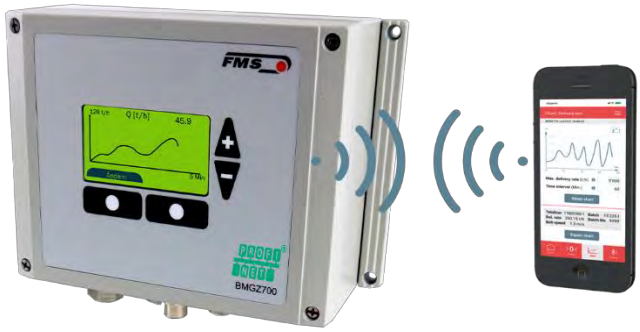
Operating Manual BMGZ710 and BMGZ710.PNET

Robust evaluation unit for conveyor belt scales, with optional PROFNET interface

Document Version	3.30	
Published / Author	12/2024	NS
Firmware Version BMGZ710	2.35	
Firmware Version BMGZ710.PNET	2.35	



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Diese Bedienungsanleitung ist auch in Deutsch erhältlich.

Bitte kontaktieren Sie Ihre nächstgelegene FMS Vertretung.

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2 Safety instructions

All safety, operating, and installation instructions given here serve to ensure that the device functions properly. They must be observed in all circumstances to ensure the safe operation of systems. Failure to comply with the safety instructions or use of the devices outside of the specified performance characteristics may endanger the safety and health of persons.

Work relating to the operation, maintenance, conversion, repair, or configuration of the device described may only be performed by qualified personnel.

2.1 Representations of safety instructions

2.1.1 Risk that may result in minor or moderate injury

Danger, warning, caution

Type and source of danger

Possible consequence of disregarding the instruction

Measures to prevent the danger

2.1.2 Instructions to ensure proper functionality

Instruction

Instruction regarding proper operation

Simplification of operation

Ensuring functionality

2.2 General safety instructions

The functionality of the conveyor belt scales is only guaranteed if the components are installed in the recommended configuration. If not, there is a risk of serious malfunction. The installation instructions on the following pages must therefore always be followed.

The on-site installation regulations serve to ensure the safety of electrical systems. These regulations are not taken into consideration by this operating manual. However, they must always be observed nonetheless.

Improper earthing may cause electric shocks to people, malfunctions of the entire system, or damage to the evaluation unit! It must always be ensured that the housing is properly grounded.

3 Product information

3.1 System configuration

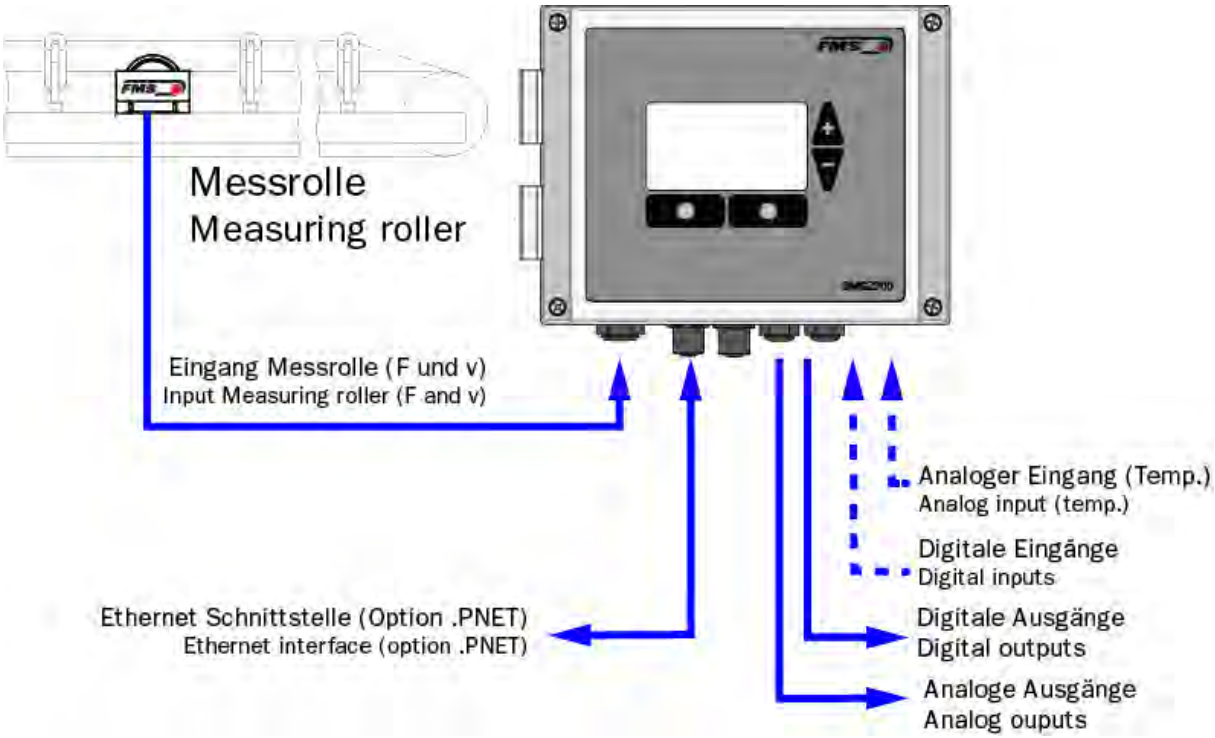


Figure1: Measuring roller and evaluation unit

3.2 Product description

The evaluation units in the BMGZ700 series are designed to meet the demanding conditions of applications in mobile and stationary conveyor systems. The illuminated graphical display shows the current flow rate, the daily amount, the total amount, and the belt speed. Additional display devices and controls can be connected via the configurable analogue and digital outputs. The web browser, included by default, allows the measuring roller to be quickly configured, e.g. with any PC or laptop, or by remote access.

An integrated PROFINET interface is available as option.

3.3 Functional description

The evaluation units in the BMGZ700 series convert the measuring signals from the measuring roller into digital form. The weight of the measuring roller and the load from the belt (taring) are subtracted from the measured value, and the resulting difference is multiplied with the belt speed. The evaluation units in the BMGZ700 series have an auto-taring program that automatically determines the tare value over two belt revolutions by pressing a button.

3.4 Scope of delivery

Included in the delivery:

Evaluation unit; for the .K version, the evaluation unit is preinstalled in the control cabinet

Not included in the delivery:

Power supply unit, installation materials

Also available:

Measuring roller, connection cable from evaluation unit to measuring roller (specify length), M12 d-coded Ethernet cable, or RJ45 patch cable for web browser.

3.5 Order code for evaluation unit

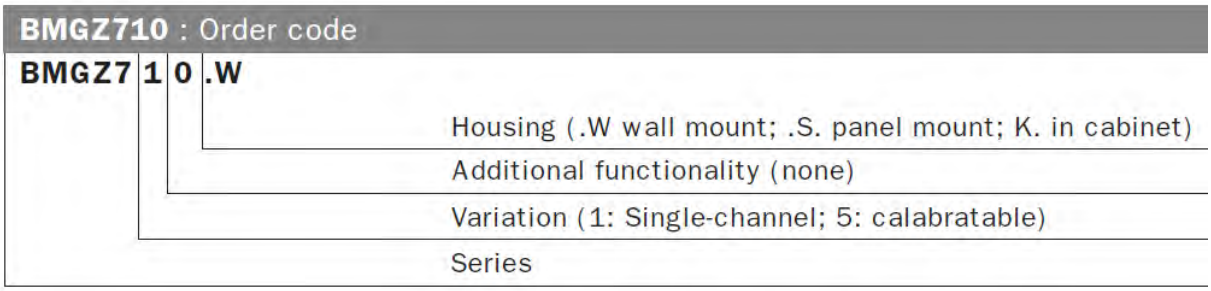


Figure2: Order code for evaluation unit

4 Installation

Several versions of the evaluation unit are available.

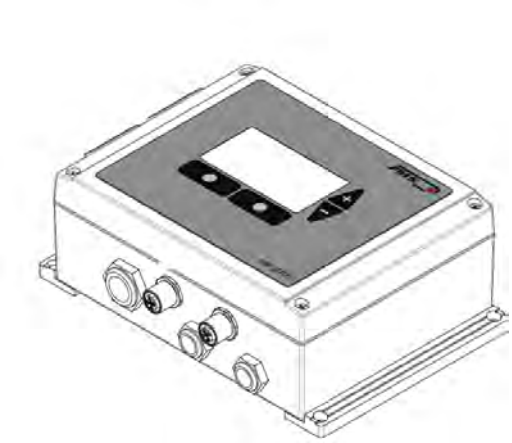


Figure3: BMGZ710.W Wall mount

- Unscrew the 4 screws on the cover with the membrane control panel and display
- The cover can now be opened
- The housing is screwed on through the 4 holes in the bottom of the housing

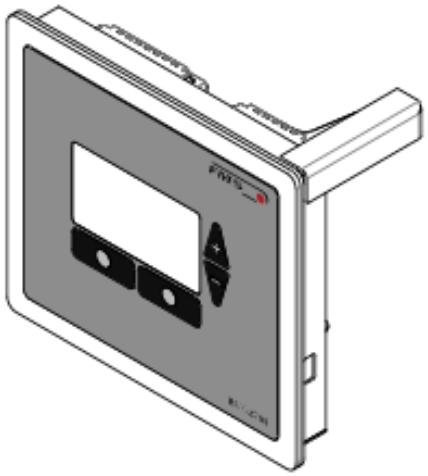


Figure4: BMGZ710.S Panel mount

5 The panel must be prepared with a suitable recess and holes. See 10 FMS BeltSCALE App

The app allows you to read the current measured values and configure the evaluation electronics via your smartphone or tablet.

The devices communicate via an integrated Bluetooth® module.

For clear identification, the last 4 digits of the serial number of the BMGZ700 series are applied to the front of the housing.

Figure27: BMGZ700-series with last 4 digits of the serial number

Only one mobile device can access the evaluation electronics at a time.

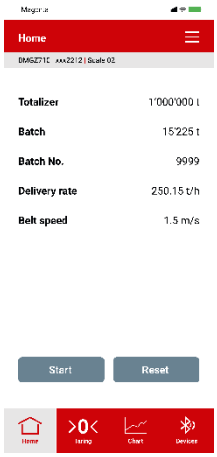
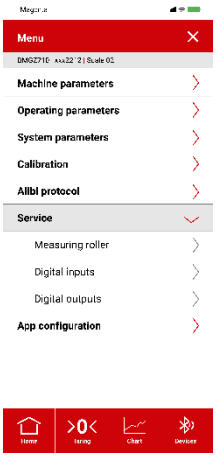
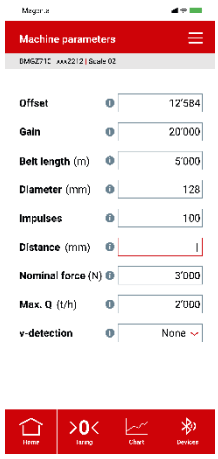
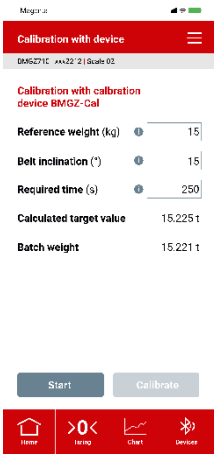
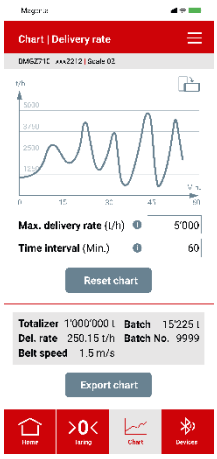
As soon as the connection to the mobile device is established, the display of the evaluation electronics flashes.

The FMS BeltSCALE app is an operating aid. No data is saved on the mobile device, only the current measured values of the evaluation electronics and the settings are displayed. The parameters are only saved in the evaluation electronics themselves.

Figure28: Link to download the app (Android or IOS)

5.1 Configuration via app

The procedure for taring and calibration is always identical to the procedure for evaluation electronics without Bluetooth communication. The only difference is that a mobile device is used for input instead of the control panel.

			
Download the FMS BeltSCALE app and install it **→ Google Play Store (Android); iTunes (IOS)**	**Overview of all devices in the reception area** **Select device, identification by serial number**	**Display of the current measured values, main menu at the bottom, configuration menu at the top right (password 3231)**	**Configuration, overview of parameters**
			
Configuration - Overview of machine parameters	**Taring**	**Graphic recording, also possible in landscape format**	

- **Dimensions**
- **The housing is clamped to the sheet metal**

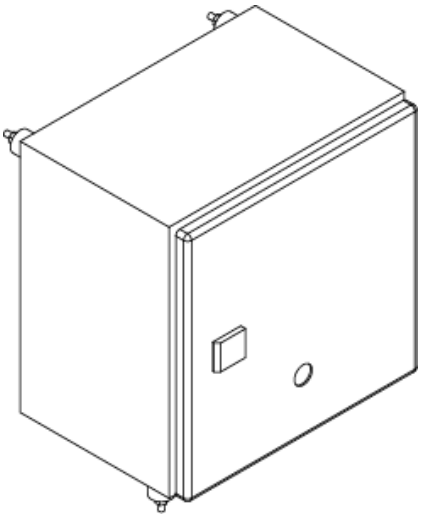


Figure5: BMGZ710.K Cabinet

- The cabinet is screwed on through the 4 holes in the back wall
- Use the rubber mounts if the system experiences vibrations

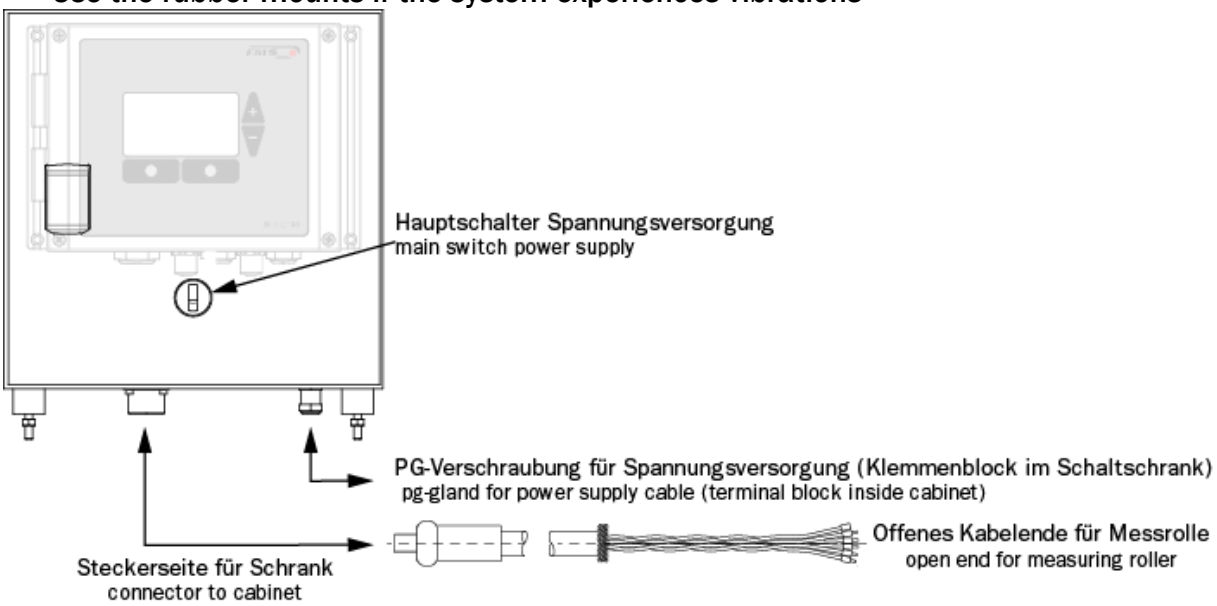


Figure6: Speciality BMGZ710.K

5.2 Electrical connection (see installation instructions for the FMS measuring roller)

The connection between the measuring roller and the evaluation unit must use the 8-core twisted-pair cable (4x2x0.75 mm²) provided.

The cable must be laid away from any power cables to ensure that no interference is induced in the measurement signal. On the measuring roller side, remove the plastic sheath of the cable over a length of approx. 14 cm.

The white wire is not required. Connect the shield to earth terminal.

On the evaluation unit side, remove the plastic sheath over a length of a approx. 25-54 cm. The white wire is not required. The shield has to have contact with the pg-gland.

The cable shield must be connected on both sides.

For the K version of the housing (cabinet), feed the cable with the 8-pin plug through the cabinet wall.

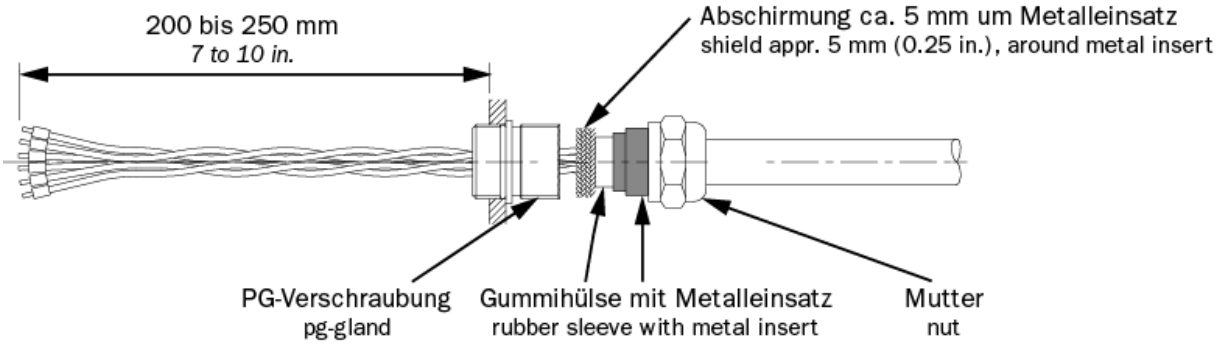


Figure7: Connection cable, evaluation unit side

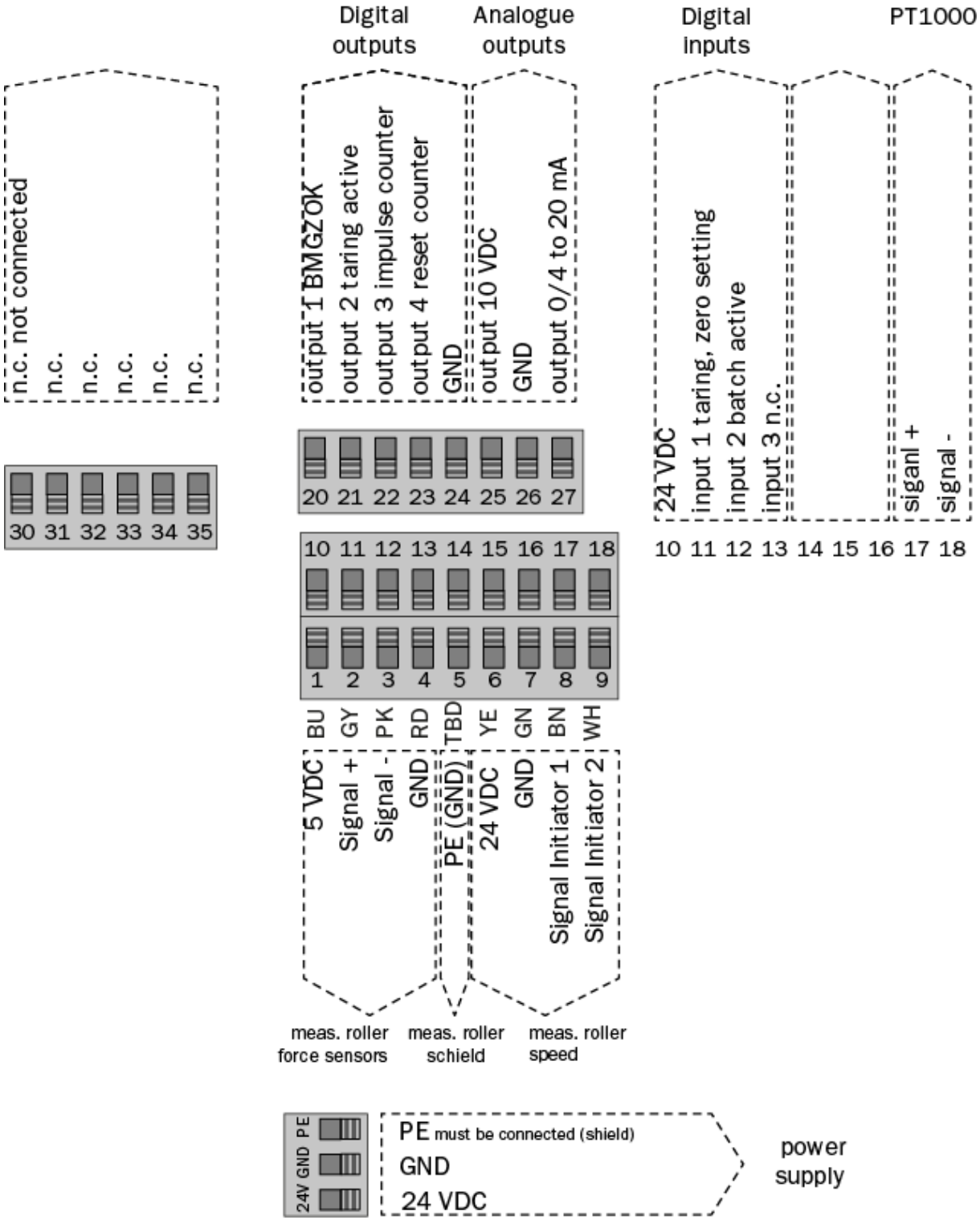
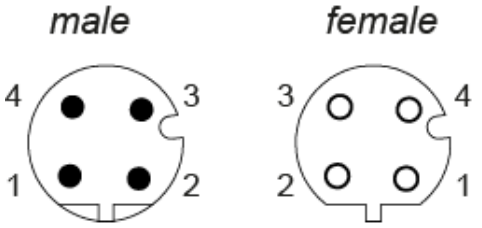


Figure8: Terminal assignment BMGZ710



Pin	DE	EN	IEC 60757
1	TD+	TD+	YE
2	RD+	RD+	WH
3	TD-	TD-	OR
4	RD-	RD-	BU

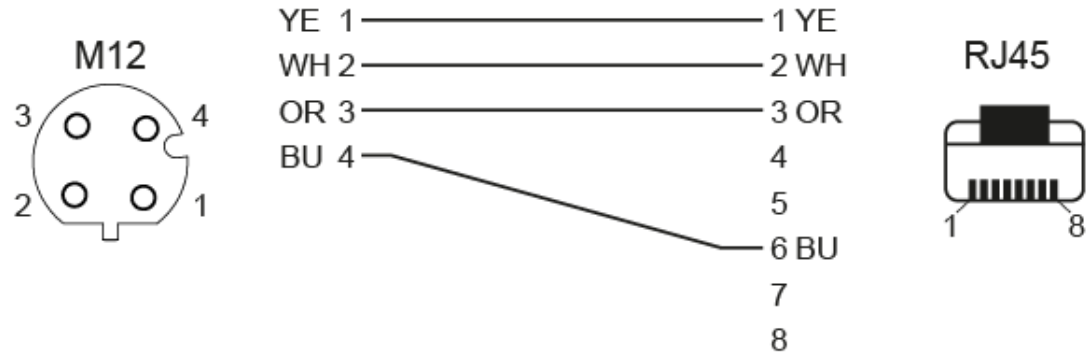


Figure9: ethernet connector M12, D-coded

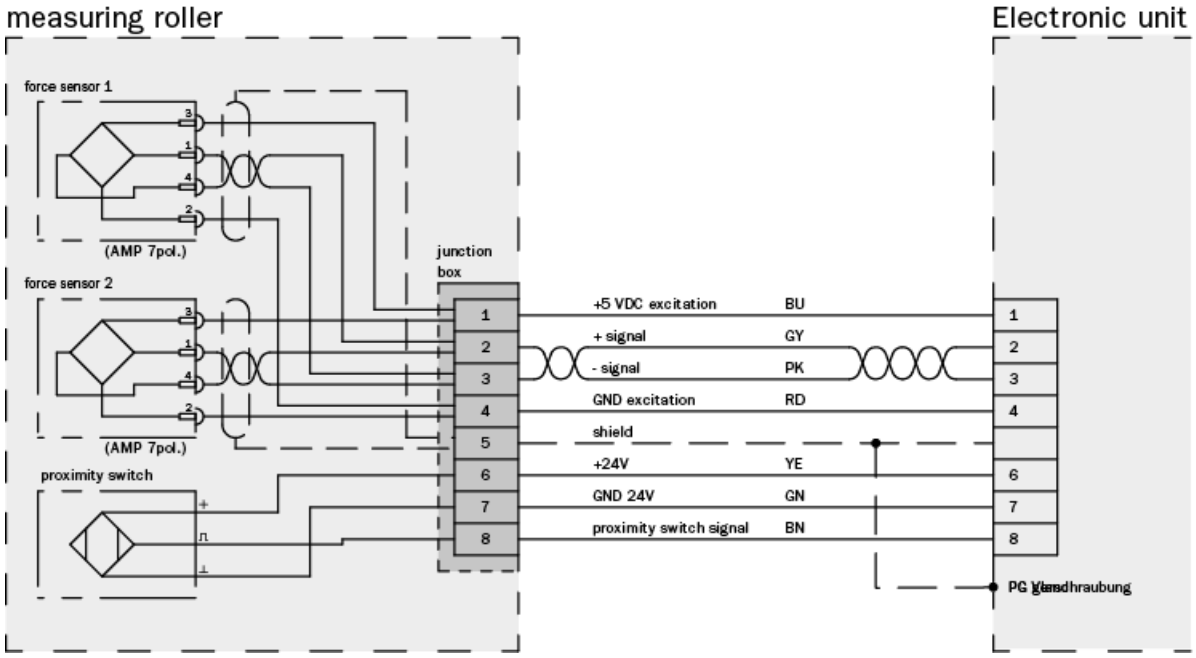


Figure10: Connection cable, measuring roller side

6 Operation and surface

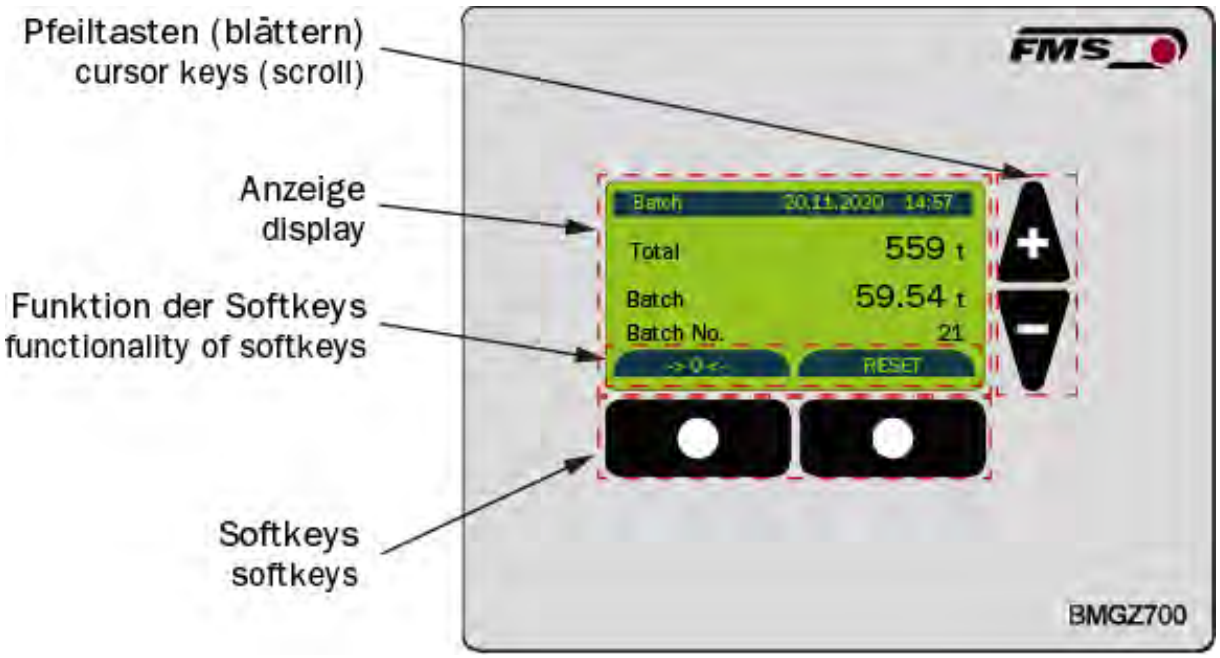


Figure11: View of device

6.1 Navigation, quick start

The menu is divided into two levels

To navigate between levels, use the softkeys (menu) or

Level 1: HOME
Display current system data with different representations

Level 2: CONFIGURATION

To enter the configuration level, press the softkey (menu) in the Home level

Machine parameters – One-time set-up of conveyor belt and measuring roller

System parameters – Country-specific parameters

Operating parameters – One-time configuration, inputs and outputs

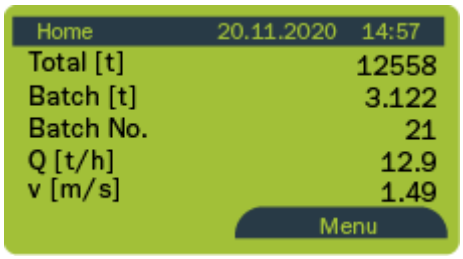
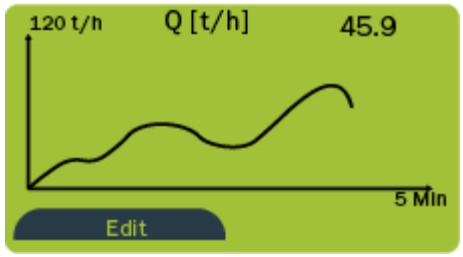
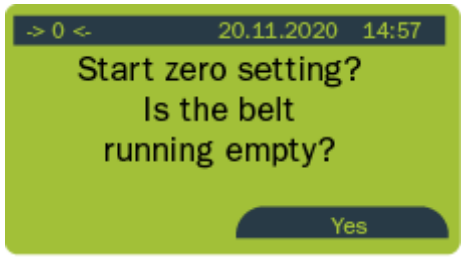
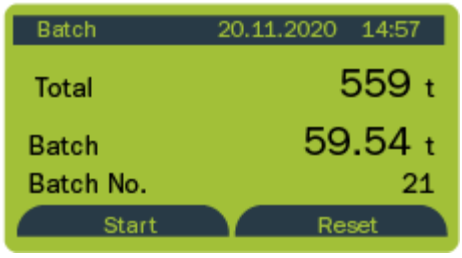
Calibration – Input correction factor

Alibi protocol – Fail-safe storage of batch data

Service – Access to system status and detailed display of error messages

Use the navigation keys to select individual parameters

To make a selection, press

Levels, navigation		
Levels	***Navigation***	***Display***
HOME		Home 
		Histogram 
		Zero setting 
		Batch 

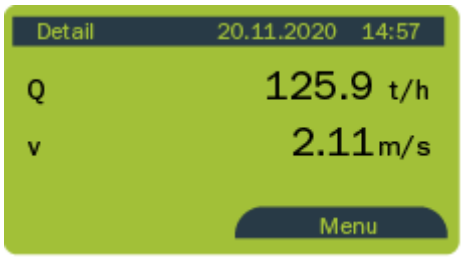
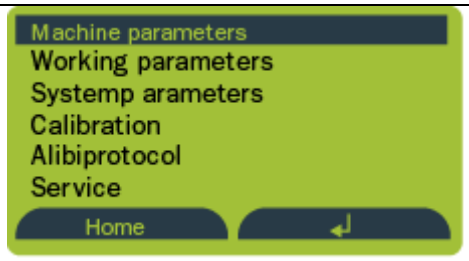
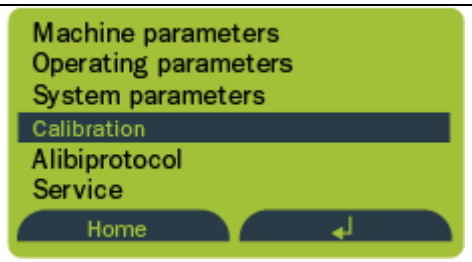
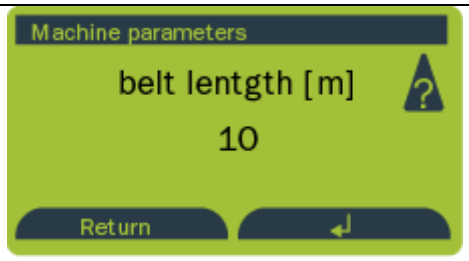
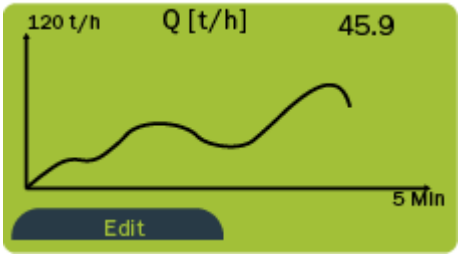
		Detail 
		Press "Menu"
CONFIGURATION		
		
		Press ↵
PARAMETER		

Table 1: levels, display

6.2 Histogram



Pressing "Edit" takes you to the configuration of the display.

The "Scaling" parameter allows you to adjust the division of the vertical axis. The "Recording" parameter allows you to set the recording time in the horizontal axis.

7 Configuration

7.1 Machine parameters

The machine parameters directly affect the weighing results.

Machine parameters						
Parameter	***Unit***	***Selection***	***Default***	***Min.***	***Max.***	***No.***
Offset	[Digit]		0	-32768	32767	1
Gain	[-]		1	0.1	10	2
Belt length	[m]		10	1	5000	3
Diameter	[mm]		108	10	1000	4
Pulse	[-]		4	1	100	5
Distance	[mm]		2000	100	5000	6
Nominal force	[N]		1000	1	5000	7
Max. Q	[t/h]		0	1	5000	54
v-detection	-	auto, none	auto			55

Table 1: Machine parameters

7.1.1 Description of machine parameters

Parameter	
Name	***Description***
Offset	The evaluation unit saves the value determined during taring / zero setting in [Digit]. Unit Digit Min. -32768 Max. 32768 Default 0 Increment 1

Parameter	
Name	***Description***
Gain	The value determined during calibration is saved under this parameter. If the automatic calibration cannot be used, a manually determined value can also be entered here. Unit - Min. 0.100 Max. 10.000 Default 1.000 Increment 0.001
Belt length	The unrolled length of the conveyor belt is saved under this parameter. This value is required for taring. Unit m Min. 1 Max. 5000 Default 10 Increment 1
Diameter	The diameter of the centre roller is saved under this parameter (see measuring roller nameplate). Unit mm Min. 10 Max. 1000 Default 108 Increment 1
Pulse	The number of blades of the pulse generator is stored under this parameter, see measuring roller nameplate. This value corresponds to the number of pulses per revolution of the measuring roller. Unit - Min. 1 Max. 100 Default 4 Increment 1

Parameter	
Name	***Description***
Distance	The distance between adjacent idlers is saved under this parameter. This value corresponds to the sum of the distances between the measuring roller and the preceding and following idler stations. Unit mm Min. 100 Max. 5000 Default 2000 Increment 1
Nominal force	Nominal force of the force senors. This value is indicated on the label of the measuring roller and the labels of each force sensor. See measuring roller nameplate. Unit N Min. 1 Max. 5000 Default 1000 Increment 1
Max. Q	The maximum capacity Q of the belt scale can be stored in this parameter. The factory setting "0" has no further effect. If a value other than "0" is set: If the current capacity falls below 5% of this value, the electronics no longer integrates. The measurement "pauses", so to speak, until the delivery rate rises above the 5 % again. Batch counter and totalizer are not increased during this time. Unit t/h Min. 0 Max. 5000 Default 0 Increment 1

Parameter	
Name	***Description***
v-detection	If this parameter is set to "automatic", the speed of the conveyor belt is recorded with the pulse generator integrated in the measuring roller. If the parameter is set to "none", no speed detection takes place. The capacity is then calculated with a preset belt speed of 1.00 m/s. In addition to this setting, digital input 3 "Belt running" must also be activated. This function not used in practice, since the automatic speed detection is usually activated. For test purposes, however, this function can be helpful. Unit - Selection none Auto Default Auto

Table 2: Description of machine parameters

7.2 Operating parameters

Operating parameters						
Parameter	***Unit***	***Selection***	***Default***	***Min.***	***Max.***	***No.***
Pulse output	[kg]		100	1	10000	50
Current output		0 to 20; 4 to 20 mA	4 to 20 mA			51
Filter output	[Hz]		10.0	0.1	20.0	52
Scaling	[t/h]		1000.0	1.0	5000.0	53

Table 3: Operating parameters

7.2.1 Description of operating parameters

Operating parameters	
Name	***Description***
Pulse output	This output emits a pulse each time the defined weight has passed the measuring roller. The weight corresponding to one pulse is stored under this parameter. Pulse duration 1 to 1000 ms, depending on flow rate Unit kg Min. 1 Max. 1000 Default 100 Increment 1
Current output	Two proportional analogue outputs are available for the flow rate. The type of current output signal is selected here. Current and voltage outputs can be used independently. Unit - Selection 0 to 20 mA, 4 to 20 mA Default 4 to 20 mA
Filter output	First-order low-pass filter for the analogue output to filter out undesirable fluctuations. The threshold frequency is configured here. This filter is independent of the other filters. Unit Hz Min. 0.1 Max. 20.0 Default 10.0 Increment 0.1

Operating parameters	
Name	***Description***
Scaling output	Here, you can define the flow rate that generates the maximum output signal (10 V or 20 mA) at the analogue outputs. The resolution is 12 bits. Unit t/h Min. 1.0 Max. 5000.0 Default 1000.0 Increment 0.1

Table 4: Description of operating parameters

7.3 System parameters

System parameters						
Parameter	***Unit***	***Selection***	***Default***	***Min.***	***Max.***	***No.***
Language	-	German, English	German			1
Filter display	Hz		1.0	0.1	1.0	2
Date format	-	DD.MM.YYYY, MM.DD.YYYY	DD.MM.YYYY			3
Time / date	-			00:00 01.01.2020	23:59 31.12.2099	4
IP address	-		192.168.0.90	0	255	5
Subnet mask	-		255.255.255.0	0	255	6

Table 5: System parameters

7.3.1 Description of system parameters

System parameters	
Name	***Description***
Language	This parameter allows the display language to be selected. Either German or English can be selected. Unit - Selection German, English Default German
Filter display	First-order low-pass filter to filter out undesirable fluctuations from the display. The threshold frequency of the filter is configured here. Unit Hz Min. 0.1 Max. 10 Default 1.0 Increment 0.1
Date format	Here, the format of the displayed date can be configured. Unit - Default DD.MM.YYYY Increment DD.MM.YYYY, MM.DD.YYYY
Time / date	The evaluation unit has a built-in real-time clock (RTC). To configure the time, the current time and date can be entered into this parameter. This information is stored in the alibi memory with the corresponding batch. There is NO automatic compensation of summer and winter time Unit - Min. 00:00 01.01.2020 Max. 23:59 31.12.2099

System parameters	
Name	***Description***
IP address	Static IP address of the evaluation unit The IP address is entered in four blocks. **Note**: This IP-address is NOT relevant for PROFINET! Unit - Min. 0 Max. 255 Default 192.168.0.90
Subnet mask	The subnet mask is entered in four blocks. Unit - Min. 0 Max. 255 Default 255.255.255.0

Table 6: Description of system parameters

7.4 Service

Service		
Parameter	***Unit***	***Display***
A/D values raw	Digit	Raw value
DMS raw	mV	Raw value
Travel	mV	Raw value minus offset
Force	N	Calculated
Belt	kg/m	Weight
Digital inputs:	-	Status: 0 = inactive; 1 = active Taring Batch active Belt is running Impulse
Digital outputs		Status: 0 = inactive; 1 = active BMGZ ok Zero setting active Remote impulse

		Remote reset
Error code		0 no error 1 Measuring roller overloaded Check measuring roller cable. Check for short circuit →strain gauge input (ADC) is over limit (> +/- 32000 Digits) → reduce load on measuring roller. 2 Analog output overloaded Q [t/h] > scaling >10V or >20mA. Check scaling The analog output (DAC) is limited (> 4095 Digits), which would lead to more than 10V or 20mA. → check scaling 3 Analog output < minimum Q [t/h] < 0 <0V or <0/4mA Check Zeroing The analog output (DAC) shows 0 Digits. There is a small hysteresis that as Q < -0.2 to indicate the error. → start zero setting or adjust offset manually. 4 Impulse output too fast. The impulse output is no longer correct. The load is higher that the output can indicate. → Reduce load or enhance the parameter of the impulse output [kg] so that more weight per pulse can be outputted.
Device offset		Factory setting: Please do not change! Can be changed in case of replacement or repair. Press and hold the ↵ and  keys simultaneously for > 5 sec. to access this parameter.
Device gain		Factory setting: Please do not change! Can be changed in case of replacement or repair. Press and hold the ↵ and  keys simultaneously for > 5 sec. to access this

		parameter.
Totalizer		Can be changed in case of replacement or repair. Press and hold the ↵ and + keys simultaneously for > 5 sec. to access this parameter.

Table 2: Service

7.5 Digital inputs

The functions of the digital inputs are preconfigured and cannot be changed.

7.5.1 Digital input 1 (zero setting)

Setting this input begins the procedure for zero setting. Setting the input to inactive aborts the ongoing procedure.

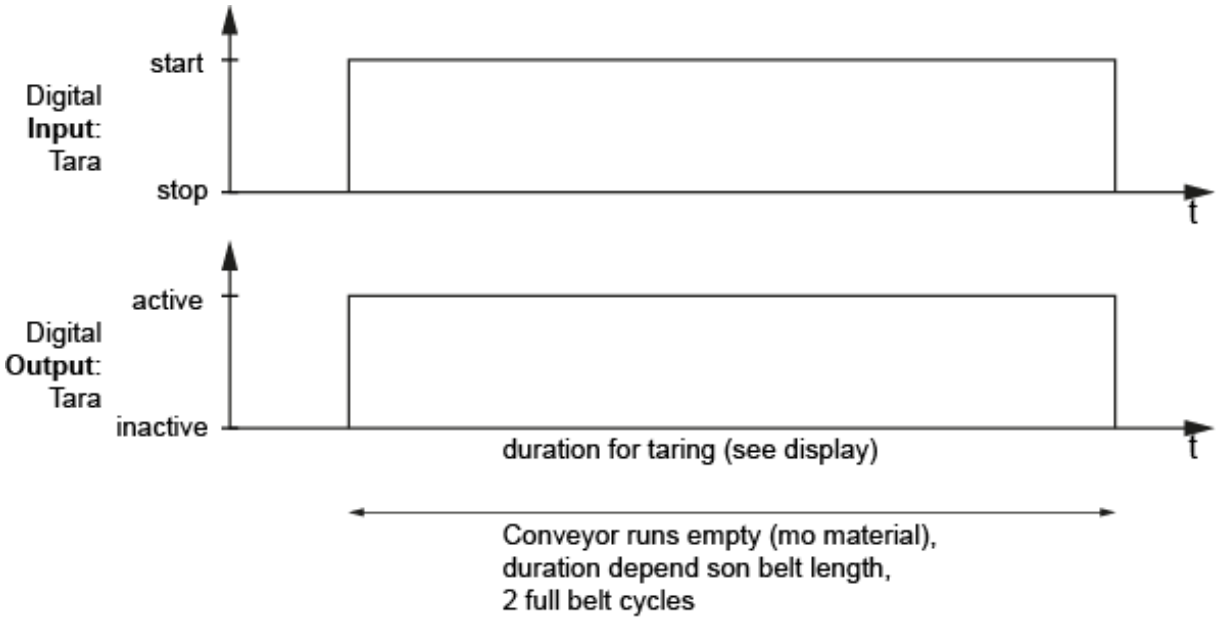


Figure 12: context dig. in- and output

7.5.2 Digital input 2 (batch active)

Setting this input starts the weighing of a new batch. The batch counter is incremented, and the batch weight is set to zero.

If the digital input 'Batch active' is set, the batch counter (quantity) is zeroed (identical to when the Reset softkey is pressed) and the batch no. is increased by 1. While this input is active, a batch is weighed. If the input becomes passive, the batch no., the weighed quantity (batch counter), date and time are saved in the alibi protocol. This ensures that weighed batches are traceable.

7.5.3 Digital input 3 (belt running)

Note

This setting is only relevant if v-detection is set to “None”.

If the v-detection parameter is set to 'None', the evaluation electronics does not calculate the speed using the initiator information but takes 1.00 m/s as the belt speed value for the calculation. However, the evaluation electronics only integrates the weight if this digital input 3 "Belt running" is active, otherwise not.

7.5.4 Digital input 4 (impulse)

The status of the proximity switch for detecting the speed is displayed here.

7.6 Digital outputs

The functions of the digital outputs are pre-configured and cannot be changed.

7.6.1 Digital output 1 (BMGZ OK)

24 VDC, max. 100 mA

This output is always “active” if the evaluation unit is switched on and there is no error. Any error deactivates the output (e.g. “belt not running”, “negative flow rate”, or “overload”). An error message is also shown on the display.

7.6.2 Digital output 2 (taring active)

24 VDC, max. 100 mA

If taring (zero setting) has been started, this output is activated until the procedure is completed or cancelled. As long as the output is active, no materiel shall be fed over the conveyor.

See 8.1 Taring (zero setting)

7.6.3 Digital output 3 (remote impulse)

24 VDC, max. 100 mA, pulse duration 1 to 1000 ms, depending on the flow rate.

A pulse is emitted on this output above a certain flow rate. The flow rate is defined in the “pulse output” operating parameter.

The pulse can for example be used for a remote counter or as a PLC input.

The pulse duration is symmetric (duty cycle 50%)

7.6.4 Digital output 4 (remote reset)

24 VDC, max. 100 mA, 100 ms

Activation resets the remote counter to zero.

This can also be performed directly through the controls on the device via “Reset” batch.

If the “Reset” softkey is pressed and confirmed with the “Yes” softkey, the batch counter is deleted, and a pulse is emitted on the “remote counter reset” digital output for 100 ms. This allows a remote counter to also be reset to zero, for example.

8 Standard procedures

8.1 Taring (zero setting)

Taring ensures that no weight is integrated when the belt is idling to avoid weighing errors. The weight of the belt and the measuring roller are subtracted from the measurement.

The “taring” procedure can be started via the “taring” digital input or on the home screen via "→0←”.

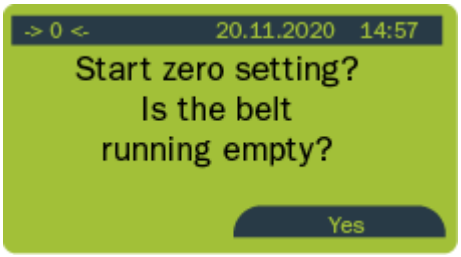


Figure13: Taring home screen

The taring procedure calculates the taring time from the “belt length” parameter and the speed and ensures that the A/D value is determined, averaged, and the offset value calculated over two belt revolutions. This value is then saved under the “Offset” parameter.

To do this, proceed as follows:

- Switch to the "->0<-” screen
- Start the conveyor belt without any load
- Start the procedure by pressing the “Yes” softkey
- The remaining time is shown on the display. The procedure can be stopped at any time by pressing the “Cancel” softkey.
- When the procedure is stopped, the newly calculated offset value is displayed and saved under the “Offset” parameter.

Multiple taring throughout the day

The belt tension directly affects the measurement results.

Strong temperature variations throughout the day will affect the belt tension, which will be directly reflected in the measurement results.

Check the belt tension regularly, and perform taring in the morning and early afternoon, for example.

Measurement accuracy

Errors or inaccurate work during taring and calibration will directly affect the accuracy of the conveyor belt scales.

Ensure that taring is performed carefully.

Setting the “taring” digital input begins the recalculation of the offset. The “taring active” digital output is set until the procedure is completed or aborted. If the “taring” input is reset before the remaining time has elapsed, the procedure is aborted, the “taring active” digital output is reset, and the offset value is not changed.

8.2 Calibrating

The belt scale must be calibrated at start-up to ensure that the evaluation unit can correctly calculate the flow rate.

- Run the conveyor belt while empty
- Press “Reset” on the home screen
- The batch amount is set to 0 t and the batch counter is incremented by 1.
- Load batch onto truck with known tare weight.
- Stop conveyor
- Weigh truck on platform or truck scale
- Compare the currently displayed batch quantity with the actual weight as weighed on the truck
- To adjust, select the menu item “Calibration” in the configuration (menu)

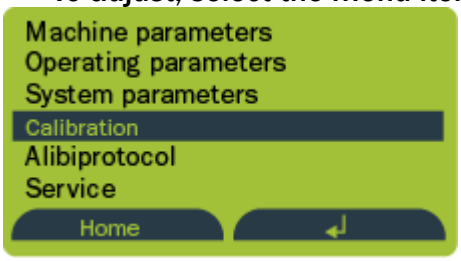


Figure14: Calibration

- Pressing ↵ activates the input
- You can use the cursor keys to enter the actual weighed quantity under “Reference value”.
- Press “Calculate”
- The display will show: “Calibration complete”. The newly calculated gain factor “Gain” will be displayed and will be saved in the background under the “Gain” parameter.

Measurement accuracy

Errors or inaccurate work during taring and calibration will directly affect the accuracy of the conveyor belt scales.

Ensure that taring is performed carefully.

8.3 Manual batch weighing

Figure15: Manual weighing of a batch

- Start the conveyor belt without any load
- Press the “Reset” softkey on the home screen
- The batch amount is set to zero
- The batch counter is incremented
- Run the desired amount over the conveyor system.
- End loading and run the belt empty.
- The display will now show the quantity that has just been conveyed under “Batch”

8.4 Manual batch weighing – with storage in the alibi protocol

Figure16: Manual batch weighing with storage in the alibi protocol

- Start the conveyor belt without any load
- Press the "Start" softkey on the “Batch” home screen
- The batch amount is set to zero
- The batch counter is incremented
- Run the desired amount over the conveyor system.
- End loading and run the belt empty
- The display will now show the quantity that has just been conveyed under “Batch”
- To end the batch, press the “Stop” softkey.

After the measurement is complete, the values (start time, end time, batch amount, and batch number) are automatically and securely saved in the so-called alibi protocol.

You can retrieve data from the alibi protocol via the web browser or in the configuration under the “Alibi protocol” menu item.

9 Configuration via web interface

IP-Adress for PROFINET

With the PROFINET version, the system parameter IP-adress CAN NOT be used for communication via the web browser.

With the PROFINET version, you have to use the (from the PLC) assigned IP-address. Or you have to assign a unique IP-address via the Ethernet Device Configuration Tool, see 12.1 Ethernet Configuration Device – FOR PROFINET DEVICE ONLY

You can configure the evaluation unit using a web browser (Internet Explorer 7 or higher). To do this, either connect the web guiding controller to an Ethernet network or connect it directly to a PC.

The browser interface is only available in English.

Press “Save changes” to save any modifications, or they will be lost.

9.1 Peer-to-peer connection

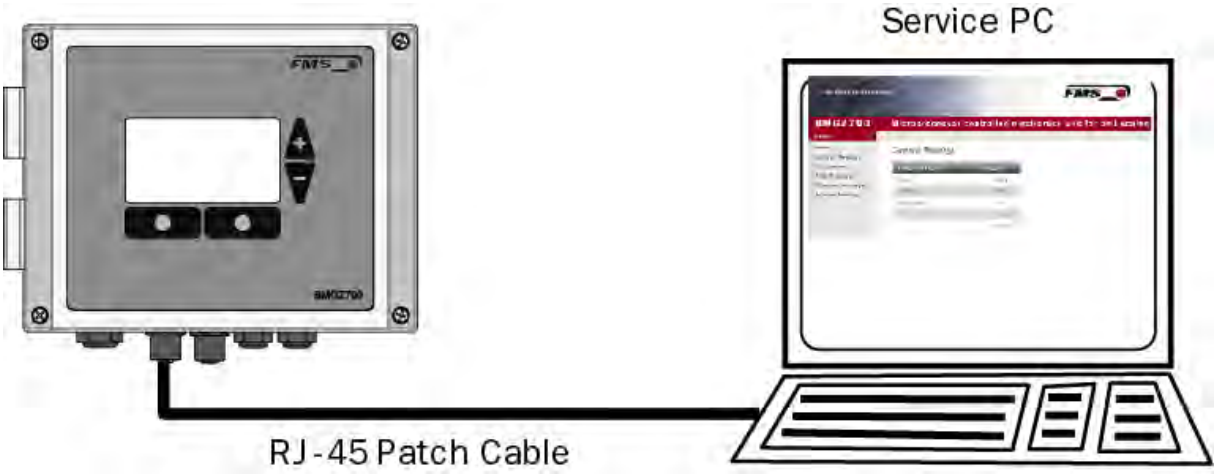


Illustration 17: Peer-to-peer connection

Before you connect the computer to the evaluation unit with the patch cable, you must assign a static IP address to your PC. The two devices can then communicate via web browser.

If the web guiding controller is already connected to a network (e.g. LAN) via a switch, you can skip the following instructions.

Settings for MS Windows 7:

- Connect the PC and evaluation unit with a patch cable
- Start up the PC and evaluation unit
- Click the start button on the PC (bottom left corner of screen)
- Click on “Control Panel”
- Double-click on LAN connection

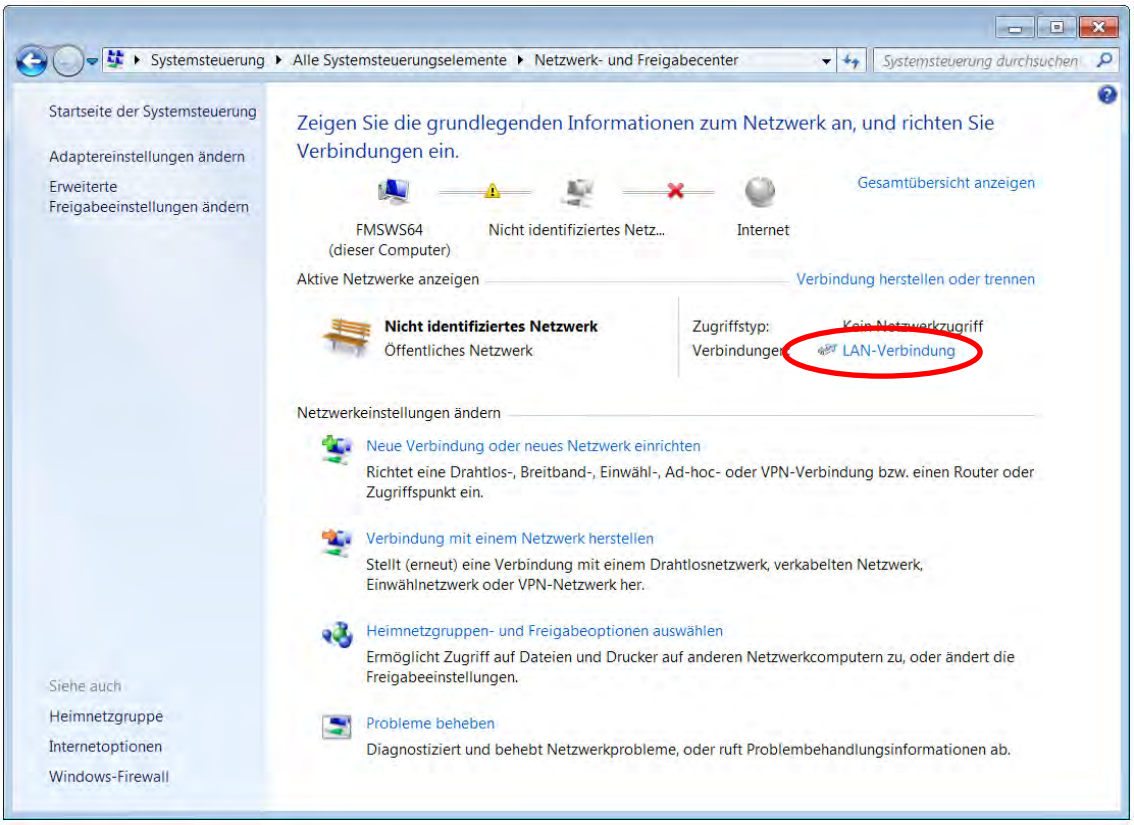


Figure18: Status of LAN connection

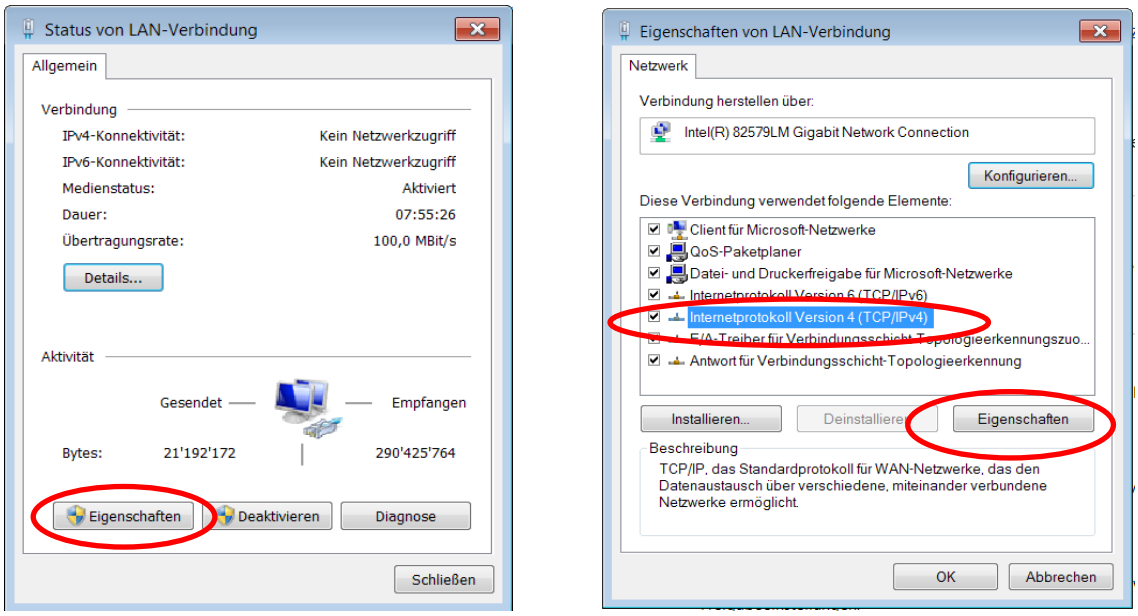


Figure19: Status of LAN connection

- **Select “Properties”**
- **The “Local Area Connection Properties” window will open**
- **Select “Internet Protocol Version 4 (TCP/IPv4)”.**

- Select “Properties”. The corresponding window will open.

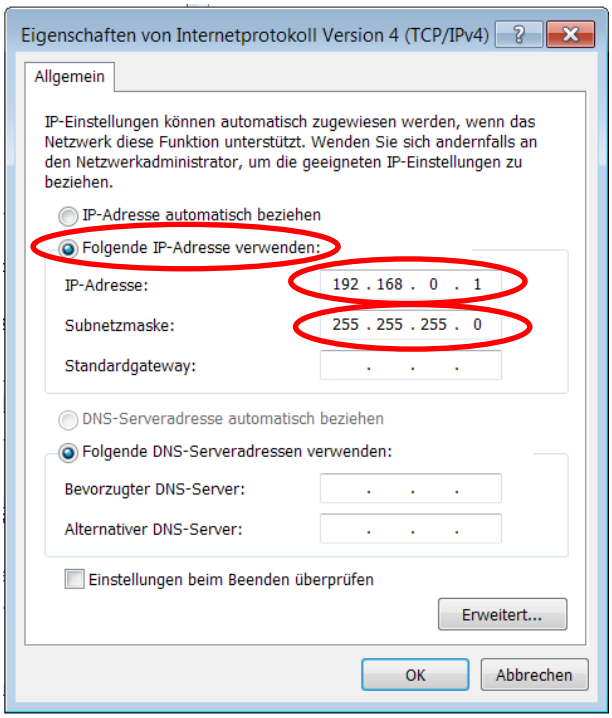


Figure20: *Internet protocol properties*

- Select “Use the following IP address:”
- Enter the PC address (e.g. 192.168.000.1)
- In the subnet mask, enter: 255 255 255 000
- Close the window with “OK”.
- Close all other windows

The computer is now ready to communicate with the evaluation unit:

- Open a web browser (Microsoft Internet Explorer, Mozilla Firefox, etc.)
- The factory default setting of the IP address of the evaluation unit is 192.168.000.090.
- Enter this IP address in the format 192.168.0.90 into the input field and confirm with “Enter”.
- The home screen will open.

9.2 Home screen

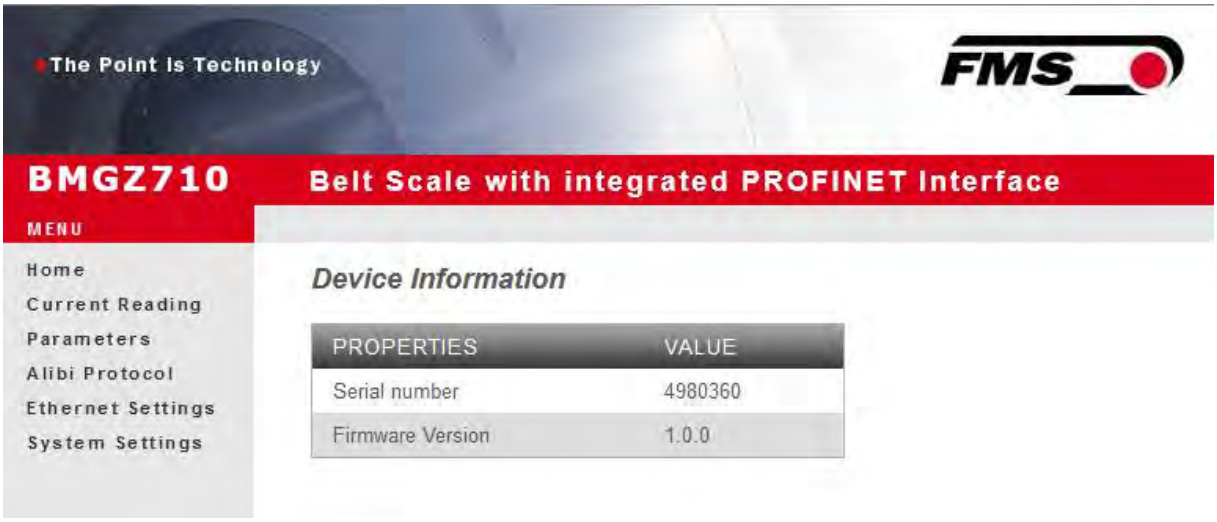


Figure21: Home screen with device information

The home page gives information about general device properties, such as the serial number and software version.

The menu on the left side of the screen allows you to navigate on the page.

9.3 Current reading

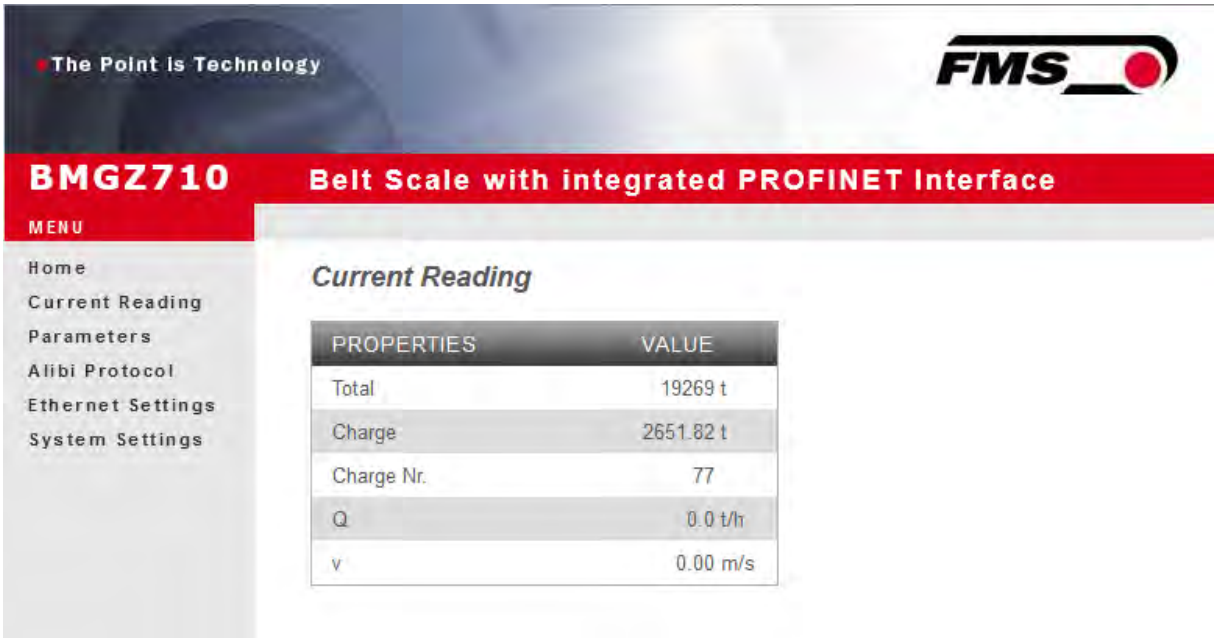


Figure22: *Current reading*

The current reading webpage shows all current values

9.4 Parameters

The parameters page allows you to modify the parameters.

In PROFINET environments, this is usually done from the PLC.

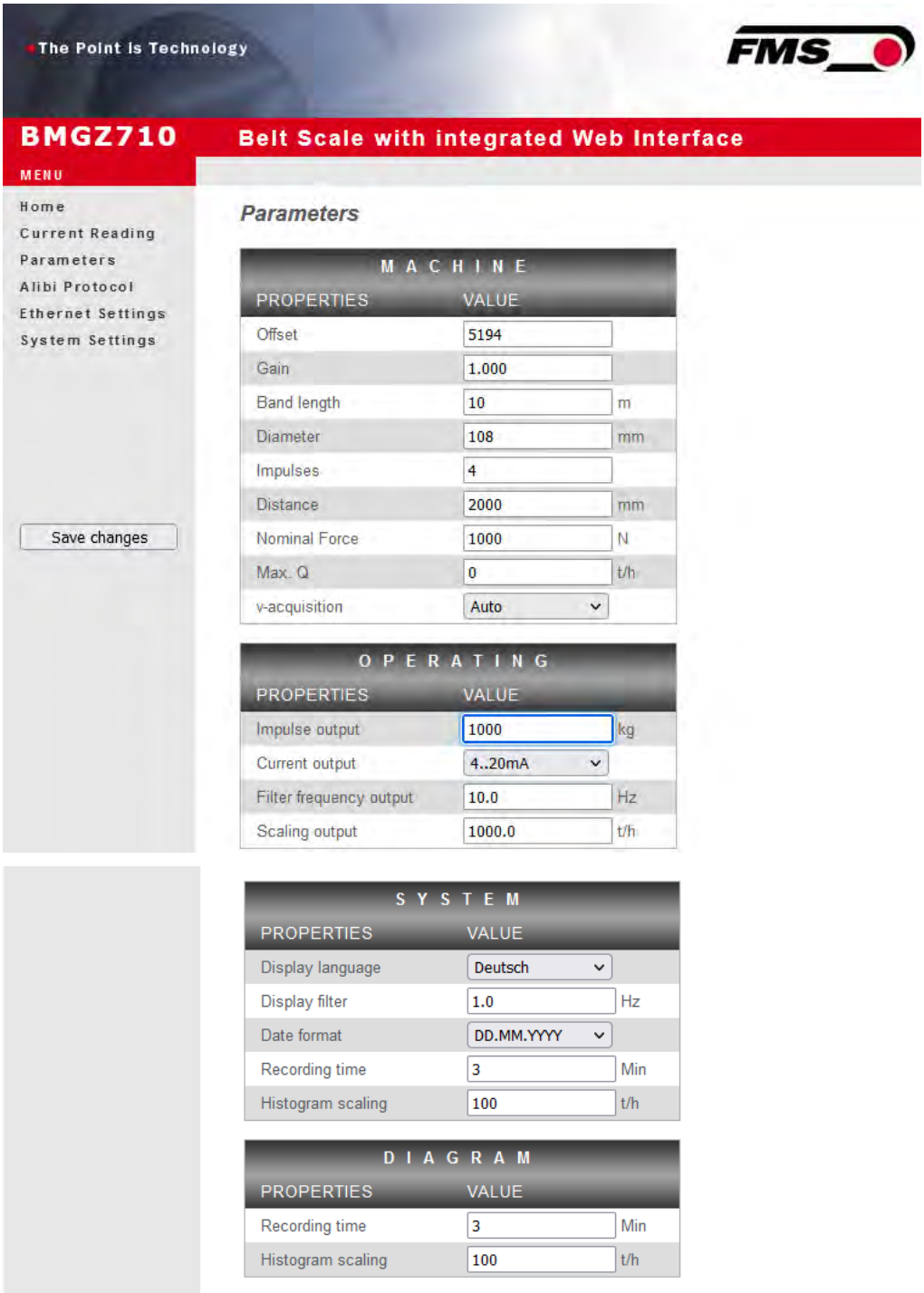


Figure23: Parameters

Press “Save changes” to save any modifications, or they will be lost.

9.5 Alibi protocol

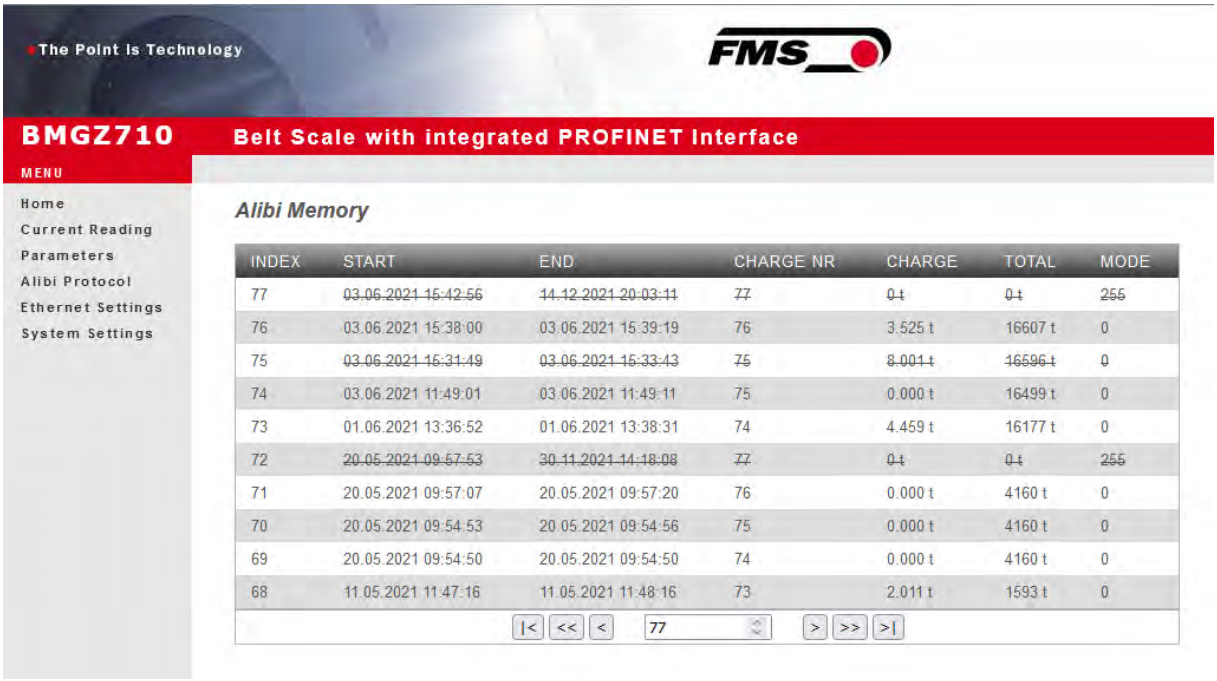


Figure24: Alibi protocol

Index – consecutive numbering

Start – start time and date of the batch measurement

End – end time and date of the batch measurement

Batch no. – saved batch number; missing batch numbers correspond to measurements made with “Reset” that were not saved in the alibi protocol.

Batch – batch amount

Total – value of totalizer at the end time

Mode – validity of measurement; invalid measurements are shown crossed out.

9.6 Ethernet settings

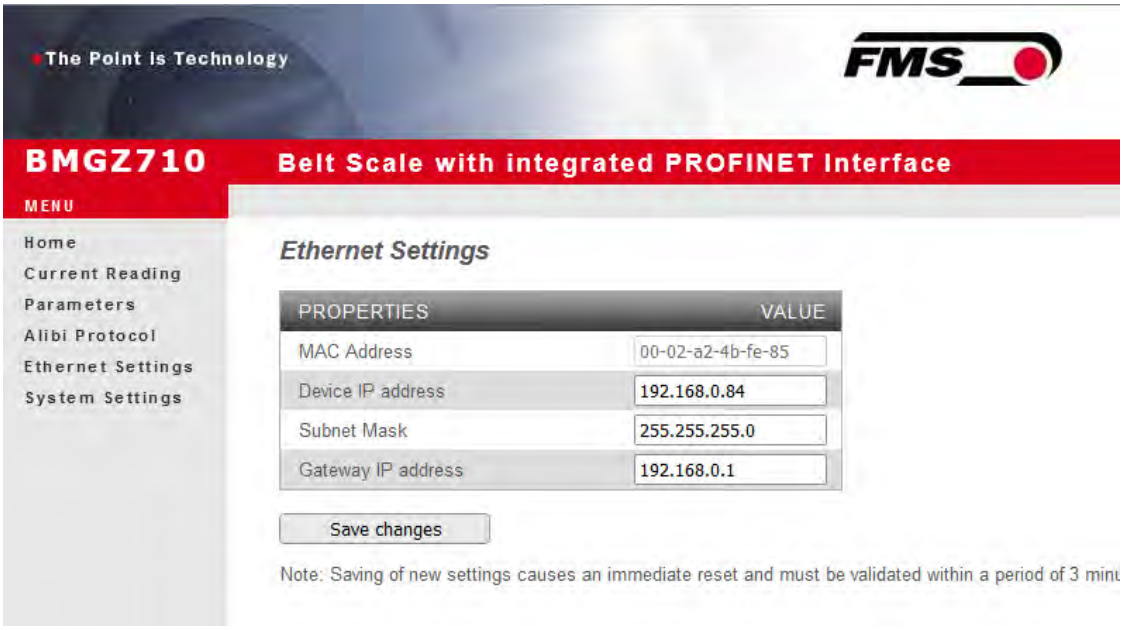


Figure25: Ethernet settings

9.7 System settings

The internal firmware version can be seen on the system settings page. New firmware can also be loaded here.

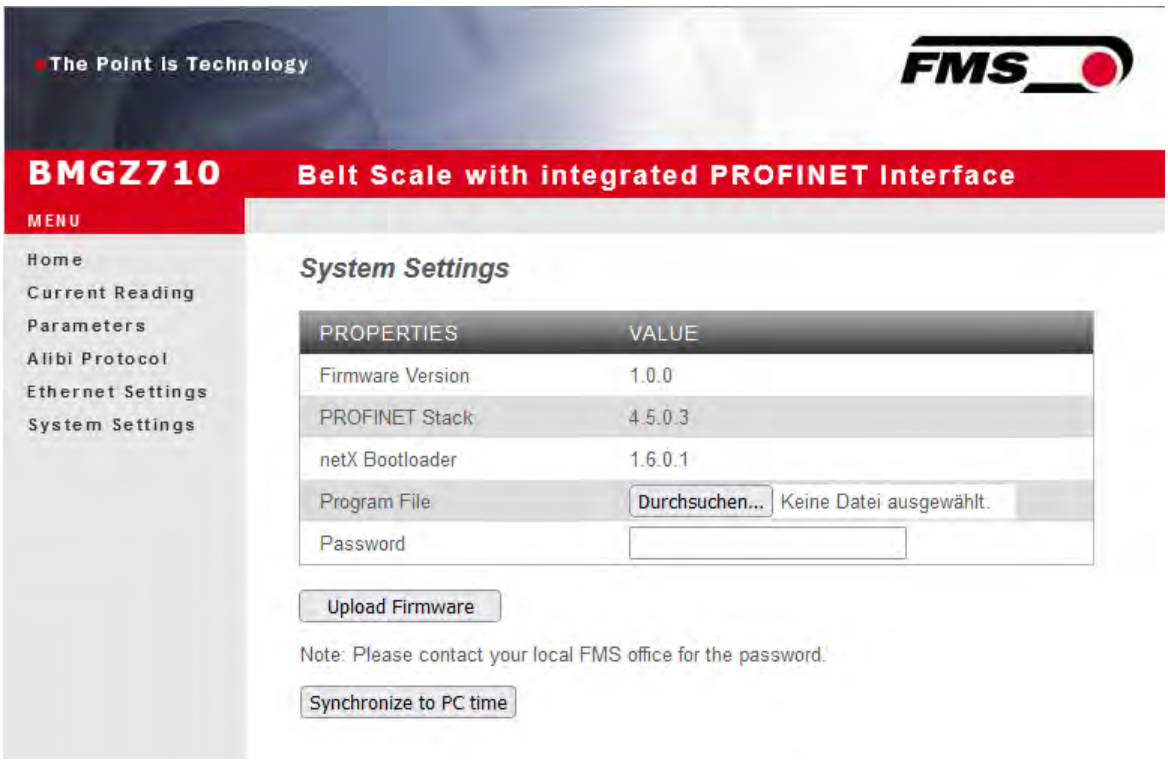


Figure26: System settings

The latest firmware files can be found in the download section of our website.

10 FMS BeltSCALE App

The app allows you to read the current measured values and configure the evaluation electronics via your smartphone or tablet.

The devices communicate via an integrated Bluetooth® module.

For clear identification, the last 4 digits of the serial number of the BMGZ700 series are applied to the front of the housing.

Figure27: BMGZ700-series with last 4 digits of the serial number

Only one mobile device can access the evaluation electronics at a time.

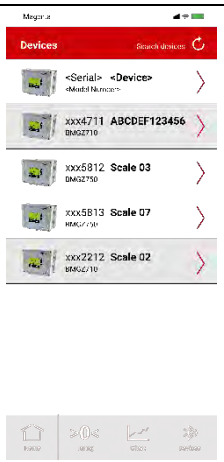
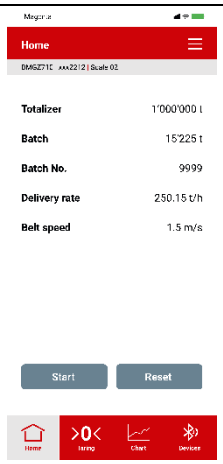
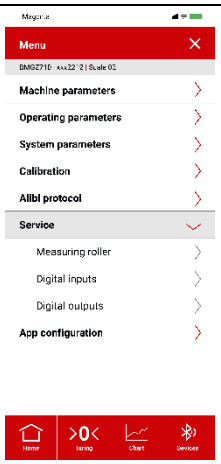
As soon as the connection to the mobile device is established, the display of the evaluation electronics flashes.

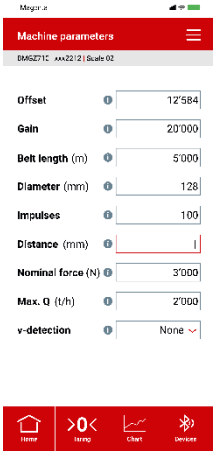
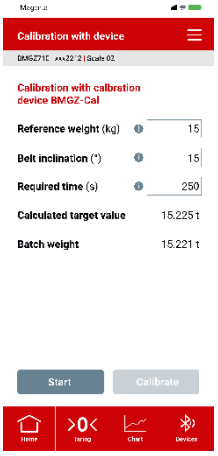
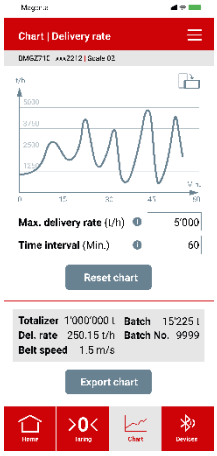
The FMS BeltSCALE app is an operating aid. No data is saved on the mobile device, only the current measured values of the evaluation electronics and the settings are displayed. The parameters are only saved in the evaluation electronics themselves.

Figure28: Link to download the app (Android or IOS)

10.1 Configuration via app

The procedure for taring and calibration is always identical to the procedure for evaluation electronics without Bluetooth communication. The only difference is that a mobile device is used for input instead of the control panel.

			
Download the FMS BeltSCALE app and install it **→ Google Play Store (Android); iTunes (IOS)**	**Overview of all devices in the reception area** **Select device, identification by serial number**	**Display of the current measured values, main menu at the bottom, configuration menu at the top right (password 3231)**	**Configuration, overview of parameters**

			
Configuration - Overview of machine parameters	**Taring**	**Graphic recording, also possible in landscape format**	

11 Dimensions

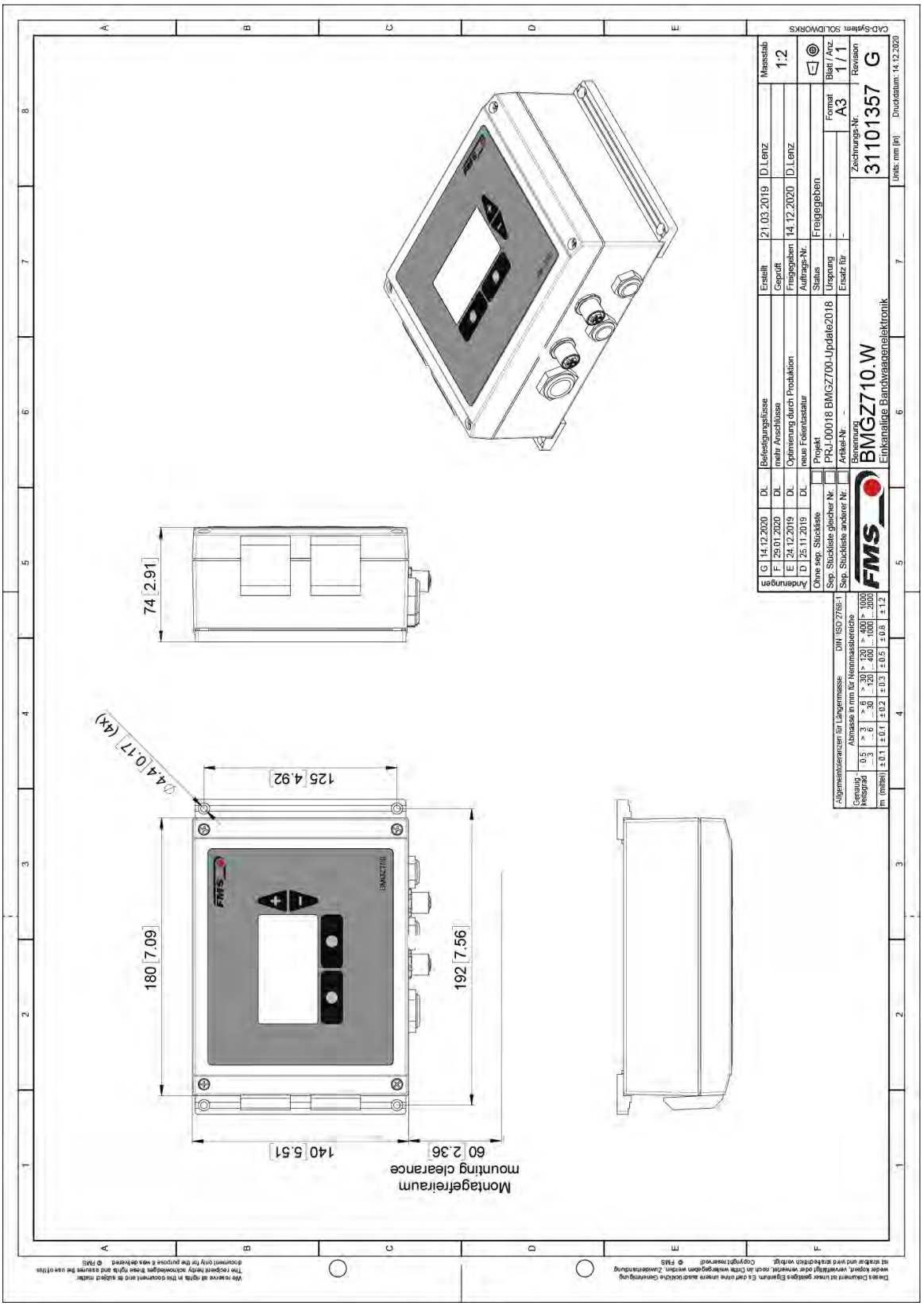


Figure29: Dimensions BMGZ710.W

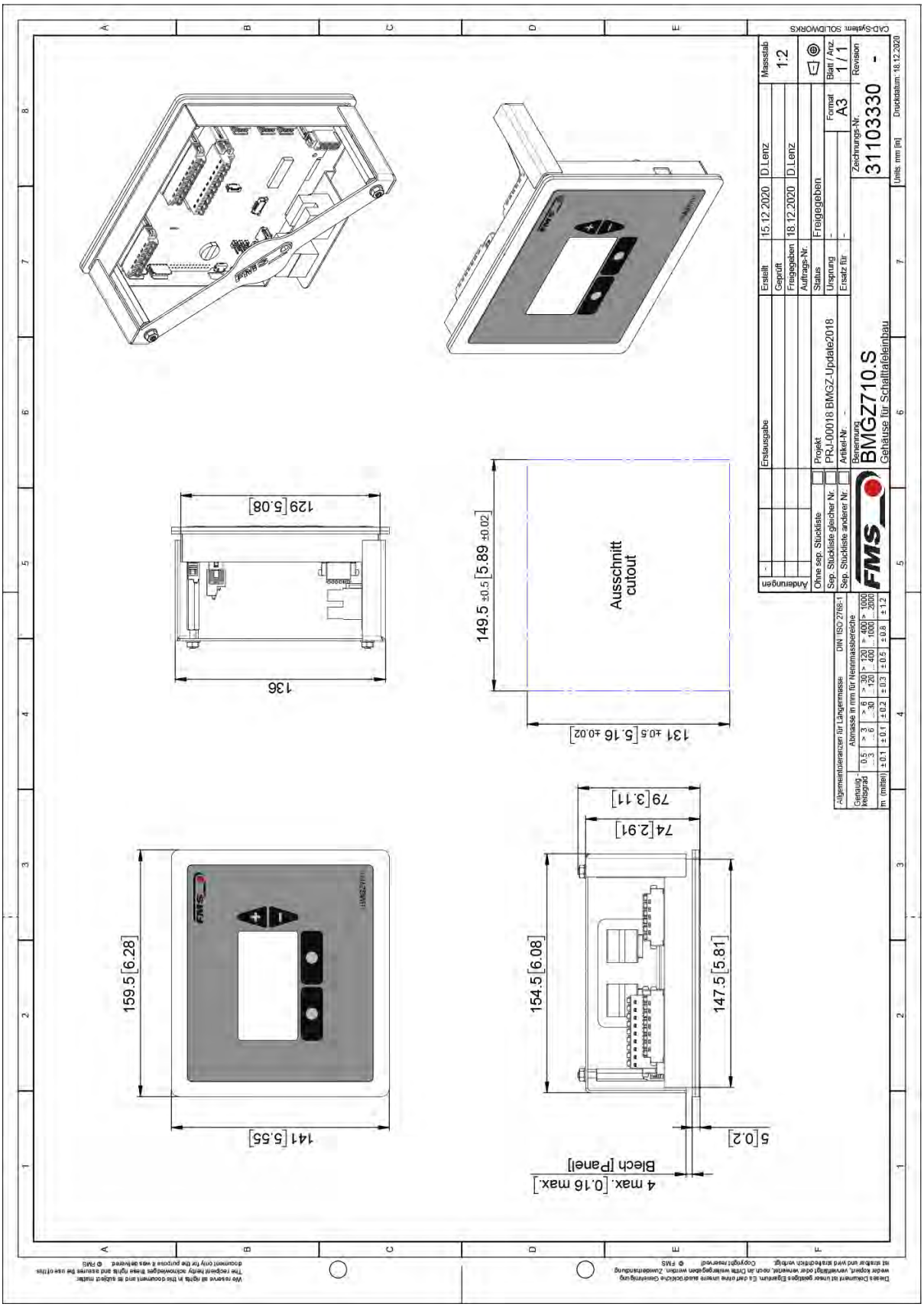


Figure30: Dimensions BMGZ710.S

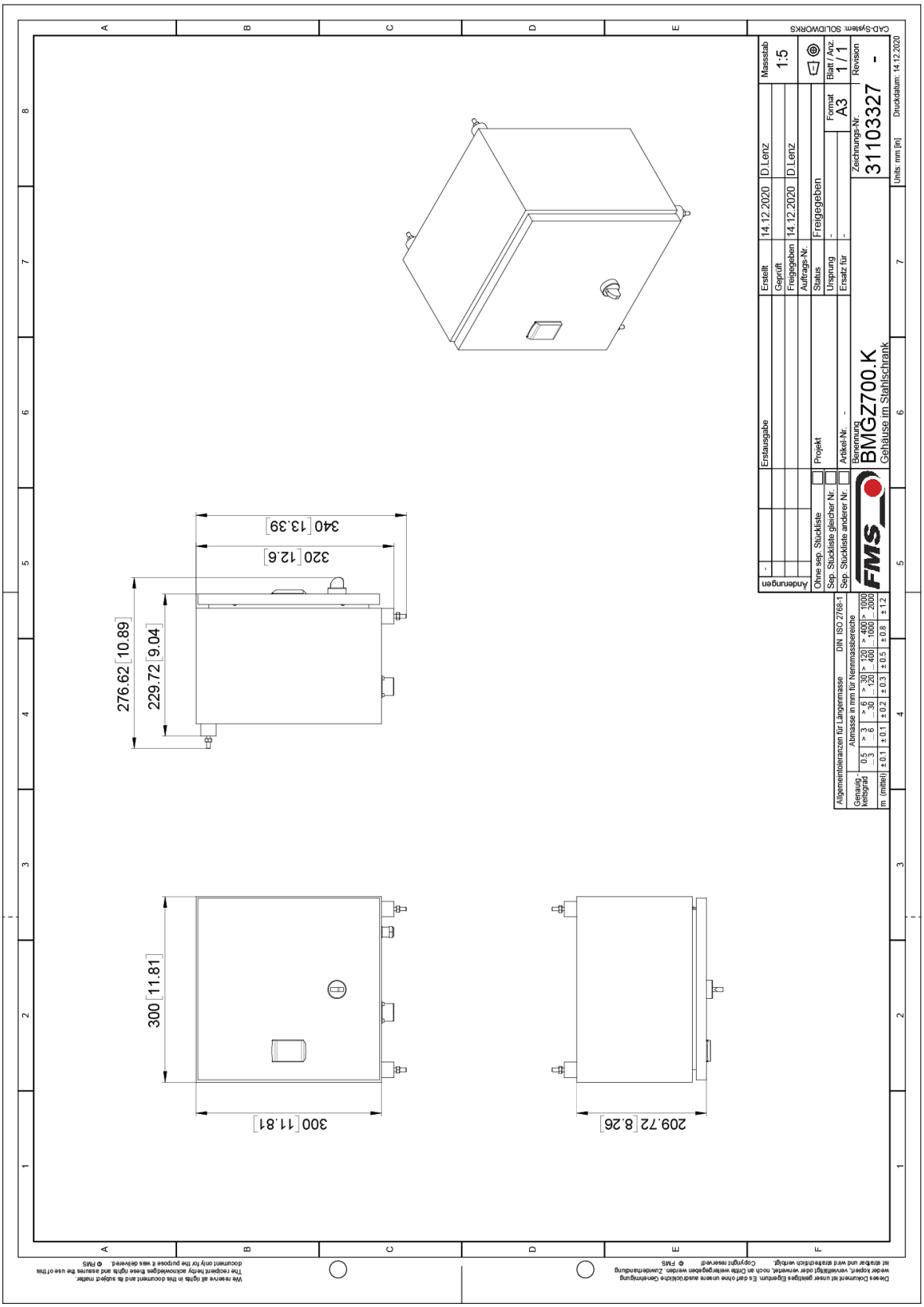


Figure31: Dimensions BMGZ710.K

12 Optional ethernet interface – PROFINET

A PROFINET interface is available for the electronics of the BMGZ700 series with the option .PNET.
BMGZ710.PNET

BMGZ750.PNET – calibratable version, see separate operating manual

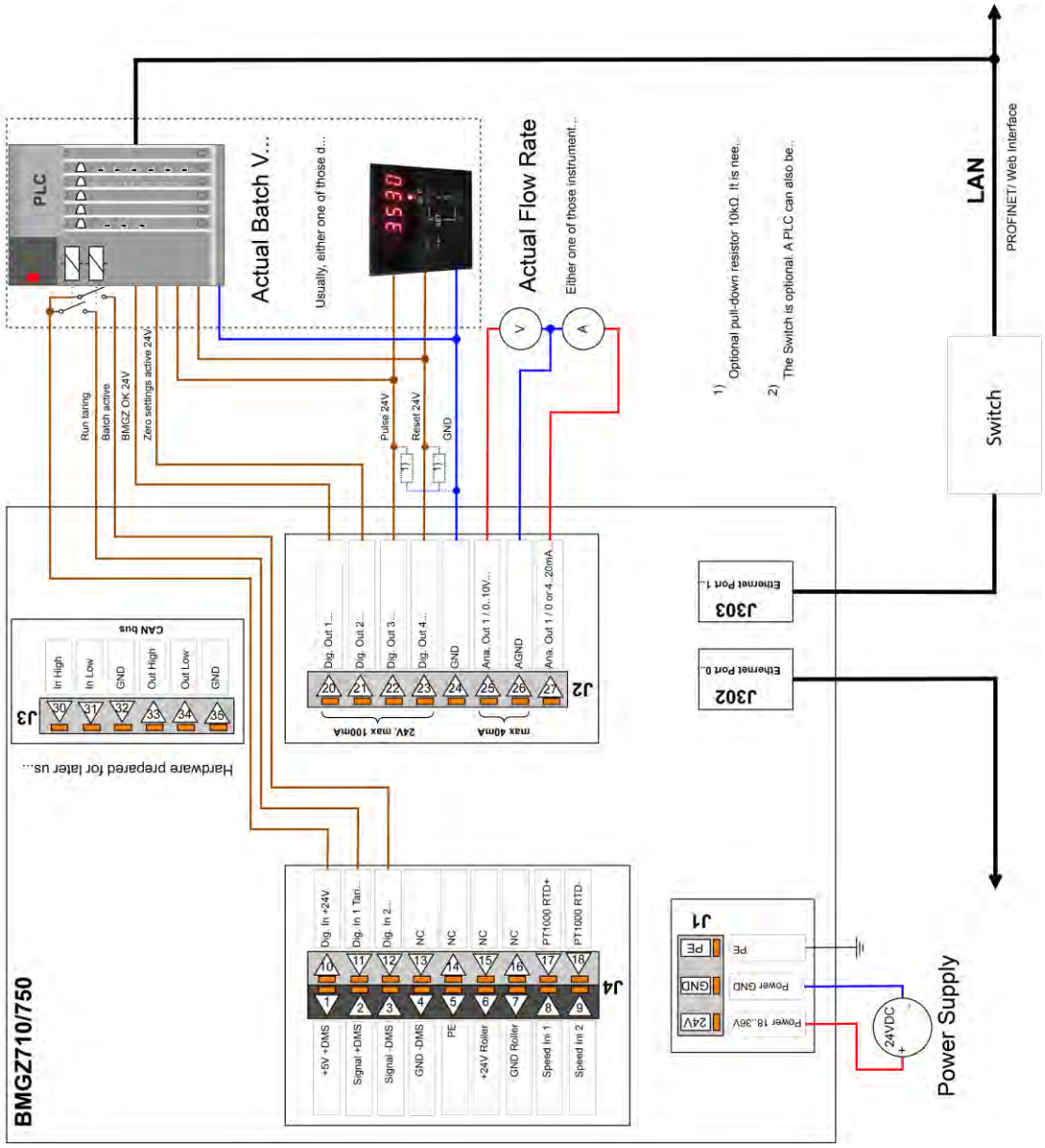


Figure 32: peripherical devices

12.1 Ethernet Configuration Device – FOR PROFINET DEVICE ONLY

The IP address of the measuring amplifier is preset to 0.0.0.0. To modify the adress, you can use the «Ethernet Device Configuration Tool». It is available for free download on https://www.fms-technology.com/en/downloadcenter/profinet

Connect the measuring amplifier with your PC. Please note that the ethernet port on your PC has an IP address that is set to static.

Start the program

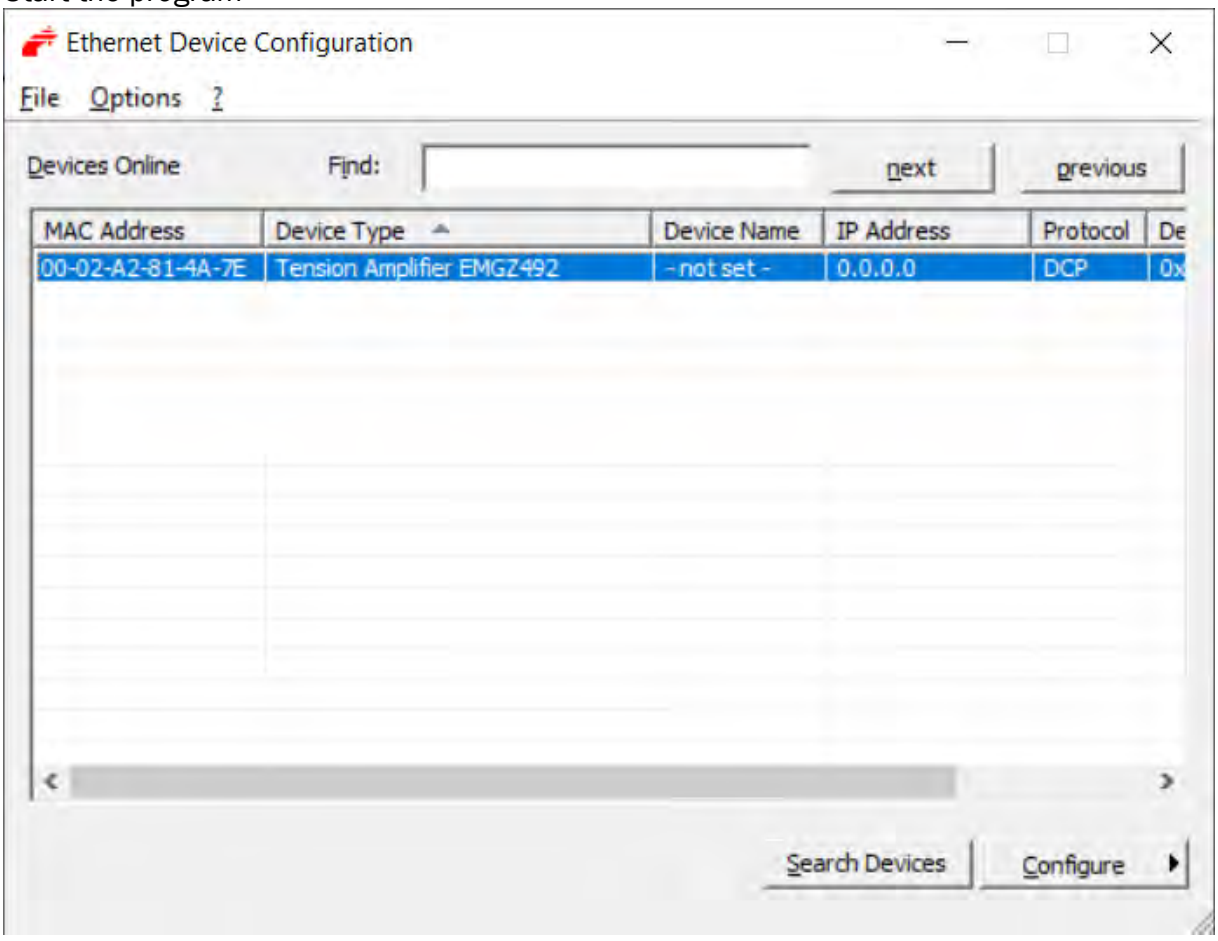


Figure 1: Ethernet Device Configuration – initial screen

Select the device and press «Configure» and «Set IP Adress...»

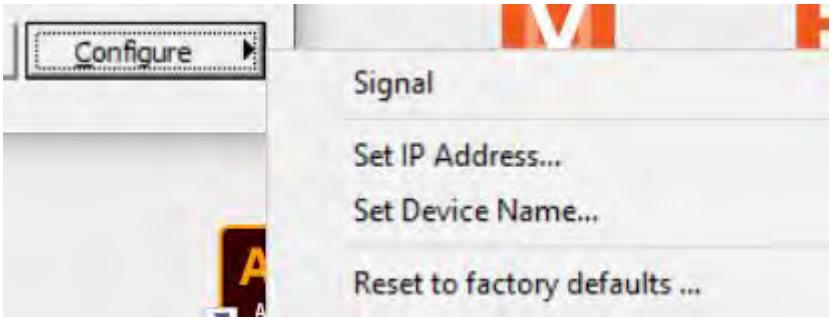


Figure 2: Ethernet Device Configuration – Configure

If you want to store the IP address only temporarily – until the next new start of the amplifier - enable the field "«Store settings temporary»

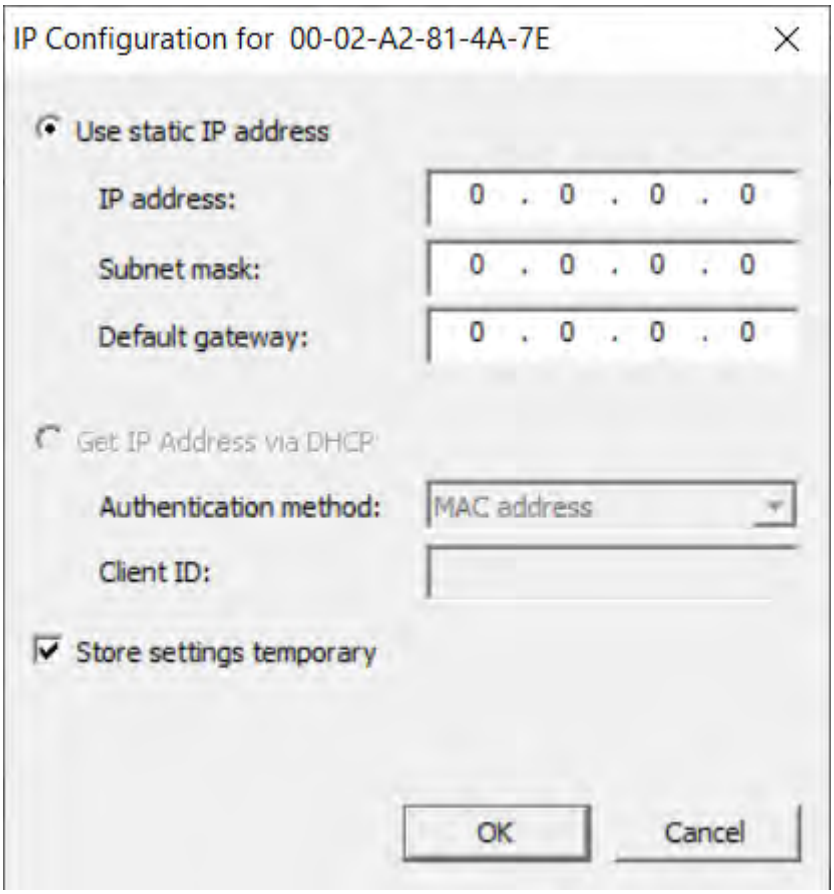


Figure 3: Ethernet Device Configuration – IP Configuration

Enter the desired IP address and also set the subnet mask to 255.255.255.0

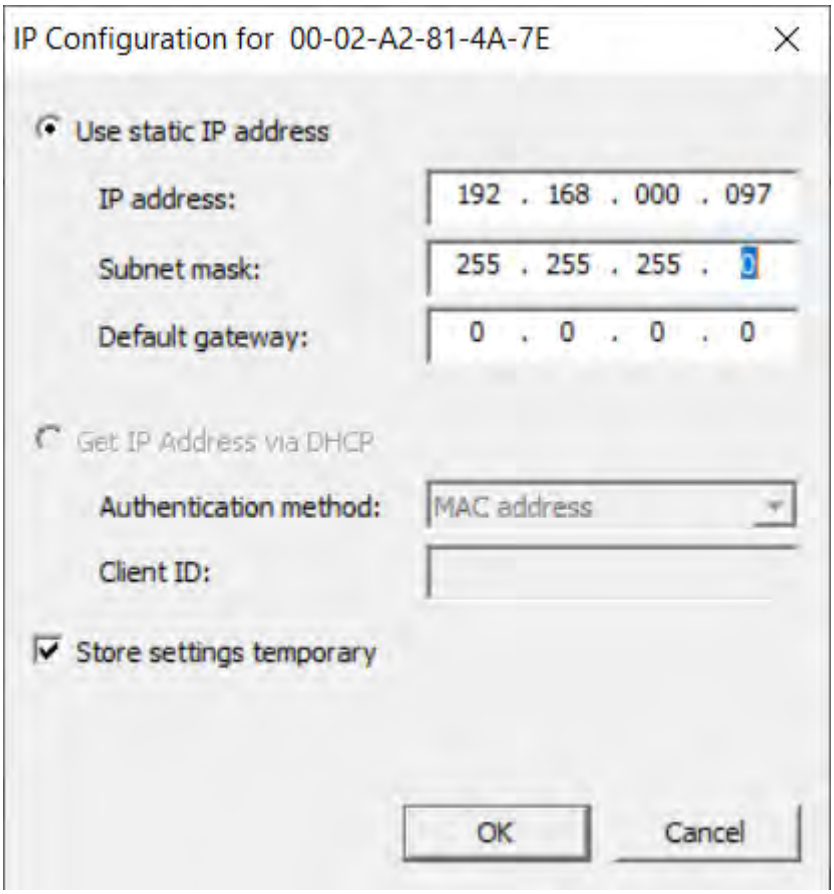


Figure 4: Ethernet Device Configuration – IP Adresse geändert

Press «OK» to store the settings.

12.2 Communication

With the acyclic data exchange, IO devices (slaves) can be parameterized, configured or status information can be read out. This is accomplished with the read/write frames via the standard IT services using UDP/IP.Allgemeine

12.2.1 Function

The read/write commands can be triggered if there is a connection between the controller and the IO device, i.e. a "Connect" has taken place.

Figure33: Read- / Write-cykle

A computer with the corresponding application can now request a "read" or "write" to a data model of the controller. This executes the read/write command via PROFINET and returns the status or the data to the computer.

12.2.2 Services und Protocols

The following services and protocols are used:

- RTC Real Time Cyclic Protocol
- RT_CLASS_1 (unsynchronisiert)
- R TA Real Time Acyclic Protocol
- DCP Discovery and Configuration Protocol
- DCE /RPC Distributed Computing Environment /Remote Procedure Calls, Connectionless RPC
- LLDP Link Layer Discovery Protocol
- PTCP Precision Transparent Clock Protocol
- SNMP Simple Network Management Protocol

All other services required for PROFINET are also permitted.

The electronics can be loaded with the above services at any time.

In addition, other services can be used as long as they do not exceed the network load according to Netload Class III for Normal Operation.

12.3 Cyclic data traffic

After a successful system start, the IO controller and the assigned IO devices can exchange cyclic process data. The following table shows which measurement data are transmitted in which form.

Cyclic data traffic reads the operating status of the evaluation electronics in a defined time cycle and updates it in the PLC. The PLC defines the cycle time for its protocol. The operating status is used to monitor the operation of the evaluation electronics.

The following table shows which data is available and how it must be interpreted.

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
2	INT32	Last Error		0	No Error
				1	A taring is not allowed while a batch runs.
				2	The taring cannot be started while a batch runs.
				3	The taring cannot be stopped when not a taring is running.
				4	A reset of the batch be cannot be executed while a batch runs.
				5	Taring cannot be started when the belt stands still.
				6	Not permitted when the device is sealed (750 only).
3	UINT32	Status			

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
		Bit 0 State of Digital Input 1 Taring belt scale		True False	Taring belt scale (edge triggered ↑) No action
		Bit 1: State of Digital Input 2 Start batch		True False	Start batch (edge triggered ↑) No action
		Bit 2: State of Digital Input 3		True False	Conveyor belt runs (BMGZ710.PNET) Sealed (BMGZ750.PNET) Conveyor belt stands still (BMGZ710.PNET) Unsealed (BMGZ750.PNET)
		Bit 3: State of Digital Output 1 BMGZ OK		True False	BMGZ runs ok The BMGZ has encountered a hardware problem. Consult the status bits 7 to 10 for more information.
		Bit 4: State of Digital Output 2 Taring Active		True False	Taring is active Taring is inactive
		Bit 5: State of Digital Output 3 Remote Counter Pulse		True False	Remote Counter counts up one digit (edge triggered ↑) No action
		Bit 6: State of Digital Output 4 Remote Counter Reset		True False	Remote Counter is reset (edge triggered ↑) No action
		Bit 7: Load cell overload		True	The load cell is loaded with too much weight and reached the mechanical stop.
		Bit 8: Analog output overflow		True	The analog output is in overflow. This happens when the parameter Scaling is set too high.
		Bit 9: Analog output underflow		True	The analog output is in the underflow state. This happens when the system is not correctly calibrated.
		Bit 10: Pulse output too fast		True	The pulse output frequency is too fast.
		Bit 12 to 31:			Not used
4		Total	t	0 to 2^{31}-1 #	Overall total
5	INT32	Batch	t	0 to 4'000'000'000 #.###	Batch

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
6	INT32	Batch Number		0 to 2^{31}-1 # 	Batch number
7	INT32	Q	t/h	0 to 5'000'000 #.###	Delivery rate
8	INT32	v	m/s	0 to 10'000'00 #.##	Conveyor belt speed
9	INT32	Raw ADC value	Digits	-32'768 to 32'767	Read ADC input value without signal processing.
10	INT32	Load cell raw voltage	mV	-20'000 to 20'000 #.###	Read load cell input voltage without any signal processing.
11	INT32	Load cell force voltage	mV	-20'000 to 20'000 #.###	Offset corrected load cell input voltage.
12	INT32	Force	N	-999’999’999 to 999’999’999 #.###	
13	INT32	Belt	kg/m	0 to 999'999'999 #.###	
14	INT32	Taring countdown time	s	0 to 600	Remaining time until the taring is over.
15	INT32	Temperature	°C	-9'999 to 9'999 #.#	The temperature at the weighing device (BMGZ750.PNET only).

Table 3: cyclic data traffic PROFINET

12.4 Acyclic data traffic

After successful system startup, IO controllers and the assigned IO devices can exchange acyclic demand data. The table below shows which parameters and commands are transmitted in which form with the acyclic data traffic.

For addressing the parameters 0x01 to 0x08 the slot 1, module Feedback, "Parameter Access Point" is to be used.

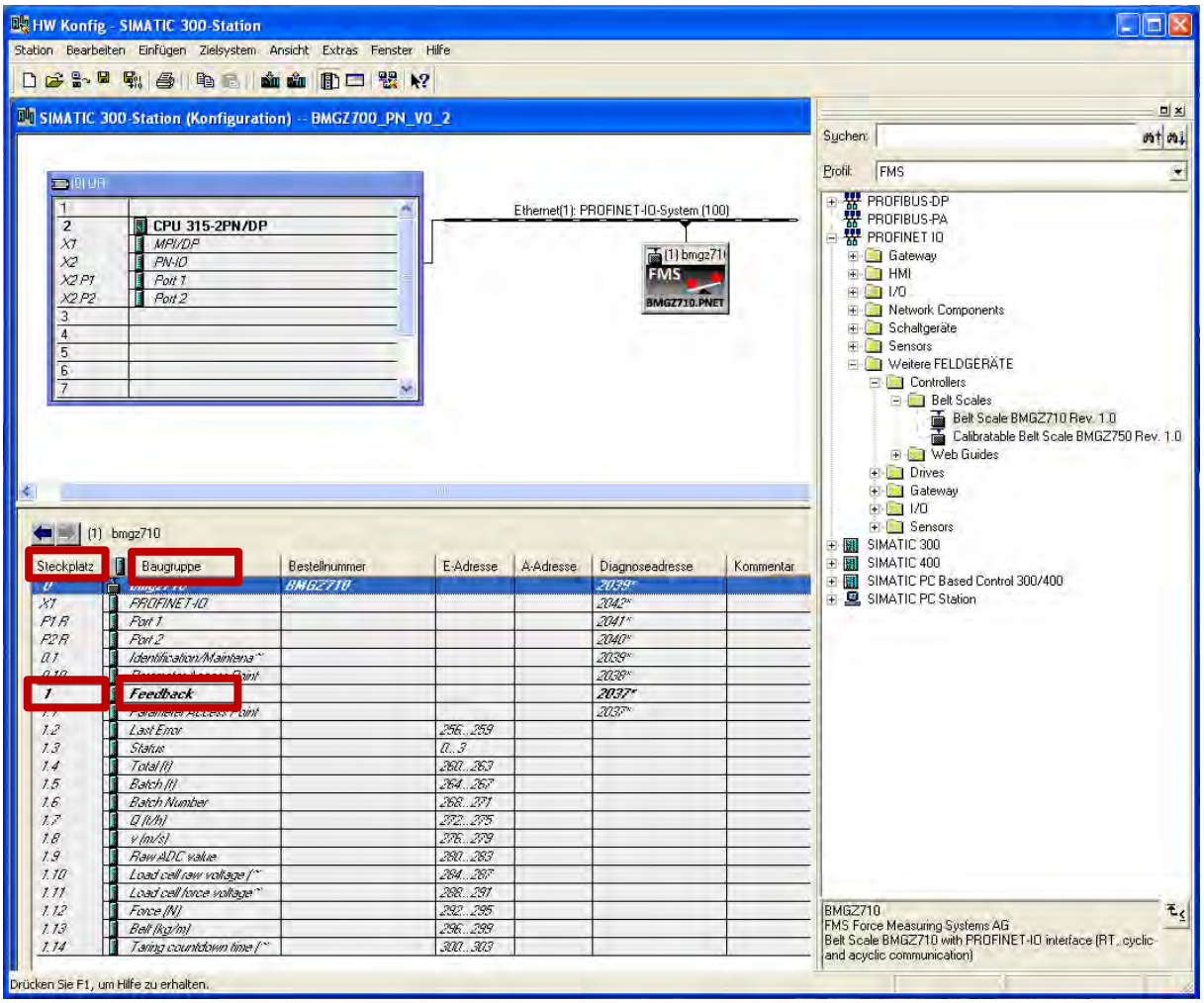


Figure34: BMGZ710.PNET configuration PLC

A PLC can exchange acyclic data with the evaluation electronics. This data is used for configuration and remote control of the evaluation electronics.

The following table shows all commands for parameter configuration. The parameters can be read and written.

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
Machine parameters					
1	INT16	Offset		-32'768 to 32'767 #	
2	UINT16	Gain		100 to 20'000 #.###	
3	UINT16	Belt length	m	1 to 5'000 #	
4	UINT16	Diameter	mm	10 to 1'000 #	
5	UINT16	Pulses		1 to 100 #	
6	UINT16	Distance	mm	100 to 5'000 #	
7	UINT32	Nominal force	N	1 to 200'000 #	
8	UINT16	Max. Q	t/h	0 to 5'000 #	
9	UINT16	v-acquisition (BMGZ710.PNET) Direction BMGZ750.PNET		0 1	None (BMGZ710.PNET) Inverse (BMGZ750.PNET) Auto (BMGZ710.PNET) Standard (BMGZ750.PNET)
Operating parameters					
10	UINT16	Pulse output	kg	1 to 1'000 #	
11	UINT16	Current output mode		0 1	0 to 20mA 4 to 20mA
12	UINT16	Filter output	Hz	1 2'000 #.#	
13	UNIT16	Scaling	t/h	10 to 50'000 #.#	Manual Automatic

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
System parameters					
14	UINT16	Language		0 1	German English
15	UINT16	Filter display	Hz	1 to 100 #.#	
16	UINT16	Date format		0 1	DD.MM.YYYY MM/DD/YYYY
17	INT32	Device Time of day	ms	0 to 86'399'999 #	Current device time. The value represents the number of ms since midnight.
18	UINT16	Device Date		4018 to 42404 #	Current device date. The value represents the number of days since 1990-1-1 (4018 = 2001-1-1 / 42404 = 2106-02-06)
19	UINT16	Recording Time	Min	1 to 600 #	Histogram recording duration of the x-axis.
20	UINT16	Histogram Scaling	t/h	0 to 5'000 #	Histogram scaling of the y-axis.
Alibi protocol					
21	INT32	Request batch log by number		0 to 2^{31} -1 #	Request batch log by the batch number. If the number is zero, then the latest batch is read.
22	INT32	Log Index		0 to 2^{31} -1 #	Log Index indicates the index of the actual read data record. This can be different from the requested index when the requested doesn't exist. If the index is negative, then the data record is corrupt.
23	INT32	Logged Batch number		0 to 2^{31}-1 #	
24	INT32	Logged Batch	t	0 to 4'000'000'000 #.###	
25	UINT16	Logged start date	Date	4018 to 42404 #	Start date of the logged batch. The value represents the number of days since 1990-1-1 (4018 = 2001-1-1 / 42404 = 2106-02-06)
26	UINT32	Logged start time	ms	0 to 86'399'999 #	Start time of the logged batch. The value represents the number of ms since midnight.

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
27	UINT16	Logged end date	Date	4018 to 42404 # 	End date of the logged batch. The value represents the number of days since 1990-1-1 (4018 = 2001-1-1 / 42404 = 2106-02-06)
28	UINT32	Logged end time	ms	0 to 86'399'999 # 	End time of of the logged batch. The value represents the number of ms since midnight.
29	INT32	Total	t	0 to $2^{31}-1$ # 	Overall total at the end time
30	UINT16	Logged Mode		0 to 255	0: Ok 1: Q < 20% or Q > 100% >= 2: Data record corrupt.

Table 4: acyclic process data PROFINET, parameter configuration

The following table shows the commands for remote control. For the remote control commands, only writing is useful.

Note, however, that it is possible to write the same value again. This will also execute the command again.

Sub-slot	*Type*	*Parameter*	*Unit*	*Valid range and number format*	*Description*
50	UINT16	Start Batch		0 1	Do nothing Starts the batch
51	UINT16	Stop Batch		0 1	Do nothing Stops the batch
52	UINT16	Reset Batch		0 1	Do nothing Resets the batch weight
53	UINT16	Start belt scale taring		0 1	Do nothing It starts a taring of the belt scale until the taring status gets inactive or it is stopped.
54	UINT16	Stop belt scale taring		0 1	Do nothing It stops a running taring of the belt scale.
55	INT32	Calibrate belt scale	t	0 to 4'000'000'000 #.###	Calibrate the belt scale with the reference weight and the last batch weight.
56	UNIT16	Reset Last Error		0 1	Do nothing Reset register last error in the operating status area. That ensures that an occurrence of an error is new.

Table 5: acyclic data PROFINET, remote control

13 Technical data BMGZ710

BMGZ710 : Technical data	
Accuracy class electronics	0.05 %
Number of channels	1, for one measuring roller
Displayed values	total amount [t], daily amount or batch [t], actual performance [t/h], belt speed [m/s] as absolute value or histogram
Daily amount, batch counter	0 to 1,000 t (resolution 5 kg); 1,000 to 10,000 t (resolution 10 kg); 10,000 to 100,000 t (resolution 100 kg); 100,000 to 1,000,000 t (resolution 1000 kg)
Operation and display	4 buttons, graphical, illuminated 128 x 64 px STN LCD, alternatively via web browser
Total amount	0 to 1 Mio. t (resolution 1000 kg)
Digital outputs	Tare active, 24 VDC, max. 100 mA; Belt scale o.k., 24 VDC, max. 100 mA; Remote counter, impulse 1 to 1000 ms, 24 VDC, max. 100 mA; Reset remote counter, 24 VDC, max. 100 mA
Digital inputs	start tare procedure, production batch active, speed probe, 24 VDC
Analogue ouput	Current output: 0/4 to 20 mA, min. 500 Ω or power output: 1 to 10 VDC, min. 1000 Ω
Cycle time	1 ms
Temperature range	-10 to +50 °C (14 to 122 F)
Power supply	24 (18 to 36) VDC
Power consumption	5 W
Analogue outputs	Actual performance, 0 to 10 VDC or 0/4 to 20 mA
Weight	1.5 kg (2.2 lbs.)

Table 7: Technical data BMGZ710

13.1 Specification PROFINET interface

BMGZ710.PNET : PROFINET Features	
Cycle time	0.5 ms for RT_CLASS_3, 1 ms for RT_CLASS_1
Media redundancy	Media Redundancy Protocol (MRP) – Client
IRT Support	Yes, RT_CLASS_3, synchronous with network clock
Integrated Switch	2 Port
PROFINET IO specification	V 2.3, legacy startup of specification V 2.2 is supported
Certification	PNIO version V 2.35, net load class: CLASS III, conformance class (CC-C)

Table 8: specifications PROFINET

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