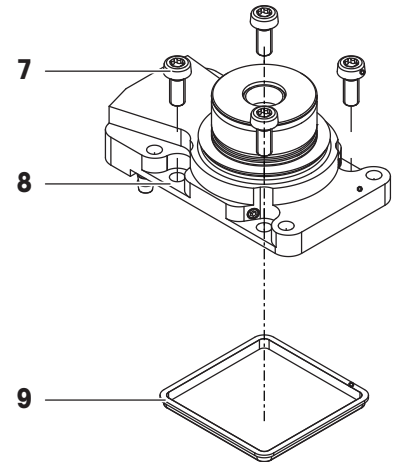
Installation without stainless steel cover

1 Ensure that the O-ring (11) is placed correctly on the wash-down head.
2 Screw in the weighing pan adapter (10) carefully as far as it will go.
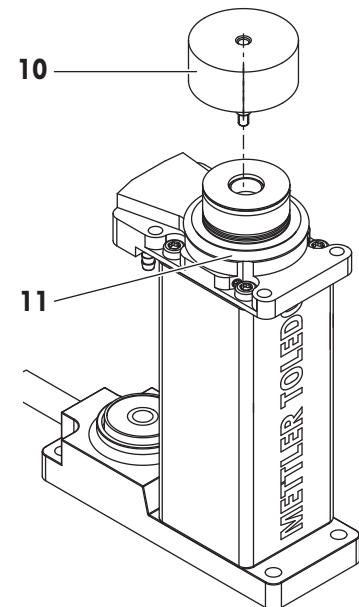
Installation with stainless steel cover

1. Place the sealing (13) delivered with the stainless steel cover on the wash-down head.
2. Place the stainless steel cover (12) on the wash-down head and mount it with the 4 screws (14).
3. Screw in the weighing pan adapter (10) carefully as far as it will go.
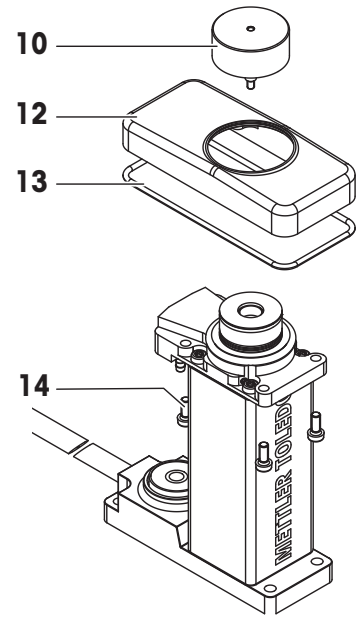
Single arrangement

In this installation the weigh module is not standing on the base but is hanging on the separating plate (15) by means of the stainless steel cover. Thus you can separate the hygienic area from the non-hygienic area.

Installation

- Separating plate (15) prepared, **see** [Wash-down Module Dimensions ▶ Page 35].
- 4 screws (16) provided.
- Wash-down module installed with stainless steel cover, see above.

1. Guide the weigh module with wash-down head through the cutout of the spacer plate (15).
2. Mount the stainless steel cover to the spacer plate using 4 screws (16).
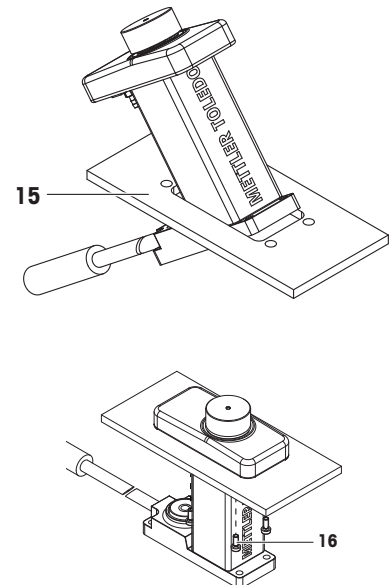
Multiline arrangement

It is possible to array several weigh modules next to each other with a pitch of at least 25 mm.

A stainless steel cover that covers all the sensors and a respective sealing gasket have to be designed by the customer.

Weigh module protection

To protect the weigh module, e.g., from dust and soiling, a separating plate (17) can be mounted on top of the wash-down module.

- Separating plate (17) prepared, see [Wash-down Module Dimensions ▶ Page 35].
- 4 screws (18) provided.
- Wash-down module installed without stainless steel cover, see above.

1 Mount the separating plate on the wash-down head with the 4 screws (18)
2 Screw in the weighing pan adapter (10) carefully as far as it will go.
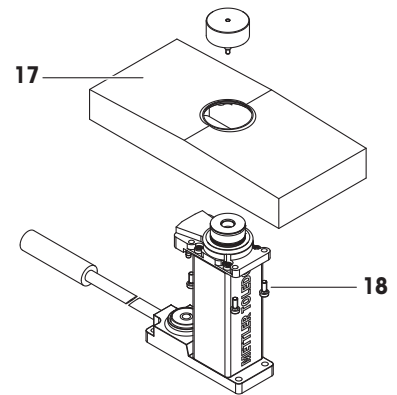
Air connection

On the bottom, the wash-down head has 3 connection fittings for compressed air.

It is recommended to use a pneumatic pipe with an inner diameter of 2.5 mm and an outer diameter of 4.0 mm.

Bellow inflation (1): To inflate the bellows for cleaning.

Laminar flow (2): During operation the laminar flow ensures that no dust may ingress into the weigh module.

Purge air (3): Purge the wash-down head after cleaning.
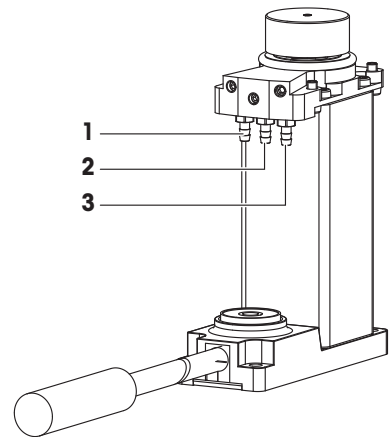
5.4 Wash-down and Ingress Protection Functionality

Functional diagram

When installing as single or multiline arrangement, the separating plate (customer interface) may work as separation of the hygienic area from the non-hygienic area.
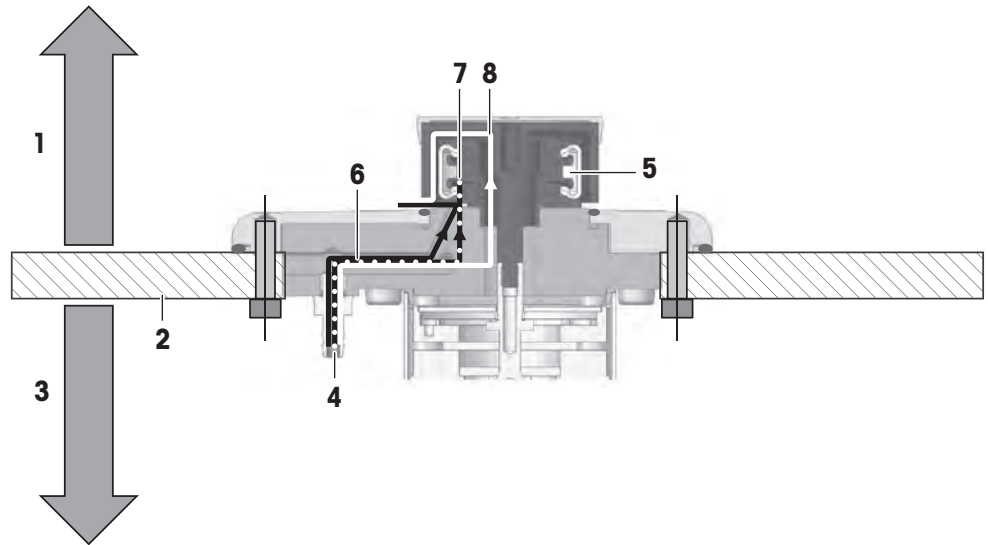
1	Hygienic area	**5**	Bellows
2	Separation plate	**6**	Laminar flow during weighing (IP54)
3	Non-hygienic area	**7**	Inflate bellows to activate the wash-down functionality (IP56)
4	Air supply	**8**	Purge air after wash-down process (IP56)

Laminar flow (IP54)

The laminar flow can remain active all the time, even during weighing.

It must be ensured that the laminar flow is within the specification of 1.8 liter/minute at STP (standard process).

Wash-down (cleaning) process (IP56)

1 Inflate the bellows 0.6 ±0.1 bar.

2 Start the cleaning process.

3 When the cleaning process is finished, relieve the bellows.

4 Activate the purge flow for about 1 minute.

⇨ The weigh module is ready for weighing.

Note

Please consider the time for the thermal stabilization.

5.5 Wash-down Module Technical Data

Protections and standards with wash-down installation

Active laminar flow (weighing mode)	IP54
Sealed with bellows (cleaning mode)	IP56

Materials

Wash-down head	PEEK CA30 Bio USP Class VI (adhesive Bio USP)
Bellows	Silicone 40 ShA (FDA approved)
Weighing pan adapter	PEEK CA30 Bio USP Class VI
Connection fitting	Stainless steel Class XX (Festo)
Stainless steel cover	X2CrNiMo17-12-2 (1.4404)

Compressed air specifications

Primary air	0.6 ±0.1 bar
Purge air	1.8 l/min at STP
Laminar flow	
Bellow inflation	

Model-specific data with wash-down head

Parameter	WMC25-SH	WMC24-SH	WMC15-SH
Repeatability (sd) at nominal load	0.05 mg (20 g)	0.1 mg (20 g)	0.05 mg (10 g)
Repeatability (sd) at low load	0.03 mg (5 g)	0.08 mg (5 g)	0.03 mg (5 g)
Linearity deviation	±0.1 mg	±0.2 mg	±0.1 mg
Eccentric load deviation (2 mm offset)	0.15 mg (10 g)	0.4 mg (10 g)	0.15 mg (5 g)
Settling time, typ. [1]	3.0 s	2.5 s	2.5 s
Weight for customer added weighing support [2]	4 g	4 g	4 g

[1] The settling time is the time between when the object to be weighed is placed on the scale and a stable signal is transmitted. This assumes optimal ambient conditions and optimal parameter settings.

[2] The weigh module still operates with full range.
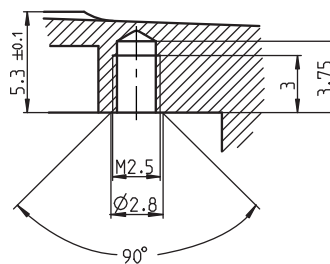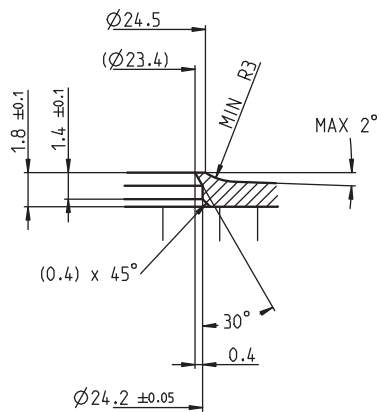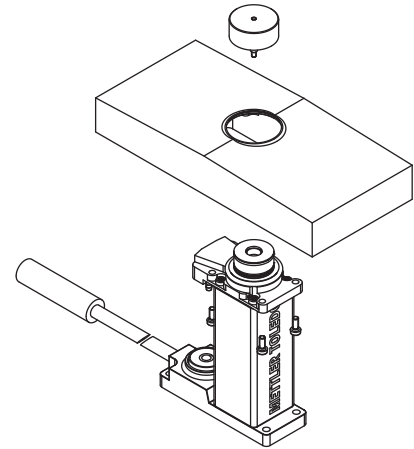
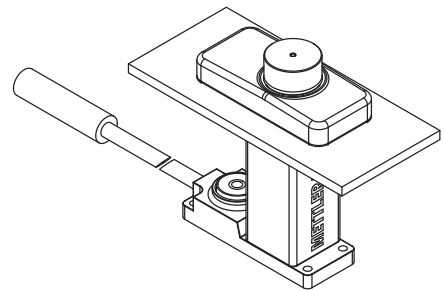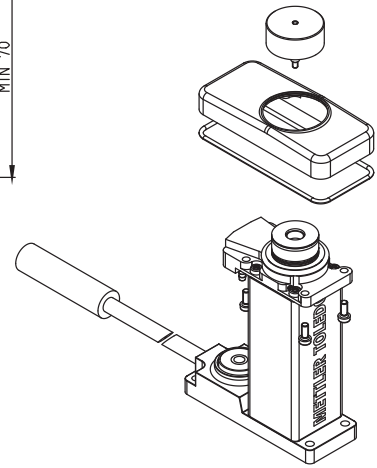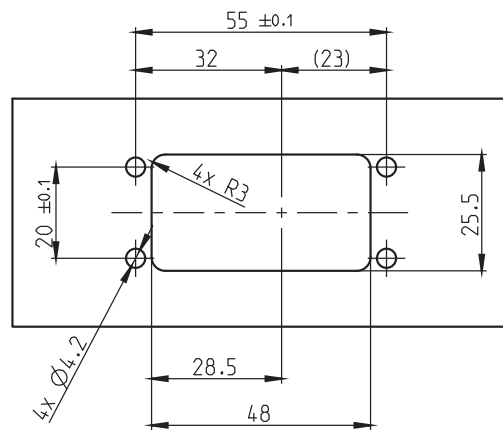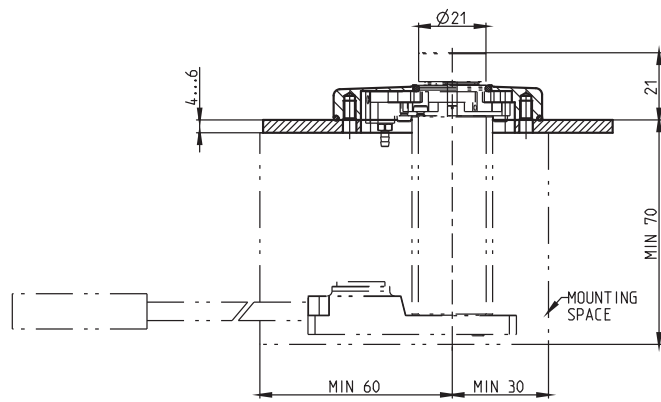## 5.6 Wash-down Module Dimensions

Wash-down head
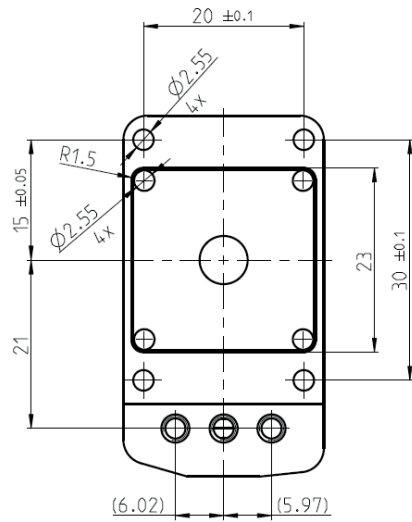
Weighing pan adapter
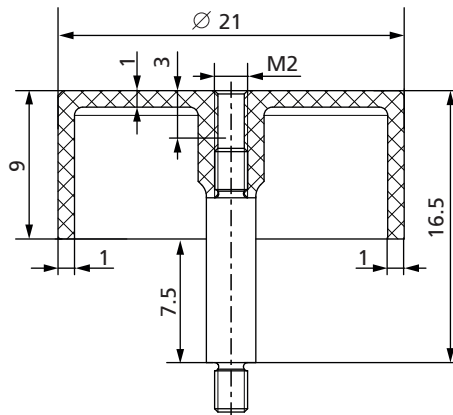
Installation without stainless steel cover and optional separating plate
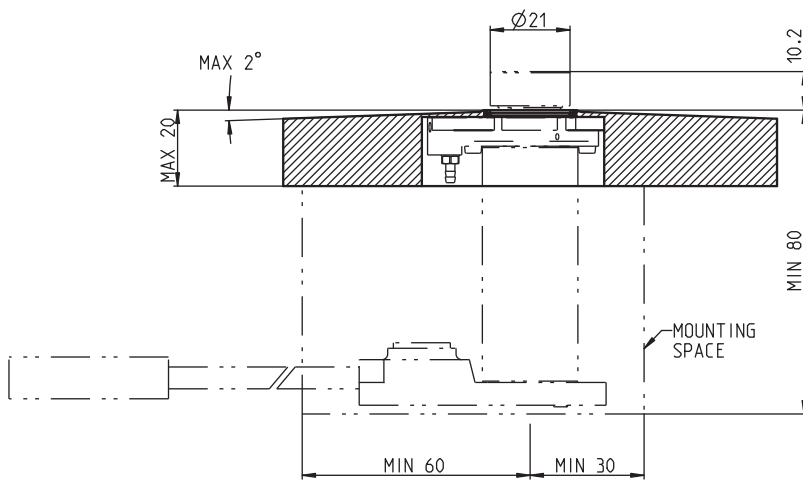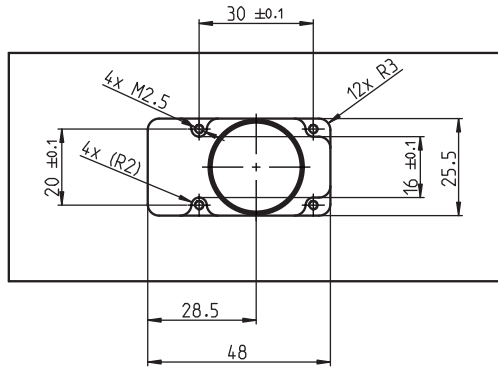
Installation with stainless steel cover / single arrangement

Ø21

4...6

21

MIN 70

MOUNTING SPACE

MIN 60   MIN 30

55 ±0.1

32   (23)

20 ±0.1

4x R3

25.5

4x Ø4.2

28.5

48

6 Accessories and Spare Parts

6.1 Accessories

Description		Part No.
Terminals		
SWT Terminal (touchscreen, monochrome display), including 2 terminal cables (0.575 m and 2 m long), including protective covering and documentation		11121057
Optional interfaces		
Second RS232C Interface		11132500
Ethernet Interface for connection to an Ethernet network		11132515
BT2 Option: Bluetooth Interface, single-point connection with other Bluetooth device e.g. computer		30237796
BT2 Paired Option: Bluetooth Interface for single point connection with RS232 device e.g. RS-P25, P-56RUE or P-58RUE		30237797
RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port		64088427
Connecting cables		
Terminal-electronic unit connector cable, 6-pin	0.575 m/1.9 ft	11132124
	0.945 m/3.1 ft	11132129
	2 m/6.5 ft	11132133
Wash-down accessories		
WMC Wash-down module, to increase IP rating to IP54 in operation and to IP56 for cleaning		30236376
WMC Stainless steel cover		30252374
WMC Wash-down weighing pan adapter		30099618
Miscellaneous		
Terminal holder for SWT terminal, including mounting screws.		11121255
Mounting bracket for electronic unit, including DIN clip and mounting screws		11121254
CarePac® 20 g F1 / 1 g E2		11123006
OIML weight 20 g E2, plastic box, incl. certificate		00158437
OIML weight 10 g E2, plastic box, incl. certificate		00158427
Tweezers, bent tips, length 130 mm		11116540
Tweezers, straight tips, length 220 mm		11116544

6.2 Spare Parts

Description		Part No.
Weigh units		
Weigh unit with mounted plastic cover (incl. 3 m cable with connector)	WMC25-OH	11149001
	WMC15-OH	11149011
	WMC24-OH	11149003
Electronic units		
Electronic unit (without power supply, power cord and mounting bracket)	WMC25-E	11149027
	WMC15-E	11149026
	WMC15-E	11149028
Weighing pans		
Standard weighing pan ø 15mm (requires weighing pan adapter)		30005370
Weighing pan adapter ø 14mm (plastic)		30005372
Miscellaneous		
12V Power supply (without country-specific power cable)		11107909
Protective covering for the SWT terminal		11106870
Plastic cover (cover for weighing pan support)		30005374
Standard draft shield		30005371

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GWP®
Good Weighing Practice™

GWP® is the global weighing standard, ensuring consistent accuracy of weighing processes, applicable to all equipment from any manufacturer It helps to:
• Choose the appropriate balance or scale
• Calibrate and operate your weighing equipment with security
• Comply with quality and compliance standards in laboratory and manufacturing

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For more information

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