

### Laser distance meter BENNING LD 60

Contamination level: 2	Measuring range: 0.05 ... 60 m	Battery life (alkaline batteries): up to 10 000 measurements
Protection category: IP 54	Measuring speed: 2 measurements per second	Operating temperature: -5 ... 40 °C
Laser type: 650 nm, Class II, <1 mW	Housing dimensions (length x width x height): 105 mm x 48 mm x 21 mm	Ambient temperature (storage): -20 ... 60 °C
Measuring accuracy: ±1.5 mm	Weight (batteries included): 83.7 g	Max. relative air humidity: 85 % RH
Laser dot size: 25 mm at a distance of 30 m		

- Only use the device within the framework of the corresponding technical data.
- Target group: Professional users, craftspeople and do-it-yourselfers
- Basic knowledge required: Knowledge of testing and measuring equipment as well as basic knowledge of length measurement, area and volume calculation as well as trigonometric functions
- The device may only be used in a technically perfect and safe condition. Always check the device for damages before using it.
- Observe relevant regulations on occupational safety and health as well as those on environmental protection.
- Use the device only in dry environments and not in potentially explosive environments.
- Operation with 2 1.5 V micro batteries (AAA)
- Please find the operating manual of the device at <http://tms.benning.de/ld40-ld60>

#### WARNING



#### Laser beam

- Eye damage or risk of accident due to glare are possible in case of eye contact with the laser beam.
- Never look directly into a laser beam or its reflections!
  - If the laser beam hits your eye, close your eyes and immediately turn your face away from the laser beam. Normally, eyes close automatically due to the blink reflex and aversion responses take place.
  - Do not point the laser beam at persons or animals.
  - Do not leave the unit switched on unnecessarily.

#### WARNING

#### Opening the device

- Eye damage or risk of accident due to glare are possible in case of eye contact with the laser beam when opening the device.
- Do not open the device (except for the battery compartment).
  - Please contact your specialty retailer or the returns management for any repairs.

### Operation

- Switching the device ON:  /  , Switching the device OFF:  >2 seconds
- Opening the menu: 
- Menu navigation:
  - Left  / Right  / Confirm  / Back 
- Starting measurement: 
- Please note that for many of the measuring functions, the respective function of the keys is shown on the digital display.

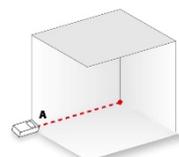
- Changing the reference plane:  (the set reference plane is shown in the respective symbol on the digital display)
- Offset of protective rubber holster:  >2 seconds  
(A green frame at the respective symbol on the digital display shows that the protective rubber holster has been factored.)
- Please note that for many of the measuring functions, the length to be measured or the measured value determined and displayed is indicated on the digital display by the respective part of the measuring function symbol flashing.

### Measurements and functions

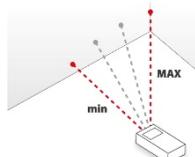
#### Requirements for measuring

- Please consider the brightness of the surrounding light conditions:
  - The ambient light must not be too bright.
  - Avoid measuring in direct sunlight.
- Avoid measuring towards reflective, transparent or very porous surfaces.
- Make sure that the laser beam outlet and the receiving lens are not covered.
- Make sure that the device does not move during the measurement (exception: continuous measurement).
- Select the reference plane according to the application.
- Select the desired measurement or calculation from the menu.

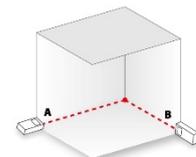
#### Length measurement (single measurement)

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- The length measurement (single measurement) is intended for measuring a distance between the device and an opposite surface. After being switched on, the device is automatically in this measuring function.
1. Point the laser beam at the measuring point (A).
  2. Press the "Measurement" key.
- The measurement is started and the measured value will be shown on the digital display.

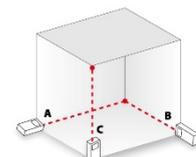
#### Length measurement (continuous measurement)

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- Length measurement (continuous measurement) is intended for continuously measuring a changing distance. In addition to the currently measured distance, the shortest and the longest measured distance of the measurement series are shown on the digital display.
1. Point the laser beam at the measuring point.
- The measured value will be shown on the digital display and updated when the distance changes.

#### Area calculation

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- The area calculation function is intended for determining the area of a rectangular surface by measuring two measured lengths that are perpendicular to each other.
1. Point the laser beam at the first measuring point (A).
  2. Press the "Measurement" key.
- The measurement is started and the measured value (L) will be shown on the digital display.
3. Point the laser beam at the second measuring point (B).
  4. Press the "Measurement" key.
- The measurement is started and the measured value (W) will be shown on the digital display.
- The device calculates the area from the two measurements and the determined value will be shown on the digital display.

#### Volume calculation

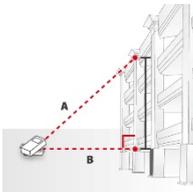
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- The volume calculation function is intended for determining the volume of a rectangular space by measuring three measured lengths that are perpendicular to each other.
1. Point the laser beam at the first measuring point (A).
  2. Press the "Measurement" key.
- The measurement is started and the measured value (L) will be shown on the digital display.
3. Point the laser beam at the second measuring point (B).
  4. Press the "Measurement" key.
- The measurement is started and the measured value (W) will be shown on the digital display.
5. Point the laser beam at the third measuring point (C).
  6. Press the "Measurement" key.
- The measurement is started and the measured value (H) will be shown on the digital display. The device calculates the volume from the three measurements and the determined value will be shown on the digital display.

### Indirect length calculation

The indirect length calculation is intended for determining certain distances using length measurements to various points and angle measurements of the respective axes.



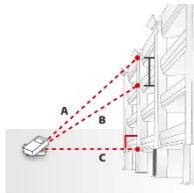
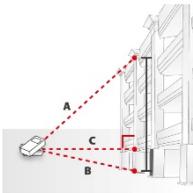
#### Indirect length calculation 1



1. Point the laser beam at the first measuring point (A).
2. Press the "Measurement" key.  
The measurement is started and the measured value will be shown on the digital display.
3. Point the laser beam perpendicularly to the surface at the second measuring point (B).
4. Press the "Measurement" key.  
The measurement is started and the second measured value will be shown on the digital display.  
The device calculates the distance between the two measuring points from the measurements and the determined value will be shown on the digital display.



#### Indirect length calculation 2 / 3



1. Point the laser beam at the first measuring point (A).
2. Press the "Measurement" key.  
The measurement is started and the measured value will be shown on the digital display.
3. Point the laser beam at the second measuring point (B).
4. Press the "Measurement" key.

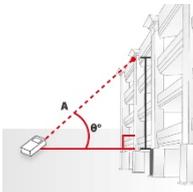
The measurement is started and the second measured value will be shown on the digital display.

5. Point the laser beam perpendicularly to the surface at the third measuring point (C).
6. Press the "Measurement" key.

The measurement is started and the third measured value will be shown on the digital display. The device calculates the distance between the measuring points A and B from the measurements and the determined value will be shown on the digital display.



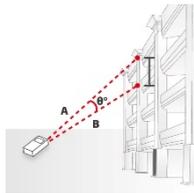
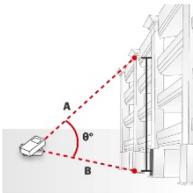
#### Indirect length calculation 4



1. Point the laser beam at the measuring point (A).
2. Press the "Measurement" key.  
The length measurement and angle measurement (in relation to the horizontal) are started and the measured values will be shown on the digital display. The device calculates the distance between measuring point A and the horizontal perpendicular (with respect to the distance to be calculated) from the measurements. The determined value will be shown on the digital display.



#### Indirect length calculation 5 / 6



1. Point the laser beam at the first measuring point (A, above the horizontal perpendicular with respect to the distance to be calculated).
2. Press the "Measurement" key.

The length measurement and angle measurement (in relation to the horizontal) are started and the measured value for the length will be shown on the digital display.

3. Point the laser beam at the second measuring point (B, indirect length calculation 5: below the horizontal perpendicular, indirect length calculation 6: above the horizontal perpendicular with respect to the distance to be calculated).
4. Press the "Measurement" key.

The length measurement and angle measurement (in relation to the horizontal) are started and the measured values (angle between measuring points A and B) will be shown on the digital display. The device calculates the distance between the measuring points A and B from the measurements and the determined value will be shown on the digital display.



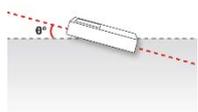
#### Digital spirit level (axis)

The digital spirit level (axis) is intended for measuring an angle of an axis in relation to the horizontal and for displaying the corresponding inclination.

1. Place the device flat onto the surface to be checked.
2. Align the device. The axis of the device must correspond to the axis to be checked.

The measured value will be shown on the digital display and a digital spirit level indicates the inclination.

In horizontal position, the alignment point ("bubble") is exactly between the two markings and will be displayed in green.



#### Digital spirit level (surface)

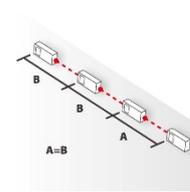
The digital spirit level (surface) is intended for displaying an inclination of a surface in relation to the horizontal.

1. Place the device onto the surface to be checked.

The digital spirit level indicates the inclination. In horizontal position, the alignment point ("bubble") is exactly within the inner marking and will be displayed in green.



#### Stake-out function



The stake-out function is intended for dividing a distance into previously set subsections of equal lengths.

1. Set the desired length of the subsections.
2. Press the "Measurement" key.
3. Point the laser beam at the measuring point.
4. Press the "Measurement" key.

The measurement is started and the following values will be shown on the digital display:

- Set length of the subsections (setting)
- Number of subsections with respect to the measured distance (measured value)

- Measured distance (measured value)

- Yellow arrows on the top and bottom of the digital display: display in which direction the next complete subsection is located (integer).

5. Reposition the device accordingly.

Press the "Measurement" key to interrupt the measurement and press the "Menu" key to exit the measuring function.



#### Measuring units

	Metre	Centimetre	Millimetre	Foot	Inch
Length	m	cm	mm	ft	in
Area	m <sup>2</sup>	m <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
Volume	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>	ft <sup>3</sup>	ft <sup>3</sup>



#### Settings

- Key tones (volume / OFF)
- Automatic rotation of the digital display ON / OFF
- Opening the measured value memory / deletion via
- Calibrating the spirit level (observe operating manual!)

#### Further measuring functions

For more detailed information or for information on further measuring functions (e. g. calibration of the spirit level, measured value memory, addition / subtraction of measured values), please refer to the operating manual on the Internet at <http://tms.benning.de/ld40-ld60>.

#### Error messages

Code	Description	Remedial measure
Err01	Measured value outside measuring range	Carry out the measurement within the measuring range.
Err02	Reflected signal too weak	Carry out the measurement at a measuring point with a different surface.
Err03	Measured value outside of display range (max. 99 999)	Divide the measurement into smaller subsections.
Err04	Pythagoras calculation failed	Check whether the measured values are correct and the correct measuring sequence has been observed.
Err05	Low battery	Replace the batteries of the device.
Err06	Ambient temperature outside the operating temperature	Carry out the measurement at a permissible ambient temperature.
Err07	Ambient light too bright	Carry out the measurement in a darker environment.

#### Disposal and environmental protection



At the end of product life, dispose of the unserviceable device and the batteries via appropriate collecting facilities provided in your community.