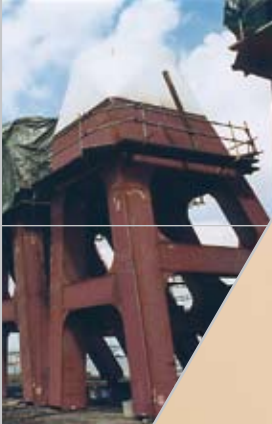


EASY-LASER®



GEOMETRICAL MEASUREMENT

Precision and reliability.



FLEXIBLE AND USER-FRIENDLY

The Easy-Laser® systems have been developed on the basis of more than 20 years' experience in solving measurement and alignment problems, and are manufactured in accordance with strict quality requirements*. Every part of the systems is designed to withstand the most demanding environments and to be easy to operate when carrying out measurements. The versatile design tackles all types of measurements quickly and accurately, with a resolution of 0.05 mils/thou [0.001 mm].

The basic idea behind the measurement system is that it should be simple to use and adapt for each measuring task. Depending on the choice of laser transmitter, the standard systems cover most requirements, but you can also expand your system with accessories and adapt it to the specific situation, as most of the parts have extra fixing holes, etc. The only limitation is your own imagination!

TWO OPTIONS

There are two main options for putting together a measuring system for geometrical measurements:

1. Start with an Easy-Laser® D600 basic system for geometry, with a 2-axis detector, and add a suitable laser transmitter and other accessories. This is the best option if you will not be measuring and aligning rotating machines.
 2. If, in combination with alignment of machine tools, you are also working on alignment of rotating machines (e.g. pumps, motors, gearboxes, cardan-shaft-coupled machines), we recommend starting with the Easy-Laser® D525 shaft alignment system instead and adding a suitable laser transmitter and other accessories.
- If you are unsure which would be best for you, consult your Easy-Laser® dealer.



*Damalini AB's quality system is approved by Nemko (Notification Number Nemko 05ATEX44280) as follows: "Nemko AS, notified body number 0470 for Annex VII in accordance with Article 9 of Council Directive 94/9/EC of March 1994 notifies to the applicant that the actual manufacturer has a product quality system which complies with Annex VII of the Directive."

SYSTEM

D600 (BASIC)



D525



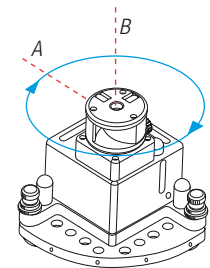
LASER TRANSMITTER



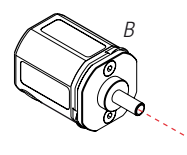
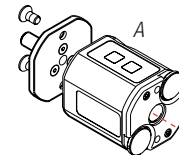
SWIVELLING LASER D22

For measuring Flatness, Straightness, Squareness, Parallelism and Spindle Direction. The laser beam can sweep 360° with a measurement distance of 130 feet [40 meters] in radius. The beam can be deflected at 90° to the sweep, within 0.5 mils/thou [0.01 mm/m].

Part No.: 12-0022



*Alternative A: the laser is used for a horizontal sweep.
Alternative B: the laser is angled at 90° to the sweep.*

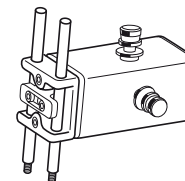


SPINDLE LASER D146

For measuring Spindle Direction and Straightness. Can be used in a rotating spindle (max. 2000rpm). Mounting pins with different diameters can be used. The mounting pin can be fitted at either end, for use when aligning bar feeders, for example. Measurement distance 65 feet [20 meters].

Part No.: 12-0146

*A. The clamping pin can be fitted at either end.
B. Clamping pin fitted by the laser opening.*

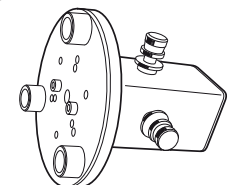


*Fixture for mounting D75 on rods (accessory).
Part No.: 12-0149*

LASER TRANSMITTER D75

For measuring Straightness and Spindle Direction. M6 threads on ends and sides offer alternative mounting options. Measurement distance 130 ft [40 meters].
(Also available as a special version with a measurement distance up to 260 feet [80 meters].)

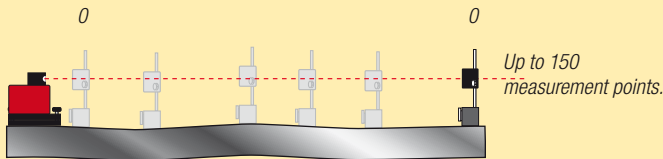
Part No.: 12-0075



*Bracket with magnets for mounting D75 against shaft end (accessory).
Part No.: 12-0187*

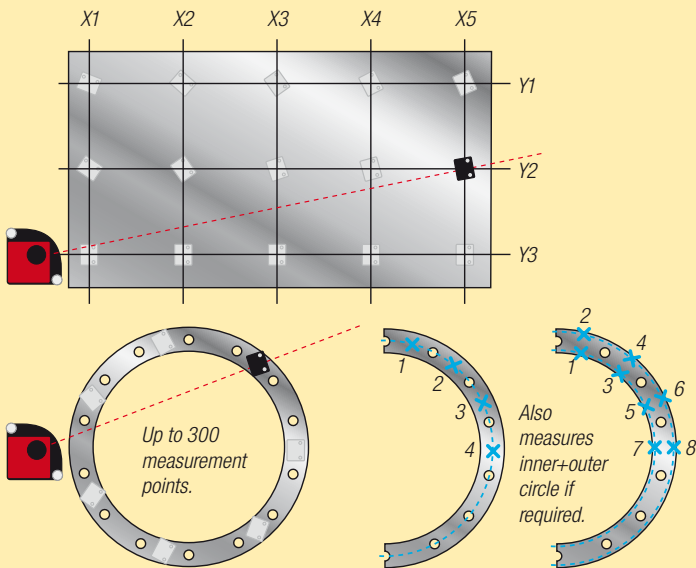
STRAIGHTNESS

Measuring straightness, like all other geometry measurements, relies on the use of the laser beam as a reference. The beam is roughly aligned along the measurement object or levelled if required. Then position the detector at selected measurement points and record the values. After measuring, set two suitable measurement points to zero, then convert the remaining points to this new reference line. New measurement points can be added to or removed from the existing set. Offset values can be entered for all points for automatic calculation of correct adjustment values.



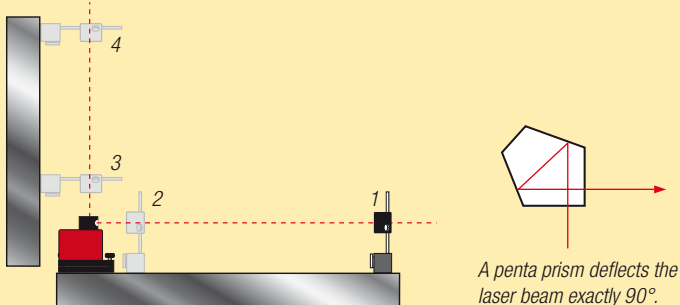
FLATNESS

Flatness can be measured on a rectangular or circular plane. The only difference is which measurement program is most suitable. First, roughly align the laser beam along and across the measurement object. Then position the detector at selected measurement points and record the values. After measuring, set three of the measurement points to zero, then the remaining points are recalculated to the new reference plane formed.



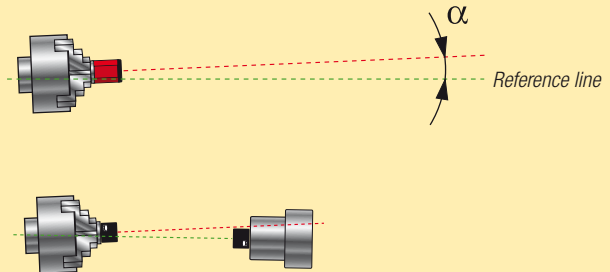
SQUARENESS

When measuring squareness, first record two measurement values on a single object to create a reference for the angle. Then use the built-in penta prism in laser transmitter D22, which deflects the laser beam 90° (as illustrated), and record two new measurement values on the second object. The measurement values are converted into an angular value, showing any deviation from 90° in the second object.



SPINDLE DIRECTION

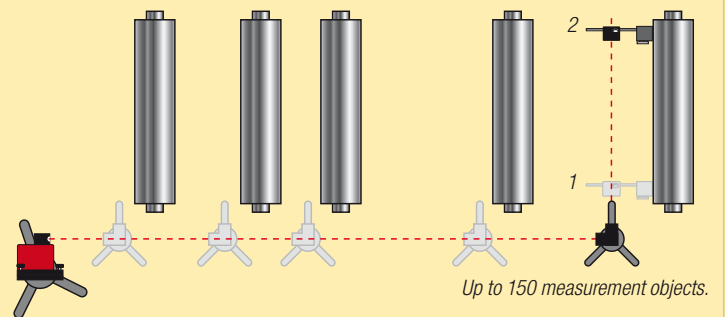
When measuring spindle direction, place a suitable laser transmitter in the machine spindle and the detector on the section that can be moved along with the machine's working area. Record the first measurement value at the first measurement point, then rotate the spindle 180° and record the next value. Then move the detector to the second measurement point and repeat the procedure. (To eliminate any static sag, laser transmitter D146 can be used with a rotating spindle while measuring.)



Another application is alignment of secondary spindle with main spindle. Here it is beneficial to use both measuring units (combined laser/detector) of the Easy-Laser® system D525.

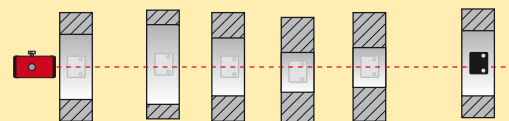
PARALLELISM

Parallelism measurements can be performed in a number of ways. The example below relies on the use of a penta prism to deflect the laser beam at 90° to the reference laser line. Measurement values are recorded at both ends of the measurement object. The penta prism is then moved to the next measurement object and two new measurement values are recorded. Repeat the procedure for all objects to be measured. The results are displayed in both graphical and digital form, with the base line or any object as reference. (The measurement process requires laser transmitter D22, 2 tripods, a penta prism and a parallelism kit.)



BORE CENTRE

For bearing positions, the straightness of the bore's centre line both vertically and horizontally should be measured. Position the detector in the bearing position, record the measurement value, then rotate the detector 180° and record a new measurement value. Repeat the procedure for each bearing position. (If bearing halves or bearings with identical diameters are to be measured, an ordinary straightness measurement can be performed instead with just one measurement value per bearing position.) (Different fixtures are required depending on the application. Consult your dealer and read more about it in other brochures.)



COMMON APPLICATIONS

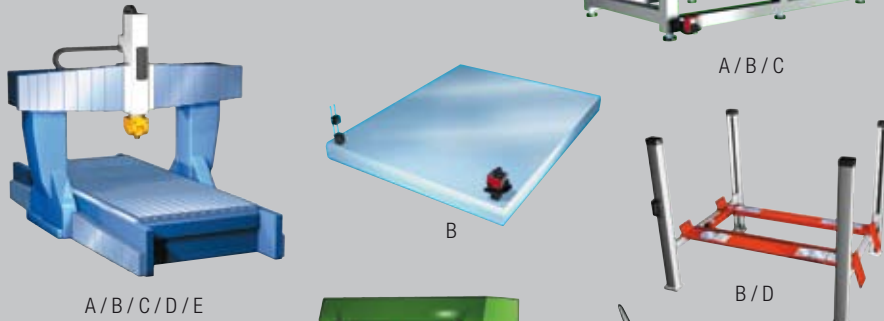
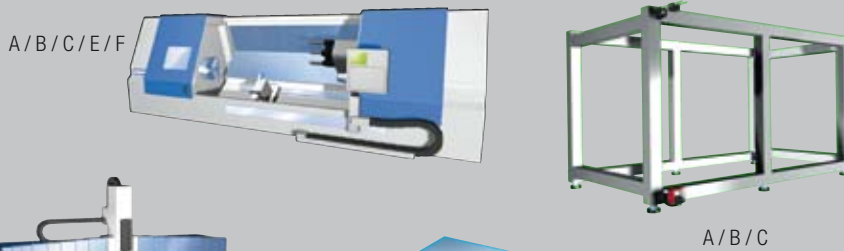
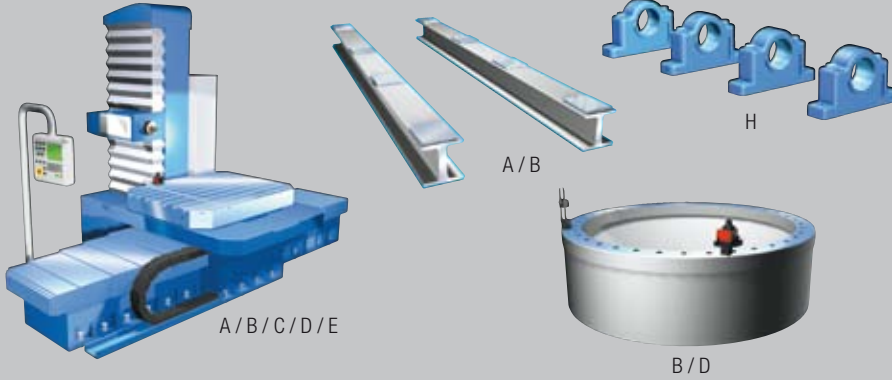
With Easy-Laser® systems you can handle almost any geometry measurement.

Below are examples of typical applications:

A. Straightness / B. Flatness / C. Squareness / D. Parallelism (using Parallelism equipment) / E. Spindle direction

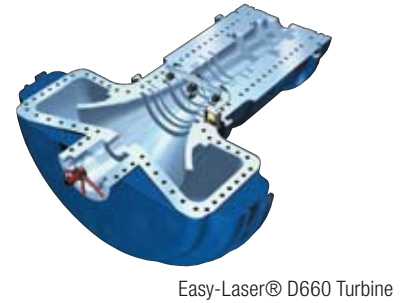
F. Shaft alignment (using Easy-Laser® D525) / G. Sheave/Pulley alignment (using BTA Digital accessories)

H. Bore centre (using requisite bore fixtures)



STANDARD APPLICATIONS















Complete measuring systems are available for certain specific geometry applications. These are described in more detail in individual brochures.
















THE SOFTWARE DOES THE JOB

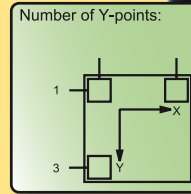
The key to quick and easy measurements is a measurement program that helps you achieve your best. We have therefore included a large number of measurement programs in the display unit as standard. All measurement programs guide the user step-by-step through the entire measurement procedure. Complicated calculations of angles and measurement values are handled by the program. In other words, you leave most of the thinking and all difficult calculations to the measurement system.

PROGRAM FOR GEOMETRIC MEASUREMENTS

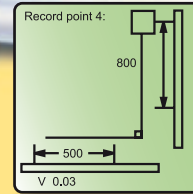
-  **STRAIGHTNESS** - For measuring straightness of machine foundations, shafts, bearing journals, machine tools, etc. Can handle up to 150 measurement points with two zero points.
-  **STRAIGHTNESS PLUS** - Versatile program with advanced functions. Measurement points can be added, deleted or re-measured at any point during the measuring process. The reference line can be offset displaced as required. Applications as above.
-  **FLATNESS** - Program for measuring flatness/twist of machine foundations, machine tables, etc. Can handle up to 300 measurement points with three zero points.
-  **SQUARENESS** - For measuring squareness in machines and installations.
-  **PARALLELISM** - For measuring parallelism between rolls, machine ends, etc. Can handle up to 150 rolls/measurement objects. The base line or any roll may be used as a reference. Every object can be individually named.
-  **PARALLELISM PLUS** - Versatile program with advanced functions. Measurement objects can be added, deleted or re-measured at any point during the measuring process. Includes base line measurement function. Applications as above.
-  **SPINDLE DIRECTION** - For measuring the pointing direction of machine spindles in machine tools, drilling machines, etc.
-  **CENTER OF CIRCLE** - Used for measuring straightness of bearing journals when the hole diameter varies. For example, diesel engines, propeller shaft installations, etc.
-  **CENTER OF CIRCLE PLUS** - Versatile program with advanced functions. Measurement points can be added, deleted or re-measured at any point during the measuring process. The reference line can be offset displaced as required. Applications as above.
-  **HALF-CIRCLE** - Readings are taken at three positions, e.g. 9, 6 and 3. Allows varying diameters. To be used together with the turbine system.
-  **HALF-CIRCLE PLUS** - Versatile program with advanced functions. Measurement points can be added, deleted or re-measured at any point during the measuring process. The reference line can be offset displaced as required. Applications as above.
-  **PLUMB LINE** - This program allows you to measure the plumb line (vertical) and straightness of turbine and generator shafts, etc.
-  **FLANGE** - For flatness measurement of flanges and circular planes, e.g. slewing ring bearings. Can measure up to 300 points, measurements can be taken on the inner and/or the outer circle. Three zero points at 120° pitch are calculated by the system.
-  **VALUES** - Shows live readings. Can be used for shaft alignment, straightness measurement and dynamic measurement. Up to four detectors can be connected in series and zeroed individually.

OTHER PROGRAMS THAT ARE INCLUDED

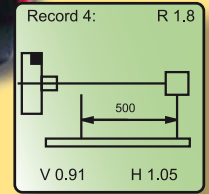
- | | | |
|--|---|---|
|  HORIZONTAL |  CARDAN |  THERMAL GROWTH COMPENSATION |
|  SOFT FOOT |  VERTICAL |  TOLERANCE CHECK |
|  EASYTURN™ |  MACHINE TRAIN |  OFFSET AND ANGLE |
|  BTA DIGITAL |  VIBROMETER |  MEASUREMENT VALUE FILTER |
| | |  REFLOCK™ |



FLATNESS



SQUARENESS



SPINDLE DIRECTION

DOCUMENTATION OF MEASUREMENT RESULTS

Once the measurement is complete, you have several options for documenting the results. Choose the one that is most suitable for the situation, depending, for example, on whether further analysis is needed or whether a measurement report must be produced. The keyboard with all characters accessible makes it simple to give each measurement a unique description.



Your description

SAVE IN THE DISPLAY UNIT

You give each measurement a unique description. The system then adds the time and date of the measurement. Up to 7000 measurement points, for example, straightness measurements, can be saved.

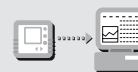


PRINT

If you want to document the alignment without using a PC, just connect up a printer and print out all measurement data.



Printout with all measurement data

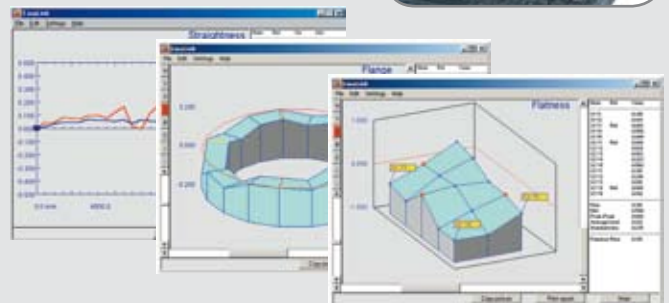


TRANSFER MEASUREMENT DATA TO PC

With the EasyLink™ program for Windows® (included), you can produce professional reports with both measurement data and pictures, export to spreadsheets such as Excel®, etc.



Excel®-sheet with graphics





SYSTEM D525

Part No. 12-0231

- 1 Display unit D279 (27 programs)
 - 2 Measuring units (S, M)
 - 12 Rods for measuring units (8x4.7", 4x2.3") [8x120 mm, 4x60 mm]
 - 2 Shaft brackets with chains
 - 2 Extension chains
 - 2 Offset brackets
 - 2 Magnet bases
 - 2 Cables with Push/Pull connectors (2x6.5') [2x2 m]
 - 1 Manual
 - 1 Measuring tape
 - 1 Protective case for Display unit
 - 1 EasyLink™ Windows® program and PC cable
- Delivered in robust aluminum framed carrying case with contoured foam insert.

SYSTEM D600 (BASIC SYSTEM)

Part No. 12-0133

- 1 Display unit D279 (27 programs)
 - 1 Detector D5
 - 8 Rods for detector (4x9.4", 4x2.3") [4x240 mm, 4x60 mm]
 - 1 Magnet base with turnable head
 - 2 Cables with Push/Pull connectors (1x16.5', 1x6.5') [5 m, 2 m]
 - 1 Manual
 - 1 Measuring tape
 - 1 Protective case for Display unit
 - 1 EasyLink™ Windows® program and PC cable
- Delivered in robust aluminum framed carrying case with contoured foam insert.

*Supplement systems D600 and D525 with a suitable laser transmitter (D22, D146, D75) and other accessories for a complete system.

TECHNICAL SPECIFICATIONS

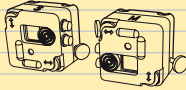
System

Data transfer	Windows® EasyLink™ program
Measurement range	See relevant laser transmitter
Temperature range	0-50° C
Relative humidity	10-95%
Max. displayed error	±1% +1 digit
Weight	D600; 24 lbs, D525 26.5 lbs. (Without laser transmitters)
Carrying case	WxHxD: D600; 26"x13.8"x6.3", D525; 19.3"x13.8"x6.3"

Display unit

Measuring programs	27 programs
Type of display	Backlit dot matrix LCD
Display size	2.9"x2.9" [73x73 mm]
Displayed resolution	Changeable: 5; 0.5; 0.05 mils/thou. 0.1; 0.01; 0.001 mm
Battery	4 x 1.5 V R14 (C)
Operating time	24-48 hours continuous, depending on connected equipment
Output port	RS232 for printer and PC communication
Keyboard	Membrane alphanumeric multifunction
Storage memory	Stores up to 7000 measurement points for e.g. straightness
Settings	For Measurement value filtering, Unit (mil/thou/mm) etc.
Housing material	Anodized aluminum/ABS plastic
Dimensions	WxHxD: 7.1"x7.1"x1.8" [180x180x45 mm]
Weight	2.8 lbs [1250 g]

Measuring units (S, M)

Type of laser	Diode laser	
Laser wavelength	635-670 nm, visible red light	
Laser Safety Class	Class 2	
Laser output power	< 1 mW	
Resolution	0.05 mils [0.001 mm]	
Type of detectors	PSD 0.7" sq [18x18 mm]	
Spirit vials	Resolution 0.5°	
Inclinometers	Electronic inclinometers, 0.1° resolution	
Thermal sensors	±1°C accuracy	
Protection	No influence from ambient light	
Housing material	Anodized aluminum	
Dimensions	WxHxD: 2.3"x2.3"x2" [60x60x50 mm]	
Weight	7 oz [198 g]	

Magnet base

Holding power	800 N
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Rods

Material	Stainless steel
Length	2.3", 4.7", 9.4" [60 mm, 120 mm, 240 mm]

Cables

Type	With push/pull connectors
Length	6.5', 16.5' [2 m, 5m]

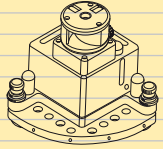
Shaft bracket

Fixture	V-fixture for chain, width 0.71" [18 mm]
Material	Anodized aluminum
Shaft diameter	Ø 3/4"-18" [20-450 mm] with standard chains

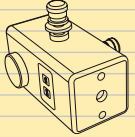
Offset bracket

Displacement	1.26" [32 mm]
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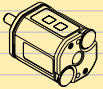
Laser transmitter D22*

Type of laser	Diode laser	
Laser wavelength	635-670 nm, visible red light	
Laser Safety Class	Class 2	
Output	< 1 mW	
Beam diameter	1/4" [6 mm] at aperture	
Working area, range	130' radius [40 meters]	
Type of battery	1 x R14 (C)	
Operating time/battery	approx. 24 hours	
Levelling range	± 30 mils/inch [± 30 mm/m] (± 1.7°)	
3 x spirit vials' scaling	0.02 mils/inch [0.02 mm/m]	
Squareness between laser beams	0.01 mils/inch [0.01 mm/m] (2 arc sec.)	
Flatness of sweep	1 mil [0.02 mm]	
Fine turning	0.1 mils/inch [0.1 mm/m] (20 arc sec.)	
2 x spirit vials for rotation	5 mils/inch (5 mm/m)	
Housing material	Anodized aluminum	
Dimensions	WxHxD: 5.5"x6.6"x5.5" [139x169x139 mm]	
Weight	5.8 lbs [2650 g]	


Laser transmitter D75*

Type of laser	Diode laser	
Laser wavelength	635-670 nm, visible red light	
Laser Safety Class	Class 2	
Output	< 1 mW	
Beam diameter	1/4" [6 mm] at aperture	
Measurement distance	130' [40 meters]	
Type of battery	1 x 1.5 V R14 (C)	
Operating time/battery	>15 hours	
Laser adjustment	2 ways ± 2°, ± 35 mils/inch [± 35 mm/m]	
Housing material	Anodized aluminum	
Dimensions	WxHxD: 2.3"x2.3"x4.7" [60x60x120 mm]	
Weight	1.5 lbs [700 g]	

Laser transmitter D146*

Type of laser	Diode laser	
Laser wavelength	635-670 nm, visible red light	
Laser Safety Class	Class 2	
Output	< 1 mW	
Beam diameter	1/8" [3 mm] at aperture	
Measurement distance	65' [20 meters]	
Type of battery	1 x R6 (AA)	
Operating time/battery	approx. 6 hours	
Max speed	2,000 rpm	
Clamping diameter	Adapted with clamping pin	
Housing material	Anodized aluminum	
Dimensions	Ø 2.3", L=3.8" [Ø 60 mm, L=98 mm]	
Weight	10.5 oz [300 g]	

Detector D5

Type of detector	2-axis PSD 0.7" sq [18x18 mm]	
Resolution	0.05 mils [0.001 mm]	
Spirit vials	0.5° resolution	
Inclinometers	0.1° resolution	
Thermal sensors	± 1° C accuracy	
Protection	No influence from ambient light	
Housing material	Anodized aluminum	
Dimensions	WxHxD: 2.3"x2.3"x2" [60x60x50 mm]	
Weight	7 oz [198 g]	

The Easy-Laser® systems come with a 2 Year Limited Warranty.
For warranty conditions, please visit www.easylaserusa.com

Easy-Laser® is manufactured by Damalini AB, Åbäcksgatan 6B, 431 67 Mölndal, Sweden, Tel +46 31 708 63 00, Fax +46 31 708 63 50, e-mail: info@damalini.se, www.damalini.com
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Authorized dealer



This product complies with:
SS-EN60825-1-1994,
21CFR 1040.10 and 1040.11



05-0289