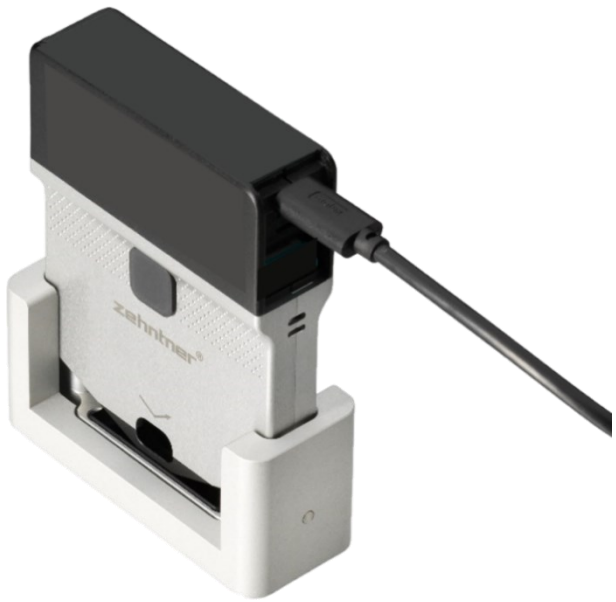
SCREENING EAGLE | proceq

ZG8150

Inline Glossmeter Technical Manual



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Revision History

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1.0	August 10, 2020	**PEGG** - Corrections and final formatting

Content

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Illustrations, descriptions as well as the technical specifications conform to the instruction manual at hand at the time of publishing or printing. However, Proceq SA policy is one of continuous product development. All changes resulting from technical progress, modified construction or similar are reserved without obligation for Proceq to update.

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The instruction manual has been drafted with the utmost care. Nevertheless, errors cannot be entirely excluded. The manufacturer will not be liable for errors in this instruction manual or for damages resulting from any errors.

The manufacturer will be grateful at any time for suggestions, proposals for improvement and references to errors.

1 Introduction

The ZG8150 is a glossmeter for use in a production test system. With a dedicated cable it can be connected to a USB or RS232 interface on the host (e.g. PC). For that a dedicated cable is used and the device has to be configured accordingly.

1.1 Scope of this document

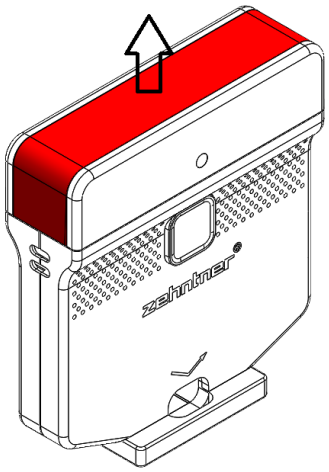
This document is an instruction manual for the ZG8150 Inline Glossmeter.
It describes in technical details, the mounting and explains the connection setup, the protocol format, the command set and their parameters, the answer-strings of the device as well as possible error reports.

2 Mounting of the device

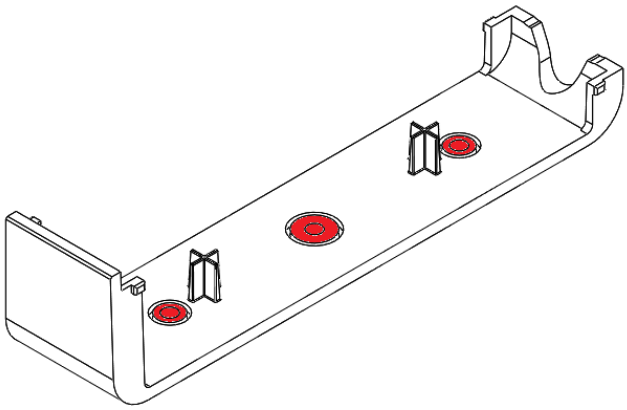
To integrate the ZG8150 into a production line, the device can be mounted to fixtures or robotic arms.

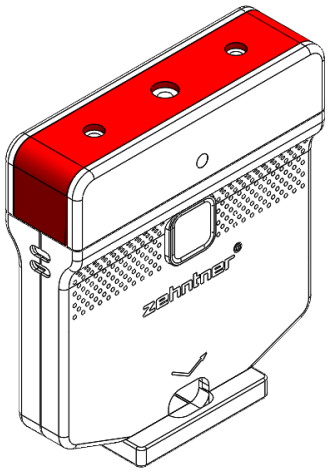
To facilitate the mounting, the device has a threaded hole on the top and two mounting guide holes.
Follow the steps

- Remove cap for mounting



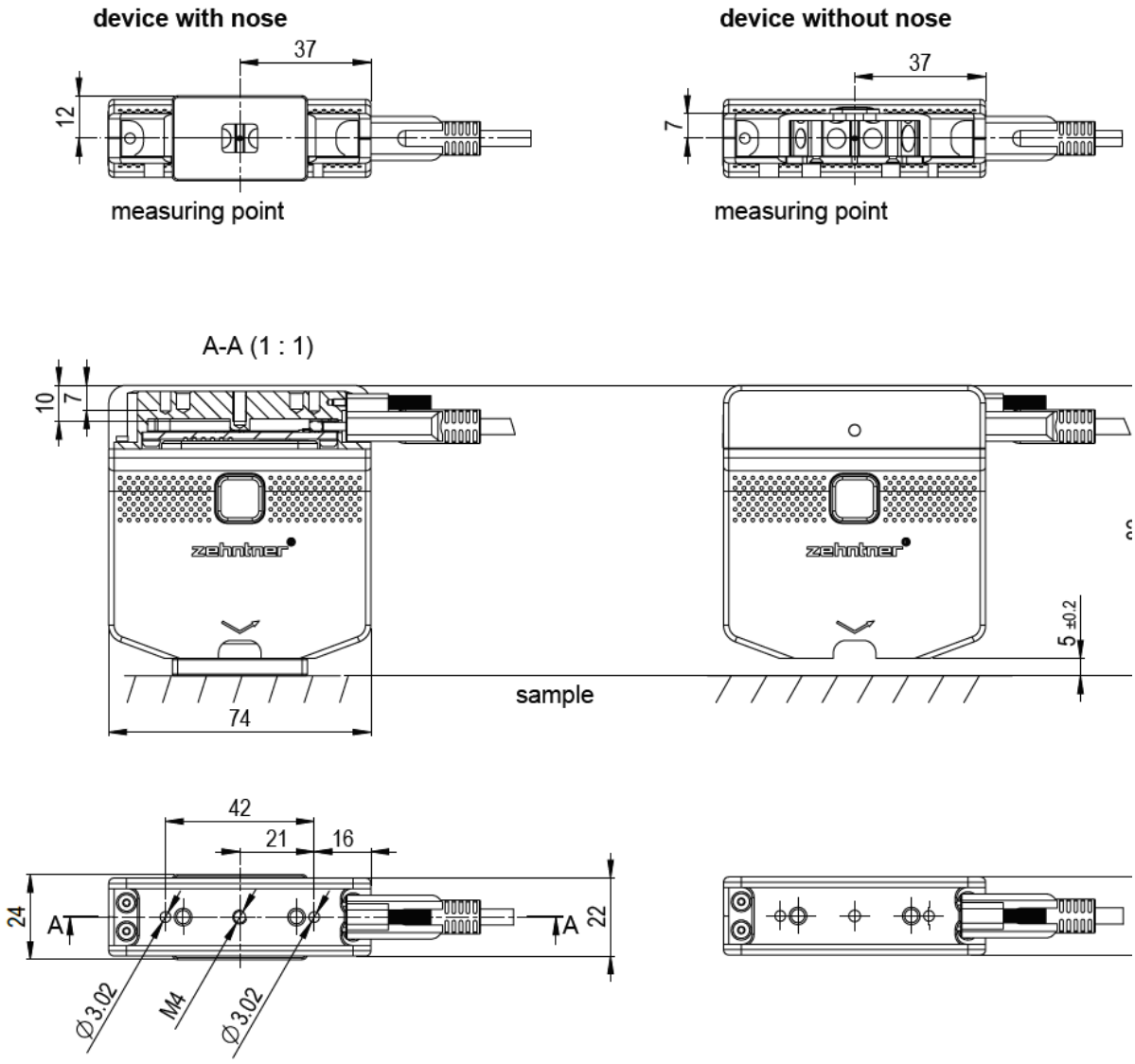
Cap can be pierced with a drill and put back on





Drill diameter: 4.5mm + 6mm

3 Dimensional Drawings

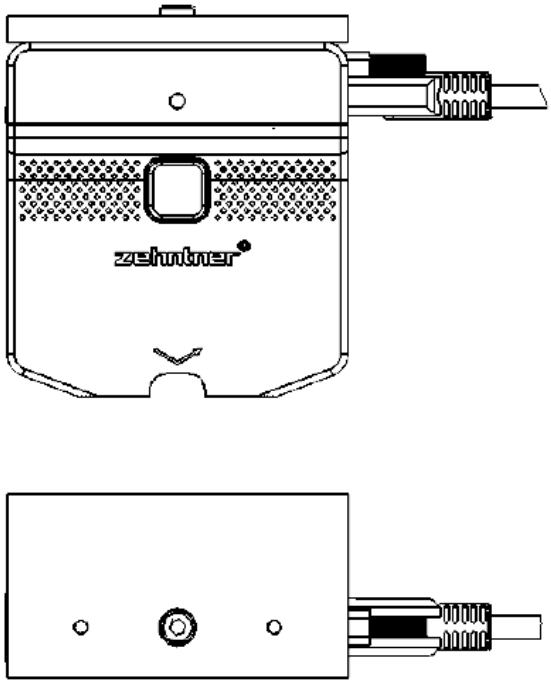


3.1 Mounting Example – with custom mounting plate

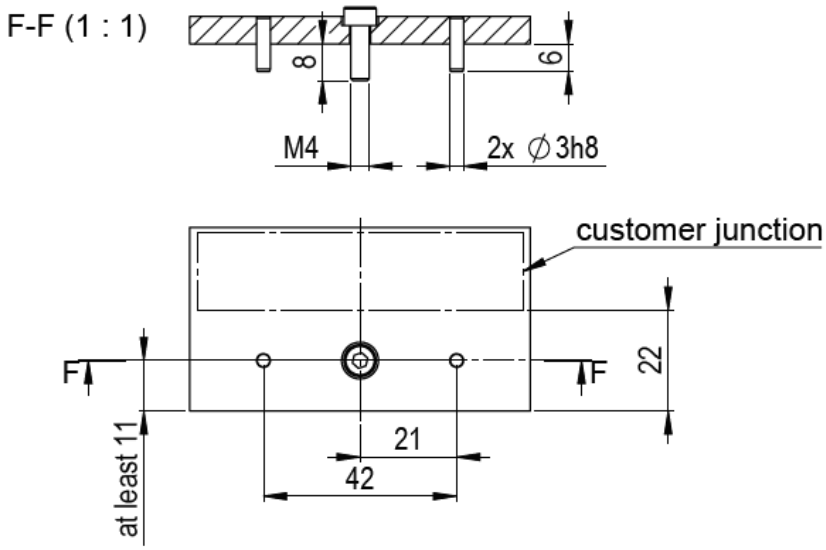
The following example shows how the ZG8150 can be mounted on a custom made mounting plate, which allows versatile mounting options to robot arms or fixtures.

NOTE:
This mounting plate is for reference purposes to make your integration easier and not available as a product.

device with mounting plate

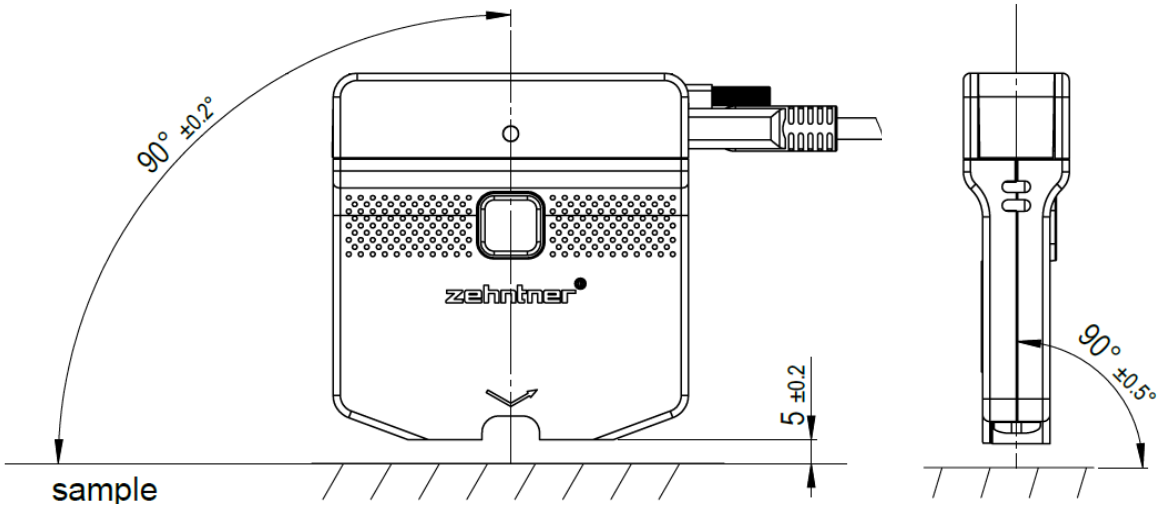


mounting plate (not available)



3.2 Mounting Tolerances

In order to guarantee the specified performance, the device shall be mounted to fulfill the following mounting tolerances.

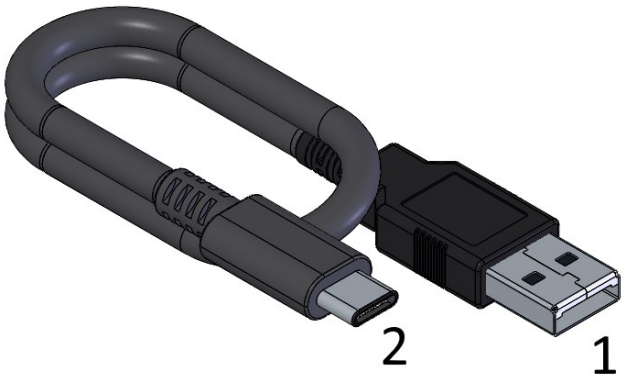


4 Connection setup

The glossmeter has a USB connection and can be connected to a USB or RS232. Interface on the host (e.g. PC). For that a dedicated cable is used and the device must be configured accordingly.

4.1 USB connection setup

To connect the device to a USB port a USB type C to type A cable is used. The device needs to be setup for USB connection.



Connector	Type	Description
1	A (male)	Plugged on PC side
2	C (male)	Plugged on device side

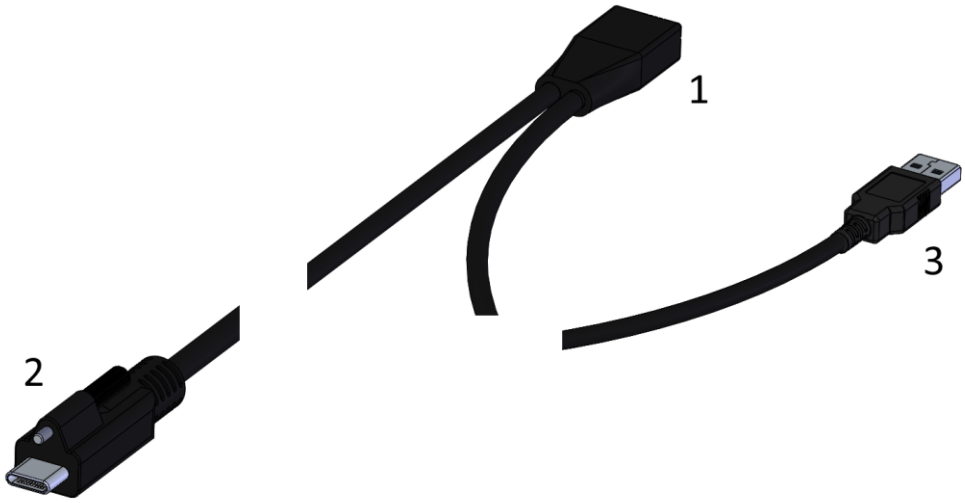
Setting	Value
Baudrate	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

4.2 RS232 connection setup

To connect the device to a RS232 port the RS232 connection kit is used.
This consists of

1. a USB Y-cable
2. a USB-to-RS232 converter
3. a gender changer adapter

Connector	Type	Description
1	A (female)	Plugged to the RS232 adapter
2	C (male)	Plugged on device side
3	A (male)	Plugged to power 5V (e.g. PC side)



In order to communicate to a RS232 port the device needs to be setup for RS232 communication (see section 6).

The serial port of the computer has to be set to the following communication settings:

Setting	Value
Baudrate	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

4.3 Firmware update

A firmware update can only be performed view a USB connection. Therefore the USB connection setup (see 4.1) is required.

If the device is used in USB setup, the device can be connected to a PC via USB and the firmware can be updated using the “pqUpgrade” tool.

If the device is used in RS232 setup, the device needs to be configured for USB setup first.

There are two ways to switch to USB connection setup:

1. Using a command string (see 6.4) After the communication is set to a USB connection setup, the device resets and starts in the selected communication setup.
2. Press the measurement button of an unplugged device. Plug in the USB cable (USB set-up) connected to the PC and wait 10s before release the measurement button. Then the update tool “PqUpgrade” will find the device. “PqUpgrade” will start the device in USB virtual com port setup. In order to return to the same communication setup as before the update a reset is required.

5 Communication protocol

The communication with the ZG8150 is completely string based. All commands are composed of ASCII-character strings. This allows an easy control of the device, for example with a commercially available terminal program such as “HyperTerminal”.

5.1 Command and return string

The communication works synchronous, with the following communication scheme:

3. A command is sent to the device
4. The command is executed
5. and a return string is sent from the device

Only after a complete sequence a new command is accepted.
In scan mode or continuous mode another scheme is used:

6. a command to start the scan mode or continuous mode is sent to the device
7. the device starts the respective mode
8. and sends data, until the mode is stopped

Only after this mode is stopped, new commands can be sent.

A command string is basically structured like this:

CMD | *TID* | *PARAMS:*

Name	Description
CMD	The command defines which operation is executed.
TID	The transaction ID can be used to identify a communication transfer.
PARAMS	The parameters are added after the TID. The number of parameter can differ from command to command.

For separation of the different values the pipe character “|” (ASCII 0x7C) is used.
As terminator is the character colon “:” (ASCII 0x3A) used.
e.g. 2|xy|3:

5.2 Transaction ID (TID)

The recommended value ranges of the 2 ASCII characters are following:

`0x21…0x2F`

`0x3B…0x40`

`0x42…0x7B`

`0x7D…0x7E`

Return strings from device which are not triggered explicitly by user side will use only ASCII numbers (0x30…0x39).

5.3 Parameter “AngleBinary”

The parameter “AngleBinary” includes the information which geometries are selected. The value corresponds to binary coded integer (active high) and the bit field is as follows:0x21…0x2F

Angle 3 (A2)	Angle 2 (A1)	Angle 1 (A0)	Value
0 (inactive)	0 (inactive)	1 (active)	**1**
0	1	0	**2**
0	1	1	**3**
1	0	0	**4**
1	0	1	**5**
1	1	0	**6**

A0 always denotes the smallest angle according to the perpendicular to the measuring plane. For example a device with the geometries 20°/60°/85°, A0 would be 20°, A1 = 60°, A2 = 85°.

5.4 Invalid measurement values

It can happen that a measurement return values smaller than zero.

Value	Meaning
-1	No measurement value
-2	Overflow

6 Commands

In this section the command strings supported by the glossmeter are listed. Some possible access by commands not described is provided for other use than inline (e.g. factory configuration/calibration/diagnostic).

6.1 2 – AdvancedMeasureValue

This command executes a single measurement.

Command:	`2`
Command string:	`2|TID|AngleBinary:`
Return string:	`2|TID|AngleBinary|Unit|ValueAn:`

Parameter:	
AngleBinary	Angle combination
ValueAn	Measured value per angle n (n = 0…2), format %4.1f
Unit	GU or %

Example		
Send	`2|xy|3:`	Command: 2 TID: xy AngleBinary: 3 (angle A0 and A1)
Receive	`2|xy|3|GU|91.2|94.5:`	Command: 2 TID: xy AngleBinary: 3 (angle A0 and A1) Uint: GU Measured values: A0 = 91.2, A2 = 94.5

6.2 3 – StartScan Measurement

This command starts the scan measurements until the device receives the stop command. Scan measurement mode executes measurements at the fastest possible rate and sends them consecuteively. Do not send other commands while scan mode is active. If you want to sent another command, first execute the StopScanMeasurement command.

Command:	`3`
Command string:	`3|TID|AngleBinary:`
Return string:	`3|TID|AngleBinary|Unit|ValueAn:`

Parameter:	
AngleBinary	Angle combination
ValueAn	Measured value per angle n (n = 0…2), format %4.1f
Unit	GU or %

Example		
Send	`3|xy|2:`	Command: 2 TID: xy AngleBinary: 2 (angle A1)

Receive	3|xy|2|GU|70.5: 3|00|2|GU|70.9: 3|01|2|GU|71.0: 3|02|2|GU|70.7: …	Command: 2 TID: xy, 00, 01, 02, … AngleBinary: 2 (angle A1) Uint: GU Measured values: A1 = 70.5, 70.9, 71.0, 70.7, …

6.3 5 – StopScanMeasurement

This command stops the scan measurements.

Command: 5
Command string: 5|TID:
Return string: 5|TID:

Example		
Send	5|xy:	Command: 5 TID: xy
Receive	5|xy:	Command: 5 TID: xy

6.4 8 – SetFlash

This command provides write access to angle independent settings.

Command: `8`
Command string: `8|TID|Index|Data:`
Return string: `8|TID:`

Parameter:
Index — Index of the setting (see Index table in 6.5)
Data — Value of the particular setting

Example		
Send	`8|xy|710|1000:`	Command: 8 TID: xy Index: 710 Data: 1000
Receive	`8|xy:`	Command: 8 TID: xy

6.5 12 – GetFlash

This command provides read access to angle independent settings.

Command: `12`
Command string: `12|TID|Index:`
Return string: `12|TID|Data:`

Parameter:
Index — Index of the setting
Data — Value of the particular setting

Index	Name	Description
`500`	Serial Number	Read only string.
`503`	Angle Binary	Read only supported angles. Value range: 1-7 (integer)
`710`	MsrIntervalTime	Measure interval time for continuous mode. Possible values in milliseconds: 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000
`1100`	UsbSettings	Communication setting. USB setup: 0 (integer) RS232 setup: 1 (integer)
`1560`	Units	Measurement units Gloss units: 0 (integer) Percent: 1 (integer)

Example		
Send	`12|xy|710:`	Command: 12 TID: xy Index: 710
Receive	`12|xy|1000:`	Command: 12 TID: xy Data: 1000

6.6 16 – StartContinuousMeasurement

This command starts the continuous measurements until the device receives the stop command.

Command:	`16`
Command string:	`16|TID|AngleBinary:`
Return string:	`16|TID|AngleBinary|Unit|ValueAn:`

Parameter:	
AngleBinary	Angle combination
ValueAn	Measured value per angle n (n = 0…2), format %4.1f
Unit	GU or %

Example		
Send	`16|xy|3:`	Command: 16 TID: xy AngleBinary: 3 (angle A0, A1)

Receive	`16|xy|3|GU|85.3|87.6:`
	`16|35|3|GU|87.5|89.4:`
	`16|36|3|GU|89.4|92.3:`
	`16|37|3|GU|91.2|94.5:`
	…
		Command: 16
		TID: xy, 35, 36, 37, …
		AngleBinary: 3 (angle A0, A1)
		Uint: GU
		Measured values:
		A0 = 85.3, 87.5, 89.4, 91.2, …
		A1 = 87.6, 89.4, 92.3, 94.5, …

6.7 18 – StopContinuousMeasurement

This command stops the continuous measurements.

Command:	`18`
Command string:	`18|TID:`
Return string:	`18|TID:`

Example		
Send	`18|xy:`	Command: 18 TID: xy
Receive	`18|xy:`	Command: 18 TID: xy

6.8 28 – GetIsOnStandard

This command returns the information if the device is placed on the working standard or not.

Command:	`28`
Command string:	`28|TID:`
Return string:	`28|TID|Data:`

Parameter:

Data	0 = is not on standard, 1 = is on standard

Example		
Send	`28|xy:`	Command: 18 TID: xy
Receive	`28|xy|1:`	Command: 18 TID: xy Data: 1 (is on standard)

6.9 53 – LaserEnable

This command enables or disables the laser of the glossmeter.

Command: `53`
Command string: `53|TID|Data:`
Return string: `53|TID:`

Parameter:
Data `0` = disable laser, `1` = enable laser

Example		
Send	`53|xy|1:`	Command: 53 TID: xy Data: 1 (enable laser)
Receive	`53|xy:`	Command: 53 TID: xy

6.10 56 – Error

This command returns the error of any command.

Command: `56`
Command string: -
Return string: `56|TID|Command|Error:`

Parameter:
Command Command caused the error
Error Error code

Example	Name	Description
-1	UNDEFINED_ERROR	
0	NO_ERROR	
1	OPCODE_NOT_FOUND	No command with this code exists.
9	NO_STANDARD_VALUE	No valid standard value is used.
10	DEVICE_NOT_ON_WORKING_STANDARD	Device is not placed on the working standard.
12	VALUE_OUT_OF_RANGE	Value is out of range.
13	PARSE_ERROR	The format of the send string is not correct or wrong send parameters are used.
14	PARAMETER_ERROR	The index of a setting is wrong.
30	NO_ACCESS_RIGHTS	The user has no accees rights.
31	ACCESS_DENIED	No access because it is not possible to access the resource.

32	BLOCK_CMD_ACCESS	The access is blocked because another action blocks it.

40	HW_ERROR	HW error occurred.
61	TIMEDATE_INCONSISTENT	Time check is not consistent.
201	FLASH_WRITE_FAILED	Writing ot the settings failed.
202	FLASH_READ_FAILED	Reading of the settings failed.

Example		
Send	`8|xy|0|3:`	Command: 8 TID: xy Index: 0 Data: 3
Receive	`56|xy|0|30:`	Command: 56 TID: xy Command: 0 Error: 30

6.11 64 – ResetDevice

This command performs a reset.

Command: `64`
Command string: `64|TID:`
Return string: -

Example		
Send	64|xy:	Command: 64 TID: xy

6.12 70 – AdvancedUserCalibration

This command is used to execute a user calibration.

Command:	`70`
Command string:	`70|TID|AngleBinary|Cal2Std|CalValue:`
Return string:	`70|TID|Deviation:`

Parameter:

AngleBinary	A single angle can be selected
Cal2Std	0 = calibrate to working standard, 1 = calibrate on second standard
CalValue	Calibration value, units depends on setting, if Cal2Std = 0 is CalValue = 0
Deviation	Deviation in ppm (e.g. 6235 = 0.6235%) relative to the used sample

Example		
Send	`70|xy|1|0|0:`	Command: 70 TID: xy AngleBinary: 1 (angle A0) Cal2Std: 0 (working standard) CalValue: 0
Receive	`70|xy|2020:`	Command: 70 TID: xy Deviation: 2020ppm (0.2020%)

6.13 78 – AcceptUserCalibration

This command is used to accept the executed AdvancedUserCalibration. This valid after user calibration or an accept command. If another command is executed the user calibration is not valid anymore.

Command:	`78`
Command string:	`78|TID|AngleBinary:`
Return string:	`78|TID:`

Parameter:

AngleBinary	A single angle which was user calibrated before.

Example		
Send	`78|xy|2:`	Command: 78 TID: xy AngleBinary: 2 (angle A1)
Receive	`78|xy:`	Command: 78 TID: xy

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