TACOMETROS-ESTROBOSCOPIOS
MEDIDOR VIBRACION-SENSORES

Soluciones para RPM, Mantenimiento e Inspección

MONARCH

SENSORES
TACOMETROS
ESTROBOSCOPIOS
MEDIDORES VIBRACION

Tel: 902.171.171
www.euro-automation.com

PORTABLE TACHOMETERS/TOTALIZERS (Contact/Non-Contact)

Pocket-Tach Series

NIST CE

Example Applications:
- Centrifuges
- Saw blades
- Grinders
- Elevators/escalators
- Engines
- Motors
- Conveyor belts

Pocket Laser Tach 200

The compact and versatile Pocket-Tachs are ideally suited for non-contact, contact and linear speed measurements.

Pocket Laser Tach 200 (PLT200) is a digital, battery-powered portable optical tachometer, which operates up to 25 feet from a reflective target using a laser light source. The ergonomic design allows safe, direct line-of-sight viewing of both the target and the display at the same time, while providing a non-slip rubber surface for single hand operation.

Multi-Function

PLT200 is a 32 function Tachometer/Ratemeter, Totalizer/Counter and Timer (stopwatch), which is programmable in both English and Metric rates. Support is built-in for both our optional Remote Contact Assembly (RCA) and our Remote Sensors. PLT200 has a TTL compatible Pulse Output to trigger devices like data collectors or stroboscopes. The KIT is supplied complete with a Remote Contact Assembly including concave and convex tips and a 10 cm linear speed wheel all in a latching carrying case.

Pocket Laser Tach 200 Kit includes: Tachometer, RCA, Contact Tips, 10cm Linear Contact Wheel, 5 feet of Reflective Tape and a Latching Carrying Case.

PLT200 Kit

Two Tachs in One ... the only portable laser tachometer available with both Remote Contact and Remote Sensors.

Optional plug-in Remote Sensors with 8 foot cable. (25 foot cables available).

Remote Optical Sensor (ROS-P) Gap 36 inches

Remote Magnetic Sensor (MT-190-P) Gap 0.25 inches

Remote Infrared Sensor (IRS-P) Gap 0.50 inches

Non-Contact Measurements- View Target & Display Simultaneously

Remote Contact Assembly (RCA) with 6 foot (1.82m) cable, Contact Tips and 10 cm Linear Contact Wheel

Optional 12 inch circumference Linear Contact Wheel

Optional RCA

Specifications PT99

•	Display:	5 Digits, 5 Alpha-numeric LCD
•	Range:	5 to 99,999 RPM
•	Accuracy:	±0.01% or ±1 Digit
•	Resolution: Autoranging:	0.001 to 1.0 RPM
	Fixed:	± 1 Digit RPM
•	Operating Range:	2 inches to 36 inches, ±30°
•	Memory:	Maximum, Minimum and Last
•	Power:	(2) "AA" 1.5 VDC batteries (60 hours)
•	Environmental:	5° to 40°C (40° to 105°F) 80% RH up to 31°C (88°F)
•	Dimensions:	6.92 "H x 2.4"W x 1.6"D (17.58 x 6.10 x 4.06cm)
•	Weight:	7 oz. (210 g)

Specifications PLT200

- Display: 5 Digits, 5 Alpha-numeric LCD
- Range(s) *Optical: 5 to 200,000 RPM
  **Contact RPM: 0.5 to 20,000 RPM

Rates	10cm Contact Wheel	12 inch circumference Contact Wheel
Inch/min	1.969 to 78,740 IPM	6.000 to 144,000 IPM
Feet/min	0.164 to 6,561.7 FT/M	0.500 to 12,000 FT/M
Yard/min	0.055 to 2,187.2 YPM	0.167 to 4,000.0 YPM
Cm/min	5.000 to 200,000 cm/M	15.240 to 365,760 cm/M
M/min	0.050 to 2,000.0 M/M	0.153 to 3,657.6 M/M

- Totalizer: 1-999,999
- Accuracy: Optical: ±0.01% of reading; Contact: ±0.05% of reading (rpm)
- Resolution: 0.001 to 10 RPM (range dependent)
- Operating Range: 2" to 25' (5cm to 7.62m), ±70° from perpendicular
- Memory: Maximum, Minimum and Last
- Power: (2) "AA" 1.5 VDC batteries (30 hours)
- Environmental: 5° to 40°C (40° to 105°F) 80% RH up to 31°C (88°F)
- Dimensions: 6.92 "H x 2.4"W x 1.6"D (17.58 x 6.10 x 4.06cm)
- Weight: 7 oz. (210 g)

*** performance subject to intensity of ambient light irradiation.**

**** also reads units per second and per hour.**

N.I.S.T. INCLUDED CALIBRATION

LASER RADIATION
AVOID DIRECT EYE EXPOSURE
CLASS 3R LASER PRODUCT
MAX OUTPUT POWER: 3mW
EMITTED WAVELENGTH: 650nm
CLASSIFIED TO IEC 60825-1:2001

PT99

Pocket Tach 99 (PT99) is a digital, battery-powered portable non-contact optical tachometer, which operates up to 36 inches from a reflective target using an LED light source. The ergonomic design allows safe, direct line-of-sight viewing of both the rotating target and the display at the same time, while providing a non-slip rubber surface for single hand operation. Pocket Tach 99 is the value-leader of the world-class Pocket Tach Series from Monarch.

Ordering Information

Pocket-Tach 99 Tachometer, Battery & 6 inches Reflective Tape.

Pocket Laser Tach 200 Tachometer, N.I.S.T. traceable certificate of calibration, 12 inches of Reflective Tape.

Pocket Laser Tach 200 Kit Tachometer with Latching Carrying Case, RCA, Tips and Linear Speed Wheel, Battery, 5 foot roll Reflective Tape, N.I.S.T. traceable certificate of calibration.

ROS-P Remote Optical Sensor with Mounting Bracket and 8 foot cable for Pocket Laser Tach 200 only

T-5 Reflective Tape, 5 foot roll, 1/2" wide.

PORTABLE TACHOMETERS (Non-Contact with Pistol Grip)

Phasar-Laser Tach Series

NIST CE

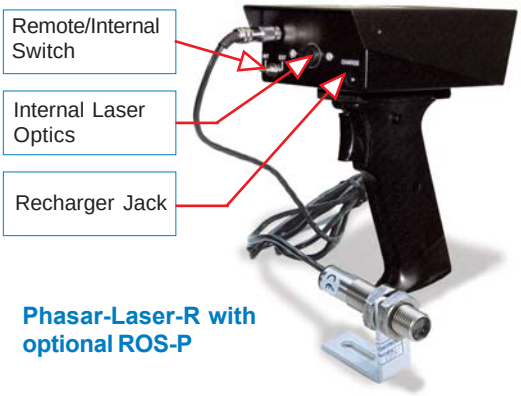
Phasar-Laser combines the accuracy and safety of a non-contact optical tachometer with the convenience and ease of operation of a pistol grip instrument, housed in a rugged steel enclosure. The tachometer provides a convenient visible red laser for easy targeting along with a latching trigger for hand held operation and a mounting bushing for tripod mounted use.

Phasar-Laser-R provides for an optional remote sensor for difficult to reach locations in addition to the standard internal measurement optics.

Features
- Convenient pistol grip design
- Rugged steel enclosure
- Safe non-contact operation to 10 feet (3 m) and 45 degrees from reflective tape
- On-target and low battery indicators
- Last measurement memory

Phasar-Laser

Example Applications:
- Engines
- Dynamometers
- Pumps
- Fan blades
- Centrifuges
- Motors



Phasar-Laser-R with optional ROS-P

N.I.S.T. INCLUDED CALIBRATION

LASER RADIATION
AVOID DIRECT EYE EXPOSURE
CLASS 3R LASER PRODUCT
MAX OUTPUT POWER: 3mW
EMITTED WAVELENGTH: 650nm
CLASSIFIED TO IEC 60825-1:2001

Specifications	Phasar-Laser and Laser-R
Range	5-100,000 RPM
Accuracy	±1 RPM or 0.01% of reading
Resolution	1 RPM
Display	6 digit, 0.5" high Liquid Crystal Display
Power On	Pistol grip trigger with latching push Switch button
Power	(4) "AA" (LR6) Alkaline batteries or *optional NiCad batteries and AC recharger

Ordering Information
Phasar-Laser Tachometer, 12" of Tape, and Alkaline Batteries
Phasar-Laser Kit Tachometer, Recharger, 5 foot roll of Tape, NiCad Batteries in Latching Case
Phasar-Laser-R Kit Tachometer, Recharger, Remote Optical Sensor, 5 foot roll of Tape, NiCad Batteries in Latching Carrying Case

PORTABLE TACHOMETERS/TOTALIZERS (Non-Contact/Multi-Function)

Tach-4A and Tach-4AR Series

NIST

Tach-4A innovated the combination of a high accuracy, wide range ***Tachometer***, multi-function ***Totalizer/Counter*** and ***Timer (Stopwatch)*** in one versatile instrument. Tach-4A is the world's most accurate portable tachometer, providing resolution of up to 0.0001 RPM. Safe non-contact operation up to 36 inches (91.44cm) and ±45° from perpendicular on a reflective tape target.

Tach-4A is menu programmable from a six button membrane keypad. A unique scaling feature allows triggering from one or multiple pulses per revolution as a tachometer, ratemeter and totalizer/counter displaying data in engineering units.

Tach-4AR is available with remote sensing capability. Remote sensors may be optical, infrared, magnetic or laser. See Page 7 for optional sensors. The optional 0-5V TTL compatible Pulse Output (PO) is supplied with a cable for BNC interface to data acquisition equipment.

Tach-4A

Example Applications:
- Vibration TTL pulses
- Pumps
- Trip switches
- Fans
- Centrifuges
- Calibration

Specifications	Tach-4A and Tach-4AR
Range	5-500,000 RPM
Frequency Range	0.083-8333.3 Hz
Accuracy	0.0015% of reading
Resolution	Up to 0.0001 RPM
Totalizer/Counter	1-999,999 counts
Timer (Stopwatch)	Hrs, Min, Sec, 0.01 Sec to 100 mins.
Display	6 digit alphanumeric, backlit LCD, update twice per second, self-test mode
Power	4 "AA" (LR6) Alkaline batteries or *optional NiCad batteries and AC recharger
Size (L x W x H)	6.2" x 3.74" x 1.3" (157 x 95 x 33 mm)
Weight	14 oz. (22 kg)

****Optional NiCad batteries may be charged while in Tachometer.***

N.I.S.T. INCLUDED CALIBRATION

Tach-4AR-PO Kit with optional TTL pulse output

Ordering Information
Tach-4A Instrument, 12" of Tape, Alkaline Batteries in Padded Case
Tach-4A Kit Instrument, Recharger, 5 foot roll of Tape, NiCad Batteries in Latching Carrying Case
Tach-4AR Kit or Tach-4AR PO Kit Instrument, Recharger, 5 foot roll of Tape, Remote Optical Sensor, NiCad Batteries in Latching Carrying Case

Evolution Series

Evolution Laser Tachometer

Evolution multi sensor system is a digital, battery-powered instrument which has interchangeable ***Sensor Modules***. A common ***Display Unit*** recognizes any ***Sensor Module*** and configures itself without programming or setup. Designed for the mobile technician, replacing the need for numerous instruments with different operating interfaces and power.

Features

- Modular design -add Sensor Modules at any time
- Single User Interface
- Light-weight industrial plastic

Example Applications:
- HVAC
- Food & Drug QC
- Balancing
- Fan blades
- Centrifuges
- Motors

DISPLAY UNIT SPECIFICATIONS	
5 digit LCD with 5 alphanumeric characters.	
Memory:	10 measurements. Min and Max. recall
Power:	(2) AA Alkaline batteries
Dimensions:	6.75 x 2.25" (72 x 58 mm)

Dual Contact Tachometer Module

optional 12 " circumference wheel

CONTACT TACHOMETER MODULE SPECIFICATIONS	
Range	0.5 to 15,000 RPM
Accuracy	± 0.05% of reading
Resolution	Fixed or Auto Range to 4 decimal places
Linear Range	Feet/Min 1.70 to 4,900 (10 cm Wheel) 0.42 to 12,000 (12 inch Wheel)
Select	Inch/Feet/Yards, Centimeters/Meters per Second/Minute/Hour and Miles Per Hour

Infrared Temperature Module with Laser Sight

Laser sighting

INFRARED TEMPERATURE MODULE SPECIFICATIONS	
Range	0 to 750 °F (-18 to +400 °C)
Accuracy	±2% or 4 °F (2 °C)
Resolution	1 °F (0.5 °C)
Target/Distance	12:1
Spectral Response	8-14 Micrometer
Emissivity	Adjustable 0.10 to 1.00
Select	°F or °C, Laser ON/OFF

Laser Tachometer Module

LASER TACHOMETER MODULE SPECIFICATIONS	
Range	5 to 200,000 RPM
Accuracy	±0.01% of reading
Resolution	Fixed or Auto Range to 4 decimal places
Target Distance	Up to 15 feet at 45° offset
Select	RPM or RPS, 0-4 decimal places

Dual Contact Temperature Module

DUAL CONTACT TEMPERATURE MODULE SPECIFICATIONS	
Display	T1, T2 DELTA T (T1-T2 or T2-T1)
Memory	10 MAX. and 10 MIN. readings
Range	K-Type T/C -198 to 2500 °F (-127 to 1371 °C) J-Type T/C -198 to 1800 °F (-127 to 982 °C)
Accuracy	0.1% =or.0 °F (0.5 °C) Typical @ 25 °C Ambient
Resolution	0.5°
Select	Type J or K T/C, °F or °C

RH and Temperature Module

RH AND TEMPERATURE MODULE SPECIFICATIONS	
Humidity Range	10 to 95% RH
Accuracy	± 3% RH
Resolution	0.1% RH
Response Time	10 seconds (still air)
Temperature Range	32 to 175 °F (0 to 80 °C)
Accuracy	± 1% or 1 °F (0.5 °C)
Resolution	0.2 °F (0.1 °C)
Select	°F or °C

LED Strobe Module

LED STROBELITE MODULE SPECIFICATIONS	
Range	60 to 50,000 Flash/Minute (1-883 Hz)
Accuracy	±0.01% of reading or 1 FPM
Resolution	1.0 FPM (0.01 Hz)
Modes	FPM or FPS or Flashlight
Features	x2, /2, and 10 memory presets, recalls last reading

Examiner 1000 and OnTime Software

Examiner 1000 overall vibration meter and electronic stethoscope is the ideal tool for cost-effective predictive maintenance. This meter is simple to operate with only one button and volume adjustment. Troubleshoot bearings and lubrication with the digital LCD and stethoscope features to enhance machinery reliability. Compare your vibration results by using the ISO 10816 Severity Chart right on the meter. **N.I.S.T. traceable calibration is available.**

Example Applications:
- Bearings
- Gearboxes
- Lubrication
- Pumps
- Motors
- Fans

Examiner 1000

Features

- Measure vibration in:
  - **Acceleration-** perfect for high-speed applications
  - **Velocity-** in English or Metric per ISO 10816
  - **Acceleration Envelope**-high-pass filter method
- Electronic Stethoscope-troubleshoot while listening to the bearing

SPECIFICATIONS		EXAMINER 1000
Amplitude Ranges	Acceleration: Velocity: Envelope:	0.01 to 19.99g (RMS) 0.01 to 19.99 in/sec (RMS) 0.1 to199.9 mm/sec (RMS) 0.01 to 19.99 ge (PEAK)
Frequency Ranges		Overall: 10 Hz to 10 kHz Envelope: 0.5 kHz to 10 kHz
Display Indications		LCD 3.5 digit with Measurement, Hold and Low Battery
Vibration Sensor		Piezoelectric Accelerometer 100 mV/g
Output		Audio: (3.5 mm) mini plug Sensor Power: 12 Vdc @ 2 mA
Power		(2) "AA" cell batteries
Operating Time		20 hours continuous without phones
Environmental		-14 to 122 °F (-10 to 50 °C)
Dimensions		6.3 x 3.3 x 1.25" (152 x 83 x 32 mm)
Weight		2.85 lbs (1.30 kg)

Examiner 1000 Kit with OnTime Trending Software

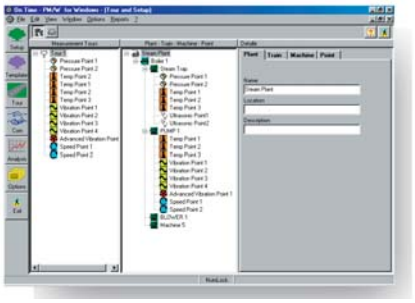
VIBRATION SEVERITY PER ISO 10816						
	Machine		Class I small machines	Class II medium machines	Class III large rigid foundation	Class IV large soft foundation
	in/s	mm/s				
Vibration Velocity Vrms	0.01	0.28				
	0.02	0.45				
	0.03	0.71		good		
	0.04	1.12				
	0.07	1.80				
	0.11	2.80		satisfactory		
	0.18	4.50				
	0.28	7.10		unsatisfactory		
	0.44	11.2				
	0.70	18.0				
	1.10	28.0		unacceptable		
	1.77	45.9				

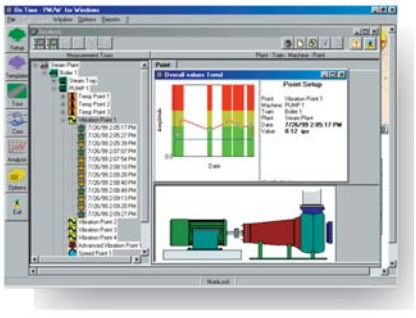
Overall Vibration Severity Chart, located on the front panel of the Examiner 1000, provides instant status of measured machinery.

OnTime Trending Software is a simple-to-use, graphical program designed for condition-based maintenance through the routine trending of vibration and process information. Trending is the best method to judge the dynamic operating conditions of your machinery. **OnTime** helps you to manage all key machinery operating conditions.

Trend:

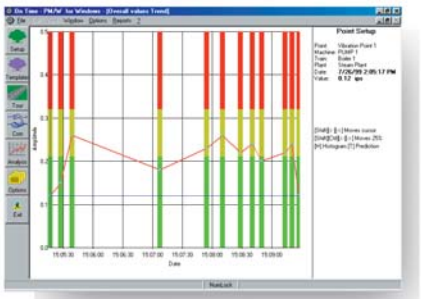
- **overall vibration readings**
- **temperature**
- **speed**
- **process measurements of any type**





OnTime is easy to set-up. Building the user-defined database of collection points is simple and intuitive. Construct entire Plants with complex machines and data collection points in minutes. Cut, paste, copy and edit-all the familiar windows features are here.

OnTime graphically displays automatically built trends of the data entered. User defined alarms are set and if violated, an immediate visual alarm is displayed in the software. This allows for instant identification of machines which require corrective action. Compare any type of data.



OnTime software does not work with Windows 2000 OS.

Ordering Information

Examiner 1000 System Vibration Meter, Sensor Pak, Headphones, Carrying Case, OnTime GP Software

Examiner 1000 Kit Vibration Meter, Sensor Pak, Headphones, Carrying Case and OnTime GPlite Software

Examiner 1000 Vibration Meter with Sensor Pak, Headphones, Carrying Case, No OnTime Software included

OnTime GP Software for Windows 95/98, XP and NT 4.0

ACT Series

ACT-3 Panel Tachometer/Ratemeter/Totalizer

Example Applications:
- Control rooms
- Alarm shutdowns
- Field testing
- Data acquisition
- R&D testing

The ACT Series consists of three models -one tachometer and two tachometer/ratemeter/totalizers. All feature universal input for two and three wire sensors providing signals of 0-5V TTL or 0-200 mVac to 0-50 Vac. All models operate from optical, infrared, laser, proximity or magnetic sensors (see Page 7) and display in fixed or floating decimal point format. The ACT-3 provides the best user benefits of any panel instrument available today.

Features

ACT-1B (5-99,999 RPM)
- One pulse/revolution (ACT-1B) or 60 pulses/revolution (ACT-1B-60)
- Output options: 4-20 mA (12 bit), 0-5 Vdc (12 bit) or TTL pulse

ACT-2A (5-999,990 RPM)
- Front panel programmable
- One or multiple pulses/revolution, scaling or totalizing
- Minimum and maximum memory recall

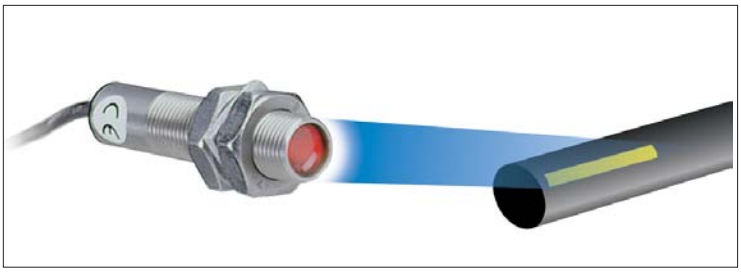
ACT-3 (5-999,990 RPM)
- N.I.S.T. Traceable Certificate of Calibration included
- Simultaneous 4-20 mA, 0-5 Vdc (12 bit), TTL pulse and 2 Alarm outputs and RS232.
- Single event speed capture from start and stop pulses, in units such as MPH, cm/sec, etc. Using one sensor - rotational, loop or reciprocating motion. Using two sensors - linear travel.

ACT-1B Panel Tachometer CE

ACT-3 Panel Tachometer/Ratemeter/Totalizer

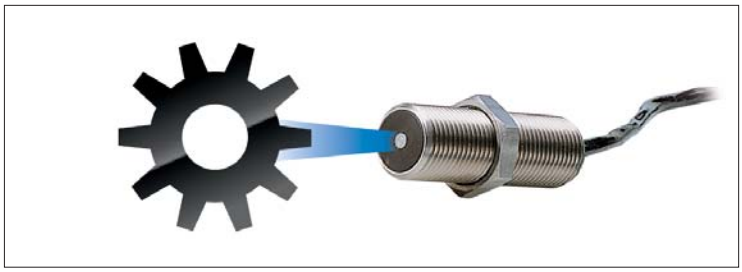
Specifications	ACT-1B	ACT-1B-60	ACT-2A	ACT-3
Speed Range	5-99,999 RPM		5-999,990 RPM (Speeds below 5 RPM possible with multiple pulses/revolution)	
Accuracy	±1 RPM or 0.005% of reading		RANGE	RESOLUTION (autoranging mode) ACCURACY (±0.0015%) of reading
Resolution	1 RPM		5.000-9.9999 10.000-99.999 100.00-999.99 1000.0-9999.9 10,000-99,999 100,000-499,999 500,000-999,990	0.0001 0.001 0.01 0.1 1 10 10
Input Configuration	1 pulse/rev	60 pulses/rev	1 or multiple pulses/rev. Front panel push button programmable	
Alarm Output	N/A			Form C relay contacts rated 1A at 115 Vac
Alarm Capability	N/A			Two alarm set points each, front panel programmable as either high or low, latching or non-latching. Hysteresis and low limit lockout are programmable.
Analog Outputs	Optional: Current Output (IO): 4-20mA (12 bit) OR Analog Output (AO): 0-5Vdc (12 bit) ***MUST SPECIFY FULL SCALE RPM FOR EITHER OPTION**		N/A	Voltage Output 0-5Vdc and Current Output 4-20mA. Panel programmable for common full scale RPM or offset ranges. Example: 0V=3600 RPM and 5V=5000 RPM
Output Update Rate	Up to 2x per second		N/A	Standard up to 25 times/second. Programmable up to 233 times/second.
Pulse Repeater Output (PO)	Optional: Pulse Output 0-5 V TTL compatible. Pulses out per rev equal pulses in per rev		N/A	Pulse Output 0-5V TTL compatible. Pulses out per revolution equal pulses in per revolution
Scale Factor	N/A		0.0001-9999.9	
Totalize/Count	N/A		1-99,999	
Display	5 digits, 0.56" (14 mm) high red LED			
Display Update	2x per second above 120 RPM			
Dimensions	1/8 DIN by 4.5" (114 mm) deep		1/8 DIN by 7" (178 mm) deep	
Power	Must Specify 115V, 230V (50/60 Hz) or 12Vdc input power - Tachometer provides 5-8 Vdc power to sensors			

for Tachometers & Stroboscopes or stand alone use



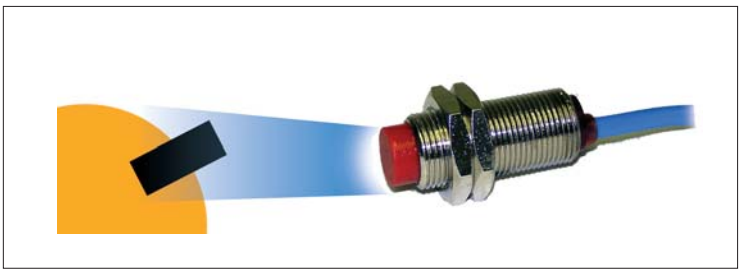
Optical (1-250,000 RPM) ***Most versatile and popular.***

ROS (Remote Optical Sensor): Threaded stainless steel remote optical sensors have a visible red LED light source and green LED 'On Target' indicator. Performs over a wide speed range and operating envelope. Modulated and High Temperature versions available. **Common usage**: Wide range of general purpose applications in relatively clean environments.



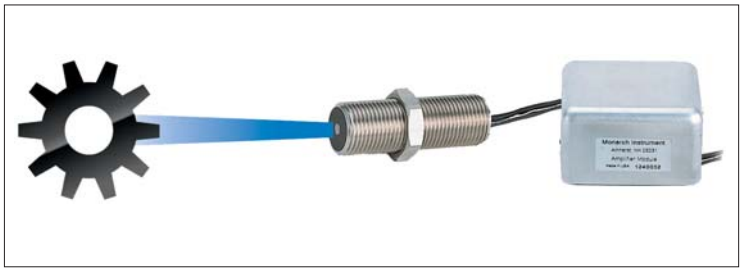
Magnetic (1-99,999 RPM) ***Self-powered gear sensor.***

M-190W or M-190P: Most popular sensor for use with 60 tooth 20 pitch gears. Sensor mounts within 0.005 inches (0.127 mm) of a minimum 0.1 inch (2.5 mm) target. Requires no power from the display module and self-generates an AC signal.
Common usage: Ferrous metals, primarily gear teeth.



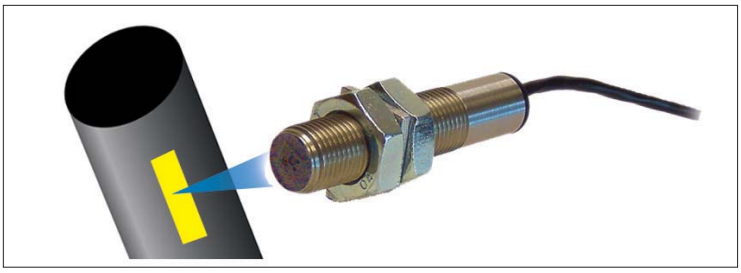
Proximity (1-60,000 RPM) ***Rugged industrial sensor.***

P5-11: A two wire probe style inductive sensor for use up to 0.2 inches (5 mm) from 0.5 inch (12 mm) metallic target such as bolt head or shaft locking key. **Common usage:** Permanent installation in harsh industrial environments.



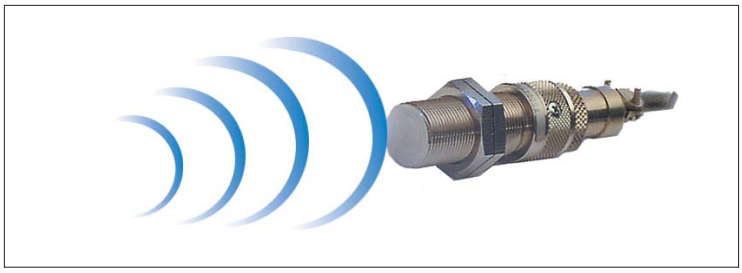
Magnetic with Amplifier Module (1-99,999 RPM) ***Amplifier enhances performance of M-190 magnetic sensor.***

MT-190W or MT-190P: Amplifier extends operating gap to 0.25 inches (6.35 mm) from the target. Frequently used on gears as the M-190, but can also sense bolt heads or shaft keys and provides a 0-5V TTL output signal. **Common usage:** Ferrous metals including bolt heads or shaft keys in addition to gear teeth.



Infrared (1-999,990 RPM) ***Reliable high speed sensor.***

IRS-W or IRS-P: Ideal sensor for working 0.5 to 1.0 inch (12 to 25 mm) from high speed equipment or other applications providing only contrasting light and dark surfaces or beam interruption by solid objects. **Common usage:** Dentist and other high speed drills, slots or gear teeth. Does not require reflective tape.



Inductive (200-20,000 RPM) ***Gasoline Engine RPM.***

GE-200: Ideal sensor for gasoline engine RPM, working 0.5 to 4.0 inches (12 to 100 mm) from ignition coil or magneto.
Common usage: 2-cycle and 4-cycle gasoline engines.

Specifications	ROS-W or P	P5-11	IRS-W or P	M-190W or P	MT-190W or P	GE-200
Operating Distance	3 feet (1 m) and 45° from reflective tape	0.2" (5 mm) from 0.5" (12 mm) metallic target	0.5 to 1.0" (12 to 25 mm) sensing gap	0.005" (0.127 mm) gap with 0.1" target (2.5 mm) minimum	0.25" (6.35 mm) gap with 0.1" target (2.5 mm) minimum	up to 4 inches (100 mm)
Speed Range	1-250,000 RPM	1-60,000 RPM	1-999,990 RPM	1-99,999 RPM		200-20K RPM
Operating Temperature	-10° to 250° F (-23° to 121° C)	-4° to 140° F (-20° to 60° C)	-10° to 212° F (-23° to 100° C)	-100° to 225°F (-73° to 107°C)		0° to 175°F (-18° to 80 °C)
Power required	3.3 to 15 Vdc @ 45 mA	7.7 to 9 Vdc, 3 mA	3.3 to 15 Vdc	Self Generating	3.3 to 24 Vdc, 4 mA	5 Vdc, 4 mA
Output Signal	Same as source	Namur (DIN 19 234)	Same as source	190V P-P	Same as source	TTL 5-0 Vdc
Standard Cable	8 feet (3.5 m)	6 feet (1.8 m)	8 feet (3.5 m)			15 feet (4.7 m)
Dimensions	2.90" x 0.625" dia. (73 x 16 mm)	1.3" (L) x 0.43" (32 x 11 mm)	0.25 x 0.25 x1.0" (6 x 6 x 25 mm)	2.0" (L) x 0.625" (50 x 16 mm)		2.16 x 0.82" dia. (55 x 21 mm)

W = tinned wire leads P = 1/8" (3.5 mm) phone plug connector. ROS is available with 8 or 25 foot cable.

SPS Series and Smart Laser Sensor

SPS-5/115 Self-powered Sensor

Common Applications:
- High Speed Drills
- R&D
- Engines/Motors
- Felt Belts/Conveyor
- Data Acquisition

The unique SPS Series of Self-Powered Sensors provide a TTL compatible pulse output from any of four input sensors:

- A visible optical red LED light source (ROS-P)
- An infrared light source (IRS-P)
- An amplified magnetic sensor (MT-190P)

See Page 7 for the sensors best suited to your applications.

The TTL compatible output is switch selectable as either positive going 0-5V pulses or negative going 5-0V pulses provided on a BNC connector. Internal rechargeable batteries provide 7 hours of operation between charges. For continuous operation, all SPS configurations can be powered by 115Vac, 230Vac or 5-12Vdc.

Self-powered sensors are a critical element for providing one pulse per revolution for vibration analyzers, spectrum analyzers, stroboscopes, data acquisition equipment, tachometers, balancers, waveform analyzers and magnetic tape recorders.

Remote Optical Sensor (ROS-P)

Magnetic Trigger Sensor (MT-190P)

Infrared Sensor (IRS-P)

Interface Module (SPS-IM)

115 Vac Recharger (R-5)

5-12 Vdc Cable (CA-SPS12)

230 Vac Recharger (R-6)

Customize your SPS for your application

1. **Begin with the SPS-IM Interface Module**
2. **Select the sensor(s) best suited for your requirement**
3. **Choose your preferred power source**

Specifications	SPS Series
Range (RPM)	Same as sensor
Output Signal	TTL compatible pulse, 0-5V or 5-0V
Pulse Width	Determined by size of target and rotational speed
Output Connector	BNC
Power	4 "AA" (LR6) NiCad Batteries, AC or 5-12 Vdc

Smart Laser Sensor is an internal battery-powered optical speed sensor utilizing a visible Class 3R Laser for a TTL pulse output. Operating range up to 65 feet (19.8 m) with reflective tape and up to 3 feet* (1 m) from contrasting color targets, keyways, bolt heads or blades.

- "Smart" auto gain provides best performance in picking up target reflections.
- "On Target" Indicator
- TTL pulse output signal inverter Switch
- Manual sensitivity knob provides dynamic fine tuning of sensor response
- Signal/Pulse/RS232 Output DIN connector Port
- External DC power or recharger Port
- Tripod Mounting Bushing (¼ - 20 UNC)

N.I.S.T. INCLUDED CALIBRATION

SLS-115/230
Smart Laser Sensor with 115/230 VAC PR Universal recharger, SLS-CA-BNC cable and 12 inches of Reflective Tape.

* performance subject to intensity of ambient light irradiation.

Specifications	Smart Laser Sensor
Optical:	Class 3R (per IEC 60825-1) visible laser 650nm @ 3 mW peak power
Operating Range:	up to 65 feet (19.8 m) from T-5 reflective tape
Speed Range:	1-500,000 RPM
Output Signal:	TTL 5-0 VDC (user selectable polarity), RS232
Operating Temp:	32° to 104°F (0° to 40°C)
Dimensions:	5.41(L) x 2.35(W) x 2.14" (H) (13.74 x 6.43 x 5.43cm)
Mounting:	¼ - 20 UNC bushing for tripod

Palm Strobe Series

NIST CE

PALM STROBE is the new industrial standard for high intensity, multi-function compact Xenon stroboscopes. Unique one-touch joystick-type button allows single hand operation for fractional RPM tuning. Select mode of operation for internal tuning, external TTL input, tachometer display and x2 ÷2 functions. 6 memory positions provide rapid recall of user defined frequencies. The unique rugged industrial strength design offers:

- **Removable Battery Pack**
- **One Hand Operation**
- **Light weight, Pocket Size**
- **Flash Rates to 12,500 FPM, 1100 lux**
- **Tachometer Mode**
- **TTL Compatible Input/Output**

Palm Strobe

Common Applications:
- Data Collectors
- Fans
- Printing Presses
- R&D
- Utilities
- Felt Belts/Conveyor
- Vibration Studies

Unlimited Power
World's First removable, rechargeable battery pack Stroboscope

Remote Trigger
Supports optional SPS (self-powered sensor) trigger. See opposite page.

Universal Power
Optional Universal Power Supply alows you to recharge anywhere in the world.

Portable Inspection Light
Unique Field Holster gives you true mobility

Palm Strobe Deluxe Kit

Specifications	Palm Strobe Series
Display	6-digit alphanumeric backlit LCD display
Light Power	7 watts (effective power), 150 mJoules
Flash Lamp Life	100 million flashes typical
Flash Duration	10 - 30 microseconds typical
Internal Mode Range	100 - 12,500 FPM (Flashes per Minute)
Flash Rate Resolution	0.1 FPM
Flash Rate Accuracy	greater of ±0.01% of reading or ±0.5 FPM
Tachometer Mode	5 to 250,000 RPM
External Input	0 to 5 Vdc (12 Vdc max.) TTL Compatible, Positive Edge Triggered
Output Pulse	0-5 Vdc typical- 350 µsec positive pulse
Run Time	Over 50 mins. at 1800 FPM with fully charged batteries
Memory	Saves flash rate at power down
Adjustment	Four Quadrant Pressure Sensitive Joystick Button adjusts flash rate, multiply and divide by 2.
Modes	Internal, External, Tach, Preset, x or ÷2, Locked On
Battery Power	Removable 6Vdc Rechargeable Lead-acid Battery Pack
Recharger(s)	PR115 110-120 Vac or PR230 240 Vac, 50-60 Hz
Weight	1.4 lbs. (0.64 kg) including battery
Dimensions	3.04 x 9.34" (77 x 237 mm)

PALMSTROBE patented

Ordering Information
Palm Strobe 115 w/ 115 Vac Recharger
Palm Strobe 230 w/ 230 Vac Recharger
Palm Strobe Kit with either 115 or 230 Vac Recharger, Spare Lamps and Latching Carrying Case.
Palm Strobe Deluxe Kit, 115 or 230 Vac Recharger, Spare Lamps, Carrying Case, Spare Battery & Holster
Universal Power Supply available for any Palm Strobe, 90-240 Vac, 50-60 Hz
Spare Batteries
L-1904 Replacement Xenon Lamp
CC-9 Latching Carry Case

PORTABLE STROBOSCOPES

Nova-Strobe Series

NIST CE

Nova-Strobe DB Plus

Nova-Strobe - The standard for high intensity multi-function portable stroboscopes. Models are available with digital displays, battery or AC power, and a useful range of features which provide unmatched performance and value. Four models range from the Nova-Strobe DB Plus, the most versatile battery powered digital stroboscope with internal phase shifting, down to the Nova-Strobe BA, the most cost effective AC powered digital stroboscope.

Both the battery powered Nova-Strobe DB Plus and AC powered Nova-Strobe DA Plus provide a range of 30 to 14,000 flashes per minute and an accuracy of ±0.01% of reading. Flash rates are easily adjusted to fractional RPM by a coarse/fine control knob. Individual TTL compatible input and output jacks are provided for 'daisy chaining' of multiple strobes, triggering from an external source, or providing a trigger signal to external equipment.

Both DB Plus and DA Plus provide internal phase shifting to keep the target precisely in view. Both provide x2 and ÷2 capability for distinguishing actual RPM from harmonic frequencies. In addition, 6 user presetable memory flash rates for repetitive measurements and storage of the last flash rate measured are included.

Features All Nova-Strobes, Digital and Basic:

- Internal rechargeable batteries or AC powered models
- Weighs less than 2.5 Lbs. for easy handling
- More than 20% brighter Xenon light than competitors
- Electronic switching provides continuous cool operation
- Tripod mounting bushing in handle

In addition, Nova-Strobe DB Plus and DA Plus models have:

N.I.S.T. Traceable Certificate of Calibration included

- Internal phase shifting for easy reference target viewing
- Tachometer mode, speed measurement up to 200,000 RPM
- Power for optional sensors
- Battery charge indicator (DB Plus only)

Nova-Strobe DB Plus

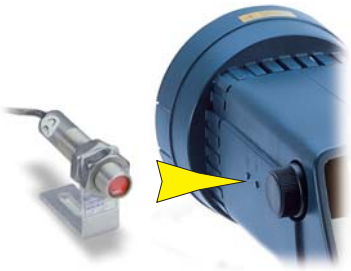
Common Applications:
- Non-contact RPM
- Diagnostic Inspection
- Bent blades/shafts
- Slipping/worn belts
- Printing Press
- Stop-action Inspection
- Textiles

Ordering Information

Nova-Strobe BA 115 Stroboscope, AC powered
Nova-Strobe BA 230 Stroboscope, AC powered
Nova-Strobe DA + 115 Stroboscope, AC powered
Nova-Strobe DA+ 230 Stroboscope, AC powered
Nova-Strobe BB 115 Stroboscope, battery powered, R-5 (115 VAC) recharger
Nova-Strobe BB 230 Stroboscope, battery powered, R-6 (230 VAC) recharger
Nova-Strobe DB+ 115 Stroboscope, battery powered, R-5 (115 VAC) recharger
Nova-Strobe DB+ 230 Stroboscope, battery powered, R-6 (230 VAC) recharger

Any of the above are also available as a Kit, including: stroboscope, recharger, spare lamp in latching carrying case.

Select optional sensors for tachometer mode



TTL compatible input/output
1/8" (3.5mm) phone plug

Nova-Strobe BB/BA digital LCD Display

Nova-Strobe DB Plus Kit 115

Specifications	Nova-Strobe DB Plus Digital, Battery Powered	Nova-Strobe DA Plus Digital, AC Powered	Nova-Strobe BB Basic, Battery Powered	Nova-Strobe BA Basic, AC Powered
Range Flashes/Minute	30-14,000 FPM (Flashes Per Minute)		100-8,000 FPM (Flashes Per Minute)	
Display	6-Digit Backlit Digital LCD		4-Digit Digital LCD	
Accuracy/Resolution	whichever is greater ±0.5 FPM or ±0.01% of reading / 0.1 FPM		± 1 FPM / 1FPM	
Flash Energy/Duration	220 mJoule (20-50 µsec)	180 mJoule (20-50 µsec)	140 mJoule (25-50 µsec)	
Average Power-Watts	10W	15W	8W	
Flash Tube Life (typical)	100 million flashes		50 million flashes	
External Trigger	TTL (24V Max) Provides 5V out, 1/8" (3.5 mm) phone jack		N/A	
Tachometer Mode	5-200,000 RPM		N/A	
Programmable Memory	Yes		N/A	
Internal Phase Shift	Yes		N/A	
Operating Time (fully charged batteries)	60 minutes at 6000 FPM	N/A	60 minutes at 6000 FPM	N/A
Power	6 Vdc internal rechargeable batteries	115 Vac, 50-400 Hz or 220-240 Vac, 50-400 Hz	6 Vdc internal rechargeable batteries	115 Vac, 50-400 Hz or 220-240 Vac, 50-400 Hz
Weight	2.5 Lbs. (1.2 kg)	1.5 Lbs. (0.72 kg)	2.5 Lbs. (1.2 kg)	1.5 Lbs. (0.72 kg)
Size (L x W x H)	Body: 9" x 3.66" x 3.56" (229 x 93 x 90 mm); Reflector Housing: 4.8" (122 mm) diameter; Handle: 4.25" (108 mm) long			

PORTABLE STROBOSCOPES (external phase-shifting)

Phaser-Strobe Series

NIST CE

Phaser-Strobes incorporate the unique design features of the Nova-Strobe DB Plus family with an increased operating range of 30 to 32,500 flashes per minute, as well as external phase shifting. The unique digital adjustment knob can select the decade for adjustments, so coarse and fine adjustments of flash rates are made quickly and with significantly better resolution than competitive units. The memory feature of the **Phaser-Strobe** allows three flash rates to be stored - displayed in flashes per minute or flashes per second. **Phaser-Strobe** operates with internal rechargeable batteries or continuously from AC line power with the optional power supply/recharger.

Features **N.I.S.T. Traceable Certificate of Calibration included**

- Phase Shift adjustable as phase angle or time with resolution to 0.1º and 0.0001sec
- Auto step mode provides slow motion viewing for high speed events
- Backlit alphanumeric LCD shows flash rate, degrees, time
- Store and recall three memory settings
- TTL compatible input/output jacks, power for optional sensors
- Tachometer mode from external trigger

Phaser-Strobe PB 115

Common Applications:
- Calibration of Tachometers
- Diagnostic Inspection
- Engine R&D
- Textiles

Specifications	Phaser-Strobe PB
Flash Range	30-32,500 FPM (Flashes/Minute) 0.5-541.66 FPS (Flashes/Sec) (Hz)
Accuracy	±0.01% of reading
Digital Adjustment Knob (All ranges and modes)	Decade change push mode enables any value to be changed in decade steps (power of 10) from 0.0001 per detent to 10,000 per detent
Flash Rate Resolution	±0.05 FPM from 30 to 2,999 FPM, ±0.5 FPM from 3K to 32.5K FPM
Flash Rate (External Triggering)	5-32,500 FPM 0.5000-541.66 FPS
Phase Delay - Degrees	0-359 ±0.1 100-3,499.0 FPM 0-355 ±0.1 3,500-9,999.9 FPM 0-350 ±0.1 10,000-32,500 FPM
Time Delay - Seconds	0 to 6.500 seconds ±0.0001 seconds
Auto Step Mode (Range)	Step Size 0-180º Step Rate 0.0001-6.50 seconds per step
Flash Energy (Typical)	150 mJoule < 10,000 FPM, 50 mJoule > 10,000 FPM
Flash Duration (Typical)	10-30 microseconds
Average Power - Watts	10W
Tachometer Mode	5-200,000 RPM from external trigger (flash inhibited above 33,000 FPM)
External Input	Input Pulse - 5 microseconds min, TTL to 24V max (1/8" phone plug)
Trigger Output/Remote Sync	5V TTL compatible negative edge, 500 microseconds pulse (Typical)
Power	Internal rechargeable batteries or AC power supply/recharger
Weight	2.5 Lbs. (1.2 kg) including batteries

Ordering Information

Phaser-Strobe PB 115 Stroboscope, R-5 (115Vac) recharger

Phaser-Strobe PB Kit 115 Same as Above with PSC-3 (115 Vac) power supply/recharger and spare lamp in latching case

Phaser-Strobe PB 230 Same as Phaser-Strobe PB 115, but with R-6 (230 Vac) recharger

Phaser-Strobe PB Kit 230 Same as Phaser-Strobe PB Kit 115, but with PSC-4 (230 Vac) power supply/recharger

PORTABLE STROBOSCOPES (for use with Vibration Data Collectors)

Vibration-Strobe Series

CE

Vibration Strobe is uniquely designed to provide precise, instantaneous synchronization to a number of data collectors and FFT Analyzers triggered by an accelerometer. Built for rugged, portable applications, the **Vibration Strobe** is the perfect lightweight phase analysis tool. **Vibration Strobe** allows for the measurement of phase without stopping the machinery to install reflective tape. Phase analysis is quick and accurate using the Filter Bandwidth Selector and the Relative Phase Adjustment. Unique "Tracking Filter" maintains phase lock to input pulse.
Kits include: Strobe, interface cable, fast recharger and spare lamp in latching carrying case.

Vibration Strobe VB-115

Specifications	Vibration Strobe
Flash Range	100-12,000 Flashes Per Minute (FPM)
Display	5-Digit Backlit Liquid Crystal Display
Accuracy	± 1 FPM
Flash Energy	180 mJoule
Flash Duration	30 µSec.
Lamp Life (Typical)	100 million flashes
External Trigger	TTL (24V max) provides 5V out
Tracking Filter	Selectable Wide and Narrow Bandwidths
Operating Time	60 minutes at 6,000 FPM
Relative Phase Adjustment	Selectable -90° to +90°
Power	6 Vdc, Internal Rechargeable Batteries; 115Vac, 50-400 Hz or 220-240 Vac, 50-400 Hz Fast Charger
Weight	2.5 Lbs. (1.1 kg)

Ordering Information
Contact Factory for available Models

PERMANENTLY MOUNTED STROBOSCOPES

Machine Vision Strobes/Lighting Systems CE

LSSC/115 with optional ROS-5LS

Monarch provides a wide range of self-contained and fiber optic strobe systems for permanently mounted applications. Self-contained strobes are well suited for intermittent or continuous general purpose strobe lighting applications. Machine Strobe systems are used in precision strobe lighting applications requiring controlled light patterns. Parabolic and Linear designs are available for area lighting and a fiber optic head accommodates precise spot lighting. All models can be remotely triggered, and the DA Plus SC and LSSC also provide a trigger out to 'daisy chain' strobes or synchronize remote equipment.

LSSC - Externally adjustable flash rate of 1 to 10,000 FPM, 20 watts, input connector, steel enclosure and mounting bracket, 115Vac or 230Vac.
Weight: 2.6 Lbs. (1.25 kg)
Size: 4.6" x 5" x 3.35" (117 x 127 x 85 mm)

DA Plus SC 115

Self-Contained Models
DA Plus SC - Internally adjustable flash rate of 30 to 14,000 FPM, 15 watts, integral digital display, 1/8" (3.5 mm) input/output phone jacks, tripod mounting bushing, 115Vac or 230Vac.
Weight: 1.5 Lbs (0.72 kg)
Size: Body - 9" x 3.66" x 3.56"
(229 x 93 x 90 mm); Reflector Housing - 4.8"
(122 mm) diameter.

X-400 Fiber Optic Stroboscope with optional fiber optic bundle and ring light

X-Series Fiber Optic Stroboscopes - High powered Machine vision models triggered externally from 1 to 8,100 FPM. 43 watts of bright Xenon light, integrated universal power supplies in an all steel housing. Contact factory for fiber optic light guide recommendations.

Specifications	LSSC	DA PLUS SC	X-1200	X-400
Maximum flash rate per minute	10,000	14,000	2,700	8,100
Input energy per flash	220 mJoules	180 mJoules	8 -10 µsec	2 - 10 µsec
Light output flash duration	35 µsec	30 µsec	225 mJoules	90 mJoules
Radiometric light output	unknown	unknown	225 mJoules	90 mJoules
Flash Lamp Life	> 10^8 flashes	> 10^8 flashes	> 2 x 10^8	flashes
Input voltage	115 or 230 Vac		100 - 240 Vac (± 10 %), 50 - 60 Hz	
Maximum output power	18 W	15W	43 W	43W
External trigger input	±1.5 to 24V TTL max. pulse		+5 V TTL pulse, 20 mA, 10-100 µsec	
Environmental Specifications				
Operating temperature	41° to 104°F (5° to 40°C)		32° to 104° F (0° to +40°C)	
Mechanical				
Size L x W x H	5.15 x 3.6 x 4.4"	9 x 3.66 x 3.56"	8.5 x 6.8 x 5.44"	
Weight	2.5 Lbs. (1.13 kg)	1.5 Lbs. (0.72 kg)	4.6 Lbs. (2.09 kg)	
Replacement Lamp	L-1920M	L-1903	MVS-9000	

Distributed by

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