

NC- INCREMENTAL LINEAR SCALES

TGM133

With thermal expansion compensation

The TGM 133 is an optoelectronic incremental sealed linear scale, with thermal expansion compensation, applied in numerous industrial areas for high-precision measuring of positions (NC-machine tools, positioning systems, robotics, etc.)

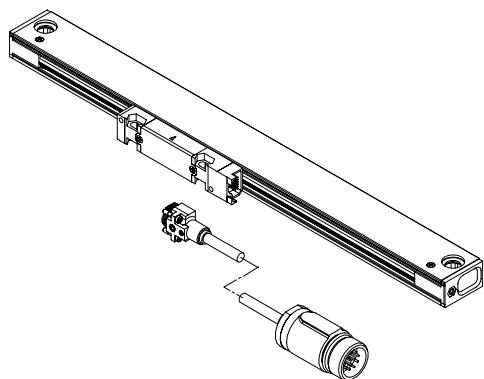
Measuring lengths: 70 to 1240 mm ,1340 to 2040 mm with mounting bar

Cross section: 18 x 32 mm (46 mm), 28 x 40 mm (51 mm) with mounting bar

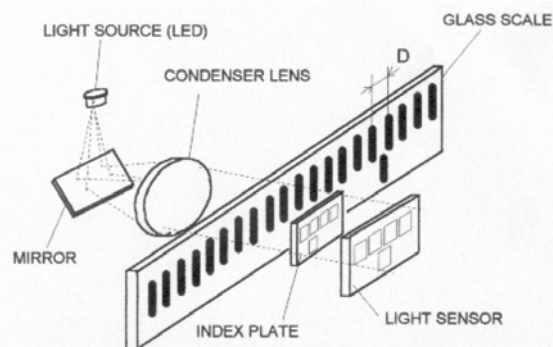
Accuracy: ± 5 , $\pm 3\mu\text{m}$

Resolution: 0.1, 0.5, 1 μm (for DS)

Outside appearance:



OPERATING PRINCIPLE:



MECHANICAL DATA:

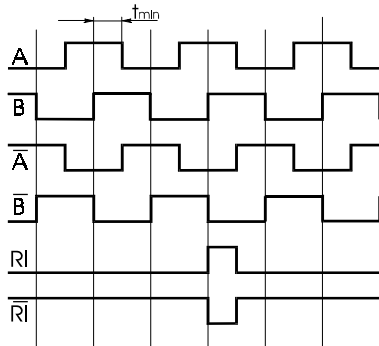
Standard measuring length "Lm" (mm)	Mounting bar recommended: 70/120/170/220/270/320/370/420/470/520/570/620/720/820/920/1020/ 1140/1240 Mounting bar required:1340/1440/1540/1640/1740/1840/1940/2040/
Reference mark	Distance Coded Reference Mark (standard) Optional at spacing of approx 10 mm along the measuring length
Accuracy class	$\pm 5\ \mu\text{m}$, $\pm 3\ \mu\text{m}$
Interval	20 μm
Resolution	0,1 μm , 0.5 μm , 1 μm for DS output signals 0,1 μm , 0.5 μm , 1 μm for SV output signals (recommended)
Maximal speed	120 m/min
Permissible acceleration	30 m/s ²
Moving force for scanning unit	$\leq 2\text{N}$
Degree of mechanical protection	IP 53 (in compliance with mounting instructions), IP64 (with compressed air purge)
Vibrations (50...2000 Hz)	$\leq 100\ \text{m/s}^2$ to $\leq 200\ \text{m/s}^2$ (with mounting bar, option)
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 (for SI signals),extension on order to 50 m (DS signals), extension on order to 150 m (SV signals)
Mass	0.45 kg + 0.65 kg/m

ELECTRICAL DATA:

Output signals	Voltage U_n	Current I_n
DS - square-wave inverted RS422A standard	5 V $\pm 5\%$	$\leq 150\ \text{mA}$
SV - sine-wave voltage 1Vpp	5 V $\pm 5\%$	$\leq 100\ \text{mA}$
SI - sine-wave current	5 V $\pm 5\%$	$\leq 100\ \text{mA}$

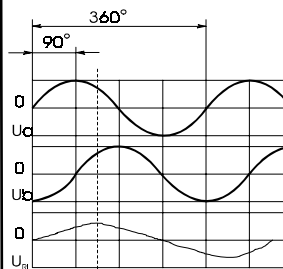
ELECTRICAL DATA:

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

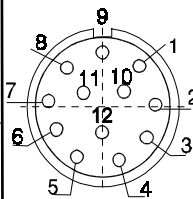


DS (RS - 422 A)			
I_{sink}	= 20 mA	U_{OL}	$\leq 0,5 \text{ V}$
I_{source}	= -20mA	U_{OH}	$\geq 2,5 \text{ V}$
t_{rLH}	$= t_{rHL} \leq 30 \text{ ns}$	without load	

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



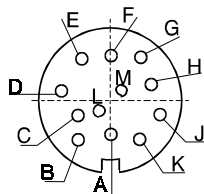
Amplitude of signals	
$U_b = U_a$	= 0,6 - 1,2 V _{pp}
U_{ri}	= 0,2 - 0,85 V _{pp}



**12 pole connector (Contact)
sine-wave output signals, 1Vpp**

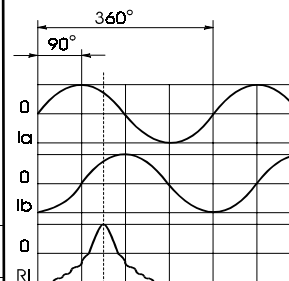
contact	1	2	3	4	5	6	7	8	9	10	11	12
signal	U_b	sense +5V	U_{RI+}	U_{RI-}	U_{A+}	U_{A-}	shield	U_{B+}		0V	sense 0V	+5V

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



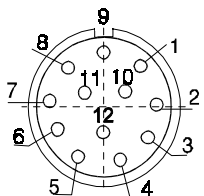
contact	A	B	C	D	E	G	H	K	L
signal	shield	0V	A	$\bar{A}$	B	RI	$\bar{RI}$	+V	$\bar{B}$

Sinusoidal output signals - SI:



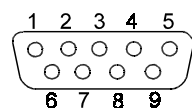
Amplitude of signals	
$I_b = I_a$	= 7 - 16 μA_{pp} at load 1 kOhm
I_{ri}	= 2 - 8 μA_{pp} used component

**12 pole connector (Contact)
square-wave output signals (DS)**



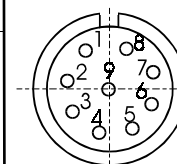
contac	1	2	3	4	5	6	7	8	9	10	11	12
signal	$\bar{B}$	sense +5V	RI	$\bar{RI}$	A	$\bar{A}$	5V	B	shield	0V	0V	+5V

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



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

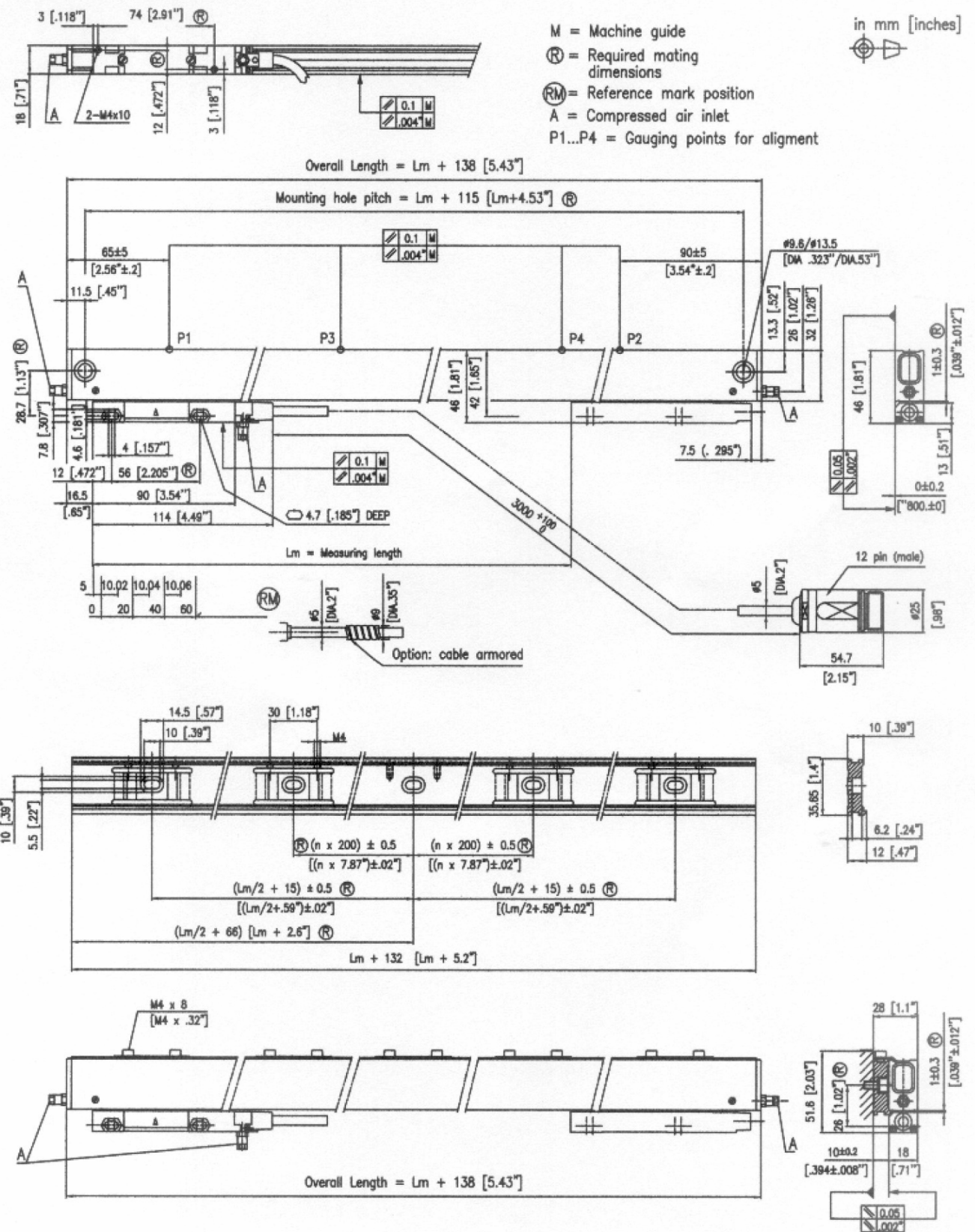
**9 pole connector (Contact)
square-wave output signals (SI)**



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

*cables shield is connected to the connector's housing

DIMENSIONS:



ORDERING DATA:

Standard requirements							Special requirements			
TGM133	- XX -	X -	XX -	X -	X -	XXXX-	XX-	X-	X-	X-
							Mounting bar 0 ... without 1 ... with			
							Metal flexible tube: 0 ... without 1 ... with			
							Connector is defined with electrical versions DS, SV or SI: 1 ... Amphenol 12 pole 3 ... Contact 9 pole (male screw) (DS, SV) 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 (DS) 9 ... other (specify) 0 without connector			
							Cable length in [m]: Standard 3 m : 03 Example: 1.5 m : 1.5 25 m : 25			
							Measuring length: Standard length			
							Accuracy: 3 ... $\pm 3 \mu\text{m}$ 5 ... $\pm 5 \mu\text{m}$			
							Reference mark: 0 ... without 1 ... in the middle 2 ... on agreement 4 ... Distance Coded RI			
							Output signals: DS, SI, SV			
							Resolution (DS): 0.1 ... 0.5 μm 0.5 ... 0.5 μm 1 ... 1 μm			
							Periode (SI,SV): 20 ... 20 μm			
							Voltage supply: 05 ... 5V			

Remark

Standard delivery includes:

3 m
cable without metal flexible tube

12 pole
Amphenol connector (for DS)

9 pole
Contact female screw connector (for SI) or

12 pole
Contact female screw connector (for SV)

Air inlet connection

Iskra Tela d.d.

Savska cesta 3, 1000 Ljubljana, SLOVENIA
 Phone: ++386-1-4733196, Fax: +386-1-4375516
 E-Mail: info@iskra-tela.si, www.iskra-tela.si