

## FAG Alignment Tools Top-Laser: SMARTY · TRUMMY · INLINE · SHIMS

Technical Product Information

# Top-Laser SMARTY

Features and advantages · Main applications · Types of misalignment

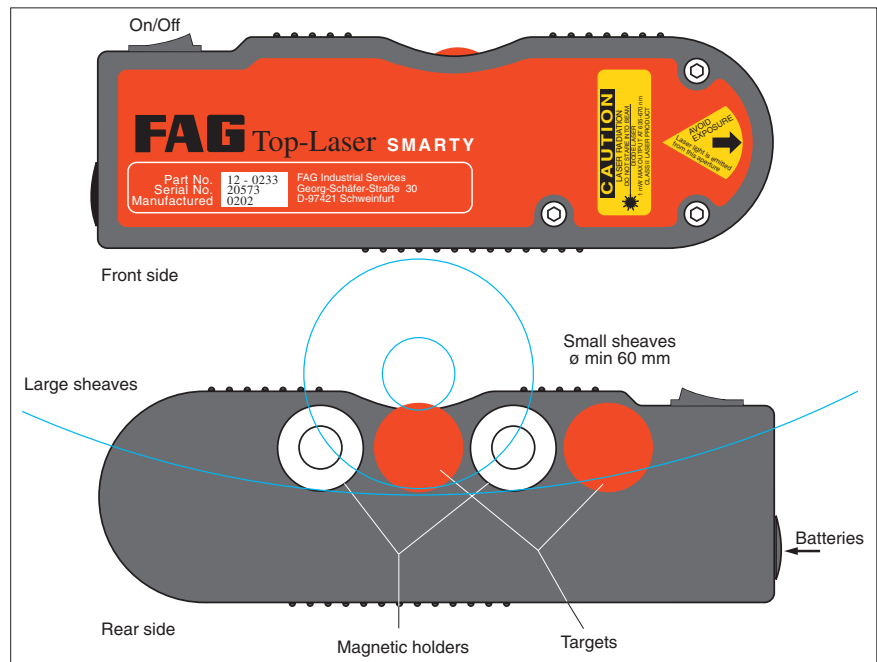
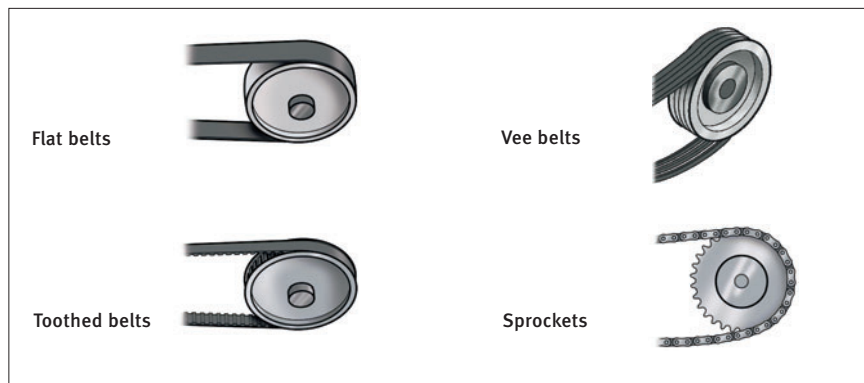
## FAG belt pulley alignment device Top-Laser SMARTY

Top-Laser SMARTY is a cost-effective measuring instrument for the alignment of belt pulleys and chain sprockets; it can make a significant contribution to preventive maintenance. Its use leads to fewer vibrations, since the wear of belts, belt pulleys, bearings and seals is significantly reduced. This gives longer service life and improved reliability of machinery and plant, reduced energy costs and higher overall cost-efficiency.

### Features and advantages

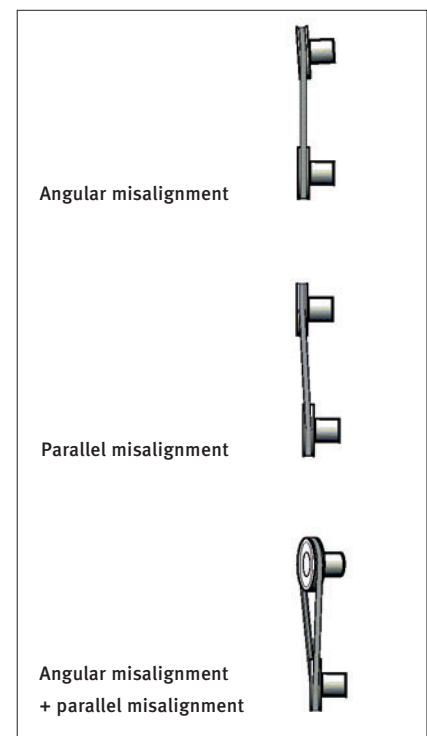
- Parallelism and misalignment of both pulleys are displayed.
- Significantly quicker, more precise operation than conventional methods.
- Suitable for both horizontally and vertically mounted machinery.
- Only one person is required for alignment.
- System can also be used on non-magnetic sprockets or pulleys.

### Main applications



Design of tool

### Types of misalignment



# Top-Laser SMARTY

Easy to use

## Easy to use

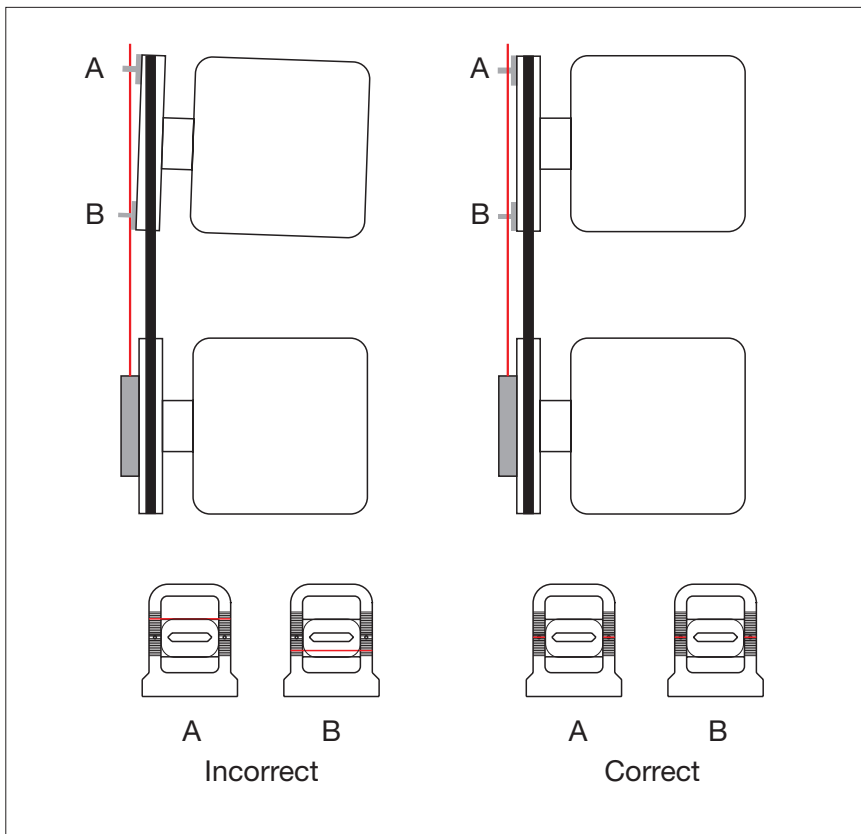
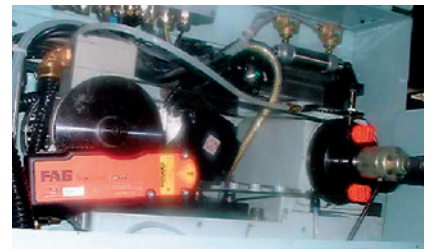
The measuring instrument can be mounted in just a few seconds. The laser beam can be clearly seen on the target marks. Once the laser beam is adjusted to coincide with the slots in the target marks, the machine is correctly aligned. Nothing could be simpler.

## Aluminium pulleys

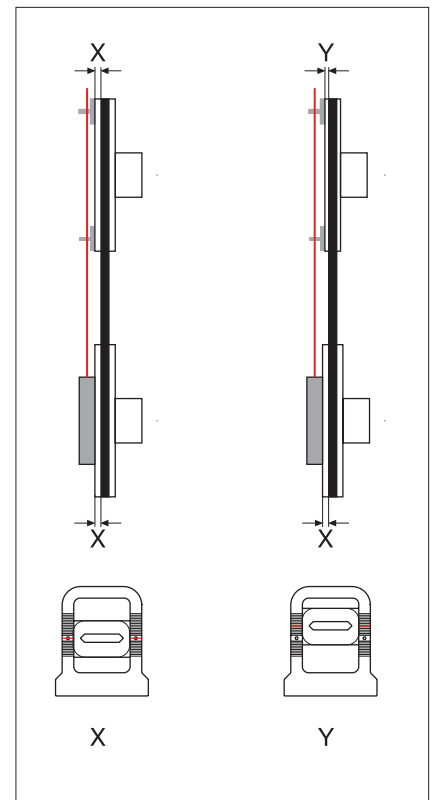
Since the measuring instrument is so light, the emitter and target marks can be easily attached to non-magnetic drive pulleys using a strong, double-sided adhesive tape.

## Laser beam adjustment

The laser beam emitted by the measuring instrument is adjusted parallel to the magnetic holders of the measuring instrument. If a deviation is found, this can be checked locally on a flat surface by the operator and readjustment carried out if necessary.



Alignment example using a belt drive



For drives with pulleys of different widths, the marks in the target marks are moved

# Top-Laser SMARTY

Technical data · Ordering designation · Spare parts

## Technical data

### Laser emitter

Belt pulleys	≥ 60 mm ø
Laser beam angle	78°
Laser class	2
Measurement distance	10 m
Batteries	2 × R6 (AA) 1,5 V
Battery life	24 h continuous
Output power	< 1 mW
Laser wavelength	635...670 nm
Housing	ABS plastic
Dimensions	
W × H × D	188 × 60 × 28 mm
Mass	0,3 kg

**Targets** 2 magnetic target marks

**Measurement accuracy** better than 0,5 mm or 0,2° \*)

\*) General rule for deviations (depending on belt type):  
less than 0,25° [4,4 mm/m]

## Spare parts

1 magnetic target mark  
**LASER.SMARTY.TARGET**



## Ordering designation

Laser measuring instrument,  
complete, including 2 target marks,  
2 batteries and user manual in  
padded case:

**LASER.SMARTY**

### Caution

Do not look into the laser beam.  
Do not point the laser beam into  
other persons' eyes.



# Top-Laser TRUMMY

Features and advantages · Ordering designation

## FAG belt tension measuring device Top-Laser TRUMMY

The robust, handy Top-Laser TRUMMY is an optical-electronic instrument for measuring and setting optimum belt tension (strand force).

### Features and advantages

Optimum belt tension, like precise alignment of the belt pulleys (see Top-Laser SMARTY, page 1), is an essential precondition for achieving the maximum possible life of the belt drive. There is also less wear of the drive components, energy costs are reduced and cost-effectiveness is increased. The user-friendly Top-Laser TRUMMY can be used in many locations and comprises a measurement probe and a microprocessor that indicates relevant measurables for belt tension either as frequency [Hz] or force [N]. By means of an impulse (for example by striking the stationary belt), the tensioned belt is excited to natural vibration. The individual static natural frequency thus generated is measured within seconds by the TRUMMY sensor using clock pulse light and displayed. In order to calculate the strand force of the belt drive, the belt mass and length are entered in the microcomputer before measurement. TRUMMY uses these to calculate the strand force, which is then compared with the specified nominal value.

In comparison with systems operating by sound waves, for example, this new measurement technique using clock pulse light is clearly superior, since the measurement result cannot be

distorted by disruptive influences. The simple and reliable user instructions are given in several languages.

### Ordering designation

Laser measuring device in plastic case:

**LASER.TRUMMY**



# Top-Laser INLINE

Advantages · Application · Scope of delivery · Ordering designation

## FAG shaft alignment device Top-Laser INLINE

More than half of all unplanned machine downtime can be attributed to misalignment and imbalance. These problems can also arise in the use of flexible couplings. The FAG Top-Laser INLINE is a PC-based system for aligning coupled shafts which can be used to significantly increase the availability of machinery.

## Advantages

- Easy to use
- Error-free handling even by untrained personnel due to automatic measurement and positioning process
- More precise alignment than with conventional methods (dial gauge and straight edge)
- Rapid measurement by “Continuous Sweep” (continuous rotary motion/patented method); 70° rotary motion is adequate for measurement (any position and rotary motion)
- Optimised measurement by “Single Beam Technology” (double laser travel distance through reflection)
- Helps to reduce vibration and friction losses
- Increased productivity through longer machine running times
- Significantly lower energy consumption
- Easy to use with conventional laptops
- Suitable for use in combination with FAG Bearing Analyser

## Application

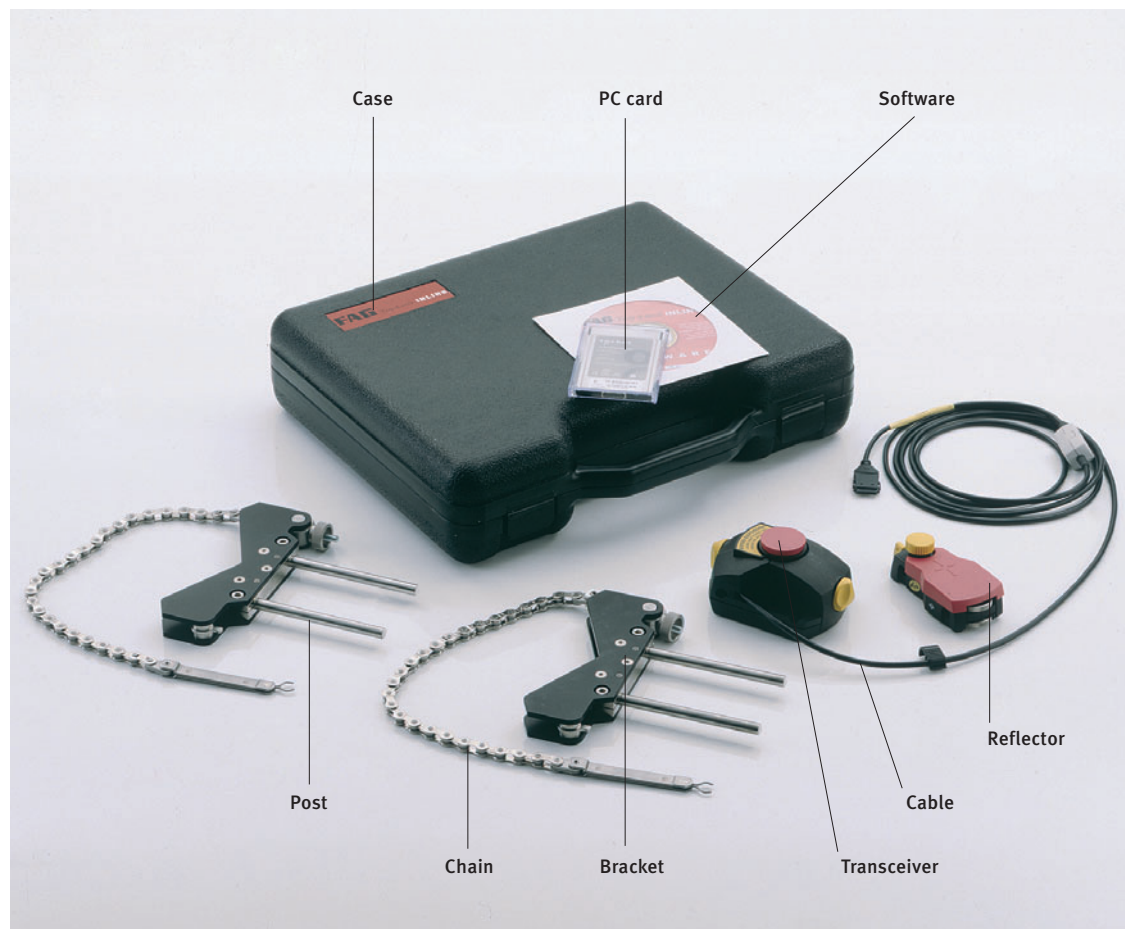
The FAG Top-Laser INLINE is suitable for aligning coupled shafts in motors, pumps, ventilators and gearboxes (with rolling bearings)

## Scope of delivery

- 1 transceiver (incl. 3 m cable)
- 1 reflector
- 2 brackets
- 2 chains (300 mm)
- 4 posts (115 mm)
- 1 software (manual, help CD)
- 1 case
- 1 serial PC card

## Ordering designation

(Top-Laser INLINE complete):  
**LASER.INLINE**



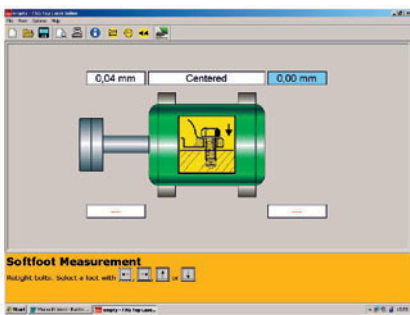
# Top-Laser INLINE

Actions before alignment · Accessories

## Actions before alignment

Before any alignment operation, any foot tilt (a machine foot that lifts off the floor when slackened) should be removed in order to prevent increased vibration tendency and bearing damage due to housing distortion.

The Top-Laser INLINE helps to quickly identify and eliminate the so-called soft foot. It is only necessary to loosen each individual screw foot connection. The computer determines any foot movement. The foot tilt can then be eliminated using shims (see page 11).



## Accessories

The possible applications of the basic device LASER.INLINE are expanded by a comprehensive range of accessories. The accessories can be ordered as a set in a handy, robust case or – individually compiled – as individual parts.

### Accessories

Accessories for LASER.INLINE	Included in delivery	Ordering designation
Accessory set, complete	1 piece	<b>LASER.INLINE.ACCESS.SET</b>
Chain, 600 mm long	2 pieces	<b>LASER.INLINE.CHAIN600</b>
Chain, 1500 mm long	2 pieces	<b>LASER.INLINE.CHAIN1500</b>
Post, 150 mm long	4 pieces	<b>LASER.INLINE.POST150</b>
Post, 200 mm long	4 pieces	<b>LASER.INLINE.POST200</b>
Post, 250 mm long	4 pieces	<b>LASER.INLINE.POST250</b>
Post, 300 mm long	4 pieces	<b>LASER.INLINE.POST300</b>
Magnetic holder	2 pieces	<b>LASER.INLINE.MAGNET</b>
Accessory case, empty	1 piece	<b>LASER.INLINE.ACCESS.SUITCASE</b>

### Chains

- For mounting of brackets on shafts
- 600 mm long for max. shaft diameter of 200 mm
  - 1500 mm long for max. shaft diameter of 500 mm



### Posts

- For mounting of measuring components on clamping device
- 150 mm long
  - 200 mm long
  - 250 mm long
  - 300 mm long



### Magnetic holders

For rapid mounting and fine adjustment of measuring components on narrow coupling flanges



# Top-Laser INLINE

Replacement parts

## Transceiver

Compact, robust transmitter/receiver for visible laser beam (red)

Ordering designation:  
**LASER.INLINE.TRANS**

## Cable

For supplying power to transceiver and exchanging data with control unit

Ordering designation:  
**LASER.INLINE.CABLE**



## Reflector

Roof prism with compact housing, mounted on clamping device by means of lever

Ordering designation:  
**LASER.INLINE.REFL**



## Bracket

Basic element of compact chain clamping device

Ordering designation:  
**LASER.INLINE.BRACKET**



## 2 chains, 300 mm long

For max. shaft diameter of 100 mm, for mounting brackets on shafts

Ordering designation:  
**LASER.INLINE.CHAIN300**



## Top-Laser INLINE

Spare parts

### 4 posts, 115 mm long

For mounting of measuring components on clamping device

Ordering designation:  
**LASER.INLINE.POST115**



### Software

Windows-compatible PC program for storage of machine dimensions and alignment conditions, evaluation and printing of results

Ordering designation:  
**LASER.INLINE.SOFTWARE**



### Case

Black plastic case with foam insert for safe transport of the device

Ordering designation:  
**LASER.INLINE.SUITCASE**



### PC card (type II)

Insertion in PC for connection to Top-Laser INLINE

Ordering designation:  
**LASER.INLINE.PCCARD**

# Top-Laser INLINE

Easy to use

## Easy to use

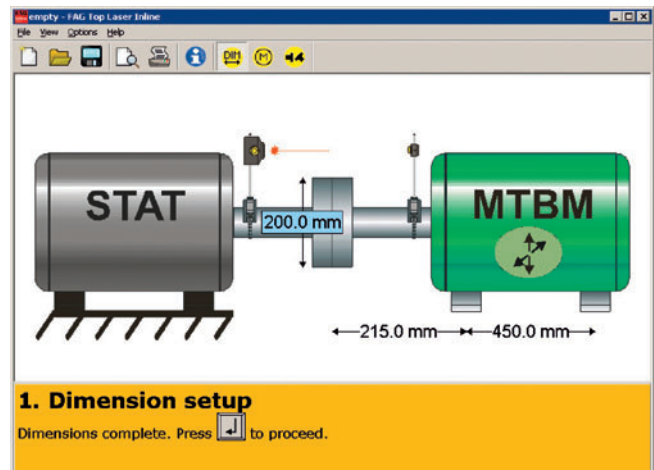
Before alignment, eliminate any foot tilt (see page 6).  
Mount the chain clamping device at the same angle on both sides of the shaft coupling.  
Mount the transceiver on the side of the shaft coupling defined as stationary (pump, ventilator).  
Mount the reflector on the side of the shaft coupling defined as movable (motor).  
Connect the transceiver to the PC card, insert the card in the laptop. The Top-Laser INLINE software will start.  
**DIM** – Enter three machine dimensions, see example “Input data for coupling”.

**M** – Enter position of transceiver and reflector relative to the coupling.  
The laser beam is centred on the screen in accordance with the instructions, see example “Scan”.

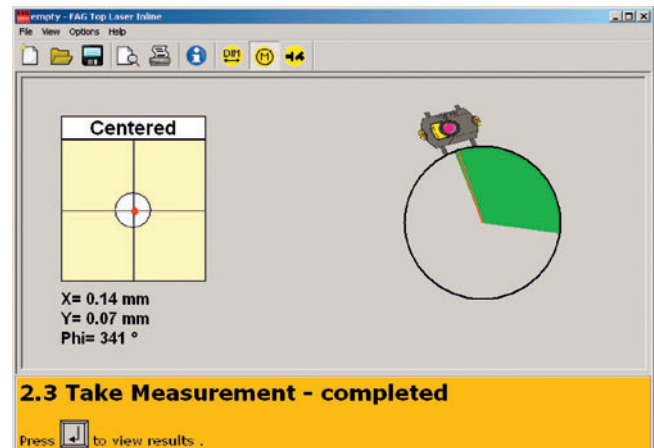
The deviations in the horizontal and vertical directions are measured by rotating the coupled shaft by at least 70° (in any direction).

**ERG** – The result is given as the amounts in mm (inch), by which the front or rear foot must be adjusted up or down (by inserting or removing the shims Top-Laser SHIMS, see page 11).  
For horizontal alignment, the feet are moved (animation).

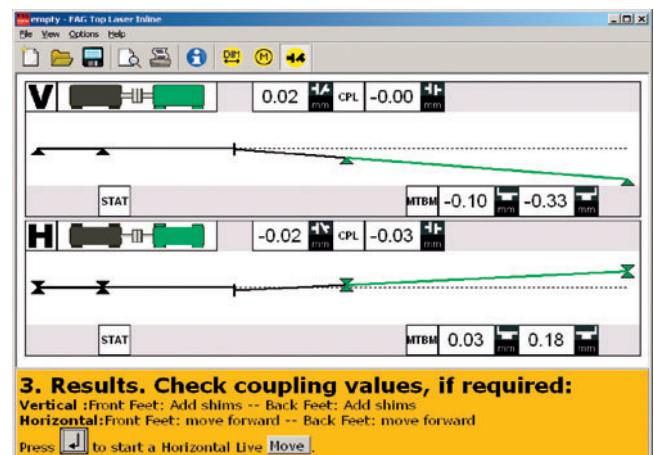
Finally, correct alignment is checked by means of a verification measurement.



Input data for coupling



Scan



Measurement results

# Top-Laser INLINE

Technical data

## Technical data

Transceiver		
Measurement method:	coaxial, reflected laser beam	
Protection class:	IP67 (dustproof, water proof - temporary immersion)	
Protection against ambient light:	yes	
Storage:	-20 to +80 °C	-4 to +176 °F
Operation:	0 to 55 °C	32 to 131 °F
Dimensions (W x H x D):	approx. 107 × 70 × 49 mm	approx. 4.213 × 2.756 × 1.929 in
Mass:	approx. 177 g	approx. 0.39 lbs

Laser (Ga-Al-As semiconductor laser)		
Wavelength (typical):	670 nm (red, visible)	
Laser class:	2; FDA 21CFR 1000 & 1040	
Beam power:	< 1 mW	
Caution:	<b>Do not look into the laser beam!</b>	
Interface:	serial I/O PCMCIA card, type II	

Detector		
Measurement range:	± 4 mm	± 0.157 in
Resolution:	1 µm	
Accuracy:	better than 2 %	

Inclinometer		
Measurement range:	0 to 360°	
Resolution:	less than 1°	

Reflector		
Type:	90° roof prism	
Protection class:	IP67 (dustproof, water proof - temporary immersion)	
Accuracy:	better than 1 %	
Storage:	-20 to +80 °C	-4 to +176 °F
Operation:	-20 to +60 °C	-4 to +140 °F
Dimensions (W x H x D):	approx. 100 × 41 × 35 mm	approx. 3.937 × 1.614 × 1.378 in
Mass:	approx. 65 g	approx. 0.143 lbs

Carry case		
Material:	standard ABS, black, drop tested (2 m)	
Dimensions (W x H x D):	approx. 470 × 400 × 195 mm	approx. 18.503 × 15.748 × 7.677 in
Mass with standard components:	approx. 6,8 kg	approx. 15 lbs

Range of application		
Shaft diameter:	min. 12 mm, max. (with accessories) 500 mm	min. 0.472 in, max. 19.685 in

# Top-Laser SHIMS

Shims for FAG alignment devices

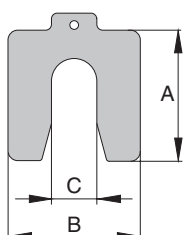
## FAG shims Top-Laser SHIMS

Top-Laser SHIMS are used to eliminate any vertical misalignment detected using the FAG Top-Laser devices. These shims are available in seven thickness values (0,05; 0,10; 0,20; 0,50; 0,70; 1,00 and 2,00 mm) and four sizes (dimension C = 15, 23, 32 or 44 mm).

### Contents of a set (basic version)

- Complete case containing 20 shims each of 3 sizes C = 15, 23 and 32 mm) and 6 thicknesses (0,05 to 1,00 mm), i.e. a total of 360 shims plus 1 extraction hook

Ordering designation:  
**LASER.SHIMS.SET**



Top-Laser SHIMS set						
Ordering designation Set FAG	Dimensions				Total quantity Shims	Mass kg
	A	B	C	Thickness		
LASER.SHIMS.SET	mm	mm	mm	mm		
	55	50	15	0,05–1,0	360	6,7
	75	70	23	0,05–1,0		
	90	80	32	0,05–1,0		

# Top-Laser SHIMS

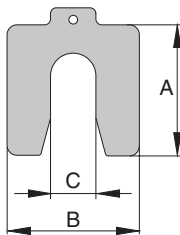
Individual parts · Spare parts

## Individual or spare parts

As individual or spare parts, we supply **10** shims each in one of the four sizes stated above (dimension C = 15, 23, 32 or 44 mm) and one of the seven thicknesses.

### Ordering examples

- 10 shims of dimension C = 15 mm and 0,20 mm thickness:  
**LASER.SHIMS15.0,20**
- 10 shims of dimension C = 44 mm and 0,10 mm thickness:  
**LASER.SHIMS44.0,10**
- 10 shims of dimension C = 23 mm and 2,00 mm thickness:  
**LASER.SHIMS23.2,00**



## Individual parts and spare parts for Top-Laser SHIMS

Ordering designation	Dimensions				Number of shims	Mass g
	A	B	C	Thick-ness		
FAG	mm					
LASER.SHIMS15.0,05	55	50	15	0,05	10	11
LASER.SHIMS15.0,10	55	50	15	0,10	10	22
LASER.SHIMS15.0,20	55	50	15	0,20	10	44
LASER.SHIMS15.0,50	55	50	15	0,50	10	110
LASER.SHIMS15.0,70	55	50	15	0,70	10	155
LASER.SHIMS15.1,00	55	50	15	1,00	10	220
LASER.SHIMS15.2,00	55	50	15	2,00	10	440
LASER.SHIMS23.0,05	75	70	23	0,05	10	21
LASER.SHIMS23.0,10	75	70	23	0,10	10	42
LASER.SHIMS23.0,20	75	70	23	0,20	10	84
LASER.SHIMS23.0,50	75	70	23	0,50	10	210
LASER.SHIMS23.0,70	75	70	23	0,70	10	295
LASER.SHIMS23.1,00	75	70	23	1,00	10	420
LASER.SHIMS23.2,00	75	70	23	2,00	10	840
LASER.SHIMS32.0,05	90	80	32	0,05	10	29
LASER.SHIMS32.0,10	90	80	32	0,10	10	58
LASER.SHIMS32.0,20	90	80	32	0,20	10	115
LASER.SHIMS32.0,50	90	80	32	0,50	10	290
LASER.SHIMS32.0,70	90	80	32	0,70	10	410
LASER.SHIMS32.1,00	90	80	32	1,00	10	580
LASER.SHIMS32.2,00	90	80	32	2,00	10	1160
LASER.SHIMS44.0,05	125	105	44	0,05	10	53
LASER.SHIMS44.0,10	125	105	44	0,10	10	105
LASER.SHIMS44.0,20	125	105	44	0,20	10	210
LASER.SHIMS44.0,50	125	105	44	0,50	10	530
LASER.SHIMS44.0,70	125	105	44	0,70	10	740
LASER.SHIMS44.1,00	125	105	44	1,00	10	1050
LASER.SHIMS44.2,00	125	105	44	2,00	10	2100

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