INCREMENTAL ANGLE ENCODERS TGR71

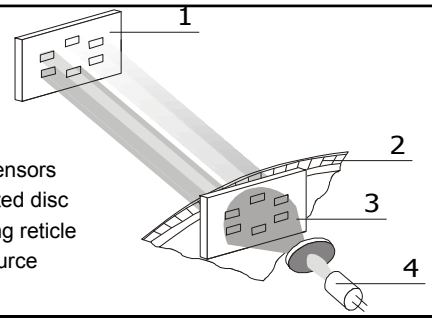
Optoelectronic 71.6

GENERAL DESCRIPTION:

The incremental angle encoders TGR 71 transform mechanical rotation to a series of electrical pulses. Operating principle is shown in the drawing below. Periodic signals of approximate sine-wave shape are generated on the photosensors via photoelectric scanning. Reference signal is generated on the similar way and can be unique or distance coded.

Number of lines: 16384, 18000; 36000
Reference mark: 1 or DCR (Distance coded)
Diameter: 170 mm
Accuracy: ± 1,5"
Output signals: DS (square wave signals, RS422)
SV (sine wave 1Vpp output signals)
SI (sine wave 11 µA signals)

OPERATING PRINCIPLE:



1 - photosensors
2 - graduated disc
3 - scanning reticle
4 - light source

APPLICATION AREA:

Incremental rotary encoders are applied in numerous industrial areas for high-precision measuring of angles, positions and rotation speed. Most frequent application areas: machine tool industry, positioning devices, robotics, telescopes, antennas etc.

MECHANICAL DATA:

Number of lines:		16384	18000	36000
Number of periodes SI, SV:		16384	18000	36000
Number of periodes DS: (with integrated interpolation electronics)			18000, 36000, 90000 180000, 450000, 900000	72000, 360000 1800000
DCR	**Number of reference marks:**		36	72
	Nominal increment (lines):		1000	1000
	Maximal rotation angle to determine position:		20°	10°

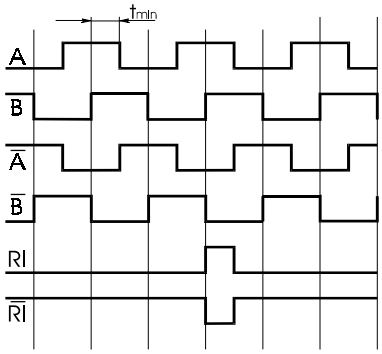
Admissible shaft loading	≤ 30N axial; ≤ 30N radial
Rotor inertia moment	≤ 3.7 x 10^{-4} kgm^2
Starting moment at 20°C	≤ 0.01 Nm
Life time of bearings	4 x 10^9 revolutions
Admissible rotation speed	1000 min^{-1}
Weight	3.5 kg
Operating temperature	0°C to 70°C
Relative humidity	max 95% (IP 64) (no condensation)
Protection class (IEC 60529)	IP 64
Shocks	300 m/s^2
Admissible vibrations (50 - 2000 Hz)	100 m/s^2

ELECTRICAL DATA:

Output signals	Voltage U_n	Current I_n	Max. cable length
DS - square wave inverted RS422A standard	5 V ± 5%	≤ 100 mA	50 m
SV - sine-wave voltage 1Vpp	5 V ± 5%	≤ 100 mA	150 m
SI - sine-current wave	5 V ± 5%	≤ 100 mA	30 m

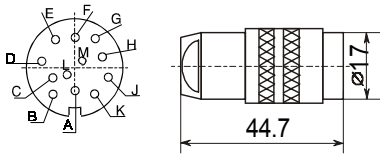
ELECTRICAL DATA:

Square-wave signals - DS (RS 422A):



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

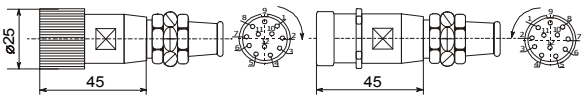
12 pole connector (Amphenol) square-wave output signals (DS)



contact	A	B	C	D	E	G	H	K	L
signal	shield	0V	A	Ā	B	RI	R̄I	+ V	B̄

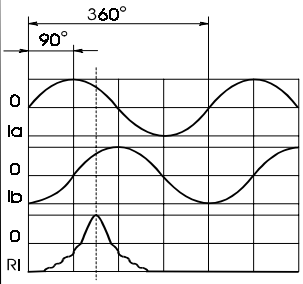
12 pole connector (Contact) square-wave output signals (DS)

connector or **coupling**



contac	1	2	3	4	5	6	7	8	9	10	11	12
signal	B̄	sense +5V	RI	R̄I	A	Ā	Ē	B		0V	sense +0V	+5V

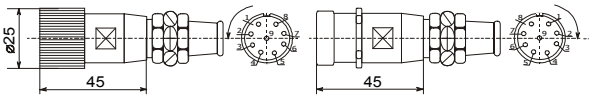
Sinusoidal output signals SI (11 µA):



Amplitude of signals
I_b = I_a = 7 - 16 μA_{pp} at load 1 kOhm
I_{ri} = 2 - 8 μA_{pp} used component
Phase - shift of signals I_a and I_b:
φ = 90° ± 10°

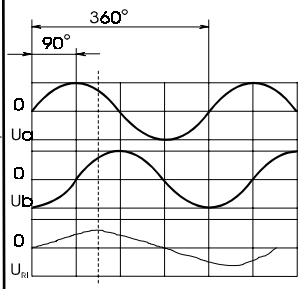
9 pole connector (Contact) sine-wave output signals SI

connector or **coupling**



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

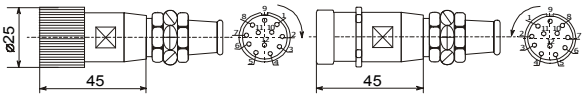
Sine-wave voltage signals, 1Vpp (SV):



Amplitude of signals
U_b = U_a = 0,6 - 1,2 V_{pp}
U_{ri} = 0,5 V_{pp} 0,2 - 0,8 V on termination imp. 120Ohm

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

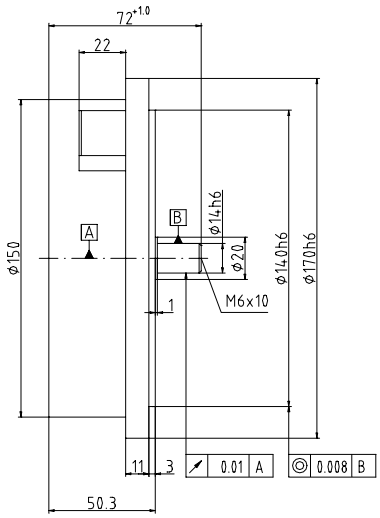
connector or **coupling**

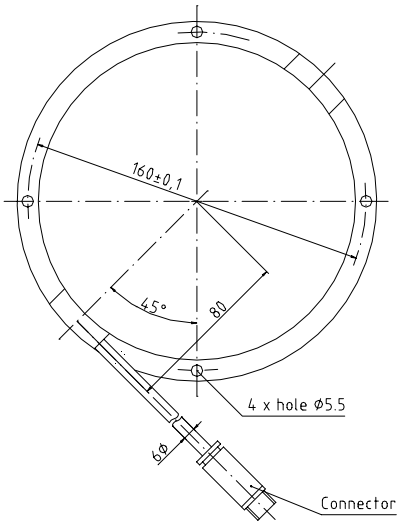


contact	1	2	3	4	5	6	7	8	9	10	11	12
signal	U_{b-}	sense +5V	U_{RI+}	U_{RI-}	U_{A+}	U_{A-}	—	U_{B+}	—	0V	sense +0V	+5V

DIMENSIONS:

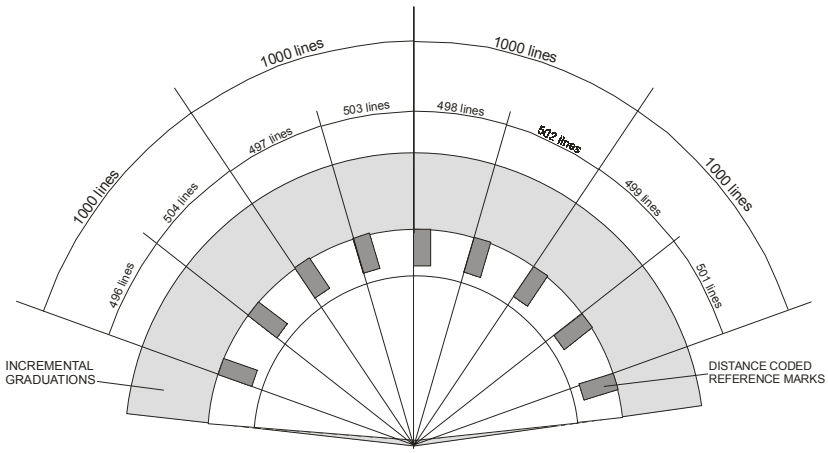
TGR 71.6





Cable length	3 m
Permanent bending radius	≥ 100 mm
Single bending radius	≥ 40 mm

DISTANCE CODED REFERENCE:



ORDERING DATA (example: TGR71.X_1-XX_2-XX_3-X_4-XX_5-$XXXXXX_6$-XX_7-X_8*)*

X_1	***Version:***	6 ... cable radial			
XX_2	***Voltage supply:***	05 ... 5V			
XX_3	***Output signals:***	DS	SI	SV	
X_4	***Reference mark:***	0 ... without 1 ... 1. reference 4 ... Distance Coded RI			
XX_5	**Accuracy:**	1.5... ± 1,5"			
$XXXXXX_6$	***No. of lines:***	Enter no. of lines (SI, SV) / output signal periods (DS) per revolution (see mechanical data)			
XX_7	***Cable length:***	Standard 03 ... 3 m Example: 1.5 ... 1.5 m 25 ... 25 m			
X_8	***Connector*** is defined with electrical versions: DS or SI, other type under special requirement	1 ... Amphenol 12 pole 2 ... Amphenol 7 pole	3 ... Contact 9 pole (COUPLING) 4 ... Contact 12 pole (CONNECTOR) 5 ... Contact 9 pole (CONNECTOR) 6 ... Contact 12 pole (COUPLING)	7 ... D-Sub 9 pole	9 ... other(specify) 0... without connector

Iskra TELA - SEM d.o.o.
Cesta dveh cesarjev 403, 1102 Ljubljana, SLOVENIA
Phone: ++386-1-4769824, Fax: +386-1-4769882
E-Mail: info@iskra-tela.si, www.iskra-tela.si