

Reference Manual for

METTLER TOLEDO

METTLER TOLEDO

Standard Interface Command Set (MT-SICS)

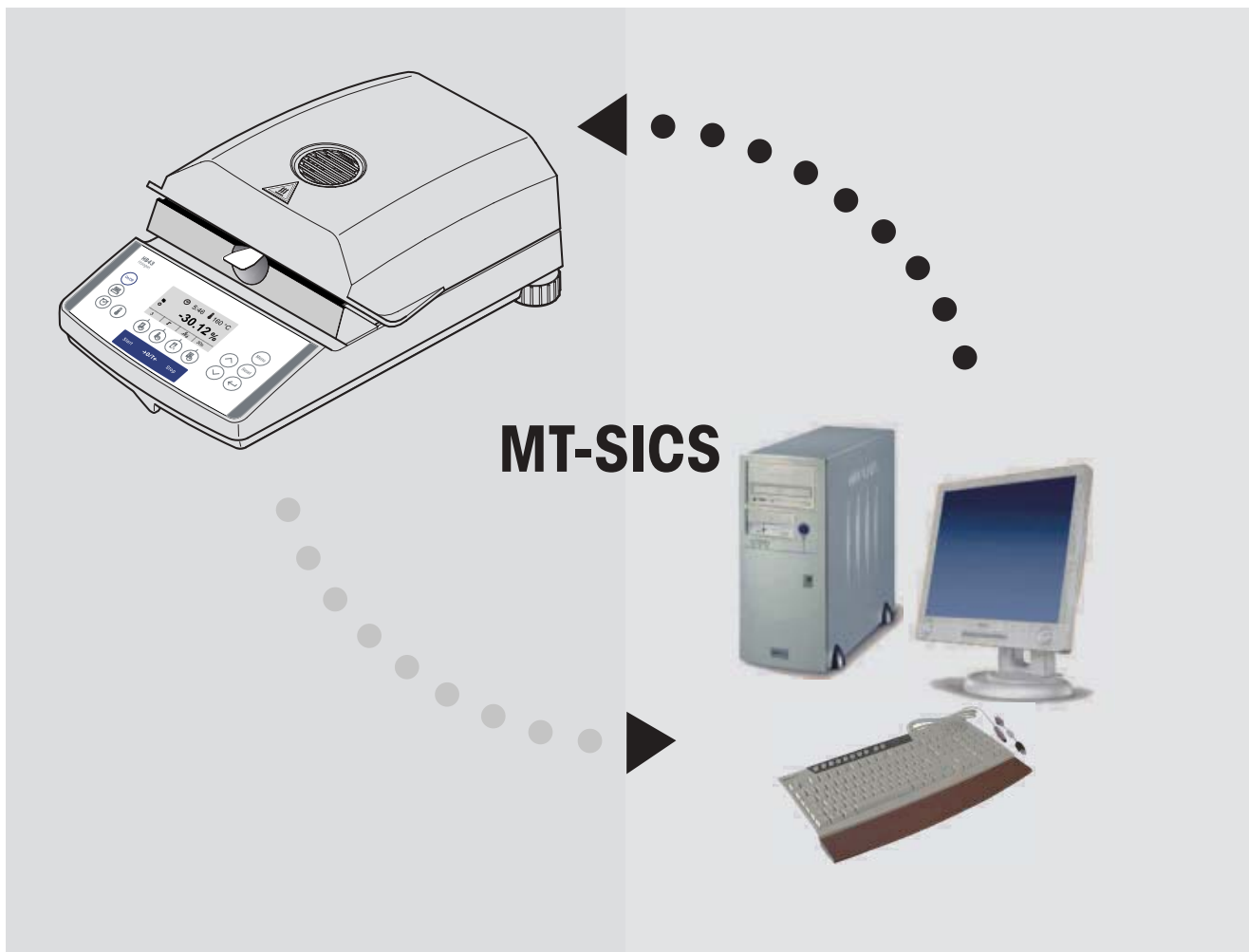
MT-SICS 0 version 2.30

MT-SICS 1 version 2.20

MT-SICS 2 for Halogen Moisture Analyzer version 2.30

MT-SICS 3 for Halogen Moisture Analyzer version 1.30

Subset for HB43



Contents

	Overview of all commands	4
1	Introduction	6
2	Basic information on data interchange	9
2.1	Command formats	9
2.2	Response formats	10
2.2.1	Format of the response with weight value	10
2.2.2	Format of the response without weight value	11
2.2.3	Error messages	12
2.2.4	Tips for the programmer	12
3	Commands and responses	13
3.1	Commands and responses MT-SICS level 0	13
3.2	Commands and responses MT-SICS level 1	22
3.3	Commands and responses MT-SICS level 2 for Halogen Moisture Analyzer HB43	24
3.4	Commands and responses MT-SICS level 3 for Halogen Moisture Analyzer HB43	26
4	System configuration (HB43 – computer)	42
5	What if...?	43

Overview of all commands

Commands and responses MT-SICS level 0

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

Commands and responses MT-SICS level 1 (subset for HB43)

D	Display	22
DW	Weight display (Display show weight)	23

Commands and responses MT-SICS level 2 for Halogen Moisture Analyzer HB43

DAT	Date	24
PWR	Power on/off	25
TIM	Time	25

Commands and responses MT-SICS level 3 (subset for Halogen Moisture Analyzer HB43)

Control commands

HA01	Reset application / escape	26
HA02	Set factory settings	26
HA03	Switch keypad on/off	26
HA05	Start / end drying	27
HA06	Trigger audio signal	27
HA07	Report instrument status change	28
HA08	Request printer records	29

Status inquiries

HA20	Inquiry of instrument status	29
HA21	Inquiry of heating module position	30
HA22	Inquiry of last balance adjustment	30
HA23	Inquiry of last heating module adjustment	31
HA24	Inquiry of temperature	31
HA25	Inquiry of drying weights	32
HA26	Inquiry of drying data	33
HA27	Inquiry of drying result	34

Instrument settings

HA40	Inquiry / setting of language	35
HA40X	Inquiry / setting of menu parameters	36

Method settings

HA61	Inquiry / setting of method parameters (part 1)	37
HA62	Inquiry / setting of method parameters (part 2)	39
HA632	Definition of freely selectable switch-off criterion	58

1 Introduction

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

Standardization of the commands

All new METTLER TOLEDO balances and Halogen 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 Halogen Moisture Analyzers HR73, HG53 and HB43

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 Halogen 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 Halogen Moisture Analyzer via the interface:

- request weighing results (raw data),
- zero the balance,
- identify MT-SICS implementation (version number),
- identify the Halogen Moisture Analyzer (serial number),
- reset the Halogen Moisture Analyzer,
- control the display.

The commands of MT-SICS level 2 and 3 for the Halogen Moisture Analyzer

All additional higher level functions for the Halogen 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 HB43 and the other Halogen Moisture Analyzers of METTLER TOLEDO. This allow direct transfer of software applications from one instrument type to another. However, not all parameters of the HR73 can be applied to the HB43.

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.

You will find a detailed description of MT-SICS level 0 and 1 in the reference manual MT-SICS (705184) which you may receive through your local METTLER TOLEDO representative.

How the Halogen Moisture Analyzer operates

Your Halogen 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 Halogen Moisture Analyzer determines the weight of the sample, the sample is then rapidly heated with the built-in halogen 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

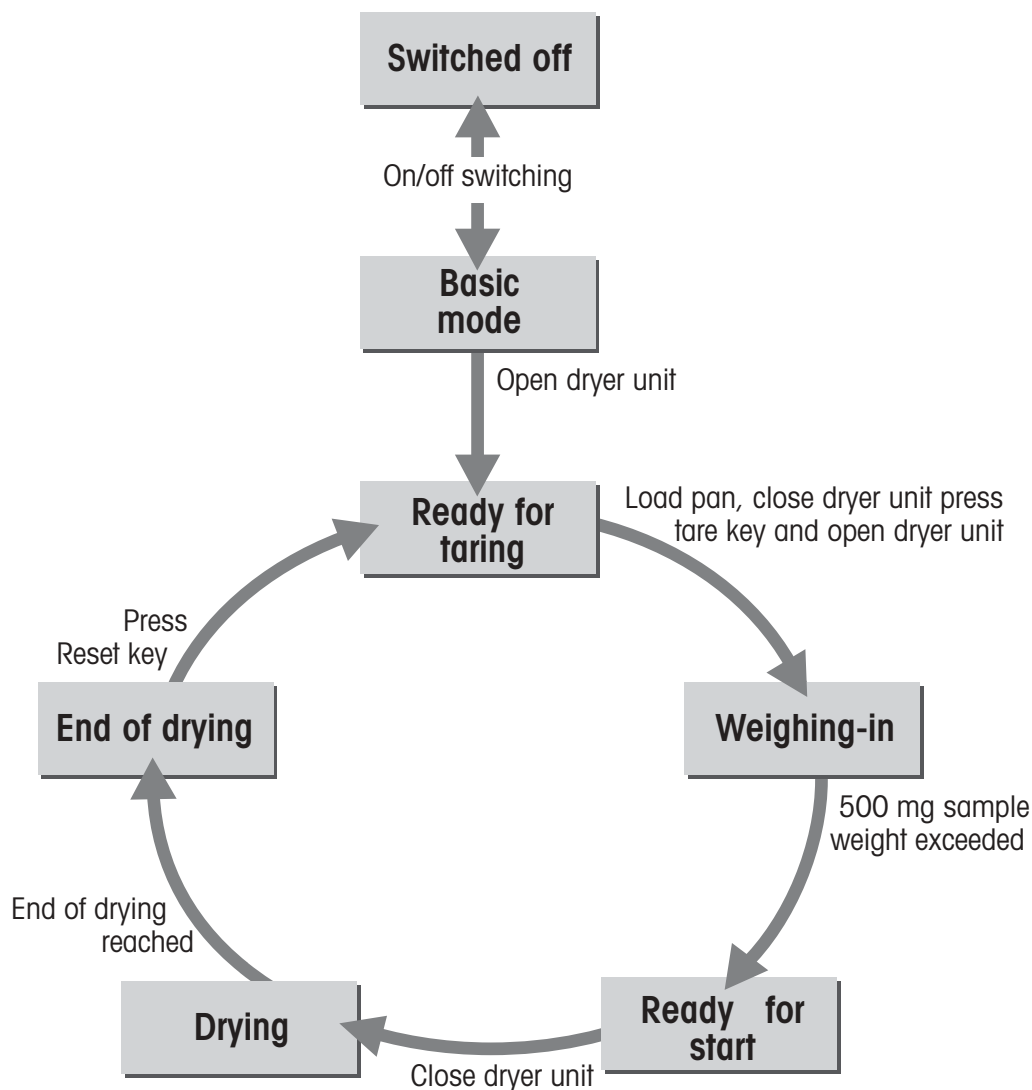
MT-SICS level 2 for Halogen Moisture Analyzer version 2.30

MT-SICS level 3 for Halogen 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 Halogen 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 Halogen Moisture Analyzer sends an appropriate message.

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

2 Basic information on data interchange

Each command received by the Halogen Moisture Analyzer via the data interface is acknowledged by a response of the Halogen 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 Halogen Moisture Analyzer comprise one or more characters of the ASCII character set. Here, the following must be noted:

- Commands can be entered 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., in this description represented as \square).
- The possible input for "text" is a sequence of characters of the 7-bit ASCII character set from 32 dec to 127 dec.
- Each command must be closed by $C_{R}L_{F}$ (ASCII 13 dec., 10 dec.).

The characters $C_{R}L_{F}$, 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 Halogen Moisture Analyzer which writes Hallo into the display:

$D\square"Hallo"$ The command terminator $C_{R}L_{F}$ is not shown

Comment

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

2.2 Response formats

All responses sent by the Halogen 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	▫	Status	▫	WeightValue	▫	Unit	C _R	L _F
		1 character		11 characters		1 – X characters		
1 – 2 characters								

ID	Response identification
▫	Space (ASCII 32 dec.)
Status	Interface status of the Halogen Moisture Analyzer, see description of the commands and responses
WeightValue	Weighing result; shown as number with 11 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▫S▫S▫S▫S▫S▫S▫S▫S▫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.



1 – 4 characters
1 character

ID	Response identification
␣	Space (ASCII, 32 dec.)
Status	Interface status of the Halogen 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 Halogen Moisture Analyzer has not recognized the received command.
ET	Transmission error The Halogen Moisture Analyzer has received a "faulty" command, e.g. owing to a parity error or interface break.
EL	Logical error The Halogen 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 Halogen Moisture Analyzer to a command. The response is the acknowledgement that the Halogen Moisture Analyzer has received the command.

Reset

To be able to start from a definite condition when establishing the communication between Halogen Moisture Analyzer and system, you should send a reset command to the Halogen Moisture Analyzer.

When the Halogen 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 Halogen 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 $C_{R}L_{F}$. 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. Except for the tare command, these commands are also available with the HB43 Halogen Moisture Analyzer.

The commands of MT-SICS level 0 are described in this reference manual only in short form. You will find a detailed description of the commands of MT-SICS level 0 in the MT-SICS reference manual (705184).

I0 Inquiry of all implemented MT-SICS commands

Command	I0	Send list of all implemented MT-SICS commands
Response	I0└B└x1└"1.Command"	x1 = number of the MT-SICS level where the 1. Command belongs to.
	I0└B└x1└"2.Command"	2nd (next) command implemented
	:	
	:	
	I0└A└x1└"last Command"	Last command implemented
	I0└A	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└B└0└"Z"	Level 0 command "Z" implemented
	I0└B└0└"@"	Level 0 command "@" (reset) implemented
	I0└B└1└"D"	Level 1 command "D" implemented
	I0└B└1└"DW"	Level 1 command "DW" implemented

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 to the order how the commands are described in this manual.

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

Command I1 Inquiry of MT-SICS level and MT-SICS versions
Response I1␣A␣"x1"␣"x2"␣"x3"␣"x4"␣"x5"

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

Comment

For details see Reference manual 705184.

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␣"HB43␣Moisture-Analyzer␣41.009␣g"

Comment

For details see Reference manual 705184.

I3 Inquiry of SW version and type definition number

Command	I3	Inquiry of Halogen Moisture Analyzer SW version and type definition number
Response	I3└┬┴┬"TEXT"	Halogen 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└┬┴┬"1.00└┬┴┬26260100"	
	1.00	Software version
	26260100	Type definition number

Comment

For details see Reference manual 705184.

I4 Inquiry of serial number

Command	I4	Inquiry of serial number
Response	I4└┬┴┬"text"	Serial number as "text"

Example

Command	I4	Inquiry of serial number
Response	I4└┬┴┬"0123456789"	

Comment

For details see Reference manual 705184.

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.

Comments

- 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

Example

Command	s	Send a stable weight value
Response	S└S└└└└└└└└└1.000└g	The current, stable weight value is 1.000 g

Comments

- Timeout approx. 7.5 s.
- For details see Reference manual 705184.

SI Send weight value immediately
--

Command **SI** Send the current weight value, irrespective of balance stability

Response **S S S WeightValue Unit**
 Stable weight value

S D WeightValue Unit
 Nonstable (dynamic) weight value

Example

Command **SI** Send current weight value

Response **S D WeightValue Unit 2.907 g**
 The current weight value is unstable (dynamic) and is 2.907 g

Comment

For details see Reference manual 705184.

SIR Send weight value immediately and repeat

Command	SIR	Send the weight values repeatedly, irrespective of balance stability
Response	SLSLWeightValueLUnit	Stable weight value
	SLDLWeightValueLUnit	Nonstable (dynamic) weight value

Example

Command	SIR	Send current weight values at intervals
Response	SLDLDDDDDDDD2.907Lg	
	SLDLDDDDDDDD2.850Lg	
	SLSLDDDDDDDD2.797Lg	
	SLSLDDDDDDDD2.775Lg	
	SLDLDDDDDDDD2.770Lg	
	...	The Halogen Moisture Analyzer sends stable or nonstable weight values at intervals of 150 ms

Comment

For details see Reference manual 705184.

Z Zero

Command	z	Zero the Halogen Moisture Analyzer
Response	ZLA	Zero setting performed, i.e. stability criterion and zero setting range complied with
	ZLI	Command not executable as the Moisture Analyzer is not in the relevant instrument status (e.g. drying unit open)

Example

Command	z	Zero
Response	ZLA	Zero setting performed

Comments

- This command is equivalent to pressing the **→0/T←** key.
- For details see Reference manual 705184.

ZI	Zero immediately
-----------	-------------------------

Command	ZI	Zero immediately, i.e. stores immediately the current weight value, which can be stable or non stable (dynamic), as zero value.
Response	ZI\downarrowS	Zero setting performed, stable weight value
	ZI\downarrowD	Zero setting performed, non-stable (dynamic) weight value
	ZI\downarrowI	Zero setting not performed (balance is currently executing another command)
	ZI\downarrowL	Command understood but not executable (e.g. certified version of balance)
	ZI\downarrow+	Upper limit of zero setting range exceeded
	ZI\downarrow-	Lower limit of zero setting range exceeded

Example 1

Command	ZI	Zero immediately
Response	ZI\downarrowS	Zero setting performed, weight value was stable

Example 2

Command	ZI	Zero immediately
Response	ZI\downarrowD	Zero setting performed, weight value was dynamic (non-stable)

Comment

For details see Reference manual 705184.

@ Reset

Command @ Resets the interface to the condition found after switching on, but without a zero setting being performed.

Response I4LAL"text" Serial number of the Halogen Moisture Analyzer, the Halogen Moisture Analyzer is ready for operation.

Example

Command @

Response I4LAL"1114350697"
 Halogen Moisture Analyzer is reset, its serial number is 1114350697.

Comment

For details see Reference manual 705184.

3.2 Commands and responses MT-SICS level 1 (subset for HB43)

The commands of MT-SICS level 1 are available with all standard balances which support the METTLER TOLEDO Standard Interface Command Set. With the HB43 Halogen Moisture Analyzer, only the commands D and DW are supported.

D	Display
----------	----------------

Write into display

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

Example

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

Clear display

Command	D " "	Clear Halogen Moisture Analyzer display
Response	D A	Display cleared, marked by the symbol *

Comments

- Max. 20 characters are admissible for "text".
- The following ASCII character set applies to "text":
0...9, A...Z, a...z, #, &, *, +, -, ., /, [,], \, :.
- A display command can be cleared with the Reset key.
- This command can be executed only in the instrument statuses "basic mode", "ready for taring", "weighing-in" and "ready for start".
- For details see Reference manual 705184.

DW	Weight display (Display show Weight)
-----------	---

Command	DW	Switch display to weight mode
Response	DWLIA	Display shows the current weight value
	DWLI	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 Halogen Moisture Analyzer HB43

DAT	Date
------------	-------------

Inquiry of date

Command **DAT** Inquiry of current date of the Halogen 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 Halogen Moisture Analyzer

Example

Command **DAT** Current date of the Halogen Moisture Analyzer is 2 April 2000

Response **DAT␣A␣02␣04␣2000**

Comments

- The set date is retained after the reset command "@".
- Admissible years: 1.1.1999 – 31.12.2099.

PWR Power On/Off

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

Comments

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

TIM Time

Inquiry of time

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

Set time

Command	TIM \backslash hh \backslash mm \backslash ss	Set time in 24-hour format (hours \backslash minutes \backslash seconds)
Response	TIM \backslash A	Time has been set, clock running
	TIM \backslash L	Command not executed as the time format is not correct (e.g. 22 \backslash 67 \backslash 25)

Example

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

3.4 Commands and responses MT-SICS level 3 (subset for Halogen Moisture Analyzer HB43)

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

HA01 Reset application / escape

Command	HA01	Reset application / escape
Response	HA01LA	Application reset

Comment

This command has the same effect as the Reset key, see operating instructions of the Halogen 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	HA02LA	Menu 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	HA03Lx	x = 0	Keypad of Halogen Moisture Analyzer switched off
		x = 1	Keypad of Halogen Moisture Analyzer switched on (factory setting)
Response	HA03LA	Command executed	
	HA03LL	Command understood, parameter wrong	

HA05 Start / end drying

Command	HA05Lx	x = 0	End drying, possible only in instrument status "drying"
		x = 1	Start drying, possible only in instrument status "ready for start"
Response	HA05LA	Command executed	
	HA05LI	Command not executable as the Moisture Analyzer is not in the relevant instrument status	
	HA05LL	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	HA06LA	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

Comment

- 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.

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 Halogen Moisture Analyzer

Comment

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.

HA21 Inquiry of heating module position

Command	HA21	Inquiry of heading 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)
		x1 = 5 AD (ATRO dry 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)
		x2 = 5 AD (ATRO dry 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)
x1 = 5 AD (ATRO dry 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 Set language (see below)

Setting language

Command	HA40┐x	Set language
		x = 0 English Eu, with European date format
		x = 1 English US, with US date format
		x = 2 German
		x = 3 French
		x = 4 Italian
		x = 5 Spanish
		x = 6 Russian
		x = 7 Japanese (Nihongo)
Response	HA40┐A	Language set
	HA40┐L	Command understood, parameter wrong

Comment

English Eu and English US differ only the format of the date when it is inputted via the keypad of the Halogen Moisture Analyzer or outputted on the internal printer.

HA40X Inquiry / setting of menu parameters

All commands on the inquiry / setting of menu parameters work similarly. 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	HA401LAx1	X1 = 0 Startmode automatic (factory setting) x1 = 1 Startmode manual

Example

Command	HA401	Inquiry of startmode
Response	HA401LA1	Startmode manual

Setting menu parameters

Command	HA401LX1	Setting of startmode X1 = 0 Startmode automatic (factory setting) X1 = 1 Startmode manual
Response	HA401LA	Startmode set
	HA401LL	Command understood, parameter wrong

Example

Command	HA401L0	Setting startmode to automatic
	HA401LA	Startmode set

Comment

Setting a menu parameter terminates a drying procedure.

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 (key protection)
x1 = 0	Key protection off, changes possible (factory setting)
x1 = 1	All keys and menu blocked except On/Off, Tare and Start/Stop
HA403	Printer
x1 = 0	Printout off
x1 = 1	Printout on (factory setting)

HA61 Inquiry / setting of method parameters (part 1)

Inquiry of display mode, switch-off criteria and temperature profile

Command	HA61└x1	Inquiry of method parameters regarding display mode, switchoff criteria and temperature profile
	x1 = 0	Inquiry of parameters of all method
Response	HA61└A└x1└x2└ ... └x11	Current setting of the method parameters This line appears for each of the existing methods x1 ... x11 Represent the individual parameters (see below)

Example

Command	HA61└1	Inquiry of current setting of the method parameters
Response	HA61└A└1└3└6└300└1└105└0└0└0└0└0	Factory setting for method 1 of the HB43

Setting display mode, switch-off criteria and temperature profile

Command	HA61└x1└x2└ ... └x11	Set method parameters regarding display mode, switch-off criteria and temperature profile x1 ... x11 represent the individual parameters (see below)
Response	HA61└A	Method parameter set
	HA61└L	Command understood, parameter wrong

Parameters

x1	Number of the method Always 1
x2	Display mode
x2 = 1	Grams
x2 = 2	DC (dry content)
x2 = 3	MC (moisture content), (factory setting)
x2 = 4	AM (ATRO moisture content)
x2 = 5	AD (ATRO dry content)
x3	Switch-off criterion
x3 = 1	Switch off manually
x3 = 2	Switch off via timer
x3 = 4	Switch-off criterion weight loss per time unit, level 1; for samples which dry very quickly
x3 = 5	Switch-off criterion weight loss per time unit, level 2; for samples which dry quickly
x3 = 6	Switch-off criterion weight loss per time unit, level 3; suitable for most types of samples (factory setting)
x3 = 7	Switch-off criterion weight loss per time unit, level 4; for samples which dry moderately quickly
x3 = 8	Switch-off criterion weight loss per time unit, level 5; for samples which dry very slowly
x3 = 9	Free switch-off criterion
x4	Setting the timer in seconds Possible settings 60 - 28800 in steps of 60 s Factory setting 300 s
x5	Drying program
x5 = 1	Standard drying (factory setting)
x5 = 2	Rapid drying
x6	Set temperature in °C Possible settings 50 ... 200 in steps of 5 °C Factory setting 105
x7	Ramp time in seconds Always 0

Parameters

Setting print interval

Command	HA62␣x1␣x2␣ ... ␣x5	Set method parameters regarding print interval x1 ... x5 represent the individual parameters (see below)
Response	HA62␣A	Method parameter set
	HA62␣L	Command understood, parameter wrong

Parameters	x1	Number of the method Possible values for HB43	1
	x2	Target weight in grams Possible settings	0
	x3	Print interval	
	x3 = 1	No print interval set, manual initiation of printout	
	x3 = 4	Printout every 30 seconds	
	x3 = 5	Printout every 60 seconds	
	x3 = 9	Printout every 300 seconds	
	x4	Method name ""	
	x5	Code " "	

Example

Command	HA62␣1␣0␣5␣"␣"␣"	Print interval set to 60 seconds
Response	HA62␣A	Method parameter set

Comments

- Setting the method parameters terminates a drying.
- The additional parameters are implemented in the HR/HG Halogen Moisture Analyzers. The above settings assure direct transfereability of control programs.

HA632 Definition of freely selectable switch-off criterion

Command **HA632** \square **x1** Inquiry of Δg and Δt

Response **HA632** \square **A** \square **x1** \square **x2** \square **x3**
Set Δg and Δt

Command **HA632** \square **x1** \square **x2** \square **x3**

Set Δg and Δt

x1: 0 active method

x2 $\Delta g = \text{Fix } 1 \text{ mg}$

x3 Δt in seconds (5...180),
factory setting 100 sec

Responses **HA632** \square **A** Δg and Δt set

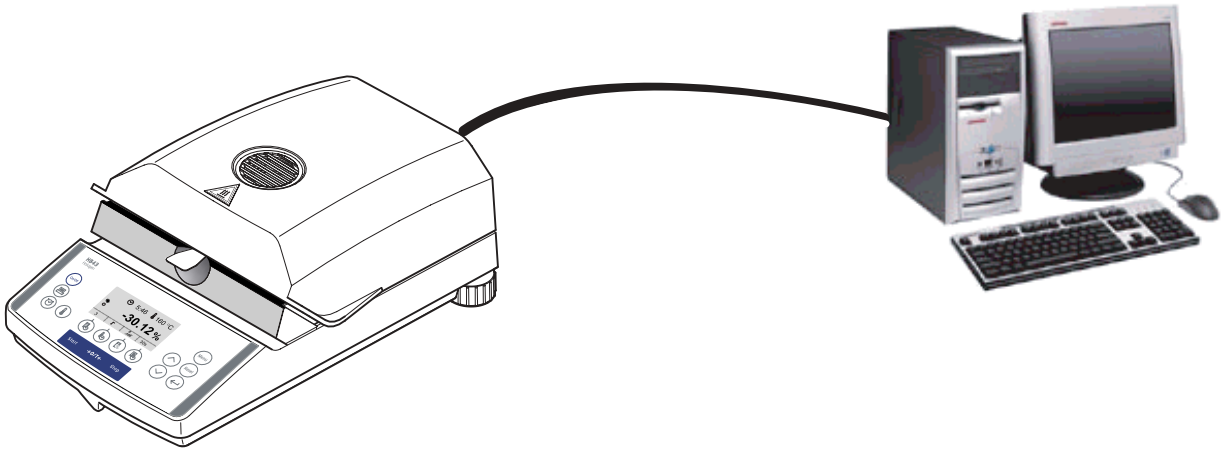
HA632 \square **L** Command understood, parameter wrong, (number,
value range, ...)

Comment

Setting the command line terminates a drying.

4 System configuration (HB43 – computer)

The HB43 Halogen 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 HB43 is: 2400 baud, 7 bits, even parity, no handshake. These settings may be adjusted in the menu of HB43. 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 Halogen Moisture Analyzer does not function.

Establishing the communication

Test whether the unidirectional operation is working:

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

The Halogen 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 Halogen Moisture Analyzer (TxD signal with RS232 interface).
- Data line to the Halogen 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 Halogen 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 Halogen Moisture Analyzer can not send or receive data.

Check whether the Halogen Moisture Analyzer is prevented from transmitting by handshake lines (CTS or DTR).

Set the parameter "handshake" for the Halogen 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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