



Features of pulsed laser distance meters with RS 232 output / computer interface

- * Non contact long range distance measuring capabilities from 300 meter to 20 000 meter
- * Several models in the accuracy range of 1 cm to 2 meter over long distances
- * High accuracy models with cm resolution up to 400 meter in distance
- * Eye safe laser technology operating in the infrared invisible spectra, laser class 1
- * RS 232 communication for sharing distance values with computers and PLC systems etc.

Laseroptronix offers several models of pulsed laser distance meters / laser range finders. Ranges differs from 300 meter for the smallest model and up to 20 000 meter for a special military style model. All are eye safe and harmless in class 1.

The most accurate model gives 1 cm in resolution and 5 cm in absolute accuracy up 300 meter in range. The long range models have +- 2 meter in accuracy up to 20 000 meter. Speed differs from 5000 Hz for high speed model and 0,3 Hz for the very long range systems.

The instruments are small and industrial rugged and suitable for many different applications. Weight is between 250 grams and 2 kg. Encapsulation differs from IP 44 to IP 68 water proof.

Many of our products are protected by patents and patent applications

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LDM 600/800/1000-232 laser distance meter

These are a series of small units with range from 600 meter to 1000 meter. The units are plastic encapsulated and have an attractive price level. Output is RS 232 working at 200 measurements per sec. Single shot accuracy is about ± 1 meter all over the range. Averaged resolution can be 0,1 meter and a realistic accuracy $\pm 0,5$ meter. Dead zone is 4 meter on all models.

The Instruments have a integrated red point sight for easy alignment. Operating voltage is 12 volt and they need max 200 mA in current.



ILM 400 series of laser distance meters.

These are heavy duty instruments for demanding industrial applications. It is rugged in a solid aluminium piece and have IP 68 encapsulation (water proof). Range is up to 400 meter on a white surface and 300 meter on a gray surface.

Speed can be from 1000 Hz to 5000 Hz depending on model. Single shot accuracy can be as good as ± 10 cm at full speed (± 1 Sigma). Averaged accuracy can be 5 cm and resolution 1 cm. Communication is RS 232 and the 5000 Hz model have a reduced protocol to keep Baud rate under control.

All models are eye safe except the 5000 Hz model which is eye safer at longer distances.

The IP encapsulation is very robust. This system is very resistant to vibrations and humidity but can not work with water on the optical aperture.

There are special versions of software giving special functions out of the system. Speed can be reduced and averaged inside the unit.

LDM 10 000 and LDM 20000 laser range finders

These are long range units operating at low speed. Speed is 0,3 Hz only. Accuracy is $\pm 2-5$ meter all over the range. Dead zone is between 50-100 meter.

The design is military and very rugged and robust. It is water proof and MIL Specified. The laser operates at 1,54 micron and is eye safe. There is a integrated telescopic sight and cross hair for alignment. Output is RS 232.





Special versions and options of pulsed laser range finders.

Laseroptronix has designed many special versions and applications based on laser distance meters.

- * Measuring speeds up to 25 000 Hz
- * Millimeter resolution systems.
- * Scanning laser profilometers based on distance meters and moving beam
- * Matrix scanners with 2 axis moving beam technology
- * Laser photocells and barriers with and without prisms
- * Gated matrix systems with area sensing
- * Triangulation and phase meters with higher accuracy and smaller range

About laser distance meters and range finders

These papers distance meters are based on pulsed technology. The laser transmits a very short and high intensity light pulse. Energy is low so they are harmless for the eye but strong enough so the reflex from the target is detected at very long range. Pulse is in the nano sec area.

The laser is a solid state diode laser in all models except the 10 000 meter and up systems. This is a very robust component giving very long life time (10 K-Hours or more). The long range lasers have a frequency shifted Yag laser operating at about 1,5 micron. The eye is not very sensitive for damage in this wavelenght area.

The time from transmitted pulse to received detector signal is recalculated to a distance.

Things to noticed about laser distance meters.

All distance values needs a solid 90 degree surface for the reflex. Split surfaces like trees and vegetation creates questions about where the system trigged the distance measuring. Angled surfaces spread out the reflex in time and the question is where the distance value trigged.

Max range is calculated to a gray surface which is matt. White surfaces gives better range which can be 20-50% more than spec says. Black surfaces can decrease range so it can be less 50% of what is specified. Matt surfaces increase range and mirror like surfaces reduce range. Water gives no values at all except for the 10 000 meter systems. Wet dark surfaces are also very bad and give reduced range.

Beam diameter increase with distance. Diode lasers have about 2,5 mili radians in divergence (2,5 meter at 1000 m). Output beam is about 25 mm and at 100 meter the diameter is about 200-250 mm in diameter.

Targets with a surface smaller than beam diameter will have effects on specifications.

At shorter range you can often detect smaller targets. Electrical wires of 40 mm in diameter can be detected at 50-100 meter in distance with LDM 600 system.

Averaged distances are always far more correct. Most of the pulsed distance meters can be averaged and get a better resolution and accuracy. The limit is set by drifts.

Technical specifications of pulsed laser distance meters with computer output

Model	LDM 600-232	LDM 800-232	LDM 1000-232	ILM 400/1000	ILM 400/5000
Distance range	4-600 meter	4-800 meter	4-1000 meter	400 meter	400 meter
Range to reflex	1200 meter	1200 meter	1200 meter	400 meter	400 meter
Speed	200 Hz	200 Hz	200 Hz	1000 Hz	5000 Hz
Output	RS 232	RS 232	RS 232	RS 232	RS 232 special
Resolution	0,5 meter	0.5 meter	0,5 meter	10 cm	1/256 of range
Accuracy	1 meter	1 meter	1 meter	5 cm Average	1/256 of /5 cm
Beam diameter	23 mm	23 mm	23 mm	22 mm	22 mm
Beam / 100 m	250 mm	250 mm	250 mm	220 mm	220 mm
Laser class	1	1	1	1	3B
Wavelength	905 nm on all models / infrared light				
Ambient temp..	0-+ 40 degree C	0-+40 Degree	0-+40 degree	- 10 -+ 50 degree	-10 till + 50 degree
Storage temperature	- 30 till + 70 degree C on all models				
Input voltage	9-12 volt DC	9-12 volt DC	9-12 volt DC	9-32 volt DC	9-32 Volt DC
Current mA	150 mA	150 mA	150 mA	250 mA	500 mA

Comments about the specifications

Accuracies and resolutions specified to the ± 1 Sigma (63 %) method

Gray is about 30% in reflectivity. Black is 4-8% and this reduce range to about 50% less than gray. White can be 100% and this can increase range with 50 % or more compared to gray.

ILM distance meters can do 4500 meter against reflector arrays. Accuracy is lost a bit in this case.

Definition of beam diameter is that 90% of energy is within the diameter spec in papers.

ILM distance meters can operate up to 70 degree C with reduces accuracy and spec.

Options for distance meters and range finders

Interface designs	USB interface type 1 via converter Ethernet / LAN / WLAN interface via converter RS 485 via converter
Alarm output	Alarm relays over external alarm module
Photo cell function	All models can have an photocell trigger module where distance changes set the alarm over a relay
Aiming system	LDM models can have a red point sight integrated in the unit ILM distance meters can have a red point sight ILM and other models can be equipped with a C CD camera for easy alignment
Ambient temperature	All models can have an external heater option All models can have a< cooler unit for getting lower temperature. Water cooling is possible All models can have extra encapsulation and air purge systems
Brackets	We have many models of brackets
Scanners	We have external profile scanners and matrix scanners (laser radar systems

Note We can offer phase measuring systems describes in separate papers. They can work up to 200 meter and get down to 1,5 mm in accuracy

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