

# Reference Manual

**METTLER TOLEDO**

**Standard Interface Command Set**

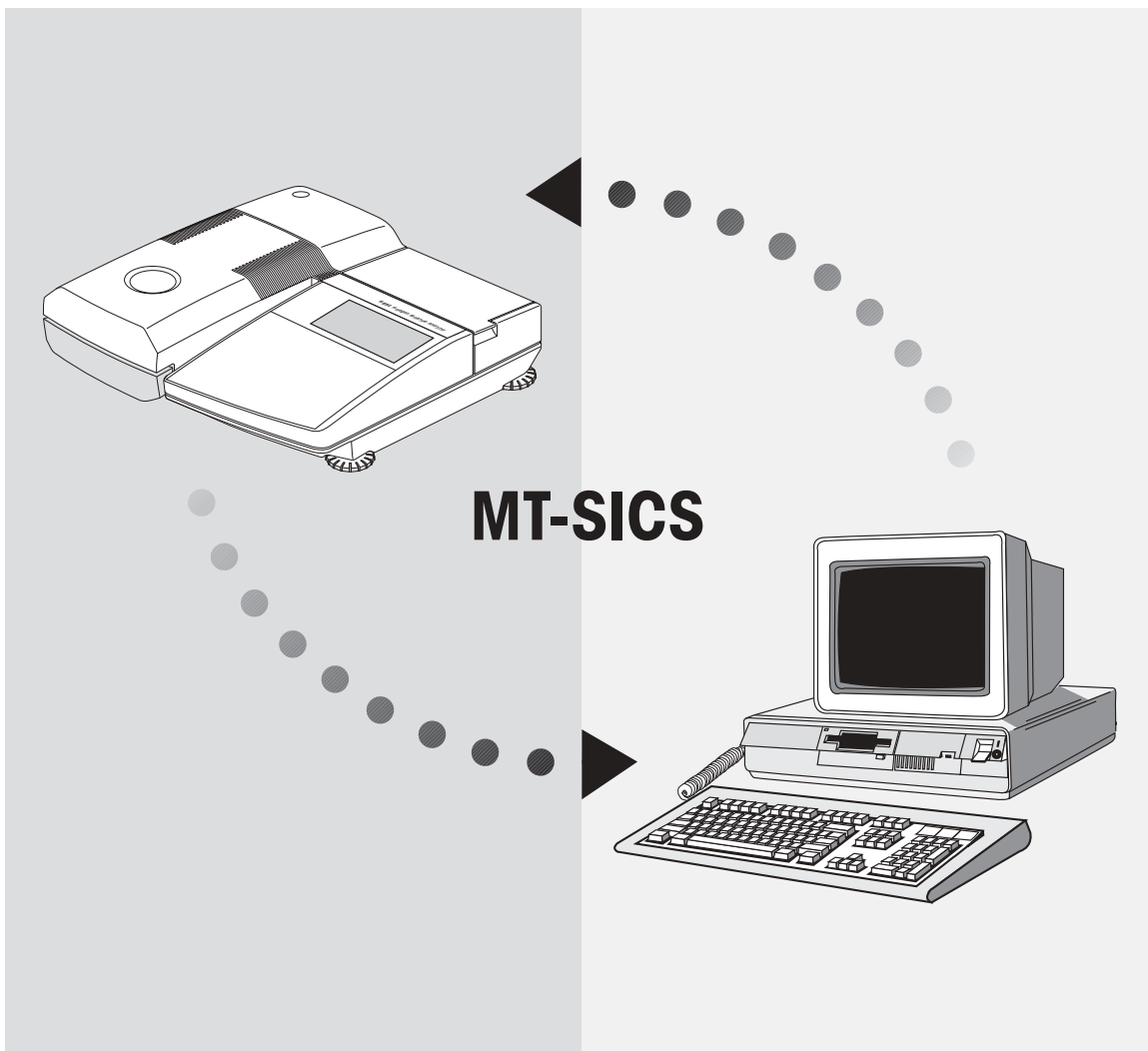
**MT-SICS 0 version 2.2x**

**MT-SICS 1 version 2.2x**

**MT-SICS 2 for Halogen Moisture Analyzers HR73 and HG53 version 2.3x**

**MT-SICS 3 for Halogen Moisture Analyzers HR73 and HG53 version 1.2x**

**METTLER TOLEDO**





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## Overview of all commands

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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 HR73 and HG53

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.

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- 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

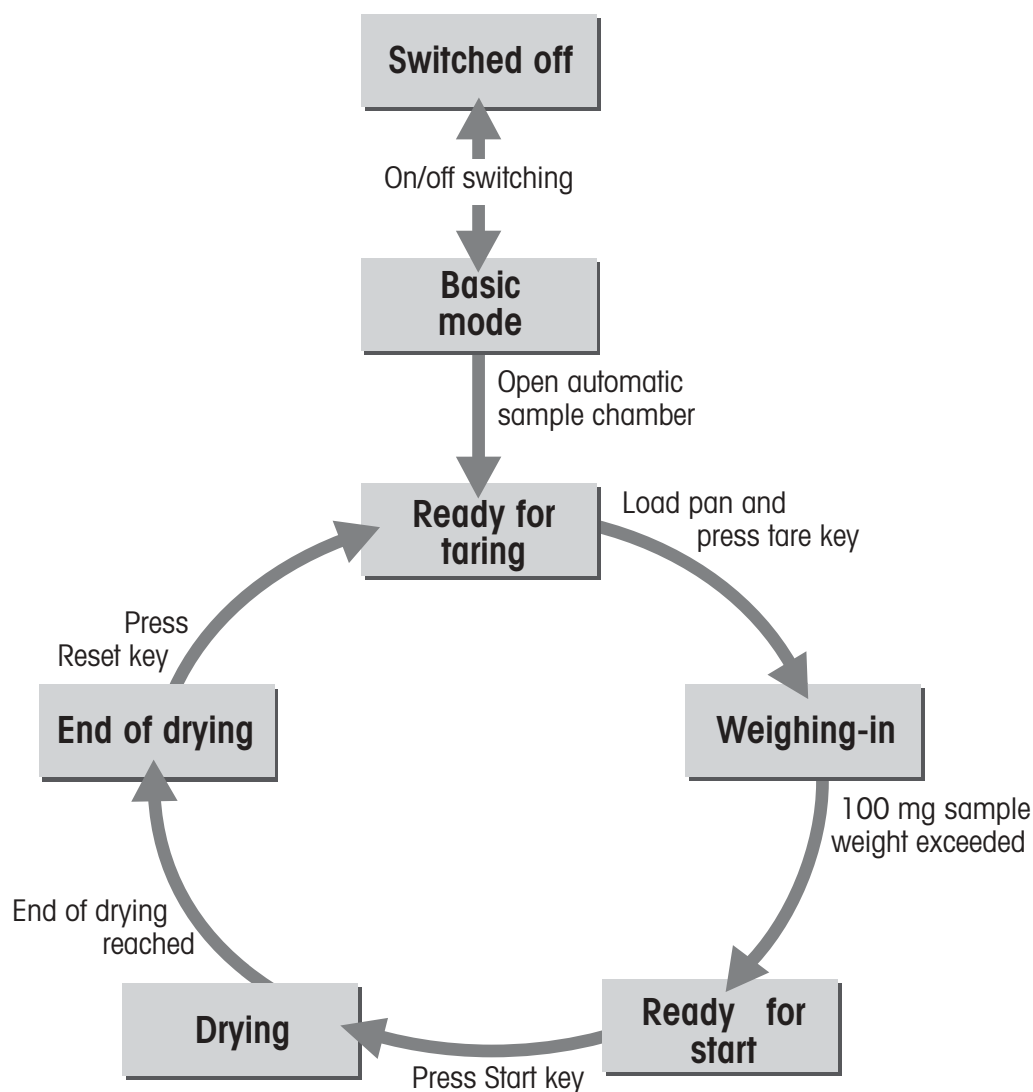
MT-SICS level 2 for Halogen Moisture Analyzers HR73 and HG53 version 2.3x

MT-SICS level 3 for Halogen Moisture Analyzers HR73 and HG53 version 1.2x

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 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.

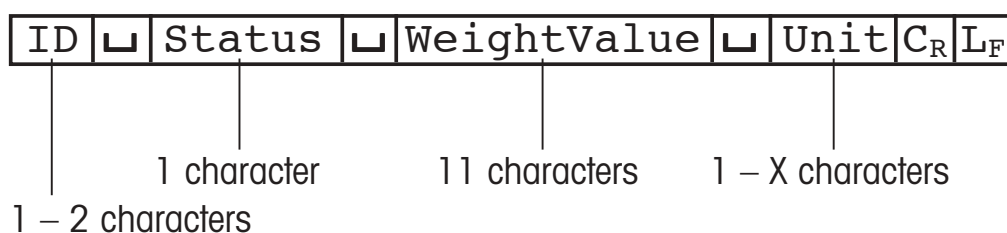
## 2.2 Response formats

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.



<b>ID</b>	Response identification
<b>□</b>	Space (ASCII 32 dec.)
<b>Status</b>	Interface status of the Halogen Moisture Analyzer, see description of the commands and responses
<b>WeightValue</b>	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.
<b>Unit</b>	Weight unit
<b>C<sub>R</sub></b>	Carriage Return (ASCII 13 dec.)
<b>L<sub>F</sub></b>	Line Feed (ASCII 10 dec.)

---

#### Comment

C<sub>R</sub>L<sub>F</sub> 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.



1 – 4 characters  
1 character

<b>ID</b>	Response identification
␣	Space (ASCII, 32 dec.)
<b>Status</b>	Interface status of the Halogen Moisture Analyzer, see description of the commands and responses
<b>Parameters</b>	Command-dependent response code
<b>C<sub>R</sub></b>	Carriage Return (ASCII 13 dec.)
<b>L<sub>F</sub></b>	Line Feed (ASCII 10 dec.)

---

### Comment

C<sub>R</sub>L<sub>F</sub> 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 <sub>R</sub>	L <sub>F</sub>
----	----------------	----------------

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

<b>ID</b>	Error identification Possible error messages are
<b>ES</b>	Syntax error The Halogen Moisture Analyzer has not recognized the received command.
<b>ET</b>	Transmission error The Halogen Moisture Analyzer has received a "faulty" command, e.g. owing to a parity error or interface break.
<b>EL</b>	Logical error The Halogen Moisture Analyzer can not execute the received command.
<b>C<sub>R</sub></b>	Carriage Return (ASCII 13 dec.)
<b>L<sub>F</sub></b>	Line Feed (ASCII 10 dec.)

---

#### Comment

C<sub>R</sub>L<sub>F</sub> 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 HR73 and HG53 Halogen Moisture Analyzers.

<b>Command</b>		<b>Page</b>
I0	Inquiry of all implemented MT-SICS commands	12
I1	Inquiry of MT-SICS level and MT-SICS versions	13
I2	Inquiry of instrument data	13
I3	Inquiry of SW version and type definition number	14
I4	Inquiry of serial number	14
S	Send stable weight value	15
SI	Send weight value immediately	15
SIR	Send weight value immediately and repeat	16
Z	Zero	16
ZI	Zero immediately	17
@	Reset	18

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).



## **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"␣"2.10"␣"2.10"␣"2.10"␣"1.10"**

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 V1.10

---

### **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␣"HR73␣Moisture-Analyzer␣71.009␣g"**  
**I2␣A␣"HG53␣Moisture-Analyzer␣51.009␣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.



## **ZI**      **Zero immediately**

Command	<b>ZI</b>	Zero immediately, i.e. stores immediately the current weight value, which can be stable or non stable (dynamic), as zero value.
Response	<b>ZI┐S</b>	Zero setting performed, stable weight value
	<b>ZI┐D</b>	Zero setting performed, non-stable (dynamic) weight value
	<b>ZI┐I</b>	Zero setting not performed (balance is currently executing another command)
	<b>ZI┐L</b>	Command understood but not executable (e.g. certified version of balance)
	<b>ZI┐+</b>	Upper limit of zero setting range exceeded
	<b>ZI┐-</b>	Lower limit of zero setting range exceeded

---

### **Example 1**

Command	<b>ZI</b>	Zero immediately
Response	<b>ZI┐S</b>	Zero setting performed, weight value was stable

### **Example 2**

Command	<b>ZI</b>	Zero immediately
Response	<b>ZI┐D</b>	Zero setting performed, weight value was dynamic (non-stable)

---

### **Comment**

For details see Reference manual 705184.

<b>@</b>	<b>Reset</b>
----------	--------------

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

Response **I4LA"text"** Serial number of the Halogen Moisture Analyzer, the Halogen Moisture Analyzer is ready for operation.

---

**Example**

Command @

Response **I4LA"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 HR73 and HG53)

The commands of MT-SICS level 1 are available with all standard balances which support the METTLER TOLEDO Standard Interface Command Set. With the HR73 and HG53 Halogen Moisture Analyzers, only the commands D and DW are supported.

<b>Command</b>		<b>Page</b>
D	Display	20
DW	Weight display (Display show Weight)	20

## D Display

### Write into display

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

### Example

Command	<b>D</b> ␣" <b>HALLO</b> "	Write HALLO into the Halogen Moisture Analyzer display
Response	<b>D</b> ␣ <b>A</b>	The full text HALLO appears in the Halogen Moisture Analyzer display

### Clear display

Command	<b>D</b> ␣" "	Clear Halogen Moisture Analyzer display
Response	<b>D</b> ␣ <b>A</b>	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	<b>DW</b>	Switch display to weight mode
Response	<b>DW</b> ␣ <b>A</b>	Display shows the current weight value
	<b>DW</b> ␣ <b>I</b>	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 HR73 and HG53**

<b>Command</b>		<b>Page</b>
DAT	Date	22
PWR	Power on/off	23
P100	Print out text on the strip printer	24
TIM	Time	25

<b>DAT</b> <b>Date</b>
------------------------

### **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 1 March 1996

Response    **DAT␣A␣01␣03␣1996**

---

### **Comments**

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



## **PWR Power on/off**

Command	<b>PWR</b> $\square$ <b>x</b>	Switch Halogen Moisture Analyzer on or off x = 0 Set Halogen Moisture Analyzer to standby mode x = 1 Switch Halogen Moisture Analyzer on
Response	<b>PWR</b> $\square$ <b>A</b>	Halogen Moisture Analyzer has been switched off successfully
	<b>PWR</b> $\square$ <b>A</b> <b>I4</b> $\square$ <b>A</b> "text"	Halogen Moisture Analyzer with the serial number according to text has been switched on successfully (see also I4 command)
	<b>PWR</b> $\square$ <b>L</b>	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).

## **P100 Print out text on the strip printer**

Command	<b>P100</b> ␣ <b>"text"</b>	Print out "text" on the internal printer
Response	<b>P100</b> ␣ <b>A</b>	Command executed
	<b>P100</b> ␣ <b>I</b>	Command can not be executed at present as there is no printer or the printer buffer is full
	<b>P100</b> ␣ <b>L</b>	Text could not be printed as, e.g. parameter wrong

---

### **Example**

Command	<b>P100</b> ␣ <b>"HALLO"</b>	Print out HALLO on the strip printer
Response	<b>P100</b> ␣ <b>A</b>	Printout has been started

---

### **Comments**

- A sequence of maximum 80 characters (incl. C<sub>R</sub>L<sub>F</sub>) 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.

<b>TIM</b> <b>Time</b>
------------------------

## Inquiry of time

Command    **TIM**                    Send current time of the Halogen Moisture Analyzer

Response    **TIM\_A\_hh\_mm\_ss**  
   "hh\_mm\_ss" represents the time in the 24-hour format (hours\_ minutes\_seconds)

---

## Set time

Command    **TIM\_hh\_mm\_ss**  
   Set time in 24-hour format (hours\_minutes\_seconds)

Response    **TIM\_A**                    Time has been set, clock running  
                 **TIM\_L**                    Command not executed as the time format is not correct (e.g. 22\_67\_25)

---

## Example

Command    **TIM**                    Inquiry of time

Response    **TIM\_A\_22\_56\_11**  
   The current time of the Halogen Moisture Analyzer is 22 hours, 56 minutes and 11 seconds

### 3.4 Commands and responses MT-SICS level 3 for Halogen Moisture Analyzers HR73 and HG53

All Halogen Moisture Analyzer specified commands are combined in MT-SICS level 3 for Halogen Moisture Analyzers HR73 and HR53.

<b>Control commands</b>		<b>Page</b>
HA01	Reset application / escape	28
HA02	Set factory settings	28
HA03	Switch keypad on/off	28
HA04	Open / close automatic sample chamber	29
HA05	Start / end drying	29
HA06	Trigger audio signal	29
HA07	Report instrument status change	30
HA08	Request printer records	31
<b>Status inquiries</b>		
HA20	Inquiry of instrument status	32
HA21	Inquiry of automatic sample chamber position	33
HA22	Inquiry of last weight adjustment	33
HA23	Inquiry of last temperature adjustment	34
HA24	Inquiry of temperature	34
HA25	Inquiry of drying weights	35
HA26	Inquiry of drying data	36
HA27	Inquiry of drying result	38
<b>Instrument settings</b>		
HA40	Inquiry / setting of language	39
HA41	Inquiry / setting of menu parameters	40
<b>Method settings</b>		
HA60	Inquiry / activation of method	43
HA61	Inquiry / setting of method parameters (part 1)	44
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## **HA04 Open / close automatic sample chamber**

Command	<b>HA04┐x</b>	x = 0	Close automatic sample chamber
		x = 1	Open automatic sample chamber
Response	<b>HA04┐A</b>		Command understood
	<b>HA04┐L</b>		Command understood, parameter wrong

---

### **Comment**

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

## **HA05 Start / end drying**

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

---

### **Comment**

Terminate current drying: with the command HA01 – Reset application.

## **HA06 Trigger audio signal**

Command	<b>HA06</b>		Trigger audio signal, e.g. at end of drying
Response	<b>HA06┐A</b>		Command executed

## HA07 Report instrument status change

Command **HA07\_Lx1** Report each internal status change  
x1 = 0 Switch off  
x1 = 1 Switch on

Response **HA07\_LA** Command executed

**HA07\_LAx1** 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\_LL** Parameter wrong (number, value range,...)

**HA07\_LI** 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	<b>HA08_Lx1</b>	Request printer records: x1 = 0 Do not send printer records x2 = 1 Send printer records
Response	<b>HA08_LA</b>	Command executed
	<b>HA08_LL</b>	Parameter wrong (number, value range, ...)
	<b>HA08_LI</b>	Response always available, hence not possible

---

### Comment

- 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	<b>HA20</b>	Inquiry of instrument status	
Response	<b>HA20└A└x</b>	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 automatic sample chamber position

Command	<b>HA21</b>	Inquiry of automatic sample chamber position	
Response	<b>HA21└A└x</b>	x = 0	Automatic sample chamber closed
		x = 1	Automatic sample chamber open
		x = 2	Automatic sample chamber not in end position

## HA22 Inquiry of last weight adjustment

Command	<b>HA22</b>	Inquiry of last successful weight adjustment	
Response	<b>HA22└A└x1└x2└x3└x4└x5└x6</b>		
		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	<b>HA22</b>
Response	<b>HA22└A└15└29└02└1996└09└34</b>

A total of 15 successful weight adjustments have been performed. The last took place on February 29, 1996 at 9.34.

---

### Comments

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

## HA23 Inquiry of last temperature adjustment

Command **HA23** Inquiry of the last successful temperature 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 29 02 1996 09 34**

A total of 15 successful temperature adjustments have been performed. The last took place on February 29, 1996 at 9.34.

### Comments

- The time of the last successful temperature adjustment is specified in the 24-hour format.
- Possible years are 1970 ... 2037.
- The counter for the temperature 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 **HA26Lx1** 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 **HA26LAx1Lx2Lx3Lx4Lx5Lx6**

**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)**

**HA26LL** Command understood, parameter wrong

---

### Example 1

Command **HA26L3** Inquiry of drying data

Response **HA26LA2L3L4.762L3.066L35.61L497**

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 **HA26L2** Inquiry of drying data

Response **HA26LA1L2L2.672L2.467L92.33L143**

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, factory setting  
x = 3 French  
x = 4 Italian  
x = 5 Spanish  
x = 6 Russian

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.

## HA41 Inquiry / setting of menu parameters

### Inquiry of menu parameters

Command **HA41** Inquiry of current setting of the menu parameters

Response **HA41Ax1x2 ... x17**

Current setting of the menu parameters

x1 ... x17 represent the individual parameters (see below)

### Example

Command **HA41** Inquiry of current setting of the menu parameters

Response **HA41A1010101010"0015009000**

Factory setting HG53

**HA41A1010101010"0015009001**

Factory setting HR73

### Setting menu parameters

Command **HA41x1x20 ... x17**

Set menu parameters

x1 ... x17 represent the individual parameters (see below)

Response **HA41A** Menu parameters set

**HA41L** Command understood, parameter wrong,  
setting not possible with HG53

### Parameters

#### x1 Vibration adapter

x1 = 0 Low, setting for stable surroundings

x1 = 1 Medium (factory setting), for normal surroundings

x1 = 2 High, for unstable surroundings

#### x2 Operating mode of the automatic sample chamber

x2 = 0 Automatic (factory setting)

x2 = 1 Manual

#### x3 Audio signal

x3 = 0 No audio signal

x3 = 1 Soft audio signal (factory setting)

x3 = 2 Loud audio signal

## Parameters

### **x4 Protection against change in the settings**

x4 = 0 The settings in the menu can be changed at will (factory setting)

x4 = 1 Except on/off switching and start/stop, all keys are blocked

### **x5 Displaying function symbols**

x5 = 0 Function symbols are not displayed

x5 = 1 Function symbols are always displayed (factory setting)

### **x6 Weighing-in aid**

x6 = 0 Weighing-in aid switched off (factory setting)

x6 = 1 Weighing-in aid switched on (passive)

x6 = 2 Weighing-in aid switched on (active)

### **x7 Limit of weighing-in aid in %**

Possible values: 1 ... 25, factory setting: 10 %

### **x8 Printer**

x8 = 0 Internal printer switched off

x8 = 1 Internal printer switched on (factory setting)

### **x9 Record of company name**

x9 = 0 Company name not recorded (factory setting)

x9 = 1 Company name recorded

This setting is not possible with the HG53.

### **x10 Company name**

Up to 20 characters are possible, factory setting: ""

No company name can be entered with the HG53.

### **x11 Record type**

x11 = 0 Normal record (factory setting)

x11 = 1 Full record

This setting is not possible with the HG53.

### **x12 Free switch-off criterion**

x12 = 0 Free switch-off criterion switched off (factory setting)

x12 = 1 Free switch-off criterion switched on

### **x13 Weight loss for free switch-off criterion**

Possible value: 1 ... 10 mg, factory setting: 1 mg

## Parameters

### x14 Time unit for free switch-off criterion

Possible values: 5 ... 180 s, factory setting: 50 s

### x15 Free print interval

x15 = 0 No free print interval, only the preset print intervals are available (factory setting)

x15 = 1 User-defined print interval

### x16 Entering free print interval

Possible values: 5 ... 3600 s, factory setting: 900 s

### x17 Working with methods

x17 = 0 Working without methods  
(factory setting with HG53)

x17 = 1 Working with methods  
(factory setting with HR73)

This setting is not possible with the HG53

---

## Example

Command **HA411102011010111"Mettler-Toledo GmbH"  
1111050119001**

The following menu parameters are set differently from the factory setting:

- Record of company name switched on
- Company name: Mettler-Toledo GmbH
- Free switch-off criterion switched on with factory setting for weight loss and time unit
- Free print interval switched on with factory setting for the free print interval

Response **HA411A**

Menu parameters set

---

## Comment

Setting the menu parameters terminates a drying.

## HA60 Inquiry / activation of method

### Inquiry of method

Command **HA60** Inquiry of current method  
Response **HA60┐A┐x** x Number of the method currently set

---

### Activating method

Command **HA60┐x** Activate method  
x Number of the method to be set  
Possible values: 1 ... 20, factory setting: 1  
Response **HA60┐A** Method activated  
**HA60┐L** Command understood, parameter wrong

---

### Comments

- The command HA60┐x is practical only with the HR73 Halogen Moisture Analyzer. The HG53 works without methods, hence only the value x = 1 (factory setting) is possible.
- 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	<b>HA61</b> $\square$ <b>x1</b>	Inquiry of method parameters regarding display mode, switch-off criteria and temperature profile.
	x1 = 0	Inquiry of parameters of all methods (possible only with HR73).
	x1 = 1 ... 20	Inquiry of parameters of a particular method. Only x1 = 1 is possible with HG53.
Response	<b>HA61</b> $\square$ <b>A</b> $\square$ <b>x1</b> $\square$ <b>x2</b> ... $\square$ <b>x11</b>	Current setting of the method parameters This line appears for each of the existing methods x1 ... x11 Represent the individual parameters (see below)
	<b>HA61</b> $\square$ <b>EOB</b>	End of block after inquiry of parameters of all methods

---

#### Example

Command	<b>HA61</b> $\square$ <b>1</b>	Inquiry of current setting of the method parameters of the HR73 or method 1 with HG53
Response	<b>HA61</b> $\square$ <b>A</b> $\square$ <b>1</b> $\square$ <b>3</b> $\square$ <b>6</b> $\square$ <b>300</b> $\square$ <b>1</b> $\square$ <b>105</b> $\square$ <b>180</b> $\square$ <b>105</b> $\square$ <b>0</b> $\square$ <b>105</b> $\square$ <b>0</b>	Factory setting with HR73 or factory setting for method 1 of the HG53

---

### Setting display mode, switch-off criteria and temperature profile

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

## Parameters

### **x1 Number of the method**

Possible values for HR73 1 ... 20

Possible value for HG53 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 = 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 HA41

### **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 HG53, only x5 = 1 is possible

## Parameters

### **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 **HA61L3L1L1L300L1L160L180L105L0L105L0**

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 HG53, 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	<b>HA62</b> ␣ <b>x1</b>	Inquiry of method parameters regarding target weight, print interval, method name and code
	x1 = 0	Inquiry of parameters of all methods (possible only with HR73)
	x1 = 1 ... 20	Inquiry of parameters of a particular method. (with HG53, only x1 = 1 is possible)
Response	<b>HA62</b> ␣ <b>A</b> ␣ <b>x1</b> ␣ <b>x2</b> ␣ ... ␣ <b>x5</b>	Current setting of the method parameters
	x1 ... x5	Represent the individual parameters (see below)
	<b>HA62</b> ␣ <b>EOB</b>	End of block after inquiry of parameters of all methods

---

### Example

Command	<b>HA62</b> ␣ <b>1</b>	Inquiry of current setting of the method parameters of the HR73 or method 1 with HG53
Response	<b>HA62</b> ␣ <b>A</b> ␣ <b>1</b> ␣ <b>2.500</b> ␣ <b>4</b> ␣ <b>"1"</b> ␣	Factory setting HR73 or factory setting for method 1 of the HG53

---

### Setting target weight, print interval, method name and code

Command	<b>HA62</b> ␣ <b>x1</b> ␣ <b>x2</b> ␣ ... ␣ <b>x5</b>	Set method parameters regarding target weight, print interval, method name and code
	x1 ... x5	represent the individual parameters (see below)
Response	<b>HA62</b> ␣ <b>A</b>	Method parameter set
	<b>HA62</b> ␣ <b>L</b>	Command understood, parameter wrong

## Parameters

### x1 Number of the method

Possible values for HR73 1 ... 20

Possible values for HG53 1

### 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, free print interval also activated in the menu, see command HA41

### x4 Method name

Maximum 20 characters, factory setting: "1"

not possible with HG53

### 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┘A** Method parameter set

---

## Comment

Setting the method parameters terminates a drying.

## HA80 Inquiry of journal

Command	<b>HA80</b> $\downarrow$ <b>x</b>	Inquiry of the journal
	x = 0	Inquiry of the journal of all methods (possible only with HR73)
	x = 1 ... 20	Inquiry of the journal of a particular method (with HG53 only x = 1 possible)
Response	<b>HA80</b> $\downarrow$ <b>A</b> $\downarrow$ <b>x1</b> $\downarrow$ <b>x2</b> ... $\downarrow$ <b>x10</b>	
		For each of the last 20 dryings of a method, you receive the following data:
	x1	Number of the method
		Possible values for HR73 1 ... 20
		Possible values for HG53 1
	x2	Day of the drying
	x3	Month of the drying
	x4	Year of the drying
	x5	Hour of the drying
	x6	Minute of the drying
	x7	Drying number
	x8	Wet weight In grams
	x9	Dry weight in grams
	x10	End of drying
		x10 = 0 Automatic end of drying
		x10 = 1 Manual end of drying
	<b>HA80</b> $\downarrow$ <b>EOB</b>	Journal closed, end of block This response also appears if no drying exists
	<b>HA80</b> $\downarrow$ <b>I</b>	Comment not executable at present as another command is being processed
	<b>HA80</b> $\downarrow$ <b>L</b>	Command understood, parameter wrong

### Example

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

Response **HA80┘3┘29┘02┘1996┘08┘12┘25┘12.345┘9.234┘0**

**HA80┘3┘29┘02┘1996┘08┘35┘26┘12.567┘9.012┘0**

**HA80┘3┘29┘02┘1996┘08┘57┘27┘12.023┘9.456┘0**

**HA80┘3┘29┘02┘1996┘09┘12┘28┘12.897┘9.342┘1**

**HA80┘3┘29┘02┘1996┘09┘26┘29┘12.678┘9.236┘0**

**HA80┘3┘29┘02┘1996┘09┘45┘30┘12.012┘9.245┘0**

...

**HA80┘3┘29┘02┘1996┘11┘59┘44┘12.567┘9.287┘0**

**HA80┘EOB** Journal of method 3, dryings No. 25 to No. 44, executed on February 29, 1996 between 8.12 and 11.59, drying No. 28 was ended manually

---

### Comments

- The journal covering all methods is sorted by methods 1 ... 20.
- 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.

## **HA81 Inquiry of journal after a certain time**

Command **HA81**  $\downarrow$  **x1**  $\downarrow$  **x2**  $\downarrow$  ...  $\downarrow$  **x6**

Inquiry of journal after a certain time

x1 = 0 Inquiry of journal of all methods (possible only with HR73)

x1 = 1 ... 20 Inquiry of journal of a particular method. With HG53, only x1 = 1 is possible

x2 Day

x3 Month

x4 Year

x5 Hour

x6 Minute

Response **HA81**  $\downarrow$  **A**  $\downarrow$  **x1**  $\downarrow$  **x2**  $\downarrow$  ...  $\downarrow$  **x10**

For the last 20 dryings of a method you receive the same data as with command HA80

**HA81**  $\downarrow$  **EOB** Journal closed, end of block  
This response also appears if no drying exists

**HA81**  $\downarrow$  **I** Command not executable at present as another command is being processed

**HA81**  $\downarrow$  **L** Command understood, parameter wrong

---

### **Comments**

- The journal covering all methods is sorted by methods 1 ... 20.
- 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.

## HA82 Clear journal

Command	<b>HA82</b> $\square$ <b>x</b>	Clear journal
		$x = 0$ Clear journals of all methods (possible only with HR73)
		$x = 1 \dots 20$ Clear journal of a particular method. With HG53, only $x1 = 1$ is possible.
Response	<b>HA82</b> $\square$ <b>A</b>	Journal cleared
	<b>HA82</b> $\square$ <b>I</b>	Command not executable at present as another command is being processed
	<b>HA82</b> $\square$ <b>L</b>	Command understood, parameter wrong

## HA83 Inquiry of statistics

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

### **x1 Select method**

$x1 = 0$	Inquiry of statistics of all methods (possible only with HR73)
$x1 = 1 \dots 20$	Inquiry of statistics of a particular method (with HG53, only $x1 = 1$ is possible)

### **x2 Display mode for statistics**

$x2 = 1$	Grams
$x2 = 2$	DC (dry content) in %
$x2 = 3$	MC (moisture content) in %
$x2 = 4$	AM (ATRO moisture content) in %
$x2 = 5$	AD (ATRO dry content) in %

Response **HA83** $\square$ **A** $\square$ **x1** $\square$ **x2** $\square$  ...  $\square$ **x7**

Statistics of all dryings of a method since last statistics deleted

$x1$	Number of the method entered as in command
$x2$	Display mode entered as in command
$x3$	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
<b>HA83LI</b>		Command not executable at present as another command is being executed
<b>HA83LL</b>		Command understood, parameter wrong
<b>HA83EOB</b>		End of block after inquiry of statistics of all methods

---

### Example 1

Command **HA83L3L3** Inquiry of statistics for method 3 in display mode MC (moisture content)

Response **HA83LA3L3L15L-25.03L0.35L-24.83L-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 **HA83L5L1** Inquiry of statistics for method 5 in the display mode grams

Response **HA83L5L1L0L0L0L0L0**

No dryings exist for method 5 since the last statistics were deleted

---

### Comment

- 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.

## HA84 Delete statistics

Command	<b>HA84Lx</b>	Delete statistics
	x = 0	Delete statistics of all methods (possible only with HR73)
	x = 1 ... 20	Delete statistics of a particular method. With HG53, only x = 1 is possible.
Response	<b>HA84LA</b>	Set(s) of statistics deleted
	<b>HA84LI</b>	Command not executable at present as another command is being executed
	<b>HA84LL</b>	Command understood, parameter wrong

---

### Comment

When the statistics are deleted, the counter for the dryings is reset to zero.



## HA90 Report keys

Command	<b>HA90_Lx1</b>	Report keys
		x1 = 0 Switch off (default)
		x1 = 1 Switch on
Response	<b>HA90_LA</b>	Command executed
	<b>HA90_Lx1</b>	x1 = 0 Key 0
		x1 = 1 Key 1
		x1 = 2 Key 2
		x1 = 3 Key 3
		x1 = 4 Key 4
		x1 = 5 Key 5
		x1 = 6 Key 6
		x1 = 7 Key 7
		x1 = 8 Key 8
		x1 = 9 Key 9
		x1 = 10 Key '!'
		x1 = 11 Key Delete
		x1 = 20 Key Reset
		x1 = 21 Key Up
		x1 = 22 Key Down
		x1 = 23 Key A...Z
		x1 = 24 Key Enter
		x1 = 25 Key Print
		x1 = 30 Key ID
		x1 = 31 Key Stat
		x1 = 32 Key Menu
		x1 = 33 Key Code
		x1 = 34 Key Journal
		x1 = 35 Key Temp
		x1 = 36 Key Time
		x1 = 37 Key Start
		x1 = 38 Key Stop
		x1 = 50 Key Switch-off criterion
		x1 = 51 Key Drying program
		x1 = 52 Key Display mode
		x1 = 53 Key Print interval
		x1 = 54 Key Target weight

x1 = 70 Key On/Off  
x1 = 71 Key Zeroing  
x1 = 72 Key Sample chamber  
x1 = 73 Key Paper feed

**HA90LL** Parameter wrong (number, value range, ...)

**HA90LI** 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	<b>HA91</b> $\square$ <b>x1</b> $\square$ <b>x2</b>	Alphanumeric entry x1 Lead text (quoted string) x2 Default (quoted string)
Response	<b>HA91</b> $\square$ <b>B</b>	Command executed, response follows
	<b>HA91</b> $\square$ <b>A</b> $\square$ " <b>ABC</b> "	Inputted value
	<b>HA91</b> $\square$ <b>L</b>	Parameter wrong (number, value range, ...)
	<b>HA91</b> $\square$ <b>I</b>	Command not possible at present or aborted

---

### Comments

- Entry is on the HR/HG 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** $\square$ "**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** $\square$ **B** Command understood.  
The user is prompted for an entry.

2nd Response **HA91** $\square$ **A** $\square$ "**XYZ**"

The user has entered "XYZ"

## 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 HR/HG 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**␣"**MACHINE:**"␣**1**␣**1**␣**9999**␣**1**␣**4**

<ACHINE:␣␣␣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 HR/HG 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**␣**6**

<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 HR/HG 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: "**␣**25**␣**6**␣**1996**␣**1**

Response **HA94**␣**A**␣**25**␣**6**␣**1996**

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 HR/HG 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**

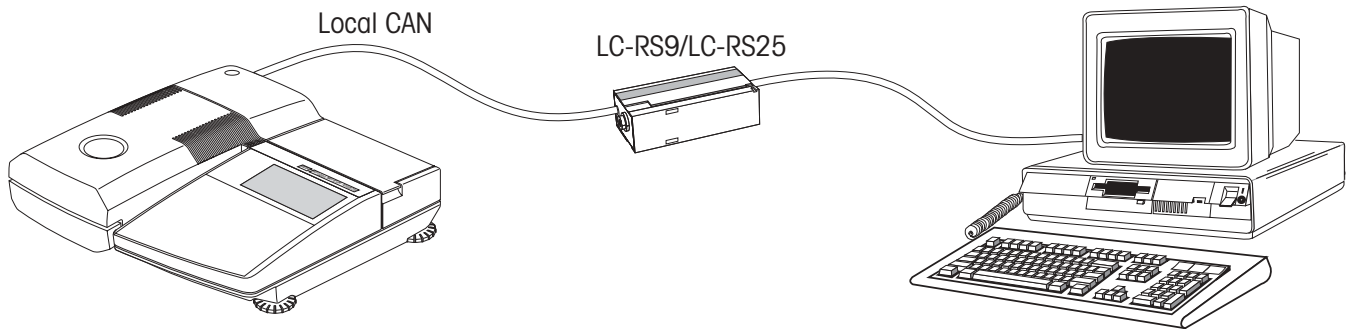
Command understood.

The user is prompted for an entry.

2nd Response **HA95**␣**A**␣**123**

#### 4. System configuration (HR73/HG53 – computer)

The HR73 and HG53 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 appropriately 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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