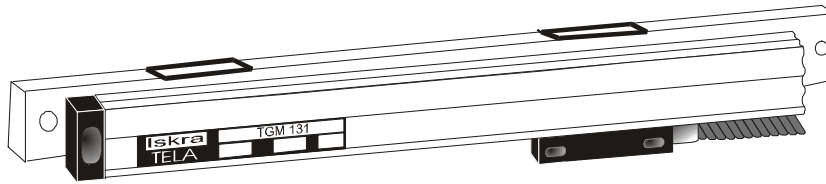


INCREMENTAL LINEAR SCALES

TGM 131

with mounting bar

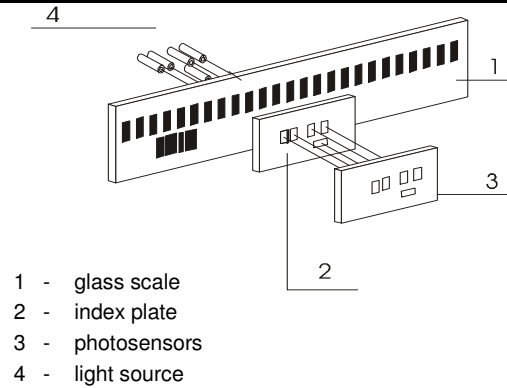


GENERAL DESCRIPTION:

The TGM 131 is an optoelectronic incremental sealed linear scale with mounting bar, applied in numerous industrial areas for high-precision measuring of positions (machine tool industry, positioning systems, robotics, etc.).

Measuring lengths: 70 to 1240 mm, 1340-2040mm with mounting bar
Cross section: 18 x 32 mm (46 mm), 28x40 (51) with m.bar
Accuracy: ± 10, ± 5, ± 3 µm
Resolution: 0.5, 1, 5, µm
Output signals: DO (square wave)
 DS (square inverted signals with RS422A)
 SI (sine-wave current signals)
 SV (sine wave 1 Vpp)

OPERATING PRINCIPLE:



MECHANICAL DATA:

Standard measuring length "Lm" (mm)	70/120/170/220/270/320/370/420/470/520/570 Mounting bar recommended: 620/670/720/770/820/920/1020/1140/1240 Mounting bar required: 1340/1440/1540/1640/1740/1840/1940/2040
Reference mark	Optional at spacing of 10 mm along the measuring length, Absolute Reference Impulse (ARI)
Accuracy class	±10 µm, ± 5 µm, ± 3 µm
Interval	20 µm
Resolution	0.5 µm, 1 µm, 5µm for DS output signals; 5µm for DO 12 V versions
Maximal speed	45 m/min continuously, 60 m/min temporarily
Permissible acceleration	30 m/s ²
Moving force for scanning unit	≤ 5N
Degree of mechanical protection	IP 53 (in compliance with mounting instructions); IP 64 with compressed air purge
Vibrations (50...2000 Hz)	30 m/s ² ,100 m/s ² (option)
Shocks (11ms)	100 m/s ²
Temperature	operating: 0°C to 50°C storage: -20°C to 70°C
Permissible relative humidity	20% - 70%
Cable length	standard 3m, extension on order to 20m (SI signals), extension on order to 50 m (DO, DS signals), extension on order to 150 m (SV signals)
Mass	0.45 kg + 0.65 kg/mwithout mounting bar 0.45 kg + 1.45 kg/mwith mounting bar

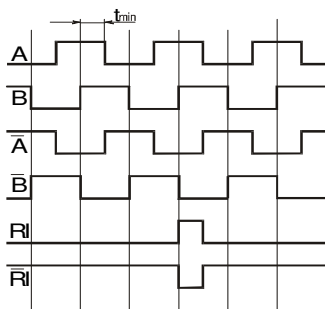
ELECTRICAL DATA:

Output signals	Voltage U _n	Current I _n
DS - square-wave inverted with RS422A	5 V ± 5%	≤ 130 mA
SI - sine-wave current	5 V ± 5%	≤ 70 mA
DO - square-wave	12 V ± 5%	≤ 120 mA
SV - sine wave voltage 1Vpp	5 V ± 5%	≤ 150 mA

with mounting bar

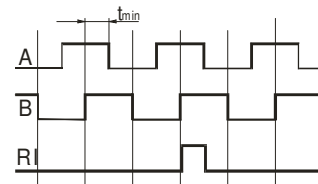
ELECTRICAL DATA:

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

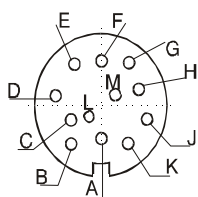


DS (RS-422 A)
$I_{\text{sink}} = 20 \text{ mA}$ $U_{\text{OL}} \leq 0.5 \text{ V}$
$I_{\text{source}} = -20 \text{ mA}$ $U_{\text{OH}} \geq 2.5 \text{ V}$
$t_{\text{LH}} = t_{\text{HL}} \leq 30 \text{ ns}$; without load

Square-wave output signals - DO:

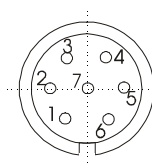


Signal level ...	HTL	Transition time:
$I_{\text{sink}} = 1 \text{ mA}$	$U_{\text{OL}} \leq 0.5 \text{ V}$	$t_{\text{LH}} = t_{\text{HL}} \leq 60 \text{ ns}$, without load
$I_{\text{source}} = 4 \text{ mA}$	$U_{\text{OH}} \geq 11 \text{ V}$	$t_{\text{min}} = f(v)$



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

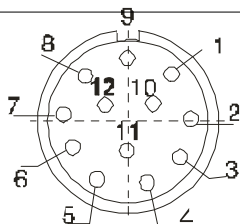
contact	A	B	C	D	E	G	H	K	L
signal	shield	0 V	A	\bar{A}	B	RI	\bar{RI}	+V	\bar{B}



7 pole connector (Amphenol) square-wave output signals (DO)

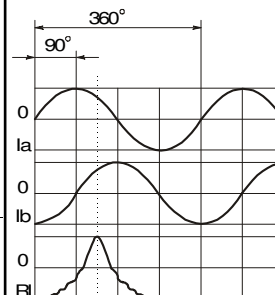
contact	1	2	3	4	5	6	7
signal	0 V		A	B	+V	RI	shield

Sinusoidal output signals - SI:



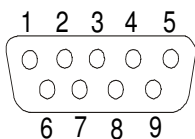
12 pole connector (Contact) square-wave output signals (DS)

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



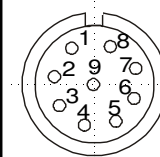
Amplitude of signals

$I_b = I_a = 7 - 16 \mu\text{A}_{\text{pp}}$ at load 1 kW
$I_{ri} = 2 - 8 \mu\text{A}_{\text{pp}}$ used component



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) sine-wave output signals (SI)

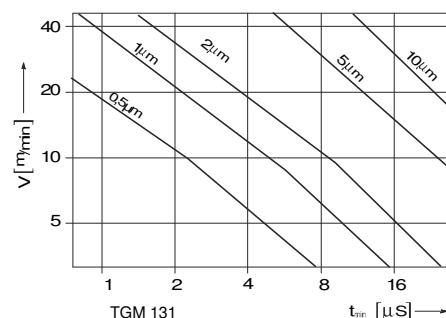
contact	1	2	3	4	5	6	7	8	9
signal	I_{a+}	I_{a-}	+5 V	0 V	I_{b+}	I_{b-}	I_{ri+}	I_{ri-}	shield

Sine wave voltage signals 1 V pp SV (remark: for details see Electrical DATA on page 28)

SPEED AND SCANNING UNIT

The maximum measuring speed allowed by the mechanical construction is given in the mechanical data table.

The dependence of minimum time interval between two neighboring fronts of square-wave output signals is given at right.

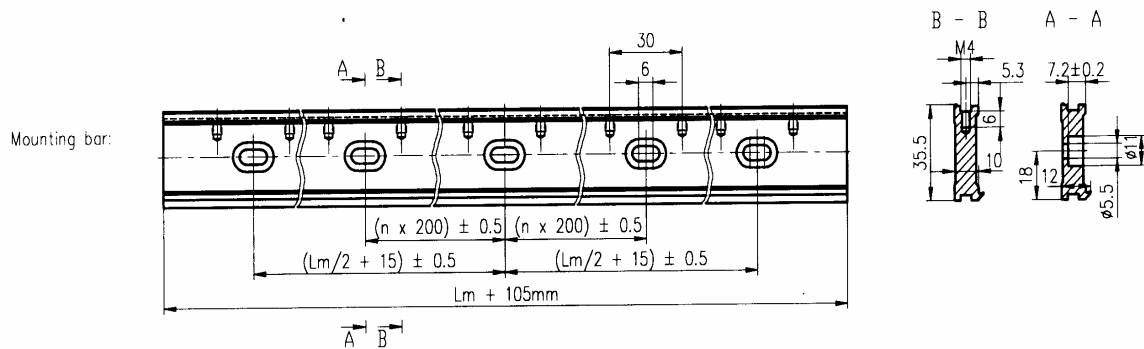
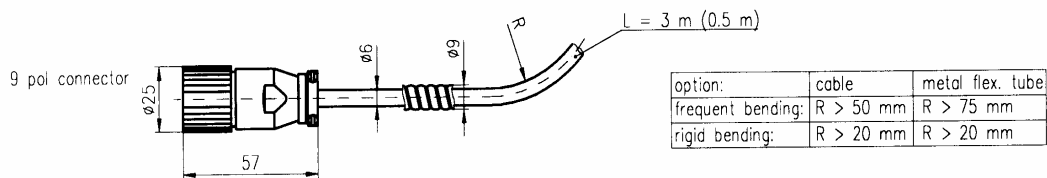
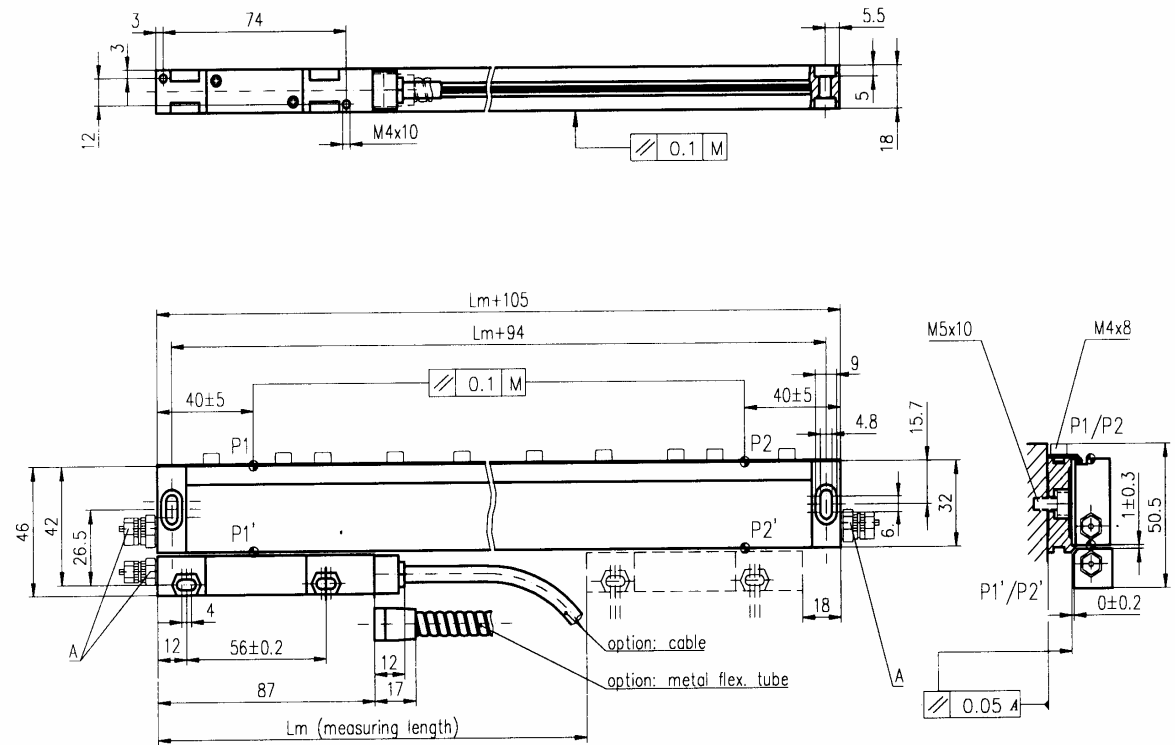


INCREMENTAL LINEAR SCALES

TGM131

With mounting bar

DIMENSIONS:



A - compressed air inlet
M - machine guide
P - gauging points for alignment

L_m	< 520	570-920	1020-1340	1440-1740	1840-2040
n	0	1	2	3	4

