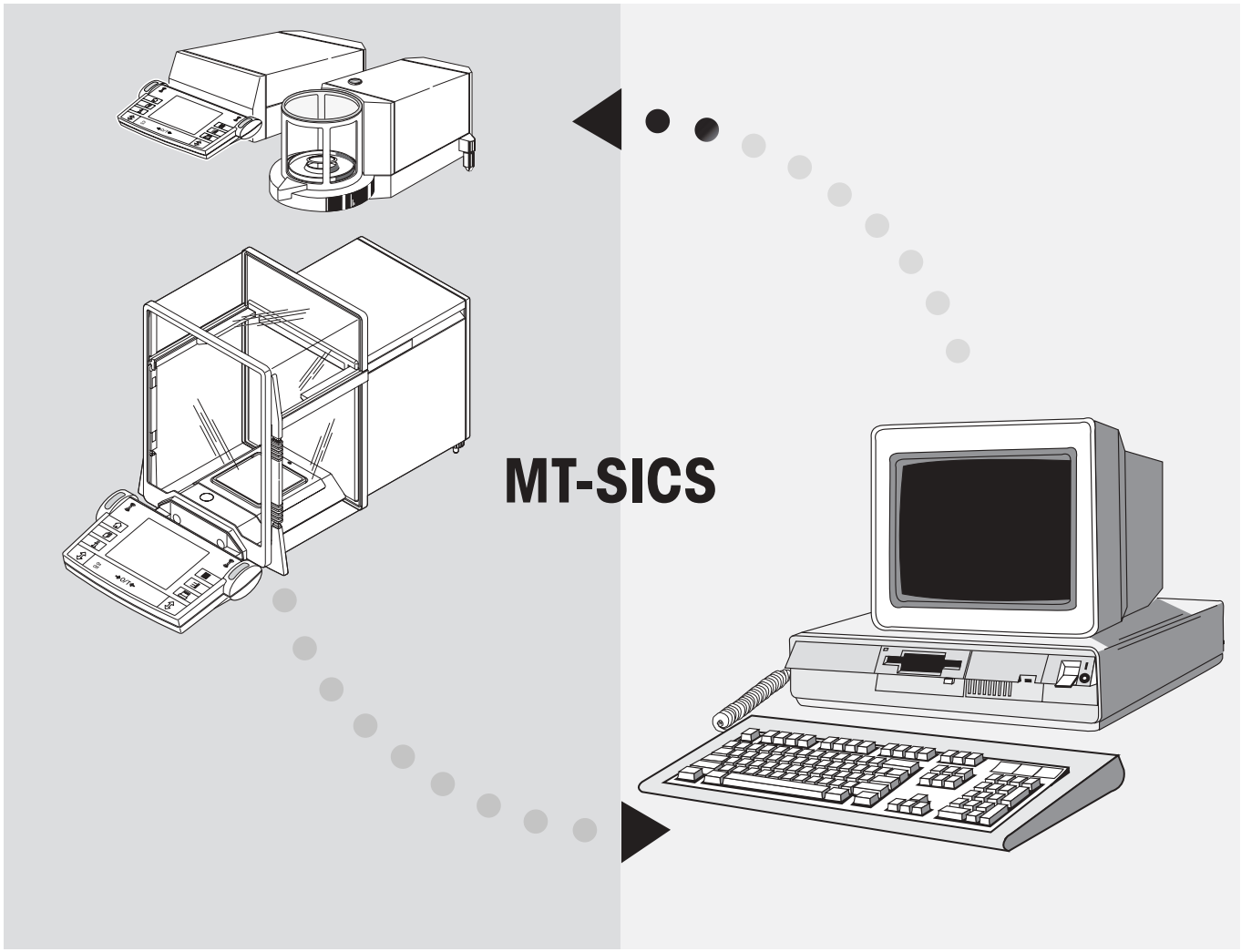
Reference manual

METTLER TOLEDO
Standard Interface Command Set
MT-SICS 0 version 2.3x
MT-SICS 1 version 2.2x
MT-SICS 2 version 1.10 for AX/MX/UMX balances
MT-SICS 3 version 1.00 for AX/MX/UMX balances



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1. Introduction

In weight measurements the demands on the readability and maximum capacity of balances and scales range from less than one microgram up to several hundred tonnes. To meet these and other requirements, METTLER TOLEDO offers an extensive range of balances and scales. Many of the balances and scales used have to be capable of integration in a complex computer or data acquisition system.

To enable you to integrate balances in your system in a simple manner and utilize their capabilities to the full, most balance functions are also available as appropriate commands via the data interface.

Standardization of the commands

All new METTLER TOLEDO balances launched on the market support the standardized command set "METTLER TOLEDO Standard Interface Command Set" (MT-SICS), which is divided into 4 levels, depending on the functionality of the balance:

- MT-SICS level 0 Command set for the simplest balance, e.g. weighing cell.
- MT-SICS level 1 Extension of the command set for standard balances, i.e. balances without integrated applications.
- MT-SICS level 2 Extension of the command set by the commands specific for a balance family, e.g. MT-SICS level 2 for the x-balance line.
- MT-SICS level 3 Application-specific commands as an extension of the command set, e.g. MT-SICS level 3 for piece counting or FreeWeigh application with Remote -x software.

A particular distinguishing feature of this concept is that the commands combined in MT-SICS level 0 and 1 are identical for all balances. Both the simplest weighing balance and a fully expanded weighing work station recognize the commands of MT-SICS level 0 and 1.
Investigations of various applications have shown that the vast majority of all system solutions can be handled with the commands of MT-SICS level 0 and 1. This means for you: if you restrict yourself to the commands of MT-SICS level 0 and 1, you can expand your system with additional balances from METTLER TOLEDO without having to change your application programs.

What do the commands of MT-SICS level 0 and 1 offer?

You can use the commands of MT-SICS level 0 and 1 to perform the following operations via the interface:

- request weighing results,
- tare the balance and preset the tare weight,
- zero the balance,
- identify MT-SICS implementation,
- identify the balance,
- reset the balance,
- control the display,
- control the keys for operation of the balance.

The commands of MT-SICS level 2 and 3

You can naturally use the data interface to exploit all functions available with your current balance or application. These additional functions are collected in the commands of MT-SICS level 2 and 3.
When creating your software application, please note that whereas the commands of MT-SICS level 2 have been specially tailored to your balance family, the commands of MT-SICS level 3 apply to your weighing application and can not be supported by every METTLER TOLEDO balance. In the enclosure with this manual, you can see what commands are supported by your balance and application.

Additional documentation on data interface

Settings of the interface such as baud rate, number of data bits, parity, handshake protocols and connector pin assignment are described in the operating instructions of the peripheral instrument or cable in question.

Version number of the MT-SICS

Each level of the MT-SICS has its own version number which can be requested with the command I1 from level 0.

This manual describes

MT-SICS level 0, version 2.3x

MT-SICS level 1, version 2.2x

MT-SICS level 2 version 1.10 for AX/MX/UMX balances

MT-SICS level 3 version 1.00 for AX/MX/UMX balances

You can use the command I1 via the interface to request the MT-SICS level and MT-SICS versions implemented on your balance.
Please make sure that the versions implemented on your balance agree with those listed above.

2. Basic information on data interchange with the balance

Each command received by the balance via the data interface is acknowledged by a response of the balance to the transmitter.
Commands and responses are data strings with a fixed format, and will be described in detail in chapter 3.

2.1 Command formats

Commands sent to the balance comprise one or more characters of the ASCII character set. Here, the following must be noted:

- Enter commands only in uppercase.
- The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec., in this description represented as ␣).
- The possible input for "text" is a sequence of characters of the 8-bit ASCII character set from 32 dec to 255 dec.
- Each command must be closed by C_RL_F (ASCII 13 dec., 10 dec.).

The characters C_RL_F, which can be inputted using the Enter or Return key of most entry keypads, are not listed in this description, but it is essential they be included for communication with the balance.

Example
Command to balance which writes Hallo into the balance display:

D␣"Hallo" The command terminator C_RL_F is not shown.

Comment

The quotation marks " " must be inserted in the entry.

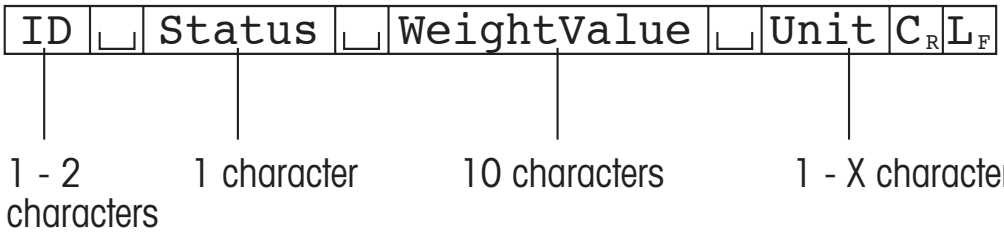
2.2 Response formats

All responses sent by the balance to the transmitter to acknowledge the received command have one of the following formats:

- Response with weight value
- Response without weight value
- Error message

2.2.1 Format of the response with weight value

A general description of the response with weight value is the following.



ID	Response identification.
␣	Space (ASCII 32 dec.).
Status	Status of the balance, see description of the commands and responses.
WeightValue	Weighing result; shown as number with 10 digits, incl. decimal point and sign – directly in front of the first digit if value negative. The weight value appears right-aligned. Preceding zeros are not shown with the exception of the zero to the left of the decimal point. With METTLER TOLEDO DeltaRange balances, outside the fine range the last decimal place is shown as a space.
Unit	Weight unit actually set under unit 1.
C_R	Carriage Return (ASCII 13 dec.).
L_F	Line Feed (ASCII 10 dec.).

Comment

C_RL_F will not be shown in this description.

Examples

Response with stable weight value of 0.256 g:

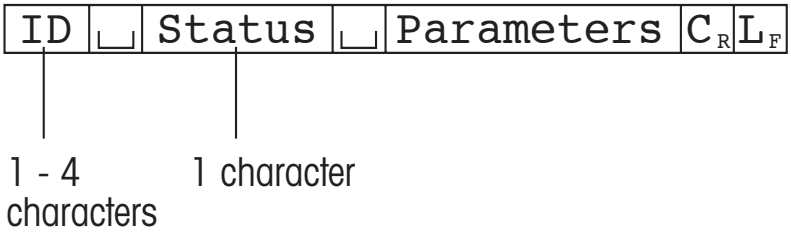
S␣S␣␣␣␣␣␣0.256␣g

Response with stable weight value outside the fine range:

S␣S␣␣␣␣4875.2␣␣g

2.2.2 Format of the response without weight value

A general description of the response without weight value is the following.



ID	Response identification.
␣	Space (ASCII, 32 dec.).
Status	Status of the balance, see description of the commands and responses.
Parameters	Command-dependent response code.
C_R	Carriage Return (ASCII 13 dec.).
L_F	Line Feed (ASCII 10 dec.).

Comment

C_RL_F will not be shown in this description.

Example

Response to D␣"Hallo" when Hallo appears unabridged in the display: D␣A.

2.2.3 Error messages

ID	C_R	L_F

There are three different error messages. The identification always comprises two characters.

ID Error identification
Possible error messages are

ES Syntax error

The balance has not recognized the received command.

ET Transmission error

The balance has received a "faulty" command, e.g. owing to a parity error or interface break.

EL Logical error

The balance can not execute the received command.

C_R Carriage Return (ASCII 13 dec.).

L_F Line Feed (ASCII 10 dec.).

Comment
C_RL_F will not be shown in this description.

2.2.4 Tips for the programmer

Command and response

You can improve the dependability of your application software by having your program evaluate the response of the balance to a command. The response is the acknowledgement that the balance has received the command.

Reset

To be able to start from a determined state, when establishing the communication between balance and system, you should send a reset command to the balance. When the balance or system is switched on or off, faulty characters can be received or sent.

Quotation marks " "

Quotation marks included in the command must always be entered.

3. Commands and responses

The balance receives commands from the system computer and acknowledges the command with an appropriate response.
The following sections contain a detailed description of all commands of the command set in alphabetical order with the associated responses. Commands and responses are closed with C_RL_F. These termination characters are not shown in the following description, but they must always be entered with commands or sent with responses.

3.1 Commands and responses MT-SICS level 0

The commands of MT-SICS level 0 are available with even the simplest balances which support the METTLER TOLEDO Standard Interface Command Set.

Command		Page
I0	Inquiry of all implemented MT-SICS commands	14
I1	Inquiry of MT-SICS level and MT-SICS versions	15
I2	Inquiry of balance data	16
I3	Inquiry of balance SW version and type definition number	16
I4	Inquiry of serial number	17
I5	SW-Identification number	17
S	Send stable weight value	18
SI	Send weight value immediately	19
SIR	Send weight value immediately and repeat	20
Z	Zero	21
ZI	Zero immediately	22
@	Reset	23

I0 – Inquiry of all implemented MT-SICS commands

Command	**I0**	Send list of all implemented MT-SICS commands
Response	**I0␣B␣x1␣"1.Command"**	x1 = number of the MT-SICS level where the 1. Command belongs to.
	I0␣B␣x1␣"2.Command"	2nd (next) command implemented
	:	
	:	
	I0␣A␣x1␣"last Command"	Last command implemented
	I0␣I	The list cannot be sent at present as another operation is taking place

Example

Command	**I0**	Send list of commands
Response	**I0␣B␣0␣"I0"**	Level 0 command "I0" implemented
	I0␣B␣0␣"I1"	Level 0 command "I1" implemented
	:	:
	:	:
	:	:
	I0␣B␣0␣"S"	Level 0 command "S" implemented
	:	:
	:	:
	I0␣B␣0␣"Z"	Level 0 command "Z" implemented
	I0␣B␣0␣"@"	Level 0 command "@" (reset) implemented
	I0␣B␣1␣"D"	Level 1 command "D" implemented
	I0␣B␣1␣"DW"	Level 1 command "DW" implemented
	:	:
	:	:
	I0␣A␣3␣I12	(last command)

Comments

- The I0 command lists all commands implemented in the present software. Thus, there is no need of the supplement sheet delivered with the previous versions of this manual.
- All level 0 commands are listed in alphabetical order before all commands of level 1 etc. This order corresponds to the order how the commands are described in this manual.

I1 – Inquiry of MT-SICS level and MT-SICS versions

Command **I1** Inquiry of MT-SICS level and MT-SICS versions.

Response **I1␣A␣"x1"␣"x2"␣"x3"␣"x4"␣"x5"**

x1 = 0	Balance with MT-SICS level 0 (simplest balance)
x1 = 01	Balance with MT-SICS level 0 and 1 (standard balance)
x1= 012	Balance with MT-SICS level 0, 1 and 2 (standard balance with extensions)
x1 = 03	Balance with MT-SICS level 0 and 3 (simplest balance with a special application)
x1 = 013	Balance with MT-SICS level 0, 1 and 3 (standard balance with a special application)
x1 = 0123	Balance with MT-SICS level 0, 1, 2, and 3 (standard balance with extensions and a special application)
x1 = 3	Application device with MT-SICS level 3 (not necessarily a balance)
X2	Version of the implemented MT-SICS0 commands
X3	Version of the implemented MT-SICS1 commands
X4	Version of the implemented MT-SICS2 commands
X5	Version of the implemented MT-SICS3 commands

I1␣I Command understood, not executable at present.

Example

Command **I1** Inquiry of MT-SICS level and versions.

Response **I1␣A␣"01"␣"2.00"␣"2.00"␣""␣""**

01	Level 0/1 implemented
2.00	Level 0, version V2.00
2.00	Level 1, version V2.00

Comments

- In the case of the MT-SICS level, only fully implemented levels are listed. In other words, if it is not possible to implement all commands from a certain level, the level is not specified.
- In the case of the MT-SICS version, all levels are specified even those only partially implemented.

I2 – Inquiry of balance data

Command	**I2**	Inquiry of balance data.
Response	**I2 A "text"**	Balance data as "text".
	I2 I	Command understood, not executable at present.

Example

Command	**I2**	Inquiry of balance type.
Possible responses	**I2 A "PR5002DR R-Standard 5100.90 g"** **I2 A "AX204-Standard 220.0090 g"**	

Comments

- With DeltaRange balances, the last decimal place is available only in the fine range.
- The number of characters of "text" depends on the balance type.

I3 – Inquiry of balance SW version and type definition number

Command	**I3**	Inquiry of balance SW version and type definition number.
Responses	**I3 A "text"**	Balance SW version and type definition number as "text".
	I3 I	Command understood, not executable at present.

Examples

Command	**I3**	Inquiry of SW version number(s) and type definition number.
Response	**I3 A "1.05 1.1.1.17.7"**	
	1.05	Software version number
	1.1.1.17.7	Type definition number

Comment

The first number (digits prior to the first space in the text string) is the SW version number. The second SW version number is optional, and depends on the balance type. The last number (following the last space) is the type definition number for service purposes.

I4 – Inquiry of serial number

Command	**I4**	Inquiry of serial number.
Responses	**I4␣A␣"text"**	Serial number as "text".
	I4␣I	Command understood, not executable at present.

Example

Command	**I4**	Inquiry of serial number.
Response	**I4␣A␣"0123456789"**	

Comments

- The serial number agrees with that on the model plate and is different for every balance.
- The serial number can be used, for example, as a device address in a network solution.
- The response to I4 appears unsolicited after switching on and after the reset command (@).

I5 – SW-Identification number

Command	**I5**	Inquiry of SW-Identification number.
Responses	**I5␣A␣"x"**	SW-Identification number as Text. x: SW-Identification number.
	I5␣I	Command understood, not executable at present.

Example

Command	**I5**	Inquiry of SW-Identification number.
Response	**I5␣A␣"12345678A"**	SW-Identification number with index.

Comment

- The SW-Identification number is unique for every Software.

S – Send stable weight value

Command	**S**	Send the current stable net weight value.
Response	**S␣S␣WeightValue␣Unit**	Current stable weight value in unit actually set under unit 1.
	S␣I	Command not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
	S␣+	Balance in overload range.
	S␣–	Balance in underload range.

Example

Command	**S**	Send a stable weight value.
Response	**S␣S␣␣␣␣␣␣100.00␣g**	The current, stable weight value is 100.00 g.

Comments

- The duration of the timeout depends on the balance type.
- To send the stable weight value in actually displayed unit, see 'SU' command in level 2
- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

SI – Send weight value immediately

Command	**SI**	Send the current net weight value, irrespective of balance stability.
Response	**S␣S␣WeightValue␣Unit**	Stable weight value in unit actually set under unit 1.
	S␣D␣WeightValue␣Unit	Nonstable (dynamic) weight value in unit actually set under unit 1.
	S␣I	Command not executable (balance is currently executing another command, e.g. taring).
	S␣+	Balance in overload range.
	S␣–	Balance in underload range.

Example

Command	**SI**	Send current weight value.
Response	**S␣D␣␣␣␣␣␣129.07␣g**	The current weight value is unstable (dynamic) and is 129.07 g.

Comments

- The response to the command SI is the last internal weight value (stable or dynamic) before receipt of the command SI.
- To send weight value immediately in actually displayed unit, see 'SIU' command in level 2

SIR – Send weight value immediately and repeat

Command	**SIR**	Send the net weight values repeatedly, irrespective of balance stability.
Response	**S␣S␣WeightValue␣Unit**	Stable weight value in unit actually set under unit 1.
	S␣D␣WeightValue␣Unit	Nonstable (dynamic) weight value in unit actually set under unit 1.
	S␣I	Command not executable (balance is currently executing another command, e.g. taring).
	S␣+	Balance in overload range.
	S␣–	Balance in underload range.

Example

Command	**SIR**	Send current weight values at intervals.
Response	**S␣D␣␣␣␣␣␣129.07␣g**	
	S␣D␣␣␣␣␣␣129.08␣g	
	S␣S␣␣␣␣␣␣129.09␣g	
	S␣S␣␣␣␣␣␣129.09␣g	
	S␣D␣␣␣␣␣␣114.87␣g	
	…	The balance sends stable or nonstable weight values at intervals.

Comments

- SIR is overwritten by the commands S, SI, SR, @ and hardware break and hence cancelled.
- The number of weight values per second depends on the balance type.
- To send weight value in actually displayed unit, see 'SIRU' command in level 2

Z – Zero

Command	**Z**	Zero the balance.
Response	**Z␣A**	The following then holds: gross = net + tare = 0. Zero setting performed, i.e. stability criterion and zero setting range complied with.
	Z␣I	Zero setting not performed (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
	Z␣+	Upper limit of zero setting range exceeded.
	Z␣–	Lower limit of zero setting range exceeded.

Example

Command	**Z**	Zero.
Response	**Z␣A**	Zero setting performed.

Comments

- The tare memory is cleared during zero setting.
- The zero point determined during switching on is not influenced by this command, i.e. the measurement ranges remain unchanged.
- The duration of the timeout depends on the balance type.
- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

ZI – Zero immediately

Command	**ZI**	Zero the balance immediately regardless the stability of the balance.
Response	**ZI␣D**	Re-zero performed under non-stable (dynamic) conditions.
	ZI␣S	Re-zero performed under stable conditions.
	ZI␣I	Zero setting not performed (balance is currently executing another command, e.g. taring).
	ZI␣+	Upper limit of zero setting range exceeded.
	ZI␣–	Lower limit of zero setting range exceeded.

Example 1

Command	**ZI**	Zero immediately.
Response	**ZI␣S**	Zero setting performed, weight value was stable.

Example 2

Command	**ZI**	Zero immediately.
Response	**ZI␣D**	Zero setting performed, weight value was dynamic (non-stable).

Comments

- The tare memory is cleared after zero setting.
- The zero point determined during switching on is not influenced by this command, i.e. the measurement ranges remain unchanged.

@ – Reset

Command	@	Resets the balance to the condition found after switching on, but without a zero setting being performed.
Response		
	I4␣A␣"text"	Serial number of the balance, the balance is ready for operation.

Example

Command	@	
Response	**I4␣A␣"1114350697"**	Balance is reset, its serial number is 1114350697.

Comments

- All commands awaiting responses are cancelled.
- Key control is set to the default setting K␣1.
- The tare memory is reset to zero.
- The "reset" command is always executed.
- If the balance is on standby, it is switched on.

3.2 Commands and responses MT-SICS level 1

The commands of MT-SICS level 1 are available with all standard balances which support the METTLER TOLEDO Standard Interface Command Set.

Command		Page
D	Balance display	25
DW	Weight display (Display show Weight)	25
K	Key control	26
SR	Send weight value on weight change (Send and Repeat)	28
T	Tare	29
TA	Inquiry/setting of tare weight value	30
TAC	Clear tare value	31
TI	Tare Immediately	32

D – Balance display

Write into balance display

Command	**D␣"text"**	Write text into balance display.
Response	**D␣A**	text appears unabridged left-aligned in the balance display marked by a symbol, e.g. *.
	D␣R	The end of the text appears in the balance display, the start is cut off. text is marked by a symbol, e.g. *.
	D␣I	Command not executable.
	D␣L	Command understood, parameter wrong or balance with no display.

Example

Command	**D␣"HALLO"**	Write "HALLO" into the balance display.
Response	**D␣A**	The full text "HALLO" appears in the balance display.

Clear balance display

Command	**D␣""**	Clear balance display.
Response	**D␣A**	Balance display cleared, marked by a symbol, e. g. *.
	D␣I	Command not executable.

Comments

- A symbol in the display, e.g. * indicates that the balance is displaying an invalid weight value.
- The maximum number of characters of "text" visible in the display depends on the balance type.

DW – Weight display (Display show Weight)

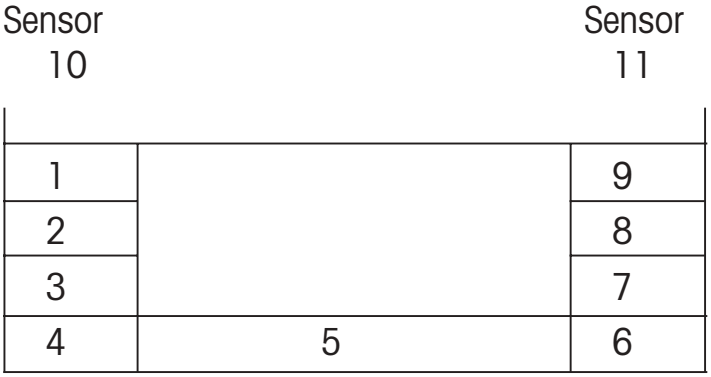
Command	**DW**	Switch main display to weight mode.
Response	**DW␣A**	Main display shows the current weight value.
	DW␣I	The command has been understood, but is not executable.

K – Key control

Commands	**K␣1**	When a key is pressed, execute the corresponding function, but do not send.
	K␣2	When a key is pressed, do not execute the corresponding function and send nothing.
	K␣3	When a key is pressed, do not execute the key function, but send the corresponding key code.
	K␣4	When a key is pressed, execute the corresponding function and send its function code. If the corresponding function can not be executed immediately, the function code K␣B␣y for the start of the function and K␣A␣y or K␣I␣y for the end of the function are sent. This behavior applies to taring, zeroing, calibrating, testing, printing, etc. If a function may not be executed, the function code K␣I␣y is sent.
Response	**K␣A**	Key control command understood and successfully executed.
	K␣I	Key control command understood but not executable at present, e.g. balance actually in menu or input mode.
	K␣L	Key control command understood, but command parameter wrong.

The key commands of the activate K␣3 command are defined as follows:

Key commands of the AX/MX/UMX balances



Response when pressed long.

When a code with a long press is sended, new key commands will not be accepted.

Example with an activated K␣3 command:

K␣R␣4	Key 4 was pressed and held around 2 seconds.
K␣C␣4	Key 4 was released.
K␣C␣10	The left SmartSens was activated, a long press is not possible.

Response when **K␣4** is active

K␣A␣y	Function y was released by pressing the correspondent key and successfully executed.
K␣I␣y	Function y was released by pressing the correspondent key, but it could not be successfully executed, e.g. calibration was aborted by user.
K␣B␣y	Function y was released and started, the execution needs time to complete. These functions are marked with an asterix (*). After this response, either K␣A␣y or K␣I␣y follows.

The balance functions are coded as follows:

Calibration*	y = 0
Tare*	y = 1
Re-zero*	y = 2
Data transfer to printing device*	y = 3
Test*	y = 7

Command	**K␣4**	When a key is pressed, execute the corresponding function and send the function code as an acknowledgement.
Responses	**K␣A**	Each time a key is pressed, immediate acknowledgement with the corresponding function code will be sent.
	K␣B␣1	The taring function has been started -> taring active.
	K␣A␣1	Taring completed successfully.
	K␣B␣1	The taring function has been started -> taring active.
	K␣I␣1	Taring not completed successfully, taring aborted.

Comments

- K␣1 is the factory setting (default value).
- K␣1 active after balance switched on and after the reset command
- Only one K command is active at any one time.
- A distinction must be made between key code K␣3 and function code K␣4. The key code is specific to the balance type, the function code corresponds to the above table.

SR – Send weight value on weight change (Send and Repeat)

Command **SR␣PresetValue␣Unit**

Send the current stable weight value and then continuously after every weight change greater or equal to the preset value a nonstable (dynamic) value followed by the next stable value, range = 1d to max. load.

SR If no preset value is entered, the weight change must be at least 12.5 % of the last stable weight value, minimum = 30d.

Response **S␣S␣WeightValue␣Unit**

Current, stable weight value in unit actually set under until 1.

Weight change.

S␣D␣WeightValue␣Unit

Dynamic weight value in unit actually set under until 1.

S␣S␣WeightValue␣Unit

Next stable weight value in unit actually set under until 1.

S␣I Command not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).

S␣L Command understood, parameter wrong.

S␣+ Balance in overload range.

S␣– Balance in underload range.

Example

Command	**SR␣10.00␣g**	Send the current stable weight value followed by every load change ≥ 10 g.
Response	**S␣S␣␣␣␣␣100.00␣g**	Balance stable.
	S␣D␣␣␣␣␣115.23␣g	100.00 g loaded.
	S␣S␣␣␣␣␣200.00␣g	Balance again stable.

Comments

- SR is overwritten by the commands S, SI, SIR, @ and hardware break and hence cancelled.
- If, following a nonstable (dynamic) weight value, stability has not been reached within the timeout interval, the response "S␣I" is sent and then a nonstable weight value. Timeout then starts again from the beginning.
- The preset value must be entered in unit actually set under until 1.

T – Tare

Command	**T**	Tare, i.e. store the next stable weight value as a new tare weight value.
Response	**T␣S␣WeightValue␣Unit**	Taring performed, i.e. stability criterion and taring range complied with. The tare weight value returned corresponds to the weight change on the balance in the unit actually set under unit 1 since the last zero setting.
	T␣I	Taring not performed (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).
	T␣+	Upper limit of taring range exceeded.
	T␣–	Lower limit of taring range exceeded.

Example

Command	**T**	The balance is tared and has a value of 100.00 g in the tare memory.
Response	**T␣S␣␣␣␣␣␣100.00␣g**	

Comments

- The tare memory is overwritten by the new tare weight value.
- The duration of the timeout depends on the balance type.
- The function of the combined tare and zero setting key corresponds to the zero setting (Z) command of the interface.
- Clearing tare memory: see command TAC.
- Unit 1 is the weight unit displayed after the balance has been switched on.
- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

TA – Inquiry/presetting of tare weight value

Inquiry of tare weight value

Command **TA** Inquiry of the tare weight value.

Response **TA␣A␣TareWeightValue␣Unit**
Current tare weight value in unit actually set under until 1.

TA␣I Current tare weight value can not be transfered at present as another operation is taking place.

Setting of tare preset value

Command **TA␣TarePresetValue␣Unit**

Entry of a tare preset value in unit actually set under unit 1.

Response **TA␣A␣WeightValue␣Unit**

Entry accepted, returned value rounded to actual readability. The balance display shows the net value referred to the inputted tare value.

TA␣I Taring not performed (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).

TA␣L Command understood, parameter wrong.

Example

Command **TA␣100.00␣g** Tare.

Response **TA␣A␣␣␣␣␣100.00␣g** The balance has 100.00 g in the tare memory.

Comments

- The tare memory will be overwritten by the preset tare weight value.
- The inputted tare value will be automatically rounded by the balance to the current readability.
- The preset value must be entered in the unit actually set under unit 1.
- The taring range is specified to the balance type.

TAC – Clear tare value

Command	**TAC**	Clear tare value.
Response	**TAC␣A**	Tare value cleared, 0 is in the tare memory.
	TAC␣I	Command not executable (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).

TI – Tare Immediately

Command **TI** Tare immediately, i.e. store the current weight value, which can be stable or non stable (dynamic), as tare weight value.

Response **TI␣S␣WeightValue␣Unit**

Taring performed, stable tare value.

The new tare value corresponds to the weight change on the balance since the last zero setting.

TI␣D␣WeightValue␣Unit

Taring performed, non-stable (dynamic) tare value.

TI␣I Taring not performed (balance is currently executing another command, e.g. zero setting).

TI␣L The command is not executable, e.g. certified version of balance.

TI␣+ Upper limit of taring range exceeded.

TI␣– Lower limit of taring range exceeded.

Example

Command **TI** Tare immediately.

Response **TI␣D␣␣␣␣␣␣117.57␣g**

The tare memory holds a non-stable (dynamic) weight value.

Comments

- The tare memory will be overwritten by the new tare weight value.
- After a non-stable (dynamic) stored tare weight value, a stable weight value can be determined. However, the absolute value of the stable weight value determined in this manner is not accurate.
- The stored tare weight value is sent in the unit actually set under unit 1.
- The taring range is specified to the balance type.

3.3 Commands and responses MT-SICS level 2 for AX/MX/UMX

The commands of MT-SICS level 2 are supported by all AX/MX/UMX balances.

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C0 – Inquiry/setting of calibration setting

Inquiry of calibration setting

Command **C0** Inquiry of the calibration setting.

Response **C0␣A␣x1␣x2␣"WeightValue␣Unit"**

Weight value and unit specify the value of the weight for an external calibration requested from the user via the display (see command C2). The unit corresponds to the factory setting of unit 1, e.g. gram (g) with standard balances or carat (ct) with carat balances respectively.

With internal calibration, neither weight value nor unit appears.

x1 Calibration mode

x1=0 Mode = Manual
The calibration can only be triggered manually.
A change in the ambient conditions has no influence on the initiation of the calibration procedure.

x1=1 Mode = Auto, status display AutoCal or Cal not activated.
The sensors built into the balance monitor the ambient conditions; however, the change is so small that a calibration is not necessary.

x1=2 Mode = Auto, status display "AutoCal" or "Cal" flashes.
The sensors built into the balance have determined a considerable change in the ambient conditions. The balance requests a calibration or at least a test (see "TST" command).

x2 Calibration weight

x2=0 Internal weight (factory setting)

x2=1 External weight
The current value of the external weight can be seen in the menu of the balance under "Calibration" (see Operating instructions).

C0␣I

The calibration status and the current setting of the calibration can not be transferred at present as another operation is taking place.

Example

Command **C0** Inquiry of status and setting of the calibration.

Response **C0␣A␣2␣1␣"␣␣␣100.000␣g"**

Current setting of mode is "Auto".
The ambient conditions of the balance have changed so much that the balance requests a calibration (x1=2) with the external weight (x2=1).
For a calibration initiated with the command C2, a weight of 100.000 g is needed.

Setting the calibration setting

Command **C0␣x1␣x2** Set calibration setting.

x1 Calibration mode

x1=0 Mode = Manual
A change in the ambient conditions has no influence on the initiation of the calibration procedure.

x1=1 Mode = Auto, the sensors built into the balance monitor the ambient conditions. When a considerable change in the ambient conditions is determined, the status display AutoCal or Cal will be activated; this means the balance will ask for calibration.

x2 Calibration weight

x2=0 Use internal weight (factory setting)

x2=1 Use external weight
The current value of the external weight can be seen in the menu of the balance under "Calibration" (see Operating instructions.

Response **C0␣A** Calibration setting set.

C0␣L Calibration setting can not be set, e.g. parameter wrong or certified version of the balance.

C0␣I Commend not executable as the balance is, e.g. being tared.

Example

Command **C0␣0␣1** Set calibration setting to manual and external.

Response **C0␣A** Calibration setting set.

Comment

• Setting x1=1 and x2=0 corresponds to the menu setting "FACT" under "Calibration".

C1 – Initiate calibration according to current setting

Command	**C1**	Start calibration in the current setting.
First response	**C1␣B**	The calibration procedure has been started. Wait for second response (see Comment)
	C1␣I	A calibration can not be performed at present as another operation is taking place. No second response follows.
	C1␣L	Calibration operation not possible, e.g. with certified balance. No second response follows.
Further responses	**C1␣"text"**	Weight request with external calibration.
	C1␣A	Calibration has been completed successfully.
	C1␣I	The calibration procedure was aborted as, e.g. stability not attained or wrong weights loaded.

Example

Command	**C1**	Start calibration.
Response	**C1␣B**	Calibration operation started.
	C1␣"␣␣␣␣␣␣0.00␣g"	Prompt to unload the balance.
	C1␣"␣␣␣2000.00␣g"	Prompt to load calibration weight 2000.00 g.
	C1␣"␣␣␣␣␣␣0.00␣g"	Prompt to unload the balance.
	C1␣A	Calibration completed successfully.

Comment

Commands sent to the balance during the calibration operation are not processed and responded to in the appropriate manner until the calibration is at an end.

C2 – Initiate calibration with external weight

Command	**C2**	Initiate external calibration. Inquiry of the weight used by means of the CO command.
First response	**C2␣B**	The calibration procedure has been started.
	C2␣I	A calibration can not be performed at present as another operation is taking place. No second response follows.
	C2␣L	Calibration operation not possible, e.g. as a calibration with an external weight is not admissible (certified balance). No second response follows.
Further responses	**C2␣"text"**	Prompt to unload or load the balance.
	C2␣A	Calibration has been completed successfully.
	C2␣I	The calibration procedure was aborted as, e.g. stability not attained or wrong weight loaded.

Example

Command	**C2**	Start calibration.
Response	**C2␣B**	Calibration operation started.
	C2␣"␣␣␣␣␣␣0.00␣g"	Prompt to unload the balance.
	C2␣"␣␣␣2000.00␣g"	Prompt to load calibration weight 2000.00 g.
	C2␣"␣␣␣␣␣␣0.00␣g"	Prompt to unload the balance.
	C2␣A	Calibration completed successfully.

Comment

Commands sent to the balance during the calibration operation are not processed and responded to in the appropriate manner until the calibration is at an end.

C3 – Initiate calibration with internal weight

Command	**C3**	Initiate internal calibration.
First response	**C3␣B**	The calibration procedure has been started. Wait for second response.
	C3␣I	A calibration can not be performed at present as another operation is taking place. No second response follows.
	C3␣L	Calibration operation not possible, e.g. as internal weight missing. No second response follows.
Further responses	**C3␣A**	Calibration has been completed successfully.
	C3␣I	The calibration was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

Example

Command	**C3**	Initiate internal calibration.
Response	**C3␣B**	Calibration operation started.
	C3␣A	Calibration completed successfully.

Comment

Commands sent to the balance during the calibration operation are not processed and responded to in the appropriate manner until the calibration is at an end.

DAT – Date

Inquiry of date

Command	**DAT**	Inquiry of current date of the balance.
Response	**DAT␣A␣dd␣mm␣yyyy**	
		"dd␣mm␣yyyy" represents the date in the format day␣month␣year.
	DAT␣I	Inquiry of the date not possible at present as another operation is taking place.

Set date

Command	**DAT␣dd␣mm␣yyyy**	
		Set date in the format "dd␣mm␣yyyy".
Response	**DAT␣A**	Date has been set.
	DAT␣I	Date can not be set at present as another operation is taking place.
	DAT␣L	Command not executed as the date format was not correct.

Example

Command	**DAT**	Inquiry of date of the balance.
Response	**DAT␣A␣01␣06␣2000**	
		Current date of the balance is 1 June 2000.

Comment

- The set date is retained even after the reset command "@".

I10 – Balance ID

Inquiry of balance identification

Command	**I10**	Inquiry of balance identification.
Response	**I10␣A␣"text"**	"text" represents the current balance identification (max. 20 alphanumeric characters).

Set balance identification

Command	**I10␣"text"**	Set balance identification text accordingly.
Response	**I10␣A**	Balance identification has been set.
	I10␣I	The balance identification can not be set at present as another operation is taking place.
	I10␣L	Command not executed as the name is too long (max. 20 characters).

Example

Command	**I10**	Inquiry of balance identification.
Response	**I10␣A␣"My Balance"**	Current balance identification is My Balance.

Comments

- A sequence of maximum 20 characters is possible as "text".
- The set balance identification is retained even after the reset command "@".

I11 – Balance type

Command	**I11**	Inquiry of model designation of the balance.
Response	**I11␣A␣"text"**	"text" represents the model designation.
	I11␣I	The model designation can not be transfered at present as another operation is taking place.

Example

Command	**I11**	Inquiry of model designation of the balance.
Response	**I11␣A␣"AX204"**	The balance is a AX204.

Comment

A sequence of maximum 20 characters is possible as "text".

PWR – Power on/off

Command	**PWR␣x**	Switch balance on or off. x = 0 Set balance to standby mode. x = 1 Switch balance on.
Response	**PWR␣A**	Balance has been switched off successfully
	PWR␣A **I4␣A␣"text"**	Balance with the serial number according to text has been switched on succesfully (see also I4 command).
	PWR␣I	Command not executable as the balance is, e.g. being tared.
	PWR␣L	Command understood, parameter wrong

P100 – Print out text on the printer

Command	**P100␣"text"**	Print out "text" on the printer (24 characters/line).
		Command executed.
Response	**P100␣A**	Command can not be executed at present as another operation is taking place, e.g. taring.
Command	**P100␣I**	
		Text could not be printed as, e.g. printer not switched on or connected.
Response	**P100␣L**	

Example

Command	**P100␣"Hallo"**	Print out Hallo on the printer.
Response	**P100␣A**	Printout has been started.

Comments

- A sequence of maximum 24 characters is admissible as text.
- The command P100␣"text" has no influence on the function of the printer as a record printer.

P101 – Send stable weight value to printer channel

Command	**P101**	Send stable weight value to the printer, corresponds to command S.
Response	**P101␣A**	Command executed.
	P101␣I	Command not executable as another operation is taking place.
	P101␣L	Command not executable as no printer connected.

Example

Command	**P101**	A stable weight value appears on the printout, e.g. 200.01 g.
Response	**P101␣A**	Command executed.

Comments

- The command P101 has no influence on the function of the printer as a record printer.
- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

P102 – Send weight value to printer channel immediately

Command	**P102**	Send weight value to the printer immediately, corresponds to command SI.
Response	**P102␣A**	Command executed.
	P102␣I	Command not executable as another operation is taking place.
	P102␣L	Command not executable no printer connected.

Example

Command	**P102**	A stable or dynamic weight value appears on the printout, e.g. "D 200.01 g".
Response	**P102␣A**	Command executed.

Comment

The command P102 has no influence on the function of the printer as a record printer.

P120 – Reset SmartTrac according to application

Command	**P120**	Reset SmartTrac according to application.
Response	**P120␣A**	SmartTrac controlled according to last command.
	P120␣I	SmartTrac can not be written to as another operation is taking place.
	P120␣L	SmartTrac can not be activated as it is not present.

P121 – Set SmartTrac as +/- display

Command **P121␣x1␣x2␣x3**

Set SmartTrac as +/- display with tolerance markers.

x1: Value␣Unit for the target value (pointer in 12 o'clock position)

x2: Value␣Unit for the +tolerance value (pointer to + marker)

x3: Value␣Unit for the -tolerance value (pointer to - marker)

The specified weight value with unit must lie in the weighing range of the balance.

Any weighing unit within Unit2 is admissible as unit (see operating instructions of the balance).

Response	**P121␣A**	SmartTrac controlled according to last command.
	P121␣I	SmartTrac can not be written to as another operation is taking place.
	P121␣L	The command could not be executed as the value range of one of the parameters has been exceeded.

Example

Command **P121␣200.00␣g␣15.00␣g␣20.00␣g**

Set SmartTrac with target value 200.00 g, +tolerance 15.0 g and –tolerance 20.0 g.

Response	**P121␣A**	Setting performed.

P122 – Activate individual pointers of the SmartTrac

Command	**P122␣x1␣x2␣x3**	Set up to 8 individual pointers of the SmartTrac.
		x1 = 0 SmartTrac without tolerance markers.
		x1 = 1 SmartTrac with tolerance markers.
		x2 … x9 Integers from 0 to 59.
		x2 Enter position of 1st pointer.
		x3 Enter position of 2nd pointer.
Response	**P122␣A**	SmartTrac controlled according to last command.
	P122␣I	SmartTrac can not be written to as another operation is taking place.
	P122␣L	The command could not be executed as the value range of one of the parameters has been exceeded or the number of parameters is wrong.

Example

Command	**P122␣0␣0␣15␣30␣45**	Set 4th pointer of the SmartTrac, similar to cross hairs.
Response	**P122␣A**	Pointer set.

Comment

At least one pointer parameter must be preset.

P123 – Activate SmartTrac by segments

Command	**P123␣x1␣x2␣x3**	Switch on up to four pointer segments of the SmartTrac.
		x1 = 0 SmartTrac without tolerance markers.
		x1 = 1 SmartTrac with tolerance markers.
		x2, x3 Integers from 0 to 59.
		x2 Start of 1st segment.
		x3 End of 1st segment.
Response	**P123␣A**	SmartTrac controlled according to last command.
	P123␣I	SmartTrac can not be written to as another operation is taking place.
	P123␣L	The command could not be executed as the value range of one of the parameters has been exceeded or no SmartTrac.

Example

Command	**P123␣0␣15␣30**	Switch on the second quarter of the SmartTrac.
Response	**P123␣A**	Command executed.

Comment

At least one segment parameter must be preset.

P124 – Switch off SmartTrac display

Command	**P124**	Switch off SmartTrac display.
Response	**P124␣A**	Command executed.
	P124␣I	SmartTrac display can not be switched off as another operation is taking place.
	P124␣L	The command can not be executed as there is no SmartTrac.

SNR – Send stable weight value and repeat after each deflection

Command **SNR␣PresetValue␣Unit**

Send current stable weight value and repeat after each deflection greater or equal to the preset value (see Comment).

Response **S␣S␣WeightValue␣Unit**

Current stable weight value (1. value)

S␣S␣WeightValue␣Unit

: Next stable weight value after preset deflection (2 value) etc.

:

S␣I	Command not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
S␣L	Command understood, parameter wrong
S␣+	Balance in overload range.
S␣–	Balance in underload range.

Example

Command **SNR␣50␣g**

Response **S␣S␣␣␣␣␣␣12.34␣g**

S␣S␣␣␣␣␣␣67.89␣g

Comment

The preset value is optional. If no value is defined, the deflection limit depends on balance readability as follows:

readability	min. deflection
0.01 mg	0.01 g
0.1 mg	0.1 g
0.001 g	1 g
0.01 g	1 g
0.1 g	1 g
1 g	5 g

SNRU – Send stable weight value with currently displayed unit and repeat after each deflection

Command **SNRU␣PresetValue␣Unit**

As the SNR command, but with currently displayed unit (see Comment).

Response **S␣S␣WeightValue␣Unit**

Current stable weight value (1. value)

S␣S␣WeightValue␣Unit

: Next stable weight value after preset deflection (2 value) etc.

:

S␣I	Command not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
S␣L	Command understood, parameter wrong
S␣+	Balance in overload range.
S␣–	Balance in underload range.

Example

Command **SNRU␣50␣g**

Response **S␣S␣␣␣␣␣␣12.34␣g**

S␣S␣␣␣␣␣␣67.89␣g

Comment

The preset value is optional. If no value is defined, the deflection limit depends on balance readability as follows:

readability	min. deflection
0.01 mg	0.01 g
0.1 mg	0.1 g
0.001 g	1 g
0.01 g	1 g
0.1 g	1 g
1 g	5 g

ST – Send stable weight value after pressing 🖷 (transfer) key

Inquiry of the status

Command	**ST**	Inquiry of actual status of the ST function.
Responces	**ST␣A␣0**	Function inactive, no weight value is sent when 🖷 (transfer key) is pressed.
	ST␣A␣1	Function active, weight value is sent each time when 🖷 (transfer key) is pressed.
	ST␣I	The current status can not be transfered at present as another operation is taking place.

Set ST function

Command	**ST␣1**	Send the current stable net weight value each time when 🖷 (transfer key) is pressed (see "S" command with MT-SICS level 0).
Responces	**ST␣0**	Stop sending weight value when transfer key is pressed.
	ST␣A	Command understood and successfully executed.
	ST␣I	Command understood, but not executable at present, e.g. balance is currently executing another function.
	ST␣L	Command understood, parameter wrong.

Example

Command	**ST␣1**	Activate ST function
Responces	**ST␣A**	Command executed When 🖷 (transfer key) is pressed:
	S␣S␣␣␣␣␣123.456␣g	Current net weight is 123.456g.

Comments

- ST␣0 is the factory setting (default value).
- ST function is not active after switching on and after the reset command.

SU – Send stable weight value with currently displayed unit

Command	**SU**	As the "S" command, but with currently displayed unit.
Response	**S␣S␣WeightValue␣Unit**	
		Command executed.
	S␣+	Balance in overload range.
	S␣–	Balance in underload range.
	S␣I	Command not executable as balance is, e.g. being tared.

Example

Command **SU**

Response **S␣S␣␣␣␣␣␣12.34␣lb**

Comment

- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

SIU – Send weight value with currently displayed unit immediately

Command	**SIU**	As the "SI" command, but with currently displayed unit.
Response	**S␣S␣WeightValue␣Unit**	
		Command executed, stable.
	S␣D␣WeightValue␣Unit	
		Command executed, dynamic.
	S␣+	Balance in overload range.
	S␣–	Balance in underload range.
	S␣I	Command not executable as balance is, e.g. being tared.

Example

Command **SIU**

Response **S␣D␣␣␣␣␣␣12.34␣lb**

SIRU – Send weight value with currently displayed unit immediately and repeat

Command **SIRU** As the "SIR" command, but with currently displayed unit.

Response **S␣S␣WeightValue␣Unit**
Command executed.

S␣D␣WeightValue␣Unit
Command executed.

S␣+ Balance in overload range.

S␣– Balance in underload range.

S␣I Command not executable as balance is, e.g. being tared.

Example

Command **SIU**

Response **S␣D␣␣␣␣␣␣12.34␣lb**

SRU – Send stable weight value with currently displayed unit after deflection

Command **SRU** As the "SR" command, but with currently displayed unit.

SRU␣WeightValue␣Unit

Response **S␣S␣WeightValue␣Unit**
Command executed.

S␣D␣WeightValue␣Unit
Deflection.

S␣+ Balance in overload range.

S␣– Balance in underload range.

S␣I Command not executable as balance is, e.g. being tared

Example

Command **SRU**

Response **S␣S␣␣␣␣␣␣12.34␣lb**

S␣D␣␣␣␣␣␣13.88␣lb

S␣S␣␣␣␣␣␣15.01␣lb

TIM – Time

Inquiry of time

Command	**TIM**	Send current time of the balance.
Response	**TIM␣A␣hh␣mm␣ss**	"hh␣mm␣ss" represents the time in the 24-hour format (hours␣minutes␣seconds).
	TIM␣I	No inquiry of the time is possible at present as another operation is taking place.

Set time

Command	**TIM␣hh␣mm␣ss**	Set time in 24-hour format (hours␣minutes␣seconds).
Response	**TIM␣A**	Time has been set, clock running.
	TIM␣I	The time can not be set at present as another operation is taking place.
	TIM␣L	Command not executed as the time format is not correct (e.g. 22␣67␣25) or no timer is built in.

Example

Command	**TIM**	Inquiry of time.
Response	**TIM␣A␣22␣56␣11**	The current time of the balance is 22 hours, 56 minutes and 11 seconds.

Comment

The time setting is retained even after the reset command "@".

TSTO – Inquiry/setting of the test function

Inquiry of the test function setting

Command	**TSTO**	Inquiry of the setting for the test function.	
Responses	**TSTO␣A␣x␣"WeightValue␣Unit"**		
		x=0	The internal weight is used for the test.
		x=1	The external weight is used for the test.
		Weight value␣Unit	Value of the external weight currently set that is requested in the test from the balance user via the display.
	TSTO␣I	The current setting of the test function can not be transferred at present as another operation is taking place.	

Set test configuration

Command	**TSTO␣x**	Set test configuration of the balance. x = 0 Test with internal weight. x = 1 Test with external weight.
Responses	**TSTO␣A**	Test configuration set.
	TSTO␣L	Wrong parameter.
	TSTO␣I	Command not executable as the balance is, e.g. being tared.

Example

Command	**TSTO**	Inquiry of current setting for the test and the value of the external test weight.
Response	**TSTO␣A␣1␣␣␣␣2000.00␣g**	
		The current setting corresponds to the test with an external weight. For a test initiated with the TST2 command (see below), an external weight of 2000.00 g is needed.

Comments

- The current value of the external weight can be seen in the menu under "Test" (see Operating instructions).
- With an internal test, no weight value appears.

TST1 – Initiate test function in the current setting

Command	**TST1**	Start test function in the current setting.
First response	**TST1␣B**	The test procedure has been started. Wait for next response (see Comment).
	TST1␣I	The test function can not be executed at present as another operation is taking place. No second response follows.
	TST1␣L	Test not possible. No second response follows.
Further responses	**TST1␣"text"**	Prompt to unload and load the balance.
	TST1␣A␣"WeightValue␣Unit"	Test procedure completed successfully. Value with unit corresponds to the deviation from the specified value displayed after the test (difference "D"). No unit is specified if the test has been performed with the internal weight.
	TST1␣I	The test procedure has been aborted as, e.g. stability was not attained or wrong weights were loaded.

Comment

Commands sent to the balance during the test procedure are not processed and responded to in the appropriate manner until the test procedure is at an end.

TST2 – Initiate test function with external weight

Command	**TST2**	Start test function with external weight. Inquiry of the weight used by means of the TST command (see above).
First response	**TST2␣B**	The test procedure has been started. Wait for next response (see Comment).
	TST2␣I	The test function can not be executed at present as another operation is taking place. No second response follows.
	TST2␣L	Test not possible. No second response follows.
Further responses	**TST2␣"text"**	Prompt to unload and load the balance.
	TST2␣A␣"WeightValue␣Unit"	Test procedure completed successfully. Weight value with unit corresponds to the deviation from the specified value displayed in the top line after the test (difference "D", see operating instructions of balance).
		The test procedure has been aborted as, e.g. stability was not attained or wrong weights were loaded.

Example

Command	**TST2␣I**	Initiate test with external weight.
Response	**TST2␣B**	The test procedure could be started.
	TST2␣"␣␣␣␣␣␣0.00␣g"	Prompt to unload the balance.
	TST2␣"␣␣␣␣␣200.0␣g"	Prompt to load the test weight.
	TST2␣"␣␣␣0.00␣g"	Prompt to unload the balance.
	TST2␣A␣"␣␣␣0.01␣g"	External test completed successfully.

Comment

Commands sent to the balance during the test procedure are not processed and responded to in the appropriate manner until the test procedure is at an end.

TST3 – Initiate test function with internal weight

Command	**TST3**	Start test function with built-in weight.
First response	**TST3␣B**	The test procedure has been started. Wait for next response (see Comment).
	TST3␣I	The test function can not be executed at present as another operation is taking place. No second response follows.
	TST3␣L	Test not possible. No second response follows.
Further responses	**TST3␣A␣"WeightValue"**	
	TST3␣I	Test procedure completed successfully. Value corresponds to the deviation from the specified value displayed after the test (difference "D").
		The test procedure has been aborted as, e.g. stability was not attained or wrong weights were loaded.

Example

Command	**TST3**	Initiate test with internal weight.
Response	**TST3␣B**	The test procedure could be started.
	TST3␣A␣"␣␣␣␣␣␣0.01"	
		The difference to the specified value is 0.01.

Comment

The commands received immediately after the first response are not processed and responded to in the appropriate manner until after the second response.

WS – Inquiry/setting of position of draft shield doors

Command	**WS**		Inquiry of position of draft shield doors.
Response	**WS␣A␣x**		x: Position 0 = door(s) closed 1 = door(s) open (right) 2 = door(s) open (left) 8 = error 9 = intermediate
	WS␣L		Parameters are missing, the command can thus not be executed.
	WS␣I		Command not executable.
Command	**WS␣x**		Setting of position of draft shield doors. int: See Inquiry.
Response	**WS␣A**		Command executed.
	WS␣L		Parameters wrong (value range, …).
	WS␣I		Command not executable.
Example	**WS 1**	→ **WS A**	Doors opening or door opening to the right.

Comments

The user must ensure that the doors are in the correct position. If the doors are blocked when closing, then they return to their original position. The position can be monitored by an inquiry command.

M01 – Inquiry/setting of weighing mode

Command	**M01**	Inquiry of weighing mode.
Response	**M01 A x**	x: Weighing 0 = normal weighing 1 = dosing 2 = other
	M01 L	Parameters are missing, the command can thus not be executed.
	M01 I	Command not executable.
Command	**M01 x**	Setting of weighing mode. See Inquiry.
Response	**M01 A**	Command executed.
	M01 L	Parameters wrong (value range, …).
	M01 I	Command not executable.
Example	**M01 0 → M01 A**	Setting of weighing mode to normal.

M02 – Inquiry/setting of environment

Command	**M02**	Inquiry of environment.
Response	**M02 A x**	x: environment 0 = very stable 1 = stable 2 = standard 3 = unstable 4 = very unstable
	M02 L	Parameters are missing, the command can thus not be executed.
	M02 I	Command not executable.
Command	**M02 x**	Setting of environment. See Inquiry.
Response	**M02 A**	Command executed.
	M02 L	Parameters wrong (value range, …).
	M02 I	Command not executable.
Example	**M02 3 → M02 A**	Setting of environment to "unstable".

M03 – Inquiry/setting of AutoZero

Command	**M03**	Inquiry of AutoZero.
Response	**M03 A x**	x: Weighing 0 = AutoZero is switched off 1 = AutoZero is activated
	M03 L	Parameters are missing, the command can thus not be executed.
	M03 I	Command not executable.
Command	**M03 x**	Setting of AutoZero. See Inquiry.
Response	**M03 A**	Command executed.
	M03 L	Parameters wrong (value range, …).
	M03 I	Command not executable.
Example	**M03 1 → M03 A**	Switching on AutoZero function.

M04 – Inquiry/setting of SmartSens functions

Command	**M04**	Inquiry of SmartSens functions.
Response	**M04 B x1 x2** **…** **M04 A x1 x2**	x1: SmartSens number 0 = left SmartSens 1 = right SmartSens x2: Function of SmartSens 0 = no function 1 = activate 1st function 2 = activate 2nd function .. = other
	M04 L	Parameters are missing, the command can thus not be executed.
	M04 I	Command not executable.
Command	**M04 x1 x2**	Setting of SmartSens function. See Inquiry.
Response	**M04**	Command executed.
	M04 L	Parameters wrong (value range, …).
	M04 I	Command not executable.

Examples

M04 0 2 → **M04 A**

Setting of first (left) SmartSens to 2nd function (e.g. door).

M04 → **M04 B 0 0**

1. SmartSens = no function.

M04 A 1 2

2. SmartSens = function 2 (e.g. zeroing).

M05 – Inquiry of user list/method

Command	**M05**	Inquiry of user list or method.
Response	**M05 B No "Name"**	No: Number of user or method
	M05 B…	
	M05 A No "Name"	Name: Name of user or method
	M05 L	Parameters are missing, the command can thus not be executed.
	M05 I	Command not executable.

Examples

```
M05     → M05 B 1 "Meier"
          M05 A 2 "Method EX-2"
```

M06 – Inquiry/setting of current user/method number

Command	**M06**	Inquiry of user or method number.
Response	**M06 A x**	x: Number of user
	M06 L	Parameters are missing, the command can thus not be executed.
	M06 I	Command not executable.
Command	**M06 x**	Setting of user or method number. See Inquiry. User number: 0..max. number of users.
Response	**M06 A**	Command executed.
	M06 L	Parameters wrong (value range, …).
	M06 I	Command not executable.

Example

```
M06 3   → M06 A
```

User or method 3 is activated.

M07 – Inquiry/setting of AutoDoor function

Command	**M07**	Inquiry of AutoDoor function.
Response	**M07 A x**	x: 0 = AutoDoor function switched off 1 = AutoDoor function switched on
	M07 L	Parameters are missing, the command can thus not be executed.
	M07 I	Command not executable.
Command	**M07 x**	Setting of AutoDoor function. See Inquiry.
Response	**M07 A**	Command executed.
	M07 L	Parameters wrong (value range, …).
	M07 I	Command not executable.
Example	**M07 → M07 A 1**	The AutoDoor function is activated.

M08 – Inquiry/setting of display brightness

Command	**M08**	Inquiry of display brightness.
Response	**M08 A x**	x: 0..100, display brightness in %
	M08 L	Parameters are missing, the command can thus not be executed.
	M08 I	Command not executable.
Command	**M08 x**	Setting of display brightness. See Inquiry.
Response	**M08 A**	Command executed.
	M08 L	Parameters wrong (value range, …).
	M08 I	Command not executable.
Examples	**M08 55 → M08 A**	Setting of display brightness.
	M08 → M08 A 60	Inquiry of display brightness.

M09 – Inquiry/setting of display contrast

Command	**M09**		Inquiry of display contrast.
Response	**M09␣A␣x**		x: 0..100, display contrast in %
	M09␣L		Parameters are missing, the command can thus not be executed.
	M09␣I		Command not executable.
Command	**M09␣x**		Setting of display contrast. See Inquiry.
Response	**M09␣A**		Command executed.
	M09␣L		Parameters wrong (value range, …).
	M09␣I		Command not executable.
Example	**M09**	**→ M09 A 60**	Inquiry of display contrast.

M10 – Inquiry/setting of main display font

Command	**M10**		Inquiry of display font.
Response	**M10␣A␣x**		x: Display font 0 = 1st display font 1 = 2nd display font … x = other
	M10␣L		Parameters are missing, the command can thus not be executed.
	M10␣I		Command not executable.
Command	**M10␣x**		Setting of display font. See Inquiry.
Response	**M10␣A**		Command executed.
	M10␣L		Parameters wrong (value range, …).
	M10␣I		Command not executable.
Example	**M10**	**→ M10 A 2**	Inquiry of display font.

M11 – Inquiry/setting of beeper volume

Command	**M11**		Inquiry of beeper volume.
Response	**M11 A x**		x: Beeper volume 0…100 %
	M11 L		Parameters are missing, the command can thus not be executed.
	M11 I		Command not executable.
Command	**M11 x**		Setting of beeper volume. See Inquiry.
Response	**M11 A**		Command executed.
	M11 L		Parameters wrong (value range, …).
	M11 I		Command not executable.
Example	**M11**	**→ M11 A 50**	Inquiry of beeper volume.

M12 – Creating beeper tone

Command	**M12 x**		Creating beeper tone. x: 0 = variant 1 (e.g. 1x beep) 1 = variant 2 2 = variant 3
Response	**M12 A**		Command executed.
	M12 L		Parameters wrong (value range, …).
	M12 I		Command not executable.
Example	**M12 1**	**→ M12 A**	Creating beeper tone.

Comment

- This command creates an acoustic signal independent of the beeper volume setting (M11 command).

M13 – Inquiry/setting of Touch function

Command	**M13**	Inquiry of the Touch function.
Response	**M13␣A␣x**	x: 0 = Touch is switched off, inactivated 1 = Touch function is switched on
	M13␣L	Parameters are missing, the command can thus not be executed.
	M13␣I	Command not executable.
Command	**M13␣x**	Setting of Touch function. See Inquiry.
Response	**M13␣A**	Command executed.
	M13␣L	Parameters wrong (value range, …).
	M13␣I	Command not executable.
Example	**M13 1 → M13 A**	Switching on Touch function.

Comment

- The functions of all other keys (hot keys, etc.) are unaffected.

M14 – Inquiry of available languages

Command	**M14**	Inquiry of available languages.
Response	**M14 B No "language"**	No: Number of language
	M14 B … **M25 A No "language"**	Language: Name of language
	M14 L	Parameters are missing, the command can thus not be executed.
	M14 I	Command not executable.
Examples	**M14** → **M14 B 0 "English"** **M14 B 1 "Deutsch"** **M14 A 2 "Français"**	

M15 – Inquiry/setting of language

Command	**M15**	Inquiry of actual language.
Response	**M15 A x**	x: Number of language
	M15 L	Parameters are missing, the command can thus not be executed.
	M15 I	Command not executable.
Command	**M15 x**	Setting of language. x: Number according to available languages (command M14).
Response	**M15 A**	Command executed.
	M15 L	Parameters wrong (value range, …).
	M15 I	Command not executable.
Example	**M15 3** → **M15 A**	Language 3 is activated.

Comment

Language number: Number of the language according to the available languages (command M14).

M16 – Inquiry/setting of standby mode

Command	**M16**	Inquiry of standby mode.
Response	**M16␣A␣x**	x: 0 = mode switched off, inactivated 1 = 5 min. 2 = 10 min. 3 = 30 min. 4 = 60 min. 5 = 120 min. 6 = 240 min.
	M16␣L	Parameters are missing, the command can thus not be executed.
	M16␣I	Command not executable.
Command	**M16␣x**	Setting of standby mode. See Inquiry.
Response	**M16␣A**	Command executed.
	M16␣L	Parameters wrong (value range, …).
	M16␣I	Command not executable.
Example	**M16 1 → M16 A**	Setting of standby mode (5 min.).

Comments

- The balance switches to standby mode if it is not operated within 5 min.
- Operating the balance includes pressing a key, significant changes in weight, item counter > 0 or interface commands.

M17 – Inquiry/setting of ProFACT time criteria

Command	**M17**	Inquiry of ProFACT time criteria.
Response	**M17 A hh mm ss x**	hh: hours (00..23h) mm: minutes (00..59) ss: seconds (00..59) x: initiating time of ProFACT in hours, minutes and days 0 = = time criterion is inactivated 2^0 = 1 = Monday 2^1 = 2 = Tuesday 2^2 = 4 = Wednesday 2^3 = 8 = Thursday 2^4 = 16 = Friday 2^5 = 32 = Saturday 2^6 = 64 = Sunday
	M17 L	Parameters are missing, the command can thus not be executed.
	M17 I	Command not executable.
Command	**M17 hh mm ss x**	Setting of ProFACT time criterion. See Inquiry.
Response	**M17 A**	Command executed.
	M17 L	Parameters wrong (value range, …).
	M17 I	Command not executable.

Example **M17 12 00 00 5 → M17 A**
Adjustment takes place on Mondays and Wednesday at 12:00.

M18 – Inquiry/setting of ProFACT temperature criterion (Δ temp.)

Command	**M18**	ProFACT temperature criterion.
Response	**M18␣A␣x**	x: 0 = temp. criterion is switched off 1 = 1st setting is activated 2 = 2nd setting is activated 3 = 3rd setting is activated
	M18␣L	Parameters are missing, the command can thus not be executed.
	M18␣I	Command not executable.
Command	**M18␣x**	Setting of ProFACT temperature criterion. See Inquiry.
Response	**M18␣A**	Command executed.
	M18␣L	Parameters wrong (value range, …).
	M18␣I	Command not executable.
Example	**M18 1 → M18 A**	1. Setting is activated.

Comments

Temperature difference is defined as the criterion. The balance is automatically adjusted if the temperature of the balance increases by the defined temperature difference.

M19 – Inquiry/setting of adjustment weight

Command	**M19**	Inquiry of adjustment weight.
Response	**M19 A Value Unit**	Value: Value of adjustment weight Unit: Weight unit of adjustment weight = Defined unit of balance
	M19 L	Parameters are missing, the command can thus not be executed.
	M19 I	Command not executable.
Command	**M19 Value Unit**	Setting of external adjustment weight. This must be entered in the defined unit of the balance. See Inquiry.
Response	**M19 A**	Command executed.
	M19 L	Parameters wrong (value range, …).
	M19 I	Command not executable.
Example	**M19 → M19 A 100.123 g**	Initiate adjustment weight.

Comments

The adjustment weight must be entered in the defined unit of the balance. This unit can be found by entering an inquiry command.

M20 – Inquiry/setting of test weight

Command	**M20**	Inquiry of external test weight.
Response	**M20␣A␣Value␣Unit**	Value: Value of test weight
		Unit: Weight unit of test weight
	M20␣L	Parameters are missing, the command can thus not be executed.
	M20␣I	Command not executable.
Command	**M20␣Value␣Unit**	Setting of external test weight. See Inquiry.
Response	**M20␣A**	Command executed.
	M20␣L	Parameters wrong (value range, …).
	M20␣I	Command not executable.

Example `M20 → M20 A 100.123 g`
Inquiry of test weight.

M21 – Inquiry/setting of unit

Command **M21**

Inquiry of unit.

Response **M21␣B␣Des␣Unit**
M21␣B␣…
M21␣A␣Des␣Unit

Des: Designation of unit
0 = unit 1, to MT-SICS
1 = display unit
2 = info unit

Unit:
0 = g
1 = kg
2 = t
3 = mg
4 = microgram
5 = carat
6 = Newton
7 = pounds
8 = ounces
9 = troy ounces
10 = grain
11 = penny weight
12 = Momme
13 = Mesghal
14 = Tael Hong Kong
15 = Tael Singapore
16 = Tael Taiwan
17 = Tical
18..22 = reserved
23 = no unit
24 = custom unit1
25 = custom unit2

	M21␣L	Parameters are missing, the command can thus not be executed.
	M21␣I	Command not executable.
Command	**M21␣Des␣Unit**	Setting of unit(s). See Inquiry.
Response	**M21␣A**	Command executed.
	M21␣L	Parameters wrong (value range, …).
	M21␣I	Command not executable.

Examples

M21 0 1 → **M21 A**
Setting of unit 1 to "kg".

M21 → **M21 B 0 0**
Inquiry of unit, unit 1 = "g".

→ **M21 B 1 3**
Display unit = "mg".

→ **M21 A 2 5**
Info unit = "carat".

Comments

- All S commands are given in Unit 1 according to the definition of the MT-SICS. Only weight units are accepted as Unit 1.

M22 – Inquiry/setting of custom unit definitions

Command **M22** Inquiry of custom unit definitions.

Response **M22␣B␣x1␣x2␣x3␣"x4"␣x5**
…
M22␣A␣x1␣x2␣x3␣"x4"␣x5

x1: Number of custom units
1 = custom unit 1
2 = custom unit 2
x = other
x2: Formula
0 = (weight offset) x factor
1 = factor / (weight offset)
x3: Factor
"x4": Name of unit
x5: Rounding step

M22␣L Parameters are missing, the command can thus not be executed.

M22␣I Command not executable.

Command **M22␣x1␣x2␣x3␣"x4"␣x5**
Setting of custom units.
See Inquiry.

Response **M22␣A** Command executed.

M22␣L Parameters wrong (value range, …).

M22␣I Command not executable.

Examples **M22** → **M22␣B␣1␣0␣15.5␣"sfr"␣0.05**
Inquiry of custom unit.

M22␣A␣2␣1␣25.4␣"hl"␣0.1

M23 – Inquiry/setting of readability, 1d/xd

Command	**M23**	Setting of readability.
Response	**M23␣A␣x**	x: Readability 0 = 1 d 1 = 10 d 2 = 100 d 3 = 1000 d
	M23␣L	Parameters are missing, the command can thus not be executed.
	M23␣I	Command not executable.
Command	**M23␣x**	Setting of readability. See Inquiry.
Response	**M23␣A**	Command executed.
	M23␣L	Parameters wrong (value range, …).
	M23␣I	Command not executable.
Example	**M23 1 → M23␣A**	Setting readability = 10 d.

M24 – Inquiry/setting of print key function

Command	**M24**	Inquiry of print key function.
Response	**M24␣A␣x**	x: Function of print key 0 = print stable weight 1 = print weight immediately 2 = no print function
	M24␣L	Parameters are missing, the command can thus not be executed.
	M24␣I	Command not executable.
Command	**M24␣x**	Setting of function of print key. See Inquiry.
Response	**M24␣A**	Command executed.
	M24␣L	Parameters wrong (value range, …).
	M24␣I	Command not executable.
Example	**M24 1 → M24␣A**	Setting of print key function.

M25 – Inquiry of application selection

Command	**M25**	Inquiry of application selection.
Response	**M25 B No "Name"** **M25 B …** **M25 A No "Name"**	No: Number of application Name: Name of application
	M25 L	Parameters are missing, the command can thus not be executed.
	M25 I	Command not executable.
Examples	**M25** → **M25 B 1 "Weighing"** **M25 B 2 "…"** **M25 A x "MinWeigh"**	

M26 – Inquiry/setting of current application

Command	**M26**	Inquiry of actual current application.
Response	**M26 A x**	x: Number of application
	M26 L	Parameters are missing, the command can thus not be executed.
	M26 I	Command not executable.
Command	**M26 x**	Setting application number. x: Number according to appl. list (command M25).
Response	**M26 A**	Command executed.
	M26 L	Parameters wrong (value range, …).
	M26 I	Command not executable.
Example	**M26 3** → **M26 A**	Application 3 is activated.

Comment

Application number: Number of the application according to the application list (command M25).

M27 – Inquiry of adjustment history

Command	**M27**	Inquiry of adjustment history.
Response	**M27 B Nr tt mm jjjj hh mm Mode "Wgt"**	
	M27 B …	No: Number of adjustment entry
	M27 A Nr tt mm jjjj hh mm Mode "Wgt"	
		tt: Date, day of adjustment
		mm: Date, month
		jjjj: Date, year
		hh: Time, hour
		mm: Time, minute
		Mode: Type of adjustment
		0 = internal adjustment
		1 = external adjustment
		Wgt: Adjustment weight used "100.234 g"
	M27 L	Parameters are missing, the command can thus not be executed.
	M27 I	Command not executable.

Examples

M27 → **M27 B 1 14 12 1999 8 26 1 "200.1234 g"**
1st adjustment, external

M27 B 2 14 12 1999 14 30 1 "200.1234 g"
2nd adjustment, external

M27 A 3 1 1 2000 8 26 0 ""
3rd adjustment, internal

M28 – Inquiry of temperature probe

Command	**M28**		Inquiry of measured values of temperature probe.
Response	**M28 B No Temp** **M28 B ...** **M28 A No Temp**		No: Number of the temperature probe Temp: Temperature of the probe in °C
	M28 L		Parameters are missing, the command can thus not be executed.
	M28 I		Command not executable.
Examples	**M28**	→ **M28 B 1 21.5**	Temperature of 1st sensor in °C.
		M28 A 2 23.2	Temperature of 2nd sensor in °C.

Comment

No information is available on the location, accuracy or correct temperature offset of the probe.

M29 – Inquiry/setting of value release

Command	**M29**		Inquiry of value release.
Response	**M29 A x**		x: value release 0 = very fast 1 = fast 2 = reliable and fast 3 = reliable 4 = very reliable
	M29 L		Parameters are missing, the command can thus not be executed.
	M29 I		Command not executable.
Command	**M29 x**		Setting of value release. See Inquiry.
Response	**M29 A**		Command executed.
	M29 L		Parameters wrong (value range, ...).
	M29 I		Command not executable.
Example	**M29 3**	→ **M29 A**	Setting of value release to "reliable".

3.4 Commands and responses MT-SICS level 3 for AX/MX/UMX

The commands of MT-SICS level 3 are supported by the standard version of all AX/MX/UMX balances, see also response to the I2 command from MT-SICS level 0.

Command		Page
PW	Inquiry/setting of the piece weight (piece counting application)	81
A01	Inquiry/setting of reference in % (percent weighing application)	82

PW – Inquiry/setting of the piece weight

Requirement

The PW command can be used only if the piece counting application has been activated in the menu of the balance (see Operating instructions).

Inquiry of the piece weight

Command **PW** Inquiry of the piece weight (only when counting application is active).

Response **PW␣A␣PieceWeightValue␣Unit**
Current piece weight value in unit actually set under unit 1.

PW␣I Piece weight value can not be transfered at present as another operation is taking place.

PW␣L Command understood, but can not be executed as the piece counting application is not active.

Setting of the piece weight

Command **PW␣PieceWeightValue␣Unit**
Set the piece weight value to the according to the preset value. The unit should correspond to unit actually set under unit 1.

Response **PW␣A** The piece weight value has been set.

PW␣I Piece weight value can not be set at present as another operation is taking place.

PW␣L Command not executed as the counting application is not active or parameter wrong .

Example

Command **PW␣1.23g** Set the piece weight value 1.23 gram.

Response **PW␣A** The piece weight value has been set.

Comment

The range of the piece weight value is specified to the balance type.

A01 – Inquiry/setting of reference in %

Command	**A01**	Inquiry of reference.
Response	**A01␣A␣x**	x: reference in %
	A01␣L	Parameters are missing, the command can thus not be executed.
	A01␣I	Command not executable.
Command	**A01␣reference**	Setting of reference in %. See Inquiry.
Response	**A01␣B**	Start to set reference (waiting for stable weight).
	A01␣A	Command executed.
	A01␣L	Parameters wrong (value range, …).
	A01␣E	Setting reference aborted (not stable, over-/ underload, abortkey,…).
	A01␣I	Command not executable.

Examples

```
A01 100.00 → A01 B
             A01 A
```

Reference is set, waiting for stable weight.
Command executed.

Comment

This command can only be used with the application percent weighing.

4. Special features

Parameter values after switching balance off/on

The commands of the standard command are seved on the permanent memory of the balance. This means that all values changed via the interface are saved when the balance is switched off.

Several commands in succession

If several commands are sent in succession without waiting for the corresponding responses, it is possible that the balance confuses the sequence of command processing or ignores entire commands.

Weight unit of weight value

In response strings with a weight value, unit always signifies the unit actually set under unit 1 in the menu of the balance (exeptions see SU, SIU, SIRU and SRU commands (MT-SICS level 2)).

METTLER TOLEDO DeltaRange balances

If the fine range of DeltaRange balances has been exceeded at the time of transmission, the balance sends a weight value as response in which the tenth character is a space.

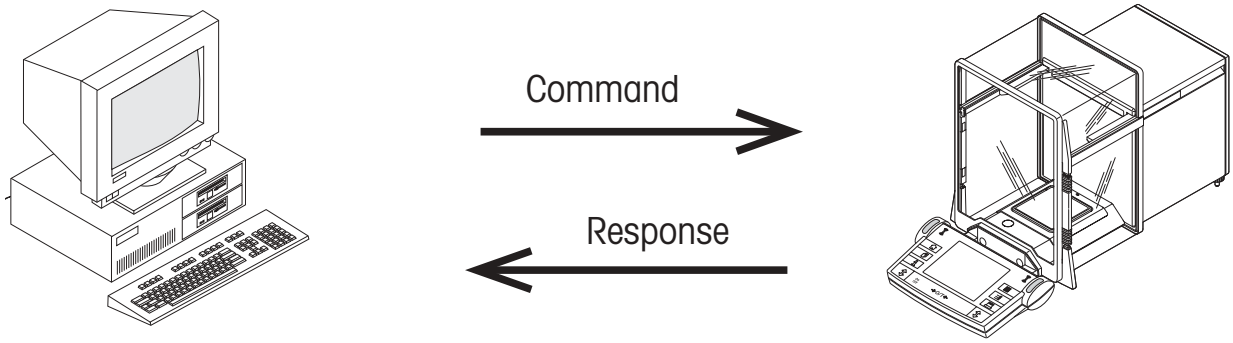
Repeat rate and timeout

The repeat rate with repeat commands and the duration of the timeout (time-limit function) depend on the balance type, see technical data of the balance in question.

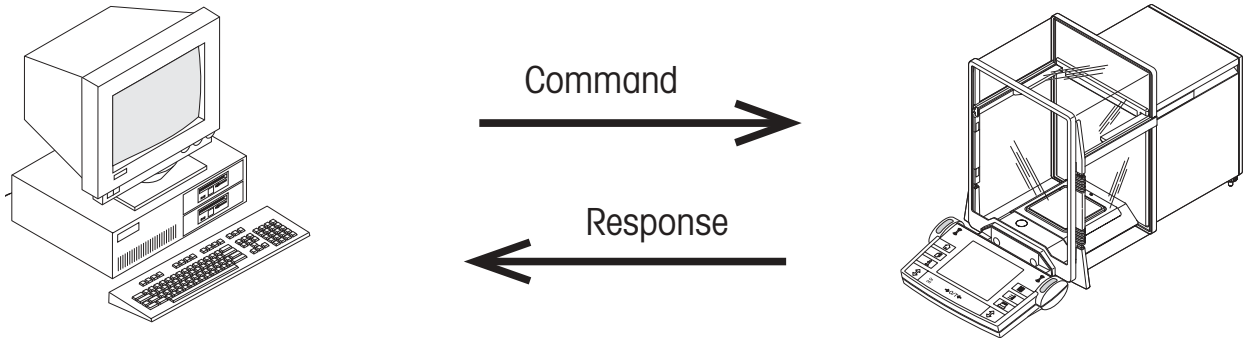
5. An example

The following simple formula weighing application shows the data interchange between the computer with the formula weighing program and the balance.

A substance (S = 55 g) comprising components K1 = 100 g and K2 = 21 g needs to be weighed into a beaker.
If too much or too little of the first component is weighed in, the target weight of the second component should be adjusted so that the ratio of the two components remains the same.
The user is guided by the balance display and acknowledges his actions with the tare key.



→	**@**	Reset balance.
←	**I2␣A␣"AX204␣R␣Standard␣220.0000␣g"**	
→	**K␣3**	Disable key function and report each keystroke.
←	**K␣A**	
→	**D␣"BEAKER"**	Prompt "(load) BEAKER" appears in the display.
←	**D␣A**	Response to the prompted text.
←	**K␣C␣5**	Acknowledges pressing of the tare key.
→	**T**	Tare weight on the balance.
←	**T␣S␣ ␣ ␣ ␣ ␣70.0000␣g**	Beaker weighs 70.0000 g.
→	**D␣"C1 100g"**	Prompt, add component 1 = 100 g.



D␣A	Response to the prompted text.
K␣C␣5	Acknowledges pressing of the tare key.
S	Send target weight of component 1.
S␣S␣ ␣ ␣ ␣ ␣ ␣105.0000␣g	Target weight of component 1 missed by 5 g.
T	Tare weight on the balance.
T␣S␣ ␣ ␣ ␣ ␣ ␣55.0000␣g	Contents of the tare memory, now corresponds to gross weight.
D␣"C2␣21␣g"	Prompt, add component 2 = 21 g.
D␣A	Response to the prompted text.
K␣C␣5	Acknowledges pressing of the tare key.
D␣"Sub␣76␣g"	Display "76 g substance weighed in".
D␣A	Response to the "Display" command.

6. What if...?

Tips from actual practice when the communication between the system (computer) and the balance does not function.

Establishing the communication

Switch the balance off with the corresponding "off" key and then on again with the "on" key. The balance must now send identification string I4, e.g. I4␣A␣"0123456789".
If this is not the case, check the following points.

Connection

For bidirectional communication, at least three connecting lines are needed:

- Data line from the balance (TxD signal with RS232 interface).
- Data line to the balance (RxD signal with RS232 interface).
- Signal ground line (SG with RS232 interface).

Make sure that all these connections are in order. Check the connector pin assignment of the connection cables.

Interface parameters

For the transmission to function properly, the settings of the following parameters must match at both the computer and the balance:

- Baud rate (send/receive rate)
- Number of data bits
- Parity bit

Check the settings at both devices.

Handshake

For control of the transmission, in part separate connection lines are used (CTS/DTR). If these lines are missing or wrongly connected, the computer or balance can not send or receive data. Check whether the balance is prevented from transmitting by handshake lines (CTS or DTR). Set the parameter "protocol" for the balance and the peripheral device to "No Handshake" or "none". The handshake lines now have no influence on the communication.

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