GIVI MISURE
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Code	Project	Release	
ST04	***A29-A***	***N***	***TECHNICAL DATASHEET***

OPTICAL SCALE NCS T (TTL)

GENERAL FEATURES

- Optical scale with glass measuring support (grating pitch 20 µm). Particularly suitable for CNC machines.
- Resolutions up to 0.1 µm. Accuracy grade up to ± 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

- 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 µm.
- 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 nickel 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 ∅ = 6.1 mm, PUR external sheath.
  - Conductors section: power supply 0.35 mm^2; signals 0.14 mm^2.

The cable's bending radius should not be lower than 80 mm.
The cable is suitable for continuous movements.

SIGNALS	CONDUCTOR COLOR
+ 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

Cod. NCS	**T**
Measuring support	glass scale
Grating pitch	20 µm 
Thermal expansion coefficient	8 x 10^{-6} °C^{-1}
Reference indexes (I_0)	**C** = coded distance **P** = constant step (every 40 mm) **E** = selectable (every 20 mm)
Resolution	**T5** 5 µm — **T1** 1 µm — **T05** 0.5 µm — **T01** 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 Vdc ± 5%
Current consumption	140 mA_{MAX} (with R = 120 Ω)
A, B and I_0 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

* 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.

GIVI MISURE S.R.L. A SOCIO UNICO
C.F. e Iscrizione al Reg. Imprese di Monza e Brianza n° 04355540156 - Cap. Soc. € 51.480,00 I.V.

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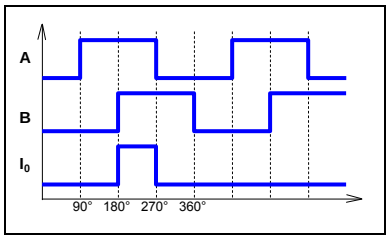
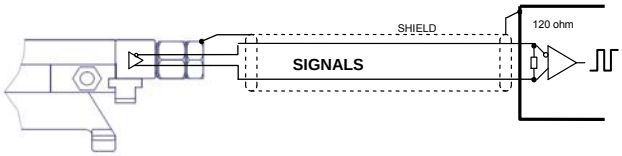
OUTPUT SIGNALS



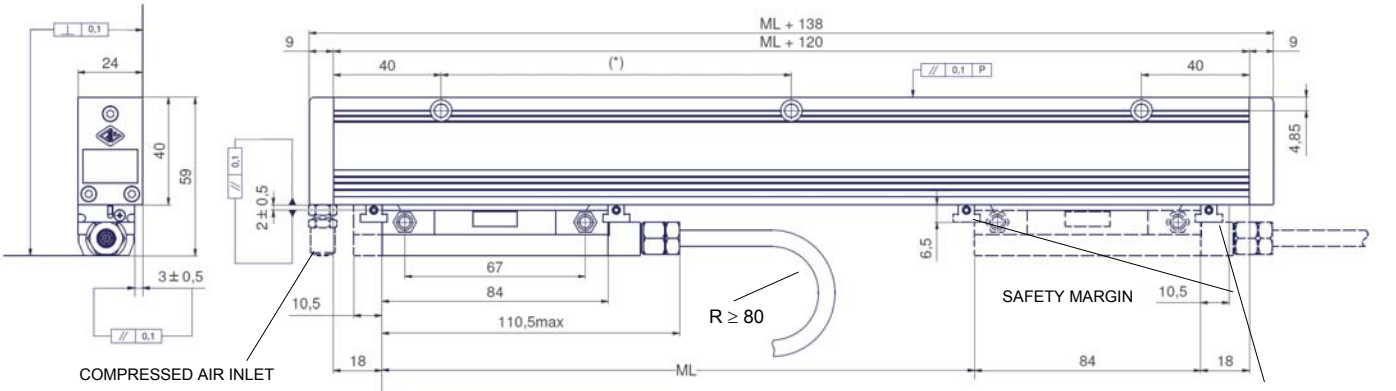
Signal amplitude	LINE DRIVER ($V_{OH} \geq 2.5$ V $V_{OL} \leq 0.5$ V) TTL
Load per channel	R = 120 Ω $I_L = \pm 20$ mA_{MAX}
A and B phase displacement	90° ± 5° electrical
Signal amplitude is referred to a differential measurement made with 120 Ω impedance and power supply voltage to the transducer of 5 V ± 5%.	

CABLE



In case of cable extension, it is necessary to guarantee:
- **the electrical connection between the body of the connectors and the cables shield;**
- **a minimum power supply voltage of 5 V to the transducer.**

DIMENSIONS

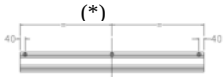


CONSTANT STEP REFERENCE INDEX 0,5 40 40 N x 40

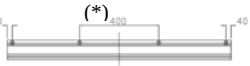
CODED DISTANCE REFERENCE INDEX 0,5 20 20 20 20 20 N x 20
10,02 10,04 10,06 10,08 10,1

P = MACHINE GUIDE
ML = MEASURING LENGTH

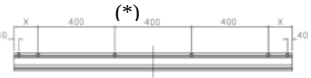
DIMENSIONS IN mm



ML ≤ 650 mm



650 mm < ML ≤ 1160 mm



ML > 1160 mm

(*) Add holes at 40 mm from the cut heads, when the first hole at constant step is at a distance X > 175 mm.

ORDERING CODE

MODEL	SCALE TYPE, GRATING PITCH, INDEX (OPTIONAL)	MEASURING LENGTH	POWER SUPPLY, OUTPUT SIGNALS	CABLE LENGTH, CABLE TYPE	CONNECTOR WIRING	SPECIAL, PRESSURIZATION
NCS	**T 05 C**	**03240**	**05VL**	**M04 / S**	**C35**	**PR**

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

Example ☞ **OPTICAL SCALE NCS T05C 03240 05VL M04/S C35 PR**