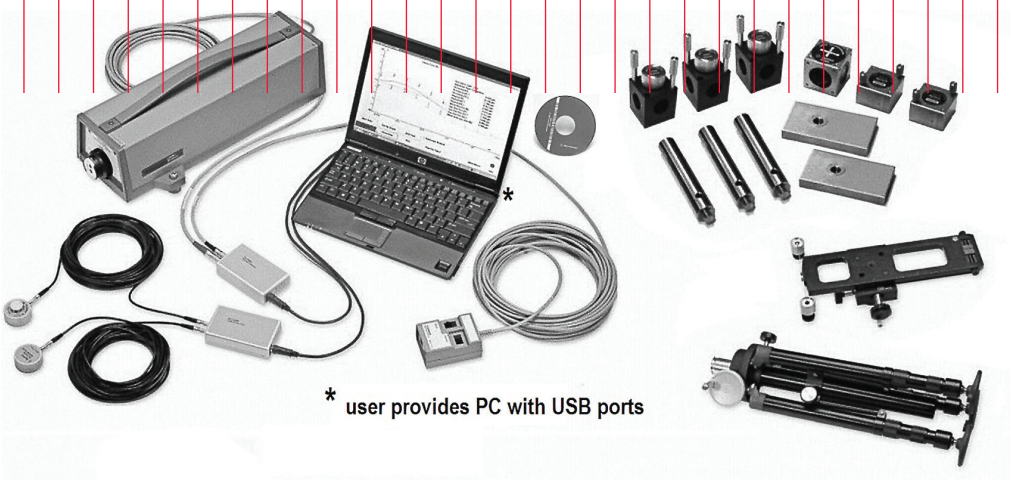
Keysight Technologies
5530 Laser Calibration System Components

Selection Guide



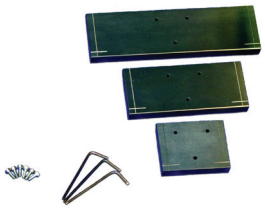
KEYSIGHT TECHNOLOGIES

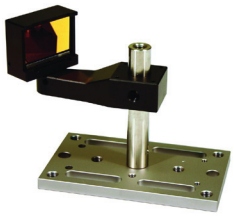
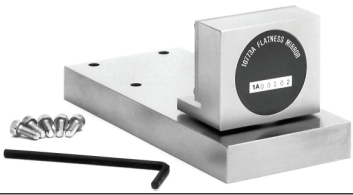
Introduction

The Keysight Technologies, Inc. 5530 Laser Calibration System is designed with the flexibility to meet your system's unique calibration requirements. A flexible and modular system consists of small and light weight electronics and sensors.

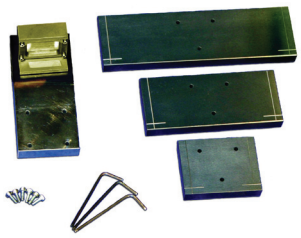
Basic 5530 with linear measurement configuration

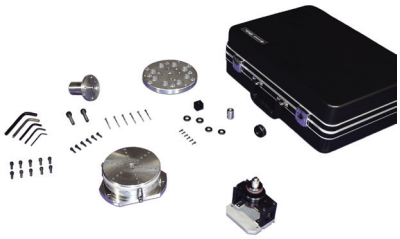
Model number	Description	Qty
10753B	Tripod with mounting base	1
10882A/B/C	Laser head cable, 5 m/7 m/20 m	1
10888A	Remote control	1
5519A/B	Laser head (0.7 m/s or 1 m/s)	1
55280B	Linear measurement kit	1
E1734A	Transit/storage case for laser head, sensors, USB modules, optics and cables	1
E1734B	Soft transit case for tripod	1
E1735A	USB axis module	1
E1736A	USB sensor hub	1
E1737A	Material temperature sensor	1
E1738A	Air temperature/pressure/humidity sensor	1
E1739A/B/C/D	Sensor cable, 5 m/10 m/15 m/25 m	2

Model number	Description	
10744A	**Fixturing kit** The kit includes mounting hardware for a variety of measurement optics devices. A large base, multiple sizes of posts and other accessories let you build structures - such as tall, rigid towers -- that place optics in the center of a machine's work zone or wherever needed.	
10747F	**Metrology application software** Operating System: Windows XP Minimum PC requirements: 1 GHz CPU, 512 MB RAM Languages: English, German, Spanish, French, Italian, Korean, Japanese, Traditional Chinese and Simplified Chinese Included in E1735A	
10753B	**Tripod with kinematic mounting plate** The tripod provides a mounting for the 5519A/B laser head. It allows 5530 Laser Calibration System optics to be located remotely from the laser head, yielding greater accuracy and simplifying fixturing. The remote setup also eliminates heat-caused distortions. The Keysight 10753B adjusts for height, rotation, tilt, and lateral offset. Height: Adjustable 90 to 163 cm Weight: 14 kg	
10759A	**Footspacing kit** The kit, included in the Keysight 55282A flatness accessory kit simplifies the mounting of the angular reflector used in flatness measurement applications. It minimizes the grid setup and data accumulation time required for plate calibration.	
10766A	**Linear interferometer** The Linear Interferometer is used in single axis measurements and can be employed when the interferometer is the moving component, instead of the measurement reflector. It has rugged thermally stable stainless steel housing.	
10767A	**Linear retroreflector** The retroreflector (cube corner) is a measurement reflector for linear measurements. It is mounted and designed for beam diameters of 6 mm or less.	
10767B	**Light weight retroreflector** The light weight retroreflector is optically identical to 10767A, but has a lightweight housing. It is used as the measurement retroreflector in situations where the weight of 10767A might cause distortion (for example, a small robot or a small coordinate measuring machine).	

Model number	Description	
10768A	**Diagonal measurement kit** The kit allows linear measurements to be made on the four body diagonals of a machine tool's working volume. These measurements document the machine's capability and quickly perform a complete check of volumetric positioning performance. In addition, long-term drift tests can be performed over hours or days, showing possible effects of temperature on geometry.	
10769A	**Turning mirror** The Turning Mirror deflects a laser beam in either the vertical or the horizontal polarization plane of the beam. It simplifies and speeds setup for slant-bed lathe calibration and simplifies diagonal measurements for machines with moving beds. The 10769A contains the same turning mirror as the 10769B, but has a different mounting.	
10769B	**Turning mirror on universal mount** The turning mirror deflects a laser beam in either the vertical or the horizontal polarization plane of the beam. It simplifies and speeds setup for slant-bed lathe calibration and simplifies diagonal measurements for machines with moving beds. The 10769B contains the same turning mirror as the 10769A, but has a different mounting.	
10770A	**Angular interferometer** The angular interferometer is a high accuracy plane mirror interferometer ideal for use in precision calibration applications. Used with 10771A angular reflector, the interferometer measures pitch and yaw motions along each axis that a machine tool or measuring machine travels.	
10771A	**Angular reflector** The angular reflector is ideal for precision calibration applications. Paired with 10770A angular interferometer, it is used to measure pitch and yaw motions along each axis that a machine tool or measuring machine travels.	
10772A	**Turning mirror** The turning mirror is a 100% reflectance mirror that turns the direction of an incoming laser beam 90 degrees. It is used for applications such as machine tool calibration.	
10773A	**Flatness mirror** The flatness mirror is a 100% reflectance mirror that turns the direction of an incoming laser beam 90 degrees. The mirror is used when measuring flatness in applications such as surface plate calibration.	
10774A	**Short range straightness optics** The optics combines a straightness interferometer and reflector to make measurements over a range of travel up to 3 m. The optics form a highly-accurate optical straight edge that can measure the straightness of travel of machine-tool and measuring-machine coordinate motions with a resolution of 0.04 µm.	

Model number	Description	
10775A	**Long range straightness optics** The optics combines a straightness interferometer and reflector to make measurements over a range of travel up to 30 m. The optics form a highly-accurate optical straight edge that can measure the straightness of travel of machine-tool and measuring-machine coordinate motions with a resolution of 0.4 µm.	
10776A	**Straightness accessory kit** The kit simplifies installation and alignment of short and long range straightness optics. It includes a large retroreflector and mounting accessories. The kit facilitates vertical straightness, parallelism and squareness measurements.	
10777A	**Optical square** The Optical Square directs an output beam at precisely 90 degrees to an input beam. It is used to measure the squareness of axes during laser calibration of a machine tool. It contains two accurately aligned mirrors in a special housing. The optical square is a “constant-deviation” device because the 90-degree bend is constant even if there is an angular rotation between optical square and the input beam.	
10784A	**Base** The base provides a mounting plate for the 10785A height adjuster and post.	
10785A	**Height adjuster and post** The height adjuster and post is used to precisely position optics devices, such as the 10766A linear interferometer. It also facilitates ease of adjustments in measurements such as pitch and yaw.	
10787A	**Straightness and squareness carrying case** The carrying case is included in the 55283A straightness measurement kit. The case protects the optical equipment from shock, vibration, moisture, impact, and contamination. It also serves as a secure enclosure for storage, shipping, or for transport between operating locations.	
10882A/B/C	**Laser head cable, 3 m/7 m/20 m** One end of the cable connects to the 5519A/B laser head, the other end connects to the E1735A USB axis module’s laser head connector.	
10888A	**Remote control** The handheld wired remote control unit initiates a measurement up to 15 m away from 5530 Laser Calibration System. The unit includes a RESET button, RECORD button and SIGNAL STRENGTH indicator.	
5519A/B	**Laser head for 5530 Laser Calibration System (5519A - 0.7 m/s, 5519B - 1.0 m/s)** The laser head is a helium neon (HeNe) laser that offers exceptional stability. The laser head contains a built-in receiver and wide range input power supply (100 to 120 VAC, 50/60/400 Hz; 220 to 240 VAC, 50/60Hz).	

Model number	Description	
55280A	**Linear measurement kit with case** The kit measures the change in distance between the interferometer and the retroreflector. Prior to movement, any point can be defined as a measurement starting point. It can be used to calibrate the positioning accuracy of numerically-controlled machine tools and coordinate measuring machines. The kit includes: 1x 10766A Linear interferometer 2x 10767A Linear retroreflector 2x 10784A Base 3x 10785A Height adjuster and post 1x Optics case	
55280B	**Linear measurement kit** The kit is identical as 55280A except it does not come with the optics case. The kit includes: 1x 10766A Linear interferometer 2x 10767A Linear retroreflector 2x 10784A Base 3x 10785A Height adjuster and post	
55281A	**Angular optics kit** Angular measurements are made at multiple points along a machine's travel path to test for rotation about an axis perpendicular to the axis of motion (pitch and yaw). The kit includes: 1x 10770A Angular interferometer 1x 10771A Augular reflector	
55281B	**Linear/Angular measurement kit** The kit enables the system to measure both linear velocity along a machine's travel path as well as rotation about an axis perpendicular to the axis of motion (pitch and yaw). The kit includes: 1x 10767A Linear retroreflector 1x 10770A Angular interferometer 1x 10771A Angular reflector 2x 10784A Base 2x 10785A Height adjuster and post	
55282A	**Flatness accessory kit** The kit when used with the 55281A angular optics kit, allows the 5530 Laser Calibration System to perform both flatness and way straightness measurements. The kit includes: 1x 10759A Footspacing kit 2x 10773A Flatness mirror	

Model number	Description	
55283-001	**Straightness measurement kit - Short range** The kit makes short range straightness and parallelism measurements to identify geometry errors that seriously degrade machine tool performance. These measurements allow documentation, analysis and diagnosis of machine tool travel and parallel axes of motion. The kit includes: 1x 10772A Turning mirror 1x 10774A Short range straightness optics (inteferometer and reflector) 1x 10776A Straightness accessory kit 1x 10787A Straightness and squareness carrying case	
55283A-C01	**Straightness measurement kit - Long range** The kit makes long range straightness and parallelism measurements to identify geometry errors that seriously degrade machine tool performance. These measurements allow documentation, analysis and diagnosis of machine tool travel and parallel axes of motion. The kit includes: 1x 10772A Turning mirror 1x 10775A Long range straightness optics (inteferometer and reflector) 1x 10776A Straightness accessory kit 1x 10787A Straightness and squareness carrying case	
55290A	**Angular position measurement kit** The kit automatically calibrates rotational axes in turning and machining centers. It can perform calibrations on full, partial or multiple rotations, improves angular positioning accuracy, and allows the documentation of machine tool capability. It keeps the laser beam on indexing tables that require a great deal of lift - up to 15 mm. Key specifications when used with 55281A angular optics kit Accuracy: ± 0.5 sec + 0.2% of displayed reading Index step size (resolution): 1°	
55290A-744	**Supplemental fixturing kit** The kit includes mounting hardware for a variety of measurement optics devices. A large base, multiple sizes of posts and other accessories let you build structures -- such as tall, rigid towers - that place optics in the center of a machine's work zone or wherever needed.	
55290B	**Rotary axis measurement kit** The kit automatically calibrates rotational axes in turning and machining centers. It can perform calibrations on full, partial or multiple rotations, improves angular positioning accuracy, and allows the documentation of machine tool capability. Key specifications when used with 55281A angular optics kit Accuracy: ± 1.0 arc sec Resolution: 0.36 arc sec Shipped weight: 26.8 kg	

Model number	Description	
55291A	**CNC upload/download software** The software allows a 5530 compensation table to be converted to a controller-specific format and downloaded to a compatible controller without a tedious, lengthy hand-key operation. The comp table can be downloaded into a CNC via the RS-232 serial port. Supported fanuc M series include: 0M, 6M, 10M, 11M, 12M, 15M, 16M, 18M, 20M, and 21M	
E1734A	**Laser and optics case** The heavy duty transport and storage case houses a basic 5530 Laser Calibration System plus additional space for most other components (except tripod and rotary measurement kit). The case has integrated wheels and handle for ease of moving around. Provision for padlocks for added security is available. Dimensions (L x W x D): 630 x 500 x 302 mm Weight empty: 12.7 kg	 contents not included
E1734B	**Tripod and accessories case** The well protected case for tripod and the kinematic mounting plate has a custom-made, air-channeled ABS walls and weather-repellent 1050 denier ballistic nylon exterior to ensure durability. The interior lined with support ribs and thick foam to protect the contents during the transportation. The soft case has heavy duty and integrated ball bearing wheel assemblies for ease of moving around. Dimensions (L x W x D): 990 x 270 x 270 mm Weight empty: 5.4 kg	 contents not included
E1735A	**USB axis module** Small and light weight, the USB axis module is the electronic interface for the 5519A/B laser head. The axis module also provides the interface for both the optional 10888A remote control unit and optional A-quad-B encoder input. Communication with the PC is through the standard high speed USB interface. Power to the unit comes from the PC's USB port, no separate power supply is required. Includes 10747F Metrology application software. Dimension: 102 x 63 x 24 mm Weight: 200 g	
E1735A-001	**A-quad-B cable, 3 m** The A-quad-B cable is a 3-meter cable that connects your machine's A-quad-B encoder output to the E1735A USB axis module's A-quad-B input connector. The cable is supplied with a mating connector for the USB axis module on one end. The other end is un-terminated, allowing you to make the connections you need for use with your machine's encoder.	

Model number	Description	
E1736A	**USB sensor hub** Small and light weight, the USB sensor hub gives users the ability to connect up to four sensors per hub. Connection from the sensors to the sensor hub is made using interchangeable E1739x sensor cables. Dimension: 102 x 63 x 24 mm Weight: 200 g	
E1737A	**Material sensor with ISO 17025 calibration** The material sensor is used with the E1736A USB sensor hub to monitor the temperature of an object being measured or of the work piece itself. The sensor detects temperature changes and automatically compensates for thermal expansion errors. A sensor cable is required for each sensor. Select the desired length by ordering E1739A (5 m), E1739B (10 m), E1739C (15 m) or E1739D (25 m). Dimension: Ø42 x 17.5 mm Weight: 30 g	
E1738A	**Air temperature/pressure/humidity sensor with ISO 17025 calibration** The air sensor is used with the E1736A USB sensor hub to monitor the air temperature, pressure and humidity in the environment of the measurement to enable the 5530 Laser Calibration System to automatically adjust for the changes to the laser wavelength. A sensor cable is required for each sensor. Select the desired length by ordering E1739A (5 m), E1739B (10 m), E1739C (15 m) or E1739D (25 m). Dimension: Ø42 x 26 mm Weight: 60 g	
E1739A/B/C/D	**Sensor cable, 5 m/10 m/15 m/25 m** The sensor cable comes in 4 different lengths (5 m, 10 m, 15 m and 25 m). The cable is compatible with both E1737A material sensor and E1738A air sensor. The cable connects a sensor to the E1736A USB sensor hub. One cable is required for each sensor.	

Measurement kits components

Keysight supplies a wide variety of optics for different calibration measurements. You may choose individual component or from a pre-configured kit. Select desired measurement type from the chart or individual optics listed below.

Model	Description	55280B linear optics kit	55281A angular optics kit	55281B linear/ angular optics kit	55282A flatness accessory kit	55283A-001 short range straightness kit	55283A-C01 long range straightness kit
10759A	Footspacing kit				1		
10766A	Linear interferometer	1					
10767A	Linear retroreflector	2		1			
10770A	Angular interferometer		1	1			
10771A	Angular reflector		1	1			
10772A	Turning mirror					1	1
10773A	Flatness mirror				2		
10774A	Straightness optics (short range)					1	
10775A	Straightness optics (long range)						1
10776A	Straightness accessory kit					1	1
10784A	Base	2		2			
10785A	Height adjuster and post	3		2			
10787A	Straightness and squareness carrying case					1	1

Required hardware for measurements

Keysight supplies a wide variety of optics for different calibration measurements. Choose individual optics or a pre-configured kit. Select desired measurement type from the chart or individual optics listed below.

Measurement	10744A	10768A	10777A	55280A/B	55281A	55281B	55282A	55283A-001	55283A-C01	55290A	55290B
Linear				●							
Diagonal		●		●							
Angular [1]						●					
Straightness (short range) [4]								●			
Straightness (long range) [4]									●		
Squareness (short range) horizontal [2, 3, 4]			●					●			
Squareness (long range) horizontal [2, 3, 4]			●						●		
Squareness (short range) vertical [3, 4]			●					●			
Squareness (long range) vertical [3, 4]			●						●		
Parallelism (short range) [4]			● [5]					●			
Parallelism (long range) [4]			● [5]						●		
Flatness [1]					●		●				
Way straightness					●		●				
Angular position	●				●					●	
Rotary axis	● [5]				●						●
Timebase (linear)				●							
Timebase (angular) [1]						●					
Timebase (str) short range								●			
Timebase (str) long range									●		
Dual axes (linear)				▲							

● *Indicates quantity of 1.*
▲ *Indicates quantity of 2.*

1. Required 10767-67001 (qty 2) alignment target (shipped with 10766A/10767A/10768A/10769A/10770A/10771A).
2. Required 10774-67001 (qty 1) interferometer target (shipped with 10774A/10775A).
3. Required 10774-20021 (qty 1) reflector target (shipped with 10774A/10775A).
4. Required 10785A (qty 1) optics height adjuster (shipped with 55280A/55280B/55281A).
5. Optional.

myKeysight

www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

www.lxistandard.org
LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.

Keysight Assurance Plans
www.keysight.com/find/AssurancePlans
Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.

www.keysight.com/quality
Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2008
Quality Management System

Keysight Channel Partners
www.keysight.com/find/channelpartners
Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/5530

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	0800 000154
Sweden	0200 882255
Switzerland	0800 805353 Opt. 1 (DE) Opt. 2 (FR) Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:
www.keysight.com/find/contactus
(BP-07-10-14)

KEYSIGHT TECHNOLOGIES

Published in USA, August 2, 2014
5990-9575EN
www.keysight.com