

Long length linear scale

TGM190

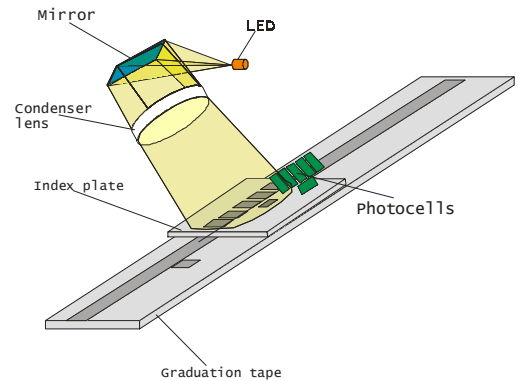


GENERAL DESCRIPTION:

The TGM 190 is an optoelectronic incremental long length linear scale; applied in numerous industrial areas for high-precision measuring of positions (machine tool industry, positioning systems, robotics, etc.)

- Measuring lengths:** 3640 mm ÷ 30040 mm
- Cross section:** 50 x 58.5 mm
- Accuracy:** ± 10 µm/m
- Resolution:** 1, 2, 5, 10 µm
- Output signals:**
 - DS (square inverted signals RS 422 standard)
 - SI (sine-wave current signals)
 - SV (sine - wave voltage 1V pp signals)

OPERATING PRINCIPLE:



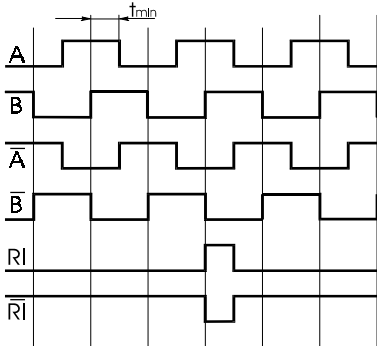
MECHANICAL DATA:

Standard measuring length "Lm"	3640 mm ÷ 30040 mm in 200 mm steps segment lengths: 1000, 1200, 1400, 1600, 1800, 2000 mm
Reference mark	Standard: Every 100 mm selectable by magnet selector Option: Distance Coded Reference Mark – 80 mm pitch
Accuracy class	± 10 µm/m
Interval	40 µm
Resolution	1, 2, 5, 10 µm
Maximal speed	120 m/min
Permissible acceleration	30 m/s ²
Moving force for scanning unit	≤ 6N
Degree of mechanical protection	IP 53, IP 64 (in compliance with mounting instructions)
Vibrations (50...2000 Hz)	≤ 300 m/s ²
Shocks (11ms)	≤ 300 m/s ²
Temperature	operating: 0°C to 50°C storage: -20°C to 70°C
Permissible relative humidity	20% - 70%
Cable length	standard 3 m, extension on order to 20 m (SI output signals), extension on order to 50 m (DI, DS output signals), 150 m SV
Mass	1.8 kg + 3.3 kg/m measuring length

Output signals	Voltage U _n	Current I _n
DS - square wave inverted RS422A standard	5 V ± 5%	≤ 150 mA
SV - sine-wave voltage 1Vpp	5 V ± 5%	≤ 100 mA
SI - sine-current wave	5 V ± 5%	≤ 100 mA

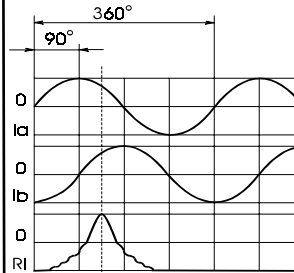
ELECTRICAL DATA:

Square-wave signals with inverted signals and RS 422A - DS:

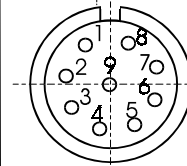


DS (RS - 422 A)	
$I_{sink} = 20 \text{ mA}$	$U_{OL} \leq 0,5 \text{ V}$
$I_{source} = -20 \text{ mA}$	$U_{OH} \geq 2,5 \text{ V}$
$t_{tLH} = t_{tHL} \leq 30 \text{ ns};$ without load	

Sinusoidal output signals (SI):



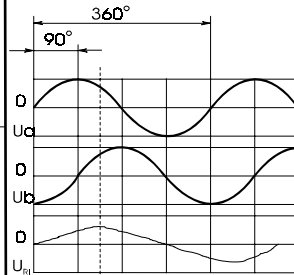
Amplitude of signals
$I_b = I_a = 7 - 16 \mu\text{A}_{pp}$ at load 1 kOhm
$I_{ri} = 2 - 8 \mu\text{A}_{pp}$ used component
Phase - shift of signals I_a and I_b :
$j = 90^\circ \pm 15^\circ f < 15 \text{ kHz}$
$j = 90^\circ \pm 30^\circ f = 60 \text{ kHz}$



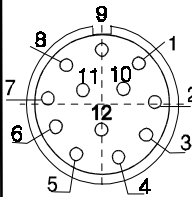
9 pole connector (Contact) square-wave output signals

contact	1	2	3	4	5	6	7	8	9
signal	I_{a+}	I_{a-}	+5V	0V	I_{b+}	I_{b-}	I_{ri+}	I_{ri-}	shield

Sine-wave voltage signals, 1Vpp (SV):

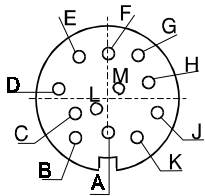


Amplitude of signals
$U_b = U_a = 0,6 - 1,2 \text{ V}_{pp}$
$U_{ri} = 0,5 \text{ V}_{pp}$ on termination imp. 120Ohm



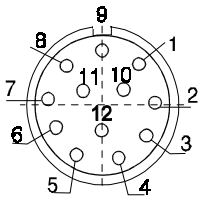
12 pole connector (Contact) sine-wave voltage 1Vpp signals

contact	1	2	3	4	5	6	7	8	9	10	11	12
signal	U_b	sense +5V	U_{RI+}	U_{RI-}	U_{A+}	U_{A-}		U_{B+}		0V	sense +5V	+5V



12 pole connector (Amphenol) square-wave output signals (DS)

contact	A	B	C	D	E	G	H	K	L
signal	shield	0V	A	\bar{A}	B	RI	\bar{RI}	+V	\bar{B}



9 pole connector (D-Sub) square-wave output signals (DI)

contact	1	2	3	4	5	6	7	8	9
signal	shield	\bar{RI}	\bar{B}	\bar{A}	+5V	RI	B	A	0V

*cables shield is connected to the connector's housing

ORDERING DATA:

Standard requirements							Special requirements			
TGM190	-XX-	X-	XX-	X-	X-	XXXXX	XX-	X-	X-	X-
										<p>Air inlet connection [special requirement]: 0 ... without 1 ... with</p> <p>Metal flexible tube: 0 ... without 1 ... with</p> <p>Connector is defined with electrical versions DS, SV or SI: 1 ... Amphenol 12 pole (DS) 3 ... Contact 9 pole (male screw) (SI) 4 ... Contact 12 pole (female screw) (DS, SV) 5 ... Contact 9 pole (female screw) (SI) 6 ... Contact 12 pole (male screw) (DS, SV) 7 ... D-Sub 9 pole 9 ... other (specify) 0 ... without connector</p> <p>Cable length in [m]: Standard 3 m : 03 Example: 1.5 m : 1.5 25 m : 25</p> <p>Measuring length: Standard length</p> <p>Accuracy: 0 ... ±10 µm</p> <p>Reference mark: 0 ... without 2 ... selectable by magnet selector 4 ... DCR (80 mm pitch) 5 ... every 100 mm</p> <p>Output signals: DS, SI, SV</p> <p>Resolution (DS): 1 ... 1 µm 2 ... 2 µm 5 ... 5 µm 10 ... 10 µm</p> <p>Periode (SI,SV): 40 ... 40 µm</p> <p>Voltage supply: 05 ... 5V</p>
							<p>Remark Standard delivery includes:</p> <p>3 m cable length</p> <p>12 pole CONTACT connector (for DS) or 9 pole Contact connector female screw (for SI) or Contact 12 pole female screw (for SV)</p> <p>Air inlet connection</p>			

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