



## Installation instructions BMGZ021 and BMGZ041

Robust measuring rollers for conveyor belts in flat, troughed  
and calibratable designs

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BMGZ041



BMGZ021

This operation manual is also available in German.  
Please contact your local representative.

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## 2 Safety instructions

All of the safety, operating and installation instructions listed here ensure the proper functioning of the device. They must be complied with at all times to ensure the safe operation of the machines. Failure to comply with the safety instructions and use of the devices outside of their specified performance data may jeopardise the safety and health of individuals.

Work involving the operation, maintenance, conversion, repair or adjustment of the device described here may only be carried out by specialists.

### 2.1 Representation of the safety instructions

#### 2.1.1 Danger that could lead to a slight or moderate breach



Danger, warning, caution

Type of danger and source

Possible consequences of disregarding

Action to avert the danger

#### 2.1.2 Note on proper functioning



Note

Note on correct operation

Simplification of operation

Ensuring functioning

### 2.2 General safety instructions



The conveyor belt scales are only able to function with the intended arrangement of the components relative to one another, otherwise serious malfunctions may occur. The installation instructions on the pages below must therefore be followed.



The local installation regulations ensure the safety of electrical systems. They are not taken into account in these operating instructions, but must be complied with at all times.



Poor earthing can lead to people receiving electric shocks, malfunctions of the entire system or damage to the evaluation electronics. Good earthing of the housing must be ensured in any case.

## 3 Product information

### 3.1 System arrangement

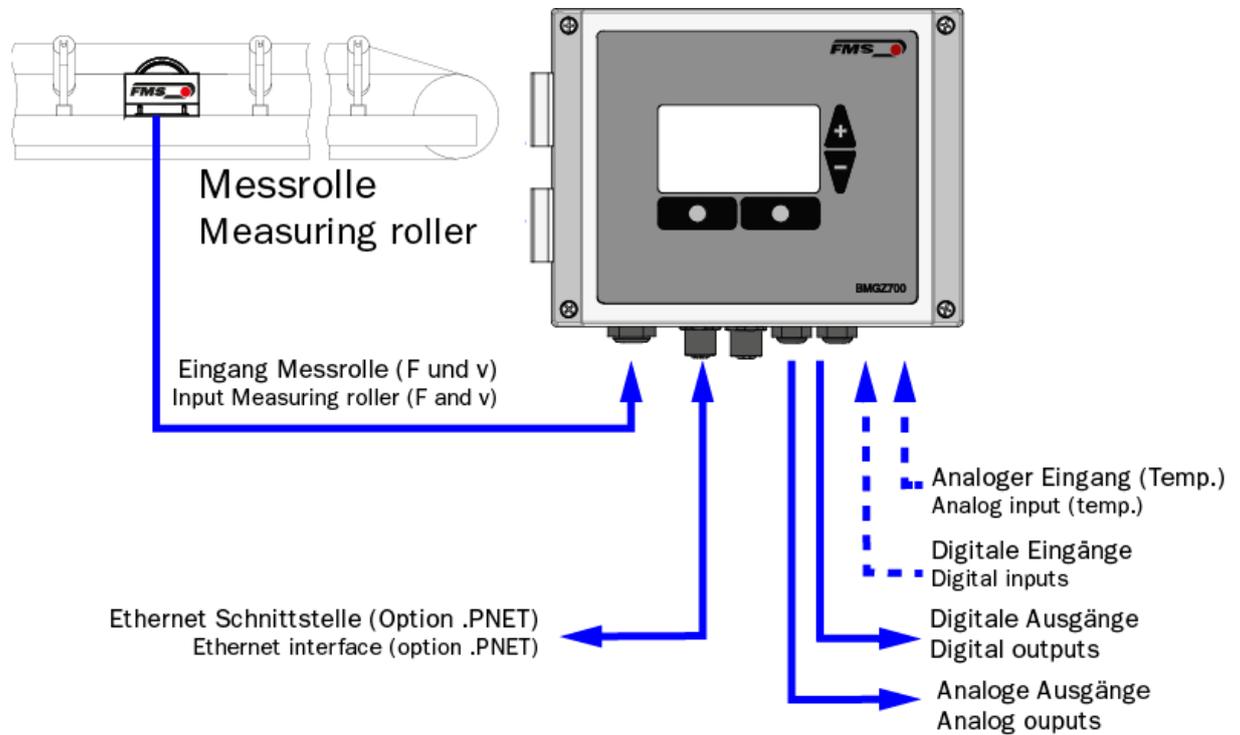


Figure 1: Measuring roller and evaluation electronics

### 3.2 Product description

FMS measuring rollers for conveyor belts are suitable for the toughest demands and permanent loads in both mobile and stationary systems for heavy bulk goods of all kinds such as gravel, ballast, chalk, coal, fertilisers, building rubble etc. Two different construction types and a wide range of different belt widths offer solutions for numerous applications.

**BMGZ021** – for flat belts

**BMGZ041** – for troughed belts

FMS are used in combination with the evaluation electronics from the BMGZ700 construction series.

**BMGZ710** – robust evaluation electronics for conveyor belt scales

**BMGZ710.PNET** - robust evaluation electronics for conveyor belt scales with a PROFINET IRT interface

**BMGZ750** – robust, calibratable evaluation electronics for conveyor belt scales

**BMGZ750.PNET** - robust, calibratable evaluation electronics for conveyor belt scales with a PROFINET IRT interface

### 3.3 Description of function

The FMS measuring roller usually replaces a conventional bearing pulley station in the conveyor belt. The conveyor belt width determines the dimensions of the measuring roller. There is a force transducer on each shaft end of the measuring axis. The type of measurement (directly at the point of actual transmission of force) makes the system resistant to forces that act, for example, in the direction of the running belt. Additional guides or struts to the frame of the conveyor belt to absorb these undesirable forces are not necessary and lead to very narrow dimensions. The minimal installation height means the FMS measuring rollers can be installed in even the smallest of spaces, for example in mobile crushers or sorting machines. The measuring roller support can be adjusted and can therefore be mounted on conveyor belts of varying frame widths without work needing to be carried out to adjust them. The universal installation bracket facilitates installation in existing systems and is included with the delivery. The fully encapsulated speed sensor is free from wear and maintenance and sits on a shaft end.

### 3.4 Scope of delivery

The following components are included in a full system:

**Scope of delivery:**

Measuring roller

**Accessories:**

Evaluation electronics, connection cable running from the evaluation electronics to the measuring roller (please indicate length)

**Not included in the scope of delivery:**

Power supply, additional installation material (screws, washers etc.)

### 3.5 Order code for flat measuring rollers

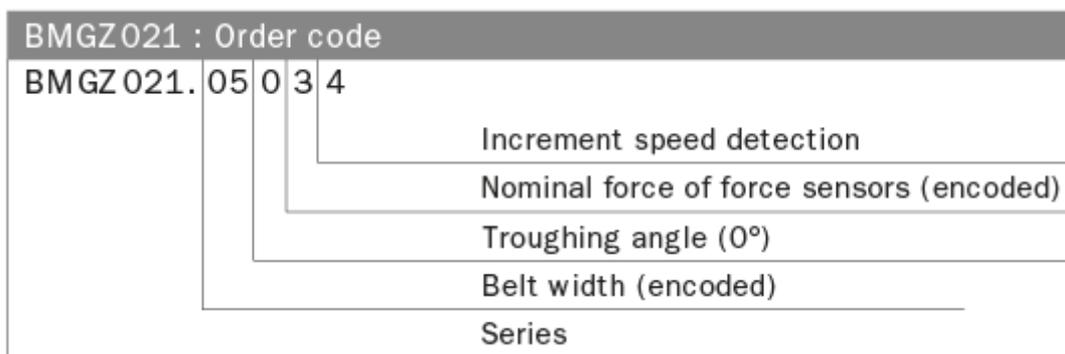
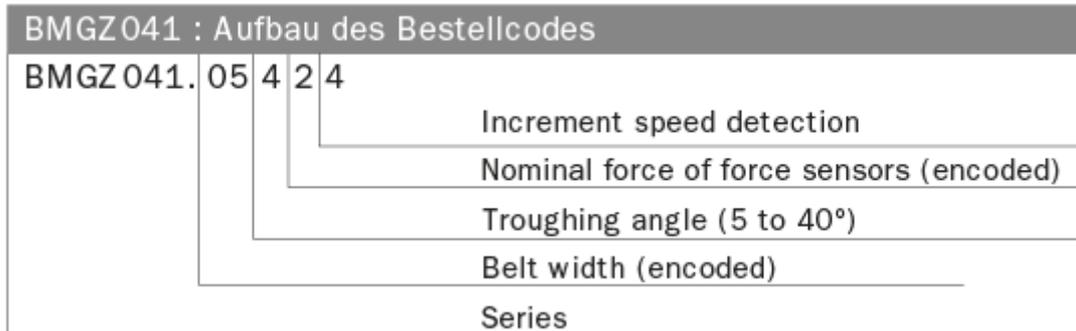


Figure 2: Order code for measuring rollers

### 3.6 Order code for troughed measuring rollers



**Figure 3: Order code for measuring rollers**

## 4 Installation of measuring rollers

### 4.1 Installation site for the measuring rollers

Note the following points:

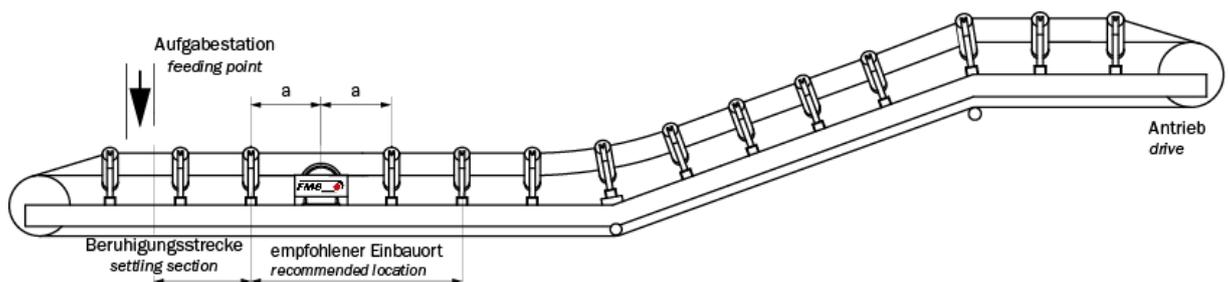
- The belt tension should be kept constant. At least one weight tensioning station should be provided where possible. Changes to the belt tension have a direct impact on the measurement.
- The gradient should only ever be high enough that the bulk goods do not slip backwards on the belt.
- The conveying capacity should be in a range from 20% to 100% of the nominal conveying capacity. The measurement accuracy decreases when the conveying capacity is low.
- The measuring roller should be positioned far enough from the material feeding station that the bulk goods have stabilised by the time they reach the measuring roller.
- Position the measuring roller as far as possible from the drive drum so the impact of belt tension is minimised.
- The measuring roller may only be positioned in a straight section of the belt with a constant level of troughing.

#### **Accuracy of the measurements**



Movements of the material being conveyed on the belt and changes to the belt tension affect the measurements and therefore increase measurement uncertainty. Proper operation is only ensured if the above points are followed.

#### Example installation position



**Figure 4: Example installation position**

- Sufficiently long stretch to settle
- Significant distance from the drive
- Sufficient distance from the cranking of the belt. The belt must lie on the measuring roller with its own weight when no load is placed on it.
- The mass "a" has already been taken into account when designing the measuring roller and must be complied with precisely ( $\pm 25$  mm).

## 4.2 Installation of the measuring rollers

Check the alignment of the adjacent bearing pulley stations and whether they run in parallel

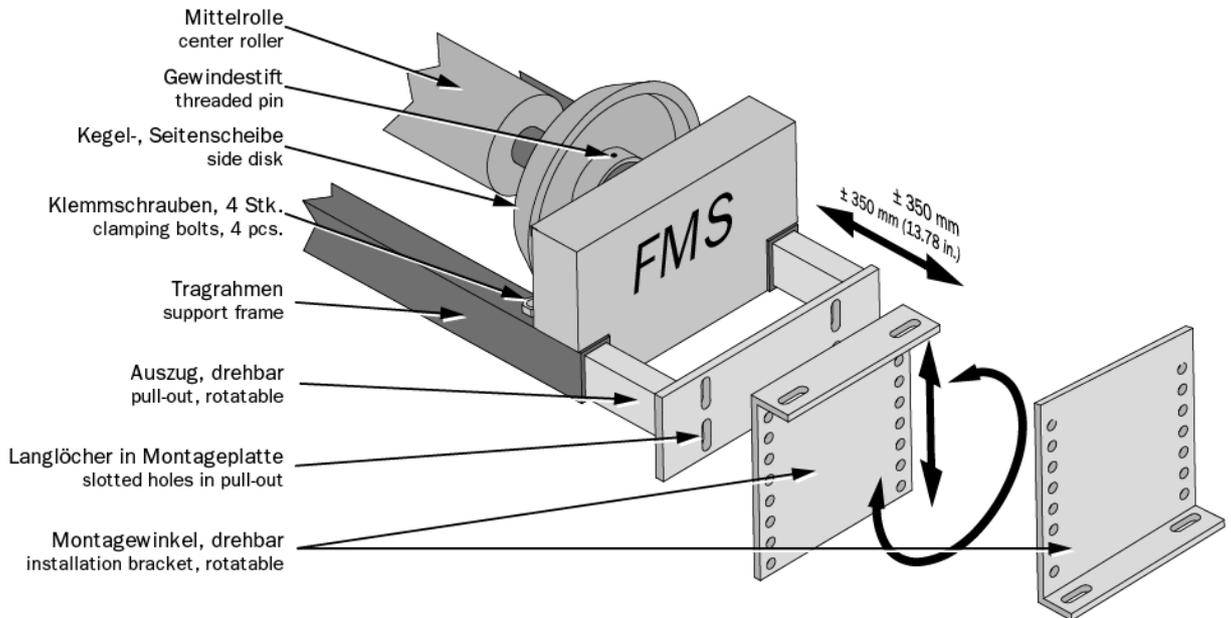


Figure 5: Installation elements

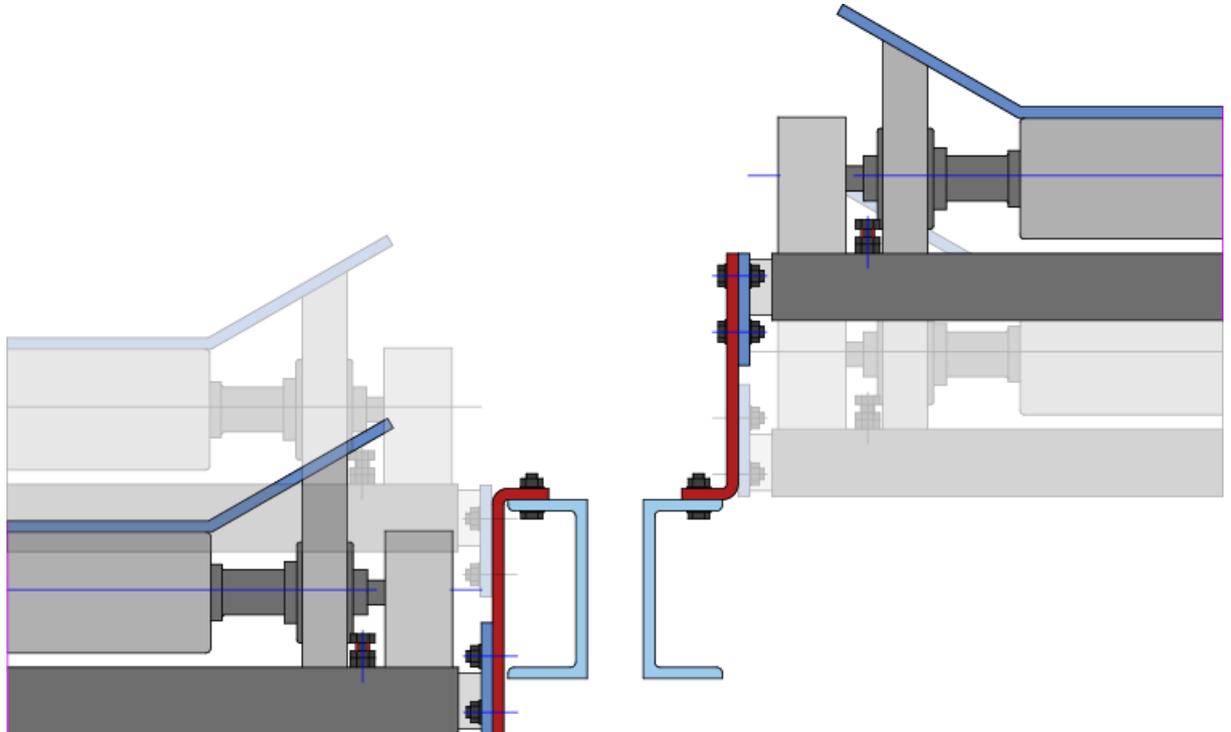


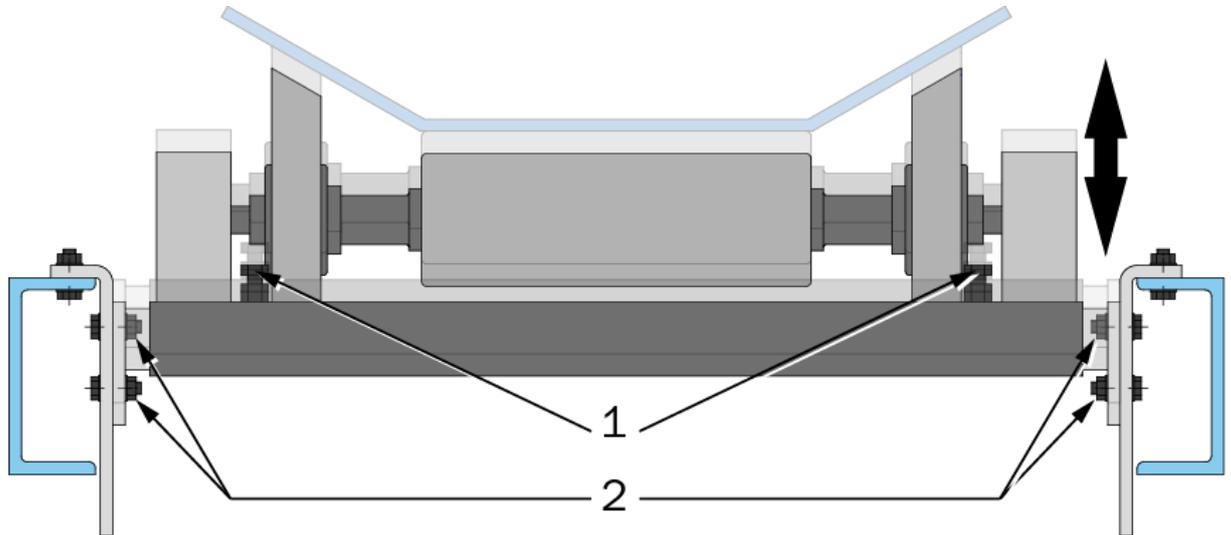
Figure 6: Installation types, possible combinations

This provides an initial rough estimate of the installation height of the measuring roller.

Ensure that the screws are initially approximately in the centre of the respective slotted holes. This ensures you have enough “breathing room” to make the fine adjustments.

After setting the height, check the central alignment of the measuring roller.

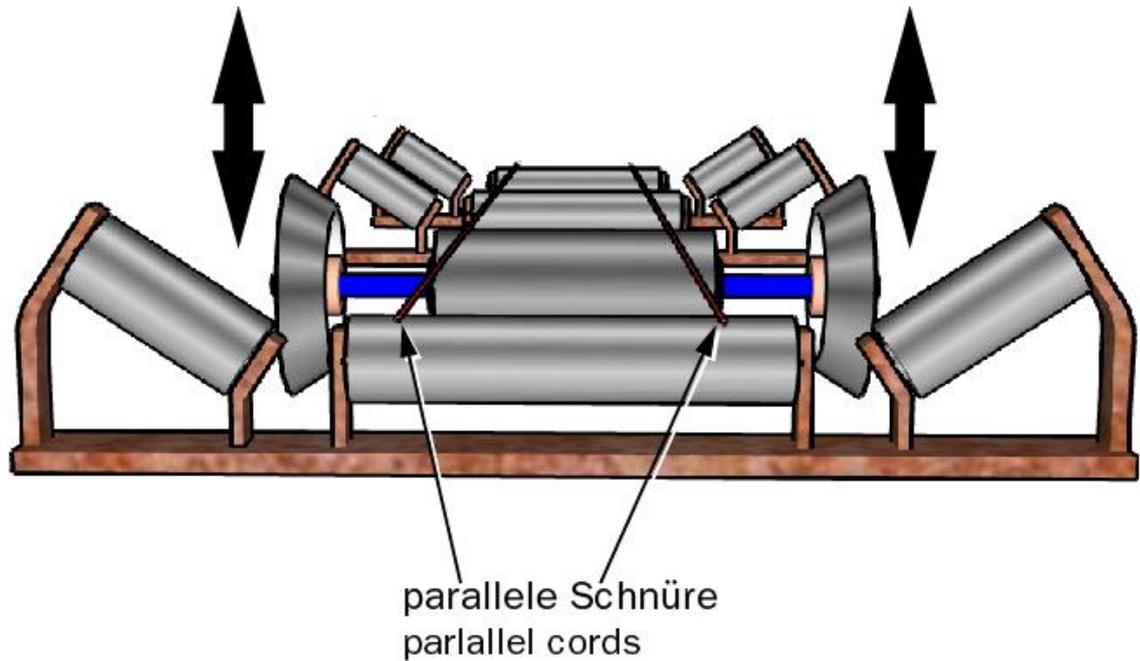
- Loosening the clamping screws “1” on both sides enables you to shift the support frame using the extensions.



*Figure 7: Fine adjustment, screws*

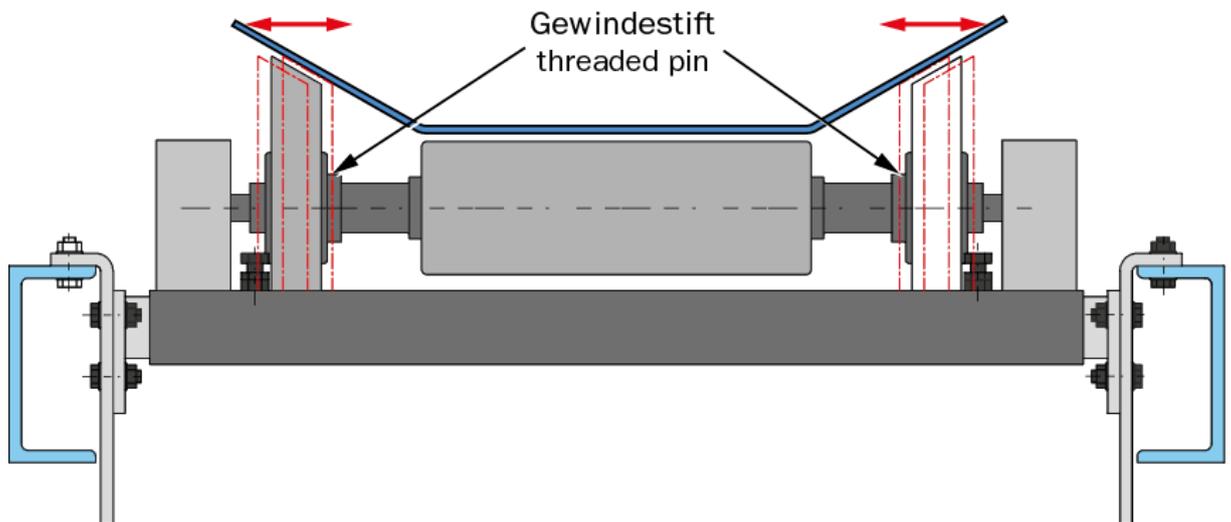
Fine adjustment of the height relative to the adjacent bearing pulley stations.

- Lift the belt with wooden wedges or similar
- Tension two cords over the adjacent load-bearing rollers
- Loosen the lateral fixing screws “2” on the installation bracket and displaceable part slightly
- Adjust the height of the measuring roller until the measuring roller contacts the cords in a straight manner
- Tighten the lateral fixing screws again



**Figure 8: Alignment with 2 cords**

You can now adjust the bevel/lateral washers (only BMGZ041). These can be shifted in a lateral direction by loosening the threaded pin.



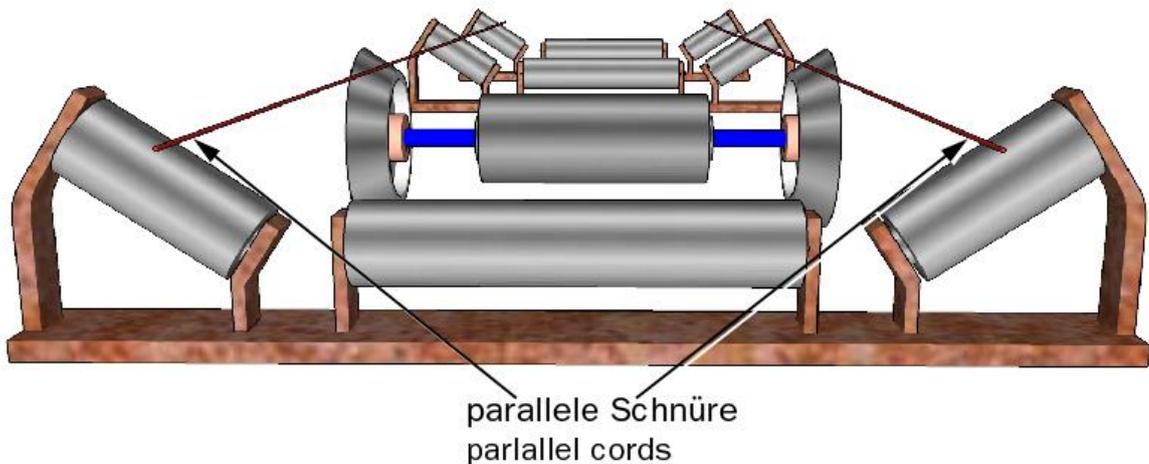
**Figure 9: Setting the bevel washers**

**Warning Damage of the axis**



Over tightening the threaded pins can lead to damages of the axis. It can lead to corrosion and it can happen that the side discs are no longer slidable on the axis.

Use a maximum torque of 20 Nm (15 ft lb)



*Figure 10: Alignment with 2 cords*

### 4.3 Electrical connection BMGZ021 and BMGZ041 (see operating instructions for the BMGZ710 series)

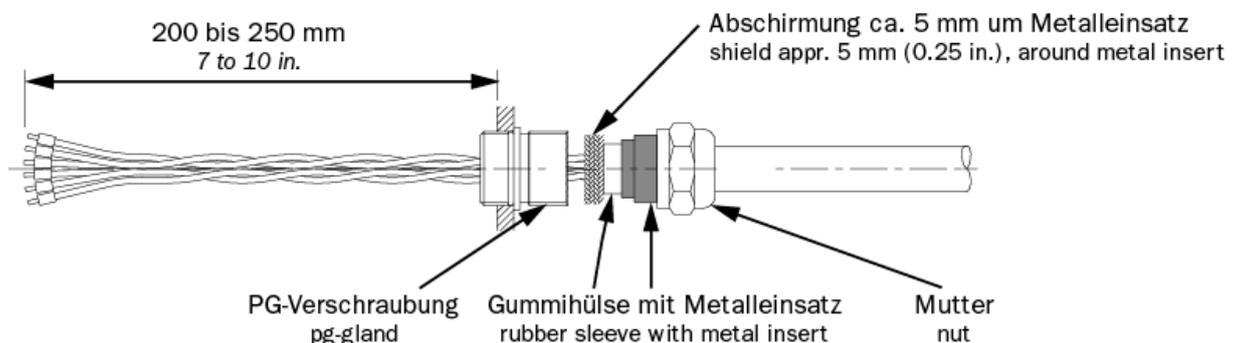
The connection between the measuring roller and the evaluation electronics must be made with the 8-wire, paired cable (4x2x0.75 mm<sup>2</sup>) included with the delivery.

The cable must be routed separately from lines carrying the power so no disruptions to the measurement signal are induced. On the measuring roller side, the plastic coating on the cable is at a distance of approximately 14 cm.

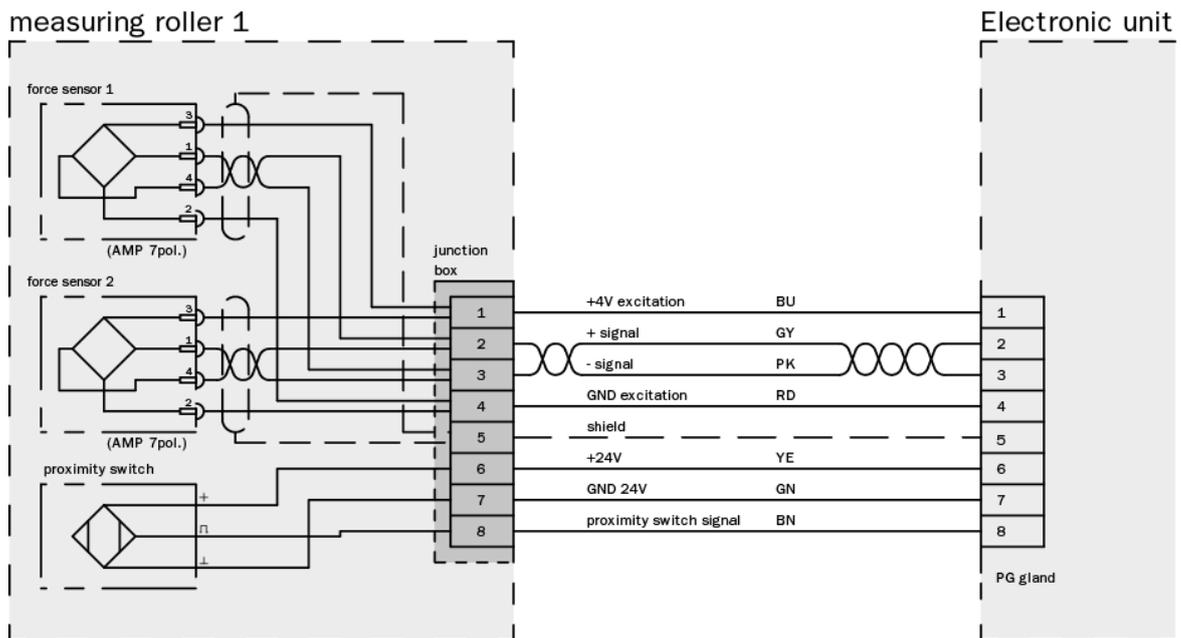
The white wire is not connected. The shield must be connected to terminal 5

The cable shield must be connected on both sides.

When using housing version K (control cabinet), the cable is guided through the control cabinet wall using the 8-pole plug connection.

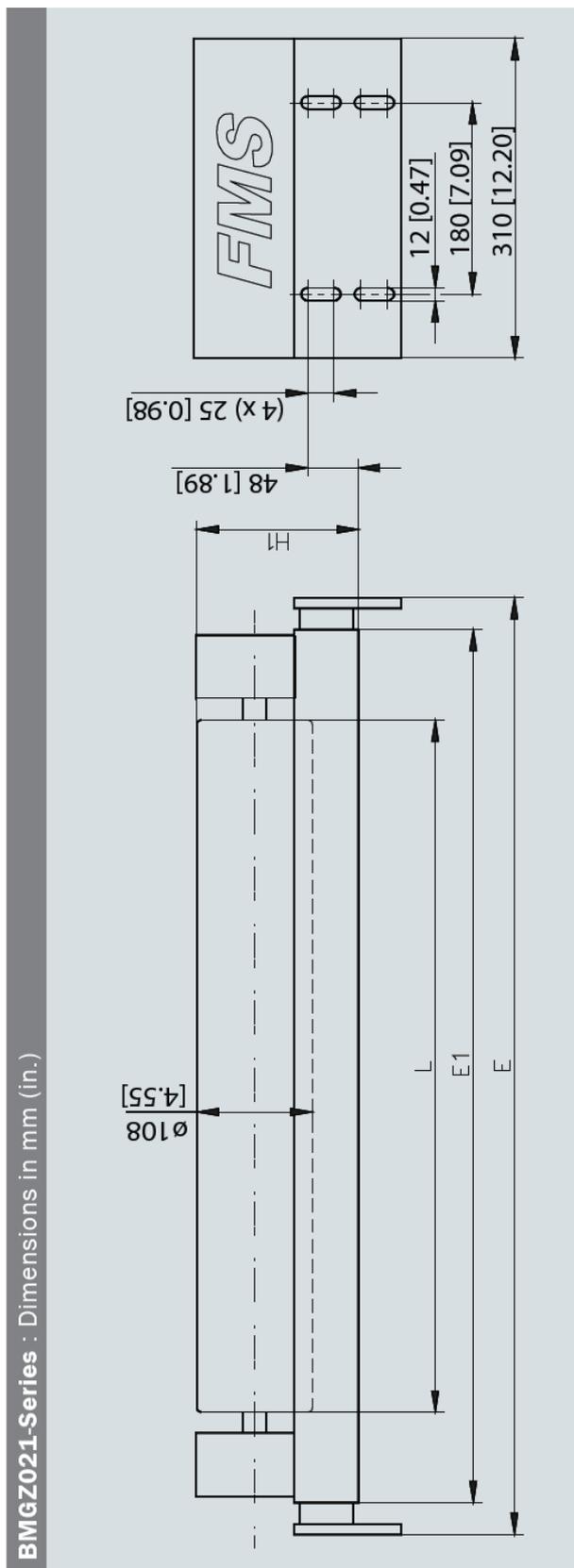


*Figure 11: Connection cable on the evaluation electronics side*



**Figure 12: Connection cable on the measuring roller side BMGZ021 and BMGZ041**

# 5 Dimensions



**BMGZ021-Series : Dimensions**

Type	Belt width mm (in.)	L mm (in.)	E mm (in.)	E1 mm (in.)	H1 mm (in.)
BMGZ021.020	400 (15.7)	400 (15.7)	600 - 970 (23.6 - 38.2)	580 (22.8)	150 (5.9)
BMGZ021.030	500 (19.7)	500 (19.7)	700 - 1070 (27.6 - 42.1)	680 (26.8)	150 (5.9)
BMGZ021.040	650 (25.6)	650 (25.6)	850 - 1220 (33.5 - 48.0)	830 (32.7)	150 (5.9)
BMGZ021.050	800 (31.5)	800 (31.5)	1000 - 1370 (39.4 - 53.9)	980 (38.6)	150 (5.9)
BMGZ021.060	1000 (39.4)	1000 (39.4)	1200 - 1570 (47.2 - 61.8)	1180 (46.5)	150 (5.9)

Figure 13: Dimensions BMGZ021

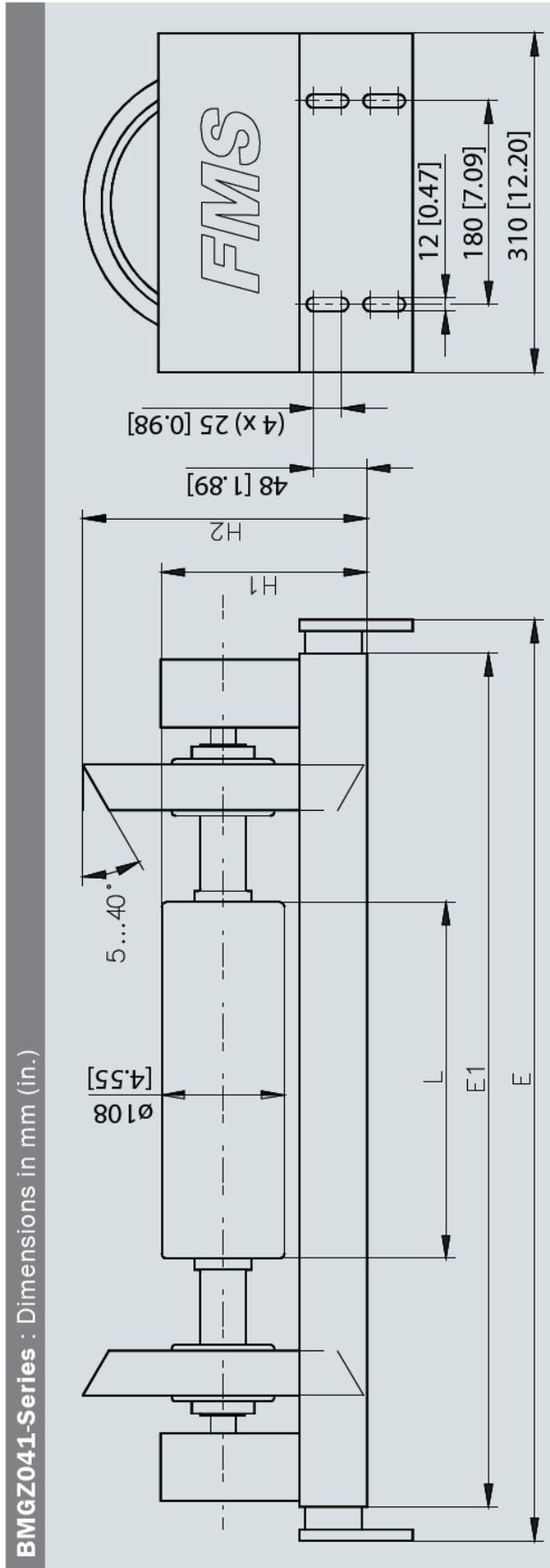


Figure 14: Dimensions BMGZ041

**BMGZ041-Series : Dimensions**

Type	Belt width mm (in.)	L mm (in.)	E mm (in.)	E1 mm (in.)	H1 mm (in.)	H2 mm (in.)
BMGZ041.02	500 (19.7)	200 (7.9)	620 - 990 (24.4 - 39.0)	600 (23.6)	180 (7.0)	232 (9.1)
BMGZ041.03	650 (25.6)	250 (9.8)	720 - 1090 (28.3 - 42.9)	700 (27.6)	180 (7.0)	250 (9.8)
BMGZ041.04	800 (31.5)	315 (12.4)	830 - 1200 (32.7 - 47.2)	810 (31.9)	180 (7.0)	250 (9.8)
BMGZ041.05	1000 (39.4)	380 (15.0)	1045 - 1415 (41.1 - 55.7)	1025 (40.4)	240 (9.4)	352 (13.9)
BMGZ041.06	1200 (47.2)	465 (18.3)	1180 - 1550 (46.5 - 61.0)	1160 (45.7)	240 (9.4)	352 (13.9)
BMGZ041.07	1400 (55.1)	530 (20.8)	1395 - 1765 (54.9 - 69.5)	1375 (54.1)	240 (9.4)	352 (13.9)

## 6 Technical data

BMGZ021 : Technical data	
Accuracy class	$\pm 0.3\%$ (FNenn)
Temperature range	-10 to +60 °C (14 to 140 F)
Overload protection force sensor	10 times nominal force (FNom)
Material frame	galvanized steel
Protection class	IP67

**Table 1: Technical data on FMS measuring rollers**

BMGZ041 : Technical data	
Accuracy class	$\pm 0.3\%$ (FNenn)
Temperature range	-10 to +60 °C (14 to 140 F)
Overload protection force sensor	10 times nominal force (FNom)
Material frame	galvanized steel
Protection class	IP67

**Table 2: Technical data on FMS measuring rollers**

# 7 Ersatzteilliste

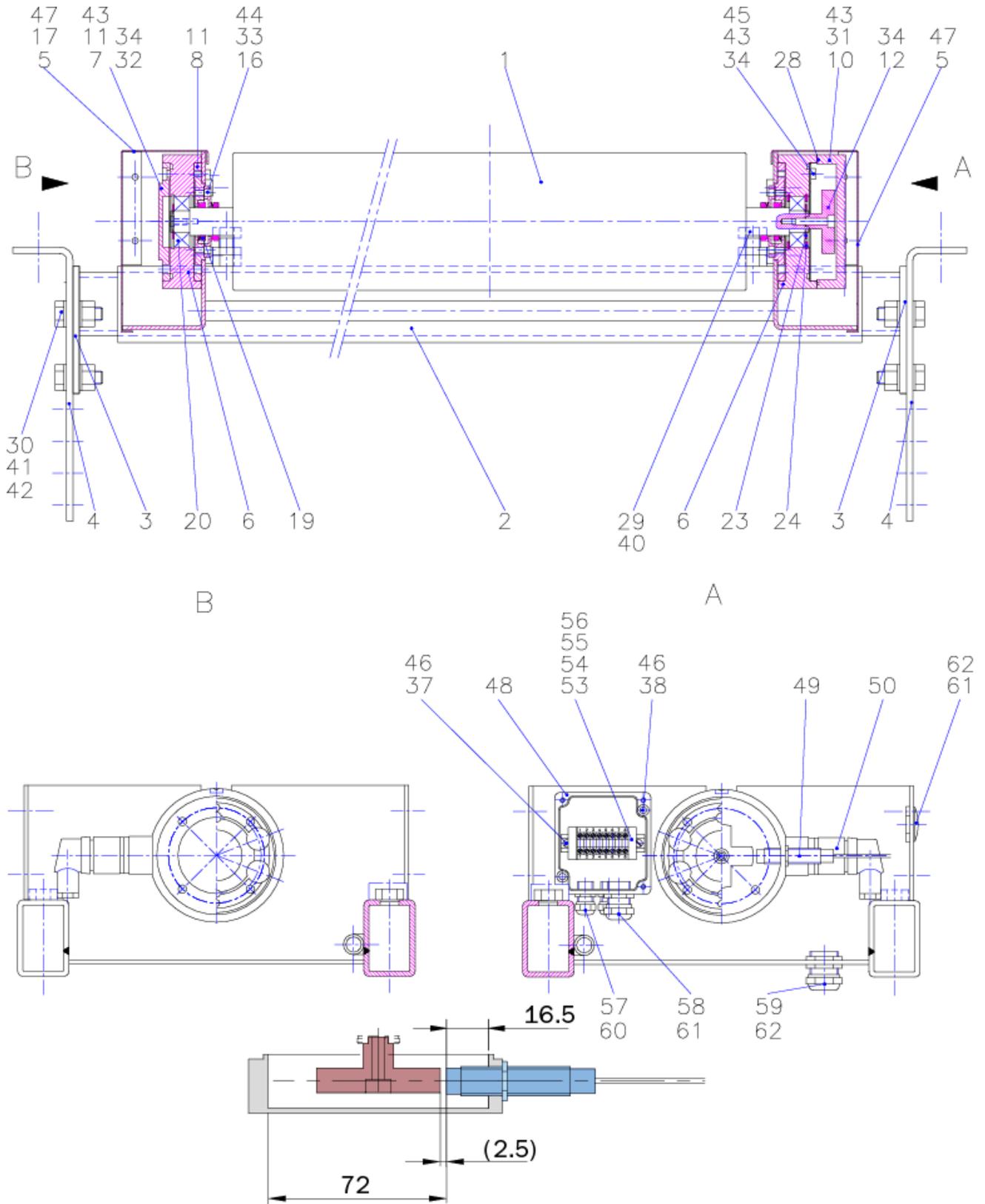


Abbildung 15: Flache Messrolle BMGZ021

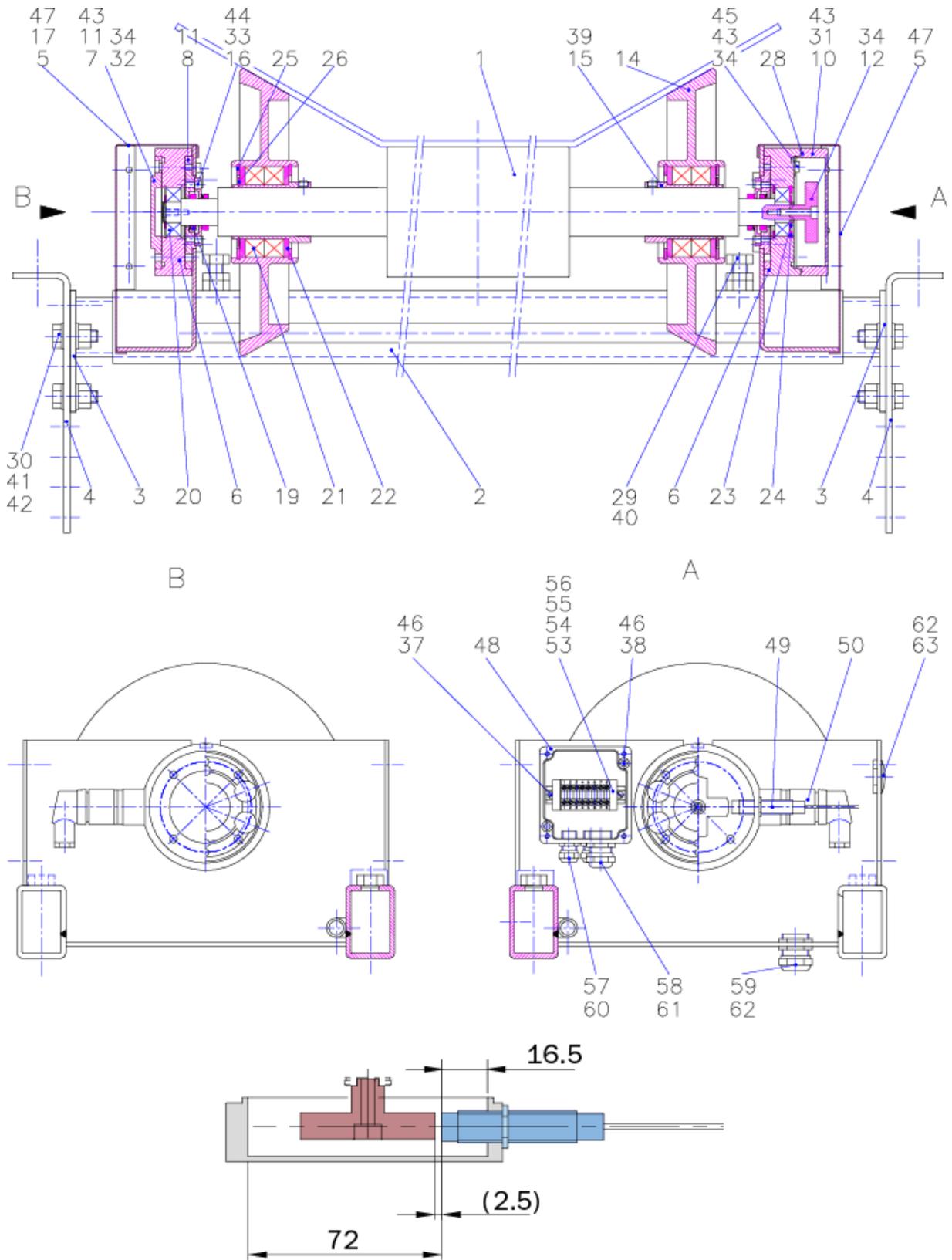


Abbildung 16: Gemuldete Messrollen BMGZ041, BMGZ061

## 7.1 Parts list

<b>Pos.</b>	<b>Description</b>	<b>Pos.</b>	<b>Bezeichnung</b>
1	Middle roller	36	–
2	Support	37	Pan head screw M4x8
3	Sliding part	38	Pan head screw M4x16
4	Mounting bracket	39	Set screw M8x6
5	Cover	40	Hex nut M12, 0.5xD
6	Force measuring bearing LMGZ203	41	Hex stop nut M10
7	Cover A	42	Washer M10
8	Cover B	43	Washer M6
9	–	44	Washer M5
10	Cover F	45	Washer Ø15/5.3x1.2
11	Paper seal LMGZ203	46	Spring washer M4
12	Pulse generator Ø50, 4 vanes	47	Self-tapping pan head screw 4.2x6.5 F
13	–	48	Aluminium housing A105
14	Bevelled side disk	49	Proxy switch M12x1
15	Bearing sleeve	50	Junction box 90°, 7-pole
16	Cover G	51	Flex cable STP 2x2x0.25mm <sup>2</sup>
17	Name plate	52	Cable binder
18	–	53	terminals MBK 2.5E
19	V-ring seal V-22A	54	Cover D-MBK 2.5E
20	Self aligning ball bearing 1203TV	55	Mounting rail, perforated NS15
21	Grooved ball bearing 6009.2ZR	56	Wire end ferrules 1mm <sup>2</sup>
22	Nilos ring LSTO 45x75	57	Screwed gland PG7
23	Locking ring A17	58	Screwed gland PG11
24	Locking ring J40	59	Screwed gland PG16
25	Locking ring J75	60	Hex nut PG7
26	Locking ring A45	61	Hex nut PG11
27	–	62	Hex nut PG16
28	O-ring 95x1.78	63	Sealing cover PG16

<b>Pos.</b>	<b>Description</b>	<b>Pos.</b>	<b>Bezeichnung</b>
29	Hex screw M12x30	64	Plug connection PG Amph. 8-pole 1)
30	Hex screw M10x30	65	
31	Hex screw M6x65	66	
32	Hex screw M6x40	67	
33	Hex screw M5x10	68	
34	Hex socket screw M5x25	69	
35	–	70	–

<sup>1)</sup> only with version „K“ (with cabinet)

**Table 1: partl list**

## 8 Trouble Shooting

<b>Message</b>	<b>Cause</b>	<b>Corrective action</b>
neg. feedback roller 1/2	Parting of the cable	Check connection cable to measuring roller 1/2
	Cable is wrongly connected	Change wires on terminals 110/111 roller 1 (202/203 roller 2)
	Error at measuring roller 1/2 Input signal >-1mV	Check internal wiring and measuring bearings of measuring roller 1/2
overload	Load on measuring roller to high	Check load of measuring roller 1/2
	Short circuit in the cable; input signal >127mV	Check connection cable to measuring roller 1/2
Output Roller 1/2 < min.	Analogue output 1/2 is driven with values < 0V. Actual flow rate is negative for more than 5s	Run tare program for measuring roller 1/2
Output Roller 1/2 > max.	Analogue output 1 is driven with values > 10V	Check load of measuring roller 1/2; adjust parameter <i>Max. output 1/2</i>
Message „Belt not running“	Tare program was started while belt was not running	Start conveyor belt; run tare program again
	Proxy switch of measuring roller defect	Replace proxy switch
Automatic weighing a charge: Conveyor belt doesn't stop	Conveyor belt is empty before Ref. charge is reached	Stop charge manually; then decrease parameter <i>Pre detection charge a little</i>
No message on the display	Power supply not correct	Check / correct power supply; Check fuses in the supply line
	Evaluation electronic unit defect	Contact FMS customer service

*Tabelle 3: Trouble Shooting*









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