

MT-SICS Interface Command for Weigh Modules



METTLER TOLEDO

Table of Contents

1	Configuration tool	5
2	Introduction	6
2.1	Command formats	6
2.1.1	Language conventions	6
2.1.2	Response formats	8
2.1.2.1	Format of responses with weight value	8
2.1.2.2	Format of responses without weight value	9
2.1.3	Error messages	10
2.1.3.1	Command-specific error messages	10
2.1.3.2	General error messages	10
2.1.4	Specific error messages on weight response	12
2.2	Tips for programmers	13
3	Commands and Responses	15
	@ – Cancel	15
	A01 – Percent weighing: Reference in %	16
	A02 – Sample identification for samples in weighing application	17
	A03 – Sample name for samples in weighing application	18
	A10 – Nominal, +Tolerance, -Tolerance	19
	A30 – Internal loads	20
	C – Cancel all commands	21
	C0 – Adjustment setting	22
	C1 – Start adjustment according to current settings	24
	C2 – Start adjustment with external weight	26
	C3 – Start adjustment with internal weight	28
	C4 – Standard / initial adjustment	29
	C5 – Enabling/disabling step control	31
	C6 – Customer linearization and sensitivity adjustment	32
	C7 – Customer standard calibration	35
	C8 – Sensitivity adjustment	38
	C9 – Scale placement sensitivity adjustment	41
	COM – Parameters of the serial interfaces	44
	D – Write text to display	46
	DAT – Date	47
	DIN – Configuration for digital inputs	48
	DIS – Digital input status	49
	DOS – Digital output status	50
	DOT – Configuration for digital outputs	51
	DOTC – Configurable digital outputs – Weight monitor	52
	DW – Show weight	54
	E01 – Current system error state	55
	E02 – Weighing device errors and warnings	56
	E03 – Current system errors and warnings	58
	F01 – Automatic prefilling configuration	59
	F02 – Material filling duration configuration	60
	F03 – Automatic refilling configuration	61
	F04 – Target weight configuration	62
	F05 – Optimization function configuration	63
	F06 – Weight monitor function configuration	65
	F07 – Time monitor function configuration	67
	F08 – Filling statistics	69
	F09 – Filling application status	70
	F10 – Control filling	72
	F11 – Report filling state	74

F12 – Filling stability criteria configuration	75
F13 – Filling phase configuration	77
F14 – Automatic tare configuration	79
F15 – Digital output function configuration	80
F16 – Emptying function configuration	82
FCUT – Filter characteristics (cut-off frequency)	83
FSET – Reset all settings to factory defaults	84
I0 – Currently available MT-SICS commands	85
I1 – MT-SICS level and level versions	86
I2 – Device data (Type and capacity)	87
I3 – Software version number and type definition number	88
I4 – Serial number	89
I5 – Software material number	90
I10 – Device identification	91
I11 – Model designation	92
I14 – Device information	93
I15 – Uptime	95
I16 – Date of next service	96
I21 – Revision of assortment type tolerances	97
I26 – Operating mode after restart	98
I27 – Change history from parameter settings	99
I29 – Filter configuration	100
I32 – Voltage monitoring	101
I43 – Selectable units for host unit	102
I44 – Selectable units for display unit	103
I45 – Selectable environment filter settings	104
I46 – Selectable weighing modes	106
I48 – Initial zero range	107
I50 – Remaining weighing ranges	108
I51 – Power-on time	109
I52 – Auto zero activation settings	110
I53 – Ipv4 runtime network configuration information	111
I54 – Adjustment loads	113
I55 – Menu version	114
I56 – Scaled weight ramp value	115
I59 – Get initial zero information	117
I62 – Timeout	119
I65 – Total operating time	120
I66 – Total load weighed	121
I67 – Total number of weighings	122
I69 – Service provider address ASCII	123
I71 – One time adjustment status	124
I73 – Sign Off	125
I74 – GEO code at point of calibration - HighRes	126
I75 – GEO code at point of use - HighRes	127
I76 – Total number of voltage exceeds	128
I77 – Total number of load cycles	129
I78 – Zero deviation	131
I79 – Total number of zero deviation exceeds	132
I80 – Total number of temperature exceeds	133
I81 – Temperature gradient	135
I82 – Total number of temperature gradient exceeds	136
I83 – Software identification	138
K – Keys control	140
LST – Current user settings	143
M01 – Weighing mode	144
M02 – Environment condition	145

M03 – Auto zero function.....	146
M17 – ProFACT: Single time criteria	147
M18 – ProFACT/FACT: Temperature criterion.....	149
M19 – Adjustment weight	150
M20 – Test weight	151
M21 – Unit	152
M22 – Custom unit definitions.....	155
M23 – Readability, 1 d/xd	156
M27 – Adjustment history	157
M28 – Temperature value	158
M29 – Weighing value release	159
M31 – Operating mode after restart.....	160
M32 – ProFACT: Time criteria	161
M33 – ProFACT: Day of the week.....	162
M34 – MinWeigh: Method	163
M35 – Zeroing mode at startup	164
M38 – Selective parameter reset	165
M39 – SmartTrac: Graphic.....	166
M43 – Custom unit.....	167
M44 – Command executed after startup response	168
M45 – Electrical termination of RS422/ RS485 data lines.....	169
M47 – Frequently changed test weight settings.....	170
M48 – Infrequently changed test weight settings.....	172
M49 – Permanent tare mode.....	174
M66 – GWP: Certified test weight settings.....	175
M67 – Timeout.....	177
M68 – Behavior of serial interfaces	178
M69 – Ipv4 network configuration mode	179
M70 – Ipv4 host address and netmask for static configuration.....	181
M71 – Ipv4 default gateway address	183
M72 – Ipv4 DNS server address	185
M89 – Interface command set.....	187
M103 – RS422/485 driver mode	188
M109 – IPv4 device managed network configuration setting.....	189
M110 – Change display resolution	190
MOD – Various user modes	192
MONH – Monitor on interface	194
NID – Node Identification (for network protocols).....	195
NID2 – Device node ID.....	196
PROT – Protocol mode	197
PW – Piece counting: Piece weight	198
PWR – Switch on / Switch off	199
RO1 – Restart device.....	200
RDB – Readability.....	201
S – Stable weight value	202
SC – Send stable weight value or dynamic value after timeout.....	203
SI – Weight value immediately	204
SIC1 – Weight value with CRC16 immediately.....	205
SIC2 – HighRes weight value with CRC16 immediately	206
SIR – Weight value immediately and repeat	207
SIRU – Weight value in display unit immediately and repeat	208
SIS – Send netweight value with actual unit and weighing status.....	209
SIU – Weight value in display unit immediately	212
SIUM – Weight value in display unit and MinWeigh information immediately	213
SNR – Send stable weight value and repeat on stable weight change.....	214
SNRU – Send stable weight value with currently displayed unit and repeat on stable weight change.....	216

SR – Send stable weight value and repeat on any weight change	218
SRU – Send stable weight value with currently displayed unit and repeat on any weight change	220
ST – Stable weight value on pressing (Transfer) key	222
SU – Stable weight value in display unit	223
SUM – Stable weight value in display unit and MinWeigh information	224
T – Tare	225
TA – Tare weight value	226
TAC – Clear tare weight value	227
TC – Tare or tare immediately after timeout	228
TI – Tare immediately	230
TIM – Time	231
TST0 – Query/set test function settings	232
TST1 – Test according to current settings	233
TST2 – Test with external weight	235
TST3 – Test with internal weight	236
TST5 – Module test with built-in weights (scale placement sensitivity test)	237
UPD – Update rate of SIR and SIRU output on the host interface	239
USTB – User stability criteria	240
WMCF – Configuration of the weight monitoring functions	242
Z – Zero	244
ZC – Zero or zero immediately after timeout	245
ZI – Zero immediately	246
<hr/>	
4 What if...?	247
<hr/>	
5 Appendix	248
5.1 Framed protocol	248
<hr/>	
Index	251

1 Configuration tool

METTLER TOLEDO recommends APW-Link™ as a configuration tool

APW-Link™ is a Windows based software.

Features

- Configuration Tree for easy commissioning and parameterization
- Multiple, selectable languages
- Terminal with free configurable buttons
- Automatic baud rate search
- Connection over RS232, USB to RS232 converter and Ethernet TCP/IP possible
- Weight Display with Zeroing and Taring button
- Graph Display with zoom function and x-y Data
- Backup / Restore feature
- Supports all APW weigh modules
- Supported operating systems: Windows XP - Professional - SP3; Windows 7 - Professional / Enterprise / Ultimate; Windows 8 / 8.1 – Professional / Enterprise; Windows Server 2003 / 2010

Download

<http://www.mt.com/apw-link> APW-Link™ is free of charge but requires a registration before download.

2 Introduction

Real weighing applications have very wide-ranging requirements which can at some cases necessitate weighing up to several hundred tons and at some applications the demanded readability could be very fine, sometimes as low as one micro-gram. METTLER TOLEDO offers an extensive range of weighing devices in order to fulfill these versatile requirements. These weighing devices provide a simple interface for a quick integration with control systems. This integration is further facilitated by standardized commands which enable certain functions and operations. Throughout this document, the term "weigh module" is used to cover also the term "(weighing) bridge" which is operated without any terminal. The term "balance" denotes a weighing device in combination with a terminal.

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

Data interface at weigh module

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

Data exchange with the weigh module

Each command received by the balance via the data interface is acknowledged by a response of the weigh module or balance to the initial device.

Commands and balance responses are data strings with a fixed format, and will be described in detail in the commands.

The existing commands that are available can be called up using the [IO ▶ Page 85] command.

Note

Some of the commands work only via the built-in RS232 interface.

2.1 Command formats

Commands sent to the weigh module/balance comprise one or more characters of the ASCII character set. Here, the following must be noted:

	Enter commands only in uppercase. Nevertheless, units have to be capitalized properly.
_	The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec.).
"text"	The possible input for "text" is a sequence of characters (8-bit ASCII character set from 32 dec. to 255 dec.).
..CR LF	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 every time, but it is essential they be included for communication with the weigh module/balance.

2.1.1 Language conventions

Throughout this manual, the following conventions are used for command and response syntax:

< >	Triangle brackets indicate that you must specify a value for the enclosed parameter. The brackets are not sent with the command string.
[]	Square brackets indicate that the enclosed expression is optional and can be omitted. The brackets are not sent with the command string.
a..b	Intervals or ranges are represented using the "dot-dot" notation indicating the set of numbers from a to b including a and b.
↓	Commands sent to the weigh module/balance.

↑	Response of the weigh module/balance.
---	---------------------------------------

Example

Command to balance which writes Hello into the balance display:

↓	D_"Hello"	The quotation marks " " must be inserted in the entry
↑	D_A	Command executed successfully

The command terminator $C_{R_L F}$ is not shown.

2.1.2 Response formats

All responses sent by the weigh module/balance to the transmitter to acknowledge the received command have one of the following formats:

- Response with weight value
- Response without weight value
- Error message

2.1.2.1 Format of responses with weight value

Syntax

A general description of the response with weight value is the following.

<ID>	␣	<Status>	␣	<WeightValue>	␣	<Unit>	C _R	L _F
1-2 characters		1 character		10 characters		1-5 characters		

Parameters

Name	Type	Values	Meaning
<ID>	String		Response identification, refers to the invoking command
␣	Blank		Space (ASCII 32 dec.)
<Status>	Character	S	S table weight value
		M	Stable weight value, but below minimal weight ([SIUM ▶ Page 213] and [SUM ▶ Page 224] only)
		D	Unstable ("D" for D ynamic) weight value
		N	Unstable weight value, below minimal weight ([SIUM ▶ Page 213] and [SUM ▶ Page 224] only)
<WeightValue>	Float		Weighing result; shown as a number with 10 characters (after a blank/space!), including decimal point, and minus sign (-) directly in front of the first digit if the value is negative. The weight value appears right aligned. Preceding zeros are not shown except for the zero to the left of the decimal point. With METTLER TOLEDO DeltaRange balances, outside the fine range the last decimal place is shown as a space.
<Unit>	String		Weight unit as actually set under host unit
C _R	Byte		Carriage return (ASCII 13 dec.)
L _F	Byte		Line feed (ASCII 10 dec.)

Examples

Response with stable weight value of 14.256 g:

↓	S	Request a stable weight value.
↑	S_S_____14.256_g	

2.1.2.2 Format of responses without weight value

Syntax

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

<ID>	␣	<Status>	␣	Parameters...	C _R	L _F
1-5 characters		1 character				

Parameters

Name	Type	Values	Meaning
<ID>	String		Response identification, refers to the invoking command
␣	Blank		Space (ASCII 32 dec.)
<Status>	Character	A	Command executed successfully
		B	Command not yet terminated, additional responses following
Parameters...			Command-dependent response code
C _R	Byte		Carriage return (ASCII 13 dec.)
L _F	Byte		Line feed (ASCII 10 dec.)

Examples

Set the update rate to 20 weight values per second:

↓	UPD_20	
↑	UPD_A	Command executed successfully.

Query the actual update rate:

↓	UPD	
↑	UPD_A_18.3	Update rate is set to 18.3 values per second.

2.1.3 Error messages

2.1.3.1 Command-specific error messages

Syntax

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

<ID>	␣	<Status>	C _R	L _F
1-5 characters		1 character		

Parameters

Name	Type	Values	Meaning
<ID>	String		Response identification, refers to the invoking command
␣	Blank		Space (ASCII 32 dec.)
<Status>	Character	+	Weigh module or balance is in overload range (weighing range exceeded)
		-	Weigh module or balance is in underload range (e.g. weighing pan is not in place)
		L	Logical error (e.g. parameter not allowed)
		I	Internal error (e.g. balance not ready yet)
C _R	Byte		Carriage return (ASCII 13 dec.)
L _F	Byte		Line feed (ASCII 10 dec.)

Examples

Trial to set the update rate to 20 weight values per second:

↓	UPD_290	Update rate accidentally set to 290.
↑	UPD_L	Command not executed successfully; parameters is outside valid range.

Response while weigh module or balance is in overload range:

↓	SI	Request a weight value immediately.
↑	S_+	Overload; no weight value available.

2.1.3.2 General error messages

Syntax

There are three different error messages:

<ID>	C _R	L _F
2 characters		

Parameters

Name	Type	Values	Meaning
<ID>	String	ES	Syntax error: The weigh module/balance has not recognized the received command or the command is not allowed
		ET	Transmission error: The weigh module/balance has received a "faulty" command, e.g. owing to a parity error or interface break
		EL	Logical error: The weigh module/balance can not execute the received command
C _R	Byte		Carriage return (ASCII 13 dec.)
L _F	Byte		Line feed (ASCII 10 dec.)

Example

Trial to set the update rate to 20 weight values per second:

↓	UPD_290	Update accidentally set to 290.
↑	UPD_L	Command not executed successfully, parameters are outside valid range.

Response while weigh module is in overload:

↓	SI	Send current weight value.
↑	S_+	Overload; no weigh value available

2.1.4 Specific error messages on weight response

Description

If any error is detected in the system, it is no longer possible to get a weight value. In this case the weight value is overwritten with an error number and trigger code.

We recommend contacting your METTLER TOLEDO representative if any error occurs.

Syntax

The error message has the same format as the weight value (10 characters) and starts always with `S_S_`.

<code>S_S</code>	<code>_</code>	<code>.._</code>	Error	<code>_</code>	<ErrorNumber>	<ErrorTrigger>	<code>C_R</code>	<code>L_F</code>
		1-2 spaces			1-2 characters	1 character		
Total 10 characters (same as weight value) - Filled with spaces on the beginning								

Parameters

Name	Type	Values	Meaning
<ErrorNumber>	Integer	1	Boot error
		2	Brand error
		3	Checksum error
		9	Option fail
		10	EEPROM error
		11	Device mismatch
		12	Hot plug out
		14	Weight module / electronic mismatch
<ErrorTrigger>	String	b	Error from electronics (weigh module)
		t	Error from terminal
<code>C_R</code>	Byte		Carriage return (ASCII 13 dec.)
<code>L_F</code>	Byte		Line feed (ASCII 10 dec.)

Examples

↓	<code>SI</code>	Send current weight value.
↑	<code>S_S__Error_10b</code>	EERPOM error on the electronic unit occurred! Check if every thing is connected correctly. If any error occurs after power restart, contact your METTLER TOLEDO representative.
↓	<code>SIR</code>	Send current weight value at intervals.
↑	<code>S_S___Error_lt</code>	Boot error on the terminal occurred! If any error occurs after power restart, contact your METTLER TOLEDO representative.

2.2 Tips for programmers

Overview of command of specific models

This reference manual covers the MT-SICS commands for weigh modules/balances. As the weigh modules/balances can differ based on model and software version, not all the MT-SICS level 2 and 3 commands are usable on every model. We therefore recommend using the [IO ▶ Page 85] command to get an overview of all commands that are supported by a particular balance.

Planning the use of MT-SICS commands

Investigations of various applications have shown that the vast majority of all system solutions can be handled with the commands of MT-SICS level 0 and 1. This means for you: if you restrict yourself to the commands of MT-SICS level 0 and 1, you can expand your system with additional weigh modules, balances from METTLER TOLEDO without having to change your application programs.

Setup with / without terminal

Use the same setup during configuration and later use: If you intend to use the weigh module without the terminal, the configuration has to be done without terminal as well. Due to the system's architecture, the storage behavioral of configurations is different whether the terminal is attached to the bridge or not: With a terminal attached, configuration is stored in the terminal's memory; without a terminal attached, the bridge's memory is used. Removing a terminal after configuration means to remove the configuration and activation the bridge's (default) configuration. Adding a terminal after configuration means overriding the configuration with the one stored within the terminal.

Command and response

You can improve the dependability of your application software by having your program evaluate the response of the weigh module/balance to a command. The response is the acknowledgement that the weigh module/balance has received the command.

Cancel

To be able to start from a determined state, when establishing the communication between weigh module/balance and system, you should send a cancel command **see** [@ ▶ Page 15] to the weigh module/balance. When the balance or system is switched on or off, faulty characters can be received or sent.

Parameter values after switching the weigh module/balance on/off

The commands of the standard command are saved on the permanent memory of the weigh module/balance. This means that all values changed via the interface are saved when the weigh module/balance is switched off.

Several commands in succession

If several commands are sent in succession without waiting for the corresponding responses, it is possible that the weigh module/balance confuses the sequence of command processing or ignores entire commands.

METTLER TOLEDO DeltaRange balances and weigh modules

If the fine range of DeltaRange balances has been exceeded at the time of transmission, the weigh module/balance sends a weight value as balance response in which the tenth character is a space.

Update rate and timeout

The update rate for repeated commands and the duration of the timeout (time-limit function) depend on the weigh module/balance type; **see** technical data of the weigh module/balance in question.

Carriage Return, Line Feed

Depending on the platform, $C_R L_F$ is not just a "new line" (Java: "newLine()") or C/C++ "\n"):

Platform	'New Line'
DOS/Windows	$C_R L_F$
Macintosh	C_R
Unix	L_F

Nevertheless, all commands have to be closed by a $C_R L_F$ (dec: 13, 10; hex: 0D, 0A) which corresponds to "ENTER" in most human machine interfaces.

Quotation marks " "

Quotation marks included in the command must always be entered. If a quotation mark is located within the string, it may be attained by a backslash (\):

↓	D_"place 4\"filter!"	
↑	D_A	Balance display: place 4" filter!

Weight unit of weight value – host unit

It is always essential to consider the weight unit that is to be used to display weighing results. Depending on where the results are output, the weigh modules/balances offer the possibility of selecting a particular unit **see** [M21 ▶ Page 152]. This enables the displayed unit and info unit to be shown on the terminal. Host unit is used to output the weighing results via an interface (host) on the basis of MT-SICS commands. The weight values and the displayed unit can only be output by means of the `SU` commands.

Digit [d]

A digit refers to the smallest numerical increment a weigh module, balance can display – this is also referred to as the weigh modules/balance's readability. E.g. a WX205 has five decimal places; its digit is 0.01 mg. The digit is sometimes used as a generic unit.

Binary coded multiple selections

Some parameters that allow multiple selections are binary coded: Each possible selection is represented by one bit, the corresponding parameter equals to the decimal interpretation.

Selection 8	Selection 7	Selection 6	Selection 5	Selection 4	Selection 3	Selection 2	Selection 1	Parameter
0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0..255
$2^7 = 128$	$2^6 = 64$	$2^5 = 32$	$2^4 = 16$	$2^3 = 8$	$2^2 = 4$	$2^1 = 2$	$2^0 = 1$	$\sum_{i=1}^8 Selection_i \cdot 2^{i-1}$

Responses may easily be interpreted by converting the decimal number to binary again.

3 Commands and Responses

@ – Cancel

Description

@ can be used to achieve the same effect as disconnecting and reconnecting the power supply, which empties the volatile memories. The purpose of this command is to initiate a command sequence.

Syntax

Command

@	Resets the weigh module/balance to the condition found after switching on, but without a zero setting being performed.
---	--

Response

I4_A_ "<SNR>"	Serial number is emitted; the weigh module/balance is ready for operation.
---------------	--

Comments

- All commands awaiting responses are cancelled.
- Key control is set to the default setting K_1 .
- The tare memory is not reset to zero.
- If the balance is on standby, it is switched on.
- The cancel command is always executed.
- The emitted serial number corresponds to the serial number of the terminal (if one is present), **see** [I4 ▶ Page 89].

Example

↓	@	Cancel
↑	I4_A_ "B021002593"	Weigh module or balance is "reset", its serial number is B021002593.



See also

📄 I4 – Serial number ▶ Page 89

A01 – Percent weighing: Reference in %

Description

Use this command to set or query the reference value for percent weighing.

For querying to take place, a reference value must have been saved beforehand (A01 or function key  or ).

Syntax

Commands

A01	Query of the reference for the percent weighing application.
A01_<Reference>	Set the reference for the percent weighing application.

Responses

A01_A_<Reference>	Reference for the percent weighing application is set.
A01_B A01_A	Start to set the reference (waiting for stable weight) Command understood and executed successfully.
A01_I	Command understood but currently not executable.
A01_L	Command understood but not executable (e.g. percent weighing application is not active or parameter is incorrect) or no reference value present.
A01_E	Setting reference aborted (not stable, over- or underload, abort key,...).

Parameter

Name	Type	Values	Meaning
<Reference>	Float	(0) ... 100	Reference for the percent weighing application in %; must be greater than zero.

Comments

- This command can only be used when the application "Percent weighing" is started. For details on available applications and how to activate them, **see** M25 and M26.
- Use the `SU` commands for percent weighing. Otherwise, the results will be displayed in the set unit unless the host unit is changed to % using [M21 ▶ Page 152].

Example

↓	A01_100.00	Set the reference for percent weighing to 100.00%.
↑	A01_B	Reference is set, waiting for stable weight.
↑	A01_A	The reference for percent weighing is set to 100.00%.

A02 – Sample identification for samples in weighing application

Description

Use A02 to set or query an identification of a sample in weighing application.



Note

Syntax

Commands

A02	Query the identifications of a sample of the weighing application.
A02_<Index>	Query the sample number of the weighing application.
A02_<Index>_<"Identification">	Set the sample number and identification of the weighing application.

Responses

A02_B_<Index>_<"Identification"> A02_B...	Query the identifications of a sample of the weighing application.
A02_A_<Index>_<"Identification">	
A02_A	Command understood and executed successfully.
A02_I	Command understood but currently not executable.
A02_L	Command understood but not executable (e.g. weighing application is not active or parameter is incorrect).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	1 ... n	Sample number (n is product dependent)
<"Identification">	String	Max 60 chars	Identification of the sample

Comment

- This command only applies to the "Weighing" application. For details on available applications and how to activate them, **see** M25 and M26.

Examples

↓	A02	Query the identifications of a sample of the weighing application.
↑	A02_B_1_"12345"	The identification of sample 1 is "12345".
↑	A02_B_2_"67890"	The identification of sample 2 is "67890".
↑	A02_A_3_" "	No identification for sample 3 (empty string).
↓	A02_1_"98765"	Set the identification 1 to "98765".
↑	A02_A	The identification 1 is set to "98765".

A03 – Sample name for samples in weighing application

Description

Use A03 to assign an individual name to sample IDs, or query the current name.

Syntax

Commands

A03	Query the IDs name of the weighing application.
A03_<No>	Query of specific ID.
A03_<No>_<"ID">	Set the ID name of the weighing application.

Responses

A03_B_<No>_<"ID"> A03_B_<No>_<"ID"> A03_A_<No>_<"ID">	All existing ID names of the weighing application.
A03_A	Command understood and executed successfully.
A03_I	Command understood but currently not executable.
A03_L	Command understood but not executable (e.g. weighing application is not active or parameter is incorrect).

Parameters

Name	Type	Values	Meaning
<No>	Integer	1 ... n	Number of weighing ID name
<"ID">	String	Max 24 chars	String of weighing ID name

Comment

- This command applies to the "Weighing" application. For details on available applications and how to activate them, **see** M25 and M26.

Examples

↓	A03	Query the IDs name of the weighing application.
↑	A03_B_1_"Batch"	Name of ID1 is "Batch".
↑	A03_B_2_"Lot"	Name of ID2 is "Lot".
↑	A03_A_3_" "	Name of ID3 name is empty.
↓	A03_2	Query the second ID name of the weighing application.
↑	A03_A_2_"Lot"	Name of second ID is "Lot".
↓	A03_1_"Batch"	Set the ID1 name to "Batch".
↑	A03_A	Name of ID1 is set.

A10 – Nominal, +Tolerance, -Tolerance

Description

Use A10 to enter the nominal values, inc. +/- tolerances, or query the current values. As soon as you have specified the values, the SmartTrac changes and displays the graphic weighing-in aid.

Syntax

Commands

A10	Query of the nominal value, + tolerance, - tolerance.
A10_<No>_<Value>_<Unit>	Set the nominal value, + tolerance, - tolerance.

Responses

A10_B_0_<Value>_<Unit> A10_B_1_<Value>_<Unit> A10_A_2_<Value>_<Unit>	Query of the nominal value, + tolerance, - tolerance.
A10_A	Command understood and executed successfully.
A10_I	Command understood but currently not executable.
A10_L	Command understood but not executable.

Parameters

Name	Type	Values	Meaning
<No>	Integer	0	Nominal value
		1	+ tolerance
		2	- tolerance
<Value>	Float		Nominal value
<Unit>	String	Max 5 chars	Weight unit, % with +/- tolerances possible

Comments

- The values will be output differently depending on the application. For details on available applications and how to activate them, **see** M25 and M26.
- Specified nominal and tolerance values must be reset manually:
 - A10_0_0_g
 - A10_1_2.5_%
 - A10_2_2.5_%
- As soon as you have specified the values, the SmartTrac switches to the graphic weighing-in aid.
- Weight and percentage values are rounded, as is the case with values entered manually.

Examples

↓	A10	Query of the nominal value, + tolerance, - tolerance.
↑	A10_B_0_100.12_g	Current setting is nominal value 100.12 g, + tolerance is 5.25 g and - tolerance is 7.6%.
↑	A10_B_1_5.25_g	
↑	A10_A_2_7.6_%	
↓	A10_0_100.12_g	Set the nominal value to 100.12 g.
↑	A10_A	The nominal value is set 100.12 g.

A30 – Internal loads

Description

Use A30 to request status of internal loads. This command is used to inquire how many internal weights are available in the balance and its status.

Syntax

Commands

A30	Query of quantity and status of the internal loads.
A30_<Qty>	Place internal load.

Responses

A30_A_Qty_Stat	Quantity and status of the internal loads.
A30_I	Command understood but currently not executable.
A30_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Qty>	Integer		Number of internal loads
		0	No load placed
		1	Total load placed
		2	First partial load placed
		3	Second partial load placed
<Stat>	Integer		Status of internal weights
		0	No load placed
		1	Total load placed
		2	First partial load placed
		3	Second partial load placed
		8	Error
9	Not determined (not in defined end position)		

Comment

- The number of internal loads depends on the balance model.

Examples

↓	A30	Query of quantity and status of the internal loads.
↑	A30_A_1_0	There is only one internal load which is currently not placed.

Control of internal loads

↓	A30_1	Place total internal load.
↑	A30_A	The load is placed.

C – Cancel all commands

Description

Cancel all running commands.

Syntax

Command

C	Cancel running commands.
---	--------------------------

Responses

C_B	The cancel running command has been started.
C_A	Command understood and executed successfully.

Comments

- This command has a similar functionality as the command [@ ▶ Page 15] but responds with a well defined answer and does not fully reset the device.
- This command is executed always immediately.
- This command cancels all active and pending interface commands correctly and in a safe way on the interface where cancel was requested. This command does not cancel any commands or procedures that are not triggered by a SICS command.
- The command C responses with C_A after all active and pending interface commands have been terminated.
- This command is typically used for repeating commands such as [SIR ▶ Page 207] and for adjustment commands triggering a procedure.
- New procedures/command requests can be initiated right after a C_A.

Example

↓	C	Cancel running commands.
↑	C_B	Cancel running started.
↑	C_A	Command understood and executed successfully.

Command-specific error responses

Response

C_E_<Error>	Current error code.
-------------	---------------------

Parameter of command-specific error

Name	Type	Values	Meaning
<Error>	Integer	0	Error while canceling

C0 – Adjustment setting

Description

This command queries and sets the type of adjustment. Additional commands are required to actually trigger and to define the weight for external adjustment.

Syntax

Commands

C0	Query of the current adjustment setting.
C0_<Mode>_<WeightType>	Set the adjustment setting.

Responses

C0_A_<Mode>_<WeightType>_<"WeightValue_ Unit">	Weight value and unit specify the value of the weight for an external adjustment requested from the user via the display, see [C1 ▶ Page 24]. The unit corresponds to the factory setting of host unit, e.g. gram (g) with standard balances or carat (ct) with carat balances respectively. With internal adjustment, neither weight value nor unit appears.
C0_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
C0_A	Adjustment setting set successfully.
C0_L	Command understood but not executable (incorrect parameter; certified version of the balance).

Parameters

Name	Type	Values	Meaning
<Mode>	Integer	0	Mode = Manual The adjustment can only be triggered manually A change in the ambient conditions has no influence on the initiation of the calibration procedure
		1	Mode = Auto, status display "AutoCal" or "Cal" not activated When a considerable change in the ambient conditions is determined, the status display "AutoCal" or "Cal" will be activated; this means the balance will ask for adjustment
		2	Mode = Auto, status display "AutoCal" or "Cal" flashes The sensors built into the balance have determined a considerable change in the ambient conditions. The balance requests an adjustment or at least a test, see [TST ▶ Page 232] x commands
<WeightType>	Integer	0	Internal weight (factory setting)
		1	External weight
<2WeightValue">	String		Weight values specify the value of the weight for an external calibration requested from the user via the display or interface, see [C1 ▶ Page 24]
<"Unit">	String		The unit corresponds to the factory setting of host unit, e.g. gram (g)

Comments

- Setting `<Mode> = 1` and `<Weight> = 0` corresponds to the menu setting "ProFACT" / "FACT" under "Adjust/Test".
- [C2 ▶ Page 26] is independent of `c0`.
- The value of the external weight can be changed in the menu of the balance under "Adjust/Test ", **see** Reference Manual or with [M19 ▶ Page 150].
- Use [C1 ▶ Page 24] to start an adjustment defined with `c0`.
- `c0` must be reset manually; [`@` ▶ Page 15] has no effect.
- Check remaining ranges with [150 ▶ Page 108] command.
- The parameters are not stored permanently.

Examples

↓	<code>c0</code>	Query of the current status and setting of the adjustment.
↑	<code>c0_A_2_1_ " 100.000_g"</code>	Current setting of mode is "Auto". The ambient conditions of the balance have changed so much that the balance requests an adjustment (<code><Mode> = 2</code>) with the external weight (<code><Weight> = 1</code>). The adjustment is initiated with the command [C1 ▶ Page 24] and requires a weight of 100.000 g.
↑	<code>c2</code>	Start external adjustment, see responses of [C2 ▶ Page 26].
↑	<code>c0</code>	Query of the current status and setting of the adjustment.
↑	<code>c0_A_3_1_ " 100.000_g"</code>	Adjustment started.
↑	<code>c0</code>	Query of the current status and setting of the adjustment.
↑	<code>c0_A_4_1_ " 100.000_g"</code>	Adjustment successfully executed.
↓	<code>c0_0_1</code>	Set adjustment setting to manual and external.
↑	<code>c0_A</code>	Adjustment setting set.

See also

- 📖 M19 – Adjustment weight ▶ Page 150
- 📖 C2 – Start adjustment with external weight ▶ Page 26
- 📖 TST0 – Query/set test function settings ▶ Page 232
- 📖 TST1 – Test according to current settings ▶ Page 233

C1 – Start adjustment according to current settings

Description

c1 is used to trigger an adjustment as defined using the c0 command.

Syntax

Command

c1	Start the adjustment according to the current setting, see [C0 ▶ Page 22].
----	---

First Responses

C1_B	The adjustment procedure has been started. Wait for second response see Comments.
C1_I	Command understood but currently not executable (balance is currently executing another command). No further response follows.
C1_L	Command understood but not executable (e.g. approved version of the balance). No further response follows.

Further Responses

C1_<"WeightValue_Unit">	Weight request with external adjustment.
C1_A	Command understood and executed successfully.
C1_I	The adjustment was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

Parameters

Name	Type	Values	Meaning
<"WeightValue">	String		Weight values specify the value of the weight for a sensitivity adjustment requested from the user via the display or interface
<"Unit">	String		The unit corresponds to the definition unit, e.g. gram (g)

Comments

- Commands sent to the balance during the adjustment operation are not processed and responded to in the appropriate manner until the adjustment is at an end.
- Use [@ ▶ Page 15] to abort a running adjustment.
- The value of the external adjustment weight needed for adjustment must be set accordingly by an [M19 ▶ Page 150] command.
- Check remaining ranges with [I50 ▶ Page 108] command.

Example

↓	C1	Start the adjustment according to the current setting.
↑	C1_B	Adjustment operation started.
↑	C1_"_____0.00_g"	Prompt to unload the balance.
↑	C1_"____2000.00_g"	Prompt to load the adjustment weight of 2000.00 g.
↑	C1_"_____0.00_g"	Prompt to unload the balance.
↑	C1_A	Adjustment completed successfully.

See also

- 📄 CO – Adjustment setting ▶ Page 22
- 📄 M19 – Adjustment weight ▶ Page 150
- 📄 TST1 – Test according to current settings ▶ Page 233
- 📄 M19 – Adjustment weight ▶ Page 150

C2 – Start adjustment with external weight

Description

Regardless of the [C0 ▶ Page 22] setting, c2 carries out external adjustment with the reference weight defined in [M19 ▶ Page 150].

Syntax

Command

C2	Start the external adjustment. Query of the current weight used by means of the [M19 ▶ Page 150] command.
----	---

First Responses

C2_B	The adjustment procedure has been started.
C2_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
C2_L	Command understood but not executable (e.g. adjustment with an external weight is not admissible, certified version of the balance). No second response follows.

Further Responses

C2_<"WeightValue">_<Unit">	Prompt to unload or load the balance.
C2_A	Command understood and executed successfully.
C2_I	The adjustment was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

Parameters

Name	Type	Values	Meaning
<"WeightValue">	Float		Weight values specify the value of the weight for a sensitivity adjustment requested from the user via the display or interface
<"Unit">	String		The unit corresponds to the definition unit, e.g. gram (g)





Comments

- Commands sent to the balance during the adjustment operation are not processed and responded to in the appropriate manner until the adjustment is at an end.
- Use [@ ▶ Page 15] to abort a running adjustment.
- The value of the external adjustment weight needed for adjustment must be set accordingly by an [M19 ▶ Page 150] command.
- Check remaining ranges with [I50 ▶ Page 108] command.

Example

↓	C2	Start the external adjustment.
↑	C2_B	Adjustment operation started.
↑	C2_ "_____0.00_g"	Prompt to unload the balance.
↑	C2_ "_____2000.00_g"	Prompt to load adjustment weight 2000.00 g.
↑	C2_ "_____0.00_g"	Prompt to unload the balance.
↑	C2_A	Adjustment completed successfully.

See also

-  M19 – Adjustment weight ▶ Page 150
-  TST2 – Test with external weight ▶ Page 235
-  M19 – Adjustment weight ▶ Page 150
-  M19 – Adjustment weight ▶ Page 150

C3 – Start adjustment with internal weight

Description

You can use `C3` to start an internal adjustment procedure.

Syntax

Command

<code>C3</code>	Start the internal adjustment.
-----------------	--------------------------------

First Responses

<code>C3_B</code>	The adjustment procedure has been started. Wait for second response.
<code>C3_I</code>	Adjustment can not be performed at present as another operation is taking place. No second response follows.
<code>C3_L</code>	Adjustment operation not possible (e.g. no internal weight). No second response follows.

Further Responses

<code>C3_A</code>	Adjustment has been completed successfully.
<code>C3_I</code>	The adjustment was aborted as, e.g. stability not attained or the procedure was aborted with the C key.

Comments

- Commands sent to the balance during the adjustment operation are not processed and responded to in the appropriate manner until the adjustment is at an end.
- Use [`@` ▶ Page 15] to abort a running adjustment.
- Check remaining ranges with [`I50` ▶ Page 108] command.

Example

↓	<code>C3</code>	Start the internal adjustment.
↑	<code>C3_B</code>	Adjustment operation started.
↑	<code>C3_A</code>	Adjustment completed successfully.

See also

- ▣ TST3 – Test with internal weight ▶ Page 236

C4 – Standard / initial adjustment

Description

An initial adjustment is a procedure that determines a new adjustment factor between the built-in weight used for internal adjustment and the external weight defined by the [M19 ▶ Page 150] command. All internal adjustments following this procedure will show the same weighing results as if the adjustment were done with the external weight. The initial adjustment thus allows tuning of the internal adjustment of several weigh modules to one external weight standard.

Syntax

Command

C4	Start initial adjustment .
----	----------------------------

First Responses

C4_B	Initial adjustment procedure has been started. Wait for second response.
C4_I	Initial adjustment cannot be performed at present because another operation is taking place (e.g. zero setting or taring), or the current weight value is outside the permissible range.
C4_L	Command understood but not executable (parameter not allowed). No second response follows.

Further Responses

C4_<"WeightValue">_<"Unit">	Prompt to unload or load the weighing module.
C4_A	The adjustment has been completed successfully.
C4_I	The adjustment procedure was aborted because, e.g. the stability needed for this operation was not achieved within the timeout limit, or a wrong weight was loaded.

Parameters

Name	Type	Values	Meaning
<"WeightValue">	Float		Weight values specify the value of the weight for a sensitivity adjustment requested from the user via the display or interface
<"Unit">	String		The unit corresponds to the definition unit, e.g. gram (g)

Comments

- In order to perform an initial adjustment, the actual load seen by the weight module must be within plus/minus (2 g + 1% of weighing capacity) relative to the load when the weight module was switched on.
- The criterion that must be fulfilled to reach stability for initial adjustment depends on the type of the weigh module and cannot be changed.
- The timeout may be set using the [M67 ▶ Page 177] command.
- The value of the external adjustment weight needed for initial adjustment must be set accordingly by an [M19 ▶ Page 150] command if preload exists.
- The new factor determined by the initial adjustment procedure will be reset to the adjustment factor evaluated in the factory when the FSET_0 or FSET_1 command is performed. With FSET_2, the initial calibration by the user is retained.
- Check remaining ranges with [I50 ▶ Page 108] command.

Example

↓	C4	Start the internal adjustment.
---	----	--------------------------------

↑	C4_B	Adjustment operation started.
↑	C4_"100.0000_g"	Prompt to load weight of 100.0000 g used for initial adjustment.
↑	C4_"0.0000_g"	Prompt to unload the module.
↑	C4_A	Adjustment completed successfully.

C5 – Enabling/disabling step control

Description

Use C5 to enable and disable step control (user interaction) during the adjustment procedures triggered by the adjustment commands C6 – C8.

Syntax

Commands

C5	Query the status of the step control.
C5_<Status>	Enable / disable the step control.

Responses

C5_A_<Status>	Current status of the step control.
C5_A	Command understood and executed successfully.
C5_I	Command understood but currently not executable.
C5_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Status>	Integer	0	Step control is turned off (all adjustment procedures run without user interaction)
		1	Step control is turned on (all adjustment procedures which support step control need a user confirmation when the weight is placed on the pan)

Comments

- Adjustment methods using internal weights and adjustment commands without parameter 'Method' will ignore the state of C5 and only work without step control.
- Use the command I62 to read out the timeout for user interaction.

Example

↓	C5	Query the status of the step control.
↑	C5_A_1	Step control is enabled.

See also

- 📖 C6 – Customer linearization and sensitivity adjustment ▶ Page 32
- 📖 C7 – Customer standard calibration ▶ Page 35
- 📖 C8 – Sensitivity adjustment ▶ Page 38
- 📖 I62 – Timeout ▶ Page 119

C6 – Customer linearization and sensitivity adjustment

Description

Use C6 to start the adjustment of the customer linearization. With these measurement values also an adjustment of the customer sensitivity scaling is done.

Syntax

Commands

C6	Request the whole list of available methods.
C6_<Method>	Execute the command with or without the step control C5.
C6_<Method>_<Load>	Execute the command with or without the step control C5 and with the parameter <Load>.

Responses

C6_B_<Method> ...	Current list of available methods.
C6_A_<Method>	
C6_B C6_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C6_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> ... C6_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"DevPerMille"> C6_A	Content of a specific method without step control C5_0.
C6_B C6_C_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C6_C C6_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C6_C_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> ... C6_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"DevPerMille"> C6_A	Content of a specific method with step control C5_1.
C6_E_<Error>	Error occurred during the adjustment.
C6_A	Command understood and executed successfully.
C6_I	Command understood but currently not executable.
C6_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Method>	Integer	0, 2	0: use default method of the adjustment (=2) 2: Adjustment with external weights
<Load>	Float		Calibration load in the host unit (default using the M19 value). Load used in step control ('Execute C6_C Load') modifies the required weight value of the actual adjustment state

Name	Type	Values	Meaning
<Index>	Integer		Step number of the procedure
<State>	Char	R, D or C	Actual state of the adjustment process R = requesting external weight D = waiting for stability C = calibration deviation (procedure is finished, corrected calibration deviation is given in parameter "DevPerMille")
<WgtState>	Char	+, -, o	Actual weight state + load is above tolerances - load is below tolerances o (small omega) load is within tolerances
<"LoadInstruction">	String		Instruction, which load to place on the pan String with the load combination to place on the pan separated by "+". The string contains as many numbers as different loads are used in the procedure "0" = do not place the load "1" = place load 1 "1+2" = place load 1 and load 2 "0+2" = only place load 2
<"ValueHostUnit">	String		Load information of the actual adjustment state (weight and host unit)
<"DevPerMille">	String		Deviation of the measured calibration load (before adjustment) relative to the exact calibration load in per mille (‰). Value is rounded to the resolution of the finest range
<Error>	Integer	0, 1 or 2	Parameter showing the source of the error 0: Timeout 1: Cancel 2: Internal weight not supported

Comments

- The parameter <Load> and also the load value corrected with step control are tested against range definitions. A logic error (L) is returned for values violating the range definitions.
- The procedure can be canceled by command c.

Examples

↓	C6	Request the whole list of available methods
↑	C6_B_0 C6_A_2	Methods 0 and 2 are available. Other methods are not implemented

↓	C6_2	Start the linearization adjustment method 2 (without step control C5_0).
↑	C6_B C6_B_0_R_-"0+0"_"_____0.00_g" C6_B_0_D_o_"0+0"_"_____" C6_B_1_R_-"1+0"_"_____200.00_g" C6_B_1_D_o_"1+0"_"_____" C6_B_2_R_-"1+2"_"_____400.00_g" C6_B_2_D_o_"1+2"_"_____" C6_B_2_C_o_"1+2"_"0.23" C6_A	Linearization adjustment is started Request weight for first step. Capture weight of first step. Request weight of second step (ext. load L1). Capture weight of third step. Request weight of third step (ext. load L1+L2). Capture weight of third step. Corrected calibration deviation in per mille (‰). Linearization adjustment finished.
↓	C6_2_400	Start linearization adjustment method 2 with step control C5_1.
↑	C6_B C6_C_0_R_-"0+0"_"_____0.00_g"	Linearization adjustment is started . Request weight for first step (ext. & int. unload).
↑	C6_C	User confirms placed weight.
↑	C6_B_0_D_o_"0+0"_"_____" C6_C_1_R_-"1+0"_"_____200.00_g"	Capture weight of first step. Request weight for second step (ext. load L1).
↑	C6_C_220.00	User changes requested weight value.
↑	C6_C_1_R_-"1+0"_"_____220.00_g"	Request weight for second step (ext. load L1).
↑	C6_C	User confirms placed weight.
↑	C6_B_1_D_o_"1+0"_"_____" C6_C_2_R_-"1+2"_"_____400.00_g"	Capture weight of second step. Request weight for third step (ext. load L1+L2).
↑	C6_C	User confirms placed weight.
↑	C6_B_2_D_o_"1+2"_"_____" C6_B_2_C_o_"1+2"_"0.23" C6_A	Capture weight of third step. Corrected calibration deviation in per mille (‰) . Linearization adjustment finished.
↓	C6_2_400	Start linearization adjustment (method 2).
↑	C6_B C6_C_0_R_-"0+0"_"_____0.00_g"	Linearization adjustment is started. Request weight for first step (ext. & int. unload).
↑	C6_E_0	Timeout error response.

See also

- 📖 C – Cancel all commands ▶ Page 21
- 📖 C5 – Enabling/disabling step control ▶ Page 31

C7 – Customer standard calibration

Description

Use C7 to start the standard calibration which defines the exact weight value of the internal calibration loads.

Syntax

Commands

C7	Request the whole list of available methods.
C7_<Method>	Execute the command with or without the step control C5.
C7_<Method>_<Load>	Execute the command with or without the step control C5 and with the optional parameter <Load>.

Responses

C7_B_<Method> ... C7_A_<Method>	Current list of available methods.
C7_B C7_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C7_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> ... C7_A	Execute the command without step control C5_0 and with optional parameter <Load>.
C7_B C7_C_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C7_C C7_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C7_C_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C7_C_<Load> C7_C_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C7_C ... C7_A	Execute the command with step control C5_1 and with modifying a required weight value of one state during the adjustment. The state which is corrected is displayed again and must be confirmed by the operator.
C7_A	Command understood and executed successfully.
C7_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
C7_L	Command understood but not executable (incorrect parameter)

Parameters

Name	Type	Values	Meaning
<Method>	Integer	0 ... 2	List of available methods (model dependent)
		0	Use default method of the adjustment
		1 or 2	Method 1: For direct force translation (without lever arms) Method 2: For hybrid force translation (with lever arms)

Name	Type	Values	Meaning
<Load>	Float		Calibration load in the definition unit (default using the M19 value) Load used in step control (Execute C5_C_Load) modifies the required weight value of the actual adjustment state
<Index>	Integer		Step number of the procedure
<State>	Char	R or D	Actual state of the adjustment process R = requesting external weight D = waiting for stability
<WgtState>	Char	+, -, o	Actual weight state: + load is above tolerances - load is below tolerances o (small omega) load is within tolerances
<"LoadInstruction">	String	0	Instruction, which load to place on the pan String with the load combination to place on the pan separated by "+". The string contains as many numbers as different loads are used in the procedure. If the actual step uses internal weights, the string will be empty. <ul style="list-style-type: none"> • "0" = do not place the load • "1" = place load 1 • "1+2" = place load 1 and load 2 • "0+2" = only place load 2
<"ValueHostUnit">	String		Load information of the actual adjustment state (weight and host unit)

Comments

- The standard adjustment determines the exact weight of the internal load. Therefore the external adjustment load must be known exactly.
- If step control is enabled, the states which require external loads must be confirmed, the others are running automatically.
- The parameter <Load> and also the load value corrected with step control are tested against range definitions. A logic error (L) is returned for values violating the range definitions.
- The procedure can be canceled by command c.
- This command is equivalent to C4.

Examples

↓	C7	Request the whole list of available methods.
↑	C7_B_0 C7_A_1	Methods 0 and 1 are available. Other methods are not implemented or disabled.
↓	C7_1_400	Start the standard calibration procedure (method 1), without step control (automatic recognition of placed weights).

↑	C7_B C7_B_0_R_-"0"_"0.00_g" C7_B_0_D_o_"0"_" C7_B_1_D_o_"_" C7_B_2_D_o_"_" C7_B_3_R_-"1"_"400.00_g" C7_B_3_D_o_"1"_" C7_B_4_R_+"0"_"0.00_g" C7_B_4_D_o_"0"_" C7_B_5_D_o_"_" C7_B_6_D_o_"_" C7_A	Standard calibration is started. Request weight for first step (ext. & int. unload). Capture weight of first step. Capture weight of second step (int. push). Capture weight of third step (int. unload). Request weight for fourth step (ext. load L1). Capture weight of fourth step. Request weight for fifth step (ext. unload). Capture weight of fifth step. Capture weight of sixth step (int. load). Capture weight of seventh step (int. unload). Standard calibration finished.
↓	C7_1_400	Start the standard calibration procedure (method 1), with step control (user interaction).
↑	C7_B C7_C_0_R_-"0"_"0.00_g"	Standard calibration is started. Request weight for first step (ext. & int. unload).
↑	C7_C	User confirms placed weight.
↑	C7_B_0_D_o_"0"_" C7_B_1_D_o_"_" C7_B_2_D_o_"_" C7_C_3_R_-"1"_"400.00_g"	Capture weight of first step. Capture weight of second step (int. push). Capture weight of third step (int. unload). Request weight for fourth step (ext. load L1).
↑	C7_C	User confirms placed weight.
↑	C7_B_3_D_o_"1"_" C7_C_4_R_+"0"_"0.00_g"	Capture weight of fourth step. Request weight for fifth step (ext. unload).
↑	C7_C	User confirms placed weight.
↑	C7_B_4_D_o_"0"_" C7_B_5_D_o_"_" C7_B_6_D_o_"_" C7_A	Capture weight of fifth step. Capture weight of sixth step (int. load). Capture weight of seventh step (int. unload). Standard calibration finished.

See also

- 📖 C – Cancel all commands ▶ Page 21
- 📖 C5 – Enabling/disabling step control ▶ Page 31

C8 – Sensitivity adjustment

Description

Use C8 to start the customer adjustment of the sensitivity scaling (internal and external).

Syntax

Commands

C8	Request the whole list of available methods.
C8_<Method>	Execute the command with or without the step control C5.
C8_<Method>_<Load>	Execute the command with optional parameter <Load>.

Responses

C8_B_<Method> ... C8_A_<Method>	Current list of available methods.
C8_B C8_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C8_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> ... C8_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"DevPerMille"> C8_A	Content of a specific method.
C8_A	Command understood and executed successfully.
C8_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
C8_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Method>	Integer	0, 1 or 2	0: use default method of the adjustment 1: internal adjustment 2: external adjustment
<Load>	Float		Calibration load in the host unit. The parameter 'Load' is optional; by default the parameter <Load> is preset by the device using the M19 definition Load used in step control (Execute C8_C_Load) modifies the required weight value of the actual adjustment state
<Index>	Integer		Step number of the procedure
<State>	Char	R, D or C	Actual state of the adjustment process R = requesting external weight D = waiting for stability C = calibration deviation (procedure is finished, corrected calibration deviation is given in parameter "DevPerMille")

↓	C8_2_400	Start the external sensitivity adjustment procedure (method 2), without step control (automatic recognition of placed weights).
↑	C8_B C8_B_0_R_0"0" "0.00_g" C8_B_0_D_0"0" " " C8_B_1_R_1"1" "400.00_g" C8_B_1_D_1"1" " " C8_B_1_C_1"1" "0.23" C8_A	Sensitivity adjustment is started. Request weight for first step (ext. & int. unload). Capture weight of first step. Request weight for second step (ext. load L1). Capture weight of second step. Corrected calibration deviation in per mille (‰). Sensitivity adjustment finished.
↓	C8_2_400	Start the external sensitivity adjustment procedure (method 2), with step control (user interaction).
↑	C8_B C8_C_0_R_0"0" "0.00_g"	Sensitivity adjustment is started. Request weight for first step (ext. & int. unload).
↑	C8_C	User confirms placed weight.
↑	C8_B_0_D_0"0" " " C8_C_1_R_1"1" "400.00_g"	Capture weight of first step. Request weight for second step (ext. load L1).
↑	C8_C	User confirms placed weight.
↑	C8_B_1_D_1"1" " " C8_B_1_C_1"1" "0.23" C8_A	Capture weight of second step. Corrected calibration deviation in per mille (‰). Sensitivity adjustment finished.
↓	C8_2_400	Start the external sensitivity adjustment procedure (method 2).
↑	C8_B C8_C_0_R_0"0" "0.00_g"	Sensitivity adjustment is started. Request weight for first step (ext. & int. unload).
↑	C8_E_0	Timeout error response.

See also

- 📖 C – Cancel all commands ▶ Page 21
- 📖 C5 – Enabling/disabling step control ▶ Page 31
- 📖 M19 – Adjustment weight ▶ Page 150

C9 – Scale placement sensitivity adjustment

Description

Start the adjustment of the scale placement sensitivity scaling. If this adjustment is used, make sure to trigger it before any subsequent adjustment in the signal processing chain since it does not reset subsequent signal processing parameters!

This command is only available for weigh modules with external lever system that is not part of the factory adjustment of the load cell. For this kind of weigh modules, this command replaces the factory standard adjustment by service technician.

Syntax

Commands

C9	Request the whole list of available methods.
C9_<Method>	Execute the command according to a predefined method.

Responses

C9_B_<Method> ... C9_A_<Method>	Current list of available methods.
C9_B C9_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> C9_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"ValueHostUnit"> ... C9_B_<Index>_<State>_<WgtState>_ <"LoadInstruction">_<"DevPerMille"> C9_A	Content of a specific method.
C9_A	Command understood and executed successfully.
C9_I	Command understood but currently not executable.
C9_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Method>	Integer	0, 1 or 2	Method = 0: use default method of the adjustment. If default method is not defined, method 1 or method 2 is used, depending on the availability of internal weights
<Index>	Integer		Step number of the procedure
<State>	Char	R, D or C	Actual state of the adjustment process R = requesting external weight D = waiting for stability C = sensitivity deviation (procedure is finished, corrected sensitivity deviation is given in parameter "DevPerMille")
<WgtState>	Char	+, -, o	Actual weight state: + load is above tolerances - load is below tolerances o (small omega) load is within tolerances

Name	Type	Values	Meaning
<"LoadInstruction">	String		<p>Instruction, which load to place on the pan</p> <p>String with the load combination to place on the pan separated by "+". The string contains as many numbers as different loads are used in the procedure. If the actual step uses internal weights, the string will be empty</p> <p>Examples for two loads</p> <p>"0+0" = do not place the load</p> <p>"1+0" = place load 1</p> <p>"1+2" = place load 1 and load 2</p> <p>"0+2" = only place load 2</p> <p>Examples for four loads:</p> <p>"0+0+0+0" = do not place the load</p> <p>"1+0+0+0" = place load 1</p> <p>"1+2+0+0" = place load 1 and load 2</p> <p>"0+2+0+0" = only place load 2</p> <p>"1+2+3+4" = place load 1, load 2, load 3 and load 4</p>
<"ValueHostUnit">	String		Load information of the actual adjustment state (weight and unit) in host units (M_{21}) with the maximum displayed decimal places
<"DevPerMille">	String		Deviation of the measured calibration load (before adjustment) relative to the exact calibration load in per mille (‰). Value is rounded to the resolution of the finest range

Comments

This command is used to perform a sensitivity adjustment. This operation performs a sensitivity adjustment without modifying the adjustment parameters of subsequent signal processing blocks. This is needed; when the linearity and the sensitivity of an external lever system are corrected with scaling blocks later in the signal processing chain (e.g. scale production adjustment).

- Method 1 of this command is an internal sensitivity adjustment. This adjustment does not reset block parameters of following SP blocks! Therefore be sure to trigger this adjustment before any adjustment of subsequent SP blocks. Otherwise do not use this adjustment!
- This adjustment can be canceled by the command c.

Examples

↓	C9	Request the whole list of available methods.
↑	C9_B_0 C9_A_1	Methods 0 and 1 are available. Other methods are not implemented or have been disabled.
↓	C9_1	Start the internal sensitivity adjustment procedure (method 1).
↑	C9_B C9_B_0_R_-" " "0.00_g" C9_B_0_D_o_-"0" " " C9_B_1_D_o_-" " " C9_B_2_D_o_-" " " C9_B_3_D_o_-"1" " " C9_B_4_D_o_-"0" " " C9_B_4_C_o_-"0" " "0.23" C9_A	<p>Sensitivity adjustment is started.</p> <p>Request weight for first step (ext. & int. unload).</p> <p>Capture weight of first step.</p> <p>Capture weight of second step (int. push).</p> <p>Capture weight of third step (int. unload).</p> <p>Capture weight of fourth step (int. load L1).</p> <p>Capture weight of fifth step (int. unload).</p> <p>Corrected calibration deviation in per mille (‰).</p> <p>Sensitivity adjustment finished.</p>

Error codes

0: Timeout

1: Cancel

2: Internal weight not supported

COM – Parameters of the serial interfaces

Description

You can use this command to define the connection parameters of the serial interfaces (e.g. RS232, RS422).

Syntax

Commands

COM	Query of the existing interface settings.
COM_<Port>_<Baud>_<Bit>_<HS>	Set parameters of the specified interface to desired values.

Responses

COM_B_<Port>_<Baud>_<Bit>_<HS> ... COM_A_<Port>_<Baud>_<Bit>_<HS>	Current communication parameters.
COM_A	Command executed successfully.
COM_I	Command understood but not executable (e.g. update rate is too high for the selected baud rate, see comments).
COM_L	Command understood but not executable (e.g. parameter incorrect).

Parameters

Name	Type	Values	Meaning
<Port>	Integer	0	Built-in RS232 interface
		1	Built-in RS422 interface
<Baud>	Integer	0	150 baud
		1	300 baud
		2	600 baud
		3	1200 baud
		4	2400 baud
		5	4800 baud
		6	9600 baud (factory setting)
		7	19200 baud
<Bit>	Integer		Bits / Parity / Stop bits
		0	7 / Even / 1
		1	7 / Odd / 1
		2	7 / None / 1
		3	8 / None / 1 (factory setting)
		4	7 / Even / 2
		5	7 / Odd / 2
		6	7 / None / 2
<HS>	Integer	0	No handshake (factory setting)
		1	Software handshake (Xoff – Xon controlled protocol)
		2	Hardware handshake (CTS – RTS controlled protocol)

Comments

- Command only available without a connected terminal.

- If an option is present in the system, the host is automatically assigned to that interface and the `COM` command is not available anymore.
- The answer is returned with the current settings, the settings are changed afterwards.
- No values other than those specified must be used; otherwise, uncontrollable settings may result.
- When adjusting the values, the connection parameters of the connected communication partner must also be adjusted. Otherwise, it will not be possible to establish any further communication.
- It is recommended to check the parity bit in the communication of the weighing device with the control system (PLC) in order to see whether there is any error in the transmission.
- Transmission errors might become more likely as the baud rate of the communication is increased.

Examples

↓	<code>COM</code>	Send current settings for interface parameters for all present interfaces.
↑	<code>COM_B_0_6_3_0</code>	RS232 is set to 9600 baud, 8 bits, no parity, 1 stop bit, no handshake.
↓	<code>COM_0_8_3_0</code>	Setting the parameters for the serial interface to 38400 baud, 8 data bits, no parity, 1 stop bit, no handshake.
↑	<code>COM_A</code>	Parameters successfully set to desired values.

D – Write text to display

Description

Use `D` to write text to the balance display.

Syntax

Command

<code>D_<Text></code>	Write text into the balance display.
-----------------------------	--------------------------------------

Responses

<code>D_A</code>	Command understood and executed successfully: Text appears left-aligned in the balance display marked by a symbol, e.g. <code>*</code> .
<code>D_I</code>	Command understood but currently not executable.
<code>D_L</code>	Command understood but not executable (incorrect parameter or balance with no display).

Parameter

Name	Type	Values	Meaning
<code><Text></code>	String		Text on the balance display

Comments

- A symbol in the display, e.g. `*` indicates that the balance is not displaying a weight value.
- The maximum number of characters of "text" visible in the display depends on the balance type. If the maximum number of characters is exceeded, the text disappears on the right side.
- Quotation marks can be displayed as indicated in chapter 1.1.3.

Examples

↓	<code>D_ "HELLO"</code>	Write HELLO into the balance display.
↑	<code>D_A</code>	The full text HELLO appears in the balance display.
↓	<code>D_ " "</code>	Clear the balance display.
↑	<code>D_A</code>	Balance display cleared, marked by a symbol, e. g. <code>*</code> .

See also

📖 DW – Show weight ▶ Page 54

DAT – Date

Description

Set or query the balance system date.

Syntax

Commands

DAT	Query of the current date of the balance.
DAT_<Day>_<Month>_<Year>	Set the date of the balance.

Responses

DAT_A_<Day>_<Month>_<Year>	Current date of the balance.
DAT_A	Command understood and executed successfully.
DAT_I	Command understood but currently not executable (balance is currently executing another command).
DAT_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Day>	Integer	01 ... 31	Day
<Month>	Integer	01 ... 12	Month
<Year>	Integer	2000 ... 2099	Year

Example

↓	DAT	Query of the current date of the balance.
↑	DAT_A_01_10_2017	The date of the balance is 1st October 2017.

See also

📖 TIM – Time ▶ Page 231

DIN – Configuration for digital inputs

Description

Set or query the configuration for the digital inputs.

Syntax

Commands

DIN	Query of the configuration for the digital inputs.
DIN_<Input>_<"Command">_<Transition>_<Interface>	Set the configuration for the digital input.

Responses

DIN_B_<Input>_<"Command">_<Transition>_<Interface> DIN_B... DIN_A_<Input>_<"Command">_<Transition>_<Interface>	Current configuration for the digital input.
DIN_A	Command understood and executed successfully.
DIN_I	Command understood but currently not executable.
DIN_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Input>	Integer	1 ... n	Number of digital input
<"Command">	String	max. 64 chars	MT-SICS command
<Transition>	Integer	0: rising edge 1: falling edge	Transition of the input signal
<Interface>	integer	0 ... n	Number of Interface, Interface number, see [COM ▶ Page 44]

Comments

- Only one event can be programmed on each digital input.
- Nonsense "Command" leads to an `ES` on the specified interface.

Example

↓	DIN	Query the current configuration for the digital input.
↑	DIN_A_2_"SI"_1_1	The command "SI" will be executed on the interface 1 by falling edge on digital input number 2.

DIS – Digital input status

Description

Use DIS to ask the actual status of the digital input ports. The number of input ports is dependent on the product model type.

Syntax

Commands

DIS	Query the status of all available input ports.
DIS_<Input>	Query the status of a specific input port.

Responses

DIS_B_<Input>_<Status>	Current status for all available input ports.
DIS_B...	
DIS_A_<Input>_<Status>	Current status of a specific input port.
DIS_I	Command understood but currently not executable.
DIS_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Input>	Integer	1 ... n	Number of the input port
<Status>	Boolean	0: off 1: on	Status of the input port

Comments

- This command returns the Boolean status of the queried input port(s).
- If the product has no physical input ports, this command returns the status of the logical input ports.

Examples

↓	DIS	Query the status of all available input ports.
↑	DIS_B_1_1	Current status for all available input ports.
	DIS_B_2_1	
	DIS_A_3_1	
↓	DIS_1	Query the status of the input port-1.
↑	DIS_A_1_1	Current status of the input port-1 is "1".

See also

📖 DIN – Configuration for digital inputs ▶ Page 48

DOS – Digital output status

Description

Use `DOS` to ask the actual status of the digital output ports. The number of output ports is dependent on the product model type.

Syntax

Commands

<code>DOS</code>	Query the status of all available output ports.
<code>DOS_<Output></code>	Query the status of a specific output port.

Responses

<code>DOS_B_<Output>_<Status></code>	Current status for all available output ports.
<code>DOS_B...</code> <code>DOS_A_<Output>_<Status></code>	
<code>DOS_A_<Output>_<Status></code>	Current status of a specific output port.
<code>DOS_I</code>	Command understood but currently not executable.
<code>DOS_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<code><Output></code>	Integer	1 ... n	Number of the output port
<code><Status></code>	Boolean	0: off 1: on	Status of the output port

Comments

- This command returns the boolean status of the queried output port(s).
- If the product has no physical output ports, this command returns the status of the logical output ports.

Examples

↓	<code>DOS</code>	Query the status of all available output ports.
↑	<code>DOS_B_1_0</code> <code>DOS_B_2_0</code> <code>DOS_B_3_0</code> <code>DOS_B_4_0</code> <code>DOS_A_5_0</code>	Current status for all available output ports.
↓	<code>DOS_1</code>	Query the status of the output port-1.
↑	<code>DOS_A_1_0</code>	Current status of the output port-1 is "0".

See also

- 📖 F01 – Automatic prefilling configuration ▶ Page 59
- 📖 F13 – Filling phase configuration ▶ Page 77
- 📖 F15 – Digital output function configuration ▶ Page 80

DOT – Configuration for digital outputs

Description

Set or query the configuration for the digital outputs.

Syntax

Commands

DOT	Query of the current configuration for the digital outputs.
DOT_<Output>_<Duration>_<Delay>	Set the configuration for the digital outputs.

Responses

DOT_B_<Output>_<Duration>_<Delay> DOT_B... DOT_A_<Output>_<Duration>_<Delay>	Current configuration for the digital output.
DOT_A	Command understood and executed successfully.
DOT_I	Command understood but currently not executable.
DOT_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Output>	Integer	1 ... n	Number of digital output
<Duration>	String	10 ... 65535 ms	Duration time in ms
<Delay>	Integer	0 ... 65535 ms	Delay time in ms

Comments

- Only one event can be programmed on each digital output.
- The timing resolution: duration and delay are rounded up to the system resolution (usually 8 or 10 ms).

Example

↓	DOT	Query the current configuration for the digital output.
↑	DOT_A_2_500_100	The digital output number 2 will increase the voltage for a duration of 500 ms with a delay of 100 ms. Digital outputs can be set with the commands: [DOTC ▶ Page 52], DOTP and [WMCF ▶ Page 242].

See also

- 📖 DOTC – Configurable digital outputs – Weight monitor ▶ Page 52
- 📖 WMCF – Configuration of the weight monitoring functions ▶ Page 242

DOTC – Configurable digital outputs – Weight monitor

Description

Use DOTC for weight monitoring functionality for dosing or check weighing application. Benefit is that this function works without a PC or PLC.

Syntax

Commands

DOTC	Query of the current configuration for the weight monitor.
DOTC_<Output>_<Active>	Set the configuration for the weight monitor.
DOTC_<Output>_<Active>_<Interface>_<TargetValue>_<TargetUnit>_<Tol->_<TolUnit>_<Tol+>_<TolUnit>_<State>	Set the configuration for the weight monitor.

Responses

DOTC_B_<Output>_<Active> DOTC_B... DOTC_A_<Output>_<Active>	Current configuration for the weight monitor.
DOTC_B_<Output>_<Active>_<Interface>_<-TargetValue>_<TargetUnit>_<Tol->_<TolUnit>_<Tol+>_<TolUnit>_<State> DOTC_B... DOTC_A_<Output>_<Active>_<Interface>_<-TargetValue>_<TargetUnit>_<Tol->_<TolUnit>_<Tol+>_<TolUnit>_<State>	Current configuration for the weight monitor.
DOTC_A	Command understood and executed successfully.
DOTC_I	Command understood but currently not executable.
DOTC_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Output>	Integer	1 ... n	Number of digital output
<Active>	Boolean	1 = on 0 = off	Command on DOT (n) active
<Interface>	Integer	0 ... n	Observed interface, Interface number, see [COM ▶ Page 44]
<TargetValue>	Float		Target value
<TargetUnit>	String		Target unit, only available units permitted
<Tol-> <Tol+>	Float		Tolerance
<TolUnit>	String		Tolerance unit, available units and % permitted
<State>	String	S = only stable values D = only dynamic values A = all values, S and D	Trigger for the value state

Comments

- Digital output must be available.

- Only one command `DOTC(n)`, `DOTP(n)` or [WMCF ▶ Page 242] can be configured for the same digital output.
- Duration and delay from the digital output must be defined with the command [DOT ▶ Page 51].
- Target value will be rounded to the defined resolution from the load cell.
- Target unit only allowed units are permitted.
- The weight value monitoring function works only with a weight value command (e.g. `SI`, `SIR`).
- The update rate depends on the defined UPD rate.
- Tol- and Tol+ defined as % reference to the target value.
- Only allowed units are permitted, **see** [M21 ▶ Page 152].

Examples

↓	<code>DOTC_2</code>	Query the current configuration for the weight monitor on the second digital output (<code>DOT_2</code>).
↑	<code>DOTC_A_2_1_0_100_g_5_%_10_g_S</code>	<code>DOT_2</code> will be set on every stable weight value on Interface 0 between 100 g – 5 % +10 g.
↓	<code>DOTC_3_1_1_300_g_5_mg_1_g_A</code>	Set the following configuration for the third digital output (<code>DOT_3</code>): <code>DOT_3</code> will be set on every value (stable and unstable) on Interface 1 between 300 g -5 mg +1 g.
↑	<code>DOTC_A</code>	Command understood and executed successfully.
↓	<code>DOTC_1_0</code>	Deactivate <code>DOTC</code> on digital output 1 (<code>DOT_1</code>). Other settings like interface, TargetValue,... will be unchanged.
↑	<code>DOTC_A</code>	Command understood and executed successfully.
↓	<code>DOTC_1_1</code>	Activate <code>DOTC</code> on digital output 1 (<code>DOT_1</code>). Old settings will be used or default if newer defined.
↑	<code>DOTC_A</code>	Command understood and executed successfully.

See also

- 📄 DOT – Configuration for digital outputs ▶ Page 51
- 📄 WMCF – Configuration of the weight monitoring functions ▶ Page 242

DW – Show weight

Description

Writes the current weight value to the balance display using the set unit. This command is used to reset the display after using the `D` command.

Syntax

Command

DW	Switch the main display to weight mode.
----	---

Responses

DW_A	Command understood and executed successfully: Main display shows the current weight value.
DW_I	Command understood but currently not executable.

Comment

- DW resets the balance display following a [`D` ▶ Page 46] command.

Example

↓	DW	Switch the main display to weight mode.
↑	DW_A	Main display shows the current weight value.

See also

- 📄 `D` – Write text to display ▶ Page 46

E01 – Current system error state

Description

This command queries severe and fatal system errors.

Syntax

Command

E01	Query of the current system error state.
-----	--

Responses

E01_<ErrorCode>_<"ErrorMessage">	Current error code and message.
E01_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<ErrorCode>	Integer	0	No error
		4	EEPROM error
		5	Wrong cell data
		6	No standard calibration
		7	Program memory defect
		9	Temperature sensor defect
		16	Wrong load cell brand
		17	Wrong type data set
		100	Memory full
		101	Battery backup lost
<"ErrorMessage">	String	128 chars	Error text message in UTF-8

Comments

- UTF-8 is ASCII compatible if only the code of the first 127 characters is used.
- The ErrorMessage is language dependent and can be switched by M15.
- The error code and message will change as soon as the device detects an other state i.e. after a restart or reset.
- If the device is able to detect multiple error s in parallel then only the most critical error (lowest error number) is stated.

Example

↓	E01	Query of the current system error state.
↑	E01_101_"БАТАРЕЯ_СЕЛА_ _ПРОВЕРЬ_ДАТУ_И_ВРЕМЯ"	The last device error is "BATTERY BACKUP LOST - CHECK DATE TIME SETTINGS". The selected language is Russian.

E02 – Weighing device errors and warnings

Description

Use E02 to ask the active errors and warnings of the weighing device. The list of the errors and warnings is always product-specific.

Syntax

Command

E02	Query active errors and warnings of the weighing device.
-----	--

Responses

E02_<ErrorCode>	Weighing device returns the error code.
E02_I	Command understood but currently not executable.

Parameter

Name	Type	Values	Meaning
<ErrorCode>	Bit set (32 bits)	$ErrorCode = \sum 2^{Bit}$	Error code including all device errors and warnings

Comments

- This command returns the error code of the weighing device which is a combination of bits for active errors and warnings. Error code of the device is calculated according to the following formula, where bits represent the respective warnings and error conditions:

$$ErrorCode = \sum 2^{Bit}$$

- The list of errors and warnings is always product-specific. Refer to the corresponding user manual of the product for a complete list of device errors and warnings.

The bits for the warning and error conditions are explained in the table below. SLP85xD load cells are taken as example:

Bit	Error Code	Meaning	Error / Warning Condition	Weighing Response
0	10	Non-volatile data memory error (EEPROM)	Error during read/write process	Send the error code instead of the weight value Example: s_s_102
1	102	Zero drift error	Zero drift (actual zero compared to user calibrated zero) > 10% of maximum capacity	
2	103	Supply voltage error	Supply voltage > 33V	
3	104	PCBA temperature error	PCBA (main board) temperature > 80 °C	

Bit	Error Code	Meaning	Error / Warning Condition	Weighing Response
4	200	Measuring sensor temperature warning	Temperature of the measuring sensor is out of the compensated range [-10 °C ... 40 °C]	Send weight value Example: S_S_10_g
5	201	Measuring sensor temperature gradient warning	Temperature change of the measuring sensor is out of tolerance ($\Delta T / \Delta t > 0.5 \text{ °C} / 60 \text{ s}$)	
6	202	PCBA temperature warning	70 °C < PCBA (main board) temperature < 80 °C	
7	203	Supply voltage warning	Supply voltage is out of tolerances [10V ... 30V]	
8	204	Zero drift warning	1% of max. cap. < zero drift (actual zero compared to user calibrated zero) < 10% of max. cap.	
9	205	Load cell overload	Weight value > Maximum capacity	
11 ... 31	0	Reserved for future use	None	

Examples

↓	E02	Query active errors and warnings of the weighing device.
↑	E02_A_8	PCBA (main board) temperature is higher than 80 °C. Device returns the error code 104 to weight request commands.
↓	E02	Query active errors and warnings of the weighing device.
↑	E02_A_102 (2 ⁶ + 2 ⁷)	PCBA (main board) temperature is higher than 70 °C and supply voltage is out of tolerances.

See also

📖 E03 – Current system errors and warnings ▶ Page 58

E03 – Current system errors and warnings

Description

Use E03 to ask the current errors and warnings of the weighing device together with the error code and the error message.

Syntax

Command

E03	Query current errors and warnings of the weighing device.
-----	---

Responses

E03_A_<Index>_<Code>_<Message>	Weighing device returns the error code and the error message.
E03_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 ... 31	Index for the error code and message
<Code>	Integer	0	No error
		10	Non-volatile data memory error (EEPROM)
		102	Zero drift error
		103	Supply voltage error
		104	PCBA temperature error
		200	Measuring sensor temperature warning
		201	Measuring sensor temperature gradient warning
		202	PCBA temperature warning
		203	Supply voltage warning
		204	Zero drift warning
205	Load cell overload		
<Message>	String	128 chars	Error text message in UTF-8

Comment

- UTF-8 is ASCII compatible if only the code of the first 127 characters is used.

Examples

↓	E03	Query current errors and warnings of the weighing device.
↑	E03_A_0_0_"No error"	Weighing device returns the error code and the error message.
↓	E03	Query current errors and warnings of the weighing device.
↑	E03_B_0_104_"PCBA temperature error"	Weighing device returns active error codes and corresponding messages.
	E03_A_1_203_"Supply voltage warning"	

See also

- 📖 E02 – Weighing device errors and warnings ▶ Page 56

F01 – Automatic prefilling configuration

Description

Use F01 to activate or deactivate the prefilling process, to assign digital outputs to the prefilling process and to set the prefilling duration.

Syntax

Commands

F01	Query the current configuration for automatic prefilling function.
F01_<Active>_<OutputOn>_<Duration>	Set the configuration for the automatic prefilling function.

Responses

F01_A_<Active>_<OutputOn>_<Duration>	Current configuration for automatic prefilling function.
F01_A	Command understood and executed successfully.
F01_I	Command understood but currently not executable.
F01_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Active>	Boolean	0: off 1: on	Activate / deactivate the prefilling function
<OutputOn>	Bit set (8 bits)	$OutputOn = \sum_{output\ ports\ on} 2^{Bit}$	Set of digital outputs which will remain high during prefilling
<Duration>	Float	0 ... 65535 ms	Prefilling duration

Comments

- Target of the prefilling is to start the filling process with a low speed in order to avoid the foaming of the liquid in-side the container.
- <OutputOn> defines which output ports are assigned to the prefilling process. This parameter is calculated as a bit set. See the table below for the definition of the bit set:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output-8	Output-7	Output-6	Output-5	Output-4	Output-3	Output-2	Output-1

Examples

↓	F01	Query the current configuration for automatic prefilling function.
↑	F01_A_1_12_500	Prefilling is activated and the digital outputs 3 and 4 are assigned to this process ($2^2 + 2^3 = 12$). This process will last for 500 ms.
↓	F01_1_5_100	Activate prefilling with the digital outputs 3 and 1 ($5 = 2^2 + 2^0$) and a duration of 100 ms.
↑	F01_A	Command understood and executed successfully.

F02 – Material filling duration configuration

Description

Use F02 to configure the material filling duration for filling applications. This is the waiting time in order to capture the filling material in the air after all filling valves are shut.

Syntax

Commands

F02	Query the current configuration for material filling duration.
F02_<Duration>	Set the configuration for the material filling duration.

Responses

F02_A_<Duration>	Current configuration for material filling duration.
F02_A	Command understood and executed successfully.
F02_I	Command understood but currently not executable.
F02_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Duration>	Float	0 ... 65535 ms	Material filling duration

Comment

- Target of the material filling duration is to wait for the filling material that is still in the air after all filling valves are closed and to capture this material inside the container.

Examples

↓	F02	Query the current configuration for material filling duration.
↑	F02_A_400	Material filling duration is configured as 400 ms.
↓	F02_200	Set material filling duration to 200 ms.
↑	F02_A	Command understood and executed successfully.

F03 – Automatic refilling configuration

Description

Use F03 to activate or deactivate the refilling function. It automatically sets the selected output port for a time calculated by the optimization function.

Syntax

Commands

F03	Query the current configuration for the automatic refilling function.
F03_<Active>	Activate or deactivate the automatic refilling function.

Responses

F03_A_<Active>	Current status of automatic refilling function.
F03_A	Command understood and executed successfully.
F03_I	Command understood but currently not executable.
F03_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Active>	Boolean	0: off 1: on	Activate / deactivate the automatic refilling function

Comments

- Target of the automatic refilling function is to fill the container up to the target weight automatically, in case the actual final weight is less than the target reference weight.
- For the refilling function, the output port(s) is/are selected automatically which is/are connected to the valve(s) that control(s) the final part of the filling process (fine filling).

The selected output port(s) will be activated and it/they will remain high for certain duration.

Examples

↓	F03	Query the current configuration for automatic refilling function.
↑	F03_A_0	Automatic refilling function is not active.
↓	F03_1	Activate the automatic refilling function.
↑	F03_A	Command understood and executed successfully.

See also

- 📖 F13 – Filling phase configuration ▶ Page 77
- 📖 F15 – Digital output function configuration ▶ Page 80

F04 – Target weight configuration

Description

Use F04 to set a target reference weight for the filling application.

Syntax

Commands

F04	Query the reference target weight.
F04_<TargetWeight>_<Unit>_<NegTolP>_<PosTolP>	Configure the reference target weight.

Responses

F04_A_<TargetWeight>_<Unit>_<NegTolP>_<PosTolP>	Current configuration of the target weight.
F04_A	Command understood and executed successfully.
F04_I	Command understood but currently not executable.
F04_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<TargetWeight>	Float		Reference target weight
<Unit>	String	g, mg or ug	Unit of the reference target weight
<NegTolP>	Float	%	Negative tolerance limit given as percentage of <TargetWeight>
<PosTolP>	Float	%	Positive tolerance limit given as percentage of <TargetWeight>

Comments

- Actual final weight is compared to reference target weight to determine the success of the filling application.
- Optimization- and refilling functions do their calculations based on the target weight.
- Filling function is deactivated if the target weight is configured as F04_0.

Examples

↓	F04	Query the reference target weight.
↑	F04_A_1000_g_1_2	Reference target weight is configured as 1000 g with negative tolerance limit of 1% (- 10 g) and positive tolerance limit of 2% (+ 20 g) .
↓	F04_2000_g_5_5	Define the reference target weight as 2000 g with negative and positive tolerance limits of 5% (± 100 g).
↑	F04_A	Command understood and executed successfully.

See also

- 📖 F03 – Automatic refilling configuration ▶ Page 61
- 📖 F05 – Optimization function configuration ▶ Page 63

F05 – Optimization function configuration

Description

Use F05 to activate or deactivate the optimization function and configure the optimization method and its degree. Optimization function is used to reconfigure the cut-off points for the valves automatically in case of a mismatch between the reference target weight and the actual final weight.

Syntax

Commands

F05	Query the configuration of the optimization function.
F05_<Active>_<Method>_<Degree>	Configure the optimization function.

Responses

F05_A_<Active>_<Method>_<Degree>	Current configuration of the optimization function.
F05_A	Command understood and executed successfully.
F05_I	Command understood but currently not executable.
F05_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Active>	Boolean	0: off 1: on	Activate / deactivate the optimization function
<Method>	Integer	1	Feedback optimization-1
		2	Feedback optimization-2
		3	Feed forward optimization
		4	Both method 1 and 3
		5	Both method 2 and 3
<Degree>	Integer	1	High optimization degree
		2	Medium optimization degree
		3	Low optimization degree

Comments

- Optimization function has the purpose of reconfiguring the cut-off points within the actual or subsequent filling cycle such that the actual final weight stays within tolerances in shortest filling time.
- Different methods for the optimization are explained below:

Method-1

In this method, the biggest cut-off point is optimized according to the deviation from the target weight. All other cut-off points are reconfigured according to the optimization step of the biggest cut-off point.

With this method, actual filling weight is optimized based on the deviation from the reference target weight.

Method-2

In this method, all cut-off points are optimized according to the biggest cut-off point such that the filling time is reduced as much as possible.

With this method, all cut-off points are brought closer to the biggest cut-off point, thus total filling time is reduced.

Method-3

This method can be used, if there is a variable (not constant) flow rate from one or all of the filling valves. In this case, the average value of the variable flow rate over the last 10 filling cycles is calculated and the biggest cut-off point is optimized based on this value.

Method-4

Set both method 1 and method 3.

Method-5

Set both method 2 and method 3.

- You can refer to the operating instructions of the SLP85xD load cells for more details regarding optimization calculations.

Examples

↓	F05	Query the status of the optimization function.
↑	F05_A_1_1_1	Optimization function is activated with feedback optimization-1 and high optimization degree.
↓	F05_1_2_3	Activate the optimization function with feedback optimization-2 and low optimization degree.
↑	F05_A	Command understood and executed successfully.

See also

- 📖 F04 – Target weight configuration ▶ Page 62
- 📖 F13 – Filling phase configuration ▶ Page 77

F06 – Weight monitor function configuration

Description

Use F06 to configure the weight monitor function. This function can be configured to monitor the filling process based on weight increase.

Syntax

Commands

F06	Query the current configuration for weight monitor function.
F06_<N>	Query the current configuration for a certain normal filling process.
F06_<N>_<Active>_<Delta>_<Unit>	Set the configuration for weight monitor function.

Responses

F06_B_<N>_<Active>_<Delta>_<Unit> F06_B_...	Current configuration for weight monitor function.
F06_A_<N>_<Active>_<Delta>_<Unit>	Current configuration for a certain normal filling process,
F06_A	Command understood and executed successfully.
F06_I	Command understood but currently not executable.
F06_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<N>	Integer	1 ... 5	Number of the normal filling process which will be monitored with this function
<Active>	Boolean	0: off 1: on	Activate / deactivate the weight monitor function
<Delta>	Float		The difference between the filling characteristic curve and monitor characteristic curve
<Unit>	String	g, mg	Unit of the parameter <Delta>

Comments

- When activated, this function builds a monitor curve which sets the lower limit for the actual filling curve. If the actual filling curve goes below the monitor curve, this implies that there is an error in the filling application. This error is interpreted as bag/bottle breakage.
- If this error occurs, following steps are taken:
 - Remaining filling process is stopped
 - Error bit for the bag/bottle breakage is set, **see** command [F09 – Filling application status ► Page 70]
 - Set the output I/O port if configured as "Alarm" message
- After the error condition is removed, filling process can be continued with the F10_2 command.
- You can refer to the operating instructions of the SLP85xD load cells for more details regarding the definition of the weight monitor function.

Examples

↓	F06	Query the current configuration for weight monitor function.
↑	F06_B_1_1_1_g F06_B_2_1_1_g F06_B_3_1_1_g F06_B_4_1_1_g F06_A_5_1_1_g	Weight monitor function is activated for all filling phases and follows the characteristic filling curve with a delta parameter of 1 g.
↓	F06_2	Query the current configuration for 2 nd filling phase.
↑	F06_A_2_1_1_g	Filling monitor function is activated for the 2 nd filling phase and follows the actual filling curve with a distance of 1 g.
or		
↑	F06_A_2_0_1_g	Weight monitor function is deactivated for 2 nd filling phase.

See also

- 📖 F09 – Filling application status ▶ Page 70
- 📖 F13 – Filling phase configuration ▶ Page 77

F07 – Time monitor function configuration

Description

Use F07 to configure the weight monitor function. This function can be configured to monitor the filling process based on time.

Syntax

Commands

F07	Query the current configuration for time monitor function.
F07_<N>	Query the current configuration for a certain cut-off point.
F07_<N>_<Active>_<TOUT>	Set the configuration for time monitor function.

Responses

F07_B_<N>_<Active>_<TOUT> F07_B_... F07_A_<N>_<Active>_<TOUT>	Current configuration for time monitor function.
F07_A_<N>_<Active>_<TOUT>	Current configuration for a certain cut-off point.
F07_A	Command understood and executed successfully.
F07_I	Command understood but currently not executable.
F07_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<N>	Integer	1 ... 5	Number of the cut-off point
<Active>	Boolean	0: off 1: on	Activate / deactivate the time monitor function
<TOUT>	Float		Time-out duration for the selected cut-off point given in seconds

Comments

- This type of monitor function can be used to monitor whether filling material is filled continuously. If filling is interrupted, it can be understood based on the timeout parameters at which filling phase the problem has occurred.
- If one of the timeout parameters is exceeded, remaining filling process is stopped and the corresponding error bit is set <TOUTN>, **see** command [F09 – Filling application status ► Page 70]. This error is interpreted as the interruption of the filling material.
- After the error condition is removed, filling process can be continued with the F10_2 command.
- You can refer to the operating instructions of the SLP85xD load cells for more details regarding the definition of the time monitor function.

Examples

↓	F07	Query the current configuration for time monitor function.
↑	F07_B_1_1_1.5 F07_B_2_1_2.5 F07_B_3_0_0 F07_B_4_0_0 F07_A_5_0_0	Time monitor function is activated with the timeout durations of 1.5 s for cut-off point-1 and 2.5 s for the cut-off point-2. Time monitor function is not activated for the cut-off points 3, 4 and 5.

↓	F07_1_1_2	Activate the time monitor function for the 1st cut-off point with a timeout duration of 2 s.
↑	F07_A	Command understood and executed successfully.
or		
↓	F07_2	Query the current configuration for 2 nd cut-off point.
↑	F07_A_2_0_0.0	Time monitor function is deactivated for 2 nd cut-off point.

See also

- 📖 F09 – Filling application status ▶ Page 70
- 📖 F13 – Filling phase configuration ▶ Page 77

F08 – Filling statistics

Description

Use F08 to query or reset the statistics of the filling application.

Syntax

Commands

F08	Query the statistics for the filling application.
F08_0	Reset the statistics for the filling application.

Responses

F08_A_<Mean>_<Std>_<Sum>_<Count>_<ActualWeight>_<Unit>_<TotalTime>	Current statistics for the filling application.
F08_A	Command understood and executed successfully.
F08_I	Command understood but currently not executable.
F08_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Mean>	Float		Mean value of all actual filling results
<Std>	Float		Standard deviation of all actual filling results
<Sum>	Float		Accumulated weight value of all previous filling cycles
<Count>	Float		Number of total filling cycles
<ActualWeight>	Float		Last filling result recorded by the load cell
<Unit>	String	g, mg, ug	Unit of the weight parameters
<TotalTime>	Float		Last total filling time recorded by the load cell. Unit given in seconds (s)

Comments

- Filling statistics are calculated by the load cell on a continuous basis, until it is reset by the user with the F08_0 command.
- Only successful filling cycles are reflected in the statistics which are not interrupted by manual intervention or aborted due to an error.

Examples

↓	F08	Query the statistics for the filling application.
↑	F08_A_1000.050_1.5_1000000.050_1000_1000.100_g_4.050	Mean weight value of the filled containers is 1000.050 g with a standard deviation of 1.5 g, and the accumulated weight value of all previous filling cycles is 1000.050 kg. In total, 1000 filling cycles have elapsed. Last filling cycle resulted with 1000.100 g as the final weight and 4.050 seconds as the filling time.
↓	F08_0	Reset the filling statistics.
↑	F08_A	Command understood and executed successfully.

F09 – Filling application status

Description

Use F09 to query the status of the filling application.

Syntax

Command

F09	Query the status of the filling application.
-----	--

Responses

F09_A_<Status>	Current status of the filling application.
F09_A	Command understood and executed successfully.
F09_I	Command understood but currently not executable.

Parameter

Name	Type	Values	Meaning
<Status>	Bit Set	$Status = \sum_{statusbit\ on} 2^{Bit}$	Status of the filling application calculated as bit set Refer to the table under the comments for the definition of the individual bits

Comments

- Filling application status is calculated as a bit set according to the following table:


Bit	Designation	Status / Error Condition
0	General Status Bit	Set if any other bit is 1
1	TareWeight+	Set if container weight > upper limit for tare weight
2	TareWeight-	Set if container weight < lower limit for tare weight
3	TOUT1	Set if filling time until 1 st cut-off point > timeout parameter-1
4	TOUT2	Set if filling time until 2 nd cut-off point > timeout parameter-2
5	TOUT3	Set if filling time until 3 rd cut-off point > timeout parameter-3
6	TOUT4	Set if filling time until 4 th cut-off point > timeout parameter-4
7	TOUT5	Set if filling time until 4 th cut-off point > timeout parameter-5
8	Bag/Bottle Breakage	Set if the weight value of the actual filling curve < weight value of the monitor characteristic curve
9	TOL-	Set if the final filling weight < lower tolerance limit of target weight
10	TOL+	Set if the final filling weight > upper tolerance limit of target weight
11	EMPTY	Remains high during the emptying process, see command [F16 – Emptying function configuration ▶ Page 82]
12	READY	Set once final filling weight is determined and reset once a new container is placed
13	RESERVED	
14	RESERVED	
15	RESERVED	

- The general status bit is set automatically if one of the error bits (Bit-1 to Bit-10) is set.
- Filling application is stopped automatically, if one of the error bits (Bit-1 to Bit-8) is set.
- The values in this register are reset automatically once run or abort command, **see** command [F10 – Control filling ▶ Page 72] is received by the weighing device.
- The status bits (READY & EMPTY) can be monitored by the control system to check when it is the right time to place a new empty container on the weighing platform after a filling cycle is finished.

Example

↓	F09	Query the statistics for the filling application.
↑	F09_A_97	Following conditions are met; (97 = 1100001B): <ul style="list-style-type: none">• Timeout for 3th cut-off point is reached.• Timeout for 4th cut-off point is reached.

See also

 F10 – Control filling ▶ Page 72

F10 – Control filling

Description

Use F10 to control the state of the filling application.

Syntax

Command

F10_<Action>	Change the status of the filling control.
--------------	---

Responses

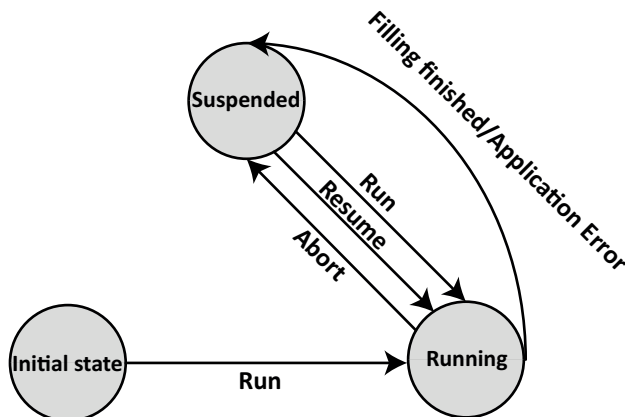
F10_A_<Action>	Status of the filling control is changed.
F10_A	Command understood and executed successfully.
F10_I	Command understood but currently not executable.
F10_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Action>	Integer	0	Run the filling application
		1	Abort the filling application
		2	Resume the filling application

Comments

- After power-on, the device enters into initial state. Based on the state of the device, different filling control commands are possible:
 - **Run** F10_0: Start the filling cycle from the initial or suspended state, and clear all the filling application status F09. That means that a new filling cycle will start.
 - **Abort** F10_1: Cancel or interrupt the filling cycle when in the running state.
 - **Resume** F10_2: Continue the filling cycle from the suspended state.



- Once the filling cycle is finished or there are application errors, device enters into the suspended state.
- Under suspended status, user can send **Resume** F10_2 command to continue the unfinished filling cycle, or send the **Run** F10_0 command to start a new filling cycle. Main difference between the "Resume" and "Run" commands is that "Run" command will clear all the filling application status F09, whereas the "Resume" command doesn't change the content of the filling application status.
- If the device is in the suspended status and user wants to start a new filling process, it only needs to send the "Run" command. It is not necessary to return from the "Suspended" status to the "Initial" State.

Example

↓	F10_0	Run the filling application.
↑	F10_A	Command understood and executed successfully.

See also

 F11 – Report filling state ▶ Page 74

F11 – Report filling state

Description

Use F11 to query the current state of the filling application.

Syntax

Command

F11	Query the current state of the filling application.
-----	---

Responses

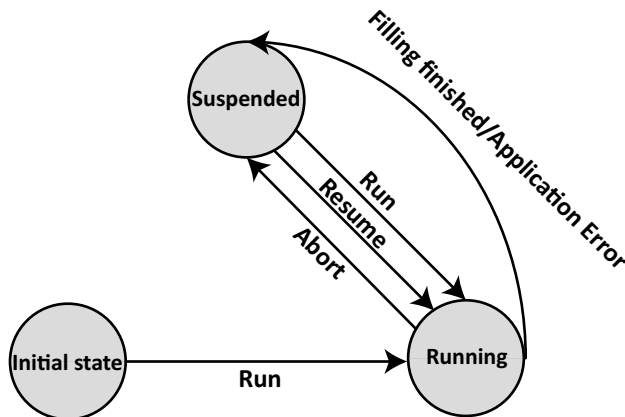
F11_A_<State>	Current state of the filling application.
F11_I	Command understood but currently not executable.
F11_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<State>	Integer	0	Initial state
		1	Running
		2	Suspended / Finished

Comments

- Use F11 to query the state of the filling machine before sending the filling control command F10.
- Following states are possible:
 - **Initial state:** After power-on, the device enters into initial state.
 - **Running state:** Filling application is running.
 - **Suspended / Finished state:** Once the filling cycle is finished or there are application errors, device enters into the suspended state. Under suspended status, user can send **Resume** F10_2 command to continue the unfinished filling cycle, or send the **Run** F10_0 command to start a new filling cycle.



Example

↓	F11	Query the current state of the filling application.
↑	F11_1	Filling application is running.

See also

📖 F10 – Control filling ▶ Page 72

F12 – Filling stability criteria configuration

Description

Use F12 to define the stability criteria for the final control weighing of the filled material.

Syntax

Commands

F12	Query the stability criteria for the final control weighing.
F12_<Tol>_<ObserTimeOut>_<StabTimeOut>	Define the stability criteria for the final control weighing.

Responses

F12_A_<Tol>_<ObserTimeOut>_<StabTimeOut>	Current configuration of the stability criteria for the final control weighing.
F12_A	Command understood and executed successfully.
F12_I	Command understood but currently not executable.
F12_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Tol>	Float	0.1 ... 1000	Tolerance in digits (smallest weight increment) within which the value must stay to be regarded as stable
<ObserTimeOut>	Float	0 ... 32535	Observation time in milliseconds during which the value must stay within tolerance in order to be regarded as stable
<StabTimeOut>	Float	0 ... 32535	Stabilization timeout in milliseconds. If this duration is reached during control weighing, last measured value will be taken as the final weight result, regardless from the fulfillment of the stabilization criteria

Comment

- During stabilization timeout <StabTimeOut>, actual weight is tested for stability. If the stability condition is met, that means if the actual weight value stays within <Tol> for the duration of <ObserTimeOut>, this is determined as the filling result, even if the stabilization timeout <StabTimeOut> has not yet expired. In any case, the last weight value will be taken as the filling result when the stabilization timeout <StabTimeOut> has expired.

Examples

↓	F12	Query the stability criteria for the final control weighing.
↑	F12_A_1.0_200_1000	Final weight has to stay within 1 digit for the duration of 200 ms in order to be regarded as stable. Last measured value will be taken as the filling result after 1000 ms has expired since the start of control weighing.

↓	F12_5.0_300_500	Set stability criteria as follows: Final weight has to stay within 5 digits for 300 ms in order to be regarded as stable. However, last measured value will be taken as the filling result if 500 ms expires without a stable weight value being detected.
↑	F12_A	Command understood and executed successfully.

F13 – Filling phase configuration

Description

Use F13 to set the configuration for different filling phases. Up to 5 different filling phases can be configured.

Syntax

Commands

F13	Query the configuration for the filling phases.
F13_<N>	Query the current configuration for a specific filling phase.
F13_<N>_<Active>_<OutputOn>_<WeightN>_<Unit>_<LockDurationN>	Set the configuration for a specific filling phase.

Responses

F13_B_<N>_<Active>_<OutputOn>_<WeightN>_<Unit>_<LockDurationN> ...	Current configuration for the filling phases.
F13_A_<N>_<Active>_<OutputOn>_<WeightN>_<Unit>_<LockDurationN>	Current configuration for a specific filling phase.
F13_A	Command understood and executed successfully.
F13_I	Command understood but currently not executable.
F13_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<N>	Integer	1 ... 5	Number of the filling phase
<Active>	Boolean	0: off 1: on	Activate / deactivate selected filling phase
<OutputOn>	Bit set	$OutputOn = \sum_{output\ ports\ on} 2^{Bit}$	Set of the digital outputs which will remain high during the selected filling phase
<WeightN>	Float		Upper limit value (cut-off point) for the selected filling phase
<Unit>	String	g, mg, ug	Available units for the cut-off point
<LockDurationN>	Float	0 ... 65535	Lock-out duration given in milliseconds

Comments

- Filling phases can be configured with an upper limit value (cut-off point) and lock-out duration. User can assign to each filling phase a set of output ports. Assigned output port(s) will remain high (logic 1) until the upper limit value (cut-off point) and they will be reset (logic 0) if the upper limit value (cut-off point) has been exceeded.
- Filling phases must be defined in correct sequence (1 → 2 → 3 → 4 → 5).
- Lock-out duration is defined as the time duration which prevents current filling phase from being cut off prematurely as a result of peak loads (overshoot).

Example

↓	F13	Query the configuration for the filling phases.
↑	F13_B_1_1_3_500.0_g_250 F13_B_2_1_6_850.0_g_100 F13_B_3_0_0_0.0_g_0 F13_B_4_0_0_0.0_g_0 F13_B_5_0_0_0.0_g_0	<p>Filling phase-1 is activated and is controlled by output ports 1 and 2 (3=00011B) which will remain high until 500 g is measured by the load cell. After filling phase-1 is activated, a lock-out time of 250 ms will be introduced where monitored weight values are not allowed to change the filling phase.</p> <p>Filling phase-2 is activated and is controlled by output ports 2 and 3 (6=00110B) which will remain high between 500 g and 850 g. After filling phase-2 is activated (at 500 g), a lock-out time of 100 ms will be introduced where monitored weight values are not allowed to change the filling phase.</p> <p>All other normal filling processes are not activated.</p>

F14 – Automatic tare configuration

Description

Use F14 to configure the automatic tare function.

Syntax

Commands

F14	Query the configuration for the automatic tare function.
F14_<Active>_<Weight>_<Unit>_<LowTolP>_<UppTolP>_<Delay>	Set the configuration for the automatic tare function.

Responses

F14_A_<Active>_<Weight>_<Unit>_<LowTolP>_<UppTolP>_<Delay>	Current configuration for the automatic tare function.
F14_A	Command understood and executed successfully.
F14_I	Command understood but currently not executable.
F14_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Active>	Boolean	0: off 1: on	Activate / deactivate automatic tare function
<Weight>	Float		Expected weight of the container
<Unit>	String	g, mg, ug	Available units for the expected container weight
<LowTolP>	Float	%	Lower tolerance limit for the tare weight given as % of the expected container weight
<UppTolP>	Float	%	Upper tolerance limit for the tare weight given as % of the expected container weight
<Delay>	Float	0 ... 65535	Introduced delay for the automatic tare function given in milliseconds

Comments

- Automatic tare function can be activated if the expected container weight is known.
- If the actual container weight is less than the lower tolerance limit of the expected container weight, "TareWeight-" bit is set in the filling application status register, **see** command [F09 – Filling application status ▶ Page 70] and the filling application is stopped.
- If the actual container weight is more than the upper tolerance limit of the expected container weight, "TareWeight+" bit is set in the filling application status register, **see** command [F09 – Filling application status ▶ Page 70] and the filling application is stopped.

Example

↓	F14	Query the configuration for the automatic tare function.
↑	F14_A_1_50.0_g_2.0_1.0_500	Automatic tare function is activated. Container weight has to be between 49 g (50 g – 2%) and 50.5 g (50 g + 1%) in order to be accepted. 500 ms delay is introduced after the entry of the start trigger to perform tare.

See also

📖 F09 – Filling application status ▶ Page 70

F15 – Digital output function configuration

Description

Use F15 to assign roles to digital output ports.

Syntax

Commands

F15	Query the roles of all digital output ports.
F15_<Output>_<Function>	Query the role of a specific digital output port.

Responses

F15_B_<Output>_<Function> ...	Current assigned roles for all output ports.
F15_A_<Output>_<Function>	
F15_A_<Output>_<Function>	Current assigned role for a specific output port.
F15_A	Command understood and executed successfully.
F15_I	Command understood but currently not executable.
F15_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Output>	Integer	1 ... 5	Number of the digital output port
<Function>	Integer	0	No function
		1	Ready Signal
		2	Empty Signal
		3	Alarm Signal
		4	Valve Control

Comments

- Only a single function can be assigned to each output port.
- Same function can be assigned to multiple output ports except the alarm function. If one output is set to "Alarm" function, another output which is already set to "Alarm" will be set to "No function" automatically, because only one output can be set as alarm.
- If the role of one output port is set or changed for the "Valve" function, then all the settings for the commands F01, F03 and F13 must be checked for consistency.
- The values that these functions can take are given in the table below:

Function	Condition for "0"	Condition for "1"
NoFunction	Always	Never
Ready Signal	By default	"READY" bit is set, see command [F09 – Filling application status ▶ Page 70]
Empty Signal	By default	"EMPTY" bit is set, see command [F09 – Filling application status ▶ Page 70]
Alarm Signal	By default	"General Status Bit" bit is set, see command [F09 – Filling application status ▶ Page 70]
Valve Control	By default	Based on the status of the filling application, see command [F01 – Automatic prefilling configuration ▶ Page 59], [F03 – Automatic refilling configuration ▶ Page 61], [F13 – Filling phase configuration ▶ Page 77]

Example

↓	F15	Query the roles of all digital output ports.
↑	F15_B_1_1 F15_B_2_2 F15_B_3_3 F15_B_4_4 F15_A_5_4	Following functions are assigned to the digital output ports: <ul style="list-style-type: none">• Output-1: "Ready Signal".• Output-2: "Empty Signal".• Output-3: "Alarm Signal".• Output-4 and Output-5: "Valve Control".

See also

- 📄 F01 – Automatic prefilling configuration ▶ Page 59
- 📄 F03 – Automatic refilling configuration ▶ Page 61
- 📄 F13 – Filling phase configuration ▶ Page 77

F16 – Emptying function configuration

Description

Use F16 to set the durations for the emptying and zeroing functions.

Syntax

Commands

F16	Query the status for the emptying and zeroing functions.
F16_<Active>_<EmptyDuration>_<ZeroDuration>	Set the durations for the emptying and zeroing functions.

Responses

F16_A_<Active>_<EmptyDuration>_<ZeroDuration>	Current status for the emptying and zeroing functions.
F16_A	Command understood and executed successfully.
F16_I	Command understood but currently not executable.
F16_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Active>	Boolean	0: off 1: on	Activate / deactivate emptying and zeroing functions
<EmptyDuration>	Float	0 to 65535	Bottle/container unloading time in milliseconds during which the "Empty" signal is active
<ZeroDuration>	Float	0 to 65535	Waiting time after the bottle/container is removed, before sending the zero command to the load cell

Comments

- During the <EmptyDuration>, the "Empty" signal is active, and indicates that the bottle/container is being removed from the platform of the weighing device.
- After the <EmptyDuration>, if the filling process is controlled by gross weight, then the application must wait for the <ZeroDuration> to send the zero command in order to keep the filling accuracy; if the filling process is controlled by the net weight, this process is skipped.

Example

↓	F16	Query the status for the emptying and zeroing functions.
↑	F16_A_1_500_1000	Emptying and zeroing functions are activated. Current configured <EmptyDuration> is 500 ms, and the <ZeroDuration> is 1000 ms.

See also

📖 F09 – Filling application status ▶ Page 70

FCUT – Filter characteristics (cut-off frequency)

Description

Use FCUT to set the cut-off frequency of the fixed filter.

Syntax

Commands

FCUT	Query cut-off frequency.
FCUT_<Frequency>	Set cut-off frequency.

Responses

FCUT_A_<Frequency>	Current cut-off frequency.
FCUT_A	Command understood and executed successfully.
FCUT_I	Command understood but currently not executable.
FCUT_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Frequency>	Float	0 or < 0.001 Hz	not active (M02 active)
		0.001 Hz – 20.0 Hz	Cut-off frequency

Comments

- To use the command FCUT you have to set [M01 ▶ Page 144] to 2 and <Frequency> ≥ 0.001 Hz.
- If FCUT is activated (<Frequency> ≥ 0.001 Hz), it will override any settings for ambient conditions ([M02 ▶ Page 145]) in sensor mode.

Examples

↓	FCUT	Query actual cut-off frequency.
↑	FCUT_A_0.1	Actual cut-off frequency is 0.1 Hz.
↓	M01_2	Change weighing mode to sensor mode to enable FCUT.
↑	M01_A	Command understood and executed successfully.
↑	FCUT_3.0	Set cut-off frequency to 3.0 Hz.
↑	FCUT_A	Command understood and executed successfully.

See also

- 📖 M01 – Weighing mode ▶ Page 144
- 📖 M02 – Environment condition ▶ Page 145

FSET – Reset all settings to factory defaults

Description

Use `FSET` to reset all settings to factory defaults.

Syntax

Command

<code>FSET_<Exclusion></code>	Resets all user and interface settings as well as the customer calibration to factory settings.
-------------------------------------	---

Responses

<code>FSET_A</code>	Command understood and executed successfully.
<code>FSET_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Exclusion>	Integer	0	Communication parameters are not reset
		1	Resets all settings
		2	Communication parameters and adjustment ([C0 ▶ Page 22], [C1 ▶ Page 24], [C2 ▶ Page 26], [C3 ▶ Page 28] and [C4 ▶ Page 29]) are not reset

Comments

- The `FSET` command cannot be canceled by [`@` ▶ Page 15].
- All user settings except date ([`DAT` ▶ Page 47]) and time ([`TIM` ▶ Page 231]) are reset to factory values.
- In case resetting of the interface parameters is included (`FSET_1`), the answer is returned with the current interface settings and the interface parameters are reset afterwards.
- After the response `FSET_A`, the weigh module restarts and issues [`I4` ▶ Page 89] when it's ready again.
- **See** `COPT` command to reset all settings on the optional interface.

Example

↓	<code>FSET_1</code>	Reset all settings to factory values.
↑	<code>FSET_A</code>	Command understood and executed successfully.
↑	<code>I4_A_"B123456789"</code>	Restart, <code>I4</code> shows the serial number: B123456789.

See also

- `I4` – Serial number ▶ Page 89

IO – Currently available MT-SICS commands

Description

The IO command lists all commands implemented in the present software.

All commands are listed first in level then in alphabetical order - even though levels are not supported anymore the Syntax of this command hasn't changed.

Syntax

Command

IO	Send list of all implemented MT-SICS commands.
----	--

Responses

IO_B_<Level>_<"Command"> IO_B_<Level>_<"Command"> IO_B ... IO_A_<Level>_<"Command">	Number of the MT-SICS level where the command belongs to 2nd (next) command implemented. ... Last command implemented.
IO_I	Command understood but currently not executable (balance is currently executing another command).

Parameters

Name	Type	Values	Meaning
<Level>	Integer	0	MT-SICS level 0 (Basic set)
		1	MT-SICS level 1 (Elementary commands)
		2	MT-SICS level 2 (Extended command list)
		3	MT-SICS level 3 (Application specific command set)
<"Command">	String		MT-SICS command

Comments

- If a terminal and a weigh module, weighing platform are being used, the command list of the terminal is output. If only a weigh module, platform is being used, the command list of the weigh module, platform is shown.
- If IO lists commands that cannot be found in the manual, these are reserved commands "for internal use" or "for future use", and should not be used or altered in any way.

Example

↓	IO	Send list of commands.
↑	IO_B_0_"IO"	Level 0 command IO implemented.
↑	IO_B...	...
↑	IO_B_0_"@"	Level 0 command [@ ▶ Page 15] (cancel) implemented.
↑	IO_B_1_"D"	Level 1 command D implemented.
↑	IO_B...	...
↑	IO_A_3_"SM4"	Level 3 command SM4 implemented.

See also

📖 @ – Cancel ▶ Page 15

I1 – MT-SICS level and level versions

Description

Query MT-SICS level and versions.

Syntax

Command

I1	Query of MT-SICS level and MT-SICS versions.
----	--

Responses

I1_A_<"Level">_<"V0">_<"V1">_<"V2">_<"V3">	Current MT-SICS level and MT-SICS versions.
I1_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<Level>	String	0	MT-SICS level 0
		01	MT-SICS level 0 and 1
		012	MT-SICS level 0, 1 and 2
		03	MT-SICS level 0 and 3
		013	MT-SICS level 0, 1 and 3
		0123	MT-SICS level 0, 1, 2, and 3
		3	Device-specific with MT-SICS level 3
<"V0"> ... <"V3">	String		MT-SICS versions of the related level (0 to 3)

Comment

- The command I14 provides more comprehensive and detailed information.

Example

↓	I1	Query the current MT-SICS level and version.
↑	I1_A_"0123"_<"2.00">_<"2.20">_<"1.00">_<"1.50">	Level 0-3 is implemented and the according version numbers are shown.

See also

📖 I14 – Device information ▶ Page 93

I2 – Device data (Type and capacity)

Description

Use I2 to query the device data (type and capacity), including the weighing capacity. The response is output as a single string.

Syntax

Command

I2	Query of the balance data.
----	----------------------------

Responses

I2_A_<"Type">_<Capacity>_<Unit">	Balance type and capacity.
I2_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring) .

Parameters

Name	Type	Values	Meaning
<"Type">	String		Type of balance or weigh module
<"Capacity">	String		Capacity of balance or weigh module
<"Unit">	String		Weight unit

Comments

- With DeltaRange balances, the last decimal place is available only in the fine range.
- The number of characters of "text" depends on the balance type and capacity.

Example

↓	I2	Query of the balance data.
↑	I2_A_"WMS404C-L_WMS-Bridge_" 410.0090_g"	Balance type and capacity.

See also

📖 I14 – Device information ▶ Page 93

I3 – Software version number and type definition number

Description

Provides the software version number and the type definition number.

Syntax

Command

I3	Query of the balance software version and type definition number.
----	---

Responses

I3_A_<"Software_TDNR">	Balance software version and type definition number.
I3_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).

Parameters

Name	Type	Values	Meaning
<"Software TDNR">	String		Software version number and type definition number (TDNR)

Comments

- Only the software version of the terminal software is issued.
- If no terminal is present, the bridge software is issued instead.
- More detailed information is available with [I14 ▶ Page 93].

Example

↓	I3	Query of the software version number(s) and type definition number.
↑	I3_A_"2.10_10.28.0.493.142"	2.10: Software version number. 10.28.0.493.142: Type definition. number

See also

📖 I14 – Device information ▶ Page 93

I4 – Serial number

Description

Use I4 to query the serial number of the balance terminal.

Syntax

Command

I4	Query of the serial number.
----	-----------------------------

Responses

I4_A_<"SerialNumber">	Serial number.
I4_I	Command not understood, not executable at present Command understood but currently not executable (balance is currently executing another command, e.g. initial zero setting).

Parameter

Name	Type	Values	Meaning
<"SerialNumber">	String		Serial number

Comments

- The serial number agrees with that on the model plate and is different for every balance.
- The serial number can be used, for example, as a device address in a network solution.
- The balance response to I4 appears unsolicitedly after switching on and after the cancel command [@ ▶ Page 15].
- More detailed information is available with [I14 ▶ Page 93].
- Only the serial number of the terminal is issued.
- If no terminal is present, the serial number of the bridge is issued instead.

Example

↓	I4	Query of the serial number.
↑	I4_A_"B021002593"	The serial number is "B021002593".

See also

- 📖 @ – Cancel ▶ Page 15
- 📖 I14 – Device information ▶ Page 93

I5 – Software material number

Description

Use `I5` to query the software material number (SW-ID).

Syntax

Command

<code>I5</code>	Query of the software material number and index.
-----------------	--

Responses

<code>I5_A_<"Software"></code>	Software material number and index.
<code>I5_I</code>	Command understood but currently not executable (balance is currently executing another command).

Parameter

Name	Type	Values	Meaning
<code><"Software"></code>	String		Software material number and index

Comments

- The SW-ID is unique for every Software. It consists of a 8 digit number and an alphabetic character as an index
- More detailed information is available with [I14 ▶ Page 93].
- Only the SW-ID of the terminal is issued.
- If no terminal is present, the SW-ID of the bridge is issued instead.

Example

↓	<code>I5</code>	Query of the software material number and index.
↑	<code>I5_A_"12121306C"</code>	12121306C: Software material number and index.

See also

📖 I14 – Device information ▶ Page 93

I10 – Device identification

Description

Use I10 to query or define the balance identification (balance ID). This allows an individual name to be assigned to a balance.

Syntax

Commands

I10	Query of the current balance ID.
I10_<"ID">	Set the balance ID.

Responses

I10_A_<"ID">	Current balance ID.
I10_A	Command understood and executed successfully.
I10_I	Command understood but currently not executable (balance is currently executing another command).
I10_L	Command not executed as the balance ID is too long (max. 20 characters).

Parameter

Name	Type	Values	Meaning
<"ID">	String	5 ... 20 chars	Balance or weigh module identification

Comments

- A sequence of maximum 20 alphanumeric characters are possible as <ID>.
- The set balance ID is retained even after the cancel command [[@ ▶ Page 15](#)].

Example

↓	I10	Query of the current balance ID.
↑	I10_A_ "My_Balance"	The balance ID is "My Balance".

I11 – Model designation

Description

This command is used to output the model designation.

Syntax

Command

I11	Query of the current balance or weigh module type.
-----	--

Responses

I11_A_<"Model">	Current balance or weigh module type.
I11_I	Type can not be transferred at present as another operation is taking place.

Parameter

Name	Type	Values	Meaning
<"Model">	String	Max 20 chars	Balance or weigh module type

Comments

- A sequence of maximum 20 alphanumeric characters is possible as <Model>.
- The following abbreviations used in model designations are relevant to MT-SICS:
DR = Delta Range.
DU = Dual Range.
/M, /A = Approved balance or weigh module.

Example

↓	I11	Query of the current weigh module type.
↑	I11_A_"WMS404C-L/10"	The weigh module is an "WMS404C-L/10".

I14 – Device information

Description

This command is used to output detailed information about the device. All components – including optional accessories – are taken into account and the associated data is output.

Syntax

Command

I14_<No>	Query of the current balance information.
----------	---

Responses

I14_A_<No>_<Index>_<"Info">	Current balance information.
I14_I	Command understood but currently not executable.
I14_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<No>	Integer	0	Instrument configuration
		1	Instrument description
		2	SW-identification number
		3	SW version
		4	Serial number
		5	TDNR number
<Index>	Integer		Index of instrument module
<"Info">	String	<Bridge>	Weighing bridge information corresponding to <No>
		<Terminal>	Balance terminal information corresponding to <No>
		<Option>	Balance option information corresponding to <No>
		<Balance>	Balance information corresponding to <No>
		<Printer>	Printer information corresponding to <No>
		<Second Display>	Second Display information corresponding to <No>

Comments

- The response to the query of instrument configuration can comprise one or more lines (compact balances, bridges with/without terminal etc.)
- The description of an option is the language-independent product name, e.g. "RS232-Option".
- If there are several modules of the same kind, the descriptions have an appendix, comprising of a hyphen and a number. Examples: <Option-1>, <Option-2>.

Examples

↓	I14_0	Query of the current balance information.
↑	I14_B_0_1_"Bridge"	Bridge.
↑	I14_B_0_2_"Terminal"	Terminal.
↑	I14_A_0_3_"Option"	Option.
↓	I14_1	Query of the current instrument descriptions.
↑	I14_B_1_1_"X205T"	Bridge is a "X205T".
↑	I14_B_1_2_"PAT"	Excellence Plus Terminal.
↑	I14_A_1_3_"RS232_Option"	RS232 Option.
↓	I14_2	Query of the current Software identification numbers.
↑	I14_B_2_1_"11670123A"	Software identification number of the bridge is "11680123A".
↑	I14_B_2_2_"11670456B"	Software identification number of the terminal is "11680456B".
↑	I14_A_2_3_"11670789B"	Software identification number of the option is "11680789B".
↓	I14_3	Query of the current software versions.
↑	I14_B_3_1_"4.23"	Version of the bridge software is "4.23".
↑	I14_B_3_2_"4.10"	Version of the terminal software is "4.10".
↑	I14_A_3_3_"1.01"	Version of the RS232 option software is "1.01".
↓	I14_4	Query of the serial numbers.
↑	I14_B_4_1_"0123456789"	Serial number of the bridge is "0123456789".
↑	I14_B_4_2_"1234567890"	Serial number of the terminal is "1234567890".
↑	I14_A_4_3_"2345678901"	Serial number of the RS232 option is "2345678901".
↓	I14_5	Query of the type definition numbers.
↑	I14_B_5_1_"1.2.3.4.5"	Type definition number of the bridge is "1.2.3.4.5".
↑	I14_B_5_2_"1.2.3.4.5"	Type definition number of the terminal is "1.2.3.4.5".
↑	I14_A_5_3_"1.2.3.4.5"	Type definition number of the RS232 option is "1.2.3.4.5".

I15 – Uptime

Description

Delivers the uptime; the period during which the device program is executing since start or restart or reset.

Syntax

Command

I15	Query the uptime.
-----	-------------------

Responses

I15_A_<Minutes>	Time in minutes since uptime, accuracy +/-5%.
I15_I	Uptime can not be transferred at present as another operation is taking place.

Parameter

Name	Type	Values	Meaning
<Minutes>	String		Uptime (in minutes) since start or restart or reset

Example

↓	I15	Query the uptime.
↑	I15_A_123014	The balance program is executed approx. 123014 minutes (since start or restart or reset).

I16 – Date of next service

Description

You can use I16 to query the date when the balance is next due to be serviced.

Syntax

Command

I16	Query the date of next service.
-----	---------------------------------

Responses

I16_A_<Day>_<Month>_<Year>	Current date of next service.
I16_I	Date of next service can not be transferred at present as another operation is taking place.

Parameters

Name	Type	Values	Meaning
<Day>	Integer	01 ... 31	Day
<Month>	Integer	01 ... 12	Month
<Year>	Integer	2000 ... 2099	Year

Example

↓	I16	Query the date of next service.
↑	I16_A_19_07_2011	Date of next service is July 19, 2011.

I21 – Revision of assortment type tolerances

Description

Use I21 to query the revision of assortment type tolerances.

Syntax

Command

I21	Query the revision of assortment type tolerances.
-----	---

Responses

I21_A_<"Revision">	Revision of assortment type tolerances.
I21_I	Balance type can not be transferred at present as another operation is taking place.

Parameter

Name	Type	Values	Meaning
<"Revision">	String	7 ... 30 chars	Revision

Example

↓	I21	Query the revision of assortment type tolerances.
↑	I21_A_"5678"	The revision is "5678".

I26 – Operating mode after restart

Description

Use I26 to query the operating mode.

Syntax

Command

I26	Query of the operating mode.
-----	------------------------------

Responses

I26_A_<Mode>	Operating mode.
I26_I	Operating mode can not be transferred at present as another operation is taking place.

Parameter

Name	Type	Values	Meaning
<Mode>	Integer	0	User mode
		1	Production mode
		2	Service mode
		3	Diagnostic mode

Example

↓	I26	Query of the operating mode.
↑	I26_A_0	Operation mode is: user mode.

I27 – Change history from parameter settings

Description

Use I27 to query the change history from the parameter settings.

Syntax

Command

I27	Query the change history.
-----	---------------------------

Responses

<pre>I27_B_<No>_<Day>_<Month>_<Year>_<Hour>_<Minute>_<"Name">_<"ID">_<"What">_<"Old">_<"New"></pre> <pre>I27_B...</pre> <pre>I27_A_<No>_<Day>_<Month>_<Year>_<Hour>_<Minute>_<"Name">_<"ID">_<"What">_<"Old">_<"New"></pre>	Get change history.
I27_A	No data, empty change history.
I27_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<No>	Integer	1 ... n	Change number (n is product dependent)
<Day>	Integer	1 ... 31	Day on which the parameter has been changed
<Month>	Integer	1 ... 12	Month on which the parameter has been changed
<Year>	Integer	2000 ... 2099	Year on which the parameter has been changed
<Hour>	Integer	0 ... 23	Hour on which the parameter has been changed
<Minute>	String	0 ... 59	Minute on which the parameter has been changed
<"Name">	String		User name
<"ID">	String		Identification
<"What">	String		Title of changed parameter
<"Old">	String		Old value
<"New">	String		New value

Example

↓	I27	Query change history.
↑	<pre>I27_B_1_12_12_2009_12_00_"User_1"_ "1_"Number_of_users_"User_6_Off"_ "User_6_On"</pre>	Last change: Number of users -> User 6 from off to on.
↑	<pre>I27_A_2_01_12_2009_10_22_"User_1"_ "1_"Passw._Change_Date_"Off"_ "On"</pre>	Password change date from off to on.

I29 – Filter configuration

Description

Query actual filter configuration.

Syntax

Command

I29	Query filter configuration.
-----	-----------------------------

Responses

I29_A_<WeighingMode>_<Environment>	Current filter configuration.
I29_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<WeighingMode>	Integer	0	Normal weighing / Universal
		1	Dosing
		2	Sensor mode
		3	Check weighing
		4	Dynamic weighing
<Environment>	Integer	0	Very stable
		1	Stable
		2	Standard
		3	Unstable
		4	Very unstable

Comment

- See [M01 ▶ Page 144] and [M02 ▶ Page 145] to change filter settings.

Example

↓	I29	Query of the current state of the level sensor.
↑	I29_A_0_2	The actual filter setting is: Normal weighing / Standard.

See also

- 📖 M01 – Weighing mode ▶ Page 144
- 📖 M02 – Environment condition ▶ Page 145

I32 – Voltage monitoring

Description

I32 returns the scaled reading from the voltage monitoring channels in volt. The number of channels is product specific.

Syntax

Commands

I32	Request the voltage of all channels.
I32_<Channel>	Request the voltage of a specific channel.

Responses

I32_B_<Channel>_<Voltage> I32_B.. I32_A_<Channel>_<Voltage>	Current voltage values for all channels.
I32_A_<Channel>_<Voltage>	Current voltage value for a specific channel.
I32_I	Command understood but currently not executable.
I32_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0 to N	ID of available voltage monitor channel Range of values: 0 ... highest available voltage monitor channel
<Voltage>	Float		Voltage of the voltage monitoring channel, in Volt

Comments

- By this command, the ADC information is made accessible for diagnostic and service purpose.
- If no voltage monitor channel is configured, the command I32 is not available and will not be shown in the command list like I0.

Example

↓	I32	Request the voltage of all configured voltage monitor channels.
↑	I32_B_0_1.1988465E1 I32_B_1_1.1679084E1 I32_B_2_-1.2217906E1 I32_B_3_3.9961543E0 I32_A_4_1.5718208E0	There are five voltage monitor channels available Channel-0: 11.988 V. Channel-1: 11.679 V. Channel-2: -1.222 V. Channel-3: 4 V. Channel-4: 1.572 V.

I43 – Selectable units for host unit

Description

Returns the selectable units for host unit. This command is used for the terminal menu to display the selectable items only.

Syntax

Command

I43	Query the selectable units for host unit.
-----	---

Responses

I43_A_<Units>_<ActUnit>_<Factory>	Selectable units for host unit.
I43_I	Command understood but currently not executable.
I43_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Units>	Bit set		Sum value of selectable units, calculated in accordance with the following formula $Environments = \sum_{SelectableEnvironmentIndexes} 2^{EnvironmentIndex}$ Units is set to 0. In this case the menu item 'select unit' is not shown. The definition unit will be used as the only available unit
<ActUnit>	Integer	-1 ... max. unit index	Actual unit for host unit. This parameter is read from M21_0
<Factory>	Integer	-1 ... max. unit index	Factory setting for host unit

Examples

↓	I43	Given the balance supports only "g" as unit 1 then the answer for this command is:
↑	I43_A_1_0_0	This is because the index for "g" is 0 and $2^0 = 1$.
↓	I43	Given the balance supports "g", "kg", "mg" and "ct" as unit 1 then the answer for this command is:
↑	I43_A_43_3_0	The actual unit is "mg", the factory setting is "g" and the possible units are "g", "kg", "mg" and "ct". The indexes for the units mentioned before are 0, 1, 3 and 5 and so the sum is $2^0 + 2^1 + 2^3 + 2^5 = 43$.

See also

📖 M02 – Environment condition ▶ Page 145

I44 – Selectable units for display unit

Description

Returns the selectable units for display unit. This command is used for the terminal menu to display the selectable items only.

Syntax

Command

I44	Query the selectable units for display unit.
-----	--

Responses

I44_A_<Units>_<ActUnit>_<Factory>	Selectable units for display unit.
I44_I	Command understood but currently not executable.
I44_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Units>	Bit set		Sum value of selectable units, calculated in accordance with the following formula $Environments = \sum_{SelectableEnvironmentIndexes} 2^{EnvironmentIndex}$ Units is set to 0. In this case the menu item 'select unit' is not shown. The definition unit will be used as the only available unit
<ActUnit>	Integer	-1 ... max. unit index	Actual unit for display unit. This parameter is read from M21_0
<Factory>	Integer	-1 ... max. unit index	Factory setting for host unit

Examples

↓	I44	Given the balance supports only "g" as unit 2 then the answer for this command is:
↑	I44_A_1_0_0	This is because the index for "g" is 0 and $2^0 = 1$.
↓	I44	Given the balance supports "g", "kg", "mg" and "ct" as unit 2 then the answer for this command is:
↑	I44_A_43_3_0	The actual unit is "mg", the factory setting is "g" and the possible units are "g", "kg", "mg" and "ct". The indexes for the units mentioned before are 0, 1, 3 and 5 and so the sum is $2^0 + 2^1 + 2^3 + 2^5 = 43$.

See also

📖 M02 – Environment condition ▶ Page 145

I45 – Selectable environment filter settings

Description

This command returns the selectable environment filter settings for use in the device menu. The device application must know which items are selectable in order to display them correctly.

Syntax

Command

I45	Query the environment filter settings.
-----	--

Responses

I45_A_<Environments>_<ActEnvt>_<Factory>	Selectable environment filter settings.
I45_I	Command understood but currently not executable.
I45_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Environments>	Bit set		List of supported environmental conditions. Sum value of selectable units, calculated in accordance with the following formula $Environments = \sum_{SelectableEnvironmentIndexes} 2^{EnvironmentIndex}$ Environment Index: in accordance with the table defined under comments
<ActEnvt>	Integer	1 ... 5	Actual environment setting. This parameter is read from M02
<Factory>	Integer	1 ... 5	Environment factory setting

Comment

- Available environment parameters are given in the table below:

ID	Environmental condition
0	Very stable
1	Stable
2	Standard
3	Unstable
4	Very unstable
5	Automatic

Examples

↓	I45	Query the environment filter settings.
↑	I45_A_14_1_2	Available environment modes: Stable, Standard and Unstable ($14 = 2^1 + 2^2 + 2^3$) Actual value: Stable (1) Factory preset: Standard (2).
↓	I45	Query the selectable units for host unit.
↑	I45_A_4_2_2	Available environment modes: Standard ($4 = 2^2$) Actual value: Standard (2) Factory preset: Standard (2).

See also

📖 M02 – Environment condition ▶ Page 145

I46 – Selectable weighing modes

Description

This command returns the selectable weighing modes for use in the device menu. The device application must know which items are selectable in order to display them correctly.

Syntax

Command

I46	Query the weighing mode settings.
-----	-----------------------------------

Responses

I46_A_<Modes>_<ActMode>_<Factory>	Current selectable weighing mode settings.
I46_I	Command understood but currently not executable.
I46_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Modes>	Bit set		Sum value of weighing modes. The sum calculated in accordance with the following formula: $Modes = \sum_{SelectableWeighingModes} 2^{Weighing\ mode}$ Mode index: in accordance with the table defined under comments
<ActMode>	Integer	1 ... 20	Actual weighing mode setting. This parameter is read from M01
<Factory>	Integer	1 ... 20	Weighing mode factory setting

Comments

- Available weighing mode parameters are given in the table below:

ID	Environmental condition
0	Normal weighing
1	Dosing
2	Fixed filter
3	Absolute weighing
4	Dynamic weighing
6	Raw weight values / No filter

Example

↓	I46	Query the weighing mode settings.
↑	I46_A_3_1_0	Only normal weighing and dosing ($3 = 2^0 + 2^1$) can be selected in the menu. The current setting is dosing (1) and factory setting is normal weighing (0).

See also

- M01 – Weighing mode ► Page 144

I48 – Initial zero range

Description

This command reads the upper and lower bound of the initial zero range. The initial zero range is defined relatively to the production zero point.

Syntax

Command

I48	Query initial zero range.
-----	---------------------------

Responses

I48_A_<Min>_<Max>_<Unit>	Initial zero range.
I48_I	Command understood but currently not executable.
I48_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Min>	Float		Lower bound of the initial zero range in the host unit
<Max>	Float		Upper bound of the initial zero range in the host unit
<Unit>	String (ASCII)		The unit used for this command is the host unit The unit can be selected by using the M21 command

Comment

- Min and max value are formatted with the finest resolution.

Example

↓	I48	Query the initial zero range
↑	I48_A_-2_18_g	The device can make the initial zero operation within -2 g and +18 g around the production zero value

See also

📖 M21 – Unit ▶ Page 152

I50 – Remaining weighing ranges

Description

You can use I50 to query the remaining weighing ranges.

Syntax

Command

I50	Query of the remaining weighing ranges.
-----	---

Responses

I50_B_<RangeNo>_<Range>_<Unit> I50_B... I50_A_<RangeNo>_<Range>_<Unit>	List of remaining weighing ranges.
I50_L	Command understood but not executable (incorrect or no parameter).
I50_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<RangeNo>	Integer	0	Remaining maximum weighing range
		1	Remaining range in which internal or initial adjustment are still possible
		2	Remaining range in which external adjustment is still possible
<Range>	Float		This number indicates the remaining range. A value with a preceding negative sign indicates the amount by which the range is exceeded
<Unit>	String		Returns the range in the currently set weight unit

Comments

- The range values relate to the sum of all loads on the weighing platform (pre, tare, net load) and are to be understood as reference values. If a range is shown as being exceeded, the preload, or possibly only the tare or net load, can be reduced.
- If there is no internal weight available, the remaining range (value 1) is zero.
- The remaining range in which an external adjustment is still possible depends on the setting of [M19 ▶ Page 150].

Example

↓	I50	Query of the current state of the level sensor
↑	I50_B_0_535.141_kg I50_B_1_-18.973_kg I50_A_2_335.465_kg	With the given preload, a remaining weighing range of about 535 kg is available. An internal adjustment by the user is not possible because the total load of approximately 19 kg is too heavy. An external adjustment is still possible up to a further additional load of 335 kg.

See also

- 📖 M19 – Adjustment weight ▶ Page 150

I51 – Power-on time

Description

Delivers the power-on time; the period during which the device is powered including short interruptions (e.g. power, restart etc.) with negligible impact on thermal model of the device.

Syntax

Command

I51	Query of the power-on time.
-----	-----------------------------

Responses

I51_A_<Days>_<Hour>_<Minutes>_<Seconds>	Power-on time data.
I51_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<Days>	Integer	0 ... 65535	Power-on time days
<Hour>	Integer	0 ... 23	Power-on time hours
<Minutes>	Integer	0 ... 59	Power-on time minutes
<Seconds>	Integer	0 ... 59	Power-on time seconds

Comment

- The power-on time is counted up as long as the microprocessor has power. The power-on time is zero after a power loss. The power-on time is not touched by a restart or reset of the microprocessor. To handle the restart or reset effects, the time information is stored immediately before the restart or reset function is executed.

Example

↓	I51	Query the power-on time data.
↑	I51_A_1456_17_3_37	The power-on time is 1456 days 17 hours 3 minutes and 37 seconds.

I52 – Auto zero activation settings

Description

This command reads the activation settings for the auto zero feature.

Syntax

Command

I52	Query the auto zero activation settings.
-----	--

Responses

I52_A_<Activation>	Initial auto zero activation.
I52_I	Command understood but currently not executable.
I52_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning	
<Activation>	Integer	0 ... 3	Identification for the auto zero activation settings. The setting defines: a) the factory setting for auto zero switched on/off b) to allow/avoid changing of the auto zero on/off state by command M03	
			Auto zero function	Changing by M03
		0	Switched off	Prohibited
		1	Switched on	Prohibited
		2	Switched off	Permitted
		3	Switched on	Permitted

Comment

- In OIML R 76-1 [19], this feature is called "zero-tracking".

Examples

↓	I52	Query the auto zero activation settings.
↑	I52_A_1	The auto zero function is enabled, and cannot be altered by the M03 command.
↓	I52	Query the auto zero activation settings.
↑	I52_A_3	The auto zero function is enabled, and can be altered by the M03 command.

See also

📖 M03 – Auto zero function ▶ Page 146

I53 – Ipv4 runtime network configuration information

Description

This command will return information entries for each Ipv4 based network interface that is currently configured in the network stack of the weigh module. The command is similar to the "ipconfig" command on Windows. The information is based on the settings that are currently operational in the network stack. The information might change after a factory reset. The IP configuration of an application is defined as follows:

- Host IP Address, **see** M70
- Netmask , **see** M70
- optional item: Default Gateway Address, **see** [M71 ▶ Page 183]
- optional item: Domain Name Service (DNS-) Server Address, **see** [M72 ▶ Page 185]

IP configuration can either be set manually, **see** [M70 ▶ Page 181]) or obtained from a DHCP server, **see** [M69 ▶ Page 179]). For the case that DHCP server becomes unavailable (due to network problems, crash,..) a fallback IP address must be configured. Such a fallback configuration can either be given manually, **see** M70) or by "AutolP" (this feature will assign an IP without contacting a server, as on Windows PCs). However, AutolP is not a real use case.

The IP settings made by above mentioned M-commands are stored in non-volatile memory. The settings only take effect after a reboot.

Syntax

Commands

I53	Query the runtime network configuration information.
I53_<Index>	Query the network interface index.

Responses

I53_B_<Index>_<"Name">_<State>_<"MAC">_<DHCP>_<AutoIP>_<"Host">_<"Netmask">_<"DefaultGateway">_<"DNSServer"> ... I53_B_<Index>_<"Name">_<State>_<"MAC">_<DHCP>_<AutoIP>_<"Host">_<"Netmask">_<"DefaultGateway">_<"DNSServer"> I53_A_<Index>_<"Name">_<State>_<"MAC">_<DHCP>_<AutoIP>_<"Host">_<"Netmask">_<"DefaultGateway">_<"DNSServer">	Current runtime network configuration information.
I53_A	Command understood and executed successfully.
I53_I	Command understood but currently not executable (no network interfaces present in the system).
I53_L	Command understood but not executable (no network interfaces with index "1" present in the system).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 or n	Network interface index
		0	1 st network interface
		n	n + 1 th network interface
<"Name">	String		Name of the network interface
<State>	Integer	0 ... 2	State of the network interface
		0	Disabled (down)
		1	Enabled but media disconnected
		2	Enabled and connected

Name	Type	Values	Meaning
<"MAC">	String	Max 17 chars	MAC address of the network interface. Must be in format "00:00:00:00:00:00"
<DHCP>	Boolean	0 ... 1	DHCP enabled or disabled
		0	DHCP disabled
		1	DHCP enabled
<AutoIP>	Boolean	0 ... 1	AutoIP enabled or disabled
		0	AutoIP disabled
		1	AutoIP enabled
<"Host">	String	Max 15 chars	Ipv4 address (dot-decimal notation) of the device on the given network interface
<"Netmask">	String	Max 15 chars	Ipv4 netmask (dot-decimal notation) on the given network interface
<"DefaultGateway">	String	Max 15 chars	Ipv4 default gateway (default router) address (dot-decimal notation) on the given network interface
<"DNSServer">	String	Max 15 chars	Ipv4 address (dot-decimal notation) of the DNS (Domain Name Service) server on the given network interface

Comment

- Before setting an IP configuration on a device (manually or by setting a fallback IP configuration in the DHCP case), the responsible person (e.g. from the IT department) for the network where the device will be connected to has to be contacted to work out a valid IP configuration for the device.

Examples

↓	I53	Query the runtime network configuration information.
↑	<pre>I53_B_0_"eth0"_2_ "11:22:33:44:55:66"_1_1_"10.0.0.2"_ "255.255.255.0"_10.0.0.1"_ "10.0.0.1" I53_B_1_"eth1"_1_ "aa:bb:cc:dd:ee:ff"_1_1_ "192.168.0.2"_255.255.255.0"_ "0.0.0.0"_192.168.0.1" I53_A_2_"wifi0"_0_ "aa:00:cc:11:ee:22"_1_1_ "172.24.225.100"_255.255.254.0"_ "172.24.225.1"_172.24.225.2"</pre>	<p>The network interface "eth0" is fully configured and operational.</p> <p>The network interface "eth1" is disconnected from the cable and no default gateway is configured.</p> <p>The network interface "wifi0" is currently disabled. All network interfaces do have DHCP and AutoIP enabled.</p>
↓	I53_1_0	Query the settings from network interfaces 1.
↑	<pre>I53_B_1_"eth1"_1_ "aa:bb:cc:dd:ee:ff"_1_1_ "192.168.0.2"_255.255.255.0"_ "0.0.0.0"_192.168.0.1"</pre>	<p>The network interface 1 "eth1" is disconnected from the cable and no default gateway is configured.</p>

I54 – Adjustment loads

Description

This command queries the weight increment for external adjustments. If the increment is bigger than 0, the weighing device can be adjusted by a defined range of external adjustment weights. This is called VariCal.

Syntax

Command

I54	Query the weight increment for external adjustments.
-----	--

Responses

I54_A_<Min>_<Max>_<Increment>	Adjustment loads.
I54_I	Command understood but currently not executable.
I54_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Min>	Float		Smallest load in the definition unit
<Max>	Float		Biggest load in the definition unit
<Increment>	Float		Load increment in the definition unit. Starting with the smallest load, the intermediate loads are defined in increments of the Increment parameter

Example

↓	I54	Query the weight increment for external adjustments.
↑	I54_A_1000.0_3000.0_750.0	In the case of external adjustment, the loads for selection are 1000 g, 1750 g, 2500 g and 3000 g.

I55 – Menu version

Description

This command queries the menu version of the device SW.

Syntax

Commands

I55	Query the menu version.
I55_A	Set the menu version.

Responses

I55_A_<Version>	Current menu version.
I55_I	Command understood but currently not executable.
I55_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Version>	Integer	0 ... n	Menu version (n is product dependent)

Comments

- The menu structure consists of menu item, menu item value range and menu item level.
- The menu version is model dependent.

Example

↓	I55	Query the menu version.
↑	I55_A_3	The menu version is 3.

I56 – Scaled weight ramp value

Description

This command is used to read the scaled weight ramp value. It is used for error diagnosis in the field, where it is very useful for locating an error in a weighing system. The scaled weight ramp value is defined as follows:

The value indicates the deflection of a digital load cell. It represents the deflection without any additional structures like for example weighing pans.

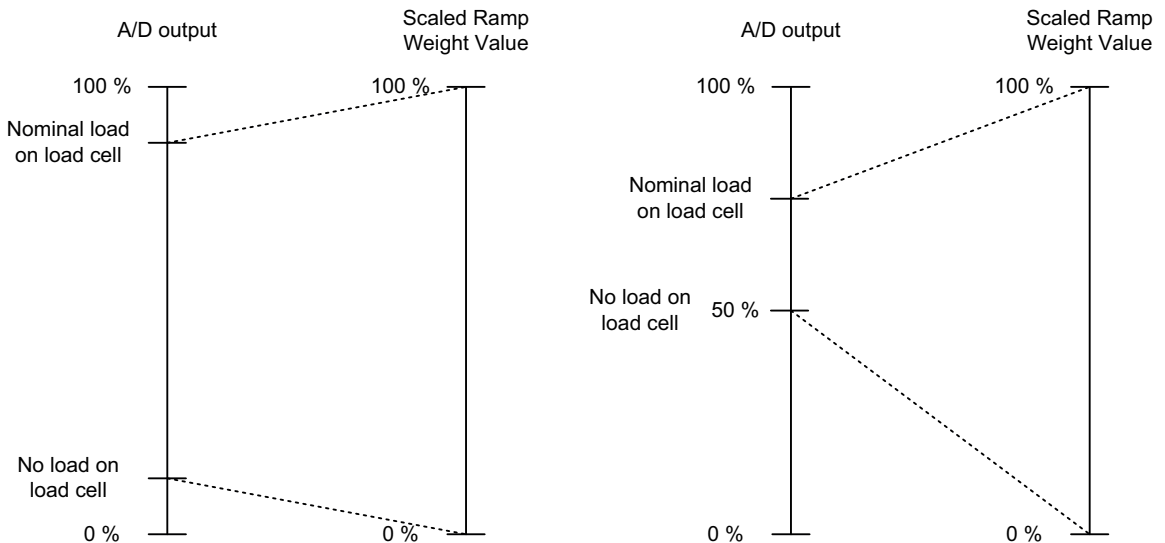
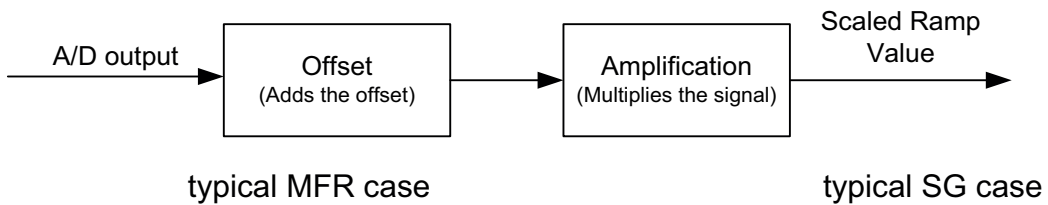
The value neither has a relation to the final weighing value nor is it processed by the Signal Processing or the Post Processing.

For both, strain gage and MFR weighing systems, a scaled weight ramp value of 0% represents no load on the digital load cell and a scaled weight ramp value of 100% means that nominal load is applied on the digital load cell.

In order to accomplish this, a scaled weight ramp value generator is introduced, consisting of an offset block and an amplification block. These blocks are needed to scale the A/D converter output signal.

The scaled weight ramp value is not restricted to the range of 0% to 100%. For example if one accidentally connects a load cell with a higher sensitivity than the formerly connected, then the scaled weight ramp value may be greater than 100% unless the configuration of the scaled weight ramp value generator is changed.

The configuration of the scaled weight ramp value generator shall be written at the end of the production and is the same per assortment type.



Syntax

Command

I56	Query the scaled weight ramp value.
-----	-------------------------------------

Response

I56_A_RampValue	Current scaled weight ramp value.
-----------------	-----------------------------------

Parameter

Name	Type	Values	Meaning
RampValue	Float		Scaled weight ramp value in percent, with one digit after the decimal point

Comment

- This command is used to display the menu item named "Ramp value" in the service menu of the pegaFOOD terminals.

Example

↓	I56	Query the scaled weight ramp value.
↑	I56_A_56.3	The scaled weight ramp value is 56.3%.

See also

📖 M35 – Zeroing mode at startup ▶ Page 164

I59 – Get initial zero information

Description

If a weighing device is starting up it is supposed to perform an initial zero operation before any weight values can be obtained from the device. If someone wants to obtain weight values before the initial zero operation has been successfully performed the device refuses to send weight values. In order to successfully perform the initial zero operation the load on the weight receptor must be within the switch on range limits. In the case where the initial zero operation can't be performed successfully the user gets no information if the switch on range limits are exceeded or not. This command is used to determine if currently an initial zero operation is in progress and if the switch on range limits are exceeded or not.

Syntax

Command

I59	Query the initial zero information.
-----	-------------------------------------

Response

I59_A_<InitZero>_<LoadState>	Current Initial information.
------------------------------	------------------------------

Parameters

Name	Type	Values	Meaning
<InitZero>	Integer	0 ... 2	Indicates whether an initial zero operation is in progress or not
		0	Undefined e.g. If initial zero operation not started
		1	Initial zero operation in progress
		2	Initial zero operation done
<LoadState>	Integer	+	Load above upper switch on range limit
		-	Load below lower switch on range limit
		S	Load within switch on range limits and stable
		D	Load within switch on range limits and unstable
		0	Undefined – If the parameter "InitZero" equals to 0 or 2 the parameter "LoadState" always equals to undefined

Comment

- If a zero value and an initial zero value has been saved with the [M35 ▶ Page 164] command the initial zero value is restored from the saved initial zero value. The answer in this case will be I59_A_2_0.

Examples

↓	I59	Query the initial zero information.
↑	I59_A_1_+	The initial zero operation is in progress and the load is above the upper switch on range limit.
↓	I59	Query the initial zero information.
↑	I59_A_1_-	The initial zero operation is in progress and the load is below the lower switch on range limit.
↓	I59	Query the initial zero information.
↑	I59_A_1_D	The initial zero operation is in progress, the load is within the switch on range limits and unstable.

↓	I59	Query the initial zero information.
↑	I59_A_0_0	The initial zero state is undefined.
↓	I59	Query the initial zero information.
↑	I59_A_2_0	The initial zero operation has been successfully performed.

I62 – Timeout

Description

This command is used to read the timeout settings for the weight recording and for the service command step control C5.

Syntax

Command

I62	Query the whole list of entries.
I62_<Index>	Query a single entry of the list.

Responses

I62_B_<Index>_<Time> I62_B.. I62_A_<Index>_<Time>	List of all timeout entries.
I62_A_<Index>_<Time>	Entry for a single timeout parameter.
I62_I	Command understood but currently not executable.
I62_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0	Weight recording
		1	Step control C5
<Time>	Integer	0 ... 120 (Index: 0)	Maximum waiting time for the stability flag and for the signal being within range
		0 ... 65535 (Index: 1)	Maximum waiting time for the user input in service command step control C5

Comment

- The parameter weight recording time also be can set with M67.

Example

↓	I62	Query the whole list of entries.
↑	I62_B_0_20 I62_A_1_1000	The timeout for weight recording is 20 seconds. The timeout for step control is 1000 seconds.

See also

- C5 – Enabling/disabling step control ▶ Page 31
- M67 – Timeout ▶ Page 177

I65 – Total operating time

Description

This command reads the device total operation time.

Syntax

Command

I65	Query of total operating time.
-----	--------------------------------

Responses

I65_A_<Day>_<Hour>	Current operating time.
I65_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<Day>	Integer		Operating time days
<Hour>	Integer	0 ... 23	Operating time hours

Comment

- Every full minute the microprocessor is running will be counted as operating time. This is also done during standby.

Example

↓	I65	Query of total operating time.
↑	I65_A_456_3	Device has been in operation for 456 days and 3 hours.

I66 – Total load weighed

Description

This command reads the device total load weighed. Every weight in all modes is counted.

Syntax

Command

I66	Query of total load weighed.
-----	------------------------------

Responses

I66_A_<TotalWeight>_<Unit>	Current total load weighed.
I66_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<TotalWeight>	Float		Total of all loads weighed in the definition unit
<Unit>	String		Definition unit

Comments

- The total load is increased every time an active MT-SICS [SNR ► Page 214] command with no preset value would send a stable weight.
- All values are added as absolute values.
- The number of significant digits in the same as for MT-SICS [SNR ► Page 214] command in the definition unit.

Example

↓	I66	Query of total load weighed.
↑	I66_A_4455.41592_g	The total load weighed is 4455.41592 g.

I67 – Total number of weighings

Description

This command reads the device total number of weighings. Every weighing in all modes is counted.

Syntax

Command

I67	Query of total number of weighings.
-----	-------------------------------------

Responses

I67_A_<WeighingNo>	Current number of weighings.
I67_I	Command understood but currently not executable.

Parameter

Name	Type	Values	Meaning
<WeighingNo>	Integer		Number of weighings

Comment

- The total number of weighings is increased every time an active MT-SICS [SNR ▶ Page 214] command with no preset value would send a stable weight.

Example

↓	I67	Query of total number of weighings.
↑	I67_A_1234	The total number of weighing is 1234.

I69 – Service provider address ASCII

Description

Address and phone number of service provider. Only printable ASCII characters are admissible.

Syntax

Commands

I69	Query the address and phone number of service provider.
I69_<Line>_<"Text">	Query the text from line.

Responses

I69_B_0_<"Text">	Current text of line 0.
I69_B_1_<"Text">	Current text of line 1.
I69_B_2_<"Text">	Current text of line 2.
I69_B_3_<"Text">	Current text of line 3.
I69_B_4_<"Text">	Current text of line 4.
I69_B_5_<"Text">	Current text of line 5.
I69_B_6_<"Text">	Current text of line 6.
I69_A_7_<"Text">	Current text of line 7.
I69_A_No_<"Text">	Current text of line No.
I69_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<Line>	Integer	0 ... 7	Text line number
<"Text">	String	Max 40 chars	Service provider address information

Examples

↓	I69	Query the address and phone number of service provider.
↑	I69_B_0_"Mettler-Toledo_GmbH"	The text of line 0 is "Mettler-Toledo GmbH".
↑	I69_B_1_"Im_Langacher_44"	The text of line 1 is "Im Langacher".
↑	I69_B_2_"8606_Greifensee"	The text of line 2 is "8606 Greifensee".
↑	I69_B_3_"044_944_45_45"	The text of line 3 is "044 944 45 45".
↑	I69_B_4_""	The text of line 4 is not defined.
↑	I69_B_5_""	The text of line 5 is not defined.
↑	I69_B_6_""	The text of line 6 is not defined.
↑	I69_A_7_""	The text of line 7 is not defined.
↓	I69_2	Query the text from line 2.
↑	I69_A_2_"8606_Greifensee"	The text of line 2 is "8606 Greifensee".

I71 – One time adjustment status

Description

Read out the one-time adjustment configuration and the one-time adjustment counter.

Syntax

Command

I71	Query one time adjustment status.
-----	-----------------------------------

Responses

I71_A_<Mode>_<MaxCount>_<CurrentCounter>	Query the status of the one-time adjustment.
I71_I	Command understood but currently not executable.
I71_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Mode>	Integer	0 ... 2	Mode of the scale placement GEO calibration adjustment
		0	Disabled
		1	Enabled
		2	Counting (permitted, but with restriction of the possible number of calibration)
<MaxCount>	Integer		Maximal allowed number of execution times in counting mode. If MaxCount = 0 the scale placement GEO calibration adjustment is disabled. If MaxCount is equal or greater than CurrentCounter, the scale placement GEO calibration adjustment is disabled
<CurrentCounter>	Integer		Current number of successful executions of the scale placement GEO calibration adjustment. Only the number of executions by command c10_1 is counted

Command

- Use case: the terminal must decide, whether the user should be forced to trigger the GEO adjustment or not.

Example

↓	I71	Query the status of the one-time adjustment.
↑	I71_A_2_1_1	The scale placement GEO calibration adjustment is in counting mode, allowing one execution of the command c10_1 and it has been executed once. The command c10_1 will return an I response if it is triggered again.

I73 – Sign Off

Description

If activated, this command is sent automatically when the device is switched off. To switch off the device, either use the command `PWR` or press the button OFF.

Syntax

Command

I73	Query sign off.
-----	-----------------

Responses

I73_A_<"SerialNumber">	Serial number.
I73_I	Command understood but currently not executable.
I73_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<"SerialNumber">	String		Device serial number

Command

- Command is needed to notify calibrity about a device switch-off by the user.

Examples

↓	I73	Query sign off.
↑	I73_A_"B314201995"	Serial number.
↓	PWR_0	Power off with I73 deactivated (pre-condition device is on).
↑	PWR_A	The device is in standby mode.
↓	PWR_0	Power off with I73 activated (pre-condition device is on).
↑	PWR_A I73_A_"B314201995"	The device is in standby mode.

I74 – GEO code at point of calibration - HighRes

Description

This command returns the high resolution GEO code at point of calibration(GCcalHR).

Syntax

Command

I74	Query the GEO code value at point of calibration.
-----	---

Responses

I74_A_<GeoCode>	Get the GEO code.
I74_I	Command understood but currently not executable.
I74_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<GeoCode>	Float	-1.0 ... 31.0	High resolution GEO code at point of calibration

Example

↓	I74	Query the GEO code value at point of calibration.
↑	I74_A_15.1	The GEO code at point of calibration is 15.1.

I75 – GEO code at point of use - HighRes

Description

This command returns the high resolution GEO code at point of use (GCuseHR).

Syntax

Command

I75	Query the GEO code value at point of use.
-----	---

Responses

I75_A_<GeoCode>	Get the GEO code.
I75_I	Command understood but currently not executable.
I75_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<GeoCode>	Float	-1.0 ... 31.0	High resolution GEO code at point of use

Example

↓	I75	Query the GEO code value at point of use.
↑	I75_A_12.1	The GEO code at point of use is 12.1.

I76 – Total number of voltage exceeds

Description

Use I76 to query the total number of the device voltage enters the configurable voltage monitor range.

Syntax

Commands

I76	Query the status of all voltage monitoring channels.
I76_<Channel>	Query the status of a certain voltage monitoring channel.

Responses

I76_B_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts> I76_B...	Current values of all voltage monitoring channels.
I76_A_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values of a certain voltage monitoring channel.
I76_I	Command understood but currently not executable.
I76_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0 ... n	Identification for voltage monitor channel (n is product dependent)
<LowerThreshold>	Float		Lower threshold value for the voltage monitor channel
<UpperThreshold>	Float		Upper threshold value for the voltage monitor channel
<Counts>	Integer		Number of voltage values falling into defined monitor channel

Comments

- Use I76 to view the results from the voltage monitor function.
- Supply voltage of the weighing device is monitored by the voltage monitor function.
- Number of the voltage monitor channels is dependent on the model type of the product.
- The target of this function is to count the number of the voltage values which fall outside the permissible supply voltage range.

Example

↓	I76	Query the status of all voltage monitoring channels.
↑	I76_B_0_7.0_10.0_0 I76_A_1_30.0_33.0_2	Channel-0 monitors the range between 7 and 10 V and there is no voltage value detected in this range. Channel-1 monitors the range between 30 and 33 V and there are 2 voltage values detected in this range.

I77 – Total number of load cycles

Description

Use I77 to query total number of load cycles that are counted between predefined thresholds.

Syntax

Command

I77	Query total number of load cycles for all defined channels.
I77_<Channel>	Query total number of load cycles for a specific channel.

Responses

I77_B_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts> I77_B.. I77_A_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values for all monitor channels.
I77_A_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values for a certain monitor channel.
I77_I	Command understood but currently not executable.
I77_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0 to N	Identification for load cycle monitor channel
<LowerThreshold>	Float		Lower threshold value for the load cycle monitor channel defined as the percentage of the maximum capacity
<UpperThreshold>	Float		Upper threshold value for the load cycle monitor channel defined as the percentage of the maximum capacity
<Counts>	Integer		Number of load cycles detected by the defined monitor channel

Comments

- The number of channels is product specific.
- A load cycle of one monitor channel is defined as placing a weight (belonging to that channel) on the weighing device until the weight is stable, and then removing the weight from the device (leaving that channel) until the weight is stable again.

Example

↓	I77	Query total number of load cycles for all defined channels.
↑	I77_B_0_1.0_20.0_0 I77_B_1_20.0_60.0_2 I77_B_2_60.0_100.0_4 I77_A_3_100.0_400.0_1	<p>Channel-0 monitors the range between 1% and 20% of maximum capacity and there is no load cycle detected in this range.</p> <p>Channel-1 monitors the range between 20% and 60% of maximum capacity and there are 2 load cycles detected in this range.</p> <p>Channel-2 monitors the range between 60% and 100% of maximum capacity and there are 4 load cycles detected in this range.</p> <p>Channel-3 monitors the range between 100% and 400% of maximum capacity and there is 1 load cycle detected in this range.</p>

I78 – Zero deviation

Description

Use I78 to query the zero deviation of the weighing device.

Syntax

Command

I78	Query the zero deviation of the weighing device.
-----	--

Responses

I78_A_<ZeroDeviation>	Current value for the zero deviation.
I78_I	Command understood but currently not executable.
I78_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<ZeroDeviation>	Float		Current zero deviation from the user calibrated zero value defined as the percentage of the maximum capacity

Comments

- When the weighing device accepts the zero command or the initial zero point is established, it can calculate the deviation between the actual zero value and the user calibrated zero value.
- Only the last calculated zero deviation value can be read with this command.

Example

↓	I78	Query the zero deviation of the weighing device.
↑	I78_A_0.2	Current zero deviation is 0.2% of the maximum capacity.

I79 – Total number of zero deviation exceeds

Description

Use I79 to query the total number of zero deviations detected by predefined monitor channels.

Syntax

Command

I79	Query total number of zero deviations for all predefined channels.
I79_<Channel>	Query total number of zero deviations for a specific channel.

Responses

I79_B_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts> I79_B... I79_A_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values for all monitor channels.
I79_A_<Channel>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values for a certain monitor channel.
I79_I	Command understood but currently not executable.
I79_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0 ... n	Identification for zero deviation monitor channel (n is product dependent)
<LowerThreshold>	Float		Lower threshold value for the zero deviation monitor channel defined as the percentage of the maximum capacity
<UpperThreshold>	Float		Upper threshold value for the zero deviation monitor channel defined as the percentage of the maximum capacity
<Counts>	Integer		Number of zero deviations detected by the defined monitor channel

Comments

- The number of channels is product specific.
- When the weighing device accepts the zero command or the initial zero point is established, it can calculate the deviation between the actual zero value and the user calibrated zero value. This value is checked by the monitor channels to increase the counter value.

Example

↓	I79	Query total number of zero deviations for all predefined channels.
↑	I79_B_0_1.0_10.0_2 I79_A_1_10.0_400.0_0	Channel-0 monitors the range between 1% and 10% of maximum capacity and there are 2 zero deviations detected in this range. Channel-1 monitors the range between 10% and 400% of maximum capacity and there are no zero deviations detected in this range.

I80 – Total number of temperature exceeds

Description

Use I80 to query the total number of temperature deviations detected by predefined monitor channels.

Syntax

Command

I80	Query total number of temperature deviations for all predefined channels.
I80_<Channel>	Query total number of temperature deviations for a specific channel.

Responses

I80_B_<Channel>_<Sensor>_<LowerThreshold>_<UpperThreshold>_<Counts> I80_B.. I80_A_<Channel>_<Sensor>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values for all monitor channels.
I80_A_<Channel>_<Sensor>_<LowerThreshold>_<UpperThreshold>_<Counts>	Current values for a certain monitor channel.
I80_I	Command understood but currently not executable.
I80_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0 ... n	Index for the channel of the temperature sensor (n is product dependent)
<Sensor>	Integer	0: Measuring sensor (SG) 1: PCBA (Mainboard)	Identification for the temperature sensor
<LowerThreshold>	Float		Lower threshold value for the temperature deviation monitor channel
<UpperThreshold>	Float		Upper threshold value for the temperature deviation monitor channel
<Counts>	Integer		Number of temperature deviations detected by the defined monitor channel

Comments

- The number of channels is product specific.
- Sensor-0 is the temperature sensor placed close to the measuring bridge (Strain Gage) and Sensor-1 is the temperature sensor placed on the PCBA (Mainboard).
- The target of this function is to count the number of the temperature values which fall outside permissible operating temperature range. The value of the counter is increased only once when a temperature value enters into a monitor range and stays inside this range.

Example

↓	I80	Query total number of temperature deviations for all predefined channels.
↑	I80_B_0_0_-50.0_-10.0_0 I80_B_1_0_40.0_80.0_1 I80_B_2_1_70.0_80.0_0 I80_A_3_1_80.0_100.0_0	<p>Channel-0 belonging to the Sensor-0 monitors the temperature range between -50°C and -10°C and there are no temperature values detected in this range.</p> <p>Channel-1 belonging to the Sensor-0 monitors the temperature range between 40°C and 80°C and there is 1 temperature value detected in this range.</p> <p>Channel-2 belonging to the Sensor-1 monitors the temperature range between 70°C and 80°C and there is no temperature value detected in this range.</p> <p>Channel-3 belonging to the Sensor-1 monitors the temperature range between 80°C and 100°C and there is no temperature value detected in this range.</p>

I81 – Temperature gradient

Description

Use I81 to query the last calculated temperature gradient for available temperature sensors.

Syntax

Command

I81	Query the last calculated temperature gradient of all available temperature sensors.
I81_<Channel>	Query the last calculated temperature gradient for a specific sensor.

Responses

I81_B_<Channel>_<Gradient>_<Duration> I81_B.. I81_A_<Channel>_<Gradient>_<Duration>	Current values for all available temperature sensors.
I81_A_<Channel>_<Gradient>_<Duration>	Current values for a certain temperature sensor.
I81_I	Command understood but currently not executable.
I81_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0: Measuring sensor (SG) 1: PCBA (Mainboard)	Identification for the temperature sensor
<Gradient>	Float		Temperature gradient given in °C
<Duration>	Float		Duration of the temperature gradient given in second

Comments

- Sensor-0 is the temperature sensor placed close to the measuring bridge (Strain Gage) and Sensor-1 is the temperature sensor placed on the PCBA (Mainboard).
- I81 command returns the temperature change (<Gradient>) over a certain time period (<Duration >) for a selected temperature sensor (<Sensor>)
- If the duration parameter is 0, either the sensor is switched off, or the gradient value has not yet been calculated.
- Only the last calculated temperature difference is used in the gradient calculation.

Example

↓	I81	Current values for all available temperature sensors.
↑	I81_A_0_0.2_60	Temperature gradient is calculated only for the temperature sensor-0 (Measuring bridge) and the result is 0.2°C temperature change measured over 60 seconds.

I82 – Total number of temperature gradient exceeds

Description

Use I82 to query the total number of temperature gradient deviations detected by predefined monitor channels.

Syntax

Command

I82	Query total number of temperature gradient deviations for all predefined channels.
I82_<Channel>	Query total number of temperature gradient deviations for a specific sensor.

Responses

I82_B_<Channel>_<MaxGradient>_<Duration>_<Counts> I82_B.. I82_A_<Channel>_<MaxGradient>_<Duration>_<Counts>	Current values for all monitor channels.
I82_A_<Channel>_<MaxGradient>_<Duration>_<Counts>	Current values for a certain monitor channel.
I82_I	Command understood but currently not executable.
I82_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0: Measuring sensor (SG) 1: PCBA (Mainboard)	Identification for the temperature sensor
<MaxGradient>	Float		Upper threshold value for the temperature gradient monitor channel
<Duration>	Float		Duration of the temperature gradient given in second
<Counts>	Integer		Number of temperature gradients exceeding the upper threshold value

Comments

- Sensor-0 is the temperature sensor placed close to the measuring bridge (Strain Gage) and Sensor-1 is the temperature sensor placed on the PCBA (Mainboard).
- If the duration parameter is 0, either the sensor is switched off, or the gradient value has not yet been calculated.
- Only the last calculated temperature difference is used in the gradient calculation.
- Counter value is not incremented during the warm-up phase of the weighing device after the power is switched-on.

Example

↓	I82	Query total number of temperature gradient deviations for all predefined channels.
↑	I82_A_0_0.5_60_0	Temperature gradient is monitored only for the temperature sensor- 0 (Measuring bridge). Upper threshold value is defined as 0.5°C temperature change in 60 seconds. The gradient values measured by the sensor have not exceeded this maximum limit so far.

I83 – Software identification

Description

This command returns the identification of the approval relevant software modules of a weighing device.

Syntax

Command

I83	Query the identification.
I83_<Index>	Query the index.

Responses

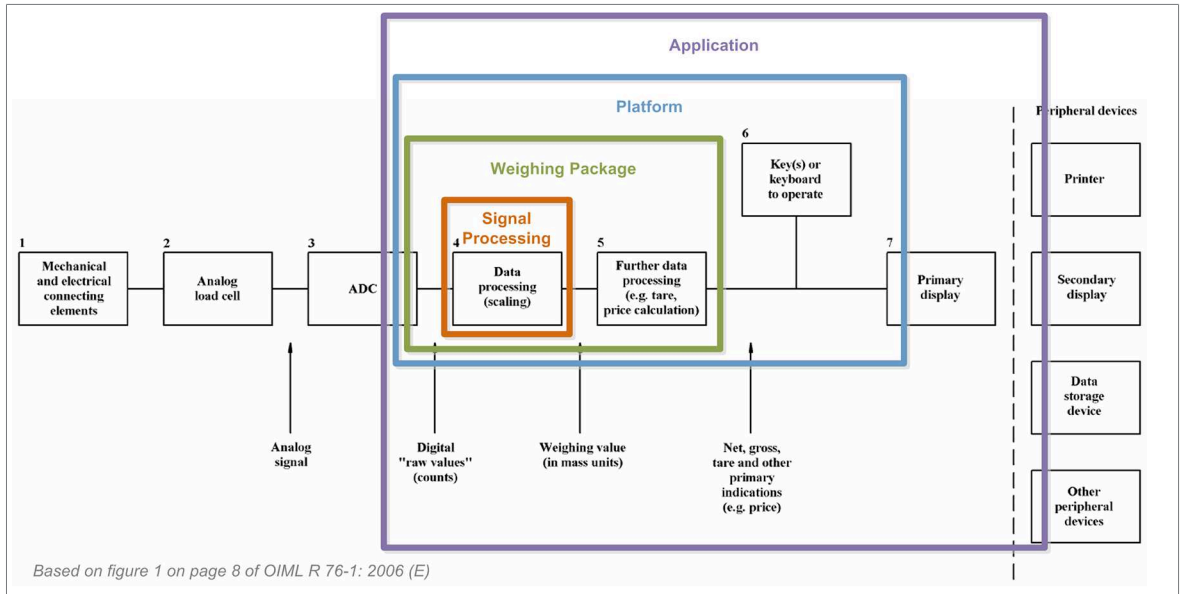
I83_B_<Index>_<"SW-Module">_<"Version"> I83_B_<Index>_<"SW-Module">_<"Version"> I83_B... I83_A_<Index>_<"SW-Module">_<"Version">	Current list of entries.
I83_A_<Index>_<"SW-Module">_<"Version">	Current text from index only.

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 ... 255	Array index of version list entry
<"SW-Module">	String	AP, PF, WP, SP (max 30 chars)	Software module name, <new module name abbreviation> must be unique and added by the MT-SICS team.
		AP	Scale terminal application software
		PF	Core system functions and configuration (e.g.: Rainbow)
		WP	Weighing package (e.g.: Rainbow)
		SP	Signal processing (e.g.: Rainbow)
<"Version">	String	Max 20 chars	Version identification

Comments

- The first line must be the application/product software version, i.e. the overall SW version.
- The number and the sequence of software modules is product dependent.
- The terminal can use the return values to show the version information required by approval documents. Solution with ICS Terminals (as an example) Test Certificate TC8039 "Software: Rainbow" requires as an essential characteristic: Software identification shown on terminal or display of complete weighing instrument in the form: Loadcell-Firmware-Version: AP:2.3.0 RB:2.2.0 WP:2.2.1 SP:1.70.33.
- The following picture emphasizes the relation between the software modules and the OIML signal path:



Examples

↓	I83	Query the identification.
↑	I83_B_0_"Application"_"2.3.0" I83_B_1_"Platform"_"2.2.0" I83_B_2_"Weighing Package"_"2.2.1" I83_A_3_"Signal Processing"_"1.70.33"	Actual entry for index 0 is: Module name "Application" with version "2.3.0". Actual entry for index 1 is: Module name "Platform" with version "2.2.0". Actual entry for index 2 is: Module name "Weighing Package" with version "2.2.1". Actual entry for index 3 is: Module name "Signal Processing" with version "1.70.33".
↓	I83_2_0	Requests the entry for index 2 only.
↑	I83_B_2_"Weighing Package"_"2.2.1"	Actual entry for index 2 is: Module name "Weighing Package" with version "2.2.1".

K – Keys control

Description

With the `κ` command, the behavior of the terminal keys may be configured: first, the `κ` command controls whether a key invokes its corresponding function or not and second, it configures whether an indication of which key has been pressed or released is sent to the host interface or not.

Using this functionality, an application running on a connected system (e.g. a PC or PLC) may make use of the balance terminal to interact with the balance operator.

Syntax

Command

<code>K_<Mode></code>	Set configuration.
-----------------------------	--------------------

Responses

<code>K_A[_<FunctionID>]</code>	Command understood and executed successfully. Mode 4: Function with <code><FunctionID></code> was invoked by pressing the corresponding key and executed successfully.
<code>K_I[_<FunctionID>]</code>	Command understood but currently not executable (balance is actually in menu or input mode). Mode 4: Function with <code><FunctionID></code> by pressing the corresponding key, but it could not be successfully executed (e.g. calibration was aborted by user or a negative value was tared).
<code>K_L</code>	Command understood but not executable (incorrect or no parameter).

Additional Responses in Mode 3:

<code>K_<EventID>_<KeyID></code>	Key <code><KeyID></code> has issued an <code><EventID></code> .
--	---

Additional Responses in Mode 4:

<code>K_B_<FunctionID></code>	Function with <code><FunctionID></code> was invoked and started; the execution needs time to complete.
-------------------------------------	--

Parameters

Name	Type	Values	Meaning
<code><Mode></code>	Integer	1	Functions are executed, no indications are sent (factory setting)
		2	Functions are not executed, no indications are sent
		3	Functions are not executed, indications are sent
		4	Functions are executed, indications are sent
<code><EventID></code>	Char	R	Key was pressed and held around 2 seconds
		C	Key was released (after being pressed shortly or for 2 second)
<code><FunctionID></code>	Integer	0	Adjustment
		1	Tare
		2	Zero
		3	Data transfer to printing device
		4 ... 6	Reserved for future use
	7	Test	
<code><KeyID></code>	Integer		Indicator for pressed key

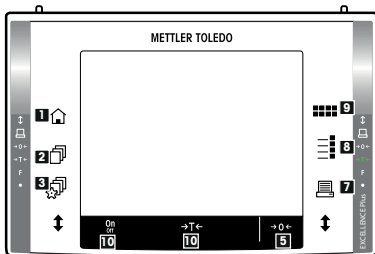
<KeyID>	Integer	1		Home
		2		User profile (XP/XPE balances or PWT terminal only)
		3		Settings (XP/XPE balances or PWT terminal only)
		4	reserved	
		5		Zero
		6	reserved	
		7		Transfer
		8		Configure actual applications
		9		Applications
		10		Tare On/Off/On/Off

Comments

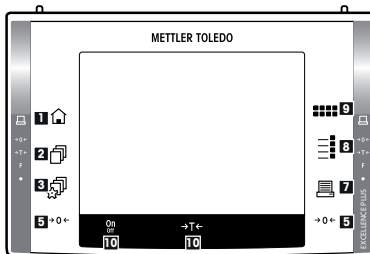
- There is no key number assigned to the door keys; therefore, no response is invoked upon pressing one of these keys.
- K_1 is the factory setting (default value).
- K_1 active after balance switched on and after the cancel command [@ ▶ Page 15].
- K_2 door function is not disabled.
- Only one κ mode is active at one time.
- The mapping of the key numbers on the different terminals are displayed below:

The terminal XS (SWT) is delivered with a new design and housing color since Q3/2014. You can find both the old and new designs below:

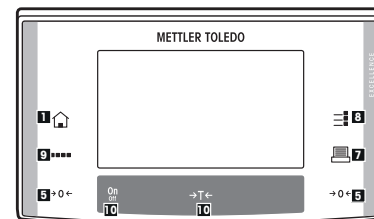
PWT terminal
(e.g. XP Analytical Balances)



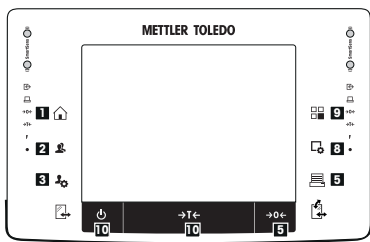
PWT terminal
(e.g. WXTM Weigh Module)



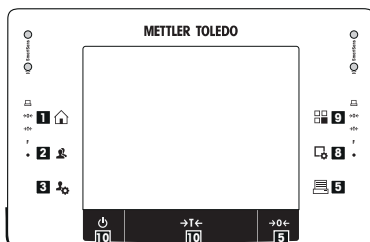
SWT terminal
(e.g. WXTS Weigh Module)



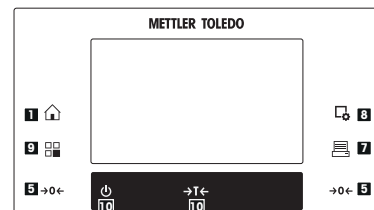
PWT terminal
(e.g. XPE Analytical Balances)



PWT terminal
(e.g. WXTM Weigh Module)



SWT terminal with new terminal design
(e.g. WXTS Weigh Module)



Example

When a code with a long press is sent, new key commands will not be accepted.

↓	K_4	Set mode 4: when a key is pressed, execute the corresponding function and send the function number as a response.
---	-----	---

↑	K_A	Command executed successfully.
↑	K_B_1	The taring function has been started → taring active.
↑	K_A_1	Taring completed successfully.
↑	K_B_1	The taring function has been started → taring active.
↑	K_I_1	Taring not completed successfully, taring aborted (e.g. tried to tare a negative value).

LST – Current user settings

Description

Use the `LST` command to listing of general module data and current settings which can be changed by the user.

Syntax

Command

<code>LST</code>	Listing of general module data and current settings which can be changed by the user.
------------------	---

Responses

<code>LST_B_I2_"WMS204-L_Standard_410.0090_g"</code>	Returns the module data (header).
<code>LST_B_I3_"1.0_1.23.4.567.890"</code>	Returns the firmware version and the type definition number (header).
<code>LST_B_I4_"1234567890"</code>	Returns the serial number (header).
<code>LST_B_C4_"0"</code>	Returns whether an initial adjustment by the user was performed ("1") or not ("0") (header).
<code>LST_B_Cx_"0"</code>	Returns whether internal or external adjustment by the user was performed ("1") or not ("0") (header).
<code>LST_B_C0_0_0</code>	Sets the adjustment settings (calibration settings) (first command of the user settings).
...	
<code>LST_A_WMCF_0</code>	Inquires the configuration of the weight monitoring function (last command of the user settings).

Comments

- The general module data are output in a five-line header ("I2" to "Cx"). This is followed by the current user settings in alphabetical sequence.
- The foregoing responses are examples. The actual responses depend on the current settings.

Examples

↓	<code>LST</code>	Query of the list of all current user settings.
↑	<code>LST_B_I2_"WMS204-L_410.0090_g"</code>	Returns the module data (header).
↑	<code>LST_B_I3_"1.0_1.23.4.567.890"</code>	Returns the firmware version and the type definition number (header).
↑	<code>LST_B_I4_"1234567890"</code>	Returns the serial number (header).
↑	<code>LST_B_C4_"0"</code>	Initial adjustment information (header).
↑	<code>LST_B_Cx_"0"</code>	Internal or external adjustment information (header).
↑	<code>LST_B_C0_0_0</code>	First command of the user settings.
↑
↑	<code>LST_A_WMCF_0</code>	Last command of the user settings.

M01 – Weighing mode

Description

Use M01 to set the weighing mode or query the current setting.

Syntax

Commands

M01	Query of the current weighing mode.
M01_<WeighingMode>	Set the weighing mode.

Responses

M01_A_<WeighingMode>	Current weighing mode.
M01_A	Command understood and executed successfully.
M01_I	Command understood but currently not executable.
M01_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<WeighingMode>	Integer	0	Normal weighing/Universal
		1	Dosing
		2	Sensor mode
		3	Check weighing
		6	Raw weight values / No filter

Comments

- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.
- Please check possible settings with product specific Reference Manual.

Examples

↓	M01	Query of the current weighing mode.
↑	M01_A_4	Dynamic weighing mode is set.
↓	M01_1	Set the weighing mode to dosing.
↑	M01_A	Dosing is set.

See also

- 📖 I46 – Selectable weighing modes ▶ Page 106
- 📖 M02 – Environment condition ▶ Page 145
- 📖 FCUT – Filter characteristics (cut-off frequency) ▶ Page 83

M02 – Environment condition

Description

Use M02 to adjust the balance so that it is optimized for the local ambient conditions, or to query the current value.

Syntax

Commands

M02	Query of the current environment.
M02_<Environment>	Set the environment.

Responses

M02_A_<Environment>	Current environment.
M02_A	Command understood and executed successfully.
M02_I	Command understood but currently not executable.
M02_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Environment>	Integer	0	Very stable
		1	Stable
		2	Standard
		3	Unstable
		4	Very unstable

Comments

- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.
- If [FCUT ▶ Page 83] is activated ($\langle \text{Frequency} \rangle \geq 0.001$ Hz) and weighing mode, **see** [M01 ▶ Page 144] is 2 (sensor mode), it will override any settings for ambient conditions (M02) in sensor mode.
- Not all balances offer the complete range of settings. If a setting is made that is not supported by the balance, an error message is issued (M02_L).

Example

↓	M02_3	Set the environment to unstable.
↑	M02_A	Environment is set.

See also

- 📖 FCUT – Filter characteristics (cut-off frequency) ▶ Page 83
- 📖 M01 – Weighing mode ▶ Page 144

M03 – Auto zero function

Description

Use M03 to switch the auto zero function on or off and query its current status.

Syntax

Commands

M03	Query of the current auto zero function.
M03_<AutoZero>	Set the auto zero function.

Responses

M03_A_<AutoZero>	Current auto zero function
M03_A	Command understood and executed successfully.
M03_I	Command understood but currently not executable.
M03_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<AutoZero>	Integer	0	Auto zero is switched off (is not supported by approved balances)
		1	Auto zero is switched on

Comment

- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	M03_1	Switch on the auto zero function.
↑	M03_A	Auto zero function is activated.

M17 – ProFACT: Single time criteria

Description

Use M17 to set the time and days when a ProFACT adjustment should be executed automatically, or to query the current setting.

 **Note** The settings ProFACT/FACT and days are model dependent.

Syntax

Commands

M17	Query of the current ProFACT time criteria.
M17_<Hour>_<Minute>_<Second>_<Days>	Set the ProFACT time criteria.

Responses

M17_A_<Hour>_<Minute>_<Second>_<Days>	Current ProFACT time criteria.
M17_A	Command understood and executed successfully.
M17_I	Command understood but currently not executable.
M17_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Hour>	Integer	00 ... 23	Hours
<Minute>	Integer	00 ... 59	Minutes
<Second>	Integer	00 ... 59	Seconds
<Days>	Integer	0	Time criteria is switched off
		2 ⁰ = 1	Monday
		2 ¹ = 2	Tuesday
		2 ² = 4	Wednesday
		2 ³ = 8	Thursday
		2 ⁴ = 16	Friday
		2 ⁵ = 32	Saturday
		2 ⁶ = 64	Sunday

Comments

- The days of the week are written in binary code. Combinations of different days are expressed as the sum of the individual days.
- Only one time criterion can be set using M17; all other times are deactivated. [M32 ▶ Page 161] must be used if you wish to set several different times.
- If two or more times are set [M32 ▶ Page 161] command, resulting in an M17 query, an M17_I response is generated.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Examples

↓	M17_12_00_00_5	Set the ProFACT time criteria to Monday and Wednesday (5 = 1 + 4) at 12:00 h.
↑	M17_A	ProFACT time criteria is set.
↓	M17	Query of the current ProFACT time criteria.

↑	M17_A_12_00_00_127	The balance will currently be adjusted every day ($127 = 1 + 2 + 4 + 8 + 16 + 32 + 64$) at 12:00 h.
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M18 – ProFACT/FACT: Temperature criterion

Description

Use M18 to set the temperature criterion for triggering a ProFACT adjustment, or to query the current value.

Syntax

Commands

M18	Query of the current ProFACT/FACT temperature criterion.
M18_<Criterion>	Set the ProFACT/FACT temperature criterion.

Responses

M18_A_<Criterion>	Current ProFACT/FACT temperature criterion.
M18_A	Command understood and executed successfully.
M18_I	Command understood but currently not executable.
M18_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Criterion>	Integer	0 ... 4	The settings of temperature criterion values depend on the balance model and system setup (bridge module with/without terminal)
		0	Temperature criterion is switched off
		1	0.5 Kelvin
		2	1.0 Kelvin
		3	2.0 Kelvin
		4	3.0 Kelvin

Comments

- Temperature difference (Δ temp.) is defined as the criterion. The balance is automatically adjusted if the temperature of the balance changes by the defined temperature difference.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	M18_1	Set the ProFACT/FACT temperature criterion to the 1 st setting.
↑	M18_A	1 st setting is activated.

M19 – Adjustment weight

Description

Use M19 to set your external adjustment weight, or to query the current weight value and unit.

Syntax

Commands

M19	Query of the current adjustment weight.
M19_<Value>_<Unit>	Set the adjustment weight.

Responses

M19_A_<Value>_<Unit>	Current adjustment weight.
M19_A	Command understood and executed successfully.
M19_I	Command understood but currently not executable.
M19_L	Command understood but not executable (incorrect parameter) or adjustment weight is too low.

Parameters

Name	Type	Values	Meaning
<Value>	Float		Value of the adjustment weight, balance specific limitation
<Unit>	String		Weight unit of the adjustment weight = defined unit of the balance

Comments

- The adjustment weight must be entered in the defined unit of the balance. This unit can be found by entering a query command M19 without arguments.
- The taring range is specified to the balance type.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Examples

↓	M19	Query of the current adjustment weight.
↑	M19_A_100.123_g	The adjustment weight is 100.123 g.
↓	M19_500.015_g	Set the adjustment weight to 500.015 g.
↑	M19_A	The adjustment weight is set to 500.015 g,

See also

- 📖 C0 – Adjustment setting ▶ Page 22
- 📖 C1 – Start adjustment according to current settings ▶ Page 24
- 📖 C2 – Start adjustment with external weight ▶ Page 26

M20 – Test weight

Description

You can use M20 to define your external test weight or query the currently weight setting.

Syntax

Commands

M20	Query of the current external test weight.
M20_<TestWeight>_<Unit>	Set the external test weight.

Responses

M20_A_<TestWeight>_<Unit>	Current external test weight.
M20_A	Command understood and executed successfully.
M20_I	Command understood but currently not executable.
M20_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<TestWeight>	Float	> 10 digits	Value of the external test weight
<Unit>	String		Weight unit of the external test weight = defined unit of the balance

Comments

- The test weight must be entered in the defined unit of the balance. This unit can be found by entering a query command M20 without arguments.
- Use [TST2 ▶ Page 235] to begin the test procedure with the set weight.

Examples

↓	M20	Query of the current external test weight.
↑	M20_A_100.123_g	The external test weight is 100.123 g.
↓	M20_500.015_g	Set the external test weight to 500.015 g.
↑	M20_A	The external test weight is set to 500.015 g.

M21 – Unit

Description

Use M21 to set the required weighing unit for the output channels of the weight or request current setting.

Syntax

Commands

M21	Query the unit of all output channels.
M21_<Channel>	Query the unit of output channel only.
M21_<Channel>_<Unit>	Set the unit of an output channel.

Responses

M21_B_<Channel>_<Unit> M21_B... M21_A_<Channel>_<Unit>	Current first unit. ... Current last unit.
M21_<Channel>_<Unit>	Unit of output channel.
M21_A	Command understood and executed successfully.
M21_I	Command understood but currently not executable.
M21_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Channel>	Integer	0	Host unit, used on the MT-SICS Host
		1	Display unit, used on the terminal screen
		2	Info unit, used in the info field on the terminal screen

Name	Type	Values	Meaning		
<Unit>	Integer	0	Gram	g	
		1	Kilogram	kg	
		2	reserved		
		3	Milligram	mg	
		4	Microgram	µg	
		5	Carat	ct	
		6	Newton	N	
		7	Pound avdp	lb	
		8	Ounce avdp	oz	
		9	Ounce troy	ozt	
		10	Grain	GN	
		11	Pennyweight	dwt	
		12	Momme	mom	
		13	Mesghal	msg	
		14	Tael Hongkong	tlh	
		15	Tael Singapore	tls	
		16	Tael Taiwan	tlt	
		17	Tical	tcl	
		18	Tola	tola	
		19	Baht	baht	
		20	lb	oz	
		25	no unit	--	
		26	Piece	PCS	available with application "Counting"
		27	Percent	%	available with application "Percent"
		28	Custom unit 1	cu1	available if custom unit 1 is switched on [M22 ▶ Page 155]
		29	Custom unit 2	cu2	available if custom unit 2 is switched on [M22 ▶ Page 155]
		30	Currency unit 1		available if currency unit 1 is switched on [M22 ▶ Page 155]
		31	Currency unit 2		available if currency unit 2 is switched on [M22 ▶ Page 155]

Comments

- All `s` commands (except `su`) are given in Host unit according to the definition of the MT-SICS. Only weight units are accepted as Host unit.
- In the event of a power failure, the host unit is lost and, following a restart, the weighing unit is displayed as "g".
- It is not possible to use "no unit" for the displayed unit.
- The units and/or their notation may be different in older software versions.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Examples

↓	M21	Query of the current unit.
↑	M21_B_0_0 M21_B_1_3 M21_A_2_5	Current host unit is g. Current display unit is mg. Current info unit is carat.
↓	M21_0_1	Set the unit to 1 kg.
↑	M21_A	The unit is set to 1 kg.

M22 – Custom unit definitions

Description

You can use M22 to set your own custom unit or query the currently defined custom unit.

Syntax

Commands

M22	Query of the current custom unit definitions.
M22_<No>_<Formula>_<Factor>_<Unit>_<Rounding>	Set the custom unit(s).

Responses

M22_B_<No>_<Formula>_<Factor>_<Unit>_<Rounding> M22_B...	Current first custom unit. ... Current last custom unit.
M22_A_<No>_<Formula>_<Factor>_<Unit>_<Rounding>	
M22_A	Command understood and executed successfully.
M22_I	Command understood but currently not executable.
M22_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<No>	Integer	1 ... max. units	Number of custom unit
<Formula>	Integer	0 1	(net weight) x factor factor/(net weight)
<Factor>	Float		Factor
<Unit>	String		Unit name (max. 4 characters)
<Rounding>	Float		Rounding step

Comments

- To query or define a custom unit, it must be switched on [M21 ▶ Page 152].
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	M22	Query of the current custom unit definitions.
↑	M22_B_1_0_15.5_"sfr"_0.05	The first custom unit is (net weight) x 15.5 sfr, rounded to 0.05.
↑	M22_A_2_1_25.4_"h1"_0.1	The second custom unit is 25.4/(net weight) h1, rounded to 0.1.

M23 – Readability, 1d/xd

Description

Use `M23` to set how many digits of the weighing result should be displayed or output and whether the value should be rounded, or to query the current value setting.

Syntax

Commands

<code>M23</code>	Query of the current readability.
<code>M23_<Readability></code>	Set the readability.

Responses

<code>M23_A_<Readability></code>	Current readability.
<code>M23_A</code>	Command understood and executed successfully.
<code>M23_I</code>	Command understood but currently not executable.
<code>M23_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<code><Readability></code>	Integer	0	1d
		1	10d
		2	100d
		3	1000d
		4	2d
		5	5d

Comments

- It is the balance model that determines which parameters can be changed.
- The customer unit [M22 ▶ Page 155] will not be changed with the `M23` command.
- `M23` has no influence of the stability criteria for the [taring ▶ Page 225] and [zeroing ▶ Page 244] commands.
- The readability is specified in digits [d] – this is the smallest increment a balance may display.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.
- The stability criteria for the weight result (weighing commands) will be adapt to the selected readability based on the USTB setting.

Example

↓	<code>M23_1</code>	Set the readability to 10d.
↑	<code>M23_A</code>	The readability is set to 10d.

See also

- 📖 M22 – Custom unit definitions ▶ Page 155
- 📖 T – Tare ▶ Page 225
- 📖 Z – Zero ▶ Page 244

M27 – Adjustment history

Description

Use M27 to call up the adjustment history.

Syntax

Command

M27	Query of the adjustment history.
-----	----------------------------------

Responses

M27_B_<No>_<Day>_<Month>_<Year>_<Hour>_<Minute>_<Mode>_<"Wgt"> M27_B... M27_A_<No>_<Day>_<Month>_<Year>_<Hour>_<Minute>_<Mode>_<"Wgt">	1 st adjustment entry. ... last adjustment entry.
M27_I	Command understood but currently not executable.
M27_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<No>	Integer	1 ... n	Number of the adjustment entry (n is product dependent)
<Day>	Integer	1 ... 31	Date, day
<Month>	Integer	1 ... 12	Date, month
<Year>	Integer	2000 ... 2099	Date, year
<Hour>	Integer	0 ... 23	Time, hour
<Minute>	Integer	0 ... 59	Time, minute
<Mode>	Integer	0	Internal adjustment
		1	External adjustment
<"Wgt">	String		Weight of the adjustment weight used

Example

↓	M27	Query of the adjustment history.
↑	M27_B_1_1_1_2011_08_26_0_""	1 st adjustment, performed at 1.1.2011, 08:26 h, internal adjustment.
↑	M27_B_2_14_12_2010_14_30_1_ "200.1234_g"	2 nd adjustment, performed at 14.12.2010, 14.30 h, external adjustment, weight 200.1234 g.
↑	M27_A_3_14_12_2010_8_26_1_ "200.1234_g"	3 rd adjustment, performed at 14.12.2010, 08:26 h, external adjustment, weight 200.1234 g.

M28 – Temperature value

Description

Use M28 to query the temperature value.

Syntax

Command

M28	Query of the current temperature value.
-----	---

Responses

M28_B_<No>_<TempVal>	1 st temperature sensor.
M28_...	...
M28_A_<No>_<TempVal>	last temperature sensor.
M28_A	Command understood and executed successfully.
M28_I	Command understood but currently not executable.

Parameters

Name	Type	Values	Meaning
<No>	Integer	1 ... n	Number of temperature sensors (n is product dependent)
<TempVal>	Float		Temperature sensor value in °C

Comments

- The number of temperature sensors depends on the product.
- There is no more information available about the temperature offset and resolution.

Example

↓	M28	Query of the current temperature value.
↑	M28_A_1_22.5	There is only one temperature sensor available. The temperature value is 22.5 °C.

M29 – Weighing value release

Description

Use M29 to define the weight value release or query the current setting.

Syntax

Commands

M29	Query of the current value release setting.
M29_<ValueRelease>	Set the value release.

Responses

M29_A_<ValueRelease>	Current value release.
M29_A	Command understood and executed successfully.
M29_I	Command understood but currently not executable.
M29_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<ValueRelease>	Integer	0	Very fast
		1	Fast
		2	Reliable and fast
		3	Reliable
		4	Very reliable

Comments

- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.
- Not all balances offer the complete range of settings. If a setting is made that is not supported by the balance, an error message is issued (M29_L).

Example

↓	M29_3	Set the value release to reliable.
↑	M29_A	The value release is set to reliable.

M31 – Operating mode after restart

Use M31 to set the operating mode of the device following restart.

Description

Syntax

Commands

M31	Query of the current operating mode following restart.
M31_<Mode>	Set the operating mode following restart.

Responses

M31_A_<Mode>	Current settings of operating mode following restart.
M31_A	Command understood and executed successfully.
M31_L	Command understood but not executable (not permitted).

Parameter

Name	Type	Values	Meaning
<Mode>	Integer	0	User mode
		1	Production mode
		2	Service mode
		3	Diagnostic mode

Comment

- Customer can only use the user- and diagnostic mode. All other settings will give a M31_L response.

Examples

↓	M31	Query of the current operating mode following restart.
↑	M31_A_0	The operating mode following restart is: user mode.
↓	M31_1	Set the production mode as operating mode after restart.
↑	M31_A	Operating mode is set.

M32 – ProFACT: Time criteria

Description

You can use M32 to set several times at which an automatic ProFACT adjustment procedure should be carried out, or query the current settings. The days of the week are defined with [M33 ▶ Page 161].

* Only modules with internal adjustment

Syntax

Commands

M32	Query of the current ProFACT time criteria.
M32_<Number>_<Hour>_<Minute>_<Status>	Set the ProFACT time criteria.

Responses

M32_B_<Number>_<Hour>_<Minute>_<Status> M32_B.. M32_A_<Number>_<Hour>_<Minute>_<Status>	Current ProFACT time criteria.
M32_A	Command understood and executed successfully.
M32_I	Command understood but currently not executable.
M32_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Number>	Integer	0 ... 3	FACT time index
<Hour>	Integer	00 ... 23	Hours
<Minute>	Integer	00 ... 59	Minutes
<Status>	Integer	0	Time deactivated (off)
		1	Time activated (on)

Comments

- Only 1 time criterion can be set using [M17 ▶ Page 147]; all other times are permanently deactivated. M32 and [M33 ▶ Page 162] must be used if you wish to set several different times.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Examples

↓	M32_2_12_00_1	ProFACT time 2 set to 12:00 and activated (on).
↑	M32_A	ProFACT time criteria is set.
↓	M32	Query of the current ProFACT time criteria.
↑	M32_B_1_09_00_1	The balance will currently be adjusted at 9:00 h, 12:00 and 15:00 h.
↑	M32_B_2_12_00_1	
↑	M32_A_3_15_00_1	

M33 – ProFACT: Day of the week

Description

You can use M33 to set the days of the week on which a ProFACT adjustment procedure should be carried out, or to query the current settings. The times for each are defined using [M32 ▶ Page 161].

* Only modules with internal adjustment

Syntax

Commands

M33	Query of the current ProFACT weekday.
M33_<Weekday>	Set the ProFACT weekday.

Responses

M33_A_<Weekday>	Current ProFACT weekday.
M33_A	Command understood and executed successfully.
M33_I	Command understood but currently not executable.
M33_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<WeekDay>	Integer	0	Time criteria is switched off
		$2^0 = 1$	Monday
		$2^1 = 2$	Tuesday
		$2^2 = 4$	Wednesday
		$2^3 = 8$	Thursday
		$2^4 = 16$	Friday
		$2^5 = 32$	Saturday
		$2^6 = 64$	Sunday

Comments

- The days of the week are written in binary code. Combinations of different days are expressed as the sum of the individual days.
- Only 1 time criterion can be set using [M17 ▶ Page 147]; all other times are deactivated. [M32 ▶ Page 161] and M33 must be used if you wish to set several different times.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	M33_5	Time adjustments are made on Mondays and Wednesdays ($5 = 1 + 4$).
↑	M33_A	ProFACT weekday is set.

M34 – MinWeigh: Method

Description

Use M34 to select the MinWeigh method you wish to work with, or query the currently set MinWeigh method.

Syntax

Commands

M34	Query of the current MinWeigh method.
M34_<Method>	Set the MinWeigh method.

Responses

M34_A_<Method>	Current MinWeigh method.
M34_A	Command understood and executed successfully.
M34_I	Command understood but currently not executable.
M34_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Method>	Integer	0	MinWeigh deactivated
		1	Method 1 activated
		2	Method 2 activated
		3	Method 3 activated

Comments

- MinWeigh can only be activated by a service technician.
- For additional information on minimum weight (MinWeigh), **see** the Reference Manual of the balance.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Examples

↓	M34	Query of the current MinWeigh method.
↑	M34_A_3	The MinWeigh method is 3.
↓	M34_1	Set the MinWeigh method to 1.
↑	M34_A	MinWeigh method 1 is set.

M35 – Zeroing mode at startup

Description

You can use M35 to save the last zero. Following a power failure, the balance will resume operation with the saved zero. In normal mode M35_0, the balance specifies a new zero reference point at start-up as soon as a stable condition has been achieved.

Syntax

Commands

M35	Query of the current zeroing mode at startup.
M35_<Mode>	Set the zeroing mode at startup.

Responses

M35_A_<Mode>	Current zeroing mode at startup.
M35_A	Command understood and executed successfully.
M35_I	Command understood but currently not executable.
M35_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Mode>	Integer	0	Normal mode
		1	Start with saved zero or save last zero

Comments

- If the mode is set to 1 when the balance is started up, the fail-safe, saved zero is used.
- For certification reasons, this command may only be executed on normal balances. Certifiable balances do not have this function.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	M35_1	Save the last zero and use it at following startup.
↑	M35_A	Start-up zeroing mode is set.

M38 – Selective parameter reset

Description

Use M38 to execute a reset of selected parameters.

Syntax

Command

M38_<ResetMode>	Execute reset
-----------------	---------------

Responses

M38_A	Command understood and executed successfully.
M38_I	Command understood but currently not executable.
M38_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<ResetMode>	Integer	0	Actions, reset, clear window
		1	Applications reset
		2	User reset
		3	Master reset

Comments

- After user- and master reset the module performs a complete restart similar to startup after power up.
- <ResetMode> 1 to 3 not yet implemented.

Example

↓	M38_0	Execute a actions reset.
↑	M38_A	Command understood and executed successfully.

See also

📖 FSET – Reset all settings to factory defaults ▶ Page 84

M39 – SmartTrac: Graphic

Description

You can use M39 to set the type of SmartTrac graphic (used weighing range graphic) or query the current setting.

Syntax

Commands

M39	Query of the current SmartTrac Graphic.
M39_<SmartTrac>	Set the SmartTrac Graphic.

Responses

M39_A_<SmartTrac>	Current setting of the SmartTrac Graphic.
M39_A	Command understood and executed successfully.
M39_I	Command understood but currently not executable.
M39_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning (Nominal =0)	Meaning (Nominal > 0)
<SmartTrac>	Integer	0	No SmartTrac	Weighing-in graphic
		1	Round SmartTrac	Round weighing in SmartTrac
		2	SmartTrac bar	Weighing-in SmartTrac bar
		3	SmartTrac measuring beaker	SmartTrac crosshairs

Comments

- If the application contains a nominal value that is > 0, the used weighing range graphics mentioned above are automatically displayed as weighing-in graphics listed in the left-most column.
- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	M39_2	Set the SmartTrac bar.
↑	M39_A	SmartTrac bar has been set.

M43 – Custom unit

Description

Use M43 to activate or deactivate custom units (Custom Unit1, Custom Unit2).

Syntax

Commands

M43	Query of the current custom unit setting.
M43_<CustomUnitNumber>_<Mode>	Write new custom unit.

Responses

M43_B_<CustomUnitNumber>_<Mode> M43_B.. M43_A_<CustomUnitNumber>_<Mode>	Current custom units.
M43_A	Command understood and executed successfully.
M43_I	Command understood but currently not executable.
M43_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<CustomUnitNumber>	Integer	1	Custom Unit1
		2	Custom Unit2
<Mode>	Integer	0	Deactivate custom unit
		1	Activate custom unit

Comments

- Dependency: [M21 ▶ Page 152] - Unit (Host-, Display- and Info-Unit)
[M22 ▶ Page 155] - Custom unit definitions (Formula, Factor, Unit, Rounding)
- Custom units cannot be fully defined or managed via Host.

Examples

↓	M43	Query of current custom unit settings.
↑	M43_B_1_1 M43_A_2_0	Custom Unit1 is on. Custom Unit2 is off.

↓	M43_1_0	Deactivated Custom Unit1
↑	M43_A	Command understood and executed successfully

M44 – Command executed after startup response

Description

Use M44 to set or query the command executed after startup.

Syntax

Commands

M44	Query of the current startup command setting.
M44_<Interface>_<"Command">	Set the startup command.

Responses

M44_B_<Interface>_<"Command">	Interface number 0.
M44_B...	...
M44_A_<Interface>_<"Command">	Interface number n.
M44_A	Command understood and executed successfully.
M44_I	Command understood but currently not executable.
M44_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Interface>	Integer	0 ... n	Interface number
<"Command">	String	max 64 chars	MT-SICS Command after startup

Comments

- Command executed after [14 ▶ Page 89] and after initial zero.
- An invalid command leads to ES after start up.

Examples

↓	M44	Query of the current startup command setting.
↑	M44_B_0_""	There is no command specified on interface 0.
	M44_A_1_"SIR"	Starts SIR after startup on interface 1.
↓	M44_0_"SR_1_g"	Start SR command after startup on interface 0.
↑	M44_A	Command understood and executed successfully.

M45 – Electrical termination of RS422/ RS485 data lines

Description

Use M45 to set the electrical termination of RS422/RS485 data lines switch state.

Syntax

Commands

M45	Query of the current RS electrical termination setting.
M45_<Interface>_<OnOff>	Set RS electrical termination on or off.

Responses

M45_B_<Interface>_<State>	Interface number 0.
M45_B...	...
M45_A_<Interface>_<State>	Interface number n.
M45_A	Command understood and executed successfully.
M45_I	Command understood but currently not executable.
M45_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Interface>	Integer	0 ... n	Interface number, see [COM ► Page 44]
<State>	Boolean	ON = 1 Off = 0	RS422 bus termination setting

Comments

- Only bus systems like RS422 will be shown in the list.
- Default setting is M45_0 = off.

Examples

↓	M45	Query of the RS electrical termination setting.
↑	M45_A_1_1	RS bus termination on interface 1 is on. There is only one bus interface available.
↓	M45_1_0	Set RS electrical termination to Off.
↑	M45_A	Command understood and executed successfully.

M47 – Frequently changed test weight settings

Description

Use M47 to read and write the frequently changed test weight settings, such as actual weight and next calibration date.

Syntax

Commands

M47	Query of the current test weight settings.
M47_<Number>	Query of the specific test weight setting.
M47_<Number>_<"Actual-Weight">_<"Unit">_<Day>_<Month>_<Year>	Write new test weight settings for the specific test weight.

Responses

M47_B_<Number>_<"Actual-Weight">_<"Unit">_<Day>_<Month>_<Year> M47_B... M47_A_<Number>_<"Actual-Weight">_<"Unit">_<Day>_<Month>_<Year>	Current test weight settings.
M47_A	Command understood and executed successfully.
M47_I	Command understood but currently not executable.
M47_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Number>	Integer	1 ... 12	Number of the test weight.
<"ActualWeight">	String	Max 10 chars	Actual weight of the test weight.
<"Unit">	String	Max 2 chars	Actual unit of the test weight.
<Day>	Integer	1 ... 31	Day of the next calibration date.
<Month>	Integer	1 ... 12	Month of the next calibration date.
<Year>	Integer	2000 ... 2099	Year of the next calibration date.

Comments

- These initial values are set by the GWP software on the weigh module, balance.
- The parameter "Number" corresponds with the "Number" of [M48 ▶ Page 172] command.
- To write the infrequently changed parameters, the command "[M48 ▶ Page 172]" is used.
- The following conditions must be met before a test weight is considered valid: if name is defined (max 20 characters), if weight value is defined (more than 0), and if unit is valid.
- This command is available only in XP and XS balances and is not supported in XA balances.

Examples

↓ M47	Query of the list for all test weight settings.
-------	---

↑	M47_B_1_"100.0"_"g"_"12_10_2010 M47_B_2_"9.9999"_"g"_"19_08_2010 M47_B_3_"20.0001"_"g"_"10_12_2009 M47_B_4_"0"_"mg"_"12_09_2011 M47_B_5_"0"_"g"_"31_12_2099 M47_B_6_"0"_"g"_"31_12_2099 M47_B_7_"0"_"g"_"31_12_2099 M47_B_8_"0"_"g"_"31_12_2099 M47_B_9_"0"_"g"_"31_12_2099 M47_B_10_"0"_"g"_"31_12_2099 M47_B_11_"0"_"g"_"31_12_2099 M47_A_12_"0"_"g"_"31_12_2099	The first three test weight settings are defined correctly, the fourth weight is not completely defined (weight value is still 0) and the rest is not defined at all.
↓	M47_1	The parameters of the first test weight are requested.
↑	M47_A_1_"100.0"_"g"_"10_11_2010	The requested test weight has an actual value of 100 grams and the next recalibration is on November 10 th 2010.
↓	M47_1_"20.0"_"g"_"10_12_2012	Parameters of the first test weight are changed.
↑	M47_A	The test weight's actual weight is set to 20 grams and the next recalibration date to December 10 th 2012.

M48 – Infrequently changed test weight settings

Description

Use M48 to read and write the infrequently changed test weight settings, such as actual weight and next calibration date.

Syntax

Commands

M48	Query of the infrequently used test weight settings.
M48_<Number>	Query of the specific infrequently used test weight setting.
M48_<Number>_<"Name">_<"ID">_<"Class">_<"Certificate">_<"Set">	Write new infrequently used test weight settings for the specific test weight.

Responses

M48_B_<Number>_<"Name">_<"ID">_<"Class">_<"Certificate">_<"Set"> M48_B... M48_A_<Number>_<"Name">_<"ID">_<"Class">_<"Certificate">_<"Set">	Current test weight settings.
M48_A	Command understood and executed successfully.
M48_I	Command understood but currently not executable.
M48_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Number>	Integer	1 ... 12	Number of the test weight.
<"Name">	String	Max 20 chars	Name of the test weight.
<"ID">	String	Max 20 chars	ID of the test weight.
<"Class">	String	See Comments	Class of the test weight.
<"Certificate">	String	Max 20 chars	Certificate of test weight.
<"Set">	String	Max 20 chars	Set number of test weight.

Comments

- The parameter "Number" corresponds with the "Number" of [M47 ▶ Page 170] command.
- Examples for Weight classes: E1, E2, F1, F2, M1, M2, M3, ASTM1, ASTM2, ASTM3, ASTM4, ASTM5, ASTM6, ASTM7.
- The following conditions must be met before a test weight is considered valid: if name is defined (max 20 characters), if weight value is defined (more than 0), and if unit is valid.
- This command is available only in XP and XS balances and is not supported in XA balances.

Examples

↓	M48	Query of the list for all infrequently used test weight settings.
---	-----	---

↑	<pre> M48_B_1_"50gQK"_"798012"_"E1"_" 1231"_"4551" M48_B_2_"55gQK"_"798013"_"E1"_" 1232"_"4552" M48_B_3_"60gQK"_"798014"_"E1"_" 1233"_"4553" M48_B_4_"Test/Adj. Weight 4"_"_"E1"_"_"_" M48_B_5_"Test/Adj. Weight 5"_"_"E1"_"_"_" M48_B_6_"Test/Adj. Weight 6"_"_"E1"_"_"_" M48_B_7_"Test/Adj. Weight 7"_"_"E1"_"_"_" M48_B_8_"Test/Adj. Weight 8"_"_"E1"_"_"_" M48_B_9_"Test/Adj. Weight 9"_"_"E1"_"_"_" M48_B_10_"Test/Adj. Weight 10"_"_"E1"_"_"_" M48_B_11_"Test/Adj. Weight 11"_"_"E1"_"_"_" M48_A_12_"Test/Adj. Weight 12"_"_"E1"_"_"_" </pre>	The first three test weight settings that are infrequently used are defined correctly, and the rest is not defined at all.
↓	M48_1	The infrequently used parameters of the first test weight are requested.
↑	<pre> M48_A_1_"50gQK"_"798012"_"E1"_" 5467"_"4556" </pre>	The actual test weight name of the requested test weight is 50gQK, the weight ID is 798012, the weight class is E1, the weight certificate is 5467 and the weight set number is 4556.
↓	<pre> M48_3_"100gQK"_"10988"_"F1"_"5991"_" 4111" </pre>	Parameters of the third test weight are changed.
↑	M48_A	Command understood and executed successfully.

See also

📖 M47 – Frequently changed test weight settings ▶ Page 170

M49 – Permanent tare mode

Description

Define tare value used for start-up. Normal behavior stores tare value to volatile memory and tare value is set back to zero for start-up (compare [M35 ▶ Page 164] for zero value). Permanent behavior stores tare value to nonvolatile memory (pre-tare value, see [TA ▶ Page 226]) and provides tare value for start-up. Two modes for permanent behavior are distinguished:

- one-time storage of current tare value by sending M49 command with tare mode 1
- continuous storage of last tare value by activation of mode 2

Syntax

Command

M49	Request the tare behavior.
M49_<TareMode>	Set the tare behavior.

Responses

M49_A_<TareMode>	Display the tare mode.
M49_A	Command understood and executed successfully.
M49_I	Command understood but currently not executable.
M49_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<TareMode>	Integer	0	Normal, tare set to zero upon startup
		1	Permanent tare used on startup, one-time storage of current tare
		2	Permanent tare used on startup, continuous storage of last tare value

Comment

- Command is similar to M35 command (permanent zero mode).

Examples

↓	M49	Request the tare behavior.
↑	M49_A_1	Permanent tare is used after startup.
↓	M49_0	Set normal tare behavior after next startup.
↑	M49_A	Command understood and executed successfully.
↓	M49_1	Set permanent tare behavior after next startup.
↑	M49_A	Command understood and executed successfully.

M66 – GWP: Certified test weight settings

Description

Use M66 command to read and write the certified test weight settings. It is used primarily for the Matrix-Code of the weight certificate of METTLER TOLEDO. It allows directly import the settings of a certified weight from the certificate into the weigh module and thus eliminates any typing errors.

Syntax

Commands

M66	Query of the data from one weight only.
M66_<"ID">_<"Class">_<"Certificate">_<"ActualWeight">_<"Unit">_<Day>_<Month>_<Year>	Set data of one weight only.

Responses

M66_A_<"ID">_<"Class">_<"Certificate">_<"ActualWeight">_<"Unit">_<Day>_<Month>_<Year>	Current data from one weight only.
M66_A	Command understood and executed successfully.
M66_I	Command understood but currently not executable.
M66_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<"ID">	String	5 ... 20 chars	Identification of the test weight
<"Class">	String	5 ... 20 chars	Class of the test weight
<"Certificate">	String	5 ... 20 chars	Certificate of test weight
<"ActualWeight">	String	Max 20 chars	Actual weight of the test weight
<"Unit">	String	Max 2 chars	Unit of the actual weight
<Day>	Integer	1 ... 31	Day of the next calibration date, e.g. 05 (Format: dd)
<Month>	String	1 ... 12	Month of the next calibration date, e.g. 11 (Format: mm)
<Year>	Integer	2000 ... 2099	Year of the next calibration date, e.g. 2009 (Format: yyyy)

Comments

- Query of whole list of entries is not possible. Use [M47 ▶ Page 170] and [M48 ▶ Page 172] to get information about all specific tests.
- The initial values are set by the software on the weigh module, balance.
- Examples for Weight classes: E1, E2, F1, F2, M1, M2, M3, ASTM1, ASTM2, ASTM3, ASTM4, ASTM5, ASTM6, ASTM7
- Please note that this command has a product specific implementation.
- This command is available only in XP and XS balances and is not supported in XA balances.

Examples

↓	M66	
↑	M66_A_"A-0926748"_E1_"MT-089987"_99.99807"_g"_21_07_210	The query was uniquely defined for the balance, the balance responds with the inquired data.

↓	M66	
↑	M66_I	The device is not ready to read the test/adj. weight settings. (e.g. there are more than one Test / Adj. weight available, therefore the query could not be answered.
↓	M66_"A-0926748_"E1_"MT-089987_"99.99807_"g_"21_07_210	Write data on the balance.
↑	M66_A	The received data are valid and has been stored on the balance.
↓	M66_"A-0926748_"E1_"MT-089987_"99.99807_"g_"21_07_210	Write data on the balance.
↑	M66_I	The device is not ready to read the test/adj. weight settings. (e.g. there are more than one Test / Adj. Weight available, therefore the query could not be answered. See product specific implementation).

M67 – Timeout

Description

Command M67 provides the possibility to configure the timeout used in commands like "S", "Z" etc to better meet the actual need.

Syntax

Command

M67	Query the actual timeout.
M67_<Timeout>	Set the timeout in seconds.

Responses

M67_A_<Timeout>	Current timeout in seconds.
M67_A	Command understood and executed successfully.
M67_I	Command understood but currently not executable.
M67_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Timeout>	Integer	0 ... 65535	Timeout in seconds

Comments

- This command affects the behavior of the commands [S ▶ Page 202], [Z ▶ Page 244], [T ▶ Page 225] ... [C1 ▶ Page 24] ... [TST1 ▶ Page 233] ... as well as the zeroing procedure at module startup.
- To specify the timeout, only integer numbers ranging from 0 to 65535 are allowed, any decimal places would be truncated.
- Choosing a too short timeout may cause other commands to response with "_I" (e.g. "C3_I" if the timeout is shorter than the time that is needed to place the internal load). Different commands under different conditions may ask different timeouts; therefore, the actual setting has to be approved under real conditions.
- After a [FSET ▶ Page 84] command, the timeout will be reset to the factory default.
- METTLER TOLEDO recommends a minimal timeout of 40 seconds (factory default setting).

Example

↓	M67_60	Set the timeout to 60 seconds.
↑	M67_A	Command understood and executed successfully. The timeout is now 60 seconds.

M68 – Behavior of serial interfaces

Description

This command is used to set the behavior when querying or setting the parameters of the serial interfaces. The behavior can either be configured to store the parameters of the serial interfaces permanently or temporary. If the permanent mode is used the parameters remain in case of a system restart. If the temporary mode is selected the parameters do not remain in case of a system restart. Temporary parameters remain valid until the system is restarted.

Syntax

Command

M68	Query the behavior of the serial interface.
M68_<Mode>	Set the behavior of the serial interface.

Responses

M68_A_<Mode>	Current behavior of the serial interface.
M68_A	Command understood and executed successfully.
M68_I	Command understood but currently not executable.
M68_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<Mode>	Integer	0	Permanent parameter storage
		1	Temporary parameter storage

Examples

↓	M68	Get current storage mode.
↑	M68_A_0	The parameters of the serial interfaces are stored permanently.
↓	M68_1	Set storage mode to temporary.
↑	M68_A	The parameters of the serial interfaces are stored temporary.

M69 – Ipv4 network configuration mode

Description

General introduction: **see** I53 – Ipv4 runtime network configuration information. This specific command will set the mode of how the device will obtain an IP configuration. In case of the mode “Use DHCP, set fallback IP configuration manually”, the IP settings made via the M70 command will be used in case of problems with the DHCP server.

Use M69 to set or query the configuration but does not apply the setting immediately and does not check whether the network stack can support the selected setting. The behavior if the supplied configuration cannot be supported by the network stack is product specific. Example: If DHCP is activated by M69 although DHCP is not supported by the network stack: use a well-known hard-coded IP address.

Syntax

Commands

M69	Query the network configuration mode.
M69_<Index>	Query the network interface index.
M69_<Index>_<Mode>	Set the IP configuration mode for a given network interface.

Responses

M69_B_<Index>_<Mode> M69_B... M69_A_<Index>_<Mode>	Current network configuration mode.
M69_A	Command understood and executed successfully.
M69_I	Command understood but currently not executable (no network interfaces present in the system).
M69_L	Command understood but not executable (no network interfaces with index 0 present in the system).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 or n	Network interface index
		0	1 st network interface
		n	n + 1 th network interface
<Mode>	Integer	0 ... 3	Mode of the IP configuration
		0	Static IP configuration
		1	Use DHCP, obtain fallback IP configuration with AutoIP
		2	Use DHCP, set fallback IP configuration manually
		3	IP networking disabled, no communication possible

Examples

↓	M69	Query the network configuration mode.
↑	M69_B_0_0 M69_B_1_1 M69_A_2_2	The network interface at index 0 is manually configured. The network interface at index 1 is configured for DHCP/AutoIP. The network interface at index 2 is configured for DHCP/Manual.
↓	M69_1	Query the mode of network interface index 1.
↑	M69_A_1_1	The network interface at index 1 is configured for DHCP/AutoIP.

↓	M69_0_0	Set IP configuration mode of network interface index 0 to manual.
↑	M69_A	The IP configuration mode at index 0 is configured for manual.
↓	M69_0_1	Set IP configuration of network interface index 0 to DHCP/AutoIP.
↑	M69_A	The IP configuration mode at index 0 is configured for DHCP/AutoIP.
↓	M69_0_2	Set IP configuration of network interface index 0 to DHCP/Manual.
↑	M69_A	The IP configuration at index 0 is configured for DHCP/Manual.
↓	M69_0_3	Set IP configuration of network interface index 0 to not configured.
↑	M69_A	The IP configuration at index 0 is not configured.

See also

📖 M70 – Ipv4 host address and netmask for static configuration ▶ Page 181

M70 – Ipv4 host address and netmask for static configuration

Description

General Introduction: **see** I53 – Ipv4 runtime network configuration information. This specific command will set a basic IP configuration composed of IPv4 host address and IPv4 netmask address. This configuration will be used by a network device if either the configuration mode M69 is set to manual or the configuration mode is set to DHCP with manual fallback IP configuration.

Syntax

Commands

M70	Query the host address and netmask.
M70_<Index>	Query the host address and netmask of network interface index.
M70_<Index>_<"Host">_<"Netmask">	Set the host address and netmask for a given network interface.

Responses

M70_B_<Index>_<"Host">_<"Netmask"> M70_B_... M70_A_<Index>_<"Host">_<"Netmask">	Current host address and netmask.
M70_A	Command understood and executed successfully.
M70_I	Command understood but currently not executable (no network interfaces present in the system).
M70_L	Command understood but not executable (no network interfaces with index 0 present in the system).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 or n	Network interface index
		0	1 st network interface
		n	n + 1 th network interface
<"Host">	String	Max 15 chars	Ipv4 address (dot-decimal notation) of the device on the given network interface
<"Netmask">	String	Max 15 chars	Ipv4 netmask (dot-decimal notation) on the given network interface

Comments

- If the mode of the IP configuration is set to "DHCP/Manual" M69, the setting of this command only takes effect in the network stack if DHCP fails.
- If the mode of the IP configuration is set to "DHCP/AutoIP" or "not configured" M69, this setting does not take effect in the network stack.

Examples

↓	M70	Query the host address and netmask.
↑	M70_B_0_"10.0.0.3"_<"255.255.255.0"	The host address at index 0 is "10.0.0.3" and the netmask is "255.255.255.0".
	M70_B_1_"192.168.0.11"_<"255.254.0"	The host address at index 1 is "192.168.0.11" and the netmask is "255.254.0".
	M70_A_2_"10.0.1.100"_<"255.255.255.0"	The host address at index 2 is set to "10.0.1.100" and the netmask is set to "255.255.255.0".

↓	M70_1	Query the host address and netmask of network interface index 1.
↑	M70_A_1_ "192.168.0.11" _ "255.255.255.0"	The host address at index 1 is "192.168.0.11" and the netmask is "255.255.255.0".

See also

📄 M69 – Ipv4 network configuration mode ▶ Page 179

M71 – Ipv4 default gateway address

Description

General Introduction: **see** I53 – Ipv4 runtime network configuration information. This specific command will set a default gateway address for a specific network device. This configuration will be used by a network device if either the configuration mode M69 is set to manual or the configuration mode is set to DHCP with manual fallback IP configuration.

Syntax

Commands

M71	Query the default gateway address.
M71_<Index>	Query the default gateway address of network interface index.
M71_<Index>_<"DefaultGateway">	Set the default gateway address for a given network interface.

Responses

M71_B_<Index>_<"DefaultGateway"> M71_B_... M71_A_<Index>_<"DefaultGateway">	Current default gateway address.
M71_A	Command understood and executed successfully.
M71_I	Command understood but currently not executable (no network interfaces present in the system).
M71_L	Command understood but not executable (no network interfaces with index 0 present in the system).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 or n	Network interface index
		0	1 st network interface
		n	n + 1 th network interface
<"DefaultGateway">	String	Max 15 chars	Ipv4 default gateway address (dot-decimal notation) on the given network interface

Comments

- If the mode of the IP configuration is set to "DHCP/Manual" M69, the setting of this command only takes effect in the network stack if DHCP fails.
- If the mode of the IP configuration is set to "DHCP/AutoIP" or "not configured" M69, this setting does not take effect in the network stack.

Examples

↓	M71	Query the default gateway address.
↑	M71_B_0_"10.0.0.1" M71_B_1_"192.168.0.1" M71_A_2_"10.0.1.1"	The default gateway address at index 0 is "10.0.0.1". The default gateway address at index 1 is "192.168.0.1". The default gateway address at index 2 is "10.0.1.1".
↓	M71_1	Query the default gateway address of network interface index 1.
↑	M71_A_1_"192.168.0.1"	The default gateway address at index 1 is "192.168.0.1".

↓	M71_0_"10.0.0.1"	Set the default gateway address of network interface index 0 to "10.0.0.1".
↑	M71_A	The default gateway address at index 0 is set to "10.0.0.1".

See also

📄 M69 – Ipv4 network configuration mode ▶ Page 179

M72 – Ipv4 DNS server address

Description

General Introduction: **see** I53 – Ipv4 runtime network configuration information. This specific command will set a DNS Server address for a specific network device. This configuration will be used by a network device if either the configuration mode M69 is set to manual or the configuration mode is set to DHCP with manual fallback IP configuration.

Syntax

Commands

M72	Query the DNS server address.
M72_<Index>	Query the DNS server address for a network interface index.
M72_<Index>_<"DNSServer">	Set the DNS server address for a given network interface.

Responses

M72_B_<Index>_<"DNSServer"> M72_B_... M72_A_<Index>_<"DNSServer">	Current DNS server address.
M72_A	Command understood and executed successfully.
M72_I	Command understood but currently not executable (no network interfaces present in the system).
M72_L	Command understood but not executable (no network interfaces with index 0 present in the system).

Parameters

Name	Type	Values	Meaning
<Index>	Integer	0 or n	Network interface index
		0	1 st network interface
		n	n + 1 th network interface
<"DNSServer">	String	Max 15 chars	Ipv4 DNS server address (dot-decimal notation) on the given network interface

Comments

- If the mode of the IP configuration is set to "DHCP/Manual" M69, the setting of this command only takes effect in the network stack if DHCP fails.
- If the mode of the IP configuration is set to "DHCP/AutoIP" or "not configured" M69, this setting does not take effect in the network stack.

Examples

↓	M72	Query the DNS server address.
↑	M72_B_0_"10.0.0.1" M72_B_1_"192.168.0.1" M72_A_2_"10.0.1.1"	The DNS server address at index 0 is "10.0.0.1". The DNS server address at index 1 is "192.168.0.1". The DNS server address at index 2 is "10.0.1.1".
↓	M72_2	Query the DNS server address of network interface index 2.
↑	M72_A_2_"10.0.1.1"	The DNS server address at index 2 is "10.0.1.1".

↓	M72_0_"10.0.0.1"	Set the DNS server address of network interface index 0 to "10.0.0.1".
↑	M72_A	The DNS server address at index 0 is set to "10.0.0.1".

See also

📄 M69 – Ipv4 network configuration mode ▶ Page 179

M89 – Interface command set

Description

This command queries and sets the interface command set.

Syntax

Commands

M89	Query the command set of all available interfaces.
M89_<Interface>	Query specific interface command set.
M89_<Interface>_<CmdSet>	Set the specific command set of interface.

Responses

M89_B_<Interface>_<CmdSet>	Current command set of the first available interface.
M89_B..	Current command set of the last available interface.
M89_A_<Interface>_<CmdSet>	
M89_A	Command understood and executed successfully.
M89_I	Command understood but currently not executable.
M89_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Interface>	Integer	0	RS interface 1
		1	RS interface 2 (model dependent)
		2	USB device (model dependent)
<CmdSet>	Integer	0	MT-SICS
		1	MT-PM
		2	Sartorius 22 character output format
		3	Sartorius 16 character output format

Comment

- The value is model dependent.

Examples

↓	M89	Query the command set of all available interfaces.
↑	M89_B_0_0	The RS interface 1 uses the MT-SICS command set.
↑	M89_A_2_1	The USB interface use the MT-PM command set. The balance does not have a RS interface 2.
↓	M89_1_2	Set the RS interface 2 to use the Sartorius command set.
↑	M89_A	The RS Interface 2 uses the Sartorius command set.

M103 – RS422/485 driver mode

Description

Configure RS422/485 driver mode which defines the handling of the two control pins DE (Driver Enable) and RE (Receiver Enable).

Syntax

Command

M103	Query the driver mode.
M103_<Interface>	Query the driver mode of a specific interface.
M103_<Interface>_<DriverMode>	Set the driver mode.

Responses

M103_B_<Interface>_<DriverMode>	Driver modes of all interfaces.
M103_B...	Driver mode of a specific interface.
M103_A_<Interface>_<DriverMode>	
M103_A	Command understood and executed successfully.
M103_I	Command understood but currently not executable.
M103_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Interface>	Integer	0 ... n	Identification for physical serial interface (n is product dependent) The kind of physical serial interface is product specific (RS232, RS422, RS485, USB etc.)
<DriverMode>	Integer	0	RS232 mode
		1	RS422 mode (full-duplex)
		2	RS485 mode (half-duplex) / RS422 mode (half-duplex)

Comments

- The activation of the RS422/485 driver mode is only possible for RS422/485 interfaces.
- The RS422 driver mode allows performing full-duplex communication using 4 unidirectional wires.
- The RS485 driver mode allows performing half-duplex communication using 2 bidirectional wires.
- The setting of data flow control COM may be dependent on the setting of the RS422/485 driver mode and vice versa.

Examples

↓	M103_0_2	Activate RS485 driver mode on the serial interface 0.
↑	M103_A	Command understood and executed successfully.
↓	M103	Query the driver mode.
↑	M103_B_0_0 M103_B_1_2 M103_A_2_0	Serial interfaces 0 and 2 are configured to use the classical RS232 mode, e.g. because the underlying physical interface is RS232 or CL which does not allow RS422/485 modes. The serial interface 1 is configured to use RS485 driver mode.

See also

- 📖 COM – Parameters of the serial interfaces ▶ Page 44

M109 – IPv4 device managed network configuration setting

Description

This command defines the setting for the IPv4 device managed network configuration. If IPv4 device managed network configuration is enabled, the device itself manages its network configuration. The network configuration can take place for example through a display on a terminal or MT-SICS commands for network configuration, **see** dependencies. If IPv4 device managed network configuration is disabled, the network settings of the device are configured by an external device, e.g. an Industrial Ethernet configuration tool.

Syntax

Commands

M109	Query the current settings.
M109_<DevNetEnabled>	Change settings.

Responses

M109_A_<DevNetEnabled>	Current list of setting.
M109_A	Command understood and executed successfully.
M109_I	Command understood but currently not executable.
M109_L	Command understood but not executable (selected setting is not available).

Parameter

Name	Type	Values	Meaning
<DevNetEnabled>	Integer	0 or 1	IPv4 device managed network configuration factory setting
		0	IPv4 configuration not managed by this device
		1	IPv4 configuration managed by this device

Comment

- Changing the settings of M109 may influence the available IPv4 network configuration capabilities of the device (e.g. disable certain SICS commands).

Examples

↓	M109	Request the setting of IPv4 device managed network configuration.
↑	M109_A_0	The setting for device managed network configuration is set to disabled.
↓	M109_0	Set the setting to enabled.
↑	M109_A	Command understood and executed successfully.

See also

- 📖 M69 – Ipv4 network configuration mode ▶ Page 179
- 📖 M70 – Ipv4 host address and netmask for static configuration ▶ Page 181
- 📖 M71 – Ipv4 default gateway address ▶ Page 183
- 📖 M72 – Ipv4 DNS server address ▶ Page 185

M110 – Change display resolution

Description

For automated processes like dosing, higher weight value resolutions are needed to control the process. This command increases/decreases the weight value resolution up to factor 100. The guaranteed readability is the standard readability based on datasheet.

Syntax

Command

M110	Query the current display resolution.
M110_<FactorID>	Set the factor.

Responses

M110_A_<FactorID>	Current display resolution.
M110_A	Command understood and executed successfully.

Parameter

Name	Type	Values	Meaning
<FactorID>	Integer	-6	Factor 100 lower
		-5	Factor 50 lower
		-4	Factor 20 lower
		-3	Factor 10 lower
		-2	Factor 5 lower
		-1	Factor 2 lower
		0	Standard display resolution
		1	Factor 2 higher
		2	Factor 5 higher
		3	Factor 10 higher
		4	Factor 20 higher
		5	Factor 50 higher
		6	Factor 100 higher

Comments

- Typical use case of an increased display resolution: Improved process control of filling and dosing applications. Process control can round the value at the required decimal.
- The resolution is specified in digits [d] – this is the smallest increment a device may display.
- The customer unit M22 will not be changed with the M110 command.
- It is recommended to implement only one of the commands M23 or M110 in a product.
- If both commands are implemented, only one of the settings can be active at the same time, i.e. only one of the commands can be configured to a value other than 0 at the same time.
- The stability criteria for the weight result (weighing commands) will be adapted for lower display resolution to the selected readability based on the USTB setting (same as M23). M110 only has an influence on weighing; it has no influence on the stability criteria for the taring, zeroing and adjustments.
- The stability criteria will not change for higher display resolution.
- M110 settings have no effect in production and service mode.
- This command may only be used on not certified devices. On certified devices it is not allowed to use this function.

Examples

↓	M110	Request the current display resolution.
↑	M110_A_6	The current display resolution is factor 100 higher. Example: standard readability 1 g -> factor 100 shows 0.01 g.
↓	M110_-2	Set display resolution to factor 5 lower.
↑	M110_A	The display resolution is 5 lower.

See also

- 📄 M22 – Custom unit definitions ▶ Page 155
- 📄 M23 – Readability, 1d/xd ▶ Page 156

MOD – Various user modes

Description

The MOD command can be used to activate a higher display resolution. The additionally displayed digit(s) or display increment is referred to as an auxiliary digit step. All specifications regarding weighing performance still relate to the nominal readability stated in the specifications.

The auxiliary digit step is a 'tendency display' that provides additional information which is especially valuable when dispensing small quantities. A maximum of 2 additional digits can be displayed.

Syntax

Commands

MOD	Query the user modes.
MOD_<Mode>	Set user mode by mode.
MOD_<Mode>_<Increment>_<Unit>	Set user mode by increment.

Responses

MOD_A_<Mode>	Query the current user mode.
MOD_A_<Mode>_<Increment>_<Unit>	Query the current user mode with increments.
MOD_A	Command understood and executed successfully.
MOD_I	Command understood but currently not executable.
MOD_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Mode>	Boolean	0	Switch off all user modes
		1	Increased display resolution
<Increment>	Float		Define higher display resolution
<Unit>	String		Unit from value increment

Comments

- The MOD command is only available on request by your METTLER TOLEDO contact person.
- Mode 1 affects all s commands: [S ▶ Page 202], [SI ▶ Page 204], [SIR ▶ Page 207]... However, the syntax response of the s command remains unchanged: "S_S_<Weight>_<Unit>". In addition: The rounding can be affected as follows: In control mode, 100.4 g can be displayed as 100.38 g.
- Activation of the increased display resolution has no effect on the stability criteria set under [USTB ▶ Page 240]. Note: The auxiliary digit step can be unstable (e.g. due to environmental effects) although the stability criterion (according to [USTB ▶ Page 240]) is fulfilled.
- When taring and zeroing, although the auxiliary digit step is set to zero when the [T ▶ Page 225] or [Z ▶ Page 244] command is transmitted, depending on environmental conditions the additional decimal place may soon be different from zero.

Examples

↓	MOD	Query the current user mode.
↑	MOD_A_0	The user mode is off.
↓	MOD	Query the current user mode.
↑	MOD_A_1_0.0001_g	The user mode is 1 (Increased display resolution) and increment is 0.0001 g
↓	MOD_1	Set the user mode to Mode 1 (increased display resolution factor 10).
↑	MOD_A	User mode is set to the desired value.

↓	MOD_1_0.0001_g	Set the user mode to Mode 1 and the increments to 0.0001 g.
↑	MOD_A	User mode is set to the desired value.

MONH – Monitor on interface

Description

The `MONH` command sent all telegrams (requests and responses) from the selected interface are sent in parallel to the interface from which the command is executed.

Syntax

Commands

<code>MONH</code>	Query the monitor on interface setting.
<code>MONH_<State>_<Interface></code>	Set monitor on interface.
<code>MONH_<State></code>	Set monitor interface off.

Responses

<code>MONH_A_<State></code>	Current monitor on interface setting. Assumption: monitor function is off (State = 0).
<code>MONH_A_<State>_<Interface></code>	Current monitor on interface setting. Assumption: monitor function is on (State = 1).
<code>MONH_A</code>	Activate/deactivate the monitor on an interface.
<code>MONH_A</code>	Set the monitor interface off; State = 0.
<code>MONH_I</code>	Command understood but currently not executable.
<code>MONH_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<code><State></code>	Boolean	0 1	Off On
<code><Interface></code>	Integer	0 ... n	Interface number (n is product dependent)

Comments

- The monitored interface can be faster than the current one. In this case some telegrams might be discarded.
- [SIR ▶ Page 207] or other repetitive commands are not locked and can lead to nonsense. `MONH` is locked against an [SIR ▶ Page 207] on the monitoring interface, not on the monitored.
- On some systems the Baud rate of the monitoring interface is set to the same Baud rate as the monitored interface.
- The command [@ ▶ Page 15] does not stop the `MONH`.

Examples

↓	<code>MONH</code>	Query the current monitor on interface setting.
↑	<code>MONH_A_0</code>	The monitor on interface is off.
↓	<code>MONH</code>	Query the current monitor on interface setting.
↑	<code>MONH_A_1_0</code>	The monitor on interface 0 is on.
↓	<code>MONH_1_1</code>	Set the monitor on interface 1 to on (set from interface 0).
↑	<code>MONH_A</code>	The monitor on interface 1 is on.

NID – Node Identification (for network protocols)

Description

Node identification. This is required to identify each device in a communication network.

Syntax

Commands

NID	Query the weigh module address.
NID_<NodeID>	Set the weigh module address.

Responses

NID_A_<NodeID>	Current weigh module address.
NID_A	Command understood and executed successfully.
NID_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<NodeID>	Integer	1 ... 31	Node identification

Comments

- This command is only available if an interface for addressed mode (e.g. RS422) is present.
- In the addressed communication protocol, **see** [PROT ► Page 197], the address (1 .. 31) is represented by a one-byte ASCII coded character starting at "1" (31 hex). The highest address (31) thus corresponds to 4F hex (ASCII character "O"). All commands must be sent to the module with preceding address byte. Consequently, the first byte of all responses is also the address:

dec.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
hex.	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F
ASCII	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?

dec.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
hex.	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
ASCII	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O

- All commands sent to the module must have a leading address byte. Because of this, the first byte of all responses is also the address.
- The address 0 (30 hex) is a broadcast. All modules on the network will reply.

Examples

↓	NID	Query the current weigh module address.
↑	NID_A_15	The address (Node ID) is 15 decimal = "?" ASCII.
↓	NID_12	Set the Node ID: 12 decimal = "<" ASCII to the weigh module.
↑	NID_A	Address (Node ID) set as desired.

See also

📖 PROT – Protocol mode ► Page 197

NID2 – Device node ID

Description

Node IDs can be changed via MT-SICS command. This command is only available for Profibus DP.

Syntax

Commands

NID2	Query the node identification.
NID2_<NodeID>	Set the node identification.

Responses

NID2_A_<NodeID>	Current node identification.
NID2_A	Command understood and executed successfully.
NID2_I	Command understood but currently not executable.
NID2_L	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<NodeID>	Integer	0 ... 127	Node identification

Example

↓	NID2_12	Set the node identifications to 12.
↑	NID2_A	Node identification is set to 12.

PROT – Protocol mode

Description

This command is only available if an interface for addressed mode (e.g. RS422) is present.

Syntax

Command

PROT	Query the protocol mode.
PROT_<Mode>	Set the protocol mode.

Responses

PROT_A_<Mode>	Current protocol mode.
PROT_A	Command understood and executed successfully.
PROT_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<Mode>	Integer	0	Standard protocol without addressing (terminal mode)
		1	Addressed protocol, suitable for network applications
		2	Framed Protocol, see [Appendix ▶ Page 248]

Comments

- The `PROT` command only changes the protocol of the interface that is suitable for addressed mode communication. Protocol via any other interface, such as RS232, is not affected.
- In the addressed communication protocol, the address (1 ... 31) is represented by a one-byte ASCII coded character starting at "1" (31 hex). The highest address (31) thus corresponds to 4F hex (ASCII character "O"). All commands must be sent to the module with a preceding address byte. Consequently, the first byte of all responses is also the address.
- To avoid bus conflicts, do not use repetitive commands ([SIR ▶ Page 207], [SNR ▶ Page 214], [SR ▶ Page 218]) in addressed mode if more than one weigh module is connected to the network.
- It's better to set the node ID with [NID ▶ Page 195] before selecting an addressed protocol. Otherwise, the current node ID has to precede the [NID ▶ Page 195] command if it should be changed.

Example

↓	PROT	Query the current protocol mode.
↑	PROT_A_0	The standard protocol without addressing (terminal mode) is active.
↓	NID_18	Set module address to 18 (ASCII "B").
↑	NID_A	Module address set as desired.
↓	PROT_1	Set the protocol mode to addressed protocol.
↑	PROT_A	Protocol set as desired.
↓	BS	Query of stable weight value from the Module with address 18 (ASCII "B").
↑	BS_S_100.000_g	Module with address 18 responds and sends the current value (100.000 g).

See also

📖 NID – Node Identification (for network protocols) ▶ Page 195

PW – Piece counting: Piece weight

Description

Use `PW` to set the reference weight of 1 piece, which you can then use for the piece counting application. You can also use `PW` to query the reference weight that you have set using `↵`, `↵`, `↵` or `PW`.

Syntax

Commands

<code>PW</code>	Query of the piece weight for the piece counting application.
<code>PW_<SinglePiece>_<Unit></code>	Set the piece weight for the according value. The unit should correspond to the unit actually set under Host unit.

Responses

<code>PW_A_<SinglePiece>_<Unit></code>	Current piece weight value in unit actually set under Host unit.
<code>PW_A</code>	Command understood and executed successfully.
<code>PW_I</code>	Command understood but currently not executable (e.g. piece counting application is not active or balance is currently executing another command).
<code>PW_L</code>	Command understood but not executable (parameter is incorrect).

Comments

- This command can only be used with the application "Piece counting". For details on available applications and how to activate them **see** M25 and M26.
- The range of the piece weight value is specified to the balance type.
- If a reference weight has been defined, the display unit automatically changes to PCS and can be queried with [SU ▶ Page 223] commands.

Example

↓	<code>PW_20.00_g</code>	Set the piece weight of the piece counting application to 20.00 g.
↑	<code>PW_A</code>	Piece weight value is set.

PWR – Switch on / Switch off

Description

Use `PWR` to switch the balance on or off. When it is switched off, standby mode is activated.

Syntax

Command

<code>PWR_<OnOff></code>	Switch the balance on or off.
--------------------------------	-------------------------------

Responses

<code>PWR_A</code>	Balance has been switched off successfully.
<code>PWR_A_</code> <code>I4_A_<"SNR"></code>	Balance with the serial number "SNR" has been switched on successfully see [14 ▶ Page 89].
<code>PWR_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or application is not in Home screen).
<code>PWR_L</code>	Command understood but not executable.

Parameter

Name	Type	Values	Meaning
<code><OnOff></code>	Integer	0	Set the balance to standby mode
		1	Switch the balance on

Comment

- The balance response to [14 ▶ Page 89] appears unsolicited after switching the balance on.

Example

↓	<code>PWR_1</code>	Switch the balance on.
↑	<code>PWR_A</code>	The balance has been switched on successfully.
↑	<code>I4_A_"0123456789"</code>	The serial number is shown.

See also

📖 I4 – Serial number ▶ Page 89

R01 – Restart device

Description

Restarts the device. This is a warm start.

Syntax

Command

R01	Restart the device.
-----	---------------------

Response

I4_A_<"SerialNumber"> (or equivalent startup response)	Startup response of the device.
--	---------------------------------

Parameter

Name	Type	Values	Meaning
I4_A_<"SerialNumber">			Startup response after the device has restarted

Example

↓	R01	Restart the device.
↑	I4_A_"B001000001"	The software has been restarted. The serial number of the device is B001000001.

See also

- 📖 FSET – Reset all settings to factory defaults ▶ Page 84
- 📖 M38 – Selective parameter reset ▶ Page 165

RDB – Readability

Description

Readability, e.g. 0.0001 g with a WMS404C-L weigh module, determines the smallest weight increment that can be measured and sent via interface to the system called 1 digit (1 d). It strongly affects weighing behavior, especially weighing speed, stability, and reproducibility. The `RDB` command makes the weigh module faster at the cost of the smallest weight increment that can be distinguished. Proper setting of this parameter is therefore important to the entire weighing application.

Syntax

Commands

<code>RDB</code>	Query the current readability.
<code>RDB_<DecPlaces></code>	Readability expressed as number of decimal places referring to weight unit g.

Responses

<code>RDB_A_<DecPlaces></code>	Current readability.
<code>RDB_A</code>	Command understood and executed successfully.
<code>RDB_L</code>	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<code><DecPlaces></code>	Integer	0 ... max. decimal places	Readability in weight unit g (Decimal places)

Comments

- Default factory setting for `RDB` is the maximum possible number of decimal places (highest accuracy) specific to the respective module, e.g. 4 decimal places with a WMS404C-L weigh module.
- The definition of the readability is always referring to the weight unit gram, regardless of the current used weighing unit.
- `RDB` enables reduction of the number of decimal places below the maximum; it cannot be increased above the maximum nor accept negative values. For more decimal places, **see** [MOD ▶ Page 192].
- After acknowledgement "`RDB_A`", the weigh module performs a complete restart similar to startup after power up. Weighing and communication can be resumed when the restart procedure is complete. Due to the restart procedure, new initial zero setting is performed and the tare memory is reset to 0. Nevertheless, all other settings (except readability) are not affected.
- The `RDB` command can be used for a complete firmware restart by leaving the parameter of `RDB` unchanged.
- Since the stability criterion for weighing, taring, and zero setting, as well as for adjustment and test is related to digits "d", **see** [USTB ▶ Page 240], changing the readability will also change the absolute stability criteria for all functions including the adjustment (calibration) and test procedures.

Examples

↓	<code>RDB</code>	Query the current readability
↑	<code>RDB_A_1</code>	The readability is 1 = 0.1 g
↓	<code>RDB_2</code>	Set the readability to 2 = 0.01 g.
↑	<code>RDB_A</code>	Readability set as desired.
↑	<code>I4_A_"B123456789"</code>	Restart, <code>I4</code> shows the serial number B123456789.

See also

📖 USTB – User stability criteria ▶ Page 240

S – Stable weight value

Description

Use `s` to send a stable weight value, along with the host unit, from the balance to the connected communication partner via the interface.

If the automatic door function is enabled and a stable weight is requested the balance will open and close the balance's doors to achieve a stable weight.

Syntax

Command

<code>s</code>	Send the current stable net weight value.
----------------	---

Responses

<code>S_S_<WeightValue>_<Unit></code>	Current stable weight value in unit actually set under host unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.

Comments

- The duration of the timeout depends on the balance type.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of responses with weight value.
- To send the stable weight value in actually displayed unit, **see** [SU ▶ Page 223].

Example

↓	<code>s</code>	Send a stable weight value.
↑	<code>S_S_100.00_g</code>	The current, stable ("S") weight value is 100.00 g.

SC – Send stable weight value or dynamic value after timeout

Description

Command `sc` with configurable timeout is used for processes with defined time cycles.

Syntax

Command

<code>SC_<Time></code>	Send the current stable net weight value – or dynamic weight value immediately after timeout. Timeout defined in ms.
------------------------------	--

Responses

<code>S_S_<WeightValue>_<Unit></code>	Current stable weight value in unit actually set under host unit.
<code>S_D_<WeightValue>_<Unit></code>	Dynamic weight value in unit actually set under host unit after timeout.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in under load range.

Parameters

Name	Type	Values	Meaning
<code><Time></code>	Integer	0 ... 65535 ms	Timeout in Milliseconds [ms]
<code><WeightValue></code>	Float		Weight value
<code><Unit></code>	String		Currently displayed unit

Comments

- `<Time>` will be rounded to the next possible interval (interval steps 8 ms)
- The [M67 ▶ Page 177] command does not apply for the `sc` command.
- The criterion for the stability of the weight value is set by the [USTB ▶ Page 240] command.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	<code>SC_500</code>	Send a stable weight value or within 500 ms a dynamic weight value.
↑	<code>S_S_100.00_g</code>	If the weigh module is able to determine a stable weight value within 500 ms, this value will be transmitted immediately; the weight is 100.00 g.
or		
↑	<code>S_D_103.04_g</code>	In case this is not possible (e.g. due to vibrations), a dynamic weight value will be transmitted immediately after timeout; in this example, a dynamic weight value (note the 'D' in the answer string) of 103.04 g was transmitted after 500 ms. The stability criterion for weighing was not met within 500 ms.

SI – Weight value immediately

Description

Use `SI` to immediately send the current weight value, along with the host unit, from the balance to the connected communication partner via the interface.

Syntax

Command

<code>SI</code>	Send the current net weight value, irrespective of balance stability.
-----------------	---

Responses

<code>S_S_<WeightValue>_<Unit></code>	Stable weight value in unit actually set under host unit.
<code>S_D_<WeightValue>_<Unit></code>	Non-stable (dynamic) weight value in unit actually set under host unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.

Comments

- The balance response to the command `SI` with the last internal weight value (stable or dynamic) before receipt of the command `SI`.
- To send weight value immediately in actually displayed unit, **see** [SIU ► Page 212].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of responses with weight value.

Example

↓	<code>SI</code>	Send current weight value.
↑	<code>S_D_129.07_g</code>	The weight value is unstable (dynamic, "D") and is currently 129.07 g.

SIC1 – Weight value with CRC16 immediately

Description

This command is an extension of the `SI` command with an additional `<CRC16>` hash value.

Syntax

Command

SIC1	Query current weight value.
------	-----------------------------

Responses

SIC1_A_<Status>_<Weight>_<Unit>_<CRC16>	Current weight value together with the <code><CRC16></code> value.
SIC1_I	The request could not be served because the state of the balance did not allow it (e.g. a taring or zeroing in progress).

Parameters

Name	Type	Values	Meaning
<Status>	Char		Weight status
		S	Stable weight
		D	Dynamic weight (unstable, not accurate)
		+	Overload
		-	Underload
		I	Invalid value
<Weight>	String		Net weight value in host unit
<Unit>	String		The unit used for this command is the host unit
<CRC16>	Integer		CRC16 hash value over the whole message CRC-16-CCITT algorithm value (polynomial: 0x1021, initial value: 0xFFFF)

Comments

- The CRC is calculated over the whole message, starting with the first `s` up to and including the space before the CRC itself. For example: `SIC1_S_12325.00_g_E603` → Message and **CRC**.
- Similar to other `s` commands this weight command reflects the error code in the command response if there is an internal error (with influence on the weight).

Examples

↓	SIC1	Query current weight value.
↑	SIC1_S_12325.00_g_E603	The current weight value is 12325.00 g and the value is detected as stable.
↓	SIC1	Query current weight value.
↑	SIC1_+	The request could not be served because of overload. A similar response is sent in case of underload.

SIC2 – HighRes weight value with CRC16 immediately

Description

This command is similar to SIC1 with the only difference that a high resolution weight is returned.

Syntax

Command

SIC2	Query current weight value.
------	-----------------------------

Responses

SIC2_A_<Status>_<HRWeight>_<Unit>_<CRC16>	High resolution weight value together with the CRC16 value.
SIC2_I	The request could not be served because the state of the balance did not allow it (e.g. a taring or zeroing in progress).

Parameters

Name	Type	Values	Meaning
<Status>	Char		Weight status
		S	Stable weight
		D	Dynamic weight (unstable, not accurate)
		+	Overload
		-	Underload
	I	Invalid value	
<HRWeight>	String		High resolution net weight value in host unit
<Unit>	String		The unit used for this command is the host unit
<CRC16>	Integer		CRC16 hash value over the whole message The CRC16 is calculated using the CRC-16-CCITT algorithm

Comments

- The CRC is calculated over the whole message, starting with the first S up to and including the space before the CRC itself. For example: SIC1_12325.00_g_ **E603** → Message and **CRC**.
- Similar to other S commands this weight command reflects the error code in the command response if there is an internal error (with influence on the weight).

Examples

↓	SIC2	Query current weight value.
↑	SIC2_S_12325.0012_g_C7C9	The current HighRes weight value is 12325.0012 g and the value is detected to be stable.
↓	SIC2	Query current weight value.
↑	SIC2_+	The request could not be served because of overload. A similar response is sent in case of underload.

SIR – Weight value immediately and repeat

Description

Use `SIR` to immediately send the current weight value, along with the host unit, from the balance to the connected communication partner via the interface, but this time on a continuous basis.

Syntax

Command

<code>SIR</code>	Send the net weight values repeatedly, irrespective of balance stability.
------------------	---

Responses

<code>S_S_<WeightValue>_<Unit></code>	Stable weight value in unit actually set under host unit.
<code>S_D_<WeightValue>_<Unit></code>	Non-stable (dynamic) weight value in unit actually set under host unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.

Comments

- `SIR` is overwritten by the commands [`S` ▶ Page 202], [`SI` ▶ Page 204], [`SR` ▶ Page 218], [`@` ▶ Page 15] and hardware break and hence cancelled.
- To send weight value in actually displayed unit, **see** [`SIRU` ▶ Page 208].
- The number of weight values per second can be configured using [`UPD` ▶ Page 239].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	<code>SIR</code>	Send current weight values at intervals.
↑	<code>S_D_129.07_g</code>	The balance sends stable ("S") or unstable ("D") weight values at intervals.
↑	<code>S_D_129.08_g</code>	
↑	<code>S_S_129.09_g</code>	
↑	<code>S_S_129.09_g</code>	
↑	<code>S_D_114.87_g</code>	
↑	<code>S_...</code>	

See also

- 📖 `S` – Stable weight value ▶ Page 202
- 📖 `SI` – Weight value immediately ▶ Page 204
- 📖 `SR` – Send stable weight value and repeat on any weight change ▶ Page 218
- 📖 `@` – Cancel ▶ Page 15
- 📖 `UPD` – Update rate of `SIR` and `SIRU` output on the host interface ▶ Page 239

SIRU – Weight value in display unit immediately and repeat

Description

Request current weight value in display unit independent of the stability and repeat sending responses until the command is stopped.

Syntax

Command

SIRU	Requests the current weight value and repeat.
------	---

Responses

S_S_<WeightValue>_<Unit>	Stable weight value in unit actually set under host unit.
S_D_<WeightValue>_<Unit>	Non-stable (dynamic) weight value in unit actually set under host unit.
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Comments

- As the [SIR ▶ Page 207] command, but with currently displayed unit.
- The number of weight values per second can be configured using [UPD ▶ Page 239].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	SIRU	Query of the current weight value with currently displayed unit.
↑	S_D_12.34_lb	Non-stable (dynamic) weight value of 12.34 lb.
↑	S_D_12.44_lb	Non-stable (dynamic) weight value of 12.44 lb.
↑	S_D_12.43_lb	Non-stable (dynamic) weight value of 12.43 lb.

See also

- 📖 SIR – Weight value immediately and repeat ▶ Page 207
- 📖 UPD – Update rate of SIR and SIRU output on the host interface ▶ Page 239

SIS – Send netweight value with actual unit and weighing status

Description

Use SIS to immediately send the current net weight value to the connected communication partner via the interface, along with the host unit and other information regarding the weighing status.

Syntax

Command

SIS	Send the current net weight value.
-----	------------------------------------

Responses

SIS_A_<State>_<"NetWeight">_<Unit1>_<Readability>_<Step>_<Approv>_<Info>	At status 0 to 3.
SIS_A_<State>_<"Error">	At status 4 to 6.
SIS_I	Command understood but currently not executable.
S_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning	
<State>	Integer	0	Stable weight value	
		1	Dynamic weight value	
		2	Stable inaccurate weight (MinWeigh)	
		3	Dynamic inaccurate weight (MinWeigh)	
		4	Overload	
		5	Underload	
		6	Error, not valid	
<"NetWeight">	Float		Net weight value	

Name	Type	Values	Meaning	
<Unit1>	Integer	0	Gram	g
		1	Kilogram	kg
		2	reserved	
		3	Milligram	mg
		4	Microgram	µg
		5	Carat	ct
		6	reserved	
		7	Pound avdp	lb
		8	Ounce avdp	oz
		9	Ounce troy	ozt
		10	Grain	GN
		11	Pennyweight	dwt
		12	Momme	mom
		13	Mesghal	msg
		14	Tael Hongkong	tlh
		15	Tael Singapore	tls
		16	Tael Taiwan	tlt
		17	reserved	
		18	Tola	tola
		20	Baht	baht
<Readability>	Integer	0 ... 6	Amount of decimal places	
<Step>	Integer	1	"1" step	
		2	"2" step	
		5	"5" step	
		10	"10" step	
		20	"20" step	
		50	"50" step	
		100	"100" step	
<Approv>	Integer	0	Standard balance, Not approved	
		1	e = d	
		10	e = 10 d	
		100	e = 100 d	
		-1	Unapproved with * in display	
<Info>	Integer	0	Without tare	
		1	Net with weighed tare	
		2	Net with stored tare	

Comments

- Can not be used with custom unit, piece counting (PCS) or percent weighing (%).
- This command has **no** effect on the other S* commands.
- The units and/or their notation may be different in older software versions.
- Relates to the host output interfaces. The weight unit is the host unit, not the displayed unit.
- Also supplies a weigh value for zeroing, adjusting and taring, and in the menu.

Examples

↓	SIS	Query of the current weight value with actual host unit and weighing status.
↑	SIS<"NetWeight">A<"NetWeight">0<"NetWeight">"100.00"<"NetWeight">0<"NetWeight">2<"NetWeight">1<"NetWeight">10<"NetWeight">0	100.0(0) g.
↓	SIS	Query of the current weight value.
↑	SIS<"NetWeight">A<"NetWeight">1<"NetWeight">"10.0"<"NetWeight">5<"NetWeight">2<"NetWeight">50<"NetWeight">0<"NetWeight">2	10.0 ct, carat value, with step 50, in coarse range, with stored tare and unstable.
↓	SIS	Query of the current weight value.
↑	SIS<"NetWeight">A<"NetWeight">6<"NetWeight">"Error7"	Error, not valid.
↓	SIS	Query of the current weight value.
↑	SIS<"NetWeight">A<"NetWeight">4<"NetWeight">""	Overload.

SIU – Weight value in display unit immediately

Description

Request current weight value in display unit independent of the stability.

Syntax

Command

SIU	Request the current weight value in display unit.
-----	---

Responses

S_S_<WeightValue>_<Unit>	Stable weight value in unit actually set under host unit.
S_D_<WeightValue>_<Unit>	Non-stable (dynamic) weight value in unit actually set under host unit.
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Comments

- As the [SI ▶ Page 204] command, but with currently displayed unit.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	SIU	Requests the current weight value in display unit independent of the stability.
↑	S_D_12.34_lb	Non-stable (dynamic) weight value is 12.34 lb.

SIUM – Weight value in display unit and MinWeigh information immediately

Description

Use `SIUM` to immediately send the current weight value, along with the displayed unit and MinWeigh information, from the balance to the connected communication partner via the interface.

Syntax

Command

<code>SIUM</code>	Send the current net weight value with currently displayed unit and MinWeigh Information, irrespective of balance stability.
-------------------	--

Responses

<code>S_<Status>_<WeightValue>_<Unit></code>	Weight value in currently displayed unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<code><Status></code>	Char	S	Stable, net \geq MinWeigh limit
		D	Dynamic, net \geq MW limit
		M	Stable, net $<$ MinWeigh limit
		N	Dynamic, net $<$ MW limit
<code><WeightValue></code>	Float		Weight value
<code><Unit></code>	String		Currently displayed unit

Comments

- As the [SI ▶ Page 204] command, but with currently displayed unit and MinWeigh information.
- If the MinWeigh function is switched off, or is not available on the balance, it corresponds to the command [SIU ▶ Page 212].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Examples

↓	<code>SIUM</code>	Query of the current weight value with currently displayed unit.
↑	<code>S_D_____123.34_mg</code>	Dynamic net weight displayed, greater than MinWeigh limit.
↓	<code>SIUM</code>	Query of the current weight value with currently displayed unit.
↑	<code>S_M_____123.34_mg</code>	Stable net weight displayed, less than MinWeigh limit.
↓	<code>SIUM</code>	Query of the current weight value with currently displayed unit.
↑	<code>S_N_____123.34_mg</code>	Dynamic net weight displayed, less than MinWeigh limit.

SNR – Send stable weight value and repeat on stable weight change

Description

Request the current stable weight value in host unit followed by stable weight values after predefined minimum weight changes until the command is stopped.

Syntax

Commands

SNR	Send the current stable weight value and repeat after each deflection (see comment).
SNR_<PresetValue>_<Unit>	Send the current stable weight value and repeat after each deflection greater or equal to the preset value (see comment).

Responses

S_S_<WeightValue>_<Unit> S_S_<WeightValue>_<Unit> ...	Current stable weight value (1 st value). Next stable weight value after preset deflection (2 nd value). ...
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<PresetValue>	Float	1 digit ... capacity	Preset minimum deflection load
<Unit>	String		Currently displayed unit

Comments

- The preset value is optional. If no value is defined, the deflection depends on balance readability as follows:

Readability	Min. deflection
0.001 mg	0.001 g
0.01 mg	0.01 g
0.1 mg	0.1 g
0.001 g	1 g
0.01 g	1 g
0.1 g	1 g
1 g	5 g

- SNR is overwritten by the commands [S ▶ Page 202], [SI ▶ Page 204], [SIR ▶ Page 207], [@ ▶ Page 15] and hardware break and hence cancelled.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	SNR_50_g	Send the current stable weight value and repeat after each deflection greater or equal to the preset value of 50 g.
↑	S_S_12.34_g	1 st weight value is 12.34 g.
↑	S_S_67.89_g	2 nd weight value is 67.89 g.

SNRU – Send stable weight value with currently displayed unit and repeat on stable weight change

Description

Request the current stable weight value in display unit followed by stable weight values after predefined minimum weight changes until the command is stopped.

Syntax

Commands

SNRU	Send the current stable weight value with the currently displayed unit and repeat after each deflection (see comment).
SNRU_<PresetValue>_<Unit>	Send the current stable weight value with the currently displayed unit and repeat after each deflection greater or equal to the preset value (see comment).

Responses

S_S_<WeightValue>_<Unit> S_S_<WeightValue>_<Unit> ...	Current stable weight value (1 st value). Next stable weight value after preset deflection (2 nd value). ...
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<PresetValue>	Float	1 digit ... capacity	Preset minimum deflection load
<Unit>	String		Currently displayed unit

Comments

- The preset value is optional. If no value is defined, the deflection depends on balance readability as follows:

Readability	Min. deflection
0.001 mg	0.001 g
0.01 mg	0.01 g
0.1 mg	0.1 g
0.001 g	1 g
0.01 g	1 g
0.1 g	1 g
1 g	5 g

- As the [SNR ▶ Page 214] command, but with current displayed unit.
- SNRU is overwritten by the commands [S ▶ Page 202], [SI ▶ Page 204], [SIR ▶ Page 207], [@ ▶ Page 15] and hardware break and hence cancelled.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	SNRU_50_g	Send the current stable weight value with the currently displayed unit and repeat after each deflection greater or equal to the preset value of 50 g.
↑	S_S_12.34_g	1 st weight value is 12.34 g.
↑	S_S_67.89_g	2 nd weight value is 67.89 g.

SR – Send stable weight value and repeat on any weight change

Description

Request the current stable weight value in host unit followed by weight values after predefined minimum weight changes until the command is stopped.

Syntax

Commands

SR	Send the current stable weight value and then continuously after every weight change If no preset value is entered, the weight change must be at least 12.5% of the last stable weight value, minimum = 30 digit.
SR_<PresetValue>_<Unit>	Send the current stable weight value and then continuously after every weight change greater or equal to the preset value a non-stable (dynamic) value followed by the next stable value, range = 1 digit to maximal capacity.

Responses

S_S_<WeightValue>_<Unit>	Current, stable weight value in unit actually set as host unit, 1 st weight change.
S_D_<WeightValue>_<Unit>	Dynamic weight value in unit actually set as host unit.
S_S_<WeightValue>_<Unit>	Next stable weight value in unit actually set as host unit.
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<WeightValue>	Float		Weight value
<Unit>	String		Unit, only available units permitted

Comments

- SR is overwritten by the commands [S ▶ Page 202], [SI ▶ Page 204], [SIR ▶ Page 207], [@ ▶ Page 15] and hardware break and hence cancelled.
- In contrast to SR, [SNR ▶ Page 214] only sends stable weight values.
- If, following a non-stable (dynamic) weight value, stability has not been reached within the timeout interval, the response S_I is sent and then a non-stable weight value. Timeout then starts again from the beginning.
- The preset value can be entered in any by the balance accepted unit.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	SR_10.00_g	Send the current stable weight value followed by every load change of 10 g.
↑	S_S_____100.00_g	Balance stable.
↑	S_D_____115.23_g	100.00 g loaded.
↑	S_S_____200.00_g	Balance again stable.

See also

- 📄 S – Stable weight value ▶ Page 202
- 📄 SI – Weight value immediately ▶ Page 204
- 📄 SIR – Weight value immediately and repeat ▶ Page 207
- 📄 SNR – Send stable weight value and repeat on stable weight change ▶ Page 214

SRU – Send stable weight value with currently displayed unit and repeat on any weight change

Description

Request the current weight values in display unit and repeat sending responses after a predefined minimum weight change until the command is stopped.

Syntax

Commands

SRU	Send the current stable weight value with the currently displayed unit and then continuously after every weight change. If no preset value is entered, the weight change must be at least 12.5% of the last stable weight value, minimum = 30 digit.
SRU_<WeightValue>_<Unit>	Send the current stable weight value with the currently displayed unit and then continuously after every weight change greater or equal to the preset value a non-stable (dynamic) value followed by the next stable value, range = 1 digit to maximal capacity.

Responses

S_S_<WeightValue>_<Unit>	Current, stable weight value with the currently displayed unit until 1 st weight change.
S_D_<WeightValue>_<Unit>	Non-stable (dynamic) weight value with the currently displayed unit.
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<WeightValue>	Float		Weight value
<Unit>	String		Unit, only available units permitted

Comments

- As the [SR ▶ Page 218] command, but with currently displayed unit.
- SRU is overwritten by the commands [S ▶ Page 202], [SI ▶ Page 204], [SIR ▶ Page 207], [@ ▶ Page 15] and hardware break and hence cancelled.
- In contrast to [SR ▶ Page 218], [SNRU ▶ Page 216] only sends stable weight values.
- If, following a non-stable (dynamic) weight value, stability has not been reached within the timeout interval, the response S_I is sent and then a non-stable weight value. Timeout then starts again from the beginning.
- The preset value can be entered in any by the balance accepted unit.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.


Example

↓	SRU	Send the current stable weight value followed by every default load change with current display unit.
---	-----	---

↑	S_S_____12.34_lb	1 st weight value is stable and 12.34 lb.
↑	S_D_____13.88_lb	2 nd weight value is non-stable and 13.88 lb.
↑	S_S_____15.01_lb	3 rd weight value is stable and 15.01 lb.


ST – Stable weight value on pressing (Transfer) key

Description



Use `ST` to send the current stable weight value when the transfer key  is pressed. The value is sent, along with the currently displayed unit, from the balance to the connected communication partner via the interface.

Syntax

Commands

<code>ST</code>	Query the current status transfer function.
<code>ST_1</code>	Sent the current stable net weight value with display unit each time when the transfer key  is pressed.
<code>ST_0</code>	Stop sending weight value when print key is pressed.

Responses

<code>ST_A_0</code>	Function inactive, no weight value is sent when the transfer key  is pressed.
<code>ST_A_1</code>	Function active, weight value is sent each time when the transfer key  is pressed.
<code>ST_A</code>	Command understood and executed successfully.
<code>ST_I</code>	Command understood but currently not executable (balance is currently executing another command).
<code>ST_L</code>	Command understood but not executable (incorrect parameter).


Parameter

Name	Type	Values	Meaning
<code><Status></code>	Boolean		Behavior of the transfer function
		0	Inactive
		1	Active

Comments

- `ST_0` is the factory setting (default value).
- `ST` function is not active after switching on and after reset command.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	<code>ST_1</code>	Activate <code>ST</code> function.
↑	<code>ST_A</code>	Command executed.
↑	<code>S_S_____123.456_g</code>	When transfer key  pressed: current net weight is 123.456 g.

SU – Stable weight value in display unit

Description

Use `SU` to query the stable weight value in display unit.

If the automatic door function is enabled and a stable weight is requested the balance will open and close the balance's doors to achieve a stable weight.

Syntax

Command

<code>SU</code>	Query the stable weight value with the currently displayed unit.
-----------------	--

Responses

<code>S_S_<WeightValue>_<Unit></code>	Current stable weight value with the currently displayed unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>S_L</code>	Command understood but not executable (incorrect parameter).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.

Responses

<code>S_S_<WeightValue>_<Unit></code>	Current stable weight value with the currently displayed unit.
<code>S_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>S_+</code>	Balance in overload range.
<code>S_-</code>	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<code><WeightValue></code>	Float		Weight value
<code><Unit></code>	String		Currently displayed unit

Comments

- As the [S ▶ Page 202] command, but with currently displayed unit.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	<code>SU</code>	Query the stable weight value with the currently displayed unit.
↑	<code>S_S_12.34_lb</code>	The current, stable weight value is 12.34 lb.

SUM – Stable weight value in display unit and MinWeigh information

Description

Use `SUM` to send the current stable weight value, along with the currently displayed unit and the MinWeigh information, from the balance to the connected communication partner via the interface.

Syntax

Command

SUM	Send the current stable net weight value with currently displayed unit and MinWeigh Information.
-----	--

Responses

SUM_<Status>_<WeightValue>_<Unit>	Weight value in currently displayed unit.
S_I	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
S_L	Command understood but not executable (incorrect parameter).
S_+	Balance in overload range.
S_-	Balance in underload range.

Parameters

Name	Type	Values	Meaning
<Status>	Char	S	Stable, >= MinWeigh limit
		M	Stable, < MinWeigh limit
<WeightValue>	Float		Weight value
<Unit>	String		Weight unit

Comments

- As the [S ▶ Page 202] command, but with currently displayed unit and MinWeigh information.
- If a weight other than the net weight is displayed, only the "S" index and the stable weight value displayed are output on the interface.
- If the MinWeigh function is switched off or not available on the balance, the corresponding command is [SU ▶ Page 223].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Examples

↓	SUM	Query of the current weight value with currently displayed unit.
↑	S_M_123.34_mg	Stable weight displayed, less than MinWeigh limit.
↓	SUM	Query of the current weight value with currently displayed unit.
↑	S_S_123.34_mg	Stable weight displayed, greater than MinWeigh limit.

T – Tare

Description

Use **T** to tare the balance. The next stable weight value will be saved in the tare memory.

Syntax

Command

T	Tare, i.e. store the next stable weight value as a new tare weight value.
---	---

Responses

T_S_<TareValue>_<Unit>	Taring successfully performed. The tare weight value returned corresponds to the weight change on the balance in the unit actually set under host unit since the last zero setting.
T_I	Command understood but currently not executable (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).
T_L	Command understood but not executable (incorrect parameter).
T_+	Upper limit of taring range exceeded.
T_-	Lower limit of taring range exceeded.

Parameters

Name	Type	Values	Meaning
<TareValue>	Float		Weight value
<Unit>	String		Currently displayed unit

Comments

- The tare memory is overwritten by the new tare weight value.
- The duration of the timeout depends on the balance type.
- Clearing tare memory: **see** [TAC ▶ Page 227].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of responses with weight value.
- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

Example

↓	T	Tare.
↑	T_S_100.00_g	The balance is tared and has a value of 100.00 g in the tare memory.

See also

📖 TAC – Clear tare weight value ▶ Page 227

TA – Tare weight value

Description

Use TA to query the current tare value or preset a known tare value.

Syntax

Commands

TA	Query of the current tare weight value.
TA_<TarePresetValue>_<Unit>	Preset of a tare value.

Responses

TA_A_<TareWeightValue>_<Unit>	Query current tare weight value in tare memory, in unit actually set under host unit.
TA_I	Command understood but currently not executable (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).
TA_L	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<TareWeightValue>	Float		Tare Weight value
<Unit>	String		Currently displayed unit

Comments

- The tare memory will be overwritten by the preset tare weight value.
- The inputted tare value will be automatically rounded by the balance to the current readability.
- The taring range is specified to the balance type.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	TA_100.00_g	Preset a tare weight of 100 g.
↑	TA_A_100.00_g	The balance has a value of 100.00 g in the tare memory.

See also

📖 TAC – Clear tare weight value ▶ Page 227

TAC – Clear tare weight value

Description

Use TAC to clear the tare memory.

Syntax

Command

TAC	Clear tare value.
-----	-------------------

Responses

TAC_A	Tare value cleared, 0 is in the tare memory.
TAC_I	Command understood but currently not executable (balance is currently executing another command, e.g. zero setting).
T_L	Command understood but not executable (incorrect parameter).

Example

↓	TAC	Clear tare value.
↑	TAC_A	Tare value cleared, 0 is in the tare memory.

See also

- 📖 T – Tare ▶ Page 225
- 📖 TI – Tare immediately ▶ Page 230
- 📖 TA – Tare weight value ▶ Page 226
- 📖 TC – Tare or tare immediately after timeout ▶ Page 228

TC – Tare or tare immediately after timeout

Description

Command TC with configurable timeout is used for processes with defined time cycles.

Syntax

Command

TC_<Time>	Tare, i.e. store the next stable weight value as a new tare weight value, and send this value back - or store and send dynamic value immediately after timeout. Timeout defined in ms.
-----------	--

Responses

TC_S_<TareWeightValue>_<Unit>	Taring successfully performed. The tare weight value returned corresponds to the weight change on the balance in the unit actually set under host unit since the last zero setting.
TC_D_<TareWeightValue>_<Unit>	Taring performed using an unstable (status "D" for dynamic) tare value immediately after timeout. The tare weight value returned corresponds to the weight change on the balance in the unit actually set under host unit since the last zero setting.
TC_I	Command understood but currently not executable (balance is currently executing another command, e.g. zero setting, or timeout as stability was not reached).
TC_L	Command understood but not executable (incorrect parameter).
TC_+	Upper limit of taring range exceeded.
TC_-	Lower limit of taring range exceeded.

Parameters

Name	Type	Values	Meaning
<Time>	Integer	1 ... 65535 ms	Timeout in milliseconds [ms]
<TareWeightValue>	Float		Tare weight value
<Unit>	String		Currently displayed unit

Comments

- The tare memory is overwritten by the new tare weight value.
- <Time> will be rounded to the next possible interval (interval steps 8 ms).
- The [M67 ▶ Page 177] command does not apply for the TC command.
- The criterion for the stability of the weight value is set by the [USTB ▶ Page 240] command.
- The tare value can be inquired by using the [TA ▶ Page 226] command.
- Clearing tare memory: **see** [TAC ▶ Page 227].
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to chapter Format of responses with weight value.

Example

↓	TC_500	Tare within a maximum time period of 500 ms.
↑	TC_S_100.00_g	The balance is tared and has a value of 100.00 g in the tare memory.
or		

↑	TC_D_____105.46_g	Taring performed upon timeout of 500 ms, an unstable (status "D" for dynamic) tare value of 105.46 g is stored in the tare memory. The stability criterion for taring was not met.
---	-------------------	--

See also

 TAC – Clear tare weight value ▶ Page 227

TI – Tare immediately

Description

Use **TI** to tare the balance immediately and independently of balance stability.

Syntax

Command

TI	Tare immediately, i.e. store the current weight value, which can be stable or non stable (dynamic), as tare weight value.
----	---

Responses

TI_S_<WeightValue>_<Unit>	Taring performed, stable tare value. The new tare value corresponds to the weight change on the balance since the last zero setting.
TI_D_<WeightValue>_<Unit>	Taring performed, non-stable (dynamic) tare value.
TI_I	Command understood but currently not executable (balance is currently executing another command, e.g. zero setting).
TI_L	Command understood but not executable (e.g. approved version of the balance).
TI_+	Upper limit of taring range exceeded.
TI_-	Lower limit of taring range exceeded.

Parameters

Name	Type	Values	Meaning
<WeightValue>	Float		Tare weight value
<Unit>	String		Currently displayed unit

Comments

- This command is not supported by approved balances.
- The tare memory will be overwritten by the new tare weight value.
- After a non-stable (dynamic) stored tare weight value, a stable weight value can be determined. However, the absolute value of the stable weight value determined in this manner is not accurate.
- The taring range is specific to the balance type.
- The weight value is formatted as a right aligned string with 10 characters including the decimal point. For details, please refer to Format of responses with weight value.
- The stored tare weight value is sent in the unit actually set under host unit.

Example

↓	TI	Tare immediately.
↑	TI_D_117.57_g	The tare memory holds a non-stable (dynamic) weight value.

See also

📖 TAC – Clear tare weight value ▶ Page 227

TIM – Time

Description

Set the system time of the balance or query the current time.

Syntax

Commands

TIM	Query of the current time of the balance.
TIM_<Hour>_<Minute>_<Second>	Set the time of the balance.

Responses

TIM_A_<Hour>_<Minute>_<Second>	Current time of the balance.
TIM_A	Command understood and executed successfully.
TIM_I	Command understood but currently not executable (balance is currently executing another command).
TIM_L	Command understood but not executable (incorrect parameter, e.g. 22_67_25) or no clock is built in.

Parameters

Name	Type	Values	Meaning
<Hour>	Integer	00 ... 23	Hours
<Minute>	Integer	00 ... 59	Minutes
<Second>	Integer	00 ... 59	Seconds

Comments

- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.

Example

↓	TIM	Query of the current time of the balance.
↑	TIM_A_09_56_11	The current time of the balance is 9 hours, 56 minutes and 11 seconds.

See also

📖 DAT – Date ▶ Page 47

TST0 – Query/set test function settings

Description

Use `TST0` to query the current setting for testing the balance, or to specify the type of testing (internal or external).

Syntax

Commands

<code>TST0</code>	Query of the setting for the test function.
<code>TST0_<Test></code>	Set the test configuration of the balance.

Responses

<code>TST0_A_<Test>_<"WeightValue">_<"Unit"></code>	Current setting for the test function.
<code>TST0_A</code>	Command understood and executed successfully.
<code>TST0_I</code>	Command understood but currently not executable (balance is currently executing another command).
<code>TST0_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<code><Test></code>	Integer	0 1	Test with internal weight Test with external weight
<code><"WeightValue"></code>	String	10 chars	Weight of the external test weight
<code><"Unit"></code>	String	Max 9 chars	Unit of the external weight currently set

Comments

- The current value of the external weight can be seen in the menu under "Test", **see** Reference Manual.
- With an internal test, no weight value appears.
- For additional information on testing the adjustment, **see** the Reference Manual of the balance.
- The value of the external weight is set in the menu under "Test" or with [M20 ▶ Page 151].

Example

↓	<code>TST0</code>	Query of the current setting for the test and the value of the external test weight
↑	<code>TST0_A_1_"____2000.0_g"</code>	The current setting corresponds to the test with an external weight. For a test initiated with the [TST2 ▶ Page 235] command, an external weight of 2000.0 g is needed.

See also

- 📖 CO – Adjustment setting ▶ Page 22

TST1 – Test according to current settings

Description

Use TST1 to start the balance test function using the preset parameter settings.

Syntax

Command

TST1	Start test function in the current setting [TST0 ▶ Page 232], [M20 ▶ Page 151].
------	--

First Responses

TST1_B	The test procedure has been started. Wait for next response, see Comment.
TST1_A_<"Deviation">	Test completed, current difference is mention.
TST1_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
TST1_L	Command understood but not executable (incorrect parameter). No second response follows.

Further Responses

TST1_<"TestWeight">_<"Unit">	Prompt to unload and load the balance (only with external weight).
TST1_A_<"TestWeight">_<"Unit">	Test procedure completed successfully. Weight value with unit corresponds to the deviation from the specified value displayed after the test. No unit is specified if the test has been performed with the internal weight.
TST1_I	The test procedure has been aborted as, e.g. stability was not attained or wrong weights were loaded.

Parameters

Name	Type	Values	Meaning
<"Deviation">	String		Current difference in definition unit
<"TestWeight">	String		Weight value
<"Unit">	String		Currently displayed unit

Comments

- Commands sent to the balance during the test procedure are not processed and responded to in the appropriate manner until the test procedure is at an end.
- Use [@ ▶ Page 15] to abort a running test.
- For additional information on testing the adjustment, **see** the Reference Manual of the balance.

Example

↓	TST1	Start test function in the current setting.
↑	TST1_B	The test procedure has been started.
↑	TST1_"_0.00000_g"	Clear weighing pan.
↑	TST1_"_100.00000_g"	Load 100 g external weight.
↑	TST1_"_0.00000_g"	Unload weight.
↑	TST1_A_"_0.00020_g"	Test completed, current difference is 0.00020 g.

See also

- 📄 TST0 – Query/set test function settings ▶ Page 232
- 📄 M20 – Test weight ▶ Page 151
- 📄 C1 – Start adjustment according to current settings ▶ Page 24

TST2 – Test with external weight

Description

Use TST2 to start the balance test function using external test weights.

Syntax

Command

TST2	Start test function with external weight.
------	---

First Responses

TST2_B	The test procedure has been started. Wait for next response, see Comment.
TST2_A_<"Deviation">	Test completed, current difference is mention.
TST2_I	Command understood but currently not executable (balance is currently executing another command). No second response follows.
TST2_L	Command understood but not executable (incorrect parameter). No second response follows.

Further Responses

TST2_<"TestWeight">_<"Unit">	Prompt to unload and load the balance.
TST2_A_<"TestWeight">_<"Unit">	Test procedure completed successfully. Weight value with unit corresponds to the deviation from the specified value displayed in the top line after the test.
TST2_I	The test procedure has been aborted as, e.g. stability was not attained or wrong weights were loaded.

Parameters

Name	Type	Values	Meaning
<"Deviation">	String		Current difference in definition unit
<"TestWeight">	String		Weight value
<"Unit">	String		Currently displayed unit

Comments

- Commands sent to the balance during the test procedure are not processed and responded to in the appropriate manner until the test procedure is at an end.
- Use [[@](#) ▶ Page 15] to abort a running test.
- For additional information on testing the adjustment, **see** the Reference Manual of the balance.
- The value of the external weight is set in the menu under "Test" or with [[M20](#) ▶ Page 151].

Example

↓	TST2	Start test with external weight.
↑	TST2_B	The test procedure has been started.
↑	TST2_"_0.00_g"	Prompt to unload the balance.
↑	TST2_"_200.00_g"	Prompt to load the test weight.
↑	TST2_"_0.00_g"	Prompt to unload the balance.
↑	TST2_A_"_0.01_g"	External test completed successfully.

See also

- 📖 [M20 – Test weight](#) ▶ Page 151
- 📖 [C2 – Start adjustment with external weight](#) ▶ Page 26

TST3 – Test with internal weight

Description

Use `TST3` to start the sensitivity test function using internal test weights.

Syntax

Command

TST3	Start sensitivity test function with internal weight.
------	---

Responses

TST3_B	The test procedure has been started. Wait for next response, see Comments.
TST3_A_<"DeviationValue">	Test procedure completed successfully. Weight value corresponds to the deviation from the specified value displayed after the test.
TST3_I	Command understood but currently not executable (balance is currently executing another command). No second response follows. The test procedure has been aborted as, e.g. stability was not attained or wrong weights were loaded.
TST3_L	Command understood but not executable (incorrect parameter). No second response follows.

Parameter

Name	Type	Values	Meaning
<"DeviationValue">	String		Current difference (deviation value is output without unit)

Comments

- The commands received immediately after the first response are not processed and responded to in the appropriate manner until after the second response.
- Use [`@ ▶ Page 15`] to abort a running test.
- For additional information on testing the adjustment, **see** the Reference Manual of the balance.
- The unit is fixed to definition unit, no unit is output since the internal weight is used.
- The result from the `TST3` is in % on the display and in digit on the host interface.

Example

↓	TST3	Start sensitivity test with internal weight.
↑	TST3_B	The test procedure has been started.
↑	TST3_A_"_0.0002"	Test with internal weight completed successfully. The difference to the specified value is 0.0002 (= 2 digits from a weigh module/balance with an increment of 0.1 mg).

See also

📖 C3 – Start adjustment with internal weight ▶ Page 28

TST5 – Module test with built-in weights (scale placement sensitivity test)

Description

Start the module test function using built-in weights to verify the scale placement sensitivity adjustment. This test does not return the overall sensitivity error of the weigh module, but it shows the sensitivity error after the factory and scale placement adjustment stage in the signal path. The corrections of the signal, which are done with the scale production and customer/user adjustment stage, are not taken into account in this test function.

This test function is used to verify the sensitivity adjustment done by command `C9` (scale placement sensitivity adjustment). Do not use this test function, to verify the sensitivity adjustment done by commands `C1`, `C2`, `C3`, `C6` and `C8` (customer sensitivity adjustment).

Syntax

Commands

TST5	Starts the test procedure with built-in weights.
------	--

Responses

TST5_B	Test procedure has been started.
TST5_A_<"DevPerMille">	Test completed, current difference is mentioned.

Parameters

Name	Type	Values	Meaning
<"DevPerMille">	String		Deviation of the measured signal when the built-in weights are applied to the scale, relative to the exact value of the built-in weights in per mille (‰). The value is rounded to the resolution of the finest range

Comments

- This test shows the sensitivity error after the factory/production adjustment and the scale placement adjustment stage in the signal path using built-in weights. In certain scales (especially in hybrid scales) the overall sensitivity error cannot be tested using built-in weights as these built-in weights cannot be applied on the external lever system. The only thing what can be tested in this case is the sensitivity error of the load cell itself, i.e. the signal before the corrections of the external lever system (which is typically done in the scale production adjustment stage and the customer/user adjustment stage). However be careful that if the adjustment of the external lever system or even the customer sensitivity or linearity adjustment is not done correctly, the scale sensitivity error can be bad even if this test function shows a good result.
- For example in hybrid scales, a sensitivity adjustment using built-in weights can only correct the span of the load cell without external lever system. This is typically done using command `C9` (scale placement sensitivity adjustment). With this test function it can be determined if such a sensitivity adjustment using built-in weights is necessary.
- This test function is similar to `TST3`, but at a different place in the signal path. The output parameter deviation is defined in per mille (different to `TST3`).
- This adjustment can be canceled by the command `@` or `C`.

Example

↓	TST5	Starts the test procedure.
↑	TST5_B	Test procedure has been started.
↑	TST5_A_"0.23"	Test completed; current difference is 0.23 per mille.

Command-specific error responses

Response

TST5_E_<Error>	Current error code.
----------------	---------------------

Parameter of command-specific error

Parameters

Name	Type	Values	Meaning
<Error>	Integer	0	Timeout
		1	Cancel
		2	Built-in weight not supported
		3	Test not available (e.g. unknown or disabled)
		4	Calibration load error (e.g. load value of built-in weights is too light or too heavy)
		5	Busy (e.g. another adjustment or test is already running)

UPD – Update rate of SIR and SIRU output on the host interface

Description

Use `UPD` to set the update rate of the host interface or query the current setting.

Syntax

Commands

<code>UPD</code>	Query of the update rate of the host interface.
<code>UPD_<CurrentUPD></code>	Set the update rate of the host interface.

Responses

<code>UPD_A_<CurrentUPD></code>	Current setting of the update rate of the host interface.
<code>UPD_A</code>	Command understood and executed successfully.
<code>UPD_I</code>	Command understood but currently not executable (balance is currently executing another command).
<code>UPD_L</code>	Command understood but not executable (incorrect parameter).

Parameter

Name	Type	Values	Meaning
<code><UpdateRate></code>	Float	1 ... 1000	Update rate in values per second Terminal: 123, stand-alone bridge: 11000

Comments

- The parameter setting will be saved and the only way to reset the default value will be via MT-SICS or by means of a factory reset, [FSET ▶ Page 84] or via terminal not [@ ▶ Page 15].
- Use [C2 ▶ Page 26] to begin the adjustment procedure with the set weight.
- Use `UPD` to configure the update rate of [SIR ▶ Page 207] and [SIRU ▶ Page 208].
- The balance can not realize every arbitrary update rate. The specified update rate is therefore rounded to the next realizable update rate. Use `UPD` without parameter to query the actually configured update rate.
- An update rate less than 23 must be specified for weigh modules, balances with a terminal. Otherwise, unpredictable behavior may occur.

Examples

↓	<code>UPD</code>	Query of the update rate of the host interface.
↑	<code>UPD_A_20.2</code>	The update rate of the interface is 20.2 values per second.
↓	<code>UPD_20</code>	Set the update rate of the host interface to 20 values per second.
↑	<code>UPD_A</code>	Command executed successfully.
↑	<code>UPD</code>	Query of the exact update rate of the host interface.
↑	<code>UPD_A_18.311</code>	The exact update rate is 18.311 values per second.

USTB – User stability criteria

Description

Use `USTB` to define the stability criteria individually for weighing, taring, zero setting and adjustment functions..

Syntax

Commands

<code>USTB</code>	Query the current stability criteria for all functions: weighing, taring, and zero setting.
<code>USTB_<Function>_<Crit>_<Time></code>	Set the stability criteria.

Responses

<code>USTB_B_<Function>_<Crit>_<Time></code> <code>USTB_B...</code> <code>USTB_A_<Function>_<Crit>_<Time></code>	Current settings of the stability criteria.
<code>USTB_A</code>	Command understood and executed successfully.
<code>USTB_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<code><Function></code>	Integer	0	Stability criterion for weighing, see "[S ▶ Page 202]", "[SI ▶ Page 204]", "[SIR ▶ Page 207]" ... commands
		1	Stability criterion for taring, see "[T ▶ Page 225]", "[TI ▶ Page 230]", commands
		2	Stability criterion for zero setting, see "[Z ▶ Page 244]", "[ZI ▶ Page 246]", commands
		3	Stability criterion for adjustment, see "[C1 ▶ Page 24]" to "[C9 ▶ Page 41]", commands
<code><Crit></code>	Float	0.1 ... 1000 digit	Specify tolerance in digits (smallest weight increment) within which the value must stay to be regarded as stable
<code><Time></code>	Float	0.1 ... 4.0 seconds	Specify the observation time in seconds during which the value must stay within tolerance in order to be regarded as stable

Comments

- The observation time period is rolling. It restarts every time the current weight value exceeds the tolerance. Therefore, the actual time for stability determination depends on the current weight trend as well as on the history before sending an [S ▶ Page 202], [SR ▶ Page 218]..., [T ▶ Page 225], or [Z ▶ Page 244] command. Ideally, taring or zero setting can take just a few milliseconds, provided the weight value was stable for the observation time period before sending the appropriate command.
- During power up or restart, **see** [RDB ▶ Page 201] command the zero point will only be determined if stability for zero setting is achieved. Otherwise, an undefined weight value will appear after the start up procedure is completed
- The adjustment function parameter is not available on all product lines.

Examples

↓	USTB	Query the current stability criteria for all functions: weighing, taring, and zero setting.
↑	USTB_B_0_1_1	Stability criteria for weighing: 1 digit for at least 1 seconds.
↑	USTB_B_1_0.5_2	Stability criteria for taring: 0.5 digit for at least 2 seconds.
↑	USTB_A_2_0.5_2	Stability criteria for zeroing: 0.5 digit for at least 2 seconds.
↓	USTB_0_1_1.5	Set the stability criteria for weighing to 1 digit for at least 1.5 seconds.
↑	USTB_A	Command understood and executed successfully.

WMCF – Configuration of the weight monitoring functions

Description

The `WMCF` command is used to configure a "Check weighing" or "Dispensing" function without a PC or PLC. The digital outputs `DOT_1...3` are used.

Syntax

Commands

<code>WMCF</code>	Query the current configuration of the weight monitoring functions.
<code>WMCF_<Function></code>	Set <code>WMCF</code> function.
<code>WMCF_1_<TargetValue>_<Unit>_<Tol->_<Unit>_<Tol+>_<Unit></code>	Set configuration for "Control Weighing" function. The digital output will be set if a stable weight value is: <code>DOT_1</code> : below <code><TargetValue> - <Tol-></code> . <code>DOT_2</code> : between <code><TargetValue> - <Tol-></code> and <code><TargetValue> + <Tol+></code> . <code>DOT_3</code> : over <code><TargetValue> + <Tol+></code> .
<code>WMCF_2_<Limit1>_<Unit>_<Limit2>_<Unit>_<Limit3>_<Unit></code>	Set configuration for "Dispensing" function. The digital output will be set if a any (stable and unstable) weight value reach: <code>DOT_1</code> : <code><Limit1></code> . <code>DOT_2</code> : <code><Limit2></code> . <code>DOT_3</code> : <code><Limit3></code> .

Responses

<code>WMCF_A_0</code> or <code>WMCF_A_1_<TargetValue>_<Unit>_<Tol->_<Unit>_<Tol+>_<Unit></code> or <code>WMCF_A_2_<Limit1>_<Unit>_<Limit2>_<Unit>_<Limit3>_<Unit></code>	Current configurations for the weight monitor function.
<code>WMCF_A</code>	Command understood and executed successfully.
<code>WMCF_I</code>	Command understood but currently not executable.
<code>WMCF_L</code>	Command understood but not executable (incorrect parameter).

Parameters

Name	Type	Values	Meaning
<code><Function></code>	Integer	0	Off
		1	Control weighing
		2	Dispensing
<code><TargetValue></code>	Float		Target value
<code><Tol-></code>	Float		Minus tolerance
<code><Tol+></code>	Float		Plus tolerance
<code><Limit1> ... <Limit3></code>	Float		Weight limit value
<code><Unit></code>	String		Target, tolerance and limit unit, only available units permitted

Comments

- Digital output must be available.
- Only one command [`DOTC` ▶ Page 52] (n), `DOTP` (n) or `WMCF` can be configured for the same digital output.

- TargetValue and Limit1 ... Limit3 will be rounded to the defined resolution from the load cell.
- Only allowed units are permitted, **see** [M21 ▶ Page 152].
- The weight value monitoring function works only with a weight value command (e.g. [SI ▶ Page 204], [SIR ▶ Page 207]).
- The weight value monitoring function works only on the interface 1 (RS422), **see** [COM ▶ Page 44].
- The update rate depends on the defined [UPD ▶ Page 239] rate.
- Tol- and Tol+ defined as % reference to the Target Value.
- Duration and Delay from the digital output must be defined with the command [DOT ▶ Page 51].

Examples

↓	WMCF	Query the current configuration for the weight monitoring function.
↑	WMCF_A_0	No weight monitoring function is activated.
or		
↑	WMCF_A_1_100_g_3_g_5_%	The target weight for check weighing is 100 g. Weights which are equal to or greater than 97 g and less than or equal to 105 g (=100 g+5 %) are within the tolerance. The digital Output are TRUE, if weight value is stable and: DOT_1: < 97 g. DOT_2: ≥ 97 g and ≤ 105 g. DOT_3: > 105 g.
or		
↑	WMCF_A_2_70_g_75_g_76_g	The limits of the dispensing function are 70 g, 75 g, and 76 g. The digital output are TRUE, if any (stable and unstable) weight values are: DOT_1: ≥ 70 g. DOT_2: ≥ 75 g. DOT_3: ≥ 76 g.
↓	WMCF_A_1	Activate "Control Weighing" function with last used parameters.
↑	WMCF_A_1_100_g_3_g_5_%	The last used parameters are activated, see example above.
↓	WMCF_1_300.00_30_mg_0.1_%	When check weighing, the target weight of 300 g may be exceeded by a minimum of 299.70 g and by a maximum of 300.30 g (= 300.00 g+ 0.1%).
↑	WMCF_A	Command understood and executed successfully.
↓	WMCF_2_150_g_165_g_167_g	When dosing, the first limit is 150 g, the second 165g and the third 167 g.
↑	WMCF_A	Command understood and executed successfully.

See also

- 📖 DOT – Configuration for digital outputs ▶ Page 51
- 📖 DOTC – Configurable digital outputs – Weight monitor ▶ Page 52

Z – Zero

Description

Use `z` to set a new zero; all weight values (including the tare weight) will be measured relative to this zero. After zeroing has taken place, the following values apply: tare weight = 0; net weight (= gross weight) = 0.

Syntax

Command

<code>z</code>	Zero the balance.
----------------	-------------------

Responses

<code>z_A</code>	Zero setting successfully performed. Gross, net and tare = 0.
<code>z_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>z_+</code>	Upper limit of zero setting range exceeded.
<code>z_-</code>	Lower limit of zero setting range exceeded.

Comments

- The zero point determined during switching on is not influenced by this command, the measurement ranges remain unchanged.
- The duration of the timeout depends on the balance type.
- The tare memory is cleared after zero setting.
- The draft shield closes with this command, when the "Door function" is set on "Automatic". It opens after sending a stable weight.

Example

↓	<code>z</code>	Zero.
↑	<code>z_A</code>	Zero setting performed.

ZC – Zero or zero immediately after timeout

Description

Use `z` to set a new zero; all weight values (including the tare weight) will be measured relative to this zero. After zeroing has taken place, the following values apply: tare weight = 0; net weight (= gross weight) = 0. The command `zC` with configurable timeout is used for processes with defined time cycles.

Syntax

Command

<code>ZC_<Time></code>	Set next stable weight value as new zero weight (reference) point or set dynamic weight value immediately after timeout as new zero weight point. Timeout is specified in ms.
------------------------------	---

Responses

<code>ZC_S</code>	Zero setting successfully performed. Gross, net and tare = 0.
<code>ZC_D</code>	Zero setting successfully performed with dynamic weight value after timeout i.e. the stability criterion for zero setting was not met. Gross, net and tare = 0.
<code>ZC_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
<code>ZC_L</code>	Command understood but not executable (incorrect parameter).
<code>ZC_+</code>	Upper limit of zero setting range exceeded.
<code>ZC_-</code>	Lower limit of zero setting range exceeded.

Parameter

Name	Type	Values	Meaning
<code><Time></code>	Integer	1 ... 65535	Timeout in milliseconds [ms]

Comments

- The tare memory is cleared after zero setting.
- `<Time>` will be rounded to the next possible interval (interval steps 8 ms).
- Zero point set under unstable conditions may not be considered as a true reference for further measurements.
- The tare memory is cleared after zero setting.
- The criterion that must be fulfilled to reach stability for zeroing can be set using the [USTB ▶ Page 240] command.

Example

↓	<code>ZC_500</code>	Set new zero point within maximum 500 ms.
↑	<code>ZC_S</code>	Zero setting performed, stability criterion for zero setting met.
or		
↑	<code>ZC_D</code>	Zero setting performed upon timeout of 500 ms under unstable conditions (stability criterion for zero setting not fulfilled).

ZI – Zero immediately

Description

Use `ZI` to set a new zero immediately, regardless of balance stability. All weight values (including the tare weight) will be measured relative to this zero. After zeroing has taken place, the following values apply: tare weight = 0; net weight (= gross weight) = 0.

Syntax

Command

<code>ZI</code>	Zero the balance immediately regardless the stability of balance.
-----------------	---

Responses

<code>ZI_D</code>	Re-zero performed under non-stable (dynamic) conditions.
<code>ZI_S</code>	Re-zero performed under stable conditions.
<code>ZI_I</code>	Command understood but currently not executable (balance is currently executing another command, e.g. taring).
<code>ZI_+</code>	Upper limit of zero setting range exceeded.
<code>ZI_-</code>	Lower limit of zero setting range exceeded.

Comments

- This command is not supported by approved balances.
- The zero point determined during switching on is not influenced by this command, the measurement ranges remain unchanged.
- The tare memory is cleared after zero setting.

Example

<code>_</code>	<code>ZI</code>	Zero immediately.
<code>_</code>	<code>ZI_D</code>	Re-zero performed under non-stable (dynamic) conditions.

4 What if...?

Tips from actual practice if the communication between the system (computer, PLC) and the balance is not working.

Establishing the communication

Switch the weigh module/balance off / on.

The balance must now send identification string [I4 ▶ Page 89], e.g. `I4_A_ "0123456789"`.

If this is not the case, check the following points.

Connection

For RS232 communication, at least three connecting lines are needed:

- Data line from the weigh module/balance (TxD signal).
- Data line to the weigh module/balance (RxD signal).
- Signal ground line (GNDINT).

For RS422 communication, at least four connecting lines are needed:

- Data line from the weigh module/balance (TX+ signal).
- Data line from the weigh module/balance (TX- signal).
- Data line to the weigh module/balance (RX+ signal).
- Data line to the weigh module/balance (RX- signal).

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 balance:

- 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 balance can not send or receive data.

Check whether the weigh module/balance is prevented from transmitting by handshake lines (CTS or DTR). Set the parameter "protocol" for the weigh module/balance and the peripheral device to "No Handshake" or "none". The handshake lines now have no influence on the communication.

Characters are not displayed correctly

In order to display ASCII characters >127 dec., ensure that 8-bit communication is taking place.

5 Appendix

5.1 Framed protocol

Introduction

With the command `PROT` a framed bus protocol (`PROT_2`) that is derived from the DIN Measurement Bus (DIN 66348) can be selected. This protocol may be used to make data transmission more reliable.

Nevertheless, full safety cannot be guaranteed since not all transmission errors may be detected or some errors may compensate each other.

In this protocol, the data is enclosed by a set of control characters and a checksum is calculated. This checksum enables the receiver to check whether the data was transmitted correctly or not.

In the following description, control characters are enclosed by angle brackets.

Used Control Characters

Character	Hex	Function
<STX>	02	FrameStart This control character marks the begin of a frame
<ETX>	03	FrameEnd This control character marks the end of a frame
<ACK>	06	Acknowledge This control character will be sent by the receiver after a frame is transmitted correctly
<NAK>	15	NegativeAcknowledgement This control character will be sent by the receiver after a frame is transmitted incorrectly
<EOT>	04	EndOfTransmission This control character terminates the transmission immediately

Frame Structure

A frame encloses the data that has to be transmitted. The control characters <STX> and <ETX> mark the begin and the end of the frame. The Block Control Code (`BCC`) follows this frame.

<STX>	Control character FrameStart
ADDR	Weighing Module address
...	Data
...	
...	
<ETX>	Control character FrameEnd
BCC	Block Control Code

BCC

Transmission errors may be detected by means of the Block Control Code. The `BCC` equals `XOR` (exclusive or) over the data bytes and <ETX> (including `ADDR`, but excluding <STX>). Single 1-bit errors may be detected whereas multiple errors may compensate each other and remain undetected.

Flow of Communication

After the transmission of a frame, the receiver has to reply with <ACK> or <NAK> within 200 ms. If the `BCC` and the data don't match, a transmission error is detected and <NAK> has to be returned. This requests the sender to transmit the frame again. The number of transmission trials is limited to three. After three erroneous trials, the transmission is aborted with <EOT>. <EOT> may also be used to abort the transmission at any time unless the `BCC` is expected (the `BCC` can take an arbitrary value including 03 hex which represents <EOT>).

Example

The command `SI` is sent to the weigh module:

Character	Hex	Comment
<STX>	02	FrameStart
7	37	Weighing Module address
,S'	53	Data
,I'	49	
<ETX>	03	FrameEnd
BCC	0E	Block Control Code

The weigh module checks the frame by means of the `BCC`. If the Data was transmitted correctly, the weigh module returns a <ACK>. Subsequently, the weigh module sends the following reply:

Character	Hex	Comment
<STX>	02	FrameStart
7	37	Weighing Module address
,S'	53	Data
,L'	20	
,D'	44	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,L'	20	
,3'	33	
,L'	2E	
,4'	34	
,8'	38	
,L'	20	
,g'	67	
<ETX>	03	FrameEnd
BCC	75	Block Control Code

The `PLC` then checks the data with the `BCC` and acknowledges the successful transmission by sending <ACK>.

Exception: SIR

A problem occurs if a `SIR` command is issued. It won't be practicable to await an acknowledgement for 200 ms after each weighing result. Therefore, the weigh module doesn't expect a <ACK> or <NAK> while replying on a `SIR` command.

Index

A

Adjustment

A30	20
C0	22
C1	24
C2	26
C3	28
C4	29
C5	31
C6	32
C7	35
C8	38
C9	41
I50	108
I54	113
I71	124
M17	147
M18	149
M19	150
M27	157
M32	161
M33	162
M47	170
M48	172

Auto zero

I52	110
-----	-----

B

Balance ID

I10	91
-----	----

Balance information

I0	85
I1	86
I10	91
I11	92
I14	93, 117
I2	87
I26	98
I3	88
I4	89
I5	90
I51	109
I56	115
I65	120
I66	121

I67	122
LST	143
M31	160

Balance settings

C	21
I15	95
I27	99
I29	100
M21	152
M38	165
M43	167
M44	168
M67	177
M89	187
RDB	201
USTB	240

C

Cancel

@	15
DW	54

Change display resolution

M110	190
------	-----

D

Data interface

COM	44
M45	169
M68	178
MONH	194
NID	195
NID2	196
PROT	197
UPD	239

Network configuration

M71	183
-----	-----

Diagnostics

I32	101
I76	128
I77	129
I78	131
I79	132
I80	133
I81	135
I82	136

Digital input

DIN	48	F14	79
DIS	49	F15	80
Digital output		F16	82
DOS	50		
DOT	51	G	
DOTC	52	GEO code	
WMCF	242	I74	126
Display		I75	127
D	46	H	
DW	54	Network configuration	
E01	55	M70	181
E02	56	Host unit	
E03	58	I43	102
K	140	I	
M23	156	ID balance	
M39	166	I10	91
PWR	199	Initial zero range	
Disply unit		I48	107
I44	103	L	
Network configuration		List of commands	
M72	185	I0	85
Driver mode		M	
M103	188	MinWeigh Application	
F		M34	163
Factor weighing		SIUM	213
M22	155	SUM	224
Factory setting		Module test with built-in weights (scale placement sensitivity test)	
FSET	84	TST5	237
I43	102	Monitoring	
I44	103	I32	101
I45	104	N	
I46	106	Network configuration	
Filling		M70	181
F01	59	Network configuration	
F02	60	I53	111
F03	61	M69	179
F04	62	M7109	189
F05	63	P	
F06	65	Percent weighing	
F07	67	SU	202, 223
F08	69	Percent weighing application	
F09	70		
F10	72		
F11	74		
F12	75		
F13	77		

A01	16	M66	175
Piece counting		TST0	232
SU	202, 223	TST1	233
Piece counting application		TST2	235
PW	198	TST3	236
Point of calibration		Timeout	
I74	126	I62	119
Point of use		Tolerances	
I75	127	I21	97
R		U	
Restart		User settings	
R01	200	LST	143
RS422		MOD	192
M103	188	W	
RS485		Weighing	
M103	188	S	202
S		SC	203
Service		SI	204
I16	96	SIR	207
I62	119	SIRU	208
I69	123	SIS	209
Software		SIU	212
I83	138	SIUM	213
Status		SNR	214
DAT	47	SNRU	216
IO	85	SR	218
PWR	199	SRU	220
TIM	231	ST	222
Switch off		SU	223
I73	125	SUM	224
T		Weighing application	
Taring		A02	17
T	225	A03	18
TA	226	Weighing filter setup	
TAC	227	FCUT	83
TC	228	I45	104
TI	230	M01	144
Temperature		M02	145
M28	158	M03	146
Terminal		M29	159
see Display	46	Weighing mode	
Test function		I46	106
M20	151	Weighing to a nominal value	
M47	170	A10	19
M48	172	Weight value	

SIC1	205
SIC2	206

Z

Zeroing	
M35	164
Z	244
ZC	245
ZI	246

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