

# MT-SICS Interface Commands

for Moisture Analyzers HX / HS



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# 1 Supported products

HX204		HS153		
				For more information: <a href="http://www.mf.com/moisture">www.mf.com/moisture</a>
V 1.00	V 1.20	V 1.00	V 1.20	Software/Firmware version minimum required

## 2 Introduction

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

### Standardization of the commands

All new METTLER TOLEDO balances and Moisture Analyzers 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 equipment:

MT-SICS level 0:	Basic Command set, e.g. weighing cell.
MT-SICS level 1:	Elementary command set, i.e. weigh modules or balances without integrated applications.
MT-SICS level 2:	Extended command set specific for a family.
MT-SICS level 3:	Application-specific command set, e.g. MT-SICS for Moisture Analyzer.

A particular distinguishing feature of this concept is that the commands combined in MT-SICS level 0 and 1 are identical for all balances and instruments. Both the simplest weighing balance and a Moisture Analyzer recognize the commands of MT-SICS level 0.

### 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 (raw data).
- Zero the balance.
- Identify MT-SICS implementation (version number).
- Identify the Moisture Analyzer (serial number).
- Reset the Moisture Analyzer.
- Control the display.

### The commands of MT-SICS level 2 and 3

All additional higher level functions for the Moisture Analyzer are collected in the commands of MT-SICS level 2 and 3. When creating your software application, please note that the commands of MT-SICS level 3 apply to your application and can not be supported by every METTLER TOLEDO balance or instrument.

### 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 (page 36) from level 0.

You can use the command I1 (page 36) via the interface to request the MT-SICS level and MT-SICS versions implemented on your Moisture Analyzer.

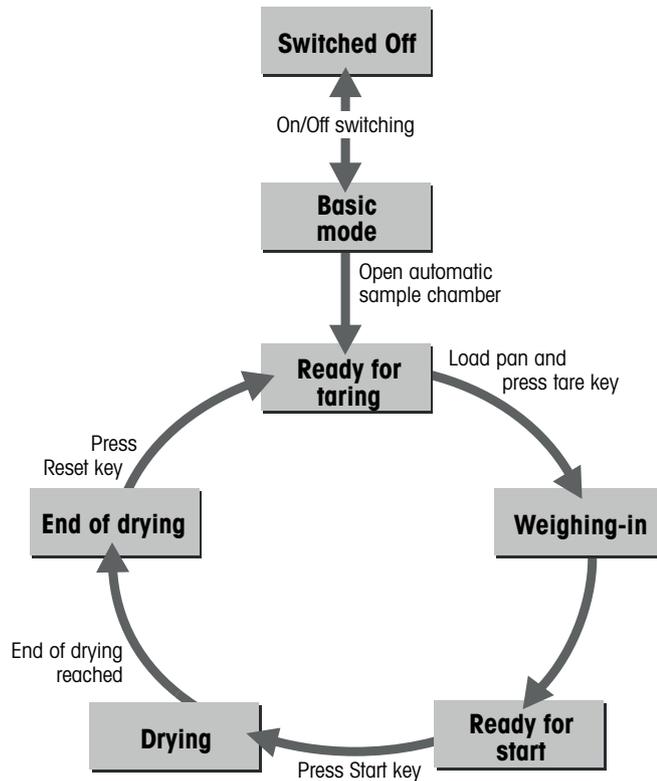
### Additional documentation on data interface

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 optional interface and the peripheral instrument or cable in question.

### How the Moisture Analyzer operates

Your Moisture Analyzer is used to determine the moisture content of virtually any substance. The instrument operates according to the thermogravimetric principle: At the start of the measurement the Moisture Analyzer determines the weight of the sample, the sample is then rapidly heated with the built-in halogen dryer unit and the moisture vaporizes. During the drying, the instrument continuously records the weight of the sample and shows the decrease in the moisture. On completion of the drying, the final result of the moisture or dry substance content of your sample is displayed.

During drying the Moisture Analyzer passes through the following instrument statuses:



The following instrument statuses also exist:

- Entry status
- Taring
- Weight adjustment
- Temperature adjustment

You will find detailed information on the functions of the Moisture Analyzer in the Operating Instructions.

## 2.1 Command Formats

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

	Enter commands in uppercase or lowercase letters.
_	The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec.).
"text"	The possible input for "text" is a sequence of characters (8-bit ASCII character set from 32 dec. to 255 dec.).
..CR LF	Each command must be closed by C <sub>R</sub> L <sub>F</sub> (ASCII 13 dec., 10 dec.). The characters C <sub>R</sub> L <sub>F</sub> , which can be inputted using the Enter or Return key of most entry keypads, are not listed in this description every time, but it is essential they be included for communication with the instrument.

### Example

Command to Moisture Analyzer which writes Hello into the display:

↓	D_"Hello"	The quotation marks " " must be inserted in the entry
↑	D_A	Command executed successfully

The command terminator C<sub>R</sub>L<sub>F</sub> is not shown.

## 2.1.1 Response formats

All responses sent by the Moisture Analyzere to the transmitter (e.g. computer) to acknowledge the received command have one of the following formats:

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

### 2.1.1.1 Format of responses with weight value

#### Syntax

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

<ID>	␣	<Status>	␣	<WeightValue>	␣	<Unit>	C <sub>R</sub>	L <sub>F</sub>
1-2 characters		1 character		10 characters		1-5 characters		

#### Parameters

Name	Type	Values	Meaning
<ID>	String		Response identification, refers to the invoking command
␣	Blank		Space (ASCII 32 dec.)
<Status>	Character	S	<b>S</b> table weight value
<WeightValue>	Float		Weighing result; shown as a number with 10 characters (after a blank/space!), including decimal point, and minus sign (–) directly in front of the first digit if the value is negative. The weight value appears right aligned. Preceding zeros are not shown except for the zero to the left of the decimal point.
<Unit>	String		Weight unit as actually set under host unit
C <sub>R</sub>	Byte		Carriage return (ASCII 13 dec.)
L <sub>F</sub>	Byte		Line feed (ASCII 10 dec.)

#### Examples

Response with stable weight value of 0.256 g:

↓	S	Request a stable weight value
↑	S␣S␣␣␣␣␣␣0.256␣g	

### 2.1.1.2 Format of responses without weight value

#### Syntax

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

<ID>	␣	<Status>	␣	Parameters...	C <sub>R</sub>	L <sub>F</sub>
1-5 characters		1 character				

#### Parameters

Name	Type	Values	Meaning
<ID>	String		Response identification, refers to the invoking command
␣	Blank		Space (ASCII 32 dec.)
<Status>	Character	A	Command executed successfully
		B	Command not yet terminated, additional responses following
Parameters...			Command-dependent response code
C <sub>R</sub>	Byte		Carriage return (ASCII 13 dec.)
L <sub>F</sub>	Byte		Line feed (ASCII 10 dec.)

#### Example

↓	D␣"Hallo"	Write "Hallo" into the display
↑	D␣A	The full text Hallo appears in the display

## 2.1.2 Error messages

### 2.1.2.1 Command-specific error messages

#### Syntax

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

<ID>	␣	<Status>	C <sub>R</sub>	L <sub>F</sub>
1-5 characters		1 character		

#### Parameters

Name	Type	Values	Meaning
<ID>	String		Response identification, refers to the invoking command
␣	Blank		Space (ASCII 32 dec.)
<Status>	Character	+	Instrument is in overload range (weighing range exceeded)
		-	Instrument is in underload range (e.g. weighing pan is not in place)
		L	Logical error (e.g. parameter not allowed)
		I	Internal error (e.g. balance not ready yet)
C <sub>R</sub>	Byte		Carriage return (ASCII 13 dec.)
L <sub>F</sub>	Byte		Line feed (ASCII 10 dec.)

#### Example

Response while balance is in overload range:

↓	SI	Request a weight value immediately
↑	S␣+	Overload; no weight value available

### 2.1.2.2 General error messages

#### Syntax

There are three different error messages:

<ID>	C <sub>R</sub>	L <sub>F</sub>
2 characters		

#### Parameters

Name	Type	Values	Meaning
<ID>	String	ES	Syntax error: The Instrument has not recognized the received command or the command is not allowed
		ET	Transmission error: The Instrument has received a "faulty" command, e.g. owing to a parity error or interface break
		EL	Logical error: The Instrument can not execute the received command
C <sub>R</sub>	Byte		Carriage return (ASCII 13 dec.)
L <sub>F</sub>	Byte		Line feed (ASCII 10 dec.)

### Example

Trial to set the update rate to 20 weight values per second:

↓	dat_30_10_2012	DAT accidentally written in lowercase
↑	ES	Syntax error; upd not recognized as a command

### 2.1.2.3 Specific error messages on weight response

#### Description

If any error is detected in the system, it is no longer possible to get a weight value. In this case the weight value is overwritten with an error number and trigger code.

We recommend contacting your METTLER TOLEDO representative if any error occurs.

#### Syntax

The error message has the same format as the weight value (10 characters) and starts always with S\_S\_.

S_S	_	...	Error	_	<ErrorNumber>	<ErrorTrigger>	C <sub>R</sub>	L <sub>F</sub>
		1-2 spaces			1-2 characters	1 character		
Total 10 characters (same as weight value) - Filled with spaces on the beginning								

#### Parameters

Name	Type	Values	Meaning
<ErrorNumber>	Integer	1	Boot error
		2	Brand error
		3	Checksum error
		9	Option fail
		10	EEPROM error
		11	Device mismatch
		12	Hot plug out
		14	Weigh module / electronic mismatch
<ErrorTrigger>	String	b	Error from electronics (weigh module, balance)
		t	Error from terminal
C <sub>R</sub>	Byte		Carriage return (ASCII 13 dec.)
L <sub>F</sub>	Byte		Line feed (ASCII 10 dec.)

#### Examples

↓	SI	Send current weight value
↑	S_S_Error_10b	EERPOM error on the electronic unit occurred! Check if every thing is connected correctly. If any error occurs after power restart, contact your METTLER TOLEDO representative

↓	SIR	Send current weight value at intervals
↑	S_S_Error_1t	Boot error on the terminal occurred! If any error occurs after power restart, contact your METTLER TOLEDO representative

### 2.1.3 Tips for programmer

#### Note

This reference manual covers the MT-SICS commands for Moisture Analyzers. As the Moisture Analyzers can differ based on model and software version, not all the MT-SICS level 2 and 3 commands are usable on every model. We therefore recommend using the IO (page 35) command to get an overview of all commands that are supported by a particular balance.

## Planning the use of MT-SICS commands

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 instruments from METTLER TOLEDO without having to change your application programs.

### Command and response

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

### Cancel

To be able to start from a determined state, when establishing the communication between Moisture Analyzer and system, you should send a cancel command **see @** (page 14) to the Moisture Analyzer. When the instrument is switched on or off, faulty characters can be received or sent.

### Parameter values after switching the instrument on/off

The commands of the standard command are saved on the permanent memory of the Moisture Analyzer. This means that all values changed via the interface are saved when the Moisture Analyzer 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 Moisture Analyzer confuses the sequence of command processing or ignores entire commands.

### Carriage Return, Line Feed

Depending on the platform,  $C_{R}L_{F}$  is not just a "new line" (Java: "newLine()" or C/C++ "\n"):

Platform	'New Line'
DOS/Windows	$C_{R}L_{F}$
Macintosh	$C_{R}$
Unix	$L_{F}$

Nevertheless, all commands have to be closed by a  $C_{R}L_{F}$  (dec: 13, 10; hex: 0D, 0A).

### Quotation marks ""

Quotation marks included in the command must always be entered. If a quotation mark is located within the string, it may be escaped by a backslash (\):

↓	D_"place 4\"filter!"	
↑	D_A	Balance display: place 4" filter!

### Weight unit of weight value – host unit

It is always essential to consider the weight unit that is to be used to display weighing results. Depending on where the results are output, the weigh modules/balances offer the possibility of selecting a particular unit **see M21** (page 49). This enables the displayed unit and info unit to be shown on the terminal. Host unit is used to output the weighing results via an interface (host) on the basis of MT-SICS commands. The weight values and the displayed unit can only be output by means of the  $SU$  commands.

### USB interface of the balance

#### If the Microsoft Windows® USB driver is used

Please make sure the balance will not be switched off, is not disconnected from the power and the USB cable is not disconnected during an established USB connection. Otherwise the connection is broken and can not be reestablished easily. To reestablish the connection you need to restart the PC or deactivate and reactivate the connection using the device manager.

### Binary coded multiple selections

Some parameters that allow multiple selections are binary coded: Each possible selection is represented by one bit, the corresponding parameter equals to the decimal interpretation.

Selection 8	Selection 7	Selection 6	Selection 5	Selection 4	Selection 3	Selection 2	Selection 1	Parameter
0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0..255
$2^7 = 256$	$2^6 = 128$	$2^5 = 64$	$2^4 = 32$	$2^3 = 16$	$2^2 = 4$	$2^1 = 2$	$2^0 = 1$	$\sum_{i=1}^8 Selection_i \cdot 2^{i-1}$

Responses may easily be interpreted by converting the decimal number to binary again.

### 3 Commands and responses

#### @ – Cancel

##### Description

@ can be used to achieve the same effect as disconnecting and reconnecting the power supply, which empties the volatile memories. The purpose of this command is to initiate a command sequence.

##### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

##### Syntax

##### Command

@	Resets the weigh module/balance to the condition found after switching on, but without a zero setting being performed.
---	--

##### Response

I4_A_ "<SNR>"	Serial number is emitted; the weigh module/balance is ready for operation.
---------------	--

##### Comments

- All commands awaiting responses are cancelled.
- The cancel command is always executed.
- The emitted serial number corresponds to the serial number of the terminal (if one is present), **see** I4 (page 39).

##### Example

↓	@	Cancel
↑	I4_A_ "B021002593"	Weigh module or balance is "reset", its serial number is B021002593

##### Also see

- I4 – Query serial number (page 39)

## C – Cancel all commands

### Description

Cancel all running commands.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

C	Cancel running commands.
---	--------------------------

#### Responses

C_B	The cancel running command has been started.
C_A	Command understood and executed successfully.

### Comments

- This command has a similar functionality as the command @ (page 14) but responds with a well defined answer and does not fully reset the balance.
- This command cancels all active and pending interface commands correctly and in a safe way on the interface where cancel was requested. This command does not cancel any commands or procedures that are not triggered by a SICS command.
- The command C responds with C\_A after all active and pending interface commands have been terminated.
- This command is typically used for repeating commands such as SIR (page 56) and for adjustment commands triggering a procedure.
- New procedures/command requests can be initiated right after a C\_A.

### Example

↓	C	Cancel running commands
↑	C_B	Cancel running started
↑	C_A	Command understood and executed successfully

### Command-specific error responses

#### Response

C_E_<Error>	Current error code.
-------------	---------------------

#### Parameter of command-specific error

Name	Type	Values	Meaning
<Error>	Integer	0	Error while canceling

## C0 – Query/set adjustment settings

### Description

C0 can be used to define the type of adjustment. Other commands are required to actually trigger the adjustment procedure and define the adjusted weights.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

C0	Query of the current adjustment setting.
C0_<Mode>_<Weight>	Set the adjustment setting.

#### Responses

C0_A_<Mode>_<Weight>_<Value>_<Unit>	Weight value and unit specify the value of the weight for an external calibration requested from the user via the display, <b>see</b> C1 (page 18). The unit corresponds to the factory setting of host unit, e.g. gram (g) with standard balances or carat (ct) with carat balances respectively. With internal adjustment, neither weight value nor unit appears.
C0_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
C0_A	Adjustment setting set successfully.
C0_L	Command understood but not executable (incorrect parameter; certified version of the balance).

#### Parameters

Name	Type	Values	Meaning
<Mode>	Integer	0	Mode = Manual The adjustment can only be triggered manually. A change in the ambient conditions has no influence on the initiation of the calibration procedure.
		1	Mode = Auto, status display AutoCal or Cal not activated. 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 adjustment.
		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 an adjustment or at least a test, <b>see</b> TST x commands.
<Weight>	Integer	0	Internal weight (factory setting).
		1	External weight.
<Value>	Float		Weight values specify the value of the weight for an external calibration requested from the user via the display or interface, <b>see</b> C1 (page 18).
<Unit>	String		The unit corresponds to the factory setting of host unit, e.g. gram (g).

## Comments

- Setting `<Mode> = 1` and `<Weight> = 0` corresponds to the menu setting "ProFACT" / "FACT" under "Adjust/Test".
- Use C1 (page 18) to start an adjustment defined with C0.
- C2 (page 19) is independent of C0.
- C0 must be reset manually; @ (page 14) has no effect.

## Examples

↓	C0	Query of the current status and setting of the adjustment
↑	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 an adjustment ( <code>&lt;Mode&gt; = 2</code> ) with the external weight ( <code>&lt;Weight&gt; = 1</code> ). The adjustment is initiated with the command C1 (page 18) and requires a weight of 100.000 g
↓	C2	Start external adjustment, <b>see</b> responses of C2 (page 19)
↓	C0	Query of the current status and setting of the adjustment
↑	C0_A_3_1_"_100.000_g"	Adjustment started
↓	C0	Query of the current status and setting of the adjustment
↑	C0_A_4_1_"_100.000_g"	Adjustment successfully executed
↓	C0_0_1	Set adjustment setting to manual and external
↑	C0_A	Adjustment setting set

## Also see

- C1 – Start adjustment according to current settings (page 18)

## C1 – Start adjustment according to current settings

### Description

C1 is used to carry out adjustment in accordance with the CO (page 16) settings.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

C1	Start the adjustment according to the current setting CO (page 16).
----	---

### First Responses

C1_B	The adjustment procedure has been started. Wait for second response <b>see</b> Comments.
C1_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
C1_L	Command understood but not executable (e.g. certified version of the balance). No second response follows.

### Further Responses

C1"<Weight>_<Unit>"	Weight request with external adjustment.
C1_A	Command understood and executed successfully.
C1_I	The adjustment was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

### Comments

- Commands sent to the balance during the adjustment operation are not processed and responded to in the appropriate manner until the adjustment is at an end.
- Use @ (page 14) to abort a running adjustment.

### Example

↓	C1	Start the adjustment according to the current setting
↑	C1_B	Adjustment operation started
↑	C1_"_____0.00_g"	Prompt to unload the balance
↑	C1_"_____2000.00_g"	Prompt to load the adjustment weight of 2000.00 g
↑	C1_"_____0.00_g"	Prompt to unload the balance
↑	C1_A	Adjustment completed successfully

### Also see

- CO – Query/set adjustment settings (page 16)

## C2 – Start adjustment with external weight

### Description

Regardless of the C0 (page 16) setting, c2 carries out external adjustment with the reference weight.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

C2	Start the external adjustment.
----	--------------------------------

#### First Responses

C2_B	The adjustment procedure has been started.
C2_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
C2_L	Command understood but not executable (e.g. adjustment with an external weight is not admissible, certified version of the balance). No second response follows.

#### Further Responses

C2_ "<Weight>"_<Unit>"	Prompt to unload or load the balance.
C2_A	Command understood and executed successfully.
C2_I	The adjustment was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

### Comments

- Commands sent to the balance during the adjustment operation are not processed and responded to in the appropriate manner until the adjustment is at an end.
- Use @ (page 14) to abort a running adjustment.

### Example

↓	C2	Start the external adjustment
↑	C2_B	Adjustment operation started
↑	C2_ "_____0.00_g"	Prompt to unload the balance
↑	C2_ "____2000.00_g"	Prompt to load adjustment weight 2000.00 g
↑	C2_ "_____0.00_g"	Prompt to unload the balance
↑	C2_A	Adjustment completed successfully

## C3 – Start adjustment with internal weight

### Description

You can use C3 to start an internal adjustment procedure.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

C3	Start the internal adjustment.
----	--------------------------------

#### First Responses

C3_B	The adjustment procedure has been started. Wait for second response.
C3_I	Adjustment can not be performed at present as another operation is taking place. No second response follows.
C3_L	Adjustment operation not possible (e.g. no internal weight). No second response follows.

#### Further Responses

C3_A	Adjustment has been completed successfully.
C3_I	The adjustment was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

### Comments

- Commands sent to the balance during the adjustment operation are not processed and responded to in the appropriate manner until the adjustment is at an end.
- Use @ (page 14) to abort a running adjustment.

### Example

↓	C3	Start the internal adjustment
↑	C3_B	Adjustment operation started
↑	C3_A	Adjustment completed successfully

## DAT – Query/set date

### Description

Set/query the balance system date.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

DAT	Query of the current date of the balance.
DAT_<dd>_<mm>_<yyyy>	Set the date of the balance.

#### Responses

DAT_A_<dd>_<mm>_<yyyy>	Current date of the balance.
DAT_A	Command understood and executed successfully.
DAT_I	Command understood but currently not executable (balance is currently executing another command).
DAT_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<dd>	Integer	01 ... 31	Day
<mm>	Integer	01 ... 12	Month
<yyyy>	Integer	2000 ... 2099	Year

#### Comment

- The set date is retained even after the Cancel-command @ (page 14).

#### Example

↓	DAT	Query of the current date of the balance
↑	DAT_A_01_04_2011	Current date of the balance is 1st April 2011

## DATI – Query/set date and time

### Description

Set/query the device system date and time in a singular action.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

DATI	Query of the current date and time of the device system.
DATI_<YYYY>_<MM>_<DD>_<hh>_<mm>_<ss>	Set the date and time of the device system.

#### Responses

DATI_A_<YYYY>_<MM>_<DD>_<hh>_<mm>_<ss>	Current date and time of the device system.
DATI_A	Command understood and executed successfully.
DATI_I	Command understood but currently not executable (balance is currently executing another command).
DATI_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<YYYY>	Integer	2000 ... 2099	Year
<MM>	Integer	1 ... 12	Month
<DD>	Integer	1 ... 31	Day
<hh>	Integer	0 ... 23	Hour
<mm>	Integer	0 ... 59	Minute
<ss>	Integer	0 ... 59	Second

#### Example

↓	DATI	Query of the current date and time of the device system
↑	DATI_A_2010_03_15_10_30_18	Current date and time of the device system is 2010-03-15 and the time is 10:30:18
↓	DATI_A_2010_5_30_12_0_0	Set date to 2010-05-30 and time to 12:00:00
↑	DATI_A	Date and time is set to 2010-05-30 and time to 12:00:00

## HA07 – Report instrument status change

### Description

Report the instrument status change.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA07	Report instrument status change.
HA07_<OnOff>	Set the instrument status change.

#### Responses

HA07_A	Command executed.
HA07_A_<Status>	Change of status.
HA07_L	Command understood but not executable (incorrect parameter e.g. number, value range).

### Comment

- Also active in standby.

### Parameter

Name	Type	Values	Meaning
<OnOff>	Integer	0	Switch off
		1	Switch on
<Status>	Integer	1	Basic mode
		2	Load pan and tare
		3	Weighing-in
		4	Ready for start
		5	Drying
		6	End of drying
		7	Entry
		11	Taring
		12	Weight adjustment or Test
13	Temperatur adjustment or Test		

### Example

↓	HA07_1	Switch instrument status change on
↑	HA07_A	Command executed

## HA24 – Query of drying temperature

### Description

Query of current drying temperature.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Command

HA24	Query drying temperature.
------	---------------------------

#### Response

HA24_A_<DryingTemperature>	Current drying temperature in °C
----------------------------	----------------------------------

#### Parameter

Name	Type	Values	Meaning
<DryingTemperature>	Integer		Drying temperature °C

#### Example

↓	HA24	Query of current drying temperature
↑	HA24_A_105	The drying temperature is 105 °C

## HA26 – Query of drying data

### Description

Query of drying data in configurable display mode.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA26_<DisplayMode>	Query drying data.
--------------------	--------------------

#### Responses

HA26_A_<Status>_<DisplayMode>_<WetWeight>_<CurrentWeight>_<Result>_<Time>	Current drying data.
HA26_A	Command understood and executed successfully.
HA26_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Status>	Integer	0	No drying exists
		1	Drying running
		2	Drying ended
		3	Drying terminated
<DisplayMode>	Integer	0	Currently set display mode
		1	Grams
		2	DC (dry content)
		3	MC (moisture content), (factory setting)
		4	AM (ATRO moisture content)
		5	AD (ATRO dry content)
		6	g/kg MC
		7	g/kg DC
8	-MC (negative moisture content)		
<WetWeight>	Integer	3	Wet weight in grams
<CurrentWeight>	Integer	4	Current weight or dry weight in grams
<Result>	Integer	5	Actual result in requested display mode
<Time>	Integer	6	Drying time (seconds)

#### Comments

- If a drying is inexistent (e.g. after a RAM LOST), the parameters x3..x6 are set to 0.
- If the measuring results exceed the tolerances for ATRO result display (L-999.99 % AM or >999.99 % AD) the selected results in x2 = 4 AM or x2 = 5 AD will automatically be transferred in x2 = 3 MC or x2 = 2 DC respectively.

#### Examples

↓	HA26_3	Query of drying data
↑	HA26_A_2_3_4.762_3.066_35.61_497	Drying has been ended regularly, result requested in % moisture content, wet weight 4.762 g, dry weight 3.066 g, 35.61 % moisture content, drying ended at 497 seconds

↓	HA26_2	Query of drying data
↑	HA26_A_1_2_2.672_2.467_92.33_143	Drying is running, result requested in % dry content, wet weight 2.672 g, dry weight 2.467 g, 92.33 % dry content, drying for 143 seconds in progress

## HA27 – Query of drying result

### Description

Query of drying result.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA27	Query of drying result.
------	-------------------------

#### Responses

HA27_A_<Result>_<DisplayMode>	Current drying result.
HA27_A	Command understood and executed successfully.
HA27_I	Command understood but currently not executable (drying in progress).
HA27_L	Command understood but not executable (incorrect parameter e.g. number, value range).

#### Parameters

Name	Type	Values	Meaning
<Result>	Integer	0	Currently set display mode
		1	Grams
		2	DC (dry content)
		3	MC (moisture content), (factory setting)
		4	AM (ATRO moisture content)
		5	AD (ATRO dry content)
		6	g/kg MC
		7	g/kg DC
<DisplayMode>	Integer	8	-MC (negative moisture content)
			Drying result (always 7 digit number)

#### Example

↓	HA27_3	Query of drying result
↑	HA27_A_-73.25_%MC	Drying result -73.25 %MC

## HA61 – Query of method parameters – part 1

### Description

Query of method parameters regarding display mode, switchoff criteria and drying program.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA61_1	Query of method parameter.
--------	----------------------------

#### Responses

HA61_A_<Method>_<DisplayMode>_<SwitchOffCriteria>_<Timer>_<DryingProgram>_<DryingTemperature>_<RampTime>_<Ramp1Temp>_<Ramp1Time>_<Ramp2Temp>	Current setting of the method parameters.
HA61_A	Command understood and executed successfully.
HA61_I	Command understood but currently not executable (no method defined).
HA61_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Method>	Integer	1	Current method is shown
<DisplayMode>	Integer	1	Grams
		2	DC (dry content)
		3	MC (moisture content), (factory setting)
		4	AM (ATRO moisture content)
		5	AD (ATRO dry content)
		6	g/kg MC
		7	g/kg DC
		8	-MC (negative moisture content)
<SwitchOffCriteria>	Integer	1	Switch off manually (n/a)
		2	Switch off via timer
		3	Test measurement
		4	Switch-off criterion 1 (1 mg / 10 s); for samples which dry very quickly
		5	Switch-off criterion 2 (1 mg / 20 s); for samples which dry quickly
		6	Switch-off criterion 3 (1 mg / 50 s); suitable for most types of samples (factory setting)
		7	Switch-off criterion 4 (1 mg / 90 s); for samples which dry moderately quickly
		8	Switch-off criterion 5 (1 mg / 140 s); for samples which dry very slowly
		9	Free switch-off criterion
<Timer>	Integer	30 ... 28800	Set the timer in seconds (factory setting: 50 s)

Name	Type	Values	Meaning
<DryingProgram>	Integer	1	Standard drying (factory setting)
		2	Rapid drying
		3	Gentle drying
		4	Step drying
<DryingTemperature>	Integer	40 ... 230	Set temperature in °C (factory setting: 105 °C)
<RampTime>	Integer	0 ... 28800	Ramp time in seconds (factory setting: 180 s)
<Ramp1Temp>	Integer	50 ... 230	Temperature of level 1 of step drying, in °C (factory setting: 50 °C)
<Ramp1Time>	Integer	0 ... 28800	Time of level 1 of step drying, in seconds (factory setting: 300 s)
<Ramp2Temp>	Integer	50 ... 230	Temperature of level 2 of step drying, in °C (factory setting: 105 °C)
<Ramp2Time>	Integer	0 ... 28800	Time of level 2 of step drying, in seconds (factory setting: 50 s)

### Example

↓	HA61_1	Query method parameters for method 1
↑	HA61_A_1_1_6_300_1_160_180_105_0_105_0	Method parameters set: Display mode grams, switch-off criterion 3, timer 300 seconds, standard drying, set temperature 160 °C, ramp time 180 seconds, ramp 1 temperature 105 °C, ramp 1 time 0 seconds, ramp 2 temperature 105 °C, ramp 2 time 0 seconds

## HA62 – Query of method parameters – part 2

### Description

Query of method parameters regarding target weight, print interval and method name.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA62_1	Query of method parameter.
--------	----------------------------

#### Responses

HA62_A_<Method>_<TargetWeight>_<PrintInterval>_<MethodName>_<Code>	Current setting of the method parameters.
HA62_A	Command understood and executed successfully.
HA62_I	Command understood but currently not executable (no method defined).
HA62_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Method>	Integer	1	Current method is shown
<TargetWeight>	Integer	0.100 ... 200.000	Target weight in grams
<PrintInterval>	Integer	1	Off (factory setting)
		2	Printout every 10 seconds
		3	Printout every 30 seconds
		4	Printout every 1 minutes
		5	Printout every 2 minutes
		6	Printout every 10 minutes
<MethodName>	String	max. 30 characters	Name for the method
<Code>	String	ID1	Comments (ID) for the measurement (max. 20 characters)

#### Example

↓	HA62_1	Query method parameters for method 1
↑	HA62_A_1_5.000_30_ "Butter"_"	Method parameters: target weight 5.000 g, print interval 30 seconds, method name "Butter", no code

## HA621 – Query of ID1

### Description

Query comments for ID1.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA621_0	Query Text ID1.
---------	-----------------

#### Responses

HA621_A	Command understood and executed successfully.
HA621_I	Command understood but currently not executable (no method or ID defined).
HA621_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Method>	Integer	0	Current method is shown
<"TextID">	String	max. 20 characters	Text ID1 (factory setting: " "). Text with reduced character set

#### Example

↓	HA621_0	Text ID1
↑	HA621_A_"Coffee_Powder"	Query of Text ID1 "Coffee Powder"

## HA622 – Query of ID2

### Description

Query comments for ID2.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA622_0	Query Text ID2.
---------	-----------------

#### Responses

HA622_A	Command understood and executed successfully.
HA622_I	Command understood but currently not executable (no method or ID defined).
HA622_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Method>	Integer	0	Current method is shown
<"TextID">	String	max. 20 characters	Text ID2 (factory setting: " "). Text with reduced character set

#### Example

↓	HA622_0	Text ID2
↑	HA622_A_"Milk_Powder"	Query of Text ID2 "Milk Powder"

## HA623 – Query of ID3

### Description

Query/ comments for ID3.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA623_0	Query Text ID3.
---------	-----------------

#### Responses

HA623_A	Command understood and executed successfully.
HA623_I	Command understood but currently not executable (no method or ID defined).
HA623_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Method>	Integer	0	Current method is shown
<"TextID">	String	max. 20 characters	Text ID3 (factory setting: " "). Text with reduced character set

#### Example

↓	HA623_0	Text ID3
↑	HA623_A_"Chocolate"	Query of Text ID3 "Chocolate"

## HA624 – Query of ID4

### Description

Query comments for ID4.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

HA624_0	Query Text ID4.
---------	-----------------

#### Responses

HA624_A	Command understood and executed successfully.
HA624_I	Command understood but currently not executable (no method or ID defined).
HA624_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Method>	Integer	0	Current method is shown
<"TextID">	String	max. 20 characters	Text ID4 (factory setting: " "). Text with reduced character set

#### Example

↓	HA624_0	Text ID4
↑	HA624_A_ "Orange_juice"	Query of Text ID4 "Orange juice"

## IO – List all implemented MT-SICS commands

### Description

The IO command lists all commands implemented in the present software.

All level 0 commands are listed in alphabetical order before all commands of level 1 etc.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

IO	Send list of all implemented MT-SICS commands.
----	--

#### Responses

IO_B_<Level>_<Command>"	Number of the MT-SICS level where the command belongs to 2nd (next) command implemented. ... Last command implemented.
IO_B_<Level>_<Command>"	
IO_B...	
IO_A_<Level>_<Command>"	
IO_I	Command understood but currently not executable (balance is currently executing another command).

#### Parameters

Name	Type	Values	Meaning
<Level>	Integer	0	MT-SICS level 0 (Basic set)
		1	MT-SICS level 1 (Elementary commands)
		2	MT-SICS level 2 (Extended command list)
		3	MT-SICS level 3 (Application specific command set)
<Command>	String		MT-SICS command

#### Comments

- If IO lists commands that cannot be found in the manual, these are reserved commands "for internal use" or "for future use", and should not be used or altered in any way.

#### Example

↓	IO	Send list of commands
↑	IO_B_0_"IO"	Level 0 command IO implemented
↑	IO_B...	...
↑	IO_B_0_"@"	Level 0 command @ (page 14) (cancel) implemented
↑	IO_B_1_"D"	Level 1 command D implemented
↑	IO_B...	...
↑	IO_A_3_"SM4"	Level 3 command SM4 implemented

## I1 – Query MT-SICS level and MT-SICS versions

### Description

Query MT-SICS level and versions.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I1	Query of MT-SICS level and MT-SICS versions.
----	--

### Responses

I1_A_ "<Level>"_ "<V0>"_ "<V1>"_ "<V2>"_ " "<V3>"	Current MT-SICS level and MT-SICS versions.
I1_I	Command understood but currently not executable.

### Parameters

Name	Type	Values	Meaning
<Level>	String	0	MT-SICS level 0
		01	MT-SICS level 0 and 1
		012	MT-SICS level 0, 1 and 2
		03	MT-SICS level 0 and 3
		013	MT-SICS level 0, 1 and 3
		0123	MT-SICS level 0, 1, 2, and 3
		3	Application device with MT-SICS level 3
<V0>..<V3>	String		MT-SICS versions of the related level (0 to 3)

### Comment

- The command I14 (page 43) provides more comprehensive and detailed information.

### Example

↓	I1	Query the current MT-SICS level and version
↑	I1_A_ "0123"_ "2.00"_ "2.20"_ "1.00"_ " "1.50"	Level 0-3 is implemented and the according version numbers are shown

### Also see

- I14 – Query balance information (page 43)

## I2 – Query balance data (Type and capacity)

### Description

Use I2 to query the balance data (type and capacity), including the weighing capacity. The response is output as a whole string.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I2	Query of the balance data.
----	----------------------------

#### Responses

I2_A_ "<Type>_<Capacity>_<Unit>"	Balance type and capacity.
I2_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring) .

#### Parameters

Name	Type	Values	Meaning
<Type>	String		Type of balance or weigh module
<Capacity>	String		Capacity of balance or weigh module
<Unit>	String		Weight unit

#### Comments

- The number of characters of "text" depends on the balance type and capacity.

#### Example

↓	I2	Query of the balance data
↑	I2_A_"HX204_Excelsence_Plus_200.900_g"	Balance type and capacity

#### Also see

- I14 – Query balance information (page 43)

## I3 – Query balance software version and type definition number

### Description

Provides the software version and the type definition number.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I3	Query of the balance Software version and type definition number.
----	---

### Responses

I3_A_ "<Software>_<TDNR>"	Balance Software version and type definition number.
I3_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).

### Parameters

Name	Type	Values	Meaning
<Software>	String		Software (Firmware) version
<TDNR>	String		TDNR = Type Definition Number

### Comments

- Only the software version of the terminal software is issued.
- If no terminal is present, the bridge software is issued instead.
- More detailed information is available with I14 (page 43).

### Example

↓	I3	Query of the Software version number(s) and type definition number
↑	I3_A_ "4.10_10.28.0.493.142"	4.10: Software version number 10.28.0.493.142: Type definition number

### Also see

- I14 – Query balance information (page 43)

## I4 – Query serial number

### Description

Use I4 to query the serial number of the balance. In the case of balances, the serial number of the terminal is output.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I4	Query of the serial number.
----	-----------------------------

#### Responses

I4_A_ "<SNR>"	Serial number.
I4_I	Command not understood, not executable at present Command understood but currently not executable (balance is currently executing another command, e.g. initial zero setting).

#### Parameter

Name	Type	Values	Meaning
<SNR>	String		Serial number

### 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 balance response to I4 appears unsolicited after switching on and after the cancel command @ (page 14).
- Only the serial number of the terminal is issued.
- If no terminal is present, the serial number of the bridge is issued instead.
- More detailed information is available with I14 (page 43).

### Example

↓	I4	Query of the serial number
↑	I4_A_ "B021002593"	The serial number is: B021002593

### Also see

- @ – Cancel (page 14)
- I14 – Query balance information (page 43)

## I5 – Query SW-Identification number

### Description

Use I5 to query the software identification number.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I5	Query of the SW-identification number.
----	--

#### Responses

I5_A_ "<SWID>"	SW-identification number with index.
I5_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).

#### Parameter

Name	Type	Values	Meaning
<SWID>	String		SW-Identification number with index

#### Comments

- The SW-Identification number is unique for every Software. It consists of a 8 digit number and an alphabetic character as an index
- Only the software identification number of the terminal is issued.
- If no terminal is present, the software identification number of the bridge is issued instead.
- More detailed information is available with I14 (page 43).

#### Example

↓	I5	Query of the SW-identification number
↑	I5_A_ "12121306C"	12121306C: SW-identification number with index

#### Also see

- I14 – Query balance information (page 43)

## I10 – Query/set balance ID

### Description

You can use I10 to query the balance ID or define it. This allows an individual name to be assigned to a balance.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

I10	Query of the current balance identification.
I10_ "<ID>"	Set the balance identification.

#### Responses

I10_A_ "<ID>"	Current balance identification.
I10_A	Balance identification has been set.
I10_I	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).

#### Parameter

Name	Type	Values	Meaning
<ID>	String		Balance or weigh module identification

#### Comments

- A sequence of maximum 20 alphanumeric characters are possible as <ID>.
- The set balance identification is retained even after the cancel command @ (page 14).

#### Example

↓	I10	Query of the current balance identification
↑	I10_A_ "My_Balance"	Current balance identification is "My Balance"

## I11 – Query balance type

### Description

You can use I11 to obtain the precise type designation of a balance or weigh module.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I11	Query of the current balance or weigh module type.
-----	--

#### Responses

I11_A_ "<Type>"	Current balance or weigh module type.
I11_I	Type can not be transferred at present as another operation is taking place.

#### Parameter

Name	Type	Values	Meaning
<Type>	String		Balance or weigh module type

#### Comments

- A sequence of maximum 20 alphanumeric characters is possible as <Type>.
- The following abbreviations used in type designations are relevant to MT-SICS:  
 DR = Delta Range.  
 DU = Dual Range.  
 /M, /A = Approved balance or weigh module.

#### Example

↓	I11	Query of the current balance type
↑	I11_A_ "HX204"	The balance is an HX204

## I14 – Query balance information

### Description

You can use I14 to query detailed information about the balance. All components – including optional accessories – are taken into account and the associated data is output.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I14_<No>	Query of the current balance information.
----------	---

#### Responses

I14_A_<No>_<Index>_<Info>	Current balance information.
I14_I	Command understood but currently not executable.
I14_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<No>	Integer	0	Instrument configuration
		1	Instrument description
		2	SW-identification number
		3	SW version
		4	Serial number
		5	TDNR number
<Index>	Integer		Index of instrument module
<Info>	String	<Bridge>	Weighing bridge information corresponding to <No>
		<Terminal>	Balance terminal information corresponding to <No>
		<Option>	Balance option information corresponding to <No>
		<Balance>	Balance information corresponding to <No>
		<Printer>	Printer information corresponding to <No>
		<Second Display>	Second Display information corresponding to <No>

#### Comments

- The response to the query of instrument configuration can comprise one or more lines (compact balances, bridges with/without terminal etc.)
- The description of an option is the language-independent product name, e.g. "RS232-Option".
- If there are several modules of the same kind, the descriptions have an appendix, comprising of a hyphen and a number. Examples: <Option-1>, <Option-2>.

#### Examples

↓	I14_0	Query of the current balance information
↑	I14_B_0_1_"Bridge"	Bridge
↑	I14_B_0_2_"Terminal"	Terminal
↑	I14_A_0_3_"Option"	Option

↓	I14_1	Query of the current instrument descriptions
↑	I14_B_1_1_"X205T"	Bridge is a X205T
↑	I14_B_1_2_"PAT"	Excellence Plus Terminal
↑	I14_A_1_3_"RS232_Option"	RS232 Option

↓	I14_2	Query of the current SW-identification numbers
↑	I14_B_2_1_"11670123A"	SW-identification number of the bridge is 11680123A
↑	I14_B_2_2_"11670456B"	SW-identification number of the terminal is 11680456B
↑	I14_A_2_3_"11670789B"	SW-identification number of the option is 11680789B

↓	I14_3	Query of the current software versions
↑	I14_B_3_1_"4.23"	Version of the bridge software is 4.23
↑	I14_B_3_2_"4.10"	Version of the terminal software is 4.10
↑	I14_A_3_3_"1.01"	Version of the RS232 option software is 1.01

↓	I14_4	Query of the serial numbers
↑	I14_B_4_1_"0123456789"	Serial number of the bridge
↑	I14_B_4_2_"1234567890"	Serial number of the terminal
↑	I14_A_4_3_"2345678901"	Serial number of the RS232 option

↓	I14_5	Query of the type definition numbers
↑	I14_B_5_1_"1.2.3.4.5"	type definition number of the bridge
↑	I14_B_5_2_"1.2.3.4.5"	type definition number of the terminal
↑	I14_A_5_3_"1.2.3.4.5"	type definition number of the RS232 option

## I28 – Query level sensor

### Description

You can use I28 to determine whether or not the balance is level.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

I28	Query of the level sensor.
-----	----------------------------

#### Responses

I28_A_<Status>	Current state of the level sensor.
I28_I	Level sensor can not be transferred at present as another operation is taking place or there is a failure at the level sensor.

#### Parameter

Name	Type	Values	Meaning
<Status>	Integer	0	Level
		1	Not level

#### Comments

- Also supported by stand-alone platforms. During stand-alone operation, the backlighting for the level sensor is not activated.
- If no level sensor is present, an "ES" response is generated.

#### Example

↓	I28	Query of the current state of the level sensor
↑	I28_A_1	Weighing bridge is out of level

## M07 – Query/set AutoDoor

### Description

You can use M07 to set the AutoDoor function or query the current setting. The AutoDoor function automatically opens and closes the door, the doors or the cover depending on the instrument.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
	✓		✓

### Syntax

#### Commands

M07	Query of the current AutoDoor setting.
M07_<AutoDoor>	Set the AutoDoor function.

#### Responses

M07_A_<AutoDoor>	Current AutoDoor setting.
M07_A	Command understood and executed successfully.
M07_I	Command understood but currently not executable.
M07_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<AutoDoor>	Integer	0	AutoDoor function switched off
		1	AutoDoor function switched on

#### Comments

- For further details, **see** the section titled "Door function" in the "User Settings" chapter of the Operating Instructions of the balance.

#### Example

↓	M07_1	AutoDoor function switched on
↑	M07_A	AutoDoor function is set

## M14 – List available languages

### Description

Lists all languages available on the balance.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

M14	Query of the available languages.
-----	-----------------------------------

#### Responses

M14_B_<No>_<Language>"	First language.
M14_B...	...
M14_A_<No>_<Language>"	Last language.
M14_I	Command understood but currently not executable.
M14_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<No>	Integer	0 ... max	Language number
<Language>	Integer	0	English
		1	Deutsch
		2	Français
		3	Español
		4	Italiano
		5	Russian
		6	Katakana
		7	Reserved
		8	Polski
		9	Reserved
		10	Cestina
		11	Magyar
		12	Slovak
		13	Slovenia
		14	Nederlands
		15	Portuguese
		16	Chinese
		17	Japanese
		18	Korean
19	Brasilian Portuguese		

#### Example

↓	M14	Query of the available languages
↑	M14_B_0_"English"	No 0 language is English
↑	M14_B_1_"Deutsch"	No 1 language is Deutsch
↑	M14_B_2_"Français"	No 2 language is Français
↑	M14_B_3_"Español"	No 3 language is Español

↑	M14_B_4_"Italiano"	No 4 language is Italiano
↑	M14_B_5_"Russian"	No 5 language is Russian
↑	M14_B_6_"Katakana"	No 6 language is Katakana
↑	M14_B_8_"Polski"	No 8 language is Polski
↑	M14_B_10_"Cestina"	No 10 language is Cestina
↑	M14_B_11_"Magyar"	No 11 language is Magyar
↑	M14_B_16_"Chinese"	No 16 language is Chinese
↑	M14_A_17_"Japanese"	No 17 language is Japanese

## M21 – Query/set unit

### Description

Use M21 to set the required weighing unit or query the current setting.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

M21	Query of the current unit.
M21_<Des>_<Unit>	Set the unit(s).

#### Responses

M21_B_<Des>_<Unit> M21_B... M21_A_<Des>_<Unit>	Current first unit. ... Current last unit.
M21_A	Command understood and executed successfully.
M21_I	Command understood but currently not executable.
M21_L	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<Des>	Integer	0	Host unit, to MT-SICS (volatile Memory)
		1	Display unit, used on the terminal screen
		2	Info unit, used in the info field on the terminal screen

Name	Type	Values	Meaning		
<Unit>	Integer	0	Gram	g	
		1	Kilogram	kg	
		2	reserved		
		3	Milligram	mg	
		4	Microgram	µg	
		5	Carat	ct	
		6	Newton	N	
		7	Pound avdp	lb	
		8	Ounce avdp	oz	
		9	Ounce troy	ozt	
		10	Grain	GN	
		11	Pennyweight	dwt	
		12	Momme	mom	
		13	Mesghal	msg	
		14	Tael Hongkong	tlh	
		15	Tael Singa- pore	tis	
		16	Tael Taiwan	tit	
		17	Tical	tcl	
		18	Tola	tola	
		19	Baht	baht	
		20	lb	oz	
		25	no unit	--	
		26	Piece	PCS	available with application "Counting"
		27	Percent	%	available with application "Per- cent"
		28	Custom unit 1	cu1	available if custom unit 1 is switched on M22
		29	Custom unit 2	cu2	available if custom unit 2 is switched on M22

### Comments

- All *s* commands (except *sv*) are given in Host unit according to the definition of the MT-SICS. Only weight units are accepted as Host unit.
- In the event of a power failure, the host unit is lost and, following a restart, the weighing unit is displayed as "g".
- It is not possible to use "no unit" for the displayed unit.
- The units and/or their notation may be different in older software versions.

### Examples

↓	M21_0_1	Set the unit to 1 kg
↑	M21_A	Unit is set
↓	M21	Query of the current unit

↑	M21_B_0_0 M21_B_1_3 M21_A_2_5	Current host unit is "g" Current display unit is "mg" Current info unit is "carat"
---	-------------------------------------	--

## M31 – Query/set operating mode - following restart

Use M31 to set the operating mode of the weigh module/balance following restart.

### Description

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

### Commands

M31	Query of the current operating mode following restart.
M31_<Mode>	Set the operating mode following restart.

### Responses

M31_A_<Mode>	Current settings of operating mode following restart.
M31_A	Command understood and executed successfully.
M31_L	Command understood but not executable (not permitted).

### Parameters

Name	Type	Values	Meaning
<Mode>	Integer	0	User mode
		1	Production mode
		2	Service mode
		3	Diagnose mode

### Comment

- Customer can only use the User- and Diagnose mode. All other settings will give a M31\_L response.

### Example

↓	M31	Query of the current operating mode following restart
↑	M31_A_0	The current operating mode following restart is: User-mode

## PWR – Power on/off

### Description

Use `PWR` to switch the balance on or off. When it is switched off, standby mode is activated.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

<code>PWR_&lt;OnOff&gt;</code>	Switch the balance on or off.
--------------------------------	-------------------------------

#### Responses

<code>PWR_A</code>	Balance has been switched off successfully.
<code>PWR_A_</code> <code>I4_A_"&lt;SNR&gt;"</code>	Balance with the serial number "SNR" has been switched on successfully <b>see</b> I4 (page 39).
<code>PWR_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>PWR_L</code>	Command understood but not executable.

#### Parameters

Name	Type	Values	Meaning
<code>&lt;OnOff&gt;</code>	Integer	0	Set the balance to standby mode
		1	Switch the balance on

#### Comment

- The balance response to I4 (page 39) appears unsolicited after switching the balance on.

#### Example

↓	<code>PWR_1</code>	Switch the balance on
↑	<code>PWR_A</code>	The balance has been switched on successfully
↑	<code>I4_A_"0123456789"</code>	The serial number is shown

#### Also see

- I4 – Query serial number (page 39)

## S – Send stable weight value

### Description

Use `s` to send a stable weight value, along with the host unit, from the balance to the connected communication partner via the interface.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

<code>s</code>	Send the current stable net weight value.
----------------	---

#### Responses

<code>S_S_&lt;WeightValue&gt;_&lt;Unit&gt;</code>	Current stable weight value in unit actually set under host unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.
<code>S_S_&lt;ErrorCode&gt;</code>	Error occurred, <b>see</b> Specific Error Messages on Weight Response

#### Parameters

Name	Type	Values	Meaning
<code>&lt;WeightValue&gt;</code>	Float		Weight value
<code>&lt;Unit&gt;</code>	String		Currently displayed unit
<code>&lt;ErrorCode&gt;</code>	String		<b>see</b> Specific Error Messages on Weight Response

#### Comments

- The duration of the timeout depends on the balance type.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of Responses with Weight Value.

#### Example

↓	<code>s</code>	Send a stable weight value
↑	<code>S_S_100.00_g</code>	The current, stable ("S") weight value is 100.00 g

## SI – Send weight value immediately

### Description

Use **SI** to immediately send the current weight value, along with the host unit, from the balance to the connected communication partner via the interface.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

SI	Send the current net weight value, irrespective of balance stability.
----	---

### Responses

S_S_<WeightValue>_<Unit>	Stable weight value in unit actually set under host unit.
S_D_<WeightValue>_<Unit>	Non-stable (dynamic) weight value in unit actually set under host unit.
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.
S_S_<ErrorCode>	Error occurred, <b>see</b> Specific Error Messages on Weight Response

### Parameters

Name	Type	Values	Meaning
<WeightValue>	Float		Weight value
<Unit>	String		Currently displayed unit
<ErrorCode>	String		<b>see</b> Specific Error Messages on Weight Response

### Comments

- The balance response to the command **SI** is the last internal weight value (stable or dynamic) before receipt of the command **SI**.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of Responses with Weight Value.

### Example

↓	SI	Send current weight value
↑	S_D_129.07_g	The weight value is unstable (dynamic, "D") and is currently 129.07 g

## SIR – Send weight value immediately and repeat

### Description

Use `SIR` to immediately send the current weight value, along with the host unit, from the balance to the connected communication partner via the interface, but this time on a continuous basis.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

<code>SIR</code>	Send the net weight values repeatedly, irrespective of balance stability.
------------------	---

### Responses

<code>S_S_&lt;WeightValue&gt;_&lt;Unit&gt;</code>	Stable weight value in unit actually set under host unit.
<code>S_D_&lt;WeightValue&gt;_&lt;Unit&gt;</code>	Non-stable (dynamic) weight value in unit actually set under host unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.
<code>S_S_&lt;ErrorCode&gt;</code>	Error occurred, <b>see</b> Specific Error Messages on Weight Response

### Parameters

Name	Type	Values	Meaning
<code>&lt;WeightValue&gt;</code>	Float		Weight value
<code>&lt;Unit&gt;</code>	String		Currently displayed unit
<code>&lt;ErrorCode&gt;</code>	String		<b>see</b> Specific Error Messages on Weight Response

### Comments

- `SIR` is overwritten by the commands `S` (page 54), `SI` (page 55), `@` (page 14) and hardware break and hence cancelled.
- The number of weight values per second can be configured using `UPD` (page 59).
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of Responses with Weight Value.

### Example

↓	<code>SIR</code>	Send current weight values at intervals
↑	<code>S_D_129.07_g</code>	The balance sends stable ("S") or unstable ("D") weight values at intervals
↑	<code>S_D_129.08_g</code>	
↑	<code>S_S_129.09_g</code>	
↑	<code>S_S_129.09_g</code>	
↑	<code>S_D_114.87_g</code>	
↑	<code>S_...</code>	

**Also see**

- S – Send stable weight value (page 54)
- SI – Send weight value immediately (page 55)
- @ – Cancel (page 14)

## TIM – Query/set time

### Description

Set the system time of the balance or query the current time.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

TIM	Query of the current time of the balance.
TIM_<hh>_<mm>_<ss>	Set the time of the balance.

#### Responses

TIM_A_<hh>_<mm>_<ss>	Current time of the balance.
TIM_A	Command understood and executed successfully.
TIM_I	Command understood but currently not executable (balance is currently executing another command).
TIM_L	Command understood but not executable (incorrect parameter, e.g. 22_67_25) or no clock is built in.

#### Parameters

Name	Type	Values	Meaning
<hh>	Integer	00 ... 23	Hours
<mm>	Integer	00 ... 59	Minutes
<ss>	Integer	00 ... 59	Seconds

#### Comment

#### Example

↓	TIM	Query of the current time of the balance
↑	TIM_A_09_56_11	The current time of the balance is 9 hours, 56 minutes and 11 seconds

## UPD – Query/set update rate of the host interface

### Description

Use `UPD` to set the update rate of the host interface or query the current setting.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

<code>UPD</code>	Query of the update rate of the host interface.
<code>UPD_&lt;UpdateRate&gt;</code>	Set the update rate of the host interface.

#### Responses

<code>UPD_A_&lt;UpdateRate&gt;</code>	Current setting of the update rate of the host interface.
<code>UPD_A</code>	Command understood and executed successfully.
<code>UPD_I</code>	Command understood but currently not executable (balance is currently executing another command).
<code>UPD_L</code>	Command understood but not executable (incorrect parameter).

#### Parameter

Name	Type	Values	Meaning
<code>&lt;UpdateRate&gt;</code>	Float	1 ... 11.4	Update rate in values per second 1 ... 11.4

#### Comments

- Use `UPD` to configure the update rate of SIR (page 56) and SIRU.
- The balance can not realize every arbitrary update rate. The specified update rate is therefore rounded to the next realizable update rate. Use `UPD` without parameter to query the actually configured update rate.

#### Examples

↓	<code>UPD</code>	Query of the update rate of the host interface
↑	<code>UPD_A_11.2</code>	The update rate of the interface is 11.2 values per second

↓	<code>UPD_12</code>	Set the update rate of the host interface to 12 values per second
↑	<code>UPD_A</code>	Command executed successfully
↓	<code>UPD</code>	Query of the exact update rate of the host interface
↑	<code>UPD_A_10.311</code>	The exact update rate is 10.311 values per second

## WS – Query/set position of draft shield doors

### Description

You can use `ws` to query the position of the draft shield doors. However, you can also use it to open or close the doors.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Commands

<code>ws</code>	Query of the position of the draft shield door(s).
<code>ws_&lt;DoorPosition&gt;</code>	Set the position of the draft shield door(s).

#### Responses

<code>ws_A</code>	Command understood and executed successfully.
<code>ws_I</code>	Command understood but currently not executable (balance is currently executing another command).
<code>ws_L</code>	Command understood but not executable (incorrect parameter).

#### Parameters

Name	Type	Values	Meaning
<code>&lt;DoorPosition&gt;</code>	Integer	0	Door(s) closed
		1	Door(s) open (right)
		2	Door(s) open (left)
		8	Error
		9	Intermediate

#### 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 a query command.

#### Example

↓	<code>ws_1</code>	Open the draft shield door(s)
↑	<code>ws_A</code>	Draft shield door(s) opened

## Z – Zero

### Description

Use `z` to set a new zero; all weight values (including the tare weight) will be measured relative to this zero. After zeroing has taken place, the following values apply: tare weight = 0; net weight (= gross weight) = 0.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

<code>z</code>	Zero the balance.
----------------	-------------------

#### Responses

<code>Z_A</code>	Zero setting successfully performed. Gross, net and tare = 0.
<code>Z_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>Z_+</code>	Upper limit of zero setting range exceeded.
<code>Z_-</code>	Lower limit of zero setting range exceeded.

#### Comments

- The zero point determined during switching on is not influenced by this command, the measurement ranges remain unchanged.
- The duration of the timeout depends on the balance type.

#### Example

↓	<code>z</code>	Zero
↑	<code>Z_A</code>	Zero setting performed

## ZI – Zero immediately

### Description

Use `ZI` to set a new zero immediately, regardless of balance stability. All weight values (including the tare weight) will be measured relative to this zero. After zeroing has taken place, the following values apply: tare weight = 0; net weight (= gross weight) = 0.

### Supported Products

HX204		HS153	
V 1.00	V 1.20	V 1.00	V 1.20
✓	✓	✓	✓

### Syntax

#### Command

<code>ZI</code>	Zero the balance immediately regardless the stability of balance.
-----------------	---

### Responses

<code>ZI_D</code>	Re-zero performed under non-stable (dynamic) conditions.
<code>ZI_S</code>	Re-zero performed under stable conditions.
<code>ZI_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>ZI_+</code>	Upper limit of zero setting range exceeded.
<code>ZI_-</code>	Lower limit of zero setting range exceeded.

### Comments

- This command is not supported by approved balances.
- The zero point determined during switching on is not influenced by this command, the measurement ranges remain unchanged.

### Example

↓	<code>ZI</code>	Zero immediately
↑	<code>ZI_D</code>	Re-zero performed under non-stable (dynamic) conditions

## 4 What if...?

Tips from actual practice when the communication between the system (e.g. computer) and the Moisture Analyzer does not function.

### **Establishing the communication**

Test whether the unidirectional operation is working.

Switch the Moisture Analyzer off with the "Off" key and then on again with the "On" key.

The Moisture Analyzer must now send identification string I4 (page 39), e.g. `I4_A_0123456789`.

If this is not the case, check the following points.

### **Connection**

For RS232 communication, at least three connecting lines are needed:

- Data line from the weigh module/balance (TxD signal).
- Data line to the weigh module/balance (RXD signal).
- Signal ground line (GNDINT).

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 Moisture Analyzer:

- 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 Moisture Analyzer can not send or receive data.

Check whether the weigh module/balance is prevented from transmitting by handshake lines (CTS or DTR). Set the parameter "protocol" for the Moisture Analyzer and the peripheral device to "No Handshake" or "none". The handshake lines now have no influence on the communication.

### **Characters are not displayed correctly**

In order to display ASCII characters >127 dec., ensure that 8-bit communication is taking place.

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## **GWP® – Good Weighing Practice™**

The global weighing guideline GWP® reduces risks associated with your weighing processes and helps to

- choose the appropriate balance
- reduce costs by optimizing testing procedures
- comply with the most common regulatory requirements

► [www.mt.com/GWP](http://www.mt.com/GWP)

[www.mt.com/moisture](http://www.mt.com/moisture)

For more information

**Mettler-Toledo AG, Laboratory & Weighing Technologies**

CH-8606 Greifensee, Switzerland

Tel. +41 (0)44 944 22 11

Fax +41 (0)44 944 30 60

[www.mt.com](http://www.mt.com)

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