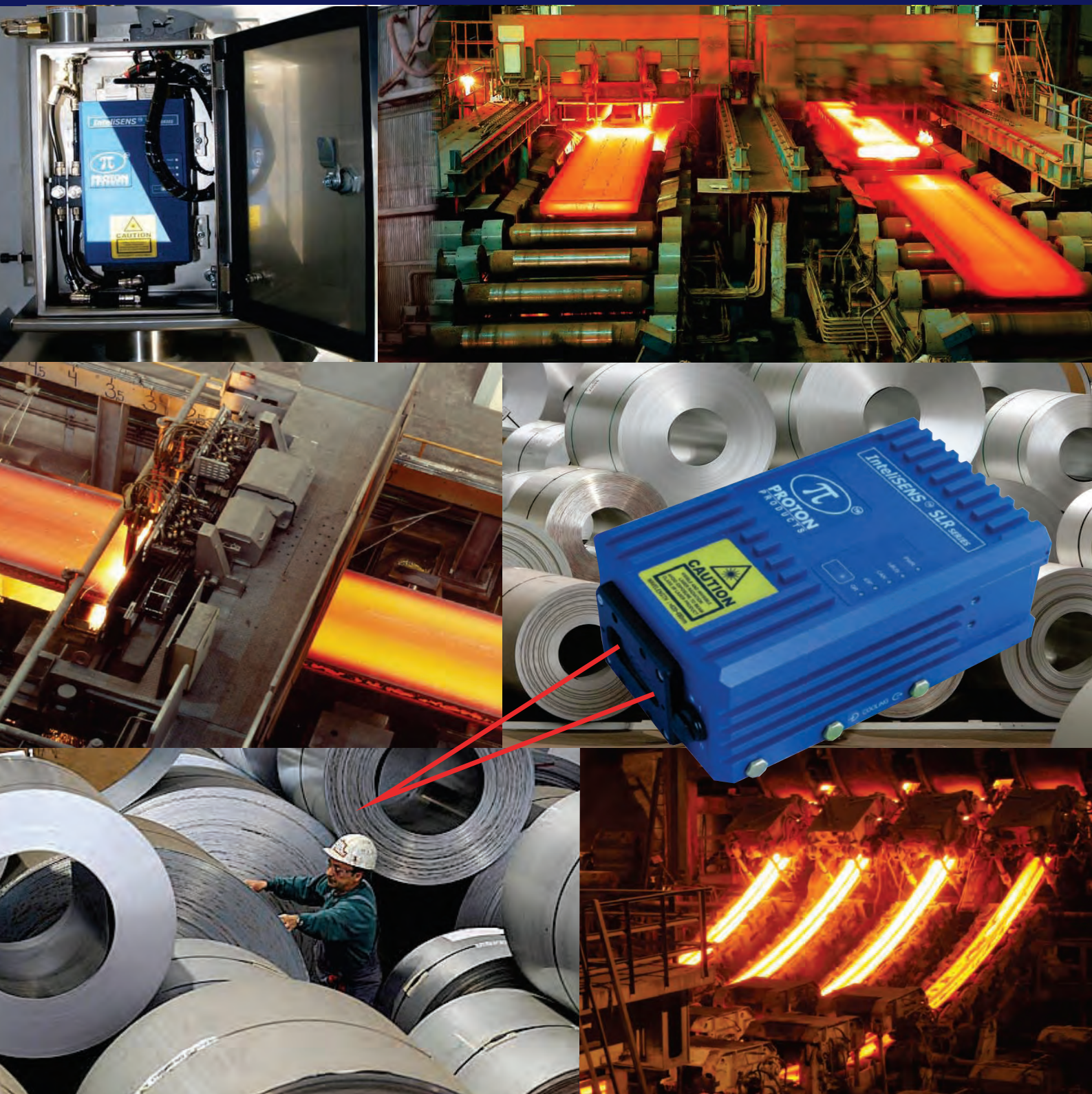




# LASER SPEED & LENGTH



# Metal Industries

## INTRODUCTION

- **InteliSENS™ SL and SLR Series** gauges directly replace traditional, high maintenance, contact-type speed & length measuring devices, with accurate “state-of-the-art” Laser Doppler Technology.
- **Easy to install, integrate and use** on production Processes such as hot and cold rolling, hot strip slab lengths, billet crop shear, pipe/tube/rod Mill, continuous casting, temper mill, elongation control, process lines (coating, forming, slitting, cutting) as well as on non-ferrous extrusion and rolling processes.
- **Simple Integration** Integration into any process has never been more easy. A multiplicity of Interfaces are provided to satisfy the most demanding process engineer.
- **Fast Payback and increase profit** Accurate, non-contact Laser Doppler Technology for Speed or Length control, provides process optimisation, reduces scrap, increases uptime and improves material yield.
- **Harsh Applications:** Standard SL or SLR Sensors and special engineered Harsh environment sensors in SLH, SLX or SLX-H Environmental Enclosures are available for applications on Hot Mills and Harsh environments, specific to the Metallurgical, Metal and Steel Industries.

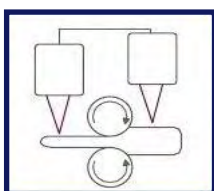
## NON-CONTACT LASER DOPPLER SPEED AND LENGTH



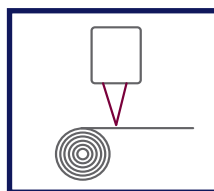
- |                                 |  |
|---------------------------------|--|
| ■ <b>Accuracy:</b>              | Better then 0.05%                      |
| ■ <b>Repeatability:</b>         | Better then 0.02%                      |
| ■ <b>Non-Contact:</b>           | no slippage, no wear, on any surface ! |
| ■ <b>No Moving Parts:</b>       | no wear, no drift, no maintenance      |
| ■ <b>Industrial Design:</b>     | for Extreme factory environments       |
| ■ <b>Easy Integration:</b>      | modern communications                  |
| ■ <b>Simple Operation:</b>      | no operator settings required          |
| ■ <b>Permanent Calibration:</b> | calibrated to UKAS traceable standards |
| ■ <b>Reliable:</b>              | inteliSENS™24/7 Technology             |
| ■ <b>Excellent Value:</b>       | low cost of ownership                  |



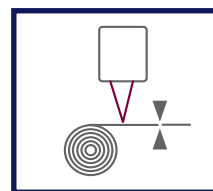
## inteliSENS™: Some APPLICATIONS



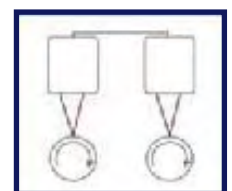
Differential Speed control on hot or cold sequential rolling Mill



Speed/Length control on process lines



Cut to length control on coil, profile, tube, rod or steel wire process lines



Speed synchronisation and Speed balancing

## NON CONTACT LASER DOPPLER : NO SLIPPAGE, NO WEAR !



Cut to length control on continuous tube welding line.



SLX120120 High Temperature Unit with combined Water and Air Cooling designed for Hot mills and harsh applications.

## CONNECT UP TO THE WORLD OF AUTOMATION

What no mechanical Speed or Length measuring system can offer you, you may expect from the PROTON inteliSENS™ non-contact Laser Doppler Sensors.

Whether connecting to PLC, PC, Scada, Network, Electronic Counters, etc... just make your choice from a host of interfaces to choose from: canbus, RS232, RS422, modbus, Ethernet TCP, Ethernet UDP, Industrial IP, profibus, profinet, devicenet, pulse outputs, analogue output, etc...

## CALIBRATION & CERTIFICATION

Following manufacture, every Sensor is tested for a period of 24 hours at an environmental temperature of 50°C. Then each unit is calibrated prior to shipping on a calibration rig to UKAS traceability. A dedicated Calibration Certificate to UKAS Traceability is supplied with each unit. Obtained accuracy is within 0.02-0.03% typical.



## LASER SAFETY REGULATIONS

The gauge contains a Class 3B Laser Diode and complies with the European Safety Norm BS EN60825-1 and has the following safety provisions in compliance with the Bureau of Radiological Health Class 3B:

- Laser Emission Indication Light.
- Delayed Laser Start-up: Laser Emission indicator on before Laser reaches full power.
- Key-operated on-off Laser-switch provided (on Laser Interface Units)
- Laser Shutter: Laser beam blocking device: mechanical shutter with remote control

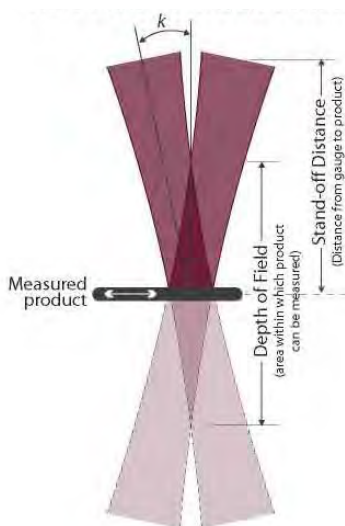
VISIBLE LASER RADIATION.  
AVOID DIRECT EXPOSURE  
TO BEAM.  
20mWmax.  
Wavelength Å: 620 - 690 nm  
CLASS 3B LASER PRODUCT

# PROTON inteliSENS™ LASER DOPPLER TECHNOLOGY

The know-how of PROTON PRODUCTS in the field of Laser Optics, State of the Art micro Electronics, Fast Field Programmable Gate Arrays (FPGA), Fourier Transformation Technology (FFT) and Auto Correlation Technology, results in probably the most accurate and fastest non-contact Laser Doppler Sensor available today

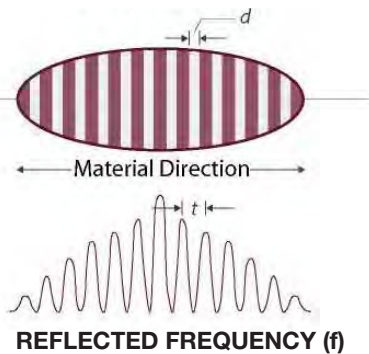
## LASER DOPPLER

SIDE VIEW OF LASER BEAMS



TOP VIEW OF LASER DOPPLER PATTERN

Doppler pattern created at the point where beams converge.  
Doppler pattern not visible to the human eye.



## ULTRA- FAST OUTPUTS

Measuring Speed and Length is just one thing, but the Measuring Frequency and update rate as well as the Transmission Speed of data to the host system, relative to dynamic product speed variations, is another thing ! inteliSENS™ provide unequalled Pulse Frequencies up to 1 MHz and an update Speed of 0.04mSec which makes the system suitable for the most dynamic speed control and length control applications.

## SL, SLR , SLH or SLX Series of PROTON inteliSENS™ LASER DOPPLER SENSORS



For harsh or very Hot Environments, PROTON provides Standard SL and SLR or SLH and SLX Series of Sensors, each of them provided with various levels of cooling and protection.



# STANDARD SL Series and SLR Series LASER DOPPLER Sensors

Standard SL and SLR Series Sensors are designed for “cold applications” , this means for normal environmental environments up to max 45°C. Although the Standard SL and SLR Series Sensor have standard a cooling channel embedded into its base, whereby air or water may be used for cooling, it only provides a base cooling that is in no way sufficient to protect the unit against extreme radiation levels of large (red) hot steel objects to be measured. Thus Standard Sensors can only be used up to 45°C ambient or 60°C ambient with the embedded cooling using pneumatic air or water as a cooling medium.

## UNI-DIRECTIONAL and BI-DIRECTIONAL Systems

### UNI-DIRECTIONAL SL SERIES:

A Standard SL SERIES Laser Doppler gauge cannot measure down to ZERO SPEED and cannot differentiate in Direction of movement. Most processes cannot change in direction, hence the fact that a Standard Laser Doppler System cannot differentiate direction of movement is not an issue. However Standard laser Doppler Systems have a minimum speed. The reason is that a Doppler signal is not available at stationary object. It requires a minimum speed to generate Doppler. The standard UNI-DIRECTIONAL SL SERIES Proton Laser Doppler systems have the lowest minimum speed of units available on the market !



Standard SL Series Laser Doppler Speed Sensor, here shown with Air Pressured Lens Protection window and cooling in and outlets to the Base. May be used for Environmental Temperatures in the range 45°C to 60°C – **proton advices on the cooling requirements to be applied.**

### BI-DIRECTIONAL SLR SERIES

**SLR SERIES** Laser Doppler gauges use special opto-electronics technology and can detect the direction of motion and operate as from **ZERO SPEED**.



Standard SLR Series Laser Doppler Sensor

## APPLICATIONS OF STANDARD SL AND SLR SENSORS

There are over 7000 Standard SL and SLR Sensors installed in Industrial processes worldwide. Many of these are in the metals industries for either Speed Control, Cut to length or Inspection of already cut length. Applications are numerous and references include very large multi national companies. It is not possible to list here all applications, but if you require details on specific applications please consult us.



Illustration: SL3060 Unit installed on a Steel bar inspection line.

## SLX and SLX- L High Temperature Environmental Enclosures

Standard SL and SLR Series Sensors are designed for “cold applications” , this means for normal environmental environments up to max 45°C. Although the Standard SL and SLR Series Sensor has a cooling channel embedded into its base, whereby air or water may be used for cooling, it only provides a base cooling that is in no way sufficient to protect the unit against extreme radiation levels of large (red) hot steel objects to be measured. What is to be considered is the level of radiated heat that is absorbed by the Instrument (in Watts) and that must be removed by effective cooling. Furthermore, a Laser Doppler system is using a lens to collect reflected laser light. When the unit is used on very hot objects, also radiated energy (including wavelengths below and above the laser wavelength) is projected thru the lens inside the Laser Sensor. Therefore, even if heat exposure might be at first sight “modest”, the level of heat that enters the unit through the lens must be considered, and adequate cooling taken into consideration.

Standard SL and SLR Series units with a cooling medium applied to the integrated embedded channel could be set-up for modest higher environmental temperatures. However for applications on large red-hot metal products the Standard SL or SLR Series unit is to be integrated into a SLX or SLX-L Series Environmental Enclosure



Standard SL120120 (stand-off 1200mm and depth of Field of 120mm) Laser Doppler Speed Sensor, here shown with Air Pressured Lens Protection window and cooling medium in and outlets to the Base. May be used for Environmental Temperatures in the range 45°C to 60°C – proton advices on the cooling requirements to be applied.

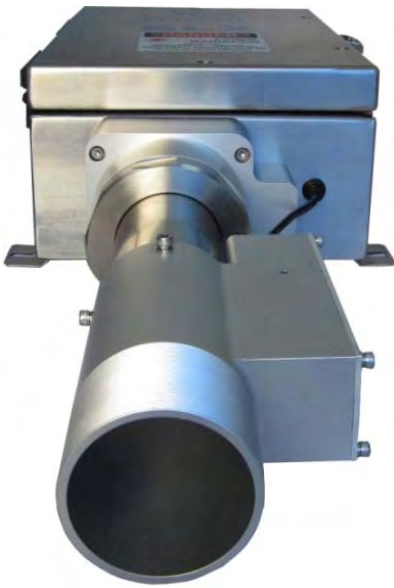
## SLH Series Harsh Environment Enclosure:



Economic Environmental Protection and Cooling Enclosure for either SL3060, SL6060, SL120120 or SLR3060, SLR6060 or SLR120120 Laser Doppler Sensors. Provides excellent mechanical protection and provisions for either water or air cooling. Suitable for many harsh environment applications in the Ferrous, non-ferrous and other Industries.

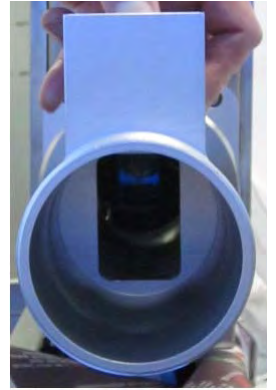
*We reserve the rights to change or amend specifications without prior notice*

## SLX120120 & SLRX120120 High Temperature Enclosure



For Cold and Hot Rolling Mills for Profile and Plate Steel, Aluminium finishing mills, etc...

SLX and SLRX Series Centrifugal Force Air Blower Units available , please consult us !



- Stand-off 600 or 1200mm – Depth of field 60 or 120mm – Accuracy better then 0.05%
- For very harsh applications: Embedded Water Cooling, Air Wipe Window, Air Pressurised nosing, possibility of extra forced aircooling, etc....Shutter integrated into nosing. Possibility to extend nosing with Semi flexible front end.
- All electrical connections and all interfaces on 1 military connector, only requires 24Vdc Power Supply.

## SLX120120- L and SLRX120120-L Extreme Temperature Enclosure:



Stand-off 1200mm – Depth of field 120mm

For Red Hot Metal applications: Double Heat Deflector, Water cooled Baffle, Pressurised Nosing, Vortex Cooler.

Electrical Control unit – 1 cable connection to Laser System, Double Siemens Power Supplies, Laser Warning Lamp, etc

All Electrical Interfaces for PLC and communication ports accessible in Electrical Control Unit.

**For Casting Processes, Hot Metal Extrusion/Forming Lines, Hot Rolling Mills for Profile and Plate Steel, etc..**



## SPECIFICATIONS

	SL3060	SL6060	SL120120 (Standard Doppler)
Minimum Speed	0.2 m/min	0.2 m/min	0.4 m/min
Maximum Speed	5000 m/min	5000 m/min	10000 m/min
	SLR3060	SLR6060	SLR120120 (Bi-Directional ZERO Speed)
Minimum Speed	0 m/min	0 m/min	0 m/min
Maximum Speed	+/- 5000 m/min	+/- 5000 m/min	+/- 5000 m/min

### COMMON SPECIFICATIONS:

Nominal Stand-off Distance	300 mm	600 mm	1200 mm
Depth of view	60 mm	60 mm	120 mm
Accuracy		better then 0,05%	
Repeatability		better then 0,02%	
Maximum acceleration rate		> 500 ms <sup>2</sup>	
Update time for Pulses and Analogue Output		40 µs (0,04 ms)	
Required Power Supply		15 - 25 Vdc, 20 Watts	
Industrial Protection Rating		IP67	
Environmental Temperature		0~ 45°C (higher temperatures possible with optional cooling)	
Sensor Dimensions (L x W x H)		230 x 130 x 75 mm	
Weight		3 Kg	
Laser-beam Diameter		4mm	
4 digital Inputs (2 are programmable)		2 x fixed: Laser enable and Optical Laser Shutter enable 2 x programmable I/P's :Reset Length, Hold Display, Hold Length, Hold Speed, Direction, Pause: contact or logic Input 24Vdc	
3 Programmable Relay outputs		Volt-free contacts, programmable for NC or NO use; Max.50Vdc 0,5A Choose from: Status sensor, Measurement OK, Laser on, Laser at temp, Shutter open, final length 1 achieved, final length 2 achieved, etc.	
Serial Interface		choose from RS232, RS485 or RS422: length, speed, quality factor	
Ethernet		Ethernet TCP/IP or UDP/IP	
CANBUS		for communication with (optional) Proton displays	
3 Pulse Outputs (European Market only)		Opto isolated differential outputs 5V tot 24V, freely programmable, Pulse rates up to 1 MHz, updated at a rate of 0.04 mSec	

### inteliSENS™ Communication Options

1 Analogue Output	0- 10Vdc programmable O/P for Speed or QF updated at a rate of 0.04 mSec,
Optional Interfaces	profIBUS profiNET, Ethernet IP, deviceNET, ModBUS, and SSI

## CONTACT:

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