TECHNICAL OVERVIEW

5530 Laser Calibration System Components

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.

This is the selection guide to help to configure 5530 Laser Calibration System.



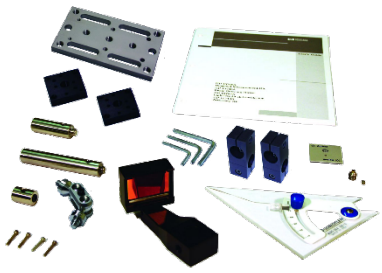
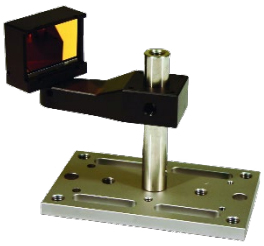
* User provides PC with USB ports

KEYSIGHT TECHNOLOGIES

Basic 5530 with Linear Measurement Configuration

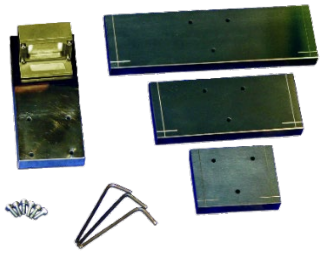
Model number	Description	Qty
10753B	Tripod	1
10882A/B/C	Laser head cable	1
E1733D	Remote control (software)	1
5519A/B	HeNe laser system with built-in receiver and power supply	1
55280B	Linear measurement kit	1
E1734A	Laser and optics case	1
E1734B	Tripod and accessories case	1
E1735A	USB axis module	1
E1736A	USB sensor hub	1
E1737A	Material sensor	1
E1738A	Air sensor	1
E1739A/B/C/D	Sensor cable	2

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.	
E1733A	**Dimensional metrology software** Operating System: Windows XP, Windows Vista, Windows 7 or Windows 8 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 (not sold separately)	
10753B/C	**Tripod** The tripod with mounting plate provides a mounting for the 5519A/B laser head. It allows the 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 tripod adjusts for height, rotation, tilt, and lateral offset. 10753B: Height: Adjustable 69 to 165 cm, Weight: 14 kg 10753C: Height: Adjustable 44 to 188 cm, Weight: 4.3 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.	

Model number	Description	
10767B	**Lightweight retroreflector** The lightweight retroreflector is optically identical to the 10767A but has a lightweight housing. It is used as the measurement retroreflector in situations where the weight of a 10767A might cause distortion (for example, a small robot or a small coordinate measuring machine).	
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	**Universal steering 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 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.	

Model number	Description	
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.	
10775A	**Long range straightness optics** The optics combine 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.	

Model number	Description	
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.	
E1733D	**Remote control (software)** 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 STRENTGH indicator.	
5519A/B	**HeNe laser system with built-in receiver and power supply (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).	
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	

Model number	Description	
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	
55283A-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 (interferometer 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 (interferometer 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.	

Model number	Description	
E1734A	**Laser and optics case** The heavy-duty transport and storage case houses a basic 5530 Laser Calibration System laser head, sensors, USB modules, plus other components, optics and cables 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	
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	
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 E1733D Remote Control software 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	

Model number	Description	
E1735A-001	**A-quad-B cable** 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.	
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** 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 sensor** 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	

Model number	Description	
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 Kit 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 measurement kit	55281A angular optics kit	55281B linear/angular measurement kit	55282A flatness accessory kit	55283A-001 straightness measurement kit - short range	55283A-C01 straightness measurement kit - long range
10759A	Footspacing kit				1		
10766A	Linear interferometer	1					
10767A	Retroreflector	2		1			
10770A	Angular interferometer		1	1			
10771A	Angular reflector		1	1			
10772A	Turning mirror					1	1
10773A	Flatness mirror				2		
10774A	Short range straightness optics					1	
10775A	Long range straightness optics and post						1
10776A	Straightness accessory kit					1	1
10784A	Base for optics height adjuster and post	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
Linear					●						
Linear time base					●						
Diagonal			●		●						
Linear dual axes					▲						
Angular[1]							●[2]				
Angular time Base[1]							●[2]				
Angular position (rotary)		●				●					●
Way straightness						●					
Flatness[1]						●					
Straightness[3]											
	Short range								●		
	Long range									●	
Straightness time base[3]											
	Short range								●		
	Long range			●[4]						●	
Parallelism[3]				●[4]							
Squareness[3,5,6]											
	Short range			●					●		
	Long range			●						●	

● Indicates quantity of 2

▲ Indicates quantity of 1

www.keysight.com/find/5530
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[1] Required 10767-67001 (qty 2) alignment target (shipped with 10766A/10767A/10768A/10769A/10770A/10771A).
[2] Or 55280A/B and 55281A
[3] Required 10785A (qty 1) optics height adjuster (shipped with 55280A/55280B/55281A).
[4] Optional
[5] Required 10774-67001 (qty 1) interferometer target (shipped with 10774A/10775A). For only horizontal measurement.
[6] Required 10774-20021 (qty 1) reflector target (shipped with 10774A/10775A).

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