Laboratory Equipment Manufacturer
www.mrclab.com

Operation Manual

Hand-Held Laser Distance Meter

DI-900

PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

3, Hagavish st. Israel 58817 Tel: 972 3 5595252, Fax: 972 3 5594529 mrc@mrclab.com

MRC.08.14

User Manual

English

Congralulalions on the purchase of your products.
Carefully read the Safety Instructions and the User Manual before using this product.

 The person responsible for the instrument must ensure that all users understand these directions and adhere to them.

Contents

Safety Instructions

Symbols used

The symbols used in the Safety Instructions have the following meanings:

⚠ WARNING:
Indicates a potentially hazardous situstion or an unintended use which, if not avoided, will result in death or serious injury.

⚠ CAUTION:
Indicaes a potentially hazardous situation or an unintended use which,if not avoided, may result in minor injury and/or in appr-eciable material,financial and environmen-tal damage.

☞ Important paragraphs which must be adhered to in practice as they enabled the product to be used in a technically correct and efficient manner.

Use of the instrument

Permitted use

Measuring distances
Computing functions,e.g.areas and volumes
Indirect measurement
Addition and subtraction operations of measurement

Prohibited use

- Using the instrument without instruction.
- Using outside the stated limits.
- Deactivation of safety systems and removal

of explanatory and hazard labels.
- Opening of the equipment by using tools (screw drivers, etc.), as far as not specifically permitted for certain cases.
- Carrying out modification or conversion of the product.
- Use after misappropriation .
- Use of accessories from other manufacturers without the express approval of our company.
- Deliberate or irresponsible behaviour on scaffolding, when using ladders, when measuring near machines which are running, or near parts of machines or installations which are unprotected.
- Aiming directly into the sun
- Deliberate dazzling of third parties; also in the dark
- Inadequate safeguards at the surveying site (e.g.when measuring on roads, construction sites, etc.)

Limits of use

See section "Technical Data ".

The poduct is designed for use in areas perm nently habitable by humans, do not use the product in explosion hazardous areas or in aggressive environments.

Areas of responsibility

As the original producer responsibility:
Responsible for providing security products include manual and origin of the parts.

Responsibilities of the manufacturer of non-Original accessories:

The manufacturers of non-Original accessories for the products are responsible for developing, implementing and communicating safety concepts for their products. They are also responsible for the effectiviness of these safety concepts in combination with the products equipment.

Responsibilities of the person in charge of the instrument:

⚠ WARNING

The person responsible for the instrument must ensure that the equipment is used in person is also accountable for the deployment of personnel and for their accordance with the instructions. This training and for the safety of the equipment when in use.The person in charge of the instrument has the following duties:
- To understand the safety instructions on the product and the instructions in the User Manual.
- To be familiar with local safety regulations relating to accident prevention.
- To inform Leica Geosystems immediately if the equipment becomes unsafe.

Hazards in use

⚠ CAUTION:

Watch out for erroneous distance measure-ments if the instrument is defective or if it has been dropped or has been misused or modified.

Precautions:

Carry out periodic test measurements. Parti-

cularly after the instrument has been subject to abnormal use, and before, during and after important measurements.
Make sure the optics is kept clean and that there is no mechanical damage to the bumpers.

⚠ CAUTION:

In using the instrument for distance measurements or for positioning moving objects (e.g. cranes, building equipment, platforms, etc.) unforeseen events may cause erroneous measurements.

Precautions:

Only use this product as a measuring sensor, not as a control device. Your system must be configured and operated in such a way, that in case of an erroneous measurement, malfunction of the device or power failure due to installed safety measures (e.g. safety limit switch), it is assured that no damage will occur.

⚠ WARNING:

Flat batteries must not be disposed of with household waste. Care for the environment
Always prevent access to the product by unauthorized personnel.

and take them to the collection points provided in accordance with national or local provided in accordance with national or local regulations.The product must not be disposed of wit household waste.Dispose of the product appropriately in accordance with the national regulations in force in your country.

Electromagnetic Compatibility (EMC)

The term "electromagnetic compatibility" is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic interference to other equipment.

⚠WARNING:

The products conforms to the most stringent requirements of the relevant standards and regulations. Yet, the possibility of it causing interference in other devices cannot be totally excluded.

⚠CAUTION:

Never attempt to repair the product yourself.
In case of damage, contact the local dealership.

Laser classification

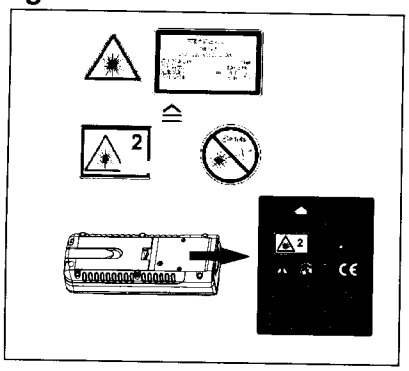
Integrated distancemeter

The produces a visible laser beam which emerges from the front of the instrument.
It is a Class 2 laser product in accordance with:
• IEC60825-1 : 2007 "Radiation safety of laser products"Laser Class 2 products:
Do not stare into the laser beam or direct it to wards other people unnecessarily. Eye protection is normally afforded by aversion responses including the blink reflex.

⚠WARNING:
Looking directly into the beam with optical aids (e.g. binoculars, telescopes) can be hazardous.
Precautions:
Do not look directly into the beam with optical aids.

⚠CAUTION:
Looking into the laser beam may be hazardous to the eyes.
Precautions:
Do not look into the laser beam. Make sure the laser is aimed above or below eye level. (particularly with fixed installations, in machines, etc.)

Labelling



Start-up

Inserting/replacing batteries

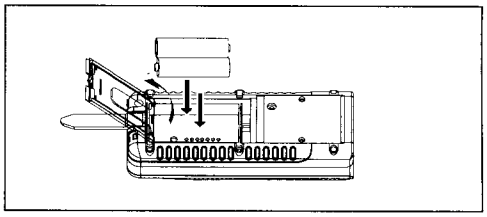
1 Remove battery compartment lid and attach handstrap.

2 Insert batteries, observing correct polarity.
3 Close the battery compartment again.

Replace the batteries when the symbol flashes permanently in the display.

☞ Only use alkaline or rechargeable batteries.

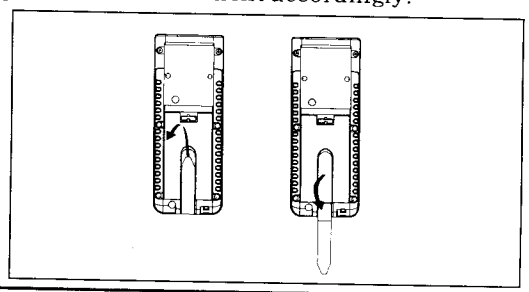
☞ Remove the batteries before any long period of non-use to avoid the danger of corrosion.



Changing the reference point (multifunctional endpiece)

The instrument can be adapted for the following measuring situations:
• For measurements from an edge, fold out the positioning bracket until it first locks in place.
• For measurements from a corner, open the positioning bracket until it locks in place, then push the positioning bracket lightly to the right to fold it out fully.
A built-in sensor automatically detects the orientation of the positioning bracket and adjusts the zero point of the instrument accordingly.
• For measurements from an edge, fold out the positioning bracket until it first locks in place.

• For measurements from a corner, open the positioning bracket until it locks in place, then push the positioning bracket lightly to the right to fold it out fully. A built-in sensor automatically detects the orientation of the positioning bracket and adjusts the zero point of the instrument accordingly.

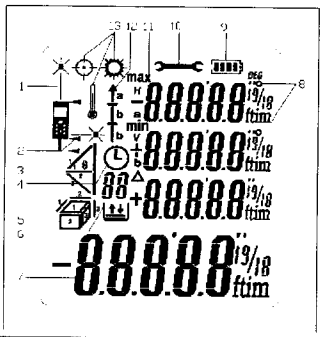


Keypad

- ON / DIST (On/measuring) - button
- Plus (+) - button
- Minus (-) - button
- Area/volume-button
- Angle button
- Reference-button
- Indirect measurement (Pythagoras) - button
- Background light/ Units—button
- Storage-button
- Timing button
- Clearn/off-button

Display

1 Laser active
2 Reference
3 Indirect measurement (Pythagoras)
4 Delay measurement
5 Area volume measurement
6 Stored record
7 Data display
8 Display unit
9 Battery status
10 Hardware failure
11 The dynamic continuous measurement
12 Marking function
13 Operation error indication



Battery state indicator

- Battery100%
- Battery75%
- Battery50%
- Battery25%
- Battery0%

Standard supply part

Laser Distance Meter
1 portable belt
2 battery
1 operating instructions
1 protective bag
1 warranty card

Menu functions

Measurements

button (pressed long) - Press once again to change the unit of distance measurement.
The following units are available: m (meter), ft (feet), in (inch), ft +/ in (feet - inch 1/16).

Beep

button (press long). You can choose the beep on or off as required.

Laser Continuous (—✳)

Press and hold down the key when switching on the device until the character ✳ appears permanently in the display with beep sounds. Every further press of the key releases a distance measurement. Press the key and hold to switch the device and laser continuous operation off.

Measuring with tripod

The reference must be appropriately adjusted in order to be able to take correct measurements with a tripod. You can switch the reference by button. The setting

can be shown on the display.

Illuminating display (💡)

button (press short), the illuminating display can be turned on or off.

The Correction of tilt sensor

Press this button to enter into the "Tilt sensor" mode. Continuously press this button five times again when the bottom of display shows 0.0; Then press button once to see the display shows 0.1. Wait for five seconds and rotate the instrument by 180 degree. Press the button once and it shows 0.2; wait several seconds till it shows 0.0 for finishing the correction. Press this button for exiting.

Operation

Switching on and off

Switches on the instrument and laser. The display shows the battery symbol until the next button is pressed.
Pressing this button for longer switches the instrument off.The instrument switches off automatically after three minutes of inactivity.

Clear button

The last action is cancelled. While making area or volume measurements, each single measurement can be deleted and remeasured in series.

Refenece setting

The default reference setting is from the rear of the

instrument.The display will show you.
Press this button, a measurement will be extended along as the reference edge. The display will show you.
Press this button, will measure the reference edge fixed to the forefront. The display will show you.
Press this button, the rear reference is set again.

Level

You can choose the level gauge on or off as required by press this button ( )

Measuring

Single distance measurement

Press to activate the laser. Press again to trigger the distance measurement. The result is displayed immediately.

Tilt measurement

☞The tilt sensor measures tilts between ± 45° .

☞During the measurement of tilt, the instrument should be held without transverse tilt, as far as possible, (± 10°).

Horizontal measurement

Press button to activate horizontal measurement in the instrument. The following symbol appears in the display . If the button is active, the horizontal distance is displayed in the summary line for each distance measurement (up to max. +/-45° and up to max. a transverse tilt of +/-10°).
Press the button to collect the measurement data, and the data will be on the display. And the height distance, horizontal distance, hypotenuse distance and angle will be showed on auxiliary display in turn.

Timer (self-triggering)

Press this button to set a 5-second time delay. or Press and hold down this button until the desired time delay is reached (max. 30 seconds).Once the key is released the remaining seconds until measurement (e.g. 29, 28, 27...) are displayed in a countdown. The last 5 seconds are counted down with a beep. After the last beep the measurement is taken and the value is displayed.

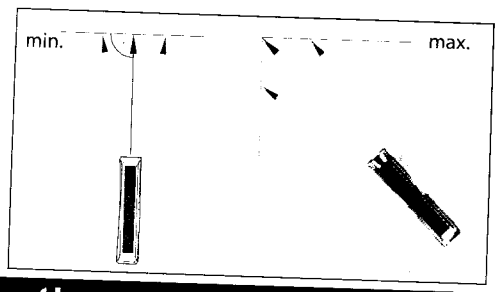
☞The timer can be used for all measurements.

Minimum/maximum measurement

This function allows the user to measure the minimum or maximum distance from a fixed measuring point. It can also be used as to determine spacings.It is commonly used to measure room diagonals (maximum values) or horizontal distances (minimum values).
Press and hold down this button until you hear a beep. Then slowly sweep the laser back and forth and up and down over the desired target point(e.g. into the

corner of a room).

Press to stop continuous measurement. The values for maximum and minimum distances are shown in the display as well as the last measured value in the summary line.



Functions

Addition / subtraction

Distance measuring.

+ The next measurement is added to the previous one.

− The next measurement is subtracted from the previous one.This process can be repeated as required.

The last step is cancelled.

Area

Press once. The symbol appears in the display.

Press this button to take the first length measurement (e.g. length).

Press it again to take the second length measurement (e.g. width).
The result is displayed in the summary line.

Volume

Press this button twice. The symbol appears in the display.

Press this button to take the first length measurement (e.g. length).

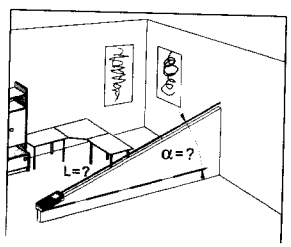
Press this button to take the second length measurement (e.g. width).

Press this button to take the third length measurement (e.g. height).
The volume then appears in the summary line.

Tilt measurement

Long press this button once to activate the tilt sensor.The tilt degree data and tilt symbol or appears in the display.

Press to measure the inclination and the distance.



Indirect measurement

The instrument can calculate distances using Pythagoras' theorem.
Make sure you adhere to the prescribed sequence of measurement:

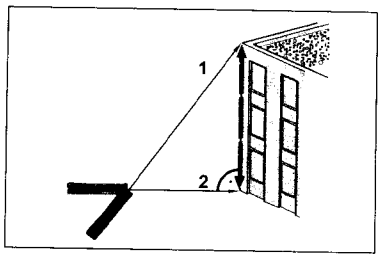
- All target points must be in a horizontal or vertical plane.
- The best results are achieved when the instrument is rotated about a fixed point (e.g. with the positioning bracket fully folded out and the instrument placed on a wall).
- The minimum/maximum function can be used - see explanation in "Measuring -> Minimum/maximum measurement". The minimum value must be used for measurements at r ight angles to the target; the maximum distance for all other measurements.

☞ Make sure that the first measurement and the distance to be measured are at right angles. Use the Minimum/maximum function, as explained in "Measuring -> Minimum/ maximum measurement".

Indirect measurement - determining a distance using 2 auxilliary measurements

e.g. for measuring building heights or widths.
It is helpful to use a tripod when measuring heights that require the measurement of two or three measurements.

Press this button once, the display shows ∠.
The laser is switched on.
Aim at the upper point (1) and trigger the measurement.After the first measurement the value is adopted. The result is displayed in the summary line,the partial results in the secondary line.(Such as:angle and distance.)
If bevelangle>45° ,Need to measure (2) .
Press this button,closed angle sensor, Shall be measured again point (1) in the distance.After the measurement is completed, Keep the instrument as horizontal as possible.
Press and hold down this button to trigger continuous measurement, sweep the laser back and forth and up and down over the ideal target point.
Press to stop continuous measurement (2).
The result is displayed in the summary line, the partial results in the secondary line.
(Such as:bevel edge and angled edge distance.)



Indirect Measurement - determining a distance using 3 measurements

Press this button twice; the display shows the following symbol ∢.The laser is switched on.
Aim at the upper point (1) and trigger the

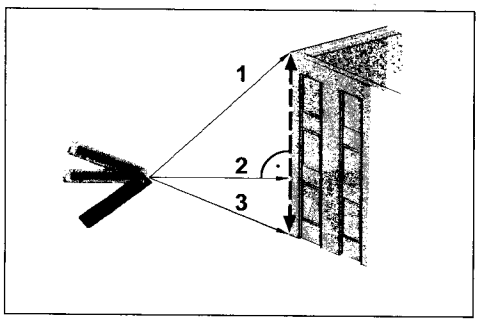
measurement. After the first measurement the value is adopted. The result is displayed in the summary line,the partial results in the secondary line.(Such as:angle and distance.)If bevel angle>45° ,Need to measure (2) .

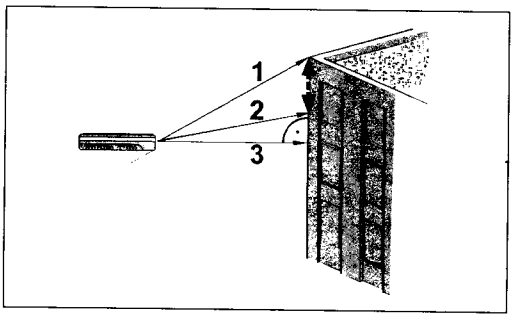
Press this button,closed angle sensor,Shall be measured again point (1) in the distance.

After the measurement is completed, Keep the instrument as horizontal as possible.

Press and hold down this button to trigger continuous measurement, sweep the laser up and down over the ideal target point.

Press to stop continuous measurement (2). The value is adopted. Aim at the lower point and Press this button to trigger the measurement (3). The result is displayed in the summary line, the partial results in the secondary lines.





Storage of constants/historical storage

Historical storage

Press this button for long time, the icon ( ) will show on the display , and the previous 10 results (measurements or calculated results) are shown in reverse order.

The + and − buttons can be used for navigation. Make it available constant for further calculations by pressing button.

Appendix

Message codes

All message codes are displayed with either or "Error". The following errors can be corrected:

Icon	Cause	Remedy
	Calculation error, Receiving the reflected light too weak or too strong, Measurement time too long	Reoperation, change a better surface reflecting or using target plate.
	The goal of the ambient light is too strong	Change the light for measuring..
	Temperature too high (+40℃) or too low (0℃)	Cool down or Warm up the instrument, External Temperature will be available from 0℃ to +40 ℃.
2800	Hardware error	Switch on / off the instrument several times. If the symbol still appears, then your instrument may be defective. Please call your dealer for assistance.

Technical data

ITEM	100m instrument	80m instrument
Measuring range	0.05 to 100 M *	0.05 to 80 M *
Measuring accuracy	Typical ± 2 mm **	Typical ± 2 mm **
Display accuracy	1 mm	1 mm
Laser classification	Class 2M II	Class 2M II
Laser type	620-690nm, 1mW	620-690nm, 1mW
Distance measurement with tilt sensor	●	●
Horizontal measurement range	± 45°	± 45°
Horizontal measurement accuracy	± 0.3°	± 0.3°
Area, Volume measuring	●	●
Indirect measurement	●	●
Pythagoras proposition	●	●
Plus-minus method	●	●
Continuous measurement	●	●
Minimum / maximum measurement	●	●
Display illumination	●	●
Show beep	●	●
Multifunctional end piece	Automatically	Automatically
Protection against splashes and dust	IP 54	IP 54
Historical storage	10	10
Temperature range for Operation	0℃ to +40℃	0℃ to +40℃
Temperature range for Storage	-20℃ to +70℃	-20℃ to +70℃
Battery life	5000 to 8000 measurements	5000 to 8000 measurements
Battery selection	LR6 (AA) 2 × 1.5V	LR6 (AA) 2 × 1.5V
Laser switch-off automatically	After 30 seconds	After 30 seconds
Instrument switch-off automatically	After 3 minutes	After 3 minutes
Dimensions	118 ×49 ×27 mm	118 ×49 ×27 mm
Weight	150g	150g
Weight	(without battery)	(without battery)

* maximum deviation occurs under unfavourable conditions such
as bright sunlight or when measuring to poorly reflecting or

very rough surfaces. Measuring accuracy between 10 m and 30 m may deteriorate to approx. ± 0.025 mm/m, for distances above 30 m to ± 0.1 mm/m.

Measuring conditions

Measuring range

The range of 100m instrument is limited to 100m.The range of 80m instrument is limited to 80m.
At night or dusk and if the target is in shadow the measuring range without target plate is increased. Use a target plate to increase the measurement range during daylight or if the target has poor reflection properties.

Target surfaces

Measuring errors can occur when measuring toward colourless liquids (e.g. water) or dust free glass, Styrofoam or similar semiperme-able surfaces. Aiming at high gloss surfaces may deflect the laser beam and lead to measurement errors.Against non-reflective and dark surfaces the measuring time may increase.

Care

Do not immerse the instrument in water. Wipe off dirt with a damp, soft cloth. Do not use aggressive cleaning agents or solutions. Handle the instrument as you would a telescope or camera.

Warranty

The instrument comes with a one-year warranty. This warranty effective premise is: according to the company's operating instructions for correct operation, processing,cleaning and maintenance of the tool, and the tool is maintained good technical condition.This means that in the tool can be used in the company's original components and spare parts.This warranty is provided in the tool during the whole life expectancy of the defective parts of the repaired or replaced free of charge.If the component due to normal wear and in need of repair or replacement, is not in the warranty van.

All illustrations, descriptions and technical specifications may be subject to change without prior notice.