

TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex Transmitter for angular position



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 (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 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

Environment conditions

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 perm., occasional
 TGM 5: < 90 % annual average, condensing permitted
 TGU 5: < 75 % annual average, condensing perm., 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, housing, mounting and safety

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

Electrical connections

Screw terminals for 2.5 mm²
 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 housing

Salt-water-proof cast aluminium
 Surface anodized
 TGE 5, TGE 5-Ex, TGU 5, TGU 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 housing to DIN 40050	Application class to DIN 40040	Max. shaft load permitted		required torque
			radial	axial	
TGU 5	IP 30/IP 00 ²⁾	HQE			≈ 0.15 Ncm (15 cmp)
TGU 5-Ex		HSE			
TGE 5	IP 54/IP 50 ¹⁾	HQR			≈ 0.3 Ncm (30 cmp)
TGM 5					
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 ¹⁾	HQR	300 N (30 kp)	900 N (90 kp)	Approx. 2 Ncm (200 cmp)
With ball bearing	IP 56/IP 50 ¹⁾	HQR	200 N (20 kp)	150 N (15 kp)	Approx. 0.6 Ncm (60 cmp)

- 1) On the shaft seal; seal for higher degree of protection
- 2) At cable end
- 3) only version V1443A-xx7xxxx
- 4) only version V1443A-xx73xxx

Electrical isolation	Power supply U _S	Max. current supply	Max. load	2-wire connection	3-wire connection	4-wire connection	Jumper Br3
No (nonly Ex)	12...20 V DC	24 mA	$\frac{U_S - 12V}{I_A}$	4...20 mA	—	—	open
No	13.2...36 V DC	24 mA	$\frac{U_S - 13,2V}{I_A}$	— — — 4...20 mA	0... 5 mA 0...10 mA 0...20 mA	0... 5 mA 0...10 mA 0...20 mA 4...20 mA ³⁾	closed closed closed open
No	13.2...26,4 V AC	24 mA	$\frac{U_S - 13,2V}{I_A} \cdot 1,4$	— — — —	— — — —	0... 5 mA 0...10 mA 0...20 mA 4...20 mA ³⁾	closed closed closed open
With	13.2...36 V DC	100 mA	600 Ω	— — — —	— — — —	0... 5 mA 0...10 mA 0...20 mA 4...20 mA ⁴⁾	closed closed closed open
With	13.2...26,4 V AC	100 mA	600 Ω	— — — —	— — — —	0... 5 mA 0...10 mA 0...20 mA 4...20 mA ⁴⁾	closed closed closed 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 1 2...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 20 V
Short-circuit current to 35 mA
Power to 0.7 W

Effective internal inductance between the terminals and housing (earth) ≤ 6 nF.

Effective internal inductance is negligible.

Output circuit

With type of protection „Intrinsic safety“
EEx ib IIC

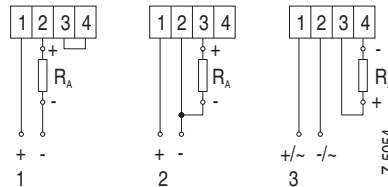
The power supply circuit and output circuit are identical for the 2-wire connection. In the event of a fault, the maximum values of the power supply circuit will also occur in the output circuit.

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

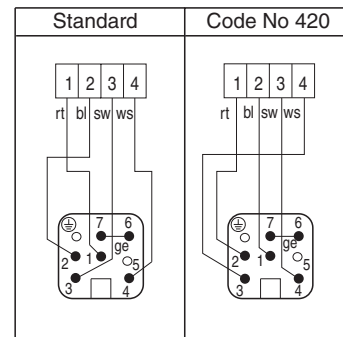
Terminal connection TGE 5, TGM 5



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

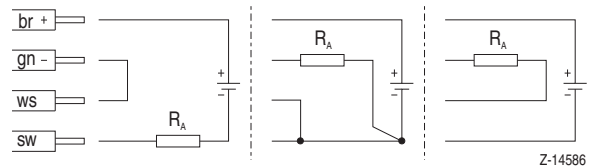
Plug connection TGE 5, TGM 5

TGE 5, TGM 5 only TGE 5



Z-13890 EN

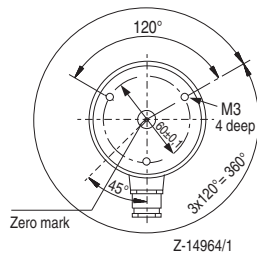
TGU 5



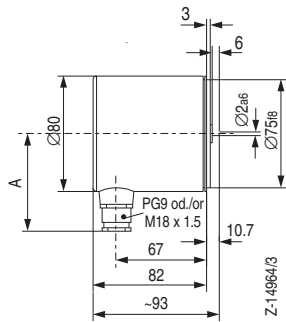
Two-wire connection Three-wire connection Four-wire connection

Dimensional drawings (Dimensions in mm)

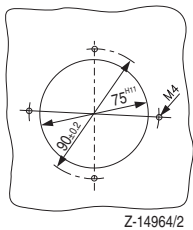
TGE 5, TGE 5-Ex



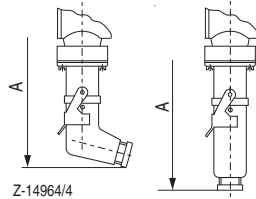
Drilling diagram for clamps



Version with plug connection



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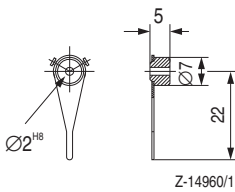


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	Cable entry		Plug connection	
	D46320-C4-Pg9-7-7	D89280-KM18x1.5-Z10	angled	straight
A	62	97	132	146

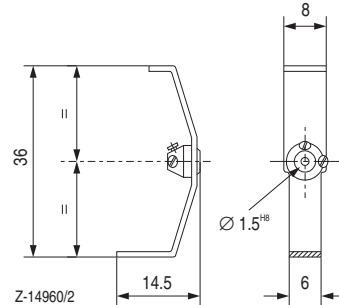
Mounting hardware

Level compl.



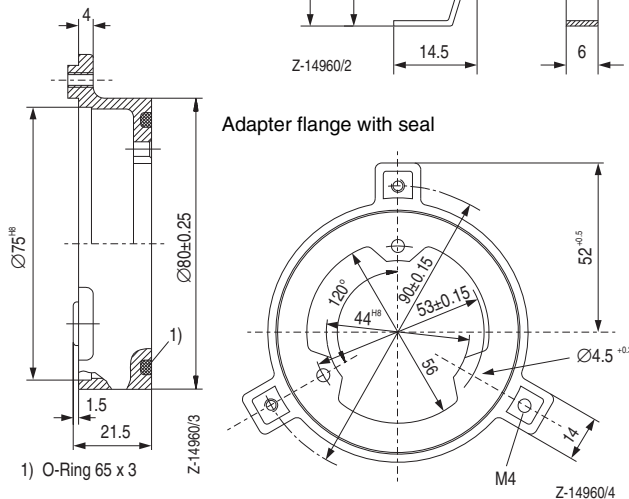
Z-14960/1

Driver compl.

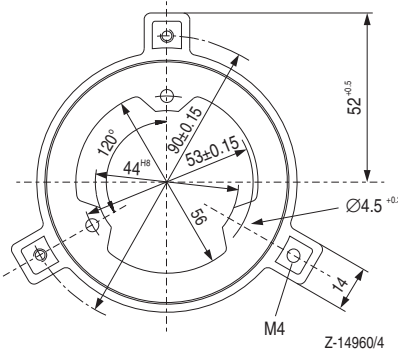


Z-14960/2

Adapter flange with seal

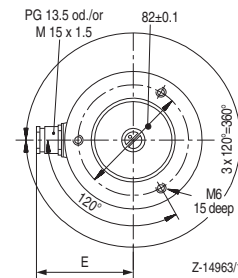


1) O-Ring 65 x 3 Z-14960/3

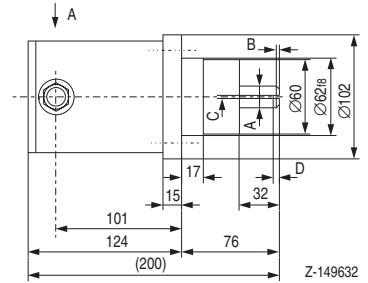


Z-14960/4

TGM 5

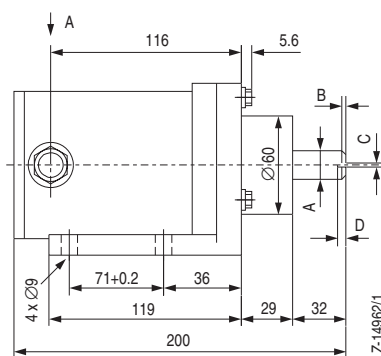


View A
Version with plug connection

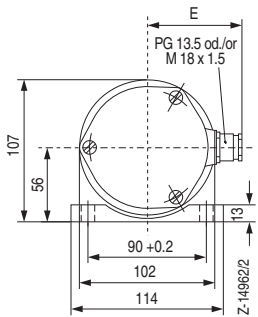


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TGM 5 base-mounted

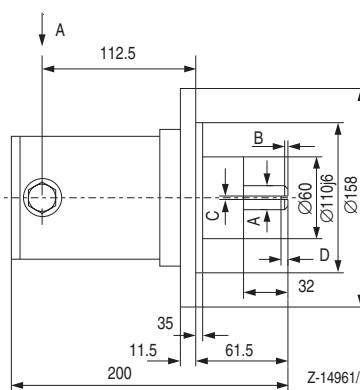


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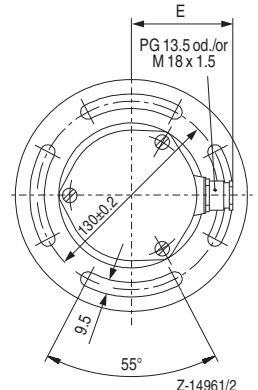


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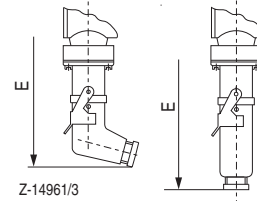
TGM 5 flange-mounted



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Z-14961/2



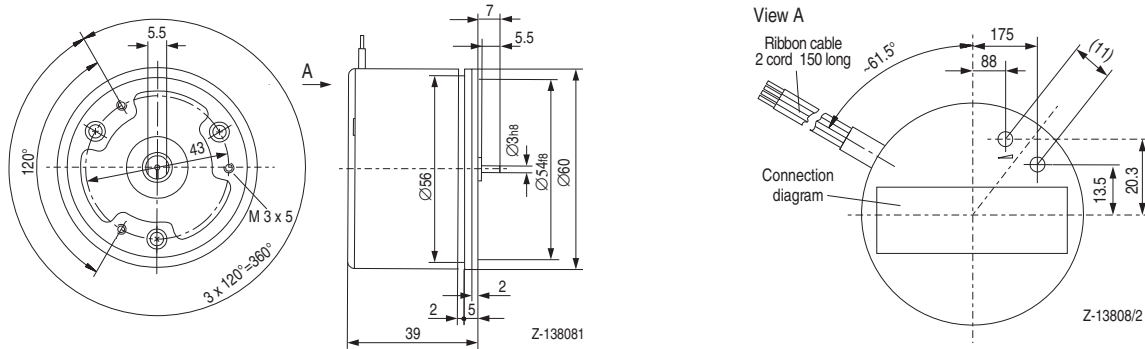
Z-14961/3

	TGM 5	
	friction bearing	ball bearing
A	Ø 19 _{f8}	Ø 10 _{f8}
B	1 × 45°	0.5 × 45°
C	3 ± 0.1	—
D	3.5 ± 0.1	—

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

Dimensional drawing (Dimensions in mm)

TGU 5, TGU 5-Ex



**TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex
Transmitter for angular position**

10/14-1.23 EN

Stock versions						
Version	Measuring range	Power supply	Bearing	Catalog No.		
Transmitter TGE 5, TGE 5-Ex						
Standard	0...270°	24 V UC	-	V14432A-1712300		
Intrinsic. safe	0...270°	24 V UC	-	V14432A-5711300		
Transmitter TGM 5						
Standard	0... 30°	24 V UC	friction bearing with sealing	V14436A-1312110		
Standard	0... 60°	24 V UC	friction bearing without sealing	V14436A-1412120		
Standard	0... 90°	24 V UC	friction bearing with sealing	V14436A-1512110		
Standard	0... 90°	24 V UC	friction bearing without sealing	V14436A-1512120		
Standard	0...270°	24 V UC	friction bearing with sealing	V14436A-1712110		
Standard	0...270°	24 V UC	friction bearing without sealing	V14436A-1712120		

**TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex
Transmitter for angular position**

10/14-1.23 EN

Ordering information										
					Catalog No.				Code	
Transmitter TGU 5					V14437A-			0	0	0
Design										
Standard					1					
Intrinsically safe EEx ib					5					
Measuring range										
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 Code-Nos. 302...306					0					
Output										
0/4...20 mA					1					
0...10 mA					3					
0... 5 mA					5					
4...20 mA 4-wire circuit ¹⁾					7					
Additional ordering information										
Other measuring ranges										
Upper value setting range as from										
0... 7,5°/17° adjusted to: ... (clear text)										302
0... 15°/75° adjusted to: ... (clear text)										303
0... 60°/165° adjusted to: ... (clear text)										304
0...150°/280° adjusted to: ... (clear text)										305
0...220°/310° adjusted to: ... (clear text)										306
Output signal increases when shaft turns towards the left (>150°)										310
Operating manual (state total quantity) ²⁾										
German (no indication for 1 manual)										Z1D
English (no indication for 1 manual)										Z1E
French (no indication for 1 manual)										Z1F

¹⁾ Not for Ex-version

²⁾ 1 manual at no extra cost

TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex
Transmitter for angular position

10/14-1.23 EN

Ordering information									
					Catalog No.			Code	
Transmitter TGM 5					V14436A-			0	
Design									
Standard					1				
Marine GL Certificate (cable connector M 18 x 1.5)					3				
Intrinsically safe EEx ib					5				
Measuring range									
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 Code-Nos. 302...306					0				
Output									
0/4...20 mA					1				
0...10 mA					3				
0... 5 mA					5				
4...20 mA 4-wire circuit ¹⁾					7				
Power supply									
Direct voltage					1				
Universal current with TAZ suppressor diode ¹⁾²⁾					2				
Universal current with electr. Isolation and TAZ suppressor diode ¹⁾ (only 4-wire-circuit)					3				
Cable entry									
Cable connector PG 13.5					1				
Cable connector M 18 x 1.5					2				
Plug connection (see Code-Nos. 415...416) ¹⁾					5				
Shaft bearings									
Friction bearing with sealing ring					1				
Friction bearing without sealing ring					2				
Ball bearing					3				
Additional ordering information									
Other measuring ranges									
Upper value setting range as from									
0... 7,5°/17° adjusted to: ... (clear text)							302		
0... 15°/75° adjusted to: ... (clear text)							303		
0... 60°/165° adjusted to: ... (clear text)							304		
0...150°/280° adjusted to: ... (clear text)							305		
0...220°/310° adjusted to: ... (clear text)							306		
Output signal increases when shaft turns towards the left (>150°)							310		
Plug connection (see Code-Nos. 415...416) ¹⁾									
Sleeve case ¹⁾									
straight, pin on TGM 5							415		
angled, pin on TGM 5							416		
Operating manual (state total quantity) ³⁾									
German (no indication for 1 manual)							Z1D		
English (no indication for 1 manual)							Z1E		
French (no indication for 1 manual)							Z1F		

¹⁾ Not for Ex-version

²⁾ only 4-wire-circuit, with the exception of 2-wire circuit with power supply direct voltage

³⁾ 1 manual at no extra cost

TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex
Transmitter for angular position

10/14-1.23 EN

Ordering information									
					Catalog No.			Code	
Transmitter TGE 5					V14432A-			0 0	
Design									
Standard					1				
Intrinsically safe EEx ib					5				
Measuring range									
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 Code-Nos. 302...306					0				
Output									
0/4...20 mA					1				
0...10 mA					3				
0... 5 mA					5				
4...20 mA 4-wire circuit ¹⁾					7				
Power supply									
Direct voltage					1				
Universal current with TAZ suppressor diode ¹⁾					2				
Universal current with electrical isolation and TAZ suppressor diode ¹⁾ only 4-wire-circuit)					3				
Cable entry									
Cable connector PG 9					3				
No cable connector ¹⁾²⁾					4				
Plug connection (see Code-Nos. 415...418 ¹⁾ and 420 or 421)					5				
Additional ordering information									
Other measuring ranges									
Upper value setting range as from									
0... 7,5°/17° adjusted to: ... (clear text)					302				
0... 15°/75° adjusted to: ... (clear text)					303				
0... 60°/165° adjusted to: ... (clear text)					304				
0...150°/280° adjusted to: ... (clear text)					305				
0...220°/310° adjusted to: ... (clear text)					306				
Output signal increases when shaft turns towards the left (>150°)					310				
Plug connection, sleeve case ¹⁾									
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				
Measuring ranges									
measuring range 0...70°					307				
adjustable 0...40°/80°									
without cable gland for TGS 40 + parts (inkluding Code-No. 307)					410				
with mounted pointer for TGS 40					430				
Operating manual (state total quantity) ³⁾									
German (no indication for 1 manual)					Z1D				
English (no indication for 1 manual)					Z1E				
French (no indication for 1 manual)					Z1F				

¹⁾ Not for Ex-version

²⁾ only 4-wire-circuit, with the exception of 2-wire circuit with power supply direct voltage

³⁾ 1 manual at no extra cost

**TGE 5, TGE 5-Ex, TGM 5, TGM 5-Ex, TGU 5, TGU 5-Ex
Transmitter for angular position**

10/14-1.23 EN

Accessories				
	Catalog No.	Code		
Mounting accessories for TGE 5 (see dimensional drawings)				
Set of mounting hardware for pressure gauge: 1 intermediate flange 1 lever 1 driver 1 sealing ring	14497-0373318			
Set of mounting hardware for drive unit: lever and driver	14497-0381236			
Gear adapter with transmission ratio 1:1	14491-8008357			
Gear adapter with transmission ratio 2:1	14491-8008358			
Gear adapter with transmission ratio 4:1	14491-8008359			
Gear adapter with transmission ratio 8:1	14491-8008360			
Gear adapter with transmission ratio 16:1	14491-8008361			
Gear adapter with transmission ratio 32:1	14491-8008362			
Gear adapter with transmission ratio 64:1	14491-8008363			
Mounting accessories for TGM 5 (see dimensional drawings)				
Mounting base	14497-0381225			
Mounting flange	14497-0381226			
Operating manual (state total quantity) ¹⁾ German (no indication for 1 manual) English (no indication for 1 manual) French (no indication for 1 manual)		Z1D Z1E Z1F		

¹⁾ 1 manual at no extra cost

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