

# Easy-Laser<sup>®</sup>

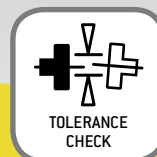
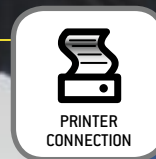
Measurement and Alignment Systems

D505

D525

## SHAFT ALIGNMENT

*Quick, simple and effective!*



## FOR ALL NEEDS

The Easy-Laser® systems were developed with the backing of more than 20 years' experience of solving measurement and alignment problems. Experience that we and our dealers pass on during the high-quality training courses in measurement and alignment technology that we offer to you, the user.

Every part of the systems is designed to withstand the most demanding environments and to be easy to operate when doing the measurements. The versatile design tackles all types of measurement quickly and accurately. You can measure all types of rotating machine, large and small, equally well, regardless of shaft diameter, and with a measurement distance of up to 20 metres [66 feet].

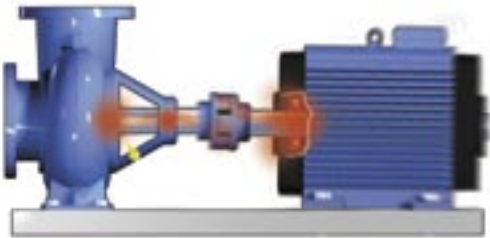
Belt drives also count as rotating machines. That's why BTA Digital is the obvious tool for this purpose. With Easy-Laser® you also have the potential to measure vibration (mm/s, inch/s) and bearing condition (g-value). All in all, Easy-Laser® provides you with many opportunities for measuring and alignment:

- SHAFT ALIGNMENT
- SHEAVE / PULLEY ALIGNMENT
- VIBRATION MEASUREMENT
- TWIST MEASUREMENT OF FOUNDATIONS
- STRAIGHTNESS MEASUREMENT
- SPINDLE ALIGNMENT (MACHINE TOOLS)

Using a single instrument, you have the potential to trouble-shoot and prevent wear and breakdowns in your machines. Easy-Laser® offers what is probably the most competent and cost-effective measuring system for rotating machines on the market!



## THE BENEFITS OF ALIGNMENT



Having correctly aligned machines reduces the risk of breakdowns. Typical problems arising from poor machine alignment are:

- LOST PRODUCTION
- LEAKING SEALS
- INCREASED VIBRATION
- HIGHER ENERGY CONSUMPTION
- BEARING FAILURE
- SHAFT BREAKAGE
- COUPLING WEAR
- QUALITY PROBLEMS

There is much to be gained in terms of time and money by adjusting the machines within the prescribed tolerances. Investing in a laser-based measuring system such as Easy-Laser® will benefit the company by reducing the cost of spare parts and lost production. And the working environment is improved at the same time.

















## VERSATILE AND USER FRIENDLY

The key to fast, simple measurement is a measuring program that helps you to perform at your best. That's why the Easy-Laser® systems have a large number of specially adapted programs that guide you step-by-step through the measurement procedure (Easy-Laser® D505: 13 programs, Easy-Laser® D525: 23 programs). In other words, you leave most of the thinking and all the difficult calculations to the measurement system.

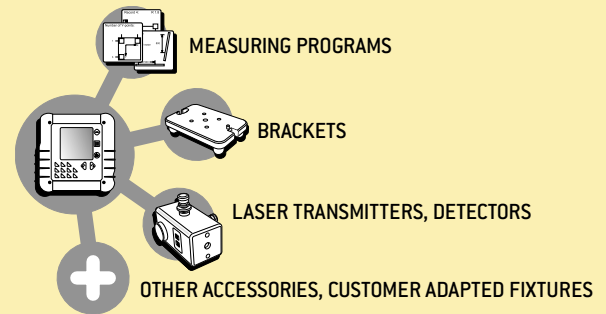


## PROGRAMS AND FUNCTIONS (FOR ROTATING MACHINES)

-  **HORIZONTAL** – For the alignment of horizontal machines by the 9–12–3 method.
-  **SOFT FOOT** – With this program you can check that the machine is resting on all its feet. Shows which foot should be corrected (if necessary).
-  **THERMAL GROWTH COMPENSATION** – Compensates for difference in thermal growth between machines. Sub-function.
-  **TOLERANCE CHECK** – Checks the offset and angle values in relation to selected tolerance. Shows graphically when the alignment is within tolerance. Sub-function.
-  **MEASUREMENT VALUE FILTER** – Advanced electronic filter for accurate results even in poor measuring conditions such as air turbulence and high vibration. Sub-function.
-  **EASYTURN™** – For the alignment of horizontal machines. Allows complete measurement with only 40° rotation of the shafts.
-  **CARDAN** – Shows angular errors and adjustment value on cardan-shaft-coupled/centre-offset machines. (Requires accessory fixtures.)
-  **VERTICAL** – For measurement of vertical and flange-mounted machines.
-  **MACHINE TRAIN** – For the alignment of between two and ten machines in line (nine couplings). The entire alignment can be followed live on the screen.
-  **REFLOCK™** – Any pair of feet can be locked/set as a reference. Sub-function.
-  **OFFSET AND ANGLE** – Shows centre offset and angular error between two shafts, for example. Also suitable for dynamic measurements.
-  **VALUES** – Shows live readings from S- and M-unit. Can be used for shaft alignment, straightness measurement and dynamic measurement. Up to four detectors can be connected in series and be zeroed individually.
-  **VIBROMETER** – Shows vibration level in "mm/s" or "inch/s", and bearing condition value in "g". The measurement complies with vibration standard ISO10816-3. (Requires accessory Vibrometer probe D283.)
-  **BTA DIGITAL** – For alignment of belt and chain drives. (This program is standard with the D525 system, not D505. Requires accessories BTA Digital transmitter and detector unit.)

## EXPANDABILITY

The two systems D505 and D525 differ in that the D505 basically only has programs for shaft alignment, while the D525 can be upgraded with parts from our other measuring systems, since it also has all our geometry programs (see penultimate page). However, system D505 can be upgraded to the D525 with all the geometry programs, should you need these functions in the future.



## DOCUMENTATION OF MEASUREMENT RESULTS

When measurement is complete, you have several options for documenting the results. Choose the one that is best suited for the situation, depending, for example, on whether further analysis is needed or whether a measurement report needs to be produced. A keyboard with all characters available makes it quick and easy to give each measurement a unique description.



*Your description*

### SAVE IN THE DISPLAY UNIT

You give every measurement an individual name. The system then adds the time and date of the measurement. Up to 1000 shaft alignment measurements can be saved.



### PRINT

Quickly print all measurement data locally. This is useful, for example, if you don't want to connect the display unit to a PC.



*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*

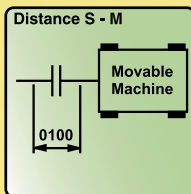
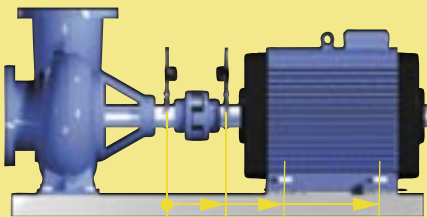
## ALIGNMENT OF ROTATING MACHINES

Easy-Laser® systems D505 and D525 have a large number of measurement programs for the alignment of rotating machines of all kinds. Added to this are several very useful functions, such as tolerance checks of measurement results.

The measuring procedure is simple. You are guided step-by-step through the entire process. Below is a description of the alignment of a motor and a pump.

### 1. WHAT THE PROGRAM NEEDS TO KNOW

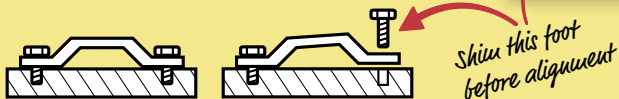
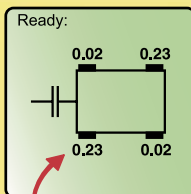
The only thing you have to tell the measurement program is the distances between the measuring units and the machine feet. The measurement system takes care of the rest. Simple!



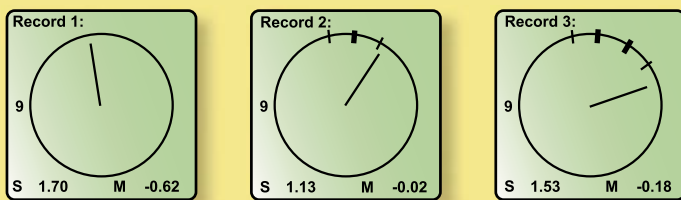
### 2. SOFT FOOT CHECK

Start by carrying out a soft foot check to ensure that the machine is resting evenly on all its feet. This is necessary for a reliable alignment.

After the soft foot check, you can go directly to the alignment program with all the machine's distances saved.



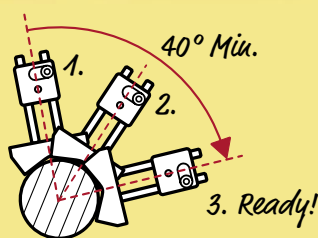
### 3. SIMPLE MEASURING PROCEDURE



Turn shafts with measuring units to three positions. With the EasyTurn™ program you can start the measurement anywhere on the revolution.

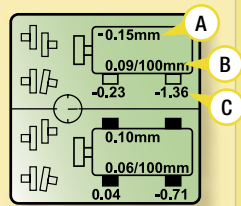
Press the Enter button  at each position to record the value.

The measurement is ready!



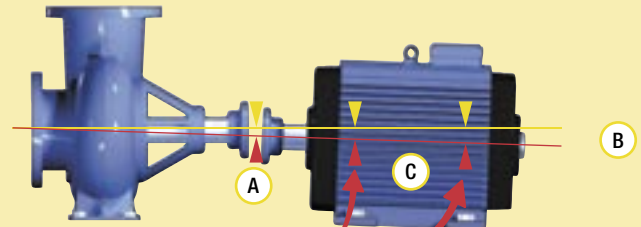
### 4. THE RESULT IS CLEARLY DISPLAYED

Offset, Angular values and Shim and Adjustment values are clearly displayed. Both horizontal and vertical values are shown "live", which makes it easy to adjust the machine.

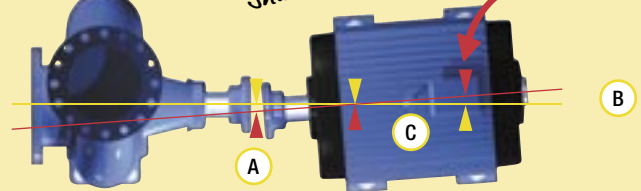


- A. Offset value
- B. Angular value
- C. Shim/Adjustment value. Live direction indicated by filled machine feet symbols.

#### VERTICALLY



#### HORIZONTALLY



### 5. TOLERANCE CHECK

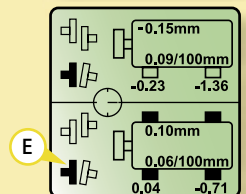
The measurement results can be checked against predefined tolerance tables or values that you determine yourself. In this way you see immediately whether the alignment is within the approved tolerance. This means that the time required for alignment can be significantly shortened.

TOLERANCES	
Speed	0-1000 rpm
Offset	0.09 mm
Angle	0.09 mm/100mm

D

< more >

- D. Tolerance settings display. Select speed range.
- E. Filled coupling symbols, indicating that alignment is within tolerance.

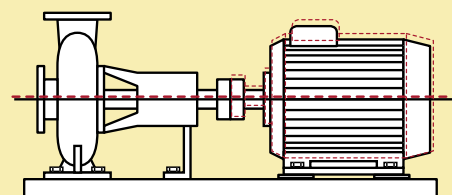


### 6. COMPENSATION FOR THERMAL GROWTH

The machines in this example, the pump and the motor, frequently expand differently when changing from a cold to a hot state (operating temperature). Using the Thermal Expansion Compensation function, the measurement system calculates the correct shim and adjustment values in these cases too. The compensation values for the various machines are normally supplied by the manufacturers.

Comp. therm. growth A	
Vertical offset	mm
	-1.15

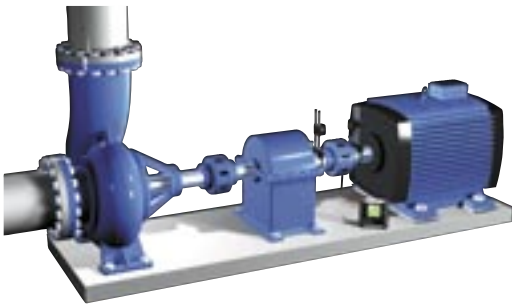
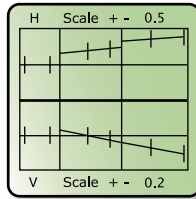
Set the value



### 7. DOCUMENT THE MEASUREMENT RESULT

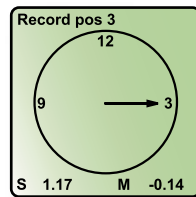
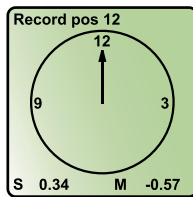
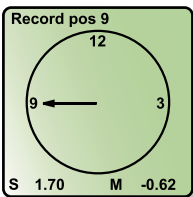
## MACHINE TRAIN PROGRAM

For the alignment of between two and ten machines in line. With the "RefLock"™ function you can choose any two foot pairs as locked (references). For example, the values for the first and last foot pairs in the entire machine train can be locked, and can form the references to which the other machines are adjusted. Can also be used when you have only two machines to align and you want to be able to choose which is to be used as stationary and which as adjustable when measurement is complete.



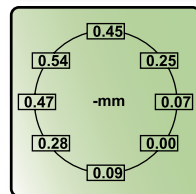
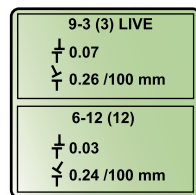
## HORIZONTAL 9-12-3 PROGRAM

For shaft alignment when the built-in electronic inclinometers cannot be used, for example on ships in the water. Instead the readings are registered in fixed 9, 12 and 3 o'clock positions.



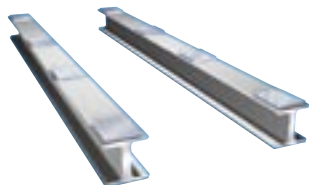
## VERTICAL / FLANGE MOUNTED MACHINES

This program is used for the alignment of vertical and flange-mounted machines. Shows centre offset, angular error and shim value at each bolt.



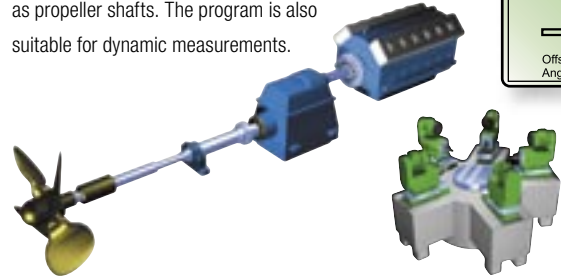
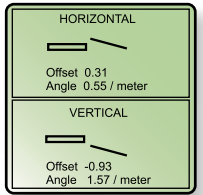
## VALUES PROGRAM

The Values program has many fields of application. It may be used, for example, to measure the straightness of foundations, shafts and bearing journals, as well the centre of bores/bearings, or when you want to measure in the same way as with dial



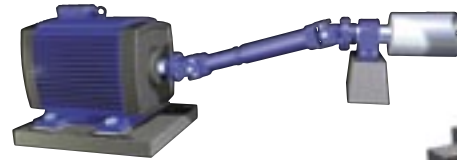
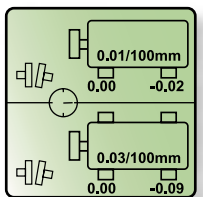
## OFFSET AND ANGLE PROGRAM

This program shows centre offset and angular error between two rotating shafts, for example machine spindles in automatic drilling machines and machine tools, as well as propeller shafts. The program is also suitable for dynamic measurements.



## CARDAN-SHAFT-COUPLED MACHINES

This program is used for the alignment of cardan-shaft-coupled / centre offset machines. (Requires the *Cardan fixture* accessory.)

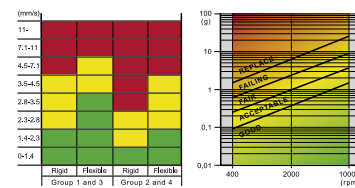
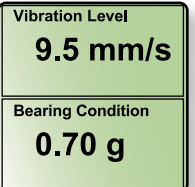


CARDAN FIXTURE  
Part Nr: 12-0125



## VIBRATION MEASUREMENT

Systems D505 and D525 have software for measuring the vibration level (mm/s, inch/s) and bearing condition (g-value). The results can be documented as normal. (Requires the *Vibrometer probe* D283 accessory.)

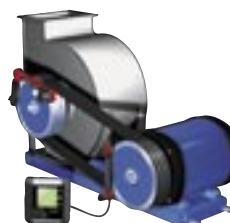
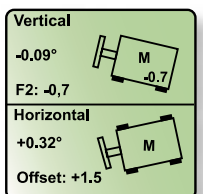


VIBROMETER PROBE  
Part Nr: 12-0283



## BTA DIGITAL (Only with system D525)

Using the program BTA Digital, you can measure and align belt drives. Adjustment of the machines is displayed in real time on the screen, with readings for angle and axial displacement in both the vertical and horizontal direction, as well as an adjustment value for the front or rear foot pair. The results can be documented as normal. (Requires accessory *BTA Digital transmitter and detector unit*.)



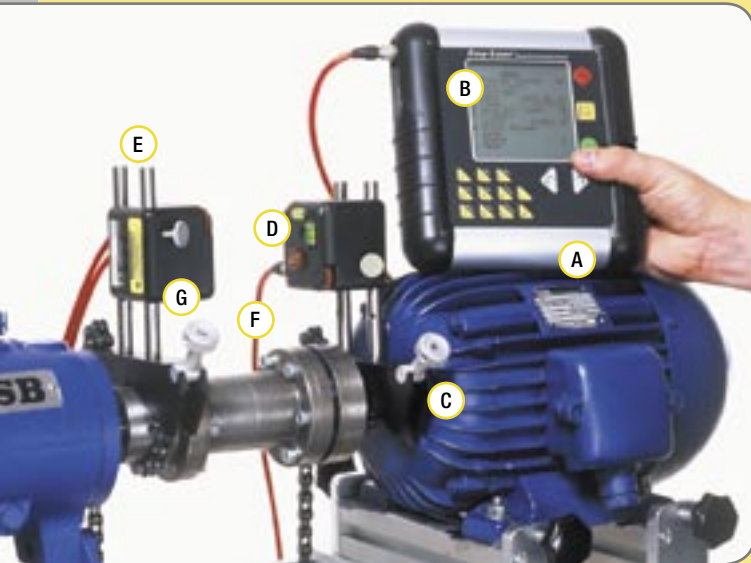
BTA DIGITAL  
Transmitter and Detector unit.  
Part Nr: 12-0162 + 12-0164



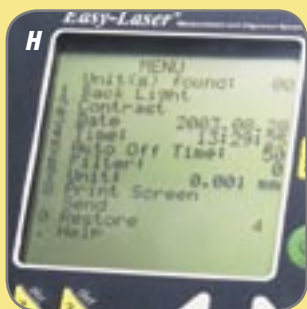


## RUGGED DESIGN

The rugged aluminium and stainless steel design guarantees stable measurement values and reliable alignment even in the harshest of environments. Double rods for the measuring units and stable chain shaft fixtures are other features making this a high performance system.



- A. Display unit made of anodized aluminium.
- B. Clear, backlit LCD display. Easy to read even in poor light conditions.
- C. Universal shaft brackets with chains.
- D. Clear spirit levels in both units for quick and accurate positioning.
- E. Double rods for each unit, made of stainless steel.
- F. Cables with Push/Pull connection.
- G. Small, lightweight measuring units made of aluminium.
- H. All settings are easy to reach from the main menu.
- I. Durable membrane keyboard with all characters.
- J. RS 232 port for printer and PC connection.
- K. Battery operated display unit. Long operating time.



Countersunk connectors, well protected against external damage.

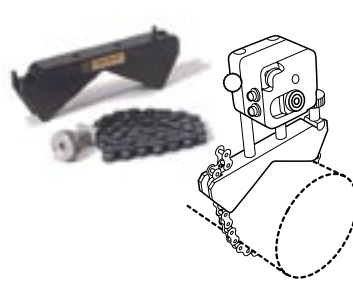


Battery cover. The unit is powered by four standard R14(C) batteries.

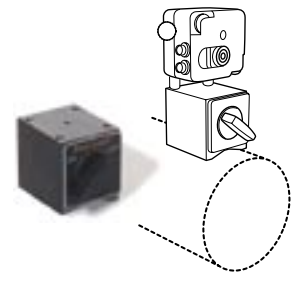
*More than 24 hours continuous operation!*

## STANDARD BRACKETS FOR SHAFT ALIGNMENT

These fixtures are supplied as standard in the measurement system.



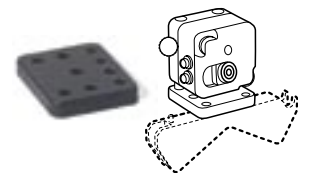
**SHAFT BRACKET WITH CHAIN**  
For mounting on shaft or coupling.



**MAGNET BASE**  
For direct fixing to shaft or coupling flange.



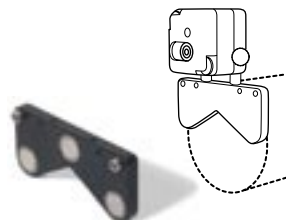
**REAR FIXING HOLES**  
Three threaded fixing hole options on the measuring units. For fixing to a machine spindle, for example.



**OFFSET BRACKET**  
Allows axial displacement between measuring units to be able to rotate past projecting machine parts.

## ACCESSORIES

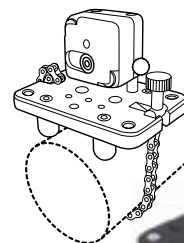
Below are some of the accessories for the Easy-Laser® measurement systems.



**MAGNETIC FIXTURES**  
Fixture for axial mounting on flange or shaft.  
Part Nr: 12-0038



**THIN SHAFT BRACKET (12 mm, 0.5")**  
This is used for example when the space between coupling and machine is limited.  
Part Nr: 12-0037



**SLIDING FIXTURE**  
Used when the shafts cannot be rotated.  
Part Nr: 12-0039



**PRINTER**  
Battery operated thermal printer with cable and charger.  
Part Nr: 03-0032

## GEOMETRY MEASUREMENT

The Easy-Laser® D525 system is designed to be easily extended and upgraded as your needs increase. Add suitable accessories, for example swivelling laser D22, and you can also measure straightness, flatness, parallelism, squareness, level and plumb with the same system. You can also add complete packages of measuring equipment from our other systems such as Linebore, Turbine, Extruder, Parallelism etc.

For more detailed information about geometrical measurements and equipment, see our geometry brochures.

### MEASUREMENT PROGRAMS (Only system D525)



**STRAIGHTNESS** – For straightness measurement of (for example) machine foundations, shafts, bearing journals, machine tools, etc. Can handle up to 150 measuring points with two zero points.



**FLATNESS** – Program to measure flatness/twist of (for example) machine foundations, machine tables, etc. Can handle up to 300 measuring points with three zero points.



**SQUARENESS** – For measurement of squareness in machines and installations.



**PARALLELISM** – For measurement of 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.



**SPINDLE DIRECTION** – For measuring the direction in which machine spindles in machine tools, drilling machines, etc., point.



**CENTER OF CIRCLE** – Used for straightness measurement of bearing journals when the bore diameter varies. For example diesel engines, propeller shaft installations, etc.



**HALF CIRCLE** – Readings are taken at three positions, for example 9, 6 and 3. Allows varying bore diameters. To be used together with the Turbine system.



**PLUMBLINE** – With this program you can measure plumb (vertical) and straightness of turbine and generator shafts, for example.

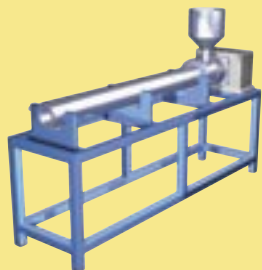


**FLANGE** – For flatness measurement of flanges and circular planes, slewing ring bearings for example. Can handle up to 150 measuring points. Three zero points at 120° pitch are computed by the system.

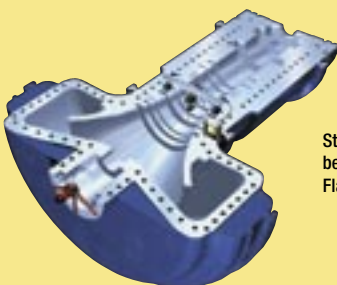
### EXAMPLES OF GEOMETRY MEASUREMENTS



Flatness of circular planes (e.g. flanges)



Straightness and pointing direction of extruder pipes.

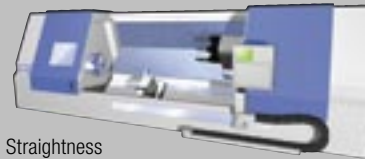
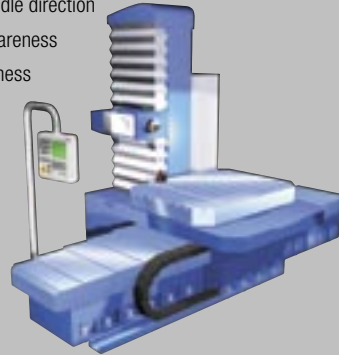


Straightness of diaphragms and bearing position.  
Flatness of parting lines.

## MACHINE PACKAGE

Contact your dealer for more detailed information about this package.

Straightness  
Parallelism  
Spindle direction  
Squareness  
Flatness



Straightness  
Centre offset  
Spindle direction



SWIVELLING LASER D22



SPINDLE LASER D146



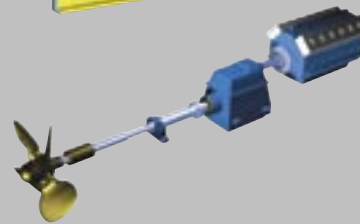
2-AXIS MEASURING UNIT

## LINEBORE PACKAGE

Contact your dealer for more detailed information about this package.

Straightness of camshaft and crankshaft positions in engines.

Straightness, centre and parallelism of shafts and bearing position.



LASER TRANSMITTER LINEBORE



DETECTOR LINEBORE

## PARALLELLITY PACKAGE

Contact your dealer for more detailed information about this package.

Parallelism between rolls and machine foundation.

Straightness and level of rolls.

Flatness of wire section.



ANGULAR PRISM D46

SWIVELLING LASER D22  
TRIPOD (2 PCS.)  
PARALLELLITY KIT

## SYSTEM D505 Part. Nr. 12-0207 SYSTEM D525 Part. Nr. 12-0231

- 1 Display unit D279 (D505 13 program, D525 23 program)
- 2 Cables with Push/Pull connectors
- 2 Measuring units (S, M)
- 8 Rods for measuring units
- 2 Shaft brackets with chains
- 2 Extension chains
- 2 Offset brackets
- 2 Magnet bases
- 1 Manual
- 1 Measuring tape
- 1 Protective case for the display unit
- 1 EasyLink™ Windows® program + PC cable *Data base software included!*
- Delivered in robust aluminium framed carrying case with contoured foam insert.

## TECHNICAL SPECIFICATIONS

<b>System</b>	
Data transfer	EasyLink™ Windows® program
Measurement distance	Up to 20 m [66 feet]
Temperature range	0–50° C [32–122° F]
Relative humidity	10–95%
Max. displayed error	±1% + 1 digit
Weight (complete system)	12 kg [27 lbs]
Carrying case	WxHxD: 490x350x160 mm [19"x14"x6"]

<b>Measuring units (S, M)</b>	
Type of laser	Diode laser
Laser wavelength	635–670 nm, visible red light
Laser safety class	Class 2
Laser output power	< 1 mW
Resolution	0.001 mm [0.05 mils] <i>High resolution!</i>
Type of detectors	PSD 18x18mm [0.71" sq]
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 aluminium
Dimensions	WxHxD: 60x60x50 mm [2.36"x2.36"x1.97"]
Weight	198 g [7 oz]

<b>Display unit</b>	
Measuring programs	D505: 13 programs, D525: 23 programs
Type of display	Backlit dot matrix LCD.
Display size	73x73 mm [2.87"x2.87"]
Displayed resolution	Changeable; 0.1, 0.01, 0.001mm. 5, 0.5, 0.05 mils/thou.
Battery	4 x 1.5 V R14 (C)
Operating time	24–48 hours depending on connected equipment
Output port	RS232 for printer and PC communication
Keyboard	Membrane alphanumeric multi function
Storage memory	1000 shaft alignment measurements <i>Large memory!</i>
Settings	Value filtering, Contrast and Unit (mil/thou/mm) etc.
Housing material	Anodized aluminium / ABS-plastics
Dimensions	WxHxD: 180x180x45 mm [7.1"x7.1"x1.8"]
Weight	1250 g [2.8 lbs]

<b>Shaft bracket</b>	
Fixture	V-fixture for chain, width 18 mm [0.71"]
Material	Anodized aluminium
Shaft diameter	Ø 20–450 mm [3/4"–18"] with standard chains.

<b>Magnet base</b>	
Holding power	800 N

<b>Offset bracket</b>	
Displacement	32 mm

<b>Rods</b>	
Material	Stainless steel
Length	120 mm [4.72"] (extendable to 240mm [9.44"])

<b>Cables</b>	
Type	With Push/Pull connectors
Length	2 m [78.74"]



## MEASURING PROGRAMS

### EASY-LASER® D525: 23 PROGRAMS

#### EASY-LASER® D505: 13 PROGRAMS

- |                             |                   |
|-----------------------------|-------------------|
| HORIZONTAL                  | BTA DIGITAL       |
| SOFT FOOT                   | STRAIGHTNESS      |
| THERMAL GROWTH COMPENSATION | FLATNESS          |
| TOLERANCE CHECK             | SQUARENESS        |
| MEASUREMENT VALUE FILTER    | PARALLELISM       |
| EASYTURN™                   | SPINDLE DIRECTION |
| CARDAN                      | CENTER OF CIRCLE  |
| VERTICAL                    | HALF CIRCLE       |
| MACHINE TRAIN               | PLUMBLINE         |
| REFLOCK™                    | FLANGE            |
| OFFSET AND ANGLE            |                   |
| VALUES                      |                   |
| VIBROMETER                  |                   |

Easy-Laser® is manufactured by Damalini AB, Åbäcksgatan 6B, 431 67 Mölndal, Sweden,

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