Reference Manual for

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

Subset for HB43
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<th>Description</th>
<th>Page</th>
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<td>DW</td>
<td>Weight display (Display show weight)</td>
<td>23</td>
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<tr>
<th>Command</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAT</td>
<td>Date</td>
<td>24</td>
</tr>
<tr>
<td>PWR</td>
<td>Power on/off</td>
<td>25</td>
</tr>
<tr>
<td>TIM</td>
<td>Time</td>
<td>25</td>
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</tbody>
</table>

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<th>Description</th>
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<td>26</td>
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<td>27</td>
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<td>27</td>
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<td>29</td>
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<th>29</th>
</tr>
</thead>
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<td>HA21</td>
<td>Inquiry of heating module position</td>
<td>30</td>
</tr>
<tr>
<td>HA22</td>
<td>Inquiry of last balance adjustment</td>
<td>30</td>
</tr>
<tr>
<td>HA23</td>
<td>Inquiry of last heating module adjustment</td>
<td>31</td>
</tr>
<tr>
<td>HA24</td>
<td>Inquiry of temperature</td>
<td>31</td>
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<tr>
<td>HA25</td>
<td>Inquiry of drying weights</td>
<td>32</td>
</tr>
<tr>
<td>HA26</td>
<td>Inquiry of drying data</td>
<td>33</td>
</tr>
<tr>
<td>HA27</td>
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</tr>
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1 Introduction

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

Standardization of the commands

All new METTLER TOLEDO balances and Halogen Moisture Analyzers support the standardized command set “METTLER TOLEDO Standard Interface Command Set” (MT-SICS), which is divided into 4 levels, depending on the functionality of the equipment:

- MT-SICS level 0  Command set for the simplest balance, e.g. weighing cell
- MT-SICS level 1  Extension of the command set for standard balances, i.e. balances without integrated applications
- MT-SICS level 2  Extension of the command set family
- MT-SICS level 3  Application-specific commands as independent command set, e.g. MT-SICS level 3 for Halogen Moisture Analyzers HR73, HG53 and HB43

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

What do the commands of MT-SICS level 0 and 1 offer?

You can use the commands of MT-SICS level 0 and 1 to perform the following operations of the Halogen Moisture Analyzer via the interface:

- request weighing results (raw data),
- zero the balance,
- identify MT-SICS implementation (version number),
- identify the Halogen Moisture Analyzer (serial number),
- reset the Halogen Moisture Analyzer,
- control the display.
The commands of MT-SICS level 2 and 3 for the Halogen Moisture Analyzer

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

Most commands in this manual are identical for the HB43 and the other Halogen Moisture Analyzers of METTLER TOLEDO. This allows direct transfer of software applications from one instrument type to another. However, not all parameters of the HR73 can be applied to the HB43.

Additional documentation on data interface

Settings of the interface such as baud rate, number of data bits, parity, handshake protocols and connector pin assignment are described in the operating instructions of the peripheral instrument or cable in question.

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

How the Halogen Moisture Analyzer operates

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

Version number of the MT-SICS

Each level of the MT-SICS has its own version number which can be requested with the command I1 from level 0.

This manual describes

- MT-SICS level 0, version 2.30
- MT-SICS level 1, version 2.20
- MT-SICS level 2 for Halogen Moisture Analyzer version 2.30
- MT-SICS level 3 for Halogen Moisture Analyzer version 1.30

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

Please make sure that the versions implemented on your moisture analyzer agree with those listed above.
During drying the Halogen Moisture Analyzer passes through the following instrument statuses:

The following instrument statuses also exist:
- Entry status
- Startup
- Taring
- Weight adjustment
- Temperature adjustment
- Error status

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

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

Each command received by the Halogen Moisture Analyzer via the data interface is acknowledged by a response of the Halogen Moisture Analyzer to the transmitter (e.g. computer).

Commands and responses are data strings with a fixed format, and will be described in detail in chapter 3.

2.1 Command formats

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

- Commands can be entered in uppercase or lowercase letters.
- The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec., in this description represented as `/`).
- 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 CRLF (ASCII 13 dec., 10 dec.).

The characters CRLF, 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 CRLF 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.

<table>
<thead>
<tr>
<th>ID</th>
<th>Status</th>
<th>WeightValue</th>
<th>Unit</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 character</td>
<td>11 characters</td>
<td>1 – X characters</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

CR

Carriage Return (ASCII 13 dec.)

LF

Line Feed (ASCII 10 dec.)

Comment

CR, LF will not be shown in this description.

Example

Response with stable weight value of 0.256 g:

\$S0.256g
### 2.2.2 Format of the response without weight value

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

<table>
<thead>
<tr>
<th>ID</th>
<th>Status</th>
<th>Parameters</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 character</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 – 4 characters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **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
- **CR**: Carriage Return (ASCII 13 dec.)
- **LF**: Line Feed (ASCII 10 dec.)

---

#### Comment

\(C_R \text{ \&}\ L_F\) will not be shown in this description.

---

#### Example

Response to \(D\text{ \&}\) "HALLO" when HALLO appears unabridged in the display: \(D\text{ \&}\ A\).
2.2.3 Error messages

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

<table>
<thead>
<tr>
<th>ID</th>
<th>Error identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES</td>
<td>Syntax error</td>
</tr>
<tr>
<td>ET</td>
<td>Transmission error</td>
</tr>
<tr>
<td>EL</td>
<td>Logical error</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>CR</th>
<th>Carriage Return (ASCII 13 dec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>Line Feed (ASCII 10 dec.)</td>
</tr>
</tbody>
</table>

Comment

CR LF 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 CRLF. These termination characters are not shown in the following description, but they must always be entered with commands or sent with responses.

3.1 Commands and responses MT-SICS level 0

The commands of MT-SICS level 0 are available with even the simplest balances which support the METTLER TOLEDO Standard Interface Command Set. Except for the tare command, these commands are also available with the HB43 Halogen Moisture Analyzer.

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I0</strong></td>
<td>Send list of all implemented MT-SICS commands</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>1.Command</strong></td>
</tr>
<tr>
<td></td>
<td>(x_1) = number of the MT-SICS level where the 1. Command belongs to.</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>2.Command</strong></td>
</tr>
<tr>
<td></td>
<td>2nd (next) command implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>last Command</strong></td>
</tr>
<tr>
<td></td>
<td>Last command implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td></td>
<td>End of the list</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>I</strong></td>
</tr>
<tr>
<td></td>
<td>The list cannot be sent at present as another operation is taking place</td>
</tr>
</tbody>
</table>

### Example

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I0</strong></td>
<td>Send list of commands</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>I0</strong> Level 0 command &quot;I0&quot; implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>I1</strong> Level 0 command &quot;I1&quot; implemented</td>
</tr>
<tr>
<td></td>
<td>2nd (next) command implemented</td>
</tr>
<tr>
<td></td>
<td>2nd (next) command implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>S</strong> Level 0 command &quot;S&quot; implemented</td>
</tr>
<tr>
<td></td>
<td>2nd (next) command implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>Z</strong> Level 0 command &quot;Z&quot; implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>@</strong> Level 0 command &quot;@&quot; (reset) implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>D</strong> Level 1 command &quot;D&quot; implemented</td>
</tr>
<tr>
<td><strong>I0</strong></td>
<td><strong>DW</strong> Level 1 command &quot;DW&quot; implemented</td>
</tr>
</tbody>
</table>

### Comments
- The **I0** command lists all commands implemented in the present software.
- All level 0 commands are listed in alphabetical order before all commands of level 1 etc. This order corresponds to the order how the commands are described in this manual.
### I1 Inquiry of MT-SICS level and MT-SICS versions

<table>
<thead>
<tr>
<th>Command</th>
<th>I1</th>
<th>Inquiry of MT-SICS level and MT-SICS versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>I1;;;;;x1;;;;x2;;;;x3;;;;x4;;;;x5</td>
<td></td>
</tr>
</tbody>
</table>

#### Example

<table>
<thead>
<tr>
<th>Command</th>
<th>I1</th>
<th>Inquiry of MT-SICS level and versions</th>
</tr>
</thead>
</table>
| Response | I1;;;;;3;;;;2.30;;;;2.20;;;;2.30;;;;1.30 | 3 Application device with MT-SICS level 3  
2.30 Level 0, version V2.30  
2.20 Level 1, version V2.20  
2.30 Level 2, version V2.30  
1.30 Level 3, version V1.30 |

#### Comment

For details see Reference manual 705184.

### I2 Inquiry of instrument data

<table>
<thead>
<tr>
<th>Command</th>
<th>I2</th>
<th>Inquiry of instrument data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>I2;;;;;text</td>
<td>Instrument data as &quot;text&quot;</td>
</tr>
</tbody>
</table>

#### Example

<table>
<thead>
<tr>
<th>Command</th>
<th>I2</th>
<th>Inquiry of instrument type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses</td>
<td>I2;;;;;HB43;;;;Moisture-Analyzer;;;;41.009g</td>
<td></td>
</tr>
</tbody>
</table>

#### Comment

For details see Reference manual 705184.
I3  Inquiry of SW version and type definition number

Command  I3  Inquiry of Halogen Moisture Analyzer SW version and type definition number
Response  I3＝"TEXT"  Halogen Moisture Analyzer SW version and type definition number as TEXT

Example
Command  I3  Inquiry of SW version number(s) and type definition number
Response  I3＝"1.00＝26260100"  
          1.00  Software version
          26260100  Type definition number

Comment
For details see Reference manual 705184.

I4  Inquiry of serial number

Command  I4  Inquiry of serial number
Response  I4＝"text"  Serial number as "text"

Example
Command  I4  Inquiry of serial number
Response  I4＝"0123456789"

Comment
For details see Reference manual 705184.
### I5  SW-Identification number

**Command**  
I5  Inquiry of SW-Identification number.

**Responses**  
I5A"x"  SW-Identification number as Text.  
  x: SW-Identification number.

I5I  Command understood, not executable at present.

**Example**  
**Command**  
I5  Inquiry of SW-Identification number.

**Response**  
I5A"12345678A"  SW-Identification number with index.

**Comments**  
- The SW-Identification number is unique for every Software.

### S  Send stable weight value

**Command**  
S  Send the current stable weight value

**Response**  
SWeightValueUnit  Current stable weight value

**Example**  
**Command**  
S  Send a stable weight value

**Response**  
S1.000g  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**

<table>
<thead>
<tr>
<th>Command</th>
<th>SI</th>
<th>Send the current weight value, irrespective of balance stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>$S_uS_u\text{WeightValue}_{\text{Unit}}$</td>
<td>Stable weight value</td>
</tr>
<tr>
<td></td>
<td>$S_uD_u\text{WeightValue}_{\text{Unit}}$</td>
<td>Nonstable (dynamic) weight value</td>
</tr>
</tbody>
</table>

#### Example

<table>
<thead>
<tr>
<th>Command</th>
<th>SI</th>
<th>Send current weight value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>$S_uD_u\text{2.907}_{\text{g}}$</td>
<td>The current weight value is unstable (dynamic) and is 2.907 g</td>
</tr>
</tbody>
</table>

#### Comment

For details see Reference manual 705184.
## SIR  Send weight value immediately and repeat

<table>
<thead>
<tr>
<th>Command</th>
<th>SIR</th>
<th>Send the weight values repeatedly, irrespective of balance stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>S腹S腹WeightValueUnit</td>
<td>Stable weight value</td>
</tr>
<tr>
<td></td>
<td>S腹D腹WeightValueUnit</td>
<td>Nonstable (dynamic) weight value</td>
</tr>
</tbody>
</table>

### Example

<table>
<thead>
<tr>
<th>Command</th>
<th>SIR</th>
<th>Send current weight values at intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>S腹D腹D腹D腹D腹D腹2.907μg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S腹D腹D腹D腹D腹2.850μg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S腹D腹D腹D腹D腹D腹2.797μg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S腹D腹D腹D腹D腹D腹2.775μg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S腹D腹D腹D腹D腹D腹2.770μg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>...</td>
<td>The Halogen Moisture Analyzer sends stable or nonstable weight values at intervals of 150 ms</td>
</tr>
</tbody>
</table>

### Comment
For details see Reference manual 705184.

## Z  Zero

<table>
<thead>
<tr>
<th>Command</th>
<th>Z</th>
<th>Zero the Halogen Moisture Analyzer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>Z腹A</td>
<td>Zero setting performed, i.e. stability criterion and zero setting range complied with</td>
</tr>
<tr>
<td></td>
<td>Z腹I</td>
<td>Command not executable as the Moisture Analyzer is not in the relevant instrument status (e.g. drying unit open)</td>
</tr>
</tbody>
</table>

### Example

<table>
<thead>
<tr>
<th>Command</th>
<th>Z</th>
<th>Zero</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>Z腹A</td>
<td>Zero setting performed</td>
</tr>
</tbody>
</table>

### Comments
- This command is equivalent to pressing the ➔O/T← key.
- For details see Reference manual 705184.
## ZI  Zero immediately

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZI</strong></td>
<td><strong>ZIūS</strong></td>
<td>Zero setting performed, stable weight value</td>
</tr>
<tr>
<td></td>
<td><strong>ZIūD</strong></td>
<td>Zero setting performed, non-stable (dynamic) weight value</td>
</tr>
<tr>
<td></td>
<td><strong>ZIūI</strong></td>
<td>Zero setting not performed (balance is currently executing another command)</td>
</tr>
<tr>
<td></td>
<td><strong>ZIūL</strong></td>
<td>Command understood but not executable (e.g. certified version of balance)</td>
</tr>
<tr>
<td></td>
<td><strong>ZIū+</strong></td>
<td>Upper limit of zero setting range exceeded</td>
</tr>
<tr>
<td></td>
<td><strong>ZIū−</strong></td>
<td>Lower limit of zero setting range exceeded</td>
</tr>
</tbody>
</table>

### Example 1

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZI</strong></td>
<td><strong>ZIūS</strong></td>
<td>Zero immediately, weight value was stable</td>
</tr>
</tbody>
</table>

### Example 2

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZI</strong></td>
<td><strong>ZIūD</strong></td>
<td>Zero immediately, weight value was dynamic (non-stable)</td>
</tr>
</tbody>
</table>

### Comment

For details see Reference manual 705184.
**Reset**

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>@</td>
<td>I4א&quot;text&quot;</td>
</tr>
</tbody>
</table>

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

**Response**

Serial number of the Halogen Moisture Analyzer, the Halogen Moisture Analyzer is ready for operation.

**Example**

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>@</td>
<td>I4א&quot;1114350697&quot;</td>
</tr>
</tbody>
</table>

Halogen Moisture Analyzer is reset, its serial number is 1114350697.

**Comment**

For details see Reference manual 705184.
3.2 Commands and responses MT-SICS level 1 (subset for HB43)

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>A</td>
<td>Write TEXT into Halogen Moisture Analyzer display</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TEXT appears unbragged left-aligned in the Halogen Moisture Analyzer display marked by the symbol *</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>The end of the text appears in the Halogen Moisture Analyzer display, the start is cut off and text is marked by the symbol *</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Command not executable</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Command understood, parameter wrong</td>
</tr>
</tbody>
</table>

**Example**

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D &quot;HALLO&quot;</td>
<td>A</td>
<td>Write HALLO into the Halogen Moisture Analyzer display</td>
</tr>
</tbody>
</table>

**Clear display**

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D &quot; &quot;</td>
<td>A</td>
<td>Clear Halogen Moisture Analyzer display</td>
</tr>
</tbody>
</table>

**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)**

<table>
<thead>
<tr>
<th>Command</th>
<th>DW</th>
<th>Switch display to weight mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>DW_A</td>
<td>Display shows the current weight value</td>
</tr>
<tr>
<td></td>
<td>DW_I</td>
<td>Command not executable</td>
</tr>
</tbody>
</table>

**Comment**

This command can be executed only in the instrument statuses "basic mode", "ready for taring", "weighing-in" and "ready for start".
### 3.3 Commands and responses MT-SICS level 2 for Halogen Moisture Analyzer HB43

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DAT</strong></td>
<td><strong>A</strong></td>
</tr>
</tbody>
</table>

**Inquiry of date**

Command  
**DAT**

Inquiry of current date of the Halogen Moisture Analyzer

Response  
**DATA**

"dd/mm/yyyy" represents the date in the format day/month/year

**Set date**

Command  
**DATdd/mm/yyyy**

Set date in the format "dd/mm/yyyy"

Response  
**DATA**  
**DALL**

Command not executed as the date format was not correct

Inquiry of date of the Halogen Moisture Analyzer

**Example**

Command  
**DAT**

Current date of the Halogen Moisture Analyzer is 2 April 2000

Response  
**DATA**

**Comments**

- The set date is retained after the reset command "@".
### PWR  Power On/Off

**Command**  
**PWR\text{x}**  
Switch Halogen Moisture Analyzer On or Off  
- \( x = 0 \) Set Halogen Moisture Analyzer to standby mode  
- \( x = 1 \) Switch Halogen Moisture Analyzer on  

**Response**  
**PWR\text{A}**  
Halogen Moisture Analyzer has been switched off successfully  
**PWR\text{A}**  
Halogen Moisture Analyzer with the serial number "text" according to text has been switched on successfully (see also \textbf{I4} command)  
**PWR\text{L}**  
Command understood, parameter wrong

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

### TIM  Time

#### Inquiry of time

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

**Response**  
**TIM\text{A}**hh\text{m}mm\text{ss}**  
"hh\text{mm}mm\text{ss}" represents the time in the 24-hour format (hours/minutes/seconds)

#### Set time

**Command**  
**TIM\text{h}hh\text{m}mm\text{ss}**  
Set time in 24-hour format (hours/minutes/seconds)  

**Response**  
**TIM\text{A}**  
Time has been set, clock running  
**TIM\text{L}**  
Command not executed as the time format is not correct (e.g. 22\text{6}7\text{2}5)

#### Example

**Command**  
**TIM**  
Inquiry of time  

**Response**  
**TIM\text{A}**22\text{5}6\text{1}1**  
The current time of the Halogen Moisture Analyzer is 22 hours, 56 minutes and 11 seconds
3.4 Commands and responses MT-SICS level 3 (subset for Halogen Moisture Analyzer HB43)

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA01</td>
<td>HA01mA</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA02</td>
<td>HA02mA</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA03</td>
<td>HA03mA</td>
</tr>
</tbody>
</table>

**Comment**
Keypad of Halogen Moisture Analyzer switched off.

<table>
<thead>
<tr>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HA03mL</td>
</tr>
</tbody>
</table>

Command understood, parameter wrong.
### HA05  Start / end drying

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA05(x)</td>
<td>(x = 0) End drying, possible only in instrument status “drying”</td>
</tr>
<tr>
<td></td>
<td>(x = 1) Start drying, possible only in instrument status “ready for start”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA05(A)</td>
<td>Command executed</td>
</tr>
<tr>
<td>HA05(I)</td>
<td>Command not executable as the Moisture Analyzer is not in the relevant instrument status</td>
</tr>
<tr>
<td>HA05(L)</td>
<td>Command understood, parameter wrong</td>
</tr>
</tbody>
</table>

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

### HA06  Trigger audio signal

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA06</td>
<td>Trigger audio signal, e.g. at end of drying</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA06(A)</td>
<td>Command executed</td>
</tr>
</tbody>
</table>
## HA07 Report instrument status change

<table>
<thead>
<tr>
<th>Command</th>
<th>HA07(x_1)</th>
<th>Report each internal status change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x1 = 0</td>
<td>Switch off</td>
</tr>
<tr>
<td></td>
<td>x1 = 1</td>
<td>Switch on</td>
</tr>
</tbody>
</table>

| Response | HA07A        | Command executed                  |
|          | HA07A\(x_1\) | 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"    |

| HA07L    | Parameter wrong (number, value range,….) |
| HA07I    | Response always available, hence not possible |

**Comment**
- aborted with the HA01 command
- see also HA20 command
- also active in standby
**HA08  Request printer records**

**Command**  
HA08\textsubscript{x1}  
Request printer records:  
x1 = 0 \quad \text{Do not send printer records}
\nx2 = 1 \quad \text{Send printer records}

**Response**  
HA08\textsubscript{A}  
Command executed

HA08\textsubscript{L}  
Parameter wrong (number, value range, ...)

HA08\textsubscript{I}  
Response always available, hence not possible

**Comments**
- The printer records use the 8-bit ASCII IBM table 4.
- Regardless of menu setting (see HA403).
- This setting is not stored.

**HA20  Inquiry of instrument status**

**Command**  
HA20  
Inquiry of instrument status

**Response**  
HA20\textsubscript{x}  
\begin{align*}  
x = 0 & \quad \text{Status: "Standby"} 
x = 1 & \quad \text{Status: "Basic mode"} 
x = 2 & \quad \text{Status: "Ready for taring"} 
x = 3 & \quad \text{Status: "Weighing in"} 
x = 4 & \quad \text{Status: "Ready for start"} 
x = 5 & \quad \text{Status: "Drying"} 
x = 6 & \quad \text{Status: "End of drying"} 
x = 7 & \quad \text{Status: "Entry"} 
x = 10 & \quad \text{Status: "Startup"} 
x = 11 & \quad \text{Status: "Taring"} 
x = 12 & \quad \text{Status: "Weight adjustment"} 
x = 13 & \quad \text{Status: "Temperature adjustment"} 
x = 101 & \quad \text{Status: "Error 1"} 
\end{align*}

\ldots

x = 10n \quad \text{Status "Error n", see operating instructions of the Halogen Moisture Analyzer}

**Comment**
With the message HA20\textsubscript{6} instrument status "End of drying", it is not apparent whether drying was ended correctly or terminated. This is possible only via the command HA25 – Inquiry of drying weight.
HA21 Inquiry of heating module position

Command  HA21  Inquiry of heating module position
Response  HA21ux  
            x = 0  Heating module closed
            x = 1  Heating module open

HA22 Inquiry of last balance adjustment

Command  HA22  Inquiry of last successful balance adjustment
Response  HA22ux1ux2ux3ux4ux5ux6  
            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  HA22ux15ux02ux04ux2000ux09ux34  
          A total of 15 successful balance adjustments have been performed. The last took place on April 02, 2000 at 9.34.

Comments
• The time of the last successful balance adjustment is specified in the 24-hour format.
• Possible years are 1999 … 2099.
• The counter for the balance adjustments runs to 65535.
**HA23  Inquiry of last heating module adjustment**

Command  **HA23**  Inquiry of the last successful heating module adjustments

Response  **HA23**

\[x_1 \text{ Number of successful adjustments} \]
\[x_2 \text{ Day of the last successful adjustment} \]
\[x_3 \text{ Month of the last successful adjustment} \]
\[x_4 \text{ Year of the last successful adjustment} \]
\[x_5 \text{ Hour of the last successful adjustment} \]
\[x_6 \text{ Minute of the last successful adjustment} \]

**Example**

Command  **HA23**

Response  **HA23**

\[x_1 \text{ Number of successful adjustments} \]
\[x_2 \text{ Day of the last successful adjustment} \]
\[x_3 \text{ Month of the last successful adjustment} \]
\[x_4 \text{ Year of the last successful adjustment} \]
\[x_5 \text{ Hour of the last successful adjustment} \]
\[x_6 \text{ Minute of the last successful adjustment} \]

\[x_1 = 15 \]
\[x_2 = 02 \]
\[x_3 = 04 \]
\[x_4 = 2000 \]
\[x_5 = 09 \]
\[x_6 = 34 \]

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

**Comments**

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

**HA24  Inquiry of temperature**

Command  **HA24**  Inquiry of current temperature

Response  **HA24**

\[x \text{ Current temperature in } ^\circ\text{C} \]

**Example**

Command  **HA24**  Inquiry of current temperature

Response  **HA24**

\[x = 105 \]

The temperature is 105 °C.
## HA25 Inquiry of drying weights

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

**Response** HA25
\( x_1 x_2 x_3 x_4 \)

- **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
\( 2 12.345 7.890 180 \)
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
\( 0 0.000 0.000 0 \)
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 **HA26x1** 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 **HA26Ax1lx2lx3lx4lx5lx6**

- **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)

**HA26L** Command understood, parameter wrong

---

**Example 1**

Command **HA263** Inquiry of drying data

Response **HA26A23u4.762u3.066u35.61u497**

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
Response HA26

Inquiry of drying data

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 x1 = 4 AM or x1 = 5 AD will automatically be transferred in x1 = 3 MC or x1 = 2 DC respectively.

HA27 Inquiry of drying result

Command HA27
Response HA27

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

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
Response HA27

Inquiry of drying result

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  HA40LAx  x  Set language (see below)

Setting language
Command  HA40Lx  Set language
x = 0   English Eu, with European date format
x = 1   English US, with US date format
x = 2   German
x = 3   French
x = 4   Italian
x = 5   Spanish
x = 6   Russian
x = 7   Japanese (Nihongo)
Response  HA40LA  Language set
HA40LL  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.
All commands on the inquiry / setting of menu parameters work similarly. As an example the inquiry for the startmode setting and the actual setting of the startmode is shown.

### Inquiry of menu parameters

**Command**  
HA401  
**Response**  
HA401\[\text{Aux}_{X1}\]  
\(X1 = 0\) Startmode automatic (factory setting)  
\(X1 = 1\) Startmode manual

**Example**

**Command**  
HA401  
**Response**  
HA401\[\text{Aux}_{1}\]  
Startmode manual

### Setting menu parameters

**Command**  
HA401\[\text{Aux}_{X1}\]  
**Response**  
HA401\[\text{Aux}_{A}\]  
Startmode set  
HA401\[\text{Aux}_{L}\]  
Command understood, parameter wrong

**Example**

**Command**  
HA401\[\text{Aux}_{0}\]  
Setting startmode to automatic  
HA401\[\text{Aux}_{A}\]  
Startmode set

**Comment**

Setting a menu parameter terminates a drying procedure.

### List of menu parameter inquiries / settings

**HA401**

<table>
<thead>
<tr>
<th>Startmode</th>
</tr>
</thead>
<tbody>
<tr>
<td>(X1 = 0)</td>
</tr>
<tr>
<td>Startmode automatic (factory setting)</td>
</tr>
<tr>
<td>(X1 = 1)</td>
</tr>
<tr>
<td>Startmode manual</td>
</tr>
</tbody>
</table>
HA402  Protection against change in the settings (key protection)

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

x1 = 1  All keys and menu blocked except On/Off, Tare and Start/Stop

HA403  Printer

x1 = 0  Printout off

x1 = 1  Printout on (factory setting)

HA61  Inquiry / setting of method parameters (part 1)

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

Command

HA61x1

Indicates inquiry of method parameters regarding display
switch-off criteria and temperature profile

x1 = 0  Inquiry of parameters of all method

Response

HA61A0x1x2x3x4x5x6x7x8x9x10x11

Current setting of the method parameters
This line appears for each of the existing methods

x1 … x11 Represent the individual parameters (see below)

Example

Command

HA611

Inquiry of current setting of the method parameters

Response

HA61A134653011050000000

Factory setting for method 1 of the HB43

Setting display mode, switch-off criteria and temperature profile

Command

HA61x1x2x3x4x5x6x7x8x9x10x11

Set method parameters regarding display mode,
switch-off criteria and temperature profile

x1 … x11 represent the individual parameters (see below)

Response

HA61A  Method parameter set

HA61L  Command understood, parameter wrong
<table>
<thead>
<tr>
<th>Parameters</th>
<th>x1</th>
<th>Number of the method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Always 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x2</th>
<th>Display mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>x2 = 1</td>
<td>Grams</td>
</tr>
<tr>
<td>x2 = 2</td>
<td>DC (dry content)</td>
</tr>
<tr>
<td>x2 = 3</td>
<td>MC (moisture content), (factory setting)</td>
</tr>
<tr>
<td>x2 = 4</td>
<td>AM (ATRO moisture content)</td>
</tr>
<tr>
<td>x2 = 5</td>
<td>AD (ATRO dry content)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x3</th>
<th>Switch-off criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>x3 = 1</td>
<td>Switch off manually</td>
</tr>
<tr>
<td>x3 = 2</td>
<td>Switch off via timer</td>
</tr>
<tr>
<td>x3 = 4</td>
<td>Switch-off criterion weight loss per time unit, level 1; for samples which dry very quickly</td>
</tr>
<tr>
<td>x3 = 5</td>
<td>Switch-off criterion weight loss per time unit, level 2; for samples which dry quickly</td>
</tr>
<tr>
<td>x3 = 6</td>
<td>Switch-off criterion weight loss per time unit, level 3; suitable for most types of samples (factory setting)</td>
</tr>
<tr>
<td>x3 = 7</td>
<td>Switch-off criterion weight loss per time unit, level 4; for samples which dry moderately quickly</td>
</tr>
<tr>
<td>x3 = 8</td>
<td>Switch-off criterion weight loss per time unit, level 5; for samples which dry very slowly</td>
</tr>
<tr>
<td>x3 = 9</td>
<td>Free switch-off criterion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x4</th>
<th>Setting the timer in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Possible settings 60 - 28800 in steps of 60 s</td>
</tr>
<tr>
<td></td>
<td>Factory setting 300 s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x5</th>
<th>Drying program</th>
</tr>
</thead>
<tbody>
<tr>
<td>x5 = 1</td>
<td>Standard drying (factory setting)</td>
</tr>
<tr>
<td>x5 = 2</td>
<td>Rapid drying</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x6</th>
<th>Set temperature in °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Possible settings 50 … 200 in steps of 5 °C</td>
</tr>
<tr>
<td></td>
<td>Factory setting 105</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters</th>
<th>x7</th>
<th>Ramp time in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Always 0</td>
</tr>
<tr>
<td>x8</td>
<td>Temperature of level 1 of step drying, in °C</td>
<td>Always 0</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>x9</td>
<td>Time of level 1 of step drying, in seconds</td>
<td>Always 0</td>
</tr>
<tr>
<td>x10</td>
<td>Temperature of level 2 of step drying, in °C</td>
<td>Always 0</td>
</tr>
<tr>
<td>x11</td>
<td>Time of level 2 of step drying, in seconds</td>
<td>Always 0</td>
</tr>
</tbody>
</table>

**Example**

**Command**

```
HA61
```

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

**Comments**

- The parameters x7 … x11 must always be 0.
- Changing 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 Ax1
```

Inquiry of method parameters regarding print interval

```x1 = 1```

Inquiry of print interval

**Response**

```
HA62 Ax1 Ax2 Ax3 Ax4 Ax5
```

Current setting of the method parameters

```
x1 … x5
```

Represent the individual parameters (see below)

**Example**

**Command**

```
HA62 Ax1
```

Inquiry of current setting of the method parameters of the HB43

**Response**

```
HA62 Ax1 Ax0 Ax4 Ax0 Ax0
```

""""""

Factory setting printout interval 30 s
Setting print interval

Command \texttt{HA62ux1ux2u ... ux5}

Set method parameters regarding print interval

\(x1 \ldots x5\) represent the individual parameters (see below)

Response \texttt{HA62uA}

Method parameter set

\texttt{HA62uL}

Command understood, parameter wrong

<table>
<thead>
<tr>
<th>Parameters</th>
<th>(x1)</th>
<th>Number of the method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Possible values for HB43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(x2)</th>
<th>Target weight in grams</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Possible settings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(x3)</th>
<th>Print interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x3 = 1)</td>
<td>No print interval set, manual initiation of printout</td>
</tr>
<tr>
<td>(x3 = 4)</td>
<td>Printout every 30 seconds</td>
</tr>
<tr>
<td>(x3 = 5)</td>
<td>Printout every 60 seconds</td>
</tr>
<tr>
<td>(x3 = 9)</td>
<td>Printout every 300 seconds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(x4)</th>
<th>Method name</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(x5)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;&quot;</td>
<td>&quot;&quot;</td>
</tr>
</tbody>
</table>

Example

Command \texttt{HA62u1u0u5u""""""}

Print interval set to 60 seconds

Response \texttt{HA62uA}

Method parameter set

Comments

- Setting the method parameters terminates a drying.

- The additional parameters are implemented in the HR/HG Halogen Moisture Analyzers. The above settings assure direct transfereability of control programs.
**HA632 Definition of freely selectable switch-off criterion**

<table>
<thead>
<tr>
<th>Command</th>
<th>HA632\textsubscript{A}x1</th>
<th>Inquiry of $\Delta \ g$ and $\Delta \ t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>HA632\textsubscript{A}x1\textsubscript{x}2\textsubscript{x}3</td>
<td>Set $\Delta \ g$ and $\Delta \ t$</td>
</tr>
</tbody>
</table>

**Command**

```
Command  HA632\textsubscript{A}x1\textsubscript{x}2\textsubscript{x}3  
Set $\Delta \ g$ and $\Delta \ t$
```

```
x1: 0  active method
x2 $\Delta \ g = \text{Fix \ 1 \ mg}$
```

```
x3 $\Delta \ t$ in seconds (5...180),
factory setting 100 sec
```

**Response**

```
Response  HA632\textsubscript{A}  
$\Delta \ g$ and $\Delta \ t$ set
```

```
HA632\textsubscript{L}  
Command understood, parameter wrong, (number,
value range, …)
```

**Comment**

Setting the command line terminates a drying.
4 System configuration (HB43 – computer)

The HB43 Halogen Moisture Analyzer is equipped with a 9 pin female RS232C Interface connector. It can be connected to a computer using a cable with order number 11101051 (9 pin) or order number 11101052 (25 pin).

The standard configuration of HB43 is: 2400 baud, 7 bits, even parity, no handshake. These settings may be adjusted in the menu of HB43. Additionally the printout setting in the menu should be «off». This avoids that printout strings are sent to the computer. Please refer to the Operating instruction.
5 What if…?

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

Establishing the communication

Test whether the unidirectional operation is working:
Switch the Halogen Moisture Analyzer off with the “Off” key and then on again with the “On” key.
The Halogen Moisture Analyzer must now send the identification string \texttt{I4}, e.g. \texttt{I4://
"0123456789"}. If “METTLER TOLEDO” is printed the communication functions properly.
Change the printout setting in the menu to the «off» position.
If no identification string is received, check the following points.

Connection

For bidirectional communication, at least three connecting lines are needed:
• Data line from the Halogen Moisture Analyzer (TxD signal with RS232 interface).
• Data line to the Halogen Moisture Analyzer (RxD signal with RS232 interface).
• Signal ground line (SG with RS232 interface).

Make sure that all these connections are in order. Check the connector pin assignment of
the connection cables.

Interface parameters

For the transmission to function properly, the settings of the following parameters must match at both the computer and the Halogen Moisture Analyzer:
• Baud rate (send/receive rate)
• Number of data bits
• Parity bit

Check the settings at both devices.

Handshake

For control of the transmission, in part separate connection lines are used (CTS/DTR). If these lines are missing or wrongly connected, the computer or Halogen Moisture Analyzer can not send or receive data.
Check whether the Halogen Moisture Analyzer is prevented from transmitting by handshake lines (CTS or DTR).
Set the parameter “handshake” for the Halogen Moisture Analyzer and the peripheral device to “No Handshake” or “none”. The handshake lines now have no influence on the communication.
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METTLER TOLEDO service assures the quality, measuring accuracy and preservation of value of all METTLER TOLEDO products for years to come.
Please send for full details about our attractive terms of service.
Thank you.