

# LTF test station

Mobile tester of laser range finders

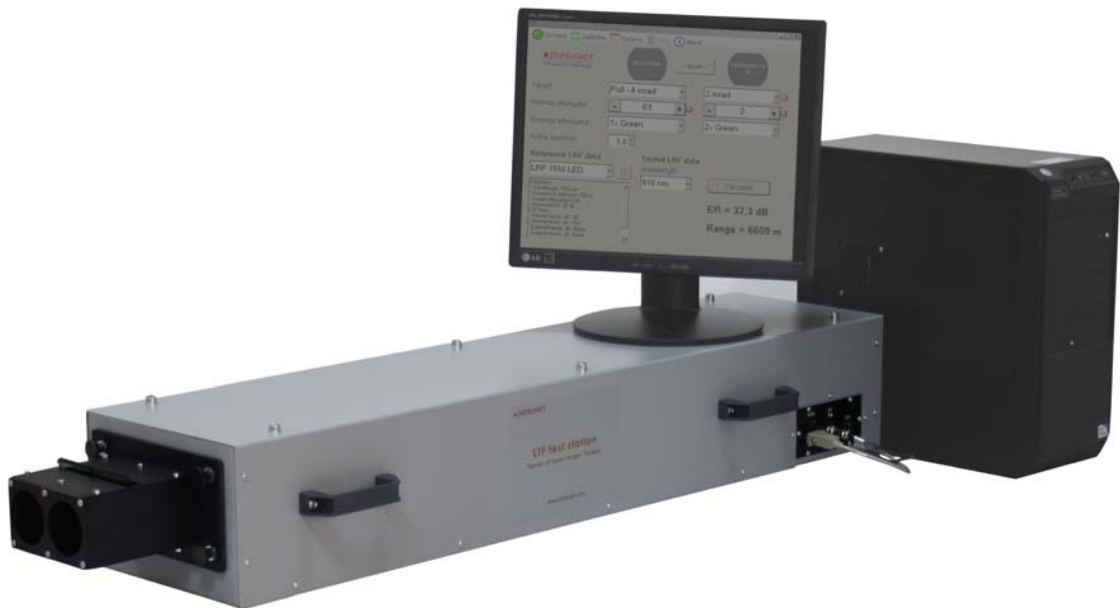


Fig. 1. Photo of the LTF test station

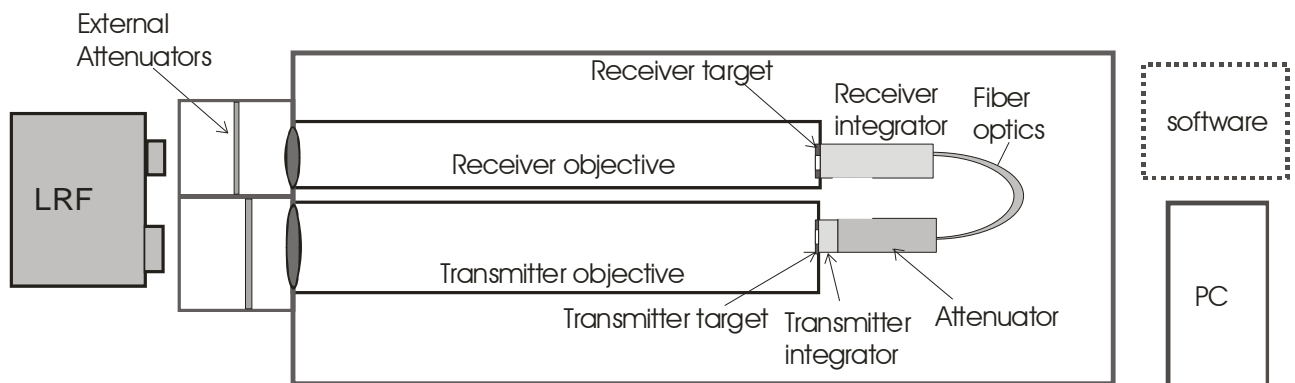


Fig. 2. Block diagram of LTF test station

## BASIC INFORMATION:

Final performance tests of laser range finders are typically done by shooting the LRF into direction of a small target placed at some distance (typically about 0.5-1 km), attenuating radiation emitted by the LRF, and checking at what attenuation level the LRF stops giving proper distance indications. In this way so called Extinction Ratio is measured. LTF test station is a compact, mobile test station based on a concept of a test station that would imitate in laboratory/depot conditions measurement of extinction ration ER of tested laser range finders without necessity of time consuming, costly field tests.

LTF test station enables performance tests of virtually all laser range finders. It particularly recommended for final users of laser range finders for demanding applications due to its simplicity of operation and capability of fast determination of real performance of tested laser range finders.

LTF test stations belongs to a family of test stations offered by Inframet for testing laser systems.

# LTF test station

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### LTF design

The LTF station is built from two main blocks: LTF main block and PC with software. The LTF main block is built from external attenuator module, transmitter objective, transmitter target, receiver integrator, fiber optics, attenuator, receiver integrator, and receiver objective. The transmitter objective focuses incoming laser radiation at plane of the transmitter target plate. The latter module simulates the small reflector target used during ER measurement – only radiation that hits the target can be transmitted. The transmitter integrator converts incoming directional radiation into diffuse radiation. The fiber optics transmits incoming radiation with some temporal delay. The attenuator attenuates incoming radiation in order to simulate attenuation by atmosphere at field conditions at regulated distance. The receiver integrator converts incoming directional radiation into diffuse radiation. The task of the receiver target is the same as the task of the transmitter target. Finally, the receiver optics emits collimated beam into direction of receiver of the tested LRF a directional beam that simulates radiation reflected by a target irradiated by tested LRF.

### LRF test methods

- A long series of parameters measured at laboratory conditions: pulse energy (or pulse power), pulse time width, pulse frequency, beam divergence, receiver sensitivity, accuracy of distance measurement, and bore-sighting errors.
- Measurement of ER extinction ratio at field conditions. The latter parameter gives precision information about most probable range of tested LRF. LTF test station makes possible ER measurement at laboratory/depot conditions.

### Recommended market

- Final users of laser range finders for demanding applications due to its simplicity of operation and capability of fast determination of real performance of tested laser range finders.
- Manufacturers of laser range finders that needs fast, effective tool for final quality control.

### Test limitations

LTF test station is optimized for testing laser range finders built using two separate optical channels: transmitter and receiver. Tests of LRF built using coaxial optics are possible but please contact Inframet with optical diagram of LRF to be tested.

Tab. 1. Basic technical parameters

Parameter	Value
Spectral range	700-1700nm
Calibrated wavelengths	1060, 1550 band, 910 nm
Simulated test distance	1200 m
Simulated attenuation range	At least 40dB
Attenuation regulation method	Motorized, PC control
Max target size	4 mrad
Minimal target size	0.5 mrad
Regulation of target size	Step regulation, five values
Control of target size	Motorized, PC control
Ability to simulate boresight errors	Yes, simulation of non parallel axis of transmitter and receiver
Max acceptable diameter of transmitter optics	50 mm
Max acceptable diameter of receiver optics	50mm
Location of LRF relative to test station	LTF optics must overlap optics of tested LRF
Work temperature range	5°C to 40°C
Storage temperature range	-5°C to 60°C
Humidity range	up to 95% (non condensing)
Voltage power	AC 110-230 V
Dimensions	1360x 320x280 (main module) plus typical PC
Mass	32 kg

# LTF test station

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### Versions of LTF test station

LTF test station can be delivered in form of a many different versions. Five digit code shown in Table 1 is used to describe version parameters.

LT series test stations are laboratory class test stations optimized for extensive tests of laser range finders and measurement of earlier mentioned parameters. LTF test stations presented in this data sheet are compact, mobile test sets optimized for simplified crucial performance tests both laboratory or depot conditions.

The performance based test concept makes the LTF test station a optimal choice for applications when quick, easy tests are needed to determine possible field performance.

In most advanced version the LTF test station enable measurement of absolute values of ER extinction ratio. If simplified version is used then relative measurement can only be done (information that ER (or performance range) is lower or higher than value set by the LTF test station.

**Tab. 2. Definitions of the five digit code (ABC-DE) used to describe versions of LTF test system**

	A	B	C	D	E
Code	Attenuation	Size of simulated target	Type of tested LRF	Number of Calibrated Wavelengths	Number of simulated targets
1	Non-regulated (binary performance tests: working/not working)	Fixed size of simulated reflective target (optimized to simulate one type LRF)	Multipulse LRF (LED LRF)	1	1
2	Flexible regulation of attenuation (possible measurement of ER of tested LRF)	Motorized step regulation of size of the reflective target (up to 5 different values)	Monopulse LRF	2	2
3			Both types	3	3
4				Up to 5	

Example versions:

LTF 111-11: fixed non regulated attenuation, fixed size of simulated target, optimized for test LED LRF, calibration for one wavelength, simulated reflection from one target.

*Attention: the attenuation can be manually regulated by Inframet/customer engineers but attenuation settings are supposed not to be regulated during normal use.*

LTF 22332: Flexible regulation of attenuation (possible measurement of ER of tested LRF), Motorized step regulation of size of the reflective target (up to 5 different values), optimized for testing both LED LRFs and monopulse LRFs, calibrated at 1060 nm, 1550 band, 910 nm (other wavelengths possible), simulates two targets separated by short distance.

LTF 111-11 is recommended for simplified tests of a single type of laser range finder. LTF 22332 is recommended to be used as an universal performance tester of wide groups of laser range finders.

### Advantages of LRF test station

- Efficient, user friendly tool for final performance evaluation of laser range finders,
- Ability to measure Extinction Ratio at lab/depot conditions,
- Compact design suitable for both laboratory, depot or field applications.

In case of any questions please contact us.

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