DIGITAL
MEASURING KIT

DIGMK300

Technical Data and Reference Information

OPERATOR'S MANUAL

SIRCHIE®

Products • Vehicles • Training

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DMLASER FORENSIC PROJECTION LASER

The DMLASER is a durable, lightweight aluminum level with a red laser beam that can be used in a variety of applications.

This state-of-the-art level projects a highly visible red dot on almost any surface with up to ±1/4 in. @ 50 ft. (±6mm accuracy at 15.3m).

With its chalk line attachment, the DMLASER projects a highly visible red line on almost any surface. Use instead of a straightedge to superimpose a center-line on blood spatter patterns.

The beam splitter attachment allows the DMLASER to be used as a plum bob or to determine 90 degrees perpendicular to any projected path.

GENERAL SAFETY RULES

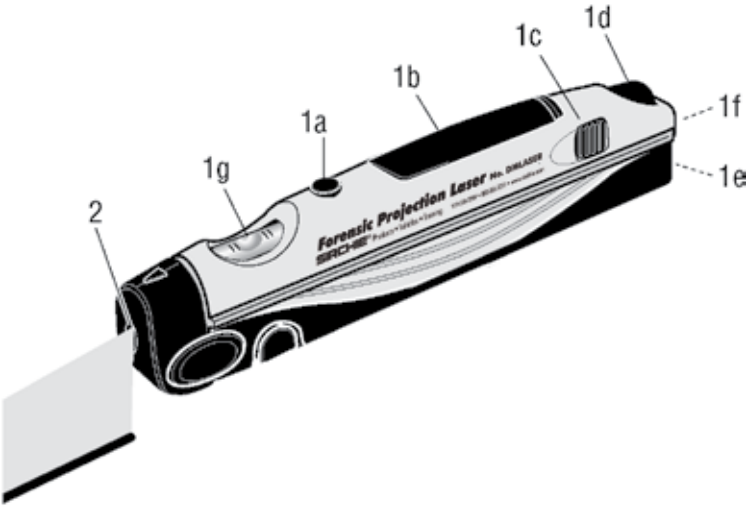
LASER RADIATION. AVOID DIRECT EYE EXPOSURE. DO NOT stare into the laser light source. Never aim light at another person or object other than the work piece. Laser light can damage your eyes.

USING YOUR DMLASER

The Laser Level offers a highly visible level reference over both short and long distances with great accuracy. The level can be placed in a central location to transfer a level reference point anywhere you need it. With its on-board circular bubble vial, the level can also be used in a vertical position for use as a laser plumb bob.

Features and Benefits

- A professional grade laser level with a magnetic base for all types of leveling jobs
- Magnetic beam spreader lens and 90°-beam splitter adapter
- Reference ridge built into side of the level allows easy alignment without a height offset
- Two precision vials—one (1) chalk line and one (1) beam splitter for plumb
- Solid machine die cast base for stability and strength
- Magnetic base
- Special tripod leveling feet for maximum leveling security



- Includes: Laser level, beam spreader, beam splitter, mini laser tripod, and batteries

1a. Power switch

1b. Battery cartridge

1c. Trivet height adjustment knob

1d. Trivet activator button

1e. Trivet retractor button

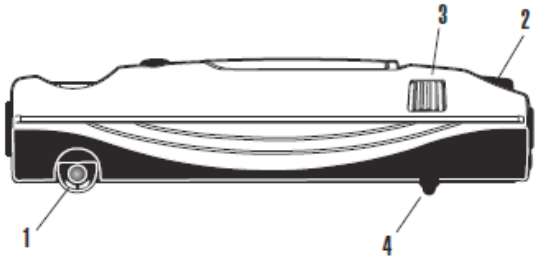
1f. Circular plumb vial

1g. Primary level vial

2. Laser Chalkline or Beam Splitter

How To Use The "Built-In" Leveling Feature

Place unit on any flat, firm surface and switch on the laser. Swing out (1) leveling feet and push the (2) trivet activator button. Use (3) trivet height adjustment knob to center the bubble. The laser beam is now projecting a visible reference to the center of the laser's aperture.



MAINTENANCE

The DMLASER is designed to be weather resistant and crime-site tough; but as with any precision instrument, care should be taken to avoid damage.

- Dry unit immediately if wet.
- The precision vials are protected; however, avoid hard contact to the vials.
- Clean the front lens with a lint-free cloth or swab using a premium glass cleaner solution.
- Clean the outside of the level with a damp cloth and dry with a soft lint free cloth.

SPECIFICATIONS

- Working Range: Up to 50' interior visible range
- Working Environment: Designed for Interior use
- Vial Sensitivity: Level ± .33° – Plumb ±.5°
- Line Accuracy: ± 1/4 in. @ 50 ft. (±6.3mm at 15.3m)
- Leveling Type: Manual, with base adjusting screw
- Level Beam Accuracy: ±1/4 in. @ 50 ft. (±6.3mm at 15.3m) in dot mode
- Laser Diode: Dual 635-650nm
- Laser Class: Class 2M/3R
- Batteries: 3 "AA" Alkaline (included)
- Battery Life: Up to 100 hours intermittent use
- Warranty: 90 Days

DMANGLE ANGEL FINDER

The DMANGLE is a precision instrument used for measuring absolute and relative angles. It's three (3) magnetic edges allow it to be attached to magnetic or steel surfaces or the DMLASER.

OPERATION

Absolute Level

To power on, push the LEVEL button. The absolute angle will be displayed along with "Level" in the upper-left corner.

Relative Level

Place the DMANGLE on a surface and push the "ZERO" button. Then move the DMANGLE to the second surface. The DMANGLE will accurately measure and display the angle between the two surfaces. To switch back to Absolute Angle Mode press and hold the "LEVEL" button for 3 seconds.

Hold

To hold the reading, push "HOLD". "H" will display at the upper left corner of the display. To disable. Press "HOLD" again.

Low Battery

If the symbol ▬ appears on the LCD display or the gauge will not power on, it is time to change the battery.

Power Off

To power off, push "LEVEL". Note the unit will power off automatically 3-5 minutes after last use.

Replacing The Battery

Remove the back plate with the screwdriver provided and insert a new standard 9V battery. Please dispose of the old battery properly.

SPECIFICATIONS

- Resolution .....0.05°
- Repeatability...0.01°
- Accuracy .....±0.2°
- Battery ..... Standard 9 volt

DRF100 RANGE FINDER

Use the DRF100 as an alternative to conventional tape measures.

Features

- Four Measurement Systems—Inches, feet and inches, decimal feet, and metric
- Length, Area and Volume Measuring capacity
- Two measuring reference points—Back and Front of DRF100
- Ergonomic Soft Grip
- Carrying case with belt loop
- Tripod Mount

GENERAL SAFETY RULES

LASER RADIATION. AVOID DIRECT EYE EXPOSURE. DO NOT stare into the laser light source. Never aim light at another person or object other than the work piece. Laser light can damage your eyes.

READ ALL INSTRUCTIONS. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.

Safety Rules

- Working safely with the DRF100 is possible only when the operating and safety information are read completely and the instructions contained therein are strictly followed.
- Never make warning labels on the DRF100 unrecognizable.
- Never aim the beam at a work piece with a reflective surface. Bright shiny reflective sheet steel or similar reflective surfaces are not recommended for laser use. Reflective surfaces could direct the beam back toward the operator.
- Take care to recognize the accuracy and range of the device.
- The use of optical instruments with this product will increase eye hazards.
- Have the DRF100 repaired only through qualified specialists using original spare parts. This ensures that the safety of the DRF100 is maintained.
- Do not allow children to use the DRF100 without supervision. They could unintentionally blind other persons.
- Do not point the laser beam at persons or animals and do not look into the laser beam yourself, not even from a large distance.

Electrical Safety Procedures

- WARNING: Batteries can explode or leak, and can cause injury or fire. To reduce this risk:
- ALWAYS follow all instructions and warnings on the battery label and package.
- DO NOT short any battery terminals.
- DO NOT charge alkaline batteries.
- DO NOT mix old and new batteries. Replace all of them at the same time with new batteries of the same brand and type.
- DO NOT mix battery chemistries.
- DISPOSE of batteries per local code.
- DO NOT dispose of batteries in fire.
- KEEP batteries out of reach of children.
- REMOVE batteries if the device will not be used for several months.

Environmental Protection

- Recycle raw materials and batteries instead of disposing of waste. The unit, accessories, packaging and used batteries should be sorted for environmentally friendly recycling in accordance with the latest regulations.

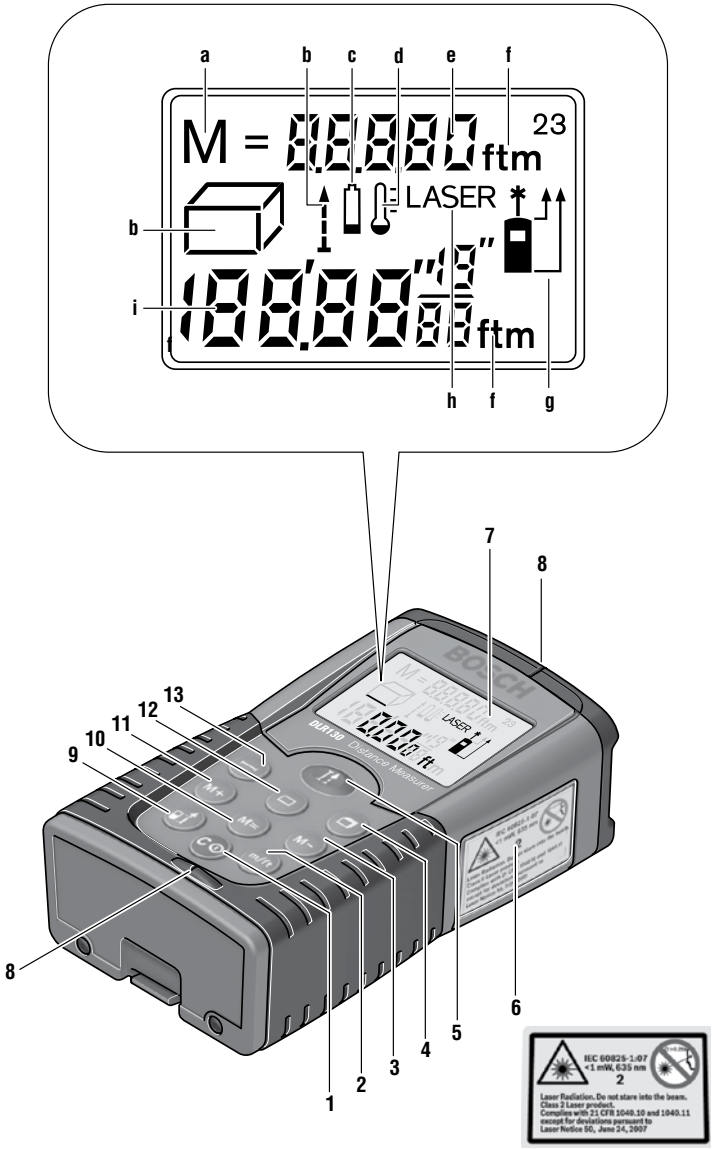
FUNCTIONAL DESCRIPTION

Intended Use

The DRF100 is intended for measuring distances, lengths, heights, clearances and for calculating areas and volumes.

The DRF100 is suitable for interior and exterior use.

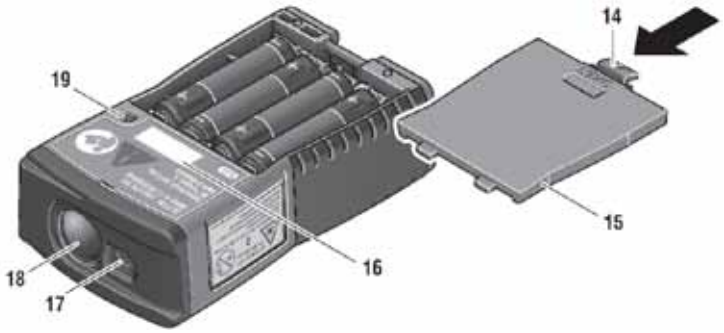
Product Features



The numbering of the product features to follow refers to the illustrations above.

1			On/Off/Clear button “C”
2			Change “unit of measure” button
3			Memory subtraction button
4			Volume measurement button
5			Measuring and continuous measurement button
6			Laser warning label
7			Display
	a		Measured value stored
	b		Measuring mode indicators
		—	Length measurement
			Area measurement
			Volume measurement
	c		Battery indication
	d		Problem temperature indicator
	e		Measured value/result
	f		Unit of measure
	g		Measurement reference point
	h		Laser switched on
	i		Individual measured value (for length measurement: result)
8			Alignment aid
9			Reference point button
10			Memory retrieve button
11			Memory add button
12			Area measurement button
13			Length measurement button

A



14		Latch of battery lid
15		Battery lid
16		Serial number
17		Laser beam outlet
18		Reception lens
19		1/4" threaded hole for mounting tripod

GETTING STARTED

Inserting/Replacing The Battery *(see Fig. A above)*

Use only alkali-manganese or rechargeable batteries. Fewer measurements are possible when using 1.2V rechargeable batteries as compared with 1.5V batteries. To open the battery lid (#15), press the latch of the battery lid (#14) in the direction of the arrow and remove the battery lid. Insert the supplied batteries. When inserting, pay attention to the correct polarity according to the representation on the inside of the battery compartment.

When the battery symbol appears in the display for the first time, then at least 100 measurements are still possible. The batteries must be replaced when the battery symbol flashes; taking measurements is no longer possible. Always replace all batteries at the same time. Only use batteries from one brand and with the identical capacity.

Remove the batteries from the DRF100 when not using it for extended periods. When storing for extended periods, the batteries can corrode and discharge themselves.

Protect the DRF100 against moisture and direct sun irradiation. Do not expose the DRF100 to extreme temperatures or variations in temperature.

INITIAL OPERATION

Switching On and Off

To switch on the DRF100 , either press or . When switching on the DRF100, the laser beam is not switched on yet.

To switch off the DRF100 , press and hold .

To save the batteries, the DRF100 switches off automatically after approx. five (5) minutes when no measurement is carried out. When a measured value has been stored, it is retained in automatic switch-off mode. When switching on the DRF100 again, "M" is indicated in the display.

MEASURING PROCEDURE

The DRF100 offers a variety of different measuring modes that can be selected by pushing the corresponding mode button (see "Measuring Modes"). After switching on, the DRF100 is in the "length measurement mode". It is possible to select any of the two different reference points for the measurement by pushing (see "Selecting the Reference Point"). After switching on, the rear edge of the DRF100 is preset as the reference point. Upon selection of the measuring mode and the reference point, all further steps are carried out by pushing . With the reference point selected, place the DRF100 against the desired measuring line (e.g. a wall). Briefly push to switch on the laser beam.

DO NOT point the laser beam at persons or animals, and do not look into the laser beam yourself, not even from a large distance.

Aim the laser beam at the target surface. Push again to initiate the measurement.

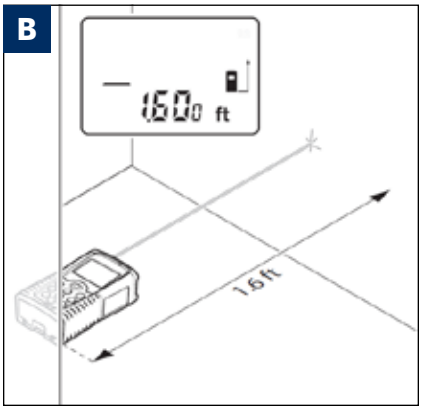
In the continuous measurement mode, the measurement already starts upon first actuation of . The measured value appears after 0.5 to 4 seconds. The duration of the measurement depends on the distance, the light conditions and the reflection properties of the target surface. The end of the measurement is indicated by a signal tone. The laser beam is switched off automatically upon completion of the measurement.

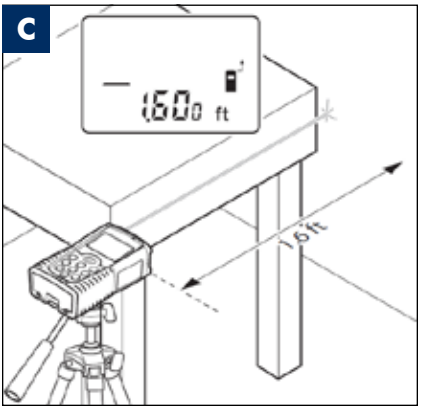
When no measurement has taken place approximately 20 seconds after sighting, the laser beam is switched off automatically to save the batteries.

Selecting The Reference Point *(see Figs. B–C)*

For measuring, it is possible to select from two different reference points:

• The rear edge of the DRF100 (e.g., when placing the DRF100 flush against a wall),

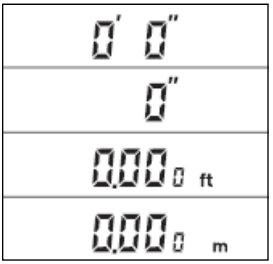




• The front edge of the DRF100 (e.g., as when measuring from the edge of a table onward).

To select the reference point, push ⏻ until the required reference point is indicated in the display. Each time after switching on, the rear edge of the DRF100 is preset as the reference point.

Changing The Unit of Measure



The unit of measure can be changed any time for display of the measured values, even for already measured or calculated values.

For display of the current length measurement values, the units of measure shown are available.

Area and volume values as well as stored measured values can only be displayed in “ft.” or “m”.

To change the unit of measure, push ⏻ until a new unit of measure is displayed. The unit-of-measure setting is retained when switching the DRF100 on or off.

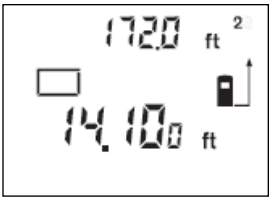
MEASURING MODES

Length Measurement

For length measurements, push ⊖. The indicator for length measurement “—” appears in the display.

Press ⊙ once for sighting and once more to take the measurement. The measured value is indicated at the bottom in the display.

Area Measurement

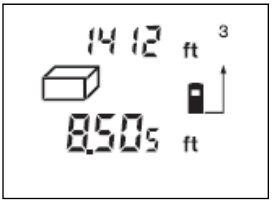


For area measurements, push ⊖. The indicator for area measurement ▭ appears in the display.

Afterwards, measure the length and the width, one after another, in the same manner as a length measurement. The laser beam remains switched on between both measurements.

After taking the second measurement, the area/surface is automatically calculated and displayed. The last individual measured value is indicated at the bottom in the display, while the final result is shown at the top.

Volume Measurement



For volume measurements, push ⊖. The indicator for volume measurement ⬚ appears in the display.

Afterwards, measure the length, width and the height, one after another, in the same manner as for a length measurement. The laser beam remains switched on between all three measurements.

After taking the third measurement, the volume is automatically calculated and displayed. The last individual measured value is indicated at the bottom in the display, while the final result is shown at the top.

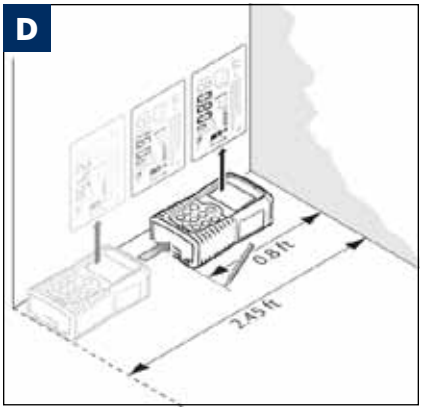
Values exceeding 99990 ft^3 cannot be displayed and "Err." is indicated in the display. In this case, switch the unit of measure to meters (see "Changing the Unit of Measure").

Area or Volume Rounding of Large Calculations

For values larger than 9999 feet or meters the DRF100 rounds the calculated value to the nearest 10 feet or 10 meters.

Accuracy in such situations is always 99.95% or better

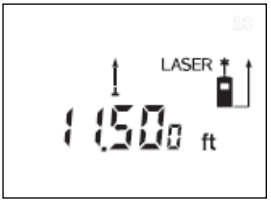
Continuous Measurement (Tracking) *(see Fig. D)*



In continuous measurement mode, the DRF100 can be moved relative to the target, whereby the measured value is updated approximately every 0.5 seconds. As an example, the user can move from a wall to "walk off" the required distance, while the actual distance can be read continuously.

For continuous measurement, push until the indication appears in the display.

Press to initiate the measuring procedure. Move the DRF100 until the required distance value is indicated at the bottom of the display.



Pushing interrupts the continuous measurement. The current measured value is indicated in the display. Repeated pushing of starts the continuous measuring again.

The continuous measuring automatically switches off after 5 minutes. The last measured value remains indicated in the display. The continuous measuring can also be ended by pushing or , also or , which changes the measuring mode.

Deleting Measured Values

Briefly pushing deletes the last individual measuring value determined in all measuring modes. Pushing the button repeatedly deletes the individual measured values in reverse order.

MEMORY MODES

When switching off the DRF100, the value in the memory is retained.

Storing/Adding Measured Values

Push M+ in order to store the current measured value – a length, area or volume value, depending on the current measuring mode. As soon as a value has been stored, "M" is indicated in the display and "Add" is briefly indicated next to it.

If a value is already stored in the memory, the new value is added to the memory contents, however, only if it's the same type of measurement.

As an example, when an area value is in the memory and the current measured value is a volume value, the addition cannot take place and "Err." briefly flashes in the display.

However, values of the same type (e.g. length values) can be added no matter if they have been measured in feet and inches, decimal feet or meters.

Subtracting Measured Values

Push M- in order to subtract the current measured value from the memory value. As soon as a value has been subtracted, "M" is indicated in the display, and is briefly followed by "Sub."

If a value is already stored, then the new measured value can be subtracted only when the measures of unit correspond (see "Storing/Adding Measured Values").

Displaying the Stored Value

Push MR in order to display the value stored in the memory. "M=" is indicated in the display. When the memory contents "M=" is indicated in the display, it can be doubled by pushing M+ or set to zero by pushing MC.

The memorized values can only be displayed in decimal feet or meters.

Deleting the Memory

To delete the memory contents, first push MR so that "M=" is indicated in the display. Then push MC; "M" is no longer indicated in the display.

OPERATING INSTRUCTIONS

The reception lens 18 and the laser beam outlet 17 must not be covered when taking a measurement (refer to Figure A).

The DRF100 must not be moved while taking a measurement (with the exception of the continuous measurement mode). Therefore, whenever possible, place the DRF100 against or on the measuring points.

Measurement takes place at the center of the laser beam, even when target surfaces are sighted at an incline.

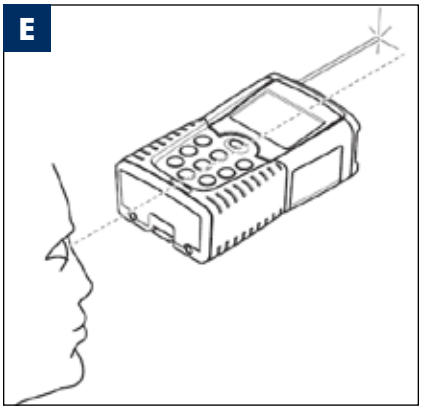
The measuring range depends upon the light conditions and the reflection properties of the target surface. For improved visibility of the laser beam when working indoors or outdoors use the DMTARGET (Laser Targets), or shade off the target.

When measuring against transparent surfaces (e.g. glass, water) or reflecting surfaces, faulty measurements are possible.

Also, porous or structured surfaces, air layers with varying temperatures or indirectly received reflections can affect the measured value. These effects are due to physical reasons and can therefore not be compensated for by the DRF100.

Sighting with the Alignment Aid

With the alignment aid (see Fig. E), sighting over larger distances is a lot easier. For this, look alongside the aligning aid on the top side of the DRF100. The laser beam runs parallel to this line of sight.



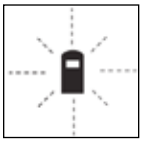
Working with Tripod

The use of a tripod is particularly advisable for larger distances because of the steadiness it provides. The DRF100 can be screwed onto the tripod using the 1/4" thread 19 (ref. back to Fig. A) on the bottom side of the housing.

When positioning the tripod, observe that the measurement will take place beginning from the rear or front edge of the measuring tool, depending on the selected reference level.

TROUBLESHOOTING		
ISSUE	POSSIBLE CAUSE	REMEDY
Problem temperature indicator  ; Measurement not possible.	The measuring tool is not within the operating temperature of – 10 °C to +50 °C (+14 °F to +122 °F), in the continuous measurement function to +40 °C (+104 °F).	Wait until the measuring tool has reached the operating temperature.
Battery indication  is indicated.	Battery voltage decreasing measurement still possible.	Replace batteries.
Battery indication  flashes; Measurement not possible.	Battery voltage too low.	Replace batteries.
The indications “Err.” and “- - -” are indicated in the display.	The angle between the laser beam and the target is too acute.	Enlarge the angle between the laser beam and the target.
	The target surface reflects too intensely (e.g. a mirror) or insufficiently (e.g. black fabric), or the ambient light is too bright.	Work with the DMTARGET target accessory.
	The laser beam outlet 17 or the reception lens 18 are misted up (e.g. due to a rapid temperature change).	Wipe the laser beam outlet 17 and/or the reception lens 18 dry using a soft cloth.
	The calculated area or volume value is larger than 99990 ft^2 or ft^3.	Change unit of measure to “m”.
The indication “Err.” flashes at the top in the display.	Addition/Subtraction of different types of measurements.	Only add/subtract of the same type.
Unreliable measuring result	The target surface does not reflect correctly (e.g. water, glass).	Cover the target surface.
	The laser beam outlet 17 or the reception lens 18 are covered.	Make sure that the laser beam outlet 17 or the reception lens 18 are unobstructed.
Measuring result not plausible.	Wrong reference point set.	Select reference point that corresponds to measurement.
	Obstruction in path of laser beam.	Laser point must be completely on target surface.

The measuring tool monitors the correct mode for each measurement. When a defect is determined, only the symbol shown flashes in the display.



Accuracy Check of the Measuring Tool

The accuracy of the measuring tool can be checked as follows:

- Select a permanently unchangeable measuring section with a length of approx. 3 to 10 meters (10 to 33 feet); its length must be precisely known (e.g. the width of a room or a door opening).
- Measure the distance 10 times after another.

The difference in values must not amount to more than a maximum of ±1/8 in. (±2 mm). Keep a record of the measurements in order to compare the accuracy at a later time.

MAINTENANCE AND SERVICE

Maintenance and Cleaning

- Store and transport the measuring tool only in the supplied protective case.
- Keep the measuring tool clean at all times.
- Do not immerse the measuring tool into water or other fluids.
- Wipe off debris using a moist and soft cloth.
- Do not use any cleaning agents or solvents.
- Maintain the reception lens 18 in particular, with the same care as required for eye glasses or the lens of a camera.
- If the measuring tool should fail despite the care taken in manufacturing and testing procedures, call customer service at 919-554-2244.

DIGMK300 CONTENTS:

DMLASER with tripod w/3 AA batteries
DRF100 with case and 4 AAA batteries
DMANGLE with 9V battery and screwdriver
DMTARGET Disposable Targets 20 pack
PPS401 Vinyl Photo Evidence Scale, Gray, 10 pack
PPS202 Low tack, adhesive backed labels “Numbers w/0-2cm Scale, 10 pack
PEN15VS Short Plastic Photo Numbers, Set of 15
TLK200B Kit Bag

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