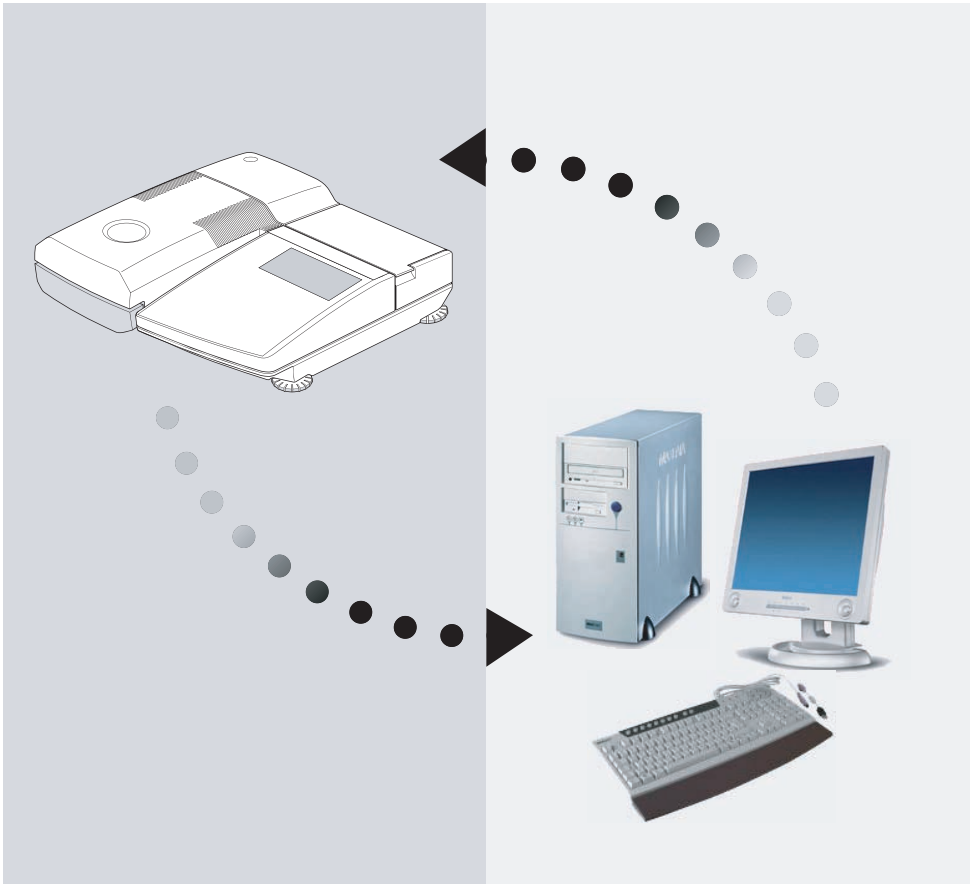
Reference Manual

METTLER TOLEDO
Standard Interface Command Set
MT-SICS 0 version 2.2x
MT-SICS 1 version 2.2x
MT-SICS 2 for Halogen Moisture Analyzers HR83 and HG63 version 2.3x
MT-SICS 3 for Halogen Moisture Analyzers HR83 and HG63 version 2.2x



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1 Introduction

To enable you to integrate Halogen Moisture Analyzers 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 HR83 and HG63

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.

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 received together with the LC-RS9 or LC-RS25 cable.

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 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.

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 2.2x

MT-SICS level 1, version 2.2x

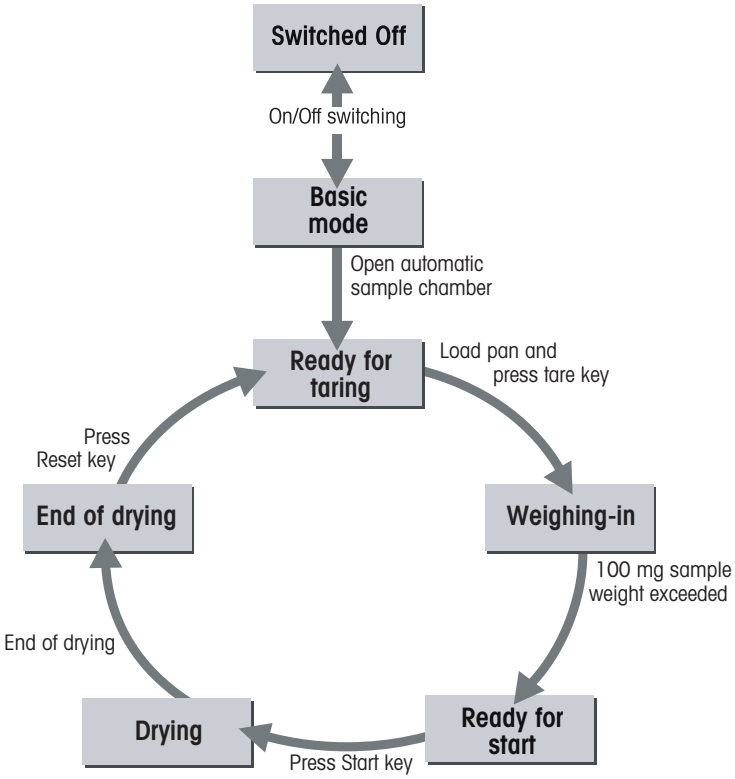
MT-SICS level 2 for Halogen Moisture Analyzers HR83 and HG63 version 2.3x

MT-SICS level 3 for Halogen Moisture Analyzers HR83 and HG63 version 2.2x

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 Section 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 ␣).
- 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_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 Halogen 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.

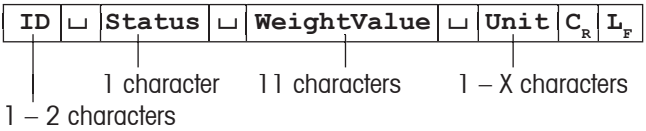
2.2 Response formats

All responses sent by the 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	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.

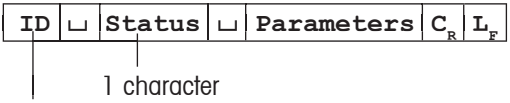
Example

Response with stable weight value of 0.256 g:

S␣S␣␣␣␣␣␣␣␣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 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

ID	C_R	L_F

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

ID	Error identification Possible error messages are
ES	Syntax error The 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_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. Except for the tare command, these commands are also available with the HR83 and HG63 Halogen Moisture Analyzers.

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␣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. Thus, there is no need of the supplement sheet delivered with the previous versions of this manual.
- All level 0 commands are listed in alphabetical order before all commands of level 1 etc. This order corresponds 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"`	

Example

Command	`I1`	Inquiry of MT-SICS level and versions
Response	`I1␣A␣"03"␣"2.10"␣"2.10"␣"2.10"␣"2.10"`	
	3	Application device with MT-SICS level 3
	2.10	Level 0, version V2.10
	2.10	Level 1, version V2.10
	2.10	Level 2, version V2.10
	1.10	Level 3, version V2.10

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␣"HR83␣Moisture-Analyzer␣81.009␣g"`	
	`I2␣A␣"HG63␣Moisture-Analyzer␣61.009␣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␣A␣"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␣A␣"1.05␣26260100"`	
	1.05	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␣A␣"text"`	Serial number as "text"

Example

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

Comment

For details see Reference manual 705184.

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␣WeightValue␣Unit** Stable weight value	
	S␣D␣WeightValue␣Unit Nonstable (dynamic) weight value	

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	

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	**S␣S␣WeightValue␣Unit**	Stable weight value
	S␣D␣WeightValue␣Unit	Nonstable (dynamic) weight value

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 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	**Z␣A**	Zero setting performed, i.e. stability criterion and zero setting range complied with

Example

Command	**Z**	Zero
Response	**Z␣A**	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 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 (balance is currently executing another command)
	ZI␣+	Upper limit of zero setting range exceeded
	ZI␣-	Lower limit of zero setting range exeeceded

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)

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	**I4␣A␣"text"**	Serial number of the Halogen Moisture Analyzer, the Halogen Moisture Analyzer is ready for operation.

Example

Command @

Response **I4␣A␣"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 HR83 and HG63)

The commands of MT-SICS level 1 are available with all standard balances which support the METTLER TOLEDO Standard Interface Command Set. With the HR83 and HG63 Halogen Moisture Analyzers, 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	**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 Halogen Moisture Analyzers HR83 and HG63

DAT Date

Command	**DAT**	Inquiry of current date of the Halogen Moisture Analyzer
Response	**DAT␣A␣x1␣x2␣x3** "dd␣mm␣yyyy" represents the date in the format day␣month␣year	
Command	**DAT␣x1␣x2␣x3**	Set date in the format "dd␣mm␣yyyy" x1: Day (1…31) x2: Month (1…12) x3: Year (1970…2037)
Response	**DAT␣A**	Date has been set
	DAT␣L	Command understood, parameter wrong, (number, value range, …) Inquiry of date of the Halogen Moisture Analyzer

Example

Command	**DAT**	Current date of the Halogen Moisture Analyzer is 8 September 2003
Response	**DAT␣A␣08␣09␣2003**	

Comments

- The set date is retained after the reset command "@".
- Admissible years: 1970 ... 2037.

PWR Power On/Off

Command	**PWR␣x1**	Switch Halogen Moisture Analyzer On or Off x1: 0 Set Halogen Moisture Analyzer to standby mode 1 Switch Halogen Moisture Analyzer on
Response	**PWR␣A**	Halogen Moisture Analyzer has been switched off successfully
	PWR␣A	Halogen Moisture Analyzer with the serial number
	I4␣A␣"text"	according to text has been switched on succesfully (see also **I4** command)
	PWR␣L	Command understood, parameter wrong, (number, value range, …)

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).

P100 Print out text on the strip printer

Command	**P100␣"x1"**	Print out "text" on the internal printer
Response	**P100␣A**	Command executed
	P100␣I	Command can not be executed at present as there is no printer or the printer buffer is full
	P100␣L	Command understood, parameter wrong, (value range, …)

Example

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

Comments

- A sequence of maximum 80 characters (incl. C_RL_F) is admissible as text. Line folding follows after 24 characters.
- The record of an ongoing series is interrupted by the **P100** command. The command has no influence on other records.
- Control characters (< 20 hex) can not be printed.
- Character set: IBM.

TIM Time

Command	**TIM**	Send current time of the Halogen Moisture Analyzer
Response	**TIM␣A␣x1␣x2␣x3**	"hh␣mm␣ss" represents the time in the 24-hour format (hours/minutes/seconds)
Command	**TIM␣x1␣x2␣x3**	Set time in 24-hour format (hours␣minutes␣seconds) x1: Hors (0…23) x2: Minutes (0…59) x3: Secondes (0…59)
Response	**TIM␣A**	Time has been set, clock running
	TIM␣L	Command understood, parameter wrong, (number, value range, …) (e.g. 22␣67␣25)

Example

Command	**TIM**	Inquiry of time
Response	**TIM␣A␣22␣56␣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 for Halogen Moisture Analyzers HR83 and HG63

All Halogen Moisture Analyzer specified commands are combined in MT-SICS level 3 for Halogen Moisture Analyzers HR83 and HG63.

HA01 Reset application / escape

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

Comments

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	**HA02␣A**	Menu and method parameters set to factory setting

Comment

This command terminates a drying.

HA03 Switch keypad on/off

Command	**HA03␣x1**	x1:	0 Keypad of Halogen Moisture Analyzer switched off 1 Keypad of Halogen Moisture Analyzer switched on (factory setting)
Response	**HA03␣A**	Command executed	
	HA03␣L	Command understood, parameter wrong, (number, value range, …)	

Comments

This command has no effect on the On/Off key. The user can thus switch the instrument on or off even if the keypad is switched off.

HA04 Open / close automatic sample chamber

Command	**HA04␣x1**	x1: 0 Close automatic sample chamber 1 Open automatic sample chamber
Response	**HA04␣A**	Command executed
	HA04␣L	Command understood, parameter wrong, (number, value range, …)

Comments

This command is not suitable for checking the position of the automatic sample chamber. See the command **HA21** – inquiry of sample chamber position.

HA05 Start / stop drying

Command	**HA05␣x1**	Start / stop drying x1: 0 Stop 1 Start 2 Start, drawer stays closed when drying is complete
Response	**HA05␣A**	Command executed
	HA05␣I	Command cannot be executed
	HA05␣L	Invalid parameter (number, value range, …)

Comment

Terminate current drying: with the command **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 1 Switch on
Response	**HA07␣A**	Command executed
	HA07␣A␣x1	Status change (see **HA20**) x1: 0 "Standby" 1 "Basic mode" 2 "Load pan and tare" 3 "Weighing-in" 4 "Ready for start" 5 "Drying" 6 "End of drying" 7 "Entry" 10 "Startup" 11 "Taring" 12 "Weight adjustment" or "Test" 13 "Temperature adjustment" or "Test" 101 "Error 1" 102 "Error 2" 10n "Error n"
	HA07␣L	Command understood, parameter wrong, (number, value range, …)

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 1 Send printer records
Response	**HA08␣A**	Command executed
	HA08␣L	Command understood, 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.

– The print interval is also effective on the host channel if the internal printer is switched off.

HA20 Inquiry of instrument status

Command	**HA20**	Inquiry of instrument status
Response	**HA20␣A␣x1**	x1: 0 Status: "Standby" 1 Status: "Basic mode" 2 Status: "Ready for taring" 3 Status: "Weighing in" 4 Status: "Ready for start" 5 Status: "Drying" 6 Status: "End of drying" 7 Status: "Entry" 10 Status: "Startup" 11 Status: "Taring" 12 Status: "Weight adjustment" or "Test" 13 Status: "Temperature adjustment" or "Test" 101 Status: "Error 1" 102 Status: "Error 2" … … 1nn Status "Error nn", see operating instructions of the Halogen Moisture Analyzer

Comments

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

HA21 Inquiry of automatic sample chamber position

Command	**HA21**	Inquiry of automatic sample chamber position
Response	**HA21␣A␣x1**	x1: 0 Automatic sample chamber closed 1 Automatic sample chamber open 2 Automatic sample chamber not in end position

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␣08␣09␣2003␣09␣34** A total of 15 successful balance adjustments have been performed. The last took place on September 08, 2003 at 9.34.

Comments

- The time of the last successful balance adjustment is specified in the 24-hour format.
- Possible years are 1970 … 2037.
- The counter for the balance adjustments runs to 65535.

HA221 Inquiry of last balance adjustment test

Command	**HA221**	Inquiry of time of last successful balance adjustment test
Response	**HA221␣A␣x1␣x2␣x3␣x4␣x5␣x6␣x7**	
		x1: Day of the last successful adjustment test
		x2: Month of the last successful adjustment test
		x3: Year of the last successful adjustment test
		x4: Hour of the last successful adjustment test
		x5: Minute of the last successful adjustment test
		x6: Set weight in g
		x7: Actual weight in g

Example

Command	**HA221**	
Response	**HA221␣A␣08␣09␣2003␣09␣54␣20.000␣20.000**	
		The last test took place on September 08, 2003 at 9.54. Set and actual weight was 20.000 g.

Comments

- The time of the last successful balance adjustment test is specified in the 24-hour format.
- Possible years are 1970 … 2037.

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␣08␣09␣2003␣09␣34** A total of 15 successful heating module adjustments have been performed. The last took place on September 08, 2003 at 9.34.	

Comments

- The time of the last successful heating module adjustment is specified in the 24-hour format.
- Possible years are 1970 … 2037.
- The counter for the heating module adjustments runs to 65535.

HA231 Inquiry of last heating module adjustment test

Command **HA231** Inquiry of the last successful heating module adjustments test

Response **HA231␣A␣x1␣x2␣x3␣x4␣x5␣x6␣x7**

- x1: Day of the last successful adjustment test
- x2: Month of the last successful adjustment test
- x3: Year of the last successful adjustment test
- x4: Hour of the last successful adjustment test
- x5: Minute of the last successful adjustment test
- x6: Actual temperature 1 in °C
- x7: Actual temperature 2 in °C

Example

Command **HA231**

Response **HA231␣A␣08␣09␣2003␣10␣14␣101␣160**

The last test took place on September 08, 2003 at 10.14. Actual temperature was 101 °C and 160 °C.

HA232 Inquiry of last heating module adjustment test 1 "freely selectable temperature"

Command **HA232** Inquiry of the last successful heating module adjustments test 1

Response **HA232␣A␣x1␣x2␣x3␣x4␣x5␣x6**

- x1: Day of the last successful adjustment test 1
- x2: Month of the last successful adjustment test 1
- x3: Year of the last successful adjustment test 1
- x4: Hour of the last successful adjustment test 1
- x5: Minute of the last successful adjustment test 1
- x6: Set temperature in °C
- x7: Actual temperature in °C

Example

Command **HA232**

Response **HA232␣A␣08␣09␣2003␣10␣34␣70␣69**

The last test took place on September 08, 2003 at 10.34. Set and actual temperature was 70 °C and 69 °C.

HA24 Inquiry of temperature

Command	**HA24**	Inquiry of current temperature
Response	**HA24␣A␣x1**	x1: 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
0 = No drying exists
1 = Drying running
2 = Drying ended
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
1 Grams
2 DC (dry content)
3 MC (moisture content), (factory setting)
4 AM (ATRO moisture content)
5 AD (ATRO dry content)

Response **HA26␣A␣x1␣x2␣x3␣x4␣x5␣x6**

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

x2: Display mode
1 Grams
2 DC (dry content)
3 MC (moisture content), (factory setting)
4 AM (ATRO moisture content)
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, (number, value range, …)

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

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.

HA27 Inquiry of drying result

Command	**HA27␣x1**	Inquiry of drying data in configurable display mode x1: 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)
Response	**HA27␣A␣x1␣x2**	**x1: Drying status** (always 7 digit number) **x2: Display mode** (g, %DC, %MC, %AM, %AD)
	HA27␣L	Command understood, parameter wrong, (number, value range, …)
	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.

HA28 Inquiry of drying result with free factor

Command	**HA28␣x1**	Inquiry of calculated drying result x1: 1 Grams 2 DC (dry content) 3 MC (moisture content), (factory setting)
Response	**HA28␣A␣x1␣x2**	**x1: Calculated drying result** (always 7 digit number) **x2: Display mode** (g, %DC, %MC)
	HA27␣L	Command understood, parameter wrong, (number, value range, …)
	HA27␣I	Response not available (drying in progress)

HA40 Inquiry / setting of language

Inquiry of language

Command	**HA40**	Inquiry of language currently set
Response	**HA40␣A␣x1**	x1: Set language (see below)

Setting language

Command	**HA40␣x1**	Set language x1: 0 English Eu, with European date format 1 English US, with US date format 2 German 3 French 4 Italian 5 Spanish 6 Russian
Response	**HA40␣A**	Language set
	HA40␣L	Command understood, parameter wrong, (number, value range, …)

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.

HA401 Inquiry / setting of start mode (operating mode)

Command	**HA401**	Inquiry of start mode
Response	**HA401␣A␣x1**	x1: 0 auto 1 manual
Command	**HA401␣x1**	Set start mode x1: 0 auto 1 manual
Response	**HA401␣A**	Start mode set

Comment
Setting the menu parameters terminates a drying.

HA402 Inquiry / setting of key protection (reset protection)

Command	**HA402**	Inquiry of key protection
Response	**HA402␣A␣x1**	x1: 0 off 1 on
Command	**HA402␣x1**	Set key protection x1: 0 off 1 on
Response	**HA402␣A** **HA402␣I**	Key protection set Password 1 set (only HR83)

Comment
- Setting the menu parameters terminates a drying.

HA403 Inquiry / setting of printer on/off

Command	**HA403**	Inquiry of printer on/off
Response	**HA403␣A␣x1**	x1: 0 off 1 on
Command	**HA403␣x1**	Set printer on/off x1: 0 Internal printer switched off 1 Internal printer switched on
Response	**HA403␣A**	Printer on/off set

Comment

- Setting the menu parameters terminates a drying.

HA411 Setting of vibration adapter

Command	**HA411**	Inquiry of vibration adapter
Response	**HA411␣A␣x1**	x1: Set vibration adapter (see below)
Command	**HA411␣x1**	Set vibration adapter x1: Vibration adapter 0 Low, setting for stable surroundings 1 Medium (factory setting), for normal surroundings 2 High, for unstable surroundings
Response	**HA411␣A** **HA411␣L**	Vibration adapter set Command understood, parameter wrong, (number, value range, …)

Comment

- Setting the menu parameters terminates a drying.

HA412 Setting of acoustic signal

Command	**HA412**	Inquiry of acoustic signal
Response	**HA412␣A␣x1**	x1: Set ton (see below)
Command	**HA412␣x1**	Set the acoustic signal x1: Signal 0 No acoustic signal 1 Soft acoustic signal, factory setting 2 Loud acoustic signal
Response	**HA412␣A** **HA412␣L**	Acoustic signal set Command understood, parameter wrong, (number, value range, …)

Comment

- Setting the menu parameters terminates a drying.

HA413 Symbols displayed

Command	**HA413**	Inquiry of symbols displaying
Response	**HA413␣A␣x1**	x1: Set symbols displaying (see below)
Command	**HA411␣x1**	Set symbols displaying x1: Symbols displayed 0 Symbols are not displayed 1 Symbols are always displayed, factory setting
Response	**HA413␣A** **HA413␣L**	Symbols displaying set Command understood, parameter wrong, (number, value range, …)

Comment

- Setting the menu parameters terminates a drying.

HA414 Menu parameter: Activate / deactivate recording of company name

Command	**HA414**	Inquiry recording of company name
Response	**HA414␣A␣x1**	x1: Set recording of company name (see below)
Command	**HA414␣x1**	Set recording of company name x1: Record company name 0 off 1 on, factory setting
Response	**HA414␣A**	Company name activated
	HA414␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA414** is possible only with HR83.
- Setting the menu parameters terminates a drying.

HA415 Definition of company name

Command	**HA415**	Inquiry of company name
Response	**HA415␣A␣"x1"**	x1: Set company name
Command	**HA415␣"x1"**	Set company name x1: Company name, " " Text of up to 20 characters with reduced character set
Response	**HA415␣A**	Company name set
	HA415␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA415** is possible only with HR83.
- Setting the menu parameters terminates a drying.

HA416 Definition of department name

Command	**HA416**	Inquiry of department name
Response	**HA416␣A␣"x1"**	x1: Set of department name
Command	**HA416␣"x1"**	Set of department name x1: Department name, " " Text of up to 20 characters with reduced character set
Response	**HA416␣A**	Department name set
	HA416␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA416** is possible only with HR83.
- Setting the menu parameters terminates a drying.

HA417 Select record length

Command	**HA417**	Inquiry of record lenght
Response	**HA417␣A␣x1**	x1: Set record length (see below)
Command	**HA417␣x1**	Set record length x1: Record length 0 Normal record, factory setting 1 Full record
Response	**HA417␣A**	Record length set
	HA417␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA417** is possible only with HR83.
- Setting the menu parameters terminates a drying.

HA418 Activate / deactivate free print interval

Command	**HA418**	Inquiry of free print interval
Response	**HA418␣A␣x1**	x1: Set free print interval (see below)
Command	**HA418␣x1**	Set free print interval x1: Free print interval 0 off, no free print interval, factory setting 1 on, the user defined the print interval
Response	**HA418␣A** **HA418␣L**	Free print interval set Command understood, parameter wrong, (number, value range, …)

Comments

- Setting the menu parameters terminates a drying.
- The command **HA418** is possible only with HR83.

HA419 Definition of free print interval

Command	**HA419**	Inquiry of free print interval
Response	**HA419␣A␣x1**	x1: Set free print interval
Command	**HA419␣x1**	Set free print interval x1: Free print interval (5…3600) secondes, factory setting 900 s
Response	**HA419␣A** **HA419␣L**	Free print interval set Command understood, parameter wrong, (number, value range, …)

Comments

- Setting the menu parameters terminates a drying.
- The command **HA419** is possible only with HR83.

HA420 Activate / deactivate methods option

Command	**HA420**	Inquiry of methods option
Response	**HA420␣A␣x1**	x1: Set methods option
Command	**HA420␣x1**	Set methods option x1: Methods 0 off 1 on, factory setting
Response	**HA420␣A** **HA420␣L**	Methods option set Command understood, parameter wrong, (number, value range, …)

Comments

- Setting the menu parameters terminates a drying.
- The command **HA420** is not possible with HR83.

HA421 Activate / deactivate statistics and journal function

Command	**HA421**	Inquiry of statistics and journal function
Response	**HA421␣A␣x1**	x1: Set statistics and journal function (see below)
Command	**HA421␣x1**	Set statistics and journal function x1: 0 off 1 on, factory setting
Response	**HA421␣A** **HA421␣L**	Statistic and journal function activated Command understood, parameter wrong, (number, value range, …)

Comments

- Setting the menu parameters terminates a drying.
- Switching off statistics and journal deletes all the statistical and journal entries without warning!

HA422 Selective deletion of comment lines

Command	**HA422**	Inquiry of selective deletion of comment lines
Response	**HA422␣A␣x1**	x1: Set selective deletion of comment lines (see below)
Command	**HA422␣x1**	Set selective deletion of comment lines x1: Delete comment line 0 no 1 1-4, factory setting 2 2-4 3 3-4 4 4
Response	**HA422␣A** **HA422␣L**	Selective deletion of comment lines set Command understood, parameter wrong, (number, value range, …)

Comments

- Setting the menu parameters terminates a drying.
- The command **HA422** is possible only with HR83.

HA423 Definition of test weight

Command	**HA423**	Inquiry of test weight
Response	**HA423␣A␣x1**	x1: Set of test weight
Command	**HA423␣x1**	Set of test weight x1: Test weight (0.1…80.0 g), factory setting 50 g
Response	**HA423␣A** **HA423␣L**	Test weight set Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA423** is possible only with HR83.
- Setting the menu parameters terminates a drying.

HA424 Definition of test weight tolerance

Command	**HA424**	Inquiry of test weight tolerance
Response	**HA424␣A␣x1**	x1: Set of test weight tolerance
Command	**HA424␣x1**	Set of test weight tolerance x1: Test weight tolerance (0.001…0.010 g), factory setting 0.002 g
Response	**HA424␣A**	Test weight tolerance set
	HA424␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA424** is possible only with HR83.
- Setting the menu parameters terminates a drying.

HA60 Inquiry / activation of method

Inquiry of method

Command	**HA60**	Inquiry of current method
Response	**HA60␣A␣x1**	x1: Number of the method currently set

Activating method

Command	**HA60␣x1**	Activate method x1: Number of the method to be set Possible values for HR83: 1 … 40, factory setting: 1 Possible values for HG63: 1 … 10, factory setting: 1
Response	**HA60␣A**	Method activated
	HA60␣L	Command understood, parameter wrong, (number, value range, …)

Comment

- Activation of a method terminates a drying.

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 methods

x1 = 1 … 40 Inquiry of parameters of a particular method
Possible values for HR83: 1 … 40

x1 = 1 … 10 Possible values for HG63: 1 … 10

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)

HA61␣EOB End of block after inquiry of parameters of all methods

Example

Command **HA61␣1** Inquiry of current setting of the method parameters of the HR83 or method 1 with HG63

Response **HA61␣A␣1␣3␣6␣300␣1␣105␣180␣105␣0␣105␣0**
Factory setting with HR83 or factory setting for method 1 of the HG63

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**
Possible values for HR83 1 … 40
Possible values for HG63 1 … 10

Parameters

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 = 3 Test measurement
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, for this the free switch-off criterion must also be activated in the menu, see command **HA631**

x4 Setting the timer in seconds

Possible settings 30 - 28800
Factory setting 300 s

x5 Drying program

x5 = 1 Standard drying (factory setting)
x5 = 2 Rapid drying
x5 = 3 Gentle drying
x5 = 4 Step drying
With HG63, only x5 = 1 and x5 = 2 is possible

x6 Set temperature in °C

Possible settings 50 … 200
Factory setting 105

x7 **Ramp time in seconds**
Possible settings 0 … 28800
Factory setting 180

x8 **Temperature of level 1 of step drying, in °C**
Possible settings 50 … 200
Factory setting 105

x9 **Time of level 1 of step drying, in seconds**
Possible settings 0 … 28800
Factory setting 0

x10 **Temperature of level 2 of step drying, in °C**
Possible settings 50 … 200
Factory setting 105

x11 **Time of level 2 of step drying, in seconds**
Possible settings 0 … 28800
Factory setting 0

Example

Command `HA61␣3␣1␣1␣300␣1␣160␣180␣105␣0␣105␣0`

Set method parameters for method 3: Display mode grams, manual switch-off, set temperature 160 °C; all other parameters are set to the factory setting.

Comments

- The weighing-in aid can be switched on or off for all methods only in the menu.
- The parameters x7 … x11 have no effect with the HG63, but they must be in the value range.
- Setting the method parameters terminates a drying.
- Each drying is ended at the latest after 28800 seconds.

HA62 Inquiry / setting of method parameters (part 2)

Inquiry of target weight, print interval, method name and code

Command **HA62␣x1** Inquiry of method parameters regarding target weight, print interval, method name and code

x1 = 0 Inquiry of parameters of all methods

x1 = 1 … 40 Inquiry of parameters of a particular method
Possible values for HR83: 1 … 40

x1 = 1 … 10 Possible values for HG63: 1 … 10

Response **HA62␣A␣x1␣x2␣ … ␣x5**
Current setting of the method parameters
x1 … x5 Represent the individual parameters (see below)

HA62␣EOB End of block after inquiry of parameters of all methods

---

Example

Command **HA62␣1** Inquiry of current setting of the method parameters of the HR83 or method 1 with HG63

Response **HA62␣A␣1␣2.500␣4␣"1"␣""**
Factory setting HR83 or factory setting for method 1 of the HG63

Setting target weight, print interval, method name and code

Command **HA62␣x1␣x2␣ … ␣x5**
Set method parameters regarding target weight, print interval, method name and code
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 HR83 1 … 40
Possible values for HG63 1 … 10

x2 Target weight in grams
Possible settings 0.100 … 50.000
Factory setting 2.500

x3 Print interval
x3 = 1 No print interval set, manual initiation of printout

x3 = 2 Printout every 5 seconds
x3 = 3 Printout every 10 seconds
x3 = 4 Printout every 30 seconds
x3 = 5 Printout every 60 seconds
x3 = 6 Printout every 120 seconds
x3 = 7 Printout every 600 seconds
x3 = 8 Free print interval

x4 **Method name**
Maximum 20 characters, factory setting: " "
not possible with HG63

x5 **Code**
Maximum 20 characters, factory setting: " "

Example

Command	**HA62␣3␣5.000␣60␣"Butter"␣""**	Method parameters set for method 3 "Butter": target weight 5.000 g, print interval 60 seconds, no code
Response	**HA62**	Method parameter set

Comment
Setting the method parameters terminates a drying.

HA621 Definition of "Code 1" comment line

Command	**HA621␣x1**	Inquiry of code line 1
Response	**HA621␣A␣x1␣"x2"** Set code line 1	
Command	**HA621␣x1␣"x2"**	Set code line 1

x1: 0 active method
1 … number of available methods

x2 Text code 1, factory setting " "
Text of up to 20 characters with reduced character set

Respones	**HA621␣A**	Code line 1 set
	HA621␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA622 Definition of "Code 2" comment line

Command	**HA622␣x1**	Inquiry of code line 2
Response	**HA622␣A␣x1␣"x2"**	Set code line 2
Command	**HA622␣x1␣"x2"**	Set code line 2
		x1: 0 active method 1 … number of available methods
		x2 Text code 2, factory setting " " Text of up to 20 characters with reduced character set
Respones	**HA622␣A**	Code line 2 set
	HA622␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA622** is possible only with HR83.
- Setting the command line terminates a drying.

HA623 Definition of "Code 3" comment line

Command	**HA623␣x1**	Inquiry of code line 3
Response	**HA623␣A␣x1␣"x2"**	Set code line 3
Command	**HA623␣x1␣"x2"**	Set code line 3
		x1: 0 active method 1 … number of available methods
		x2 Text code 3, factory setting " " Text of up to 20 characters with reduced character set
Respones	**HA623␣A**	Code line 3 set
	HA623␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA623** is possible only with HR83.
- Setting the command line terminates a drying.

HA624 Definition of "Code 4" comment line

Command	**HA624␣x1**	Inquiry of code line 4
Response	**HA624␣A␣x1␣"x2"**	Set code line 4
Command	**HA624␣x1␣"x2"**	Set code line 4
		x1: 0 active method 1 … number of available methods
		x2 Text code 4, factory setting " " Text of up to 20 characters with reduced character set
Respones	**HA624␣A**	Code line 4 set
	HA624␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- The command **HA624** is possible only with HR83.
- Setting the command line terminates a drying.

HA631 Activate / deactivate free switch-off criterion

Command	**HA631␣x1**	Inquiry of switch-off criterion status
Response	**HA631␣A␣x1␣x2**	Set switch-off criterion status
Command	**HA631␣x1␣x2**	Set switch-off criterion status
		x1: 0 active method 1 … number of available methods
		x2 Free switch-off criteron 0 no, factory setting 1 yes
Respones	**HA631␣A**	Free switch-off criterion set
	HA631␣L	Command understood, parameter wrong, (number, value range, …)

Comment

Setting the command line terminates a drying.

HA632 Definition of freely selectable switch-off criterion

Command	**HA632␣x1**	Inquiry of Δ g and Δ t
Response	**HA632␣A␣x1␣x2␣x3**	Set Δ g and Δ t
Command	**HA632␣x1␣x2␣x3**	Set Δ g and Δ t x1: 0 active method 1 … number of available method x2 Δ g in mg (1…10), factory setting 1 mg x3 Δ t in seconds (5…180), factory setting 100 sec
Respones	**HA632␣A**	Δ g and Δ t set
	HA632␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA633 Activate / deactivate free %MC factor

Command	**HA633␣x1**	Inquiry of free %MC factor status
Response	**HA633␣A␣x1␣x2**	Set free %MC factor status
Command	**HA633␣x1␣x2**	Set free %MC factor status x1: 0 active method 1 … number of available methods x2 Free %MC factor 0 no, factory setting 1 yes
Respones	**HA633␣A**	Free %MC factor set
	HA633␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA634 Definition of free %MC factor

Command	**HA634␣x1**	Inquiry of free %MC factor
Response	**HA634␣A␣x1␣x2**	Set free %MC factor
Command	**HA634␣x1␣x2**	Set free %MC factor x1: 0 active method 1 … number of available methods x2 Free %MC factor (0.500…2.000), factory setting 1.000
Respones	**HA634␣A**	Free %MC factor set
	HA634␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA635 Activate / deactivate free g factor

Command	**HA635␣x1**	Inquiry of free g factor status
Response	**HA635␣A␣x1␣x2**	Set free g factor status
Command	**HA635␣x1␣x2**	Set free g factor status x1: 0 active method 1 … number of available methods x2 Free g factor 0 no, factory setting 1 yes
Respones	**HA635␣A**	Free g factor set
	HA635␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA636 Definition of free g factor

Command	**HA636␣x1**	Inquiry of free g factor
Response	**HA636␣A␣x1␣x2**	Set free g factor
Command	**HA636␣x1␣x2**	Set free g factor x1: 0 active method 1 … number of available methods x2 Factor g (1…100), factory setting 10
Respones	**HA636␣A**	Free g factor set
	HA636␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA637 Activate / deactivate link method

Command	**HA637␣x1**	Inquiry of link method status
Response	**HA637␣A␣x1␣x2**	Set link method status
Command	**HA637␣x1␣x2**	Set link method status x1: 0 active method 1 … number of available methods x2 Link method 0 no, factory setting 1 yes
Respones	**HA637␣A**	Link method set
	HA637␣L	Command understood, parameter wrong, (number, value range, …)

Comments
- The command **HA637** is possible only with HR83.
- Setting the command line terminates a drying.

HA638 Definition of link method

Command	**HA638␣x1**	Inquiry of link method
Response	**HA638␣A␣x1␣x2**	Set link method
Command	**HA638␣x1␣x2**	Set link method x1: 0 active method 1 … number of available methods x2 Link method number of available methods, factory setting 01
Respones	**HA638␣A**	Link method set
	HA638␣L	Command understood, parameter wrong, (number, value range, …)

Comments

- Method connot be linked to itself
- Default linked method for method 01 is method 02
- The command **HA638** is possible only with HR83.
- Setting the command line terminates a drying.

HA639 Setting of sign for free %MC factor set

Command	**HA639␣x1**	Inquiry of sign for free %MC factor status
Response	**HA639␣A␣x1␣x2**	Set sign for free %MC factor status
Command	**HA639␣x1␣x2**	Set sign for free %MC factor x1: 0 active method 1 … number of available methods x2 Sign for free %MC factor 0 neg 1 pos, factory setting
Respones	**HA639␣A**	Link method set
	HA639␣L	Command understood, parameter wrong, (number, value range, …)

Comment

Setting the command line terminates a drying.

HA641 Activate / deactivate high resolution (0.1 mg)

Command	**HA641␣x1**	Inquiry high resolution
Response	**HA641␣A␣x1␣x2**	x1, x2: See "Set status"
Command	**HA641␣x1␣x2**	Set high resolution (0.1 mg): x1: 0 Active method 1 … Number of available methods x2 Resolution 0 Standard (1 mg), factory setting 1 High (0.1 mg)
Respones	**HA641␣A**	Resolution was set
	HA641␣L	Invalid parameter (number, value range, …)

Comments

- Setting the command line terminates a drying.
- The Command **HA641** is only possible with HR83

HA642 Activate / deactivate standby temperature

Command	**HA642␣x1**	Inquiry standby temperature status
Response	**HA642␣A␣x1␣x2**	x1, x2: See "Set status"
Command	**HA642␣x1␣x2**	Set standby temperature status: x1: 0 active method 1 … number of available methods x2 Standby temperature 0 no, factory setting 1 yes
Respones	**HA642␣A**	Standby temperature status was set
	HA642␣L	Invalid parameter (number, value range, …)

Comments

- Setting the command line terminates a drying.
- The Command **HA642** is only possible with HR83

HA643 Define standby temperature

Command	**HA643␣x1**	Inquire standby temperature definition
Response	**HA643␣A␣x1␣x2␣x3␣x4␣x5** x1, x2 ... x5: See "Set definition"	
Command	**HA643␣x1␣x2**	Set standby temperature: x1: 0 active method 1 … number of available methods x2 Standby temperature in degrees [40 ... 100], factory setting 40 x3 Standby time in minutes [0, 30 ... 480], factory setting 30 0 Standby permanently x4, x5 Switch off time as time of day 0_0 Switch off time time inactive, factory setting [0_01 ... 23_59]
Respone	**HA643␣A**	Standby temperature definition was set
	HA643␣L	Invalid parameter (number, value range, ...)

Comments

- Setting the command line terminates a drying.
- The Command **HA643** is only possible with HR83

HA646 Activate / deactivate drying temperature with no time limit

Command	**HA646␣x1**	Inquire drying temperature with no time limit (Temperature extension)
Response	**HA646␣A␣x1␣x2**	x1, x2: See "Set definition"
Command	**HA646␣x1␣x2**	Set drying temperature with no time limit x1: 0 active method 1 … number of available methods x2 Settings 0 time limit active, factory setting 1 time limit inactive
Respones	**HA646␣A**	Drying temperature with no time limit was set
	HA646␣L	Invalid parameter (number, value range, …)

Comment

- Setting the command line terminates a drying.

HA650 Weighing-in aid no / passive / active

Command	**HA650␣x1**	Inquiry of weighing-in aid status
Response	**HA650␣A␣x1␣x2**	Set weighing-in aid status
Command	**HA650␣x1␣x2**	Set weighing-in aid status x1: 0 active method 1 … number of available methods x2 Weighing-in aid 0 no, factory setting 1 passive 2 active
Respones	**HA650␣A**	Weighing-in aid set
	HA650␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA651 Definition of tolerance range

Command	**HA651␣x1**	Inquiry of tolerance range
Response	**HA651␣A␣x1␣x2**	Set tolerance range
Command	**HA651␣x1␣x2**	Set tolerance range x1: 0 active method 1 … number of available methods x2 Tolerance range in % (1…25 %), factory setting 10 %
Respones	**HA651␣A**	Tolerance range set
	HA651␣L	Command understood, parameter wrong, (number, value range, …)

Comment
Setting the command line terminates a drying.

HA80 Inquiry of journal

Command **HA80␣x1** Inquiry of the journal

x1 = 0 Inquiry of the journal of all methods

x1 = 1 … 40 Inquiry of the journal of a particular method

Response **HA80␣A␣x1␣x2␣ … ␣x10**

For each of the last 20 dryings of a method, you receive the following data:

x1	Number of the method Possible values for HR83 1 … 40	
x2	Day of the drying	(1 … 31)
x3	Month of the drying	(1 … 12)
x4	Year of the drying	(1970 … 2037)
x5	Hour of the drying	(0 … 23)
x6	Minute of the drying	(0 … 59)
x7	n	Drying number
x8	xx.xxx	Wet weight In grams
x9	xx.xxx	Dry weight in grams
x10	End of drying 0 Automatic end of drying 1 Manual end of drying	

HA80␣EOB Journal closed, end of block
This response also appears if no drying exists

HA80␣I Comment not executable at present as another command is being processed

HA80␣L Command understood, parameter wrong

Example

Command **HA80␣3** Inquiry of journal of method 3

Response **HA80␣3␣08␣09␣2003␣08␣12␣25␣12.345␣9.234␣0**

HA80␣3␣08␣09␣2003␣08␣35␣26␣12.567␣9.012␣0

HA80␣3␣08␣09␣2003␣08␣57␣27␣12.023␣9.456␣0

HA80␣3␣08␣09␣2003␣09␣12␣28␣12.897␣9.342␣1

HA80␣3␣08␣09␣2003␣09␣26␣29␣12.678␣9.236␣0

HA80␣3␣08␣09␣2003␣09␣45␣30␣12.012␣9.245␣0

...

HA80␣3␣08␣09␣2003␣11␣59␣44␣12.567␣9.287␣0

HA80␣EOB Journal of method 3, dryings No. 25 to No. 44, executed on September 08, 2003 between 8.12 and 11.59, drying No. 28 was ended manually

Comments

- The journal covering all methods is sorted by methods 1 … 40.
- Date and time in European format.
- The counter for the dryings of a method runs until it is reset to 0 with the command **HA84** – Delete statistics.
- The command **HA80** is possible only with HR83.

HA81 Inquiry of journal after a certain time

Command **HA81␣x1␣x2␣ … ␣x6**

Inquiry of journal after a certain time

x1	0	Inquiry of journal of all methods
x1		Number of the method Possible values for HR83 1 … 40
x2		Day of the drying (1 … 31)
x3		Month of the drying (1 … 12)
x4		Year of the drying (1970 … 2037)
x5		Hour of the drying (0 … 23)
x6		Minute of the drying (0 … 59)
x7		n Drying number
x8		xx.xxx Wet weight In grams
x9		xx.xxx Dry weight in grams
x10		End of drying 0 Automatic end of drying 1 Manual end of drying

Response **HA81␣A␣x1␣x2␣ … ␣x10**

		For the last 20 dryings of a method you receive the same data as with command **HA80**
	HA81␣EOB	Journal closed, end of block This response also appears if no drying exists
	HA81␣I	Command not executable at present as another command is being processed
	HA81␣L	Command understood, parameter wrong

Comments

- The journal covering all methods is sorted by methods 1 … 40.
- Date and time in European format.
- The counter for the dryings of a method runs until it is reset to 0 with the command **HA84** – Delete statistics.
- The command **HA81** is possible only with HR83.

HA82 Clear journal

Command	**HA82␣x1**	Clear journal		
		x1	0	Clear journals of all methods)
			1 … 40	Clear journal of a particular method.
Response	**HA82␣A**	Journal cleared		
	HA82␣I	Command not executable at present as another command is being processed		
	HA82␣L	Command understood, parameter wrong		

Comment

The command **HA82** is possible only with HR83.

HA83 Inquiry of statistics

Command **HA83␣x1␣x2** Inquiry of statistics covering all dryings of a method since deletion of the last set of statistics

x1 Select method

0 Inquiry of statistics of all methods

1 … 40 Inquiry of statistics of a particular method

x2 Display mode for statistics

1 Dry weight
2 DC (dry content) in %
3 MC (moisture content) in %
4 AM (ATRO moisture content) in %
5 AD (ATRO dry content) in %

Response **HA83␣A␣x1␣x2␣ … ␣x7**

Statistics of all dryings of a method since last statistics deleted

x1 1 … Number of the method entered as in command

x2 Display mode entered as in command
1 Dry weight
2 DC (dry content) in %
3 MC (moisture content) in %
4 AM (ATRO moisture content) in %
5 AD (ATRO dry content) in %

x3 Sample size (number of dryings of the relevant method since the last statistics were deleted), possible values: 1 … 9999

x4 Mean value in selected display mode

x5 Standard deviation

x6 Minimum value in the selected display mode

x7 Maximum value, in the selected display mode

HA83␣I Command not executable at present as another command is being executed

HA83␣L Command understood, parameter wrong

HA83␣EOB End of block after inquiry of statistics of all methods

Example 1

Command	**HA83␣3␣3**	Inquiry of statistics for method 3 in display mode MC (moisture content)
Response	**HA83␣A␣3␣3␣15␣-25.03␣0.35␣-24.83␣-25.16**	Statistics for method 3 in display mode MC (moisture content). Sample size 15, mean moisture content 25.03 %, standard deviation 0.35 %, lowest moisture content 24.83 %, highest moisture content 25.16 %.

Example 2

Command	**HA83␣5␣1**	Inquiry of statistics for method 5 in the display mode grams
Response	**HA83␣5␣1␣0␣0␣0␣0␣0** No dryings exist for method 5 since the last statistics were deleted	

Comments

- Maximum 9999 dryings are stored for each method for the statistical evaluation.
- 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.
- The command **HA83** is possible only with HR83.

HA84 Delete statistics

Command	**HA84␣x1**	Delete statistics		
		x1	0	Delete statistics of all methods
			1 … 40	Delete statistics of a particular method.
Response	**HA84␣A**	Set(s) of statistics deleted		
	HA84␣I	Command not executable at present as another command is being executed		
	HA84␣L	Command understood, parameter wrong		

Comments

- The command **HA84** is possible only with HR83.
- When the statistics are deleted, the counter for the dryings is reset to zero.

HA90 Report keys

Command	**HA90␣x1**	Report keys	
		x1	0 Switch off (default) 1 Switch on
Response	**HA90␣A**	Command executed	
	HA90␣x1	x1	0 Key 0 1 Key 1 2 Key 2 3 Key 3 4 Key 4 5 Key 5 6 Key 6 7 Key 7 8 Key 8 9 Key 9 10 Key '.' 11 Key Delete 12 Key 0 … 9 20 Key Reset 21 Key Up 22 Key Down 23 Key A...Z 24 Key Enter 25 Key Print 30 Key ID / Method 31 Key Stat 32 Key Menu 33 Key Code 34 Key Journal 35 Key Temp 36 Time 37 Key Start 38 Key Stop 39 Key Target 50 Key Switch-off criterion 51 Key Drying program 52 Key Display mode 53 Key Print interval 54 Key Target weight

		70 Key On/Off 71 Key Zeroing 72 Key Sample chamber 73 Key Paper feed
	HA90␣L	Parameter wrong (number, value range, …)
	HA90␣I	Response always available, hence not possible

Comments

- The keys with code 70…73 are executed before sending.
- After switching off (On/Off) and after the Reset command **@**, the keys are no longer reported.
- During local entries (e.g. **HA91**…**HA95**), no keys are reported, but are executed locally.

HA91 Alphanumeric entry

Command	**HA91␣x1␣x2**	Alphanumeric entry
		x1 Lead text (quoted string)
		x2 Default (quoted string)
Response	**HA91␣B**	Command executed, response follows
	HA91␣A␣"ABC"	Inputted value
	HA91␣L	Parameter wrong (number, value range, …)
	HA91␣I	Command not possible at present or aborted

Comments

- Entry is on the HR83/HG63 main line.
- The command can be executed only in the statuses 1, 2, 3 and 4 (see **HA07** or **HA20**).
- The alphanumeric entry can have a length of up to 20 characters, the lead text up to 9 characters.

Example

Command **HA91␣"PASSWORD:" "1234567890"**

<PASSWORD:12> is displayed left aligned

The rest of the default is not visible. In the entry the default is overwritten and the lead text scrolls away to the left.

1st Response **HA91␣B** Command understood.
The user is prompted for an entry.

2nd Response **HA91␣A␣"YXZ"** The user has entered "YXZ"

HA92 Integer entry (positive values only)

Command **HA92␣x1␣x2␣x3␣x4␣x5␣x6**
Integer entry:

x1		lead text (quoted string)
x2	[0…32767]	default
x3	[0…32767]	smallest value
x4	[0…32767]	largest value
x5	[1…100]	step
x6	[1…5]	width of the entry field without lead text

Response **HA92␣B** Command executed, response follows

HA92␣A␣Value Inputted value

HA92␣L Parameter wrong (number, value range,…)

HA92␣I Command not possible at present or aborted

Comments

- Entry is on the HR83/HG63 main line.
- The command can be executed only in the statuses 1, 2, 3 and 4 (see **HA07** or **HA20**).
- Length of the lead text (maximum 9) + width of the entry field should be 10.
- The default must be between the smallest and the largest value.

Example

Command **HA92␣"MASCHINE:"␣1␣1␣9999␣1␣4**
<SCHINE:␣␣␣1> is displayed

The default is shown right aligned. The entry is left aligned in the entry field.

1st Response **HA92␣B** Command understood.

The user is prompted for an entry.

2nd Response **HA92␣A␣123**

HA93 Real entry (positive values only)

Command **HA93␣x1␣x2␣x3␣x4␣x5␣x6␣x7**

Real entry

x1	lead text (quoted string)	
x2	[0…9999999]	default
x3	[0…9999999]	smallest value
x4	[0…9999999]	largest value
x5	[0…1000000]	step
x6	[0…6]	number of decimal places
x7	[1…7]	width of the entry field without lead text

Response	**HA93␣B**	Command executed, response follows
	HA93␣A␣Value	Inputted value
	HA93␣L	Parameter wrong (number, value range, …)
	HA93␣I	Command not possible at present or aborted

Comments

- Entry is on the HR83/HG63 main line.
- The command can be executed only in the statuses 1, 2, 3 and 4 (see **HA07** or **HA20**).
- Length of the lead text (maximum 9) + width of the entry field should be 10.
- In the case of parameter x7, the point is also counted.
- The default must be between the smallest and the largest value.

Example

Command **HA93␣"WERTE:"␣2.111␣0␣10.0␣.5␣3␣7**

<ERTE:␣␣2.111> is displayed

The default is shown right aligned. The entry is left aligned in the entry field.

1st Response **HA93␣B** Command understood.

The user is prompted for an entry.

2nd Response **HA93␣A␣10.000**

HA94 Date entry

Command **HA94␣x1␣x2␣x3␣x4␣x5**

Date entry

x1	lead text (quoted string)	
x2	[1…31]	dd
x3	[1…12]	mm
x4	[1970…2032]	yyyy
x5	0 = mm:dd:yyyy,	1 = dd:mm:yyyy

Response **HA94␣B** Command executed, response follows

HA94␣A␣dd␣mm␣yyyy

Inputted value

HA94␣L Parameter wrong (number, value range,…)

HA94␣I Command not possible at present or aborted

Comments

- Entry is on the HR83/HG63 main line.
- The command can be executed only in the statuses 1, 2, 3 and 4 (see **HA07** or **HA20**).
- Length of the lead text (excluding colon or point should be 4; width of the entry field is fixed at 6.

Example

Command **HA94␣"Date:"␣08␣09␣2003␣1**

Response **HA94␣A␣08␣09␣2003**

Always **dd␣mm␣yyyy**, irrespective of **x5**

HA95 Time entry

Command **HA95␣x1␣x2␣x3␣x4␣x5**

Time entry

x1	lead text (quoted string)	
x2	[0…3599]	default
x3	[0…3599]	min. value
x4	[0…3599]	max. value
x5	[1…100]	step

Response	**HA95␣B**	Command executed, response follows
	HA95␣A␣Value	Inputted value
	HA95␣L	Parameter wrong (number, value range,…)
	HA95␣I	Command not possible at present or aborted

Comments

- Entry is on the HR83/HG63 main line.
- The command can be executed only in the statuses 1, 2, 3 and 4 (see **HA07** or **HA20**).
- Length of the lead text (excluding colon or point should be 6; width of the entry field is fixed at 4.
- The default must be between the smallest and the largest value.

Example

Command **HA95␣"Time:"␣121␣0␣1439␣5**

<TIME:␣␣02:01> is displayed

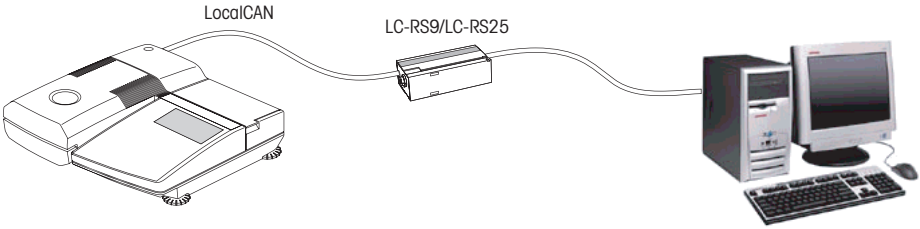
The default is shown right aligned. The entry is left aligned in the entry field.

1st Response **HA95␣B** Command understood.
The user is prompted for an entry.

2nd Response **HA95␣A␣123**

4 System configuration (HR83/HG63 – computer)

The HR83 and HG63 Halogen Moisture Analyzers are equipped with the LocalCAN universal interface as standard. You also need an LC-RS9 or LS-RS25 cable for the attachment of a computer.



The cable is configured in the factory for attachment of a computer with the following protocol: 2400 baud, 7 bits, even parity, CTS/DTR.

If work is performed with a different communications protocol, the cable must be approbiately configured using the 3 switches, see operating instructions of the LC-RS25/LC-RS9 cable.

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 this is not the case, 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 "protocol" 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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 11780559A Printed in Switzerland 0605/2.12

Mettler-Toledo GmbH, Laboratory & Weighing Technologies, CH-8606 Greifensee, Switzerland
Phone+41-44-944 22 11,Fax+41-44-944 30 60,Internet:http://www.mt.com