

# DIGITAL LENGTH GAUGES



## GMR SERIES

### Key-Features:

- High precision length gauges with photoelectric linear encoder
- Measurement ranges up to 50 mm
- Small range linearity up to 0.5  $\mu\text{m}$
- Repeatability up to 0.3  $\mu\text{m}$
- Resolution up to 0.1  $\mu\text{m}$
- Incremental output RS-422
- Protection class IP67

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## TECHNICAL DATA

Measurement range	[mm]	10		25		50
Linearity <sup>1)</sup>	[ $\mu\text{m}$ ]	0.8+L/50	1.5+L/50	0.8+L/50	1.5+L/50	1.5+L/50
Linearity at small range <sup>2)</sup>	[ $\mu\text{m}$ ]	0.5				
Repeatability	[ $\mu\text{m}$ ]	0.3				
Resolution	[ $\mu\text{m}$ ]	0.1	1	0.1	1	1
Response speed max.	[mm/s]	400	1500	400	1500	1500
Measurement force max.	[N]	probe tip points down: 1.4 probe tip points horizontal: 1.3 probe tip points up: 1.2		probe tip points down: 4.6 probe tip points horizontal: 4.3 probe tip points up: 4		probe tip points down: 5.7 probe tip points horizontal: 5.3 probe tip points up: 4.9
Output signal		90° phase difference, differential square wave (RS-422 equivalent)				
Signal pitch	[ $\mu\text{m}$ ]	0,4	4	0,4	4	4
Edge distance min.		250 ns (4 MHz)	500 ns (2 MHz)	250 ns (4 MHz)	500 ns (2 MHz)	500 ns (2 MHz)
Reference signal (Z phase) <sup>3)</sup>	[mm]	approx. 3		approx. 5		
Repeatability reference signal	[ $\mu\text{m}$ ]	$\leq 0.5 \mu\text{m}$ (at a constant reference point passing speed less than 300 mm/s in the same direction)				
Supply		5 $\pm$ 0.2 VDC (ripple voltage max. 200 mV <sub>pp</sub> )				
Connection		cable, 2 m with Hirose connector, 10 pins				
Protection class		IP67				
Operating temperature	[°C]	0...+50				
Storage temperature	[°C]	-10...+60				
Humidity	[%]	20...80 (relative, no condensation)				
Probe tip		carbide ball $\varnothing 3 \text{ mm}$				
Weight	[g]	260		300		400

<sup>1)</sup> L = actual measured length in mm

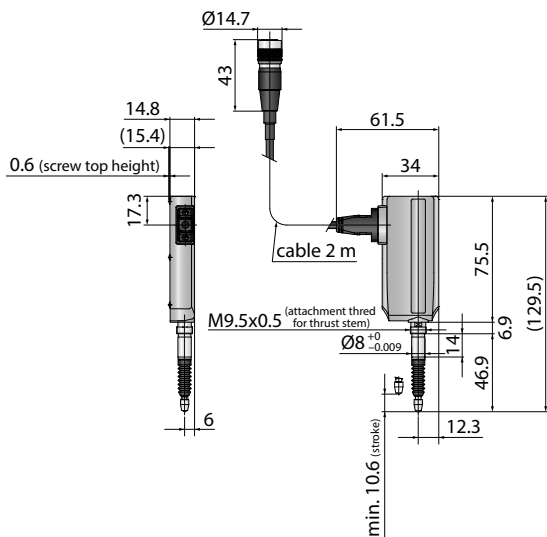
Example for linearity 0.8+L/50: For a actual measured length of 5 mm the linearity is 0.9  $\mu\text{m}$ .

<sup>2)</sup> within a measured length of 20  $\mu\text{m}$

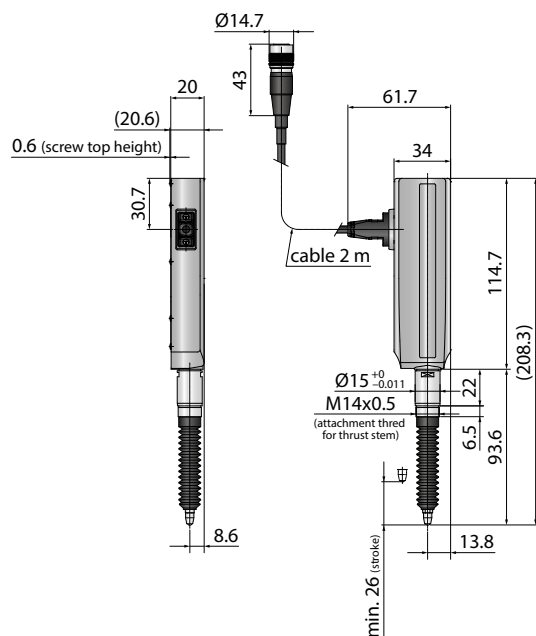
<sup>3)</sup> from lowest resting point

## TECHNICAL DRAWING

**GMR-10: measurement range 10 mm**

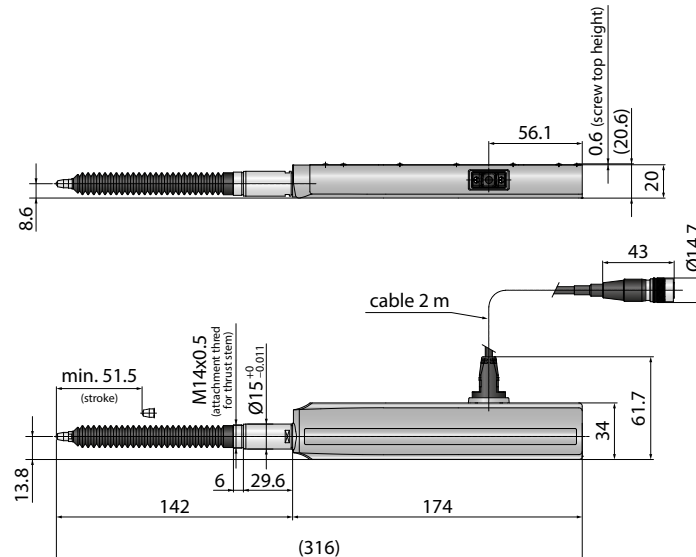


**GMR-25: measurement range 25 mm**



## TECHNICAL DRAWING

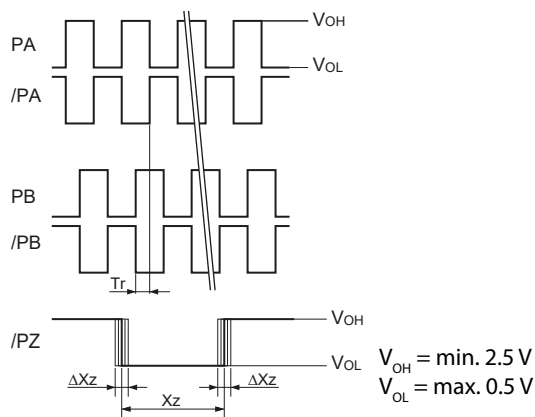
### GMR-50: measurement range 50 mm



## SIGNAL DESCRIPTION

Digital length gauges of the GMR series provide the following two output signal:

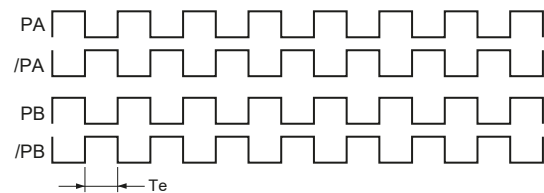
#### Normal output signal:



- Output condition: Speed of rod movement  $\leq$  Sensor response speed
- $T_r$  = Edge distance (see table below)
- Output delay time: Not more than 1  $\mu$ s
- $\Delta X_z$  = Repeatability of reference signal  $\leq 0.5 \mu$ m
- $X_z$  = Reference signal pulse width approx. 40...60  $\mu$ m

#### Error output signal:

If an error occurs, PA, /PA, PB and /PB are put out in phase.



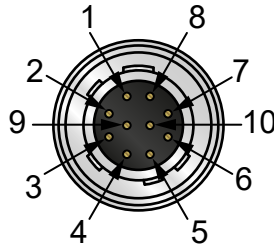
- Output conditions: The sensor enters the error state and the special pattern indicated in the figure above is output under the following conditions:  
Speed of rod movement  $>$  Sensor response speed
- $T_e$  = Edge distance (see table below)

Resolution	$T_r$	$T_e$
1 $\mu$ m	500 ns	500 ns
0.1 $\mu$ m	250 ns	500 ns

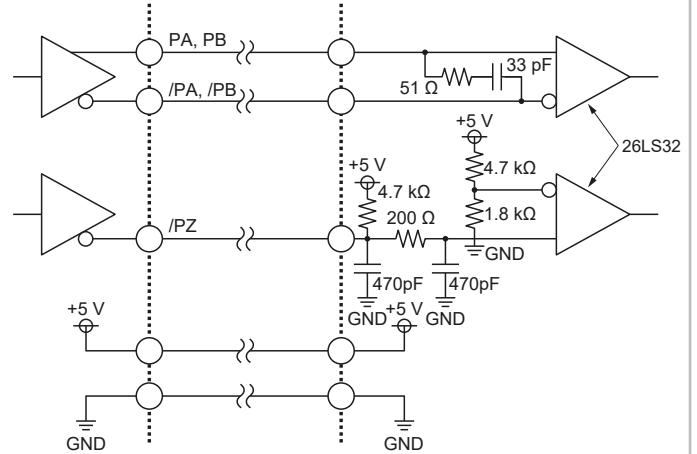
## ELECTRICAL CONNECTION

Connector type: Hirose HR10A-10P-10P, male

Function	Pin	Connection cable K10P2M-F-HR
PA	1	GN
/PA	2	YE
n. c.	3	-
PB	4	PK
/PB	5	GY
n. c.	6	-
n. c.	7	-
/PZ	8	RD
+V	9	BN
GND	10	WH
Shield	Housing	Housing



Circuit diagram



## ORDER CODE

GMR - [ ] - [ ]

Measurement range	
0...10 mm	10
0...25 mm	25
0...50 mm <sup>1)</sup>	50

	Resolution
1	1 μm
01	0.1 μm <sup>1)</sup>

<sup>1)</sup> Measurement range 50 mm not in combination with resolution 0.1 μm

## MODELS

GMR-10-1	Measurement range 0...10 mm, resolution 1 μm
GMR-25-1	Measurement range 0...25 mm, resolution 1 μm
GMR-50-1	Measurement range 0...50 mm, resolution 1 μm

GMR-10-01	Measurement range 0...10 mm, resolution 0.1 μm
GMR-25-01	Measurement range 0...25 mm, resolution 0.1 μm

## ACCESSORIES

**Cable with Hirose connector (female), 10 poles, shielded**

K10P2M-F-HR 2 m, straight connector

**Digital displays for sensors with HTL or TTL output, 2 channel**

WAY-DXM-S touch screen, supply: 18...30 VDC

WAY-DXM-AC touch screen, supply: 115...230 VAC

For more information and options please refer to the [WAY-DXM data sheet](#).

Subject to change without prior notice.

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