

Code <b>ST02</b>	Project <b>A35-B</b>	Release <b>C</b>	<b>TECHNICAL DATASHEET</b>
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## ABSOLUTE OPTICAL SCALE AGS


### GENERAL FEATURES

- Absolute optical scale with glass measuring support (particularly suitable for CNC machines).
- Resolutions up to 0.1  $\mu\text{m}$ .
- Adjustable connecting cable output.
- Connector incorporate into the transducer.
- Direct reading of absolute measure.
- Small size, to allow installation in narrow spaces.



### MECHANICAL AND ELECTRICAL CHARACTERISTICS

- MECHANICAL**
- Rugged and heavy PROFILE: anodized aluminium, dimensions 40x24 mm.
  - Elastic COUPLING for misalignment compensation and self-correction of mechanical hysteresis. Backlash error <math><0.2 \mu\text{m}</math>.
  - 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 1 Vpp output signals with phase displacement of 90° (electrical).
  - Serial protocol SSI – BiSS.
  - Electrical protection against polarity inversion and short circuits on output ports.
  - CABLE:
    - 10 wires shielded cable  $\varnothing = 7.1 \text{ mm}$ , PUR external sheath.
    - Conductor section: supply 0.35 mm<sup>2</sup>; signals 0.1 mm<sup>2</sup>.
    - Shielded twisted pair for digital signals (SSI – BiSS).
- The cable's bending radius should not be lower than 45 mm.  
The cable is suitable for continuous movements.

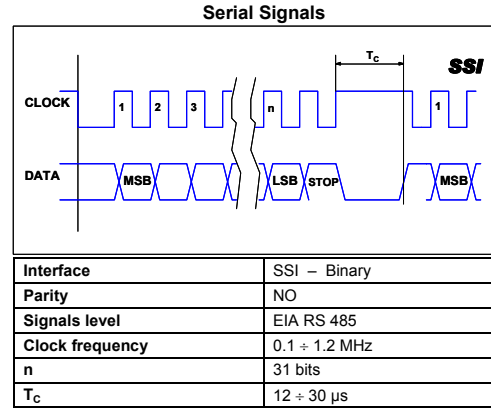
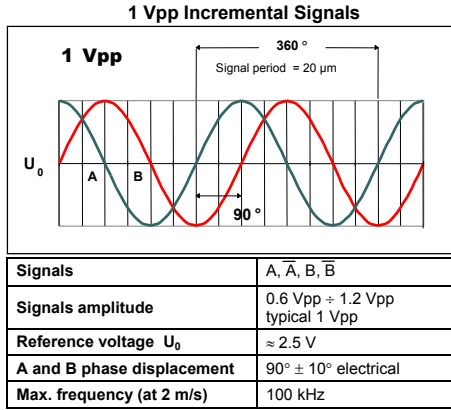
Cod. AGS	T
<b>Measuring support</b>	glass scale
Grating pitch	20 $\mu\text{m}$ 
Thermal expansion coefficient	$8 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
<b>Incremental signal</b>	sine wave 1 Vpp
<b>Resolution 1 Vpp</b>	up to 0.1 $\mu\text{m}$ *
<b>Serial interface</b>	SSI – BiSS
<b>Resolution absolute measure</b>	1 $\mu\text{m}$ – 0.1 $\mu\text{m}$
<b>Accuracy grade</b>	$\pm 3 \mu\text{m}$ **
<b>Measuring length ML in mm</b>	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 <sub>MAX</sub>
<b>Max. traversing speed</b>	120 m/min
<b>Max. acceleration</b>	30 m/s <sup>2</sup>
<b>Required moving force</b>	$\leq 4 \text{ N}$ $\leq 2.5 \text{ N}$ on request
<b>Vibration resistance (EN 60068-2-6)</b>	100 m/s <sup>2</sup> [55 ÷ 2000 Hz]
<b>Shock resistance (EN 60068-2-27)</b>	150 m/s <sup>2</sup> [11 ms]
<b>Protection class (EN 60529)</b>	IP 54 standard    IP 64 pressurized
<b>Operating temperature</b>	0 °C ÷ 50 °C
<b>Storage temperature</b>	-20 °C ÷ 70 °C
<b>Relative humidity</b>	20% ÷ 80% (not condensed)
<b>Sliding block</b>	by ball bearings ©
<b>Power supply</b>	5 V $\pm$ 5%
<b>Current consumption</b>	180 mA <sub>MAX</sub> (con R = 120 $\Omega$ )
<b>Max. cable length</b>	25 m ***
<b>Electrical connections</b>	see related table
<b>Connector</b>	inside the transducer
<b>Electrical protections</b>	inversion of polarity and short circuits
<b>Weight</b>	420 g + 1320 g/m

SIGNALS	CONDUCTOR COLOR
VS = 5 V	Red
VS0 = 0 V	Blue
A	Green
$\overline{A}$	Orange
B	White
$\overline{B}$	Light-blue
CK	Brown
$\overline{CK}$	Yellow
D	Pink
$\overline{D}$	Grey
SCH	Shield

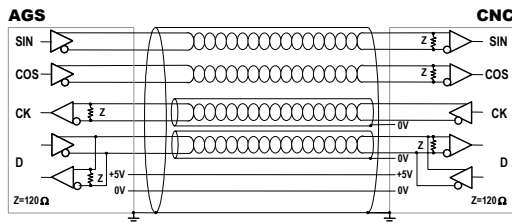
\* Depending on CNC division factor.  
 \*\* The declared accuracy grade of  $\pm X \mu\text{m}$  is referred to a measuring length of 1 m.  
 \*\*\* Ensuring a minimum power supply voltage of 5 V to the transducer, the maximum length can be extended to 100 m.

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### OUTPUT SIGNALS



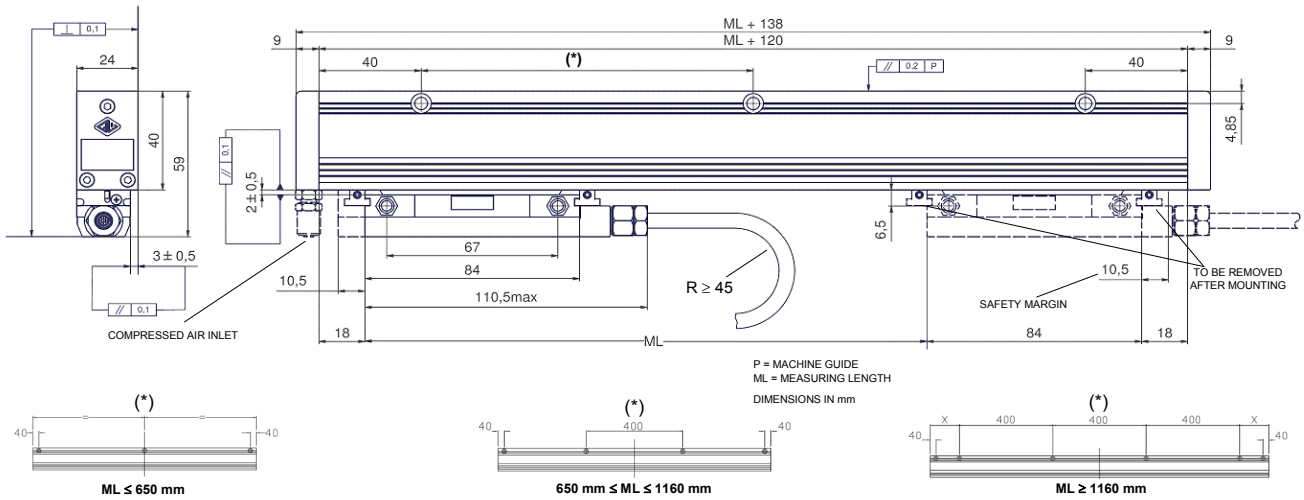
### CABLE



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



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

### ORDERING CODE

MODEL	SCALE TYPE, RESOLUTION	MEASURING LENGTH	POWER SUPPLY, OUTPUT SIGNALS	CABLE LENGTH, CABLE TYPE	CONNECTOR WIRING	SPECIAL, PRESSURIZED
<b>AGS</b>	<b>T1A</b>	<b>03240</b>	<b>05VS</b>	<b>M04 / S</b>	<b>C15</b>	<b>PR</b>

T1 = 1 $\mu$ m T01 = 0.1 $\mu$ m A = absolute	Length in mm 03240 = ML <sub>MAX</sub>	05V = 5 V S = SSI B = BiSS	Mnn = length in m M04 = 4 m (standard) 100 = 100 m S = cable for continuous mov.	Cnn = progressive	No cod. = standard SPnn = special nn PR = pressurized
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Example  **ABSOLUTE OPTICAL SCALE AGS T1A 03240 05VS M04/S C15 PR**