

Code ST04	Project A29-A	Release M	TECHNICAL DATASHEET
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OPTICAL SCALE NCS T (TTL)

GENERAL FEATURES

- Optical scale with glass measuring system (grating pitch 20 µm). Particularly suitable for CNC machines.
- Resolutions up to 0.1 µm.
- Adjustable connecting cable output.
- Connector incorporated into the transducer.
- Reference indexes at coded distance, or at constant step, with predetermined or selectable positions.
- Small size, to allow installation in narrow spaces.



MECHANICAL AND ELECTRICAL CHARACTERISTICS

MECHANICAL	Cod. NCS	T								
<ul style="list-style-type: none"> • Rugged and heavy PROFILE made of anodized aluminium. Dimensions 40x24 mm. • Elastic COUPLING for misalignment compensation and self-correction of mechanical hysteresis. Backlash error <0.2 mm. • Double level SEALING LIPS (internal and external) along the sliding side of the reader head. • READER HEAD, consisting of tie rod and reading block, with fully-protected place for electronic boards. • READING BLOCK sliding through ball bearings. • Die-cast TIE ROD, with chrome surface treatment. • GLASS SCALE placed in the scale housing. • Elastomeric GASKETS which allow to reproduce the full protection in mechanical joints (in case of disassembling). • Full possibility to disassemble and reassemble it. • Possibility of direct service. 	Measuring support Grating pitch Thermal expansion coefficient	glass scale 20 µm  $8 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$								
	Reference index	C = coded distance P = constant step (every 40 mm) E = selectable (every 20 mm)								
	Resolution	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td>T5</td> <td>T1</td> <td>T05</td> <td>T01</td> </tr> <tr> <td>5 µm</td> <td>1 µm</td> <td>0.5 µm</td> <td>0.1 µm</td> </tr> </table>	T5	T1	T05	T01	5 µm	1 µm	0.5 µm	0.1 µm
T5	T1	T05	T01							
5 µm	1 µm	0.5 µm	0.1 µm							
	Accuracy grade	± 3 µm * standard version ± 1 µm * high accuracy version								
	Measuring length ML in mm	70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 720, 770, 820, 920, 1020, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040, 3240 _{MAX}								
	Max. traversing speed	120 m/min **								
	Max. acceleration	30 m/s ²								
	Required moving force	≤ 4 N ≤ 2.5 N on request								
	Vibration resistance (EN 60068-2-6)	100 m/s ² [55 ÷ 2000 Hz]								
	Shock resistance (EN 60068-2-27)	150 m/s ² [11 ms]								
	Protection class (EN 60529)	IP 54 standard IP 64 pressurized								
	Operating temperature	0 °C ÷ 50 °C								
	Storage temperature	-20 °C ÷ 70 °C								
	Relative humidity	20% ÷ 80% (not condensed)								
	Sliding block	by ball bearings ☉								
	Power supply	5 V ± 5%								
	Current consumption	140 mA _{MAX} (with R = 120 Ω)								
	A, B and I₀ output signals	LINE DRIVER PUSH-PULL 								
	Max. cable length	100 m (LINE DRIVER) 50 m (PUSH-PULL)								
	Electrical connections	see related table								
	Connector	inside the transducer								
	Electrical protections	inversion of polarity and short circuits								
	Weight	420 g + 1320 g/m								

MECHANICAL

- Rugged and heavy PROFILE made of anodized aluminium. Dimensions 40x24 mm.
- Elastic COUPLING for misalignment compensation and self-correction of mechanical hysteresis. Backlash error <0.2 mm.
- Double level SEALING LIPS (internal and external) along the sliding side of the reader head.
- READER HEAD, consisting of tie rod and reading block, with fully-protected place for electronic boards.
- READING BLOCK sliding through ball bearings.
- Die-cast TIE ROD, with chrome surface treatment.
- GLASS SCALE placed in the scale housing.
- Elastomeric GASKETS which allow to reproduce the full protection in mechanical joints (in case of disassembling).
- Full possibility to disassemble and reassemble it.
- Possibility of direct service.

ELECTRICAL

- Reading device with an infra-red light emitter and receiving photodiodes.
- A and B output signals with phase displacement of 90° (electrical).
- Reference indexes at coded distance, at constant step or selectable.
- CABLE:
 - 8 wires shielded cable Ø = 6.1 mm, PUR external sheath.
 - Conductor section: supply 0.35 mm²; signals 0.14 mm².

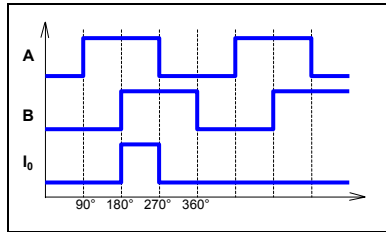
The cable's bending radius should not be lower than 40 mm.
The cable is suitable for continuous movements.

SIGNALS	CONDUCTOR COLOR
5 V	Red
0 V	Blue
A	Green
\overline{A}	Orange
B	White
\overline{B}	Light-blue
I ₀	Brown
$\overline{I_0}$	Yellow
SCH	Shield

* The declared accuracy grade of ± X µm is referred to a measuring length of 1 m.
** With a 0.1 resolution, the maximum traversing speed becomes 45 m/min.

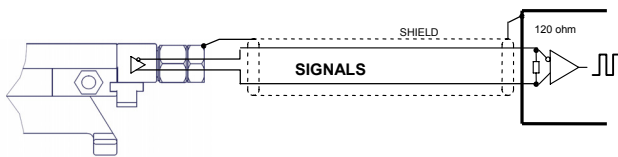
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OUTPUT SIGNALS



Signal amplitude	LINE DRIVER ($V_{OH} \geq 2.5 V$ $V_{OL} \leq 0.5 V$) TTL
Load per channel	$R = 120 \Omega$ $I_L = \pm 20 mA_{MAX}$
A and B phase displacement	$90^\circ \pm 5^\circ$ electrical

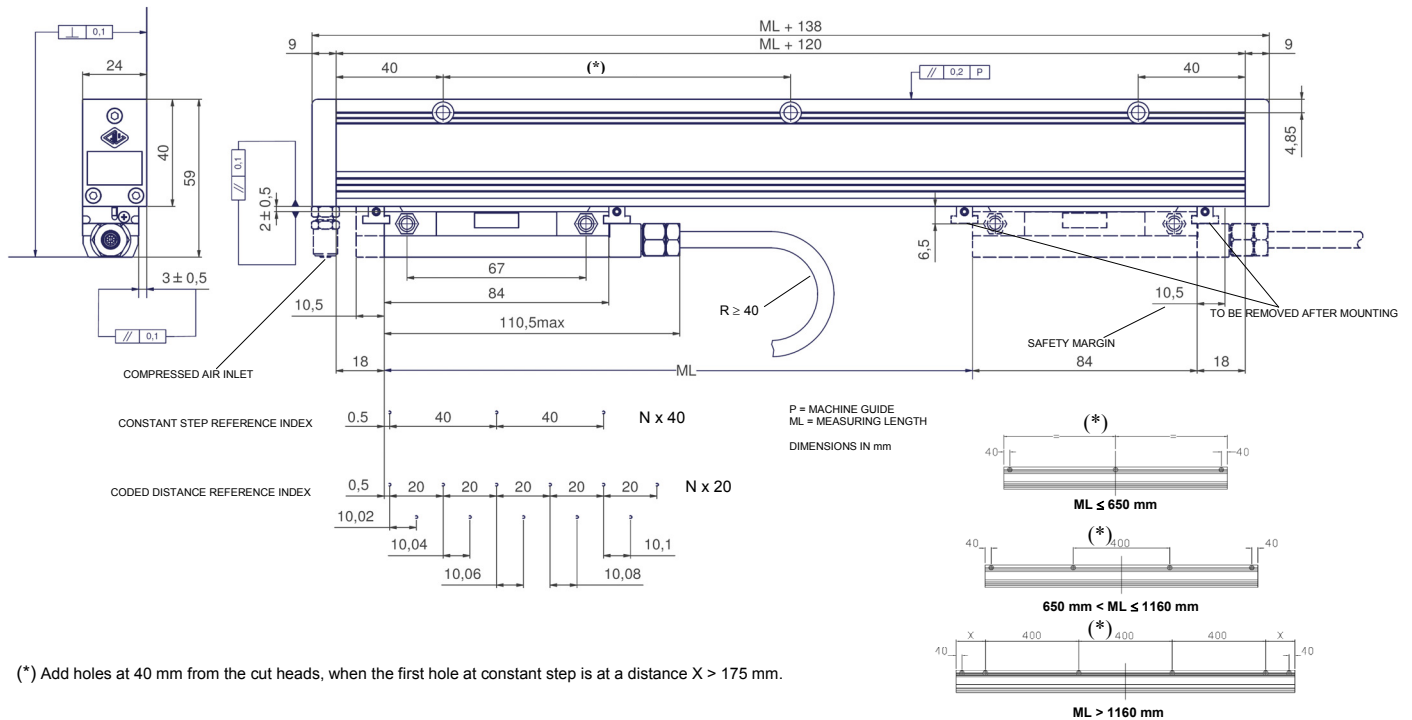
CABLE



In case of cable extension, it is necessary to guarantee:

- the electrical connection between the body of the connectors;
- a minimum power supply voltage of 5 V to the transducer.

DIMENSIONS



ORDERING CODE

MODEL	SCALE TYPE, RESOLUTION, INDEX (OPTIONAL)	MEASURING LENGTH	POWER SUPPLY, OUTPUT SIGNALS	CABLE LENGTH, CABLE TYPE	CONNECTOR WIRING	SPECIAL, PRESSURIZED
NCS	T 05 C	03240	05VL	M04 / S	C15	PR

T = TTL	Length in mm	05V = 5 V	Mnn = length in m	Cnn = progressive	No cod. = standard
5 = 5 μm	03240 = ML_{MAX}	L = LINE DRIVER	M04 = 4 m (standard)		SPnn = special nn
1 = 1 μm		Q = PUSH-PULL	M50 = 50 m		PR = pressurized
05 = 0.5 μm			S = cable for continuous mov.		
01 = 0.1 μm					
C = index at coded distance					
P = index at constant step					
E = selectable index					

Example **OPTICAL SCALE NCS T05C 03240 05VL M04/S C15 PR**