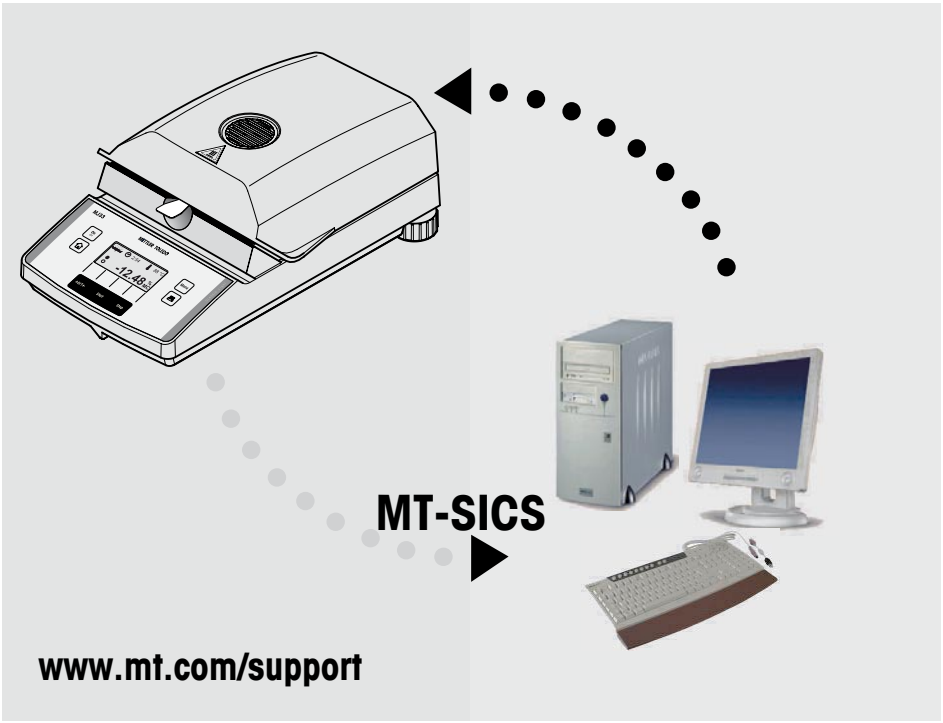
Reference Manual for

METTLER TOLEDO
Standard Interface Command Set (MT-SICS)
MT-SICS 0 version 2.30
MT-SICS 1 version 2.20
MT-SICS 2 for Moisture Analyzer MJ33 version 2.30
MT-SICS 3 for Moisture Analyzer MJ33 version 1.30



METTLER TOLEDO

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1 Introduction

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

Standardization of the commands

All new METTLER TOLEDO balances and Moisture Analyzers 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 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 family
- MT-SICS level 3 Application-specific commands as independent command set, e.g. MT-SICS level 3 for Moisture Analyzers MJ33

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 of the Moisture Analyzer 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 for the Moisture Analyzer

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.

Most commands in this manual are identical for the MJ33 and the other Moisture Analyzers of METTLER TOLEDO.

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.

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 dryer unit and the moisture evaporates. 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.

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 2.30

MT-SICS level 1, version 2.20

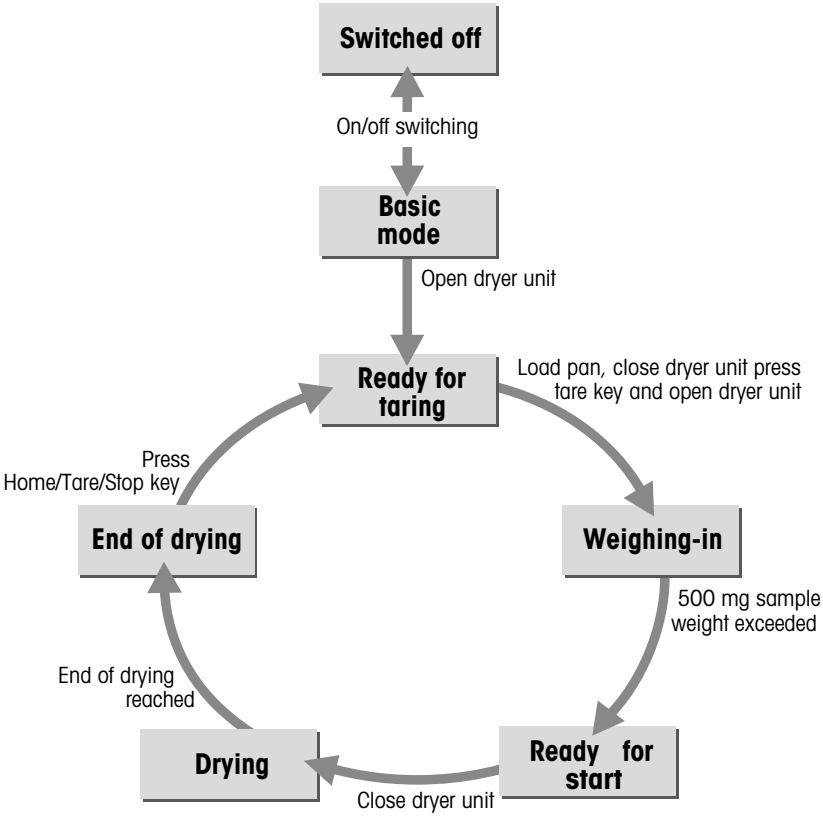
MT-SICS level 2 for Moisture Analyzer version 2.30

MT-SICS level 3 for Moisture Analyzer version 1.30

You can use the command I1 via the interface to request the MT-SICS level and MT-SICS versions implemented on your moisture analyzer.

Please make sure that the versions implemented on your moisture analyzer agree with those listed above.

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



The following instrument statuses also exist:

- Entry status
- Startup
- Taring
- Weight adjustment
- Temperature adjustment
- Error status

Some functions or commands can be executed only in particular instrument statuses. In the instrument status "Drying", for example, the value in the display can not be overwritten. If a command can not be executed for this reason, the Moisture Analyzer sends an appropriate message.

You will find detailed information on the functions of the Moisture Analyzer in the operating instructions.

2 Basic information on data interchange

Each command received by the Moisture Analyzer via the data interface is acknowledged by a response of the Moisture Analyzer to the transmitter (e.g. computer).
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 Moisture Analyzer comprise one or more characters of the ASCII character set. Here, the following must be noted:

- Commands must be entered in upper case letters (case sensitive!).
- 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 ␣).
- 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 instrument.

Example
Command to Moisture Analyzer which writes Hallo into the display:

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

Comment

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

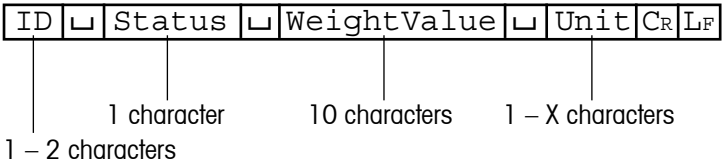
2.2 Response formats

All responses sent by the Moisture Analyzer 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

2.2.1 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	Interface status of the Moisture Analyzer, 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.
Unit	Weight unit
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

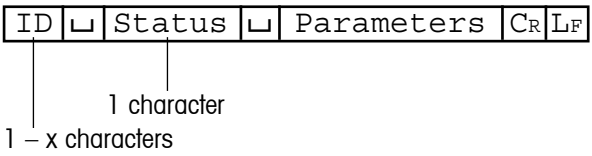
Response with stable weight value of 0.256 g:

S␣S␣␣␣␣␣␣0.256␣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	Interface status of the Moisture Analyzer, 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

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

ID	C_R	L_F

ID Error identification
Possible error messages are

- **ES** Syntax error
  The Moisture Analyzer has not recognized the received command.
- **EL** Logical error
  The Moisture Analyzer 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 Moisture Analyzer to a command. The response is the acknowledgement that the Moisture Analyzer has received the command.

Reset

To be able to start from a definite condition when establishing the communication between Moisture Analyzer and system, you should send a reset command to the Moisture Analyzer.
When the Moisture Analyzer is switched off, meaningless characters may be received or sent.

Quotation marks " "

Quotation marks included in the command must always be entered.

3 Commands and responses

The Moisture Analyzer receives commands from the system (e.g. 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 always 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.

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 = ident 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. End of the list
	`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␣A␣3␣"HA403"`	Level 3 command "HA403" implemented

Comments

- The `I0` 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. This order corresponds th 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

Example

Command `I1` Inquiry of MT-SICS level and versions

Response `I1␣A␣"3"␣"2.30"␣"2.20"␣"2.30"␣"1.30"`

3	Application device with MT-SICS level 3
2.30	Level 0, version V2.30
2.20	Level 1, version V2.20
2.30	Level 2, version V2.30
1.30	Level 3, version V1.30

I2 Inquiry of instrument data

Command	`I2`	Inquiry of instrument data
Response	`I2␣A␣"text"`	Instrument data as "text"

Example

Command	`I2`	Inquiry of instrument type
Responses	`I2␣A␣"MJ33␣Moisture-Analyzer␣35.010␣g"`	

I3 Inquiry of SW version and type definition number

Command	`I3`	Inquiry of Moisture Analyzer SW version and type definition number
Response	`I3␣A␣"TEXT"`	Moisture Analyzer SW version and type definition number as TEXT

Example

Command	`I3`	Inquiry of SW version number(s) and type definition number
Response	`I3␣A␣"1.00␣`4.10.5.93.43`"`	
	1.00	Software version
	4.10.5.93.43	Type definition number

I4 Inquiry of serial number

Command	`I4`	Inquiry of serial number
Response	`I4␣A␣"text"`	Serial number as "text"

Example

Command	`I4`	Inquiry of serial number
Response	`I4␣A␣"0123456789"`	

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 weight value
Response	`S␣S␣WeightValue␣Unit`	Current stable weight value
	`S␣I`	Command not executable (Moisture Analyzer is currently executing another command)
	`S␣+`	Balance in overload range
	`S␣-`	Balance in underload range

Example

Command	`S`	Send a stable weight value
Response	`S␣S␣␣␣␣␣␣␣1.000␣g`	The current, stable weight value is 1.000 g

Comment

- Timeout approx. 30 s.

SI Send weight value immediately

Command	**SI**	Send the current weight value, irrespective of balance stability
Response	**S␣S␣WeightValue␣Unit**	Stable weight value
	S␣D␣WeightValue␣Unit	Nonstable (dynamic) weight value
	S␣I	Command not executable (Moisture Analyzer is currently executing another command)
	S␣+	Balance in overload range
	S␣-	Balance in underload range

Example

Command	**SI**	Send current weight value
Response	**S␣D␣␣␣␣␣␣␣2.907␣g**	The current weight value is unstable (dynamic) and is 2.907 g

SIR Send weight value immediately and repeat

Command	**SIR**	Send the weight values repeatedly, irrespective of balance stability
Response	**S␣S␣WeightValue␣Unit**	Stable weight value
	S␣D␣WeightValue␣Unit	Nonstable (dynamic) weight value
	S␣I	Command not executable (Moisture Analyzer is currently executing another command)
	S␣+	Balance in overload range
	S␣-	Balance in underload range

Example

Command	`SIR`	Send current weight values at intervals
Response	`S␣D␣␣␣␣␣␣␣2.907␣g`	
	`S␣D␣␣␣␣␣␣␣2.850␣g`	
	`S␣S␣␣␣␣␣␣␣2.797␣g`	
	`S␣S␣␣␣␣␣␣␣2.775␣g`	
	`S␣D␣␣␣␣␣␣␣2.770␣g`	
	`...`	The Moisture Analyzer sends stable or nonstable weight values at intervals of 150 ms

Comment

- SIR is overwritten by the commands S, SI and @.

Z Zero

Command	`Z`	Zero the Moisture Analyzer
Response	`Z␣A`	Zero setting performed, i.e. stability criterion and zero setting range complied with
	`Z␣I`	Command not executable as the Moisture Analyzer is not in the relevant instrument status (e.g. drying unit open)
	`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

Comment

- This command is equivalent to pressing the →**0/T**← key.

ZI Zero immediately

Command	`ZI`	Zero immedeately, i.e. stores immediately the current weight value, which can be stable or non stable (dynamic), as zero value.
Response	`ZI␣S`	Zero setting performed, stable weight value
	`ZI␣D`	Zero setting performed, non-stable (dynamic) weight value
	`ZI␣I`	Zero setting not performed (Moisture Analyzer is currently executing another command)
	`ZI␣L`	Command understood but not executable (e.g. certified version of balance)
	`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)

@ Reset

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

Example

Command `@`

Response `I4␣A␣"1114350697"`

Moisture Analyzer is reset, its serial number is 1114350697.

Comment

All current commands are terminated on @ command

3.2 Commands and responses MT-SICS level 1 for Moisture Analyzer MJ33

The commands of MT-SICS level 1 are available with all standard balances which support the METTLER TOLEDO Standard Interface Command Set. With the MJ33 Moisture Analyzer, only the commands D and DW are supported.

D Display

Write into display

Command	D␣"TEXT"	Write TEXT into Moisture Analyzer display
Response	D␣A	TEXT appears unabridged left-aligned in the Moisture Analyzer display.
	D␣R	The end of the text appears in the Moisture Analyzer display, the start is cut off
	D␣I	Command not executable
	D␣L	Command understood, parameter wrong

Example

Command	D␣"HALLO"	Write HALLO into the Moisture Analyzer display
Response	D␣A	The full text HALLO appears in the Moisture Analyzer display

Clear display

Command	D␣" "	Clear Moisture Analyzer display
Response	D␣A	Display cleared

Comments

- A display command can be cleared with the DW or Reset command.
- This command can be executed only in the instrument statuses "basic mode", "ready for taring", "weighing-in" and "ready for start".

DW Weight display (Display show Weight)

Command	**DW**	Switch display to weight mode
Response	**DW␣A**	Display shows the current weight value
	DW␣I	Command not executable

Comment

This command can be executed only in the instrument statuses "basic mode", "ready for taring", "weighing-in" and "ready for start".

3.3 Commands and responses MT-SICS level 2 for Moisture Analyzer MJ33

DAT Date

Inquiry of date

Command	**DAT**	Inquiry of current date of the Moisture Analyzer
Response	**DAT␣A␣dd␣mm␣yyyy**	"dd␣mm␣yyyy" represents the date in the format day␣month␣year

Set date

Command	**DAT␣dd␣mm␣yyyy**	Set date in the format "dd␣mm␣yyyy"
Response	**DAT␣A**	Date has been set
	DAT␣L	Command not executed as the date format was not correct Inquiry of date of the Moisture Analyzer

Example

Command	**DAT**	Current date of the Moisture Analyzer is 2 April 2000
Response	**DAT␣A␣02␣04␣2000**	

Comments

- The set date is retained after the reset command "@".
- Admissible years: 1.1.1901 – 31.12.2099.

PWR Power On/Off

Command	**PWR␣x**	Switch Moisture Analyzer On or Off
		x = 0 Set Moisture Analyzer to standby mode
		x = 1 Switch Moisture Analyzer on
Response	**PWR␣A**	Moisture Analyzer has been switched off successfully
	PWR␣A **I4␣A␣"text"**	Moisture Analyzer with the serial number according to text has been switched on succesfully (see also **I4** command)
	PWR␣L	Command understood, parameter wrong

Comments

- In the standby mode, the interface remains active; but all commands except **PWR, HA07, HA20** and **@** are answered with EL.
- On switching on, the Moisture Analyzer also sends the serial number (see also **I4** command).
- On switching off, all current commands are terminated.

TIM Time

Inquiry of time

Command	**TIM**	Send current time of the Moisture Analyzer
Response	**TIM␣A␣hh␣mm␣ss**	"hh␣mm␣ss" represents the time in the 24-hour format (hours/minutes/seconds)

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␣L	Command not executed as the time format is not correct (e.g. 22␣67␣25)

Example

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

3.4 Commands and responses MT-SICS level 3 for Moisture Analyzer MJ33

All Moisture Analyzer specified commands are combined in MT-SICS level 3 for Moisture Analyzers HR73, HG53, HB43-S and MJ33.

HA01 Reset application / escape

Command	**HA01**	Reset application / escape
Response	**HA01␣A**	Application reset

Comment
This command has the same effect as the Reset key, see operating instructions of the Moisture Analyzer. It terminates all current commands and activities.

HA02 Set factory settings

Command	**HA02**	Set factory setting of the menu and method parameters
Response	**HA02␣A**	Menu and and method parameters set to factory setting

Comment
All menu parameters are reset to factory settings except RS interface settings and language. This command terminates a drying.

HA03 Switch keypad on/off

Command	**HA03␣x**	x = 0	Keypad of Moisture Analyzer switched off
		x = 1	Keypad of Moisture Analyzer switched on (factory setting)
Response	**HA03␣A**	Command executed	
	HA03␣L	Command understood, parameter wrong	

HA05 Start / end drying

Command	**HA05␣x**	x = 0	End drying, possible only in instrument status "drying"
		x = 1	Start drying, possible only in instrument status "ready for start"
Response	**HA05␣A**	Command executed	
	HA05␣I	Command not executable as the Moisture Analyzer is not in the relevant instrument status	
	HA05␣L	Command understood, parameter wrong	

Comment
To abort current drying use **HA01** (Reset application).

HA06 Trigger audio signal

Command	**HA06**	Trigger audio signal, e.g. at end of drying
Response	**HA06␣A**	Command executed

HA07 Report instrument status change

Command	**HA07␣x1**	Report each internal status change x1 = 0 Switch off x1 = 1 Switch on
Response	**HA07␣A**	Command executed
	HA07␣A␣x1	Status change (see **HA20**) x1 = 0 "Standby" x1 = 1 "Basic mode" x1 = 2 "Load pan and tare" x1 = 3 "Weighing-in" x1 = 4 "Ready for start" x1 = 5 "Drying" x1 = 6 "End of drying" x1 = 7 "Entry" x1 = 10 "Startup" x1 = 11 "Taring" x1 = 12 "Weight adjustment" x1 = 13 "Temperature adjustment" x1 = 101 "Error 1" x1 = 102 "Error 2" x1 = 10n "Error n"
	HA07␣L	Parameter wrong (number, value range,…)
	HA07␣I	Response always available, hence not possible

Comments

- aborted with the **HA01** command
- see also **HA20** command
- also active in standby

HA08 Request printer records

Command	**HA08␣x1**	Request printer records: x1 = 0 Do not send printer records x2 = 1 Send printer records
Response	**HA08␣A**	Command executed
	HA08␣L	Parameter wrong (number, value range, ...)
	HA08␣I	Response always available, hence not possible

Comments

- The printer records use the 8-bit ASCII IBM table 4.
- Regardless of menu setting (see **HA403**).
- This setting is not stored.
- To reactivate the menu settings, use the "@" command.

HA20 Inquiry of instrument status

Command	**HA20**	Inquiry of instrument status		
Response	**HA20␣A␣x**	x = 0	Status:	"Standby"
		x = 1	Status:	"Basic mode"
		x = 2	Status:	"Ready for taring"
		x = 3	Status:	"Weighing in"
		x = 4	Status:	"Ready for start"
		x = 5	Status:	"Drying"
		x = 6	Status:	"End of drying"
		x = 7	Status:	"Entry"
		x = 10	Status:	"Startup"
		x = 11	Status:	"Taring"
		x = 12	Status:	"Weight adjustment"
		x = 13	Status:	"Temperature adjustment"
		x = 101	Status:	"Error 1"
		...	...	
		x = 10n	Status	"Error n", see operating instructions of the Moisture Analyzer

Comments

- With the message **HA20␣A␣6** instrument status "End of drying", it is not apparent whether drying was ended correctly or terminated. This is possible only via the command **HA25** – Inquiry of drying weight.
- Also active in standby.

HA21 Inquiry of heating module position

Command	**HA21**	Inquiry of heating module position	
Response	**HA21␣A␣x**	x = 0	Heating module closed
		x = 1	Heating module open

HA22 Inquiry of last balance adjustment

Command	**HA22**	Inquiry of last successful balance adjustment	
Response	**HA22␣A␣x1␣x2␣x3␣x4␣x5␣x6**		
		x1	Number of the successful adjustments
		x2	Day of the last successful adjustment
		x3	Month of the last successful adjustment
		x4	Year of the last successful adjustment
		x5	Hour of the last successful adjustment
		x6	Minute of the last successful adjustment

Example

Command **HA22**

Response **HA22␣A␣15␣02␣04␣2000␣09␣34**

A total of 15 successful balance adjustments have been performed.
The last took place on April 02, 2000 at 9.34.

Comments

- The time of the last successful balance adjustment is specified in the 24-hour format.
- Possible years are 1999 … 2099.
- The counter for the balance adjustments runs to 65535.

HA23 Inquiry of last heating module adjustment

Command	**HA23**	Inquiry of the last successful heating module adjustments
Response	**HA23␣A␣x1␣x2␣x3␣x4␣x5␣x6**	
	x1	Number of successful adjustments
	x2	Day of the last successful adjustment
	x3	Month of the last successful adjustment
	x4	Year of the last successful adjustment
	x5	Hour of the last successful adjustment
	x6	Minute of the last successful adjustment

Example

Command **HA23**

Response **HA23␣A␣15␣02␣04␣2000␣09␣34**

A total of 15 successful heating module adjustments have been performed. The last took place on April 02, 2000 at 9.34.

Comments

- The time of the last successful heating module adjustment is specified in the 24-hour format.
- Possible years are 1999 … 2099.
- The counter for the heating module adjustments runs to 65535.

HA24 Inquiry of temperature

Command	**HA24**	Inquiry of current temperature
Response	**HA24␣A␣x**	Current temperature in °C

Example

Command	**HA24**	Inquiry of current temperature
Response	**HA24␣A␣105**	The temperature is 105 °C.

HA25 Inquiry of drying weights

Command **HA25** Inquiry of drying weight of the last or current drying

Response **HA25␣A␣x1␣x2␣x3␣x4**

x1	**Drying status**
x1 = 0	No drying exists
x1 = 1	Drying running
x1 = 2	Drying ended
x1 = 3	Drying terminated
x2	**Wet weight in grams**
x3	**Current weight or dry weight in grams**
x4	**Drying time (seconds)**

Example 1

Command **HA25** Inquiry of drying weights

Response **HA25␣A␣2␣12.345␣7.890␣180**
Drying has been ended regularly, wet weight 12.345 g, dry weight 7.890 g, drying time 180 seconds

Example 2

Command **HA25** Inquiry of drying weights

Response **HA25␣A␣0␣0.000␣0.000␣0**
No drying exists, e.g. as the battery was discharged

Comment

Together with the command **HA07** – Report instrument status change – dryings can be shown in parallel on the host.

HA26 Inquiry of drying data

Command **HA26␣x1** Inquiry of drying data in configurable display mode

x1 = 0 currently set display mode
x1 = 1 Grams
x1 = 2 DC (dry content)
x1 = 3 MC (moisture content), (factory setting)
x1 = 4 AM (ATRO moisture content)

Response **HA26␣A␣x1␣x2␣x3␣x4␣x5␣x6**

x1 Drying status
x1 = 0 No drying exists
x1 = 1 Drying running
x1 = 2 Drying ended
x1 = 3 Drying terminated

x2 Display mode
x2 = 1 Grams
x2 = 2 DC (dry content)
x2 = 3 MC (moisture content), (factory setting)
x2 = 4 AM (ATRO moisture content)

x3 Wet weight in grams

x4 Current weight or dry weight in grams

x5 Actual result in requested display mode

x6 Drying time (seconds)

HA26␣L Command understood, parameter wrong

Example 1

Command **HA26␣3** Inquiry of drying data

Response **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

Example 2

Command **HA26␣2** Inquiry of drying data

Response **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

Comment

- 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.

HA27 Inquiry of drying result

Command **HA27␣x1** Inquiry of drying data in configurable display mode

x1 = 0	currently set display mode
x1 = 1	Grams
x1 = 2	DC (dry content)
x1 = 3	MC (moisture content), (factory setting)
x1 = 4	AM (ATRO moisture content)

Response **HA27␣A␣x1␣x2**

x1	**Drying status** (always 7 digit number)
x2	**Display mode** (g, %DC, %MC, %AM, %AD)

HA27␣I Response not available (drying in progress)

Example

Command **HA27␣3** Inquiry of drying result

Response **HA27␣A␣␣-73.25%MC**
Drying result -73.25 % MC

Comment

If the measuring results exceed the tolerances for ATRO result display (L-999.99 % AM or > 999.99 % AD) the selected results in x1 = 4 AM or x1 = 5 AD will automatically be transferred in x1 = 3 MC or x1 = 2 DC respectively.

HA40 Inquiry / setting of language

Inquiry of language

Command	**HA40**	Inquiry of language currently set
Response	**HA40␣A␣x**	x Language (see below)

Setting language

Command	**HA40␣x**	Set language
		x = 1 English
		x = 2 German
		x = 3 French
		x = 4 Italian
		x = 5 Spanish
		x = 6 Russian
		x = 7 Japanese (Nihongo)
		x = 8 Portuguese
Response	**HA40␣A**	Language set
	HA40␣L	Command understood, parameter wrong

HA40X Inquiry / setting of menu parameters

All commands on the inquiry / setting of menu parameters work similiarly. As an example the inquiry for the startmode setting and the actual setting of the startmode is shown.

Inquiry of menu parameters

Command	**HA401**	Inquiry of startmode
Response	**HA401␣A␣x1**	
		x1 = 0 Startmode automatic (factory setting)
		x1 = 1 Startmode manual

Example

Command	**HA401**	Inquiry of startmode
Response	**HA401␣A␣1**	Startmode manual

Setting menu parameters

Command	**HA401␣x1**	Setting of startmode
		x1 = 0 Startmode automatic (factory setting)
		x1 = 1 Startmode manual
Response	**HA401␣A**	Startmode set
	HA401␣L	Command understood, parameter wrong

Example

Command	**HA401␣0**	Setting startmode to automatic
	HA401␣A	Startmode set

List of menu parameter inquiries / settings

HA401 **Startmode**

x1 = 0 Startmode automatic (factory setting)

x1 = 1 Startmode manual

HA402 **Protection against change in the settings (menu protection)**

x1 = 0 Menu protection off, changes possible (factory setting)

x1 = 1 Menu protection on, changes are not possible

HA403 **Printer**

x1 = 0 Printout off

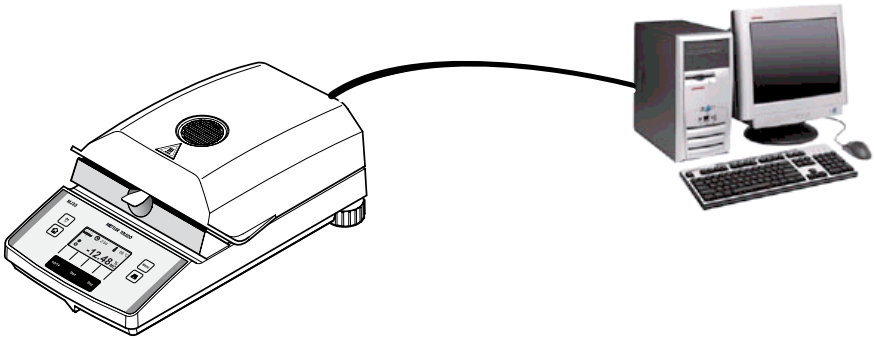
x1 = 1 Printout on (factory setting)

Comment

After the usage of HA08 the command HA403 has no effect on the printout but only on the setting of printout in the menu

4 System Configuration (MJ33 – Computer)

The MJ33 Moisture Analyzer is equipped with a 9 pin female RS232C Interface connector. It can be connected to a computer using a cable with order number 11101051 (9 pin) or order number 11101052 (25 pin).



The standard configuration of MJ33 is: 2400 baud, 7 bits, even parity, no handshake. These settings may be adjusted in the menu of MJ33. Additionally the printout setting in the menu should be "off". This avoids that printout strings are sent to the computer. Please refer to the Operating instruction.

5 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 the identification string **I4**, e.g. **I4␣A␣"0123456789"**. If "METTLER TOLEDO" is printed the communication functions properly. Change the printout setting in the menu to the "off" position.
If no identification string is received, check the following points.

Connection

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

- Data line from the Moisture Analyzer (TxD signal with RS232 interface).
- Data line to the Moisture Analyzer (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 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 Moisture Analyzer is prevented from transmitting by handshake lines (CTS or DTR).
Set the parameter "handshake" for the Moisture Analyzer and the peripheral device to "No Handshake" or "none". The handshake lines now have no influence on the communication.

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Subject to technical changes.

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