



IntelisiENS[®]

SLmini-i4 SERIES

Non-Contact Laser Doppler Speed & Length Measurement

- No Slip, No Wear, No Marking
- Incredibly Small and Easy to Install
- Pulse Outputs like your Encoder
- Stand Alone Device
- Integrate to Machine PLC
- Industry 4.0 Data Communications



mini

mini

mini



IntelisiSENS

SLmini-i4 SERIES



Non-Contact Laser Doppler
Speed & Length Measurement

The IntelisiSENS SLmini-i4 Non-Contact Speed and Length measurement gauge is ideal for flat surface products in “roll to roll” or “cut to length” processes. Paper, Film, Foil, Wovens, Non-Wovens, Textiles, Roofing, Sidings, Gypsum Board are just a few examples. Applications, where speed measurement is critical for drive control or where length measurement is critical for product quality, will benefit from the increased accuracy of Laser Doppler Speed and Length Measurement.

Focused on connectivity the SLmini-i4 Smart Sensor with 32bit communications comes pre-loaded with Profibus, Profinet, and Ethernet Industrial Protocol for your PLC connection. Modbus, OPC-UA, RS232, RS485, and WiFi round out a wide range of digital communications for your Industry 4.0 Solution.



Applications

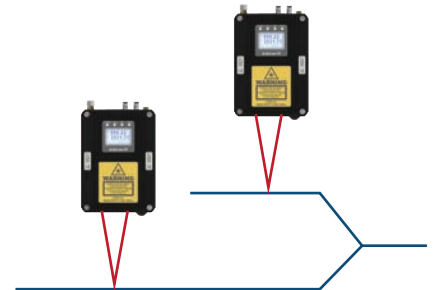
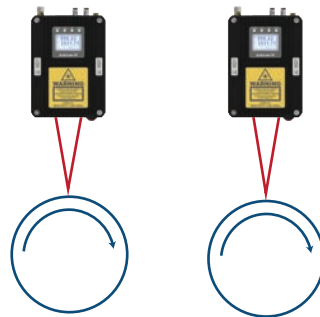
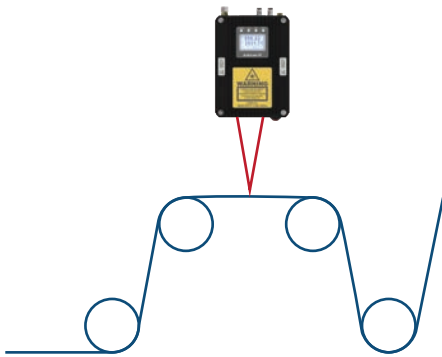


Speed Measurement



Speed Synchronisation

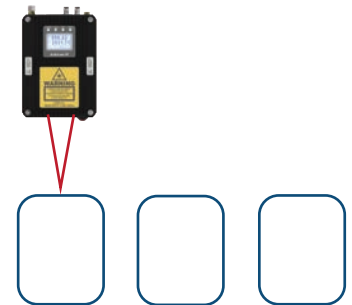
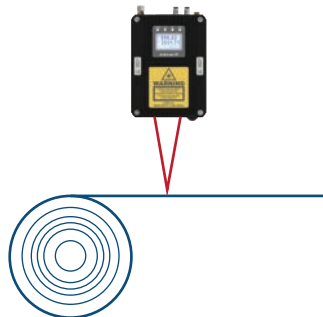
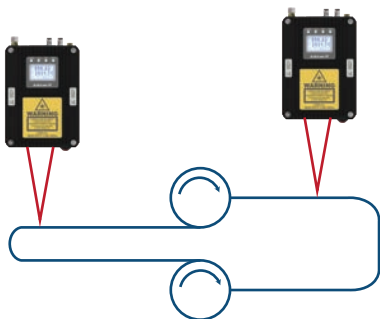
Speed Balancing



Speed Ratio (Elongation)

Speed Length Measurement

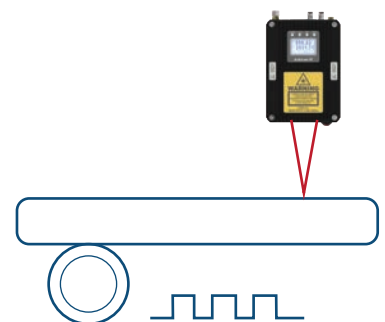
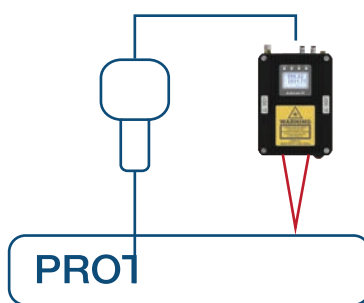
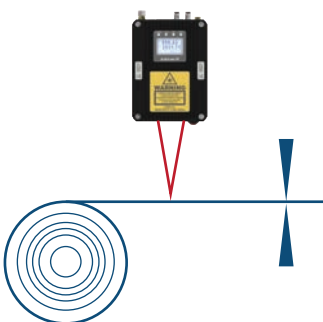
Part Length Measurement



Cut-To-Length Control

Inkjet Printer Control

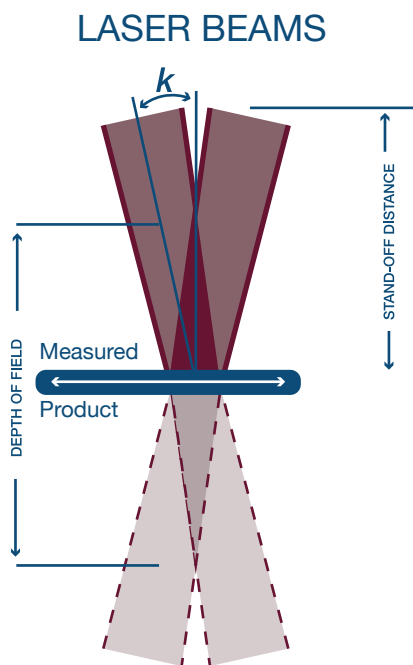
Encoder Calibration



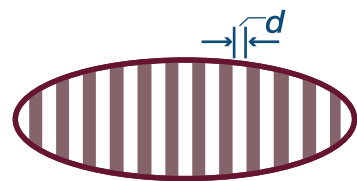
Operating Principle

The IntelliSENS SLmini-i4 Series Laser Doppler Speed and Length gauge illuminates the measured surface with an interference pattern created by the intersection of two laser beams. The alternating bright and dark fringe pattern modulates the light scattered by the object with a frequency proportional to the object's speed. This scattered light is detected by a photodiode and the electrical signal is digitally processed to determine the frequency and hence the speed. Object length is then calculated by integrating the speed measurement with respect to time.

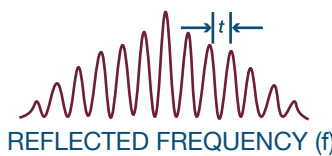
The IntelliSENS SLRmini-i4 Series Laser Doppler Speed and Length gauge extends the measurement principle of the SLmini-i4 Series by using a high-frequency Bragg cell modulator to illuminate the measured surface with a scanning interference pattern, which generates an oscillating light signal even when the object is stationary. The direction of motion is determined by whether the scattered light frequency is higher or lower than the stationary frequency.



DOPPLER PATTERN



← MATERIAL DIRECTION →
Doppler pattern created at the point where beams converge.



$$d = \frac{\lambda}{2 \sin k}$$

Fringe spacing is a function of laser wavelength and beam angle

$$f = \propto \frac{v}{d}$$

Doppler frequency is proportional to speed/fringe spacing.

$$L = \int_0^T v dt$$

Speed is integrated to measure length

Class 3B Visible Laser.

Wavelength 650 - 670 nm, typically 658 nm with a beam diameter of 3mm (0.12")

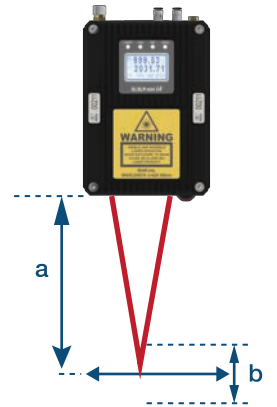
Total emitted power 40mW. Power Density at Stand Off Distance 50mW/cm²



Specifications

SLmini and SLRmini Non-Contact Laser Doppler Speed and Length Gauges are specified with “a” Stand off Distance” and “b” Depth of Field.

The object to be measured must be within the “Depth of Field” which is centered around the “Stand off Distance”.



Performance

	SLmini 1220-i4	SLmini 3060-i4	SLRmini 1220-i4	SLRmini 3060-i4
Stand Off Distance	120mm 4.74"	300mm 11.81"	120mm 4.74"	300mm 11.81"
Depth of Field	20mm 0.79"	60mm 2.36"	20mm 0.79"	60mm 2.36"
Minimum Speed	0.1 m/min 0.33 ft/min	0.25 m/min 0.82 ft/min	0 m/min 0 ft/min	0 m/min 0 ft/min
Maximum Speed	2000 m/min 6562 ft/min	5000 m/min 16404 ft/min	± 2000 m/min ± 6562 ft/min	± 5000 m/min ± 16404 ft/min

Accuracy Factory Calibrated to better than 0.05%.
Repeatability of 0.02%

Measurement Maximum Acceleration Rate of 500m/s² (1640ft/s²)
Measurement Rate Up to 24,400/sec

Units Speed Measurement selectable m/min, ft/min, yd/min
Length Measurement selectable m, ft, inch, yd

Mode Normal (Continuous Length), Batch Length

Object Detection Automatic Detection and Object Present

Electrical and Operating Requirements

Power Supply
15 - 30 Vdc

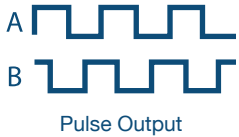
Power Consumption
15 Watts

Operating Temperature
5°C- 40°C-(41°F-104°F)*

Environmental Protection
IP 67

*See Accessories for High Temperature Options

Connectivity



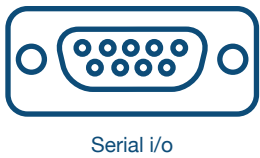
Default Output 5vdc or User Input to 24vdc
Max Maximum Frequency 2MHz Pulse Rate Selectable - Pulse/Meter or Meter/Pulse Configurable as 6 x Single End or 3 Quadrature or 3 Differential.
Non Isolated from Gauge Head, Opto Isolated from the PSU-BOB i4



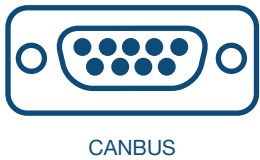
Maximum Input Voltage 24Vdc
2 x Fixed logic Inputs - Laser Enable and Shutter Enable
3 x Selectable logic Inputs - Reverse Direction, Length Reset, Display Hold, Speed Hold, Total Length Reset, End of Reel



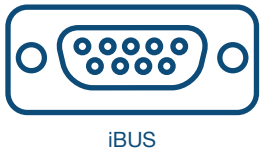
Maximum Voltage 30Vdc, Current 100mA.
N-Channel MOSFET pull-down (for connection to user supplied onto isolated relay)
1 x Fixed Logic Output - Shutter Status
3 x Selectable logic outputs - Gauge Ok, Measuring Speed, Preset Length 1, Preset Length 2, Good Readings Low, Object Detected, Gauge Hot.



RS232 MODBUS RTU, PROTON ASCII code or Label Printer
USB using RS232 - USB Converter Cable
RS485 MODBUS RTU, PROTON ASCII code (Not available with PROFIBUS)



Connects to Proton Products CDi4 Display



Connect to a PLC using PROFIBUS, PROFINET, or EtherNet I/P, data update rate up to 500/sec. Flexible Data Configuration, Big Endian, Little Endian



Ethernet selectable between OPC-UA and Modbus



Connect to a PC or Mobile Device using WiFi 2.4G and use the Proton Products Gauge App available for iOS and Android. Ideal for gauge configuration and diagnostics

Industry 4.0



More than 200 Data Words are available to communicate with your Industry 4.0 Solution. Data Words are divided into distinct function groups to make it easy to select the ones you want.

Gauge ID Data Words	Model Number, Serial Number, Firmware APP version, Firmware Core Version, Firmware Date
Calibration Data	Last Calibration Date, Days Since Last Calibration, Total Run Time, Calibration Alarm
Validation Data Words	SNR, Signal Amplitude, Good Readings, FFT Amplitude
Wired Network Info	IP Address, Netmask, Gateway
WiFi Network Info	IP Address, Netmask, Gateway, SSID
Measurement Data	Instant Speed, Average Speed, Batch Length, Total Length
Diagnostic Data	Laser Temperature, APD Temperature, Laser ON/OFF Cycles, Max/ Min Case Temperature

Smart Sensors Enable Smart Factories

“Industry 4.0 the Fourth Industrial Revolution is real. In its various shapes, forms, and definitions, it’s happening, accelerating around the world, and Proton Products is an active player in this movement. A Smart Sensor is a Bridge between the Physical World (Measurement of Products and Processes) and the Digital World (MES, ERP Factory Management Systems). The more connected these worlds are, the more informed we become, improving our decision processes which ultimately enable us to reach our goals.”

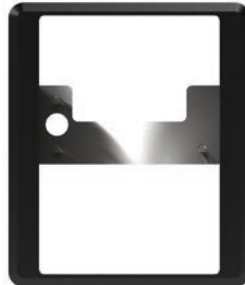
Proton Products Inc.

Accessories

Display



CDi4
Part No. 00049MC021



CDi4 Panel Mount
Part No. 00049MC043



CAN 9DD Cable
Part No. Length Dependent



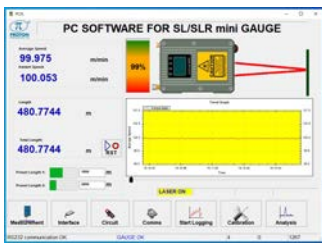
SiDi-AiG1
Part No. 00001MC970



SiDi-AiG3
Part No. 00005MC300



RS232 9DD Cable
Part No. Length Dependent

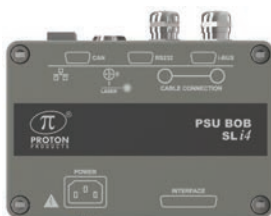


PCIS-SL/SLR mini
Part No. 00050SW001



USB-RS232_1.8m Cable
Part No. GP00000624

Power



PSU-BOB-SL i4
Part No. 00060MC050



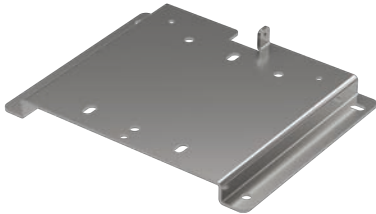
Mains Cable
Part No. 00002CM502



DB44 Cable
Part No. Length Dependent

Accessories

Stands and Guards



Base Plate
Part No. 00050MC042



3D ADJ Plate
Part No. 00050MC044



Vibrating Reduction Kit
Part No. 00050MC043

Protection



Air Wipe
Part No. 00050MC034



Beam Shroud 1220
Part No. 00050MC033



Beam Shroud 3060
Part No. 00050MC037



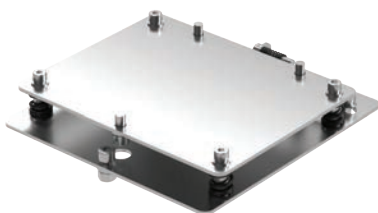
S-BOX mini
Part No. 00050MC019



S-BOX Panel
Part No. 00046MC048



S-BOX Panel Vortex
Part No. 00046MC039



S-Box mini 3D ADJ Plate
Part No. 00050MC020



Air Accelerator
Part No. 00060MC038



Air Filter
Part No. 00043MC048

Accessories

Cooling



TC300 Temperature Controller
Part No. 00039MC002



Mains Cable
Part No. 00002CM502

Alarm & Report



A1 Alarm Unit
Part No. 00025MC001



M16AP Cable
Part No. 00025CB003



Zebra Label Printer
Part No. 00043MC033



RS232 9DD Cable
Part No. Length Dependent

Accessories



Aperture Plate
Part No. 00050MC281



Stainless Steel Replacement Kit
Part No. 00050MC891

Locations

USA HEAD OFFICE:

Proton Productst Inc.
1590 S Coast Hwy, Unit 13
Laguna Beach, CA 92651
United States
E-mail: sales@protonproducts.us

GLOBAL HEAD OFFICE:

Proton Products International Ltd.
10 Aylesbury End,
Beaconsfield Buckinghamshire
England
Email: sales@protonproducts.com

ASIA HEAD OFFICE:

Proton Products Chengdu Ltd.
Tianfu Software Park G3-401,
No.1800 Central YiZhou Avenue,
Chengdu, Sichuan 610041
China
E-mail: sales@protonproducts.cn

EUROPEAN HEAD OFFICE:

Proton Products Europe N.V.
Terspelt Business Park
Koeweideblock 2/C13
B-1785 Merchtem
Belgium
E-mail: sales@protonproducts.eu



Contact: