NDC TECHNOLOGIES
a spectris company

LASERSPEED® PRO LENGTH & SPEED GAUGE

The industry leader in non-contact measurement by which all others are measured

NEW
Industry 4.0
Ready Connectivity.
Greater Performance.

- More gauges installed worldwide than all other manufacturers combined
- The most versatile Ethernet connectivity, communication and control capabilities for easy integration into production networks
- Direct replacement for contact encoders
- Realize the lowest total cost of ownership

The Most Sought-After, Non-Contact Length & Speed Gauge on the Market Today

Don't be fooled by look-alikes. There is only one LaserSpeed Pro!

With 25-plus years of service in over 8,000 installations worldwide, the LaserSpeed non-contact length & speed gauge has long been the preferred measurement solution for quality-conscious manufacturers everywhere. A fine-tuned optical engine combined with an ultra-stable laser diode enables LaserSpeed to deliver better than ±0.03% accuracy with ±0.02% repeatability for the full depth of field (the highest in the industry) for measurement precision 20 to 40 times that of mechanical encoders. In production, where even a 1% error has a major impact on the bottom line, LaserSpeed is helping companies gain control of quality to reduce waste and rework – and avoid costly downtime and product give-away.

Now, the world's best non-contact measurement system is even better! Featuring powerful new capabilities in connectivity, communication and control consistent with Industry 4.0, **LaserSpeed Pro** integrates more easily than ever into production networks, providing the real-time data exchanges and tight processing efficiencies that today's manufacturers need to deliver true product quality.

The LaserSpeed Pro Advantage

- **Direct replacement** for tachometers and encoders
- **No slippage, no-marking** measurements on all material types, shapes, colors and textures
- **Measures forward and reverse** directions, and down to "true" zero speed
- **Permanently calibrated**, no moving parts; "smart" gauge (all optics, electronics, I/O in gauge)
- **Expanded Ethernet connectivity** supports Industry 4.0 standards such as ModBus TCP, Ethernet/IP and Profinet IO – as well as fieldbus support for Profibus DP. (Future connection via WIFI, BlueTooth, ZigBee)
- **LaserTrak Software** suite provides complete digital control over LaserSpeed Pro setup and operation. Tools include gauge communication setup, length and speed pulse setup, high- and low-speed pulse output control, graphing/charting and data storage.
- **Extended baud rates** (4.8 to 460 kbaud); full-time automatic baud rate detection
- **Multiple simultaneous host connections**, via proprietary and industry standard protocols, permits gauge to communicate with devices concurrently
- **Real-time clock** accurately, reliably keeps gauge in synch with SNTP server and other networked devices
- **NEW Advanced laser diode technology,** backed by a 3-year warranty, doubles the life of conventional diodes – providing the longest service life in the industry!
- **2-Year product warranty** on all other LaserSpeed Pro product components

Accessories

Airwipe and Quick-Change Window

Designed for dirty environments, the airwipe and quick change window help to ensure minimal downtime for cleaning.

Breakout Box/Power Supply

Provides easy access to all gauge inputs and outputs. Also provides power to the LaserSpeed Pro.

Environmental Housing

Provides heavy-duty, double-sealed protection against hot and humid environments.

Accessory Case

A convenient case to hold the LaserSpeed Pro and all accessories safe and secure.

DP700 Display

Displays LaserSpeed length, velocity, quality factor, and gauge status, and lets you configure gauge and process settings. Includes Ethernet/IP and Modbus for Allen Bradly controls.

Adjustable Mounting Bracket

Enables you to adjust or tilt the gauge in three directions to achieve the desired measurement angle for your unique application.

Technology

Contact Tachometers vs. LaserSpeed Pro

Contact tachometers are typically used in manufacturing applications for length and speed measurement. However, there are a variety of problems with the use of contact length measurement that can be avoided by replacing tachometers with LaserSpeed Pro:

Normal Tachometer Problem:		LaserSpeed Pro Solution:
1. Measurement errors and inaccuracy caused by: product slippage, dirt build-up, day-to-day wear problems	▶▶▶	Non-contact measurement ensures high accuracy and repeatability
2. High cost of ownership due to the need to regularly replace parts and recalibrate	▶▶▶	Use of 100% solid-state digital technology with no moving parts ensures permanent calibration and low cost of ownership
3. Contact measurement can mark or damage the product	▶▶▶	Non-contact measurement ensures no marking or damage of the product

Laser Doppler Velocimetry Principle

LaserSpeed Pro uses dual-beam laser interferometer technology to measure product velocity (speed), which is integrated over time to measure length.

Fringe distance is a function of laser wavelength and beam angle:

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

Velocity is distance over time:

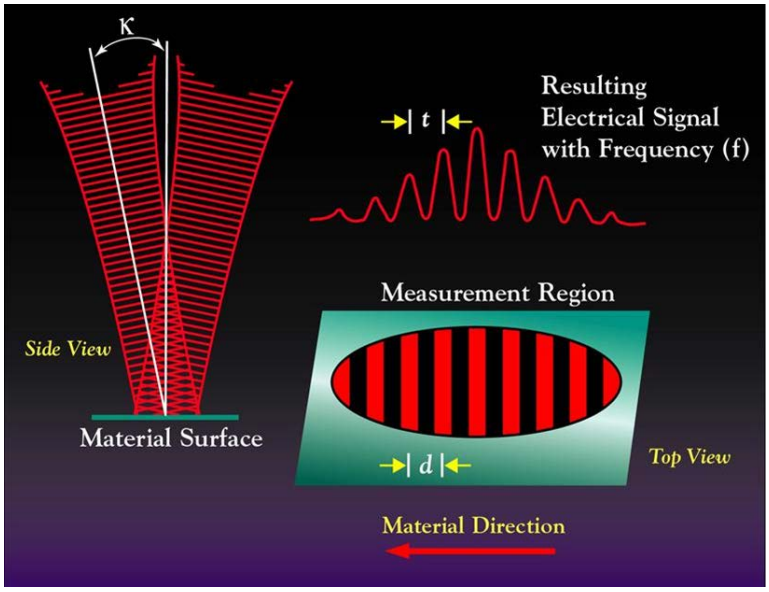
$$v = \frac{d}{t}$$

Period is the inverse of frequency:

$$t = \frac{1}{f}$$

Velocity is integrated to find length:

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



LaserSpeed Pro Safety Enclosure

Designed to meet recognized industrial safety regulations, this enclosure protects operators from direct or incidental exposure to laser beams. Includes laser safety shutter control switch, linear height adjustment and position indicator, optional roller guides for products up to 50 mm, and optional height stands. Accommodates all LaserSpeed Pro models with either 300 or 600 mm stand-off distances.

Laser Safety Information

The following safety features required to comply with the Bureau of Radiological Health Class IIIB laser requirements are included:

- Key-operated power switch on optional controller
- Laser indicator light on supply and laser
- Delayed laser startup-laser indicator light on prior to laser radiation
- Laser beam blocking device
- Interlock capability for remote shut-off

	-401 (LS Pro 4500 only)	-403	-406	-410
Standoff Distance	100 mm (4 in.)	300 mm (12 in.)	600 mm (24 in.)	1000 mm (39.4 in.)
Speed Range: LS Pro 4500	0.2 to 1700 m/min (0.7 to 5500 ft/min)	0.4 to 4000 m/min (1.3 to 13100 ft/min)	0.8 to 8000 m/min (2.6 to 26200 ft/min)	1.0 to 12000 m/min (3.2 to 39400 ft/min)
Speed Range: LS Pro 8500	Not available	0.4 to 4000 m/min (1.3 to 13100 ft/min)	0.8 to 8000 m/min (2.6 to 26200 ft/min)	1.0 to 12000 m/min (3.2 to 39400 ft/min)
Speed Range: LS Pro 9500	Not available	-4000 to 4000 m/min (-13100 to 13100 ft/min)	-8000 to 8000 m/min (-26200 to 26200 ft/min)	-12000 to 12000 m/min (-39400 to 39400 ft/min)
Measurement Depth of Field	15 mm (0.6 in.)	35 mm (1.4 in.)	50 mm (2.0 in.)	100 mm (4.0 in.)

	LS Pro 4500-4	LS Pro 8500-4 / 9500-4
Measurement Rate	>20000/s	LS Pro 8500: >50,000/s LS Pro 9500:100,000/s
Starting/ Ending Length Correction	No	Yes
Serial I/O	• RS-232	• RS-232 / RS-422
Data Available	• Speed, Length • Quality Factor, Status	• Speed, Length • Quality Factor, Status
Baud Rate	• 460K, 230K, 115K, 57.6K, 38.4K, 19.2K, 9.6K, 4.8K	• 460K, 230K, 115K, 57.6K, 38.4K, 19.2K, 9.6K, 4.8K
Status via Serial I/O or **Ethernet**	• Laser at Temperature • Laser On • Shutter Open • Gauge Temperature	• Laser at Temperature • Laser Interlock • Shutter Position • Valid Measurements • Material Present • System Ready
Quadrature Pulse		
Output 1	• Opto isolated • Scaleable pulse amplitude (5-24V) • Fixed at 1000 pulses/unit • 250 KHz max pulse rate	• Opto isolated • Scaleable pulse amplitude (5-24V) • Selectable pulses/unit • 250 KHz max pulse rate
Output 2	• Scaleable pulse amplitude (5-24V) • Selectable pulses/unit • 250 KHz max pulse rate	• RS-422 Drivers • Selectable pulses/unit • 5 MHz max pulse rate
Index pulse output	Yes/programmable	Yes/programmable
Gauge Power	24VDC (±4 VDC) @ 1 Amp 50 mV ripple max	LS Pro 8500: 24VDC (±4 VDC) @ 1.5 Amp, 50 mV ripple max LS Pro 9500: 24VDC (±4 VDC) @ 2.0 Amp, 50 mV ripple max
Gauge Size	203 x 159 x 87.6 mm (8.0 x 6.25 x 3.45 in.)	203 x 159 x 97.5 mm (8.0 x 6.25 x 3.84 in.)
Gauge Weight	3.0 kg (6.6 lbs)	LS Pro 8500: Short - 3.3 kg (7.2 lbs) LS Pro 9500: Short - 3.5 kg (7.8 lbs); Long - 3.9 kg (8.6 lbs)
Temperature Range	-5 to 45ºC (21 to 113ºF)	LS Pro 8500: 5 to 45ºC (41 to 113ºF) LS Pro 9500: - 5 to 45ºC (21 to 113ºF)
Output Rate	2 to 32 ms in 2 ms increments	1 to 2000 ms in 1 ms increments
Spot Size	3 x 5 mm 1.75 x 5 mm (L Version)	3 x 5 mm (-310: 3 x 7)

All LaserSpeed Gauges

Acceleration Rate	>500 m/s^2
Repeatability	±0.02%
Accuracy	<±0.03% of reading
User Isolated Voltage	5 to 24 VDC (300mA)
Relative Humidity	Non-condensing
Units of measure	Selectable
Speed	m/min, m/s, ft/min, ft/s, in/min, mm/sec, yards/in, yards/sec
Length	m, ft, in, yards
Fieldbus Connectivity	Ethernet (ModBus TCP, Ethernet/IP, Profinet IO); Profibus DP
Product Warranty	2 years
Diode Warranty	3 years

Cooling*	
Air	• Pressure: Less than 70 kPa (< 10 PSI) • Flow Rate: 50 l/min (2 SCFM) Typical
Water	• Pressure: Less than 207 kPa (< 30 PSI) • Flow Rate: 1.0 to 3.8 l/min (0.26 to 1 gpm) 1.5 l/m (0.4 gpm) Typical • Coolant Temp: 5 to 45°C (41 to 113°F)
Analog Output	0-2V Velocity or quality factor
Ethernet	10/100 Base-T (M12)
Multiple Simultaneous Host Connections	Proprietary & industry standard protocols

***For ambient temperatures beyond gauge specification.**

NDC Technologies is represented in over 60 countries worldwide. **www.laserspeedgauge.com**

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