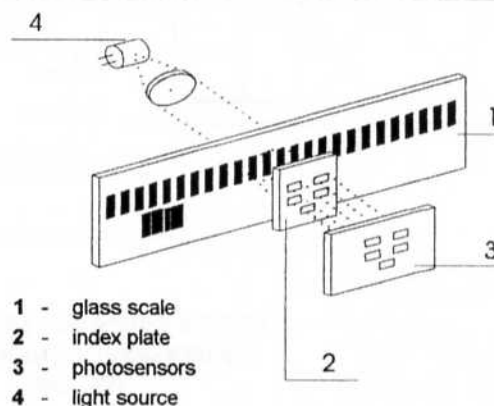


GENERAL DESCRIPTION:

The TGM 114 is an optoelectronic incremental sealed linear scale, applied in numerous industrial areas for high-precision measuring of positions (machine tool industry, positioning systems, robotics, etc.).

Measuring lengths: 220 to 3220 mm
Cross section: 37 x 57 mm (85 mm)
Accuracy: $\pm 10, \pm 5, \pm 3 \mu\text{m}$
Resolution: 0.5, 1, 2, 5, 10 μm
Output signals: DI (square wave inverted signals)
 DS (square inverted signals RS422 standard)
 SI (sine-wave current signals)

OPERATING PRINCIPLE:



MECHANICAL DATA:

Standard measuring length "Lm" (mm)	220/320/420/520/620/720/820/920/1020/1120/1220/1320/1420/1620/1720/1820/1920/2020/2220/2420/2620/2820/3020/3220
Reference mark	Standard position in centre. Other positions optional at spacing of 50 mm along the measuring length.
Accuracy class	$\pm 10 \mu\text{m}, \pm 5 \mu\text{m}, \pm 3 \mu\text{m}$
Interval	20 μm or 40 μm
Resolution	0,5 $\mu\text{m}, 1 \mu\text{m}, 2 \mu\text{m}, 5 \mu\text{m}, 10 \mu\text{m}$ (for DI,DS signals)
Maximal speed	45 m/min
Permissible acceleration	30 m/s^2
Moving force for scanning unit	$\leq 6\text{N}$
Degree of mechanical protection	IP 53 (in compliance with mounting instructions)
Vibrations (50...2000 Hz)	30 m/s^2
Shocks (11ms)	100 m/s^2
Temperature	operating: 0°C to 50°C storage: -30°C to 70°C
Permissible relative humidity	20% - 70%
Cable length	standard 3 m, extension on order to 50 m (DI,DS output signals), extension on order to 20m (SI output signals)
Mass	0,4 kg +2 kg/m measuring length

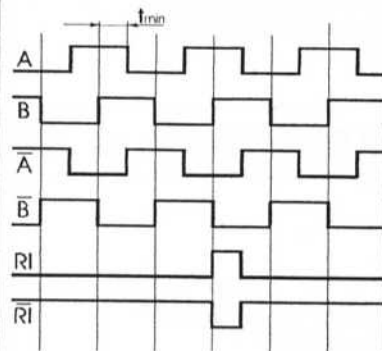
ELECTRICAL DATA:

Output signals	Voltage U_n	Current I_n
DS - square-wave inverted with RS422A	5 V $\pm 5\%$	$\leq 130 \text{ mA}$
DI - square-wave inverted	5 V $\pm 5\%$	$\leq 130 \text{ mA}$
SI - sine-wave current	5 V $\pm 5\%$	$\leq 120 \text{ mA}$

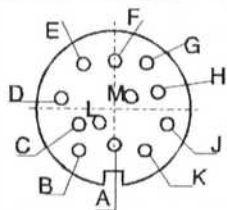
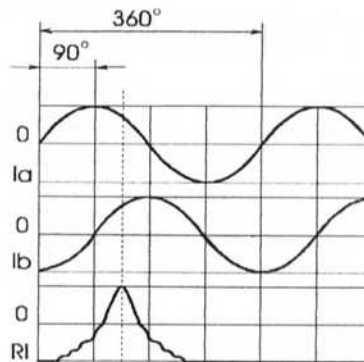
ELECTRICAL DATA:

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

Sinusoidal output signals (SI):



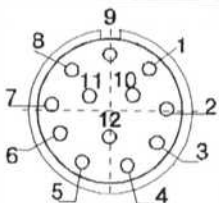
DS (RS- 422 A)	
$I_{sink} = 20 \text{ mA}$	$U_{OL} \leq 0,5 \text{ V}$
$I_{source} = -20 \text{ mA}$	$U_{OH} \geq 2,5 \text{ V}$
$t_{LH} = t_{HL} \leq 30 \text{ ns; without load}$	
DI	
$I_{sink} = 15 \text{ mA}$	$U_{OL} \leq 0,5 \text{ V}$
$I_{source} = -15 \text{ mA}$	$U_{OH} \geq 4,0 \text{ V}$
$t_{LH} = t_{HL} \leq 60 \text{ ns; without load}$	



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

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

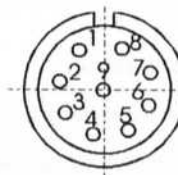
Amplitude of signals	
$I_b = I_a = 7 - 16 \mu A_{pp}$	at load $1 \text{ k}\Omega$
$I_{ri} = 2 - 8 \mu A_{pp}$	used component
Phase - shift of signals I_a and I_b :	
$\epsilon\tau = 90^\circ \pm 15^\circ$	$f < 15 \text{ kHz}$
$\epsilon\tau = 90^\circ \pm 30^\circ$	$f = 60 \text{ kHz}$



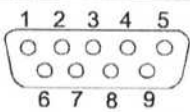
12 pole connector (Contact) square-wave output signals (DI, DS)

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

9 pole connector (Contact) square-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_n+	I_n-	shield



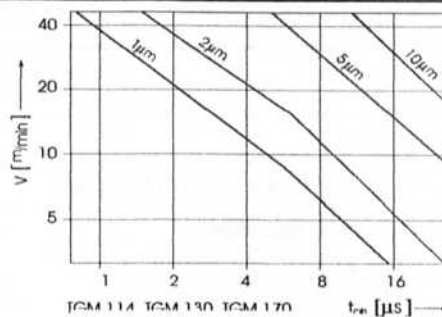
9 pole connector (D-Sub) square-wave output signals (DI,DS)

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

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.



ORDERING DATA:

Standard requirements

Special requirements

TGM114	- XX -	X -	XX -	X -	XX -	XXXX-	XX-	X-	X-	X-
--------	--------	-----	------	-----	------	-------	-----	----	----	----

Air inlet connection
[special requirement]:
0 ... without
1 ... with

Metal flexible tube:
0 ... without
1 ... with

Connector is defined with electrical versions DS, DI or SI:
1 ... Amphenol 12 pole
3 ... Contact 9 pole (male screw)
4 ... Contact 12 pole (female screw)
5 ... Contact 9 pole (female screw)
6 ... Contact 12 pole (male screw)
7 ... D-Sub 9 pole
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 ... ±3µm
5 ... ±5µm
0 ... ±10µm

Reference mark:
0 ... without
1 ... in the middle
2 ... on agreement

Output signals:
DI, DS, SI

Resolution (DI, DS):	Periode (SI):
0.5 ... 0.5 µm	20 ... 20 µm
1 ... 1 µm 5 ... 5 µm	40 ... 40 µm
2 ... 2 µm 10 ... 10 µm	

Voltage supply:
05 ... 5V

Remark

Standard delivery includes:

3 m
cable with flexible tube

12 pole
Amphenol connector
(for DI, DS)
or

9 pole
Contact connector
(female screw)
(for SI)

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