

## Transmitters for Angular Position TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex



- Conversion of the angular position of the shafts of mechanical primary detectors into a load-independent direct current signal
- High precision: Non-linearity < 1 %
- Simple conversion from 2, 3 or 4-wire operation with the same device (only 2-wire circuit in the case of devices with explosion protection)
- Options
  - Electrical isolation between output and power supply
  - Marine version with German Lloyd approval
  - Intrinsically safe version, Code EEx ib IIC T4/T6 for operation in Zone 1
  - Limitation of superimposed interference voltage peaks
  - Plug connection Han 7 D
- Version TGE 5, TGE 5-Ex for attachment to
  - pressure gauges (with mounting hardware)
  - scales etc.
- Version TGM 5, TGM 5-Ex for attachment to shafts
  - in heavy machinery
  - on ships etc.
- Version TGU 5, TGU 5-Ex for installation in
  - pressure gauges
  - rotameters
- Installation in systems with very high mechanical and climatic stress
- The customer's specific adjustments are effected at the factory, but can be changed subsequently

**Technical data**

**Input** (see Ordering information for measuring range)  
Zero: Approx. ± 5 % adjustable (referred to the output span)  
Shaft: can be freely rotated

**Output and power supply**

Non-linearity  
< 1 % (referred to the output span)  
TGE 5, TGM 5 (measuring range < 90 °):  
< 0.5 % (referred to the output span)  
Response time: < 50 ms (jump 0...100 %)  
Long-term influence: < 0.2 % / year  
Residual ripple (peak-peak)  
Output signal < 1 %  
Power supply < 1.5 V

**General and safety data**

**Environmental capabilities**

See Table 2 for application class  
Ambient temperature: -25...+80 °C  
Transportation and storage temperature: -40...+80 °C  
Relative atmospheric humidity  
TGE 5: < 75 % annual average, condensing permitted, occasional  
TGM 5: < 90 % annual average, condensing permitted  
TGU 5: < 75 % annual average, condensing permitted, occasional

**Mechanical stress capabilities**

Tested to DIN IEC 68-2-27 and 68-2-6  
Impact: 50 g / 11 ms  
Vibration: 5 g / ±10 mm / 5...150 Hz

**TGU 5**

Interference proof acc. to NAMUR Recommendation for industrial standard in 2-wire circuit

**TGE 5, TGM 5**

Interference immunity acc. to NAMUR Recommendation for industrial standard (surge 1.2/50 1.5 kV). Devices with explosion protection (Ex devices) are only operated in 2-wire circuit.

**Connection, case, mounting and safety**  
TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex

Electrical connections  
Screw terminals for 2.5 mm<sup>2</sup>  
or plug connection Han 7 D (not for Ex)

TGU 5, TGU 5-Ex  
4-conductor ribbon cable 150 mm long

Mounting orientation: any

Test voltage to: DIN VDE 0411; 0.5 kV

Material of case  
Salt-water-proof cast aluminium  
Surface anodized  
TGE 5 and TGE 5-Ex: plastic cover

Weight  
TGE 5 approx. 0.5 kg  
TGM 5 approx. 2.6 kg  
TGU 5 approx. 0.2 kg

Version	Degree of protection of case to DIN 40050	Application class to DIN 40040	Max. shaft load permitted radial axial		required torque
TGU 5	IP 30/IP 00 <sup>2)</sup>	HQE			Approx. 0.15 Ncm (15 cmp)
TGU 5-Ex		HSE			
TGE 5	IP 54/IP 50 <sup>1)</sup>	HQR			Approx. 0.3 Ncm (30 cmp)
<b>TGM 5</b>					
with friction bearings + sealing ring	IP 66	HQR	300 N (30 kp)	900 N (90 kp)	Approx. 8 Ncm (800 cmp)
with friction bearings w. sealing ring	IP 66/ IP 50 <sup>1)</sup>	HQR	300 N (30 kp)	900 N (90 kp)	Approx. 2 Ncm (200 cmp)
with ball bearing	IP 56/ IP 50 <sup>1)</sup>	HQR	200 N (20 kp)	150 N (15 kp)	Approx. 0,6Ncm (60 cmp)

1) On the shaft seal; seal for higher degree of protection  
2) At cable end

Electrical isolation	Power supply U <sub>s</sub>	Max. current supply	Max. load consumption	2-wire connection	3-wire connection	4-wire connection	Jumper Br3
No (only Ex)	12...20 V DC	24 mA	$\frac{U_s - 12 V}{I_A}$	4...20 mA	–	–	Open
No	13.2...36 V DC	24 mA	$\frac{U_s - 13,2 V}{I_A}$	–	0... 5 mA	0... 5 mA	Closed
				–	0...10 mA	0...10 mA	Closed
				–	0...20 mA	0...20 mA	Closed
				4...20 mA	4...20 mA	4...20 mA	Open
No	13.2...26.4 V AC	24 mA	$\frac{U_s - 13,2 V}{I_A} \cdot 1,4$	–	–	0... 5 mA	Closed
				–	–	0...10 mA	Closed
				–	–	0...20 mA	Closed
				–	–	4...20 mA	Open
With	13.2...36 V DC	100 mA	600 Ω	–	–	0... 5 mA	Closed
				–	–	0...10 mA	Closed
				–	–	0...20 mA	Closed
				–	–	4...20 mA	Open
With	13,2...26,4 V AC	100 mA	600 Ω	–	–	0... 5 mA	Closed
				–	–	0...10 mA	Closed
				–	–	0...20 mA	Closed
				–	–	4...20 mA	Open

**Technical data**

**Explosion protection**

Only with 2-wire connection

**TGU 5-Ex, TGE 5-Ex, TGM 5-Ex**

Manufacturer's code  
49/14-09 Ex

Certificate of Conformity  
PTB No. Ex-89.C.2148

Type of protection  
Intrinsic safety "I"

Code  
EEx ib IIC T4/T6

Hazardous area  
Zone 1 or 2

Protection group  
T6 at max. 40 °C ambient temperature  
T4 at max. 70 °C ambient temperature  
Transmitter TGx 5-Ex must be powered from an intrinsically safer certified current source, suitable for connection to the transmitter's power supply circuit.  
In the case of a 2-wire connection, the output signal is shown as a change of the current consumption.

Power supply circuit  
With type of protection "intrinsic safety"  
EEx ib IIC

Rated values  
Voltage 12...20 V DC

Current  
With 2-wire connection up to 20 mA

For connection to an intrinsically safe certified circuit with the following max. values:  
Open-circuit voltage to 20 V  
Short-circuit current to 35 mA  
Power to 0.7 W

Effective internal inductance between the terminals and case (earth)  $\leq 6$  nF.

Effective internal inductance is negligible.

**Output circuit**

With type of protection "Intrinsic safety"  
EEx ib IIC

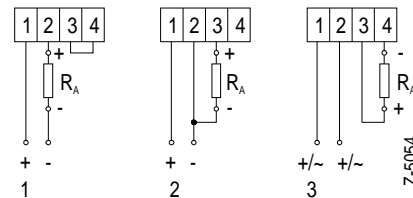
The power supply circuit and output circuit are identical for the 2-wire connection. In the event of a fault, the maximum values of the power supply circuit will also occur in the output circuit.

If active, intrinsically safe circuits are connected to the output circuit, the sum total of the maximum values of the active, intrinsically safe circuits, connected to the output circuit, including the maximum values of the power supply circuit may not exceed the following values:

Voltage	to 20 V
Current	to 35 mA
Power	to 0.7 W

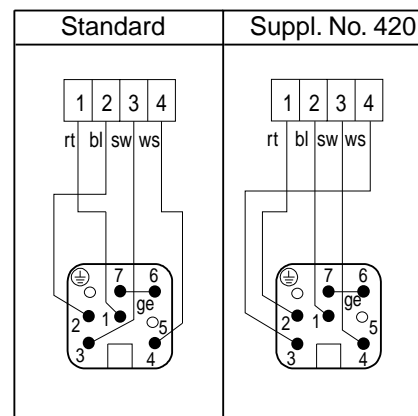
**Connection diagrams**

**Terminal connection TGE 5, TGM 5**



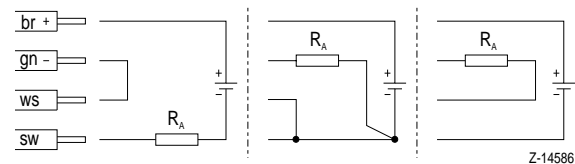
- 1 = Two-wire connection
- 2 = Three-wire connection
- 3 = Four-wire connection

**Plug connection TGE 5, TGM 5**



Z-13890 EN

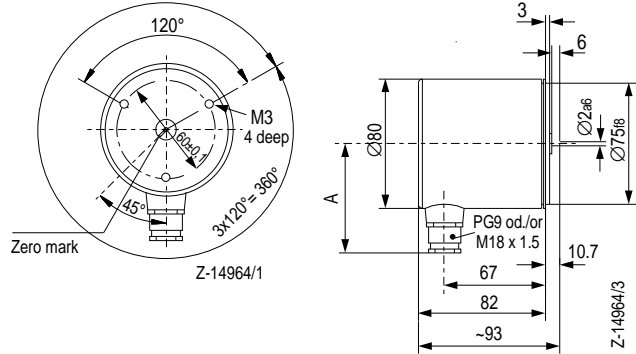
**TGU 5**



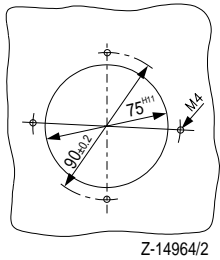
- Two-wire connection
- Three-wire connection
- Four-wire connection

**Dimensional drawings** (Dimensions in mm)

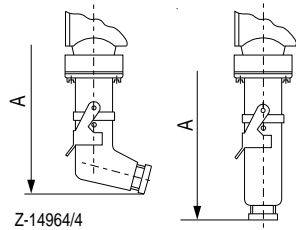
### TGE 5, TGE 5-Ex



#### Drilling diagram for clamps



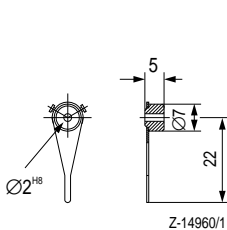
#### Version with plug connection



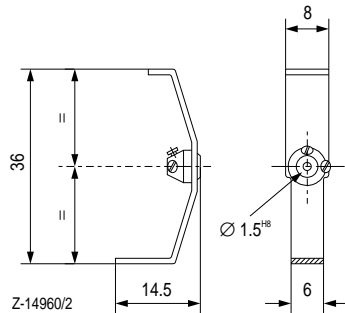
	Cable entry		Plug connection	
	D46320-C4-Pg9-7-7	D89280-KM18x1,5-Z10	angled	straight
A	62	97	132	146

### Mounting hardware

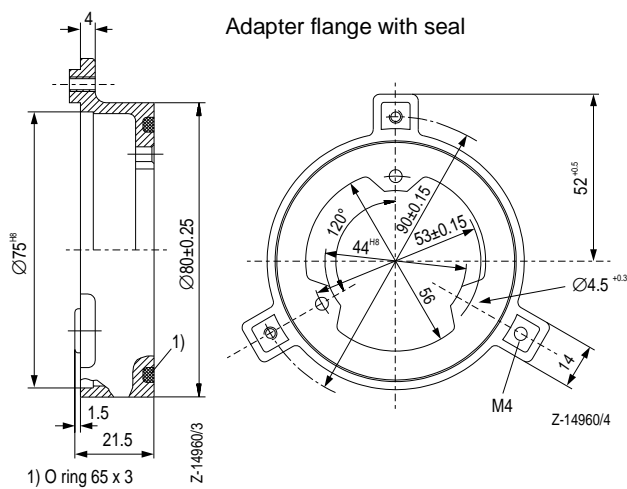
#### Lever complete



#### Driver complete

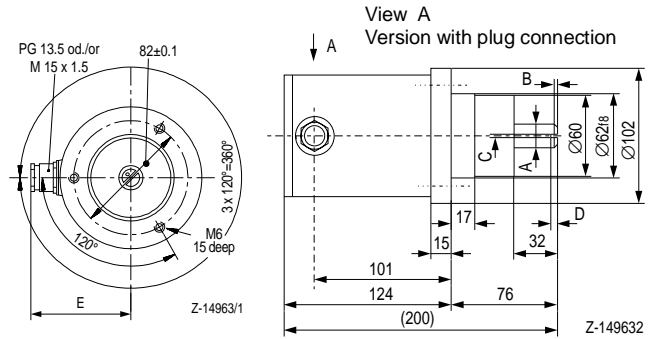


#### Adapter flange with seal

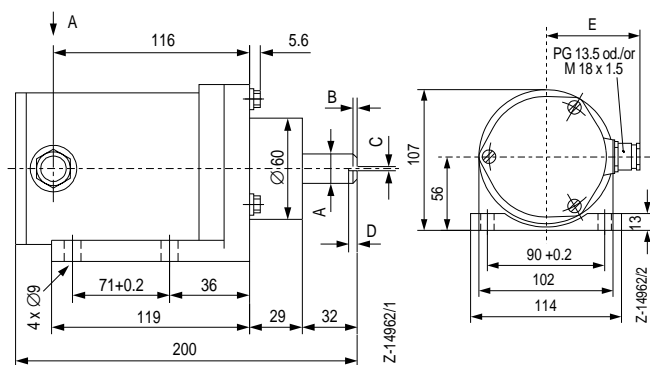


1) O ring 65 x 3

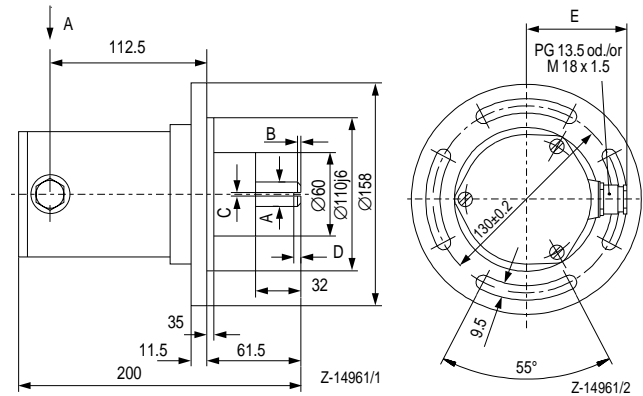
### TGM 5



### TGM 5 base-mounted



### TGM 5 flange-mounted



	TGM 5	
	friction bearing	ball bearing
A	Ø 19 <sub>h8</sub>	Ø 10 <sub>h8</sub>
B	1 × 45°	0.5 × 45°
C	3 ± 0.1	—
D	3.5 ± 0.1	—

	Cable entry		Plug connection	
	Pg13.5	M 18 × 1.5	angled	straight
E	71.5	90.5	≈ 143	≈ 157

**Stock versions**

**Transmitter TGE 5/TGE 5-Ex**

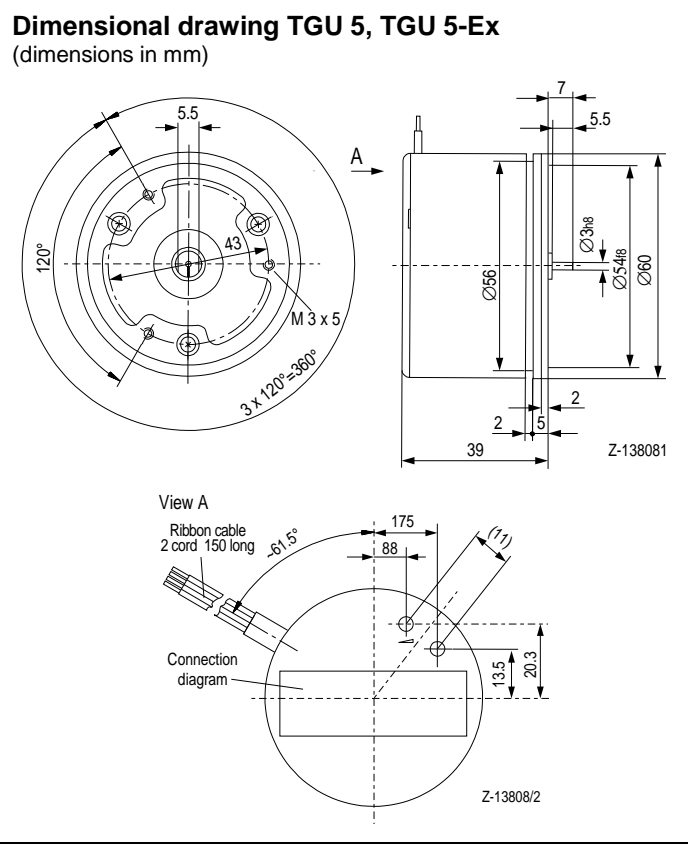
Standard	0...270°	24 V UC	–	<b>14432-1712300</b>
	0... 90°	24 V UC	–	<b>14432-1512300</b>
Intrinsically safe	0...270°	24 V DC	–	<b>14432-5711300</b>

**Transmitter TGM 5**

Standard	0... 30°	24 V UC	friction bearing with sealing	<b>14436-1312110</b>
Standard	0... 60°	24 V UC	friction bearing without sealing	<b>14436-1412120</b>
Standard	0... 90°	24 V UC	friction bearing without sealing	<b>14436-1512110</b>
Standard	0... 90°	24 V UC	friction bearing without sealing	<b>14436-1512120</b>
Standard	0...270°	24 V UC	friction bearing without sealing	<b>14436-1712110</b>
Standard	0...270°	24 V UC	friction bearing without sealing	<b>14436-1712120</b>

**Transmitter TGU 5/TGU 5-Ex**

Standard	0...270°	–	–	<b>14437-1710000</b>
	0...180°	–	–	<b>14437-1610000</b>
Intrinsically safe	0...270°	–	–	<b>14437-5710000</b>



**Ordering information**

**Transmitter TGU 5**

**Catalog No.**

**1 4 4 3 7** -

**Design**

Standard . . . . .	1	0 0 0 0
Intrinsically safe EEx ib . . . . .	5	

**Measuring range**

0... 10°, can be set to 0... 9/ 11° . . . . .	1	0 0 0 0
0... 30°, can be set to 0... 27/ 33° . . . . .	3	
0... 60°, can be set to 0... 54/ 66° . . . . .	4	
0... 90°, can be set to 0... 81/ 99° . . . . .	5	
0...180°, can be set to 0...162/198° . . . . .	6	
0...270°, can be set to 0...224/280° . . . . .	7	
0...310° . . . . .	8	
Other measuring ranges acc. to Suppl. Nos. 302...306 . . . . .	0	

**Output**

0/4...20 mA . . . . .	1	0 0 0 0
0...10 mA . . . . .	3	
0... 5 mA . . . . .	5	
4...20 mA 4-wire circuit <sup>1)</sup> . . . . .	7	

**Catalog No.**

**1 4 4 3 7** -

| | 0 0 0 0

If necessary, append the Suppl. Nos. to the Catalog Numbers.

<sup>1)</sup> Not for Ex-version

<b>Additional optional ordering information</b>		<b>Suppl. No.</b>
Other measuring ranges		
Upper value setting	0...7.5°/ 17°	302 <input style="width: 30px; height: 15px;" type="text"/>
range as from	0...15°/ 75°	303 <input style="width: 30px; height: 15px;" type="text"/>
	0...60°/165°	304 <input style="width: 30px; height: 15px;" type="text"/>
	0...150°/280°	305 <input style="width: 30px; height: 15px;" type="text"/>
	0...220°/310°	306 <input style="width: 30px; height: 15px;" type="text"/>
Output signal increases when shaft turns towards the left		310
<b>Additional ordering information</b>		
Licence No. OTOA7.AX		493
<input style="width: 30px; height: 15px;" type="text"/> Add clear text		



# Transmitters for Angular Position TGE 5

## Ordering informations

<b>Transmitter TGE 5</b>	<b>Catalog No.</b>	<span style="border: 1px solid black; padding: 2px;">1 4 4 3 2</span> -
<b>Design</b>		<span style="border: 1px solid black; padding: 2px;">        0 0</span>
Standard . . . . .	1	
Intrinsically safe EEx ib . . . . .	5	
<b>Measuring range</b>		<span style="border: 1px solid black; padding: 2px;">        0 0</span>
0... 10°, can be set to 0... 9/ 11° . . . . .	1	
0... 30°, can be set to 0... 27/ 33° . . . . .	3	
0... 60°, can be set to 0... 54/ 66° . . . . .	4	
0... 90°, can be set to 0... 81/ 99° . . . . .	5	
0...180°, can be set to 0...162/198° . . . . .	6	
0...270°, can be set to 0...224/280° . . . . .	7	
0...310° . . . . .	8	
Other measuring ranges acc. to Suppl. Nos. 302...306 . . . . .	0	
<b>Output</b>		<span style="border: 1px solid black; padding: 2px;">        0 0</span>
0/4...20 mA . . . . .	1	
0...10 mA . . . . .	3	
0... 5 mA . . . . .	5	
4...20 mA 4-wire circuit <sup>1)</sup> . . . . .	7	
<b>Power supply</b>		<span style="border: 1px solid black; padding: 2px;">        0 0</span>
Direct voltage . . . . .	1	
Universal current with TAZ suppressor diode <sup>1)</sup> . . . . .	2	
Universal current with electrical isolation and TAZ suppressor diode <sup>1)</sup> (only 4-wire circuit) . . . . .	3	
<b>Cable entry</b>		<span style="border: 1px solid black; padding: 2px;">        0 0</span>
Cable connector PG 9 . . . . .	3	
No cable connector <sup>1)2)</sup> . . . . .	4	
Plug connection (see Suppl. Nos. 415...418) <sup>1)</sup> . . . . .	5	

**Catalog No.**      1 4 4 3 2 - | | | | 0 0

If necessary, append the Suppl. Nos. to the Catalog Numbers.

<b>Additional opt. ordering information</b>	<b>Suppl. No.</b>
Other measuring ranges	
Upper value setting	302
0...7.5°/ 17°	
range as from	303
0...15°/ 75°	
0...60°/165°	304
0...150°/280°	305
0...220°/310°	306
Output signal increases	
when shaft turns towards the left	310
<b>Additional ordering information</b>	
Plug connection	
Sleeve case <sup>1)</sup>	
Straight, pin on TGE 5	415
Angled, pin on TGE 5	416
Straight, socket on TGE 5	417
Angled, socket on TGE 5	418
Pinout	
Acc. to TGS 40 connection diagram	420
Standard (connection diagram TGE 5 version)	421
<input type="checkbox"/> Add clear text	

1) Not for Ex version  
2) only 4-wire circuit, with the exception of 2-wire circuit with power supply direct voltage



**Accessories**

<b>Mounting accessories for TGE 5 (see dimensional drawings)</b>		<b>Catalog No.</b>
Set of mounting hardware for pressure gauge	1 Intermediate flange 1 Lever 1 Driver 1 Sealing ring	<b>14497-0373318</b>
Set of mounting hardware for drive unit		<b>14497-0381236</b>
Gear adapter with transmission ratio 1:1		<b>14491-8008357</b>
Gear adapter with transmission ratio 2:1		<b>14491-8008358</b>
Gear adapter with transmission ratio 4:1		<b>14491-8008359</b>
Gear adapter with transmission ratio 8:1		<b>14491-8008360</b>
Gear adapter with transmission ratio 16:1		<b>14491-8008361</b>
Gear adapter with transmission ratio 32:1		<b>14491-8008362</b>
Gear adapter with transmission ratio 64:1		<b>14491-8008363</b>
<b>Mounting accessories for TGM 5 (see dimensional drawings)</b>		
Mounting base		<b>14497-0381225</b>
Mounting flange		<b>14497-0381226</b>