Laser interferometer is recognized as a high precision, high sensitive measuring method by applying light wavelength as criterion, and is widely used in high-end manufacturing domain.

Laser interferometer SJ6000 insists of high-frequency Helium-Neon laser generator from an USA supplier, high-precision environmental compensation modules, high-precision laser interference signal processing system, high-performance computer control system. By applying with thermal frequency stabilization technology of laser dual-longitudinal mode and geometric parameters interference optical path design, SJ6000 can output long-term stable and high-precision(0.05ppm) laser quickly/about 6 minutes) which has powerful anti-interference performance. With different prism modules, it can measure linearity, angle, straightness, Flatness and perpendicularity, besides it can also analyze dynamic characteristics.
Functions

2. Measure and analyze many kinds of dynamic parameters, such as displacement, velocity, acceleration and amplitude frequency.
3. Built-in variety of general standards of machine tools.

[ Application ]

Linear meas. of machine tool  Linear meas. of stage module  Lab length reference

Linear meas. of machine tool  Angle meas. of stage module  Angle meas. of DC motor

Parallelism meas. of two guide rails  Straightness meas. of equipment  Flatness meas. of Granite table

Perpendicularity meas. of CMM  Perpendicularity meas. of equipment  Twin guide rails meas. of equipment
**Time based**

- **Motion performance evaluation**
  - Control parameter test and setting of motion controller PID
  - Stability test and evaluation after high-speed motion
  - Small steps test of high-performance motion controller

- **Vibration monitoring**
  - Scanning application:
    - Applied for the situation when positioning accuracy is not important but constant speed is critical for high quality imaging.
  - Machine tool applications:
    - Applied for the situation when slow and smooth contour movement of cutting tool is critical for high quality machining.

- **Vibration frequency analysis**
  - Vibration frequency analysis of the measured object
  - FFT fast Fourier transform analysis

**Distance based**

In distance-based dynamic measurement, laser interferometer SJ6000 “flies” along the axis, that means SJ6000 samples data at designated points without stopping.

**Pulse Trigger Mode**

Pulse trigger CT70 is compatible with glass scales, encoders and controllers. Equipped with Pulse trigger CT70, laser interferometer SJ6000 can sample data in pulse trigger mode. Even if the axis does not stop, laser interferometer SJ6000 could sample data at designated points or continuously sample data.
Technical Parameters

System parameters:
1. Measuring method: single frequency
2. Laser frequency accuracy: 0.05ppm
3. Dynamic capture rate: 50kHz
4. Warm-up time: about 6 min
5. Operating temperature: (0~40)℃
6. Environment temperature: (0~40)℃, humidity: 0~95%
7. Storage temperature: -20℃~70℃

Environmental sensors:
1. Atmospheric temperature sensor : ±0.1℃(0~40)℃, resolution: 0.01℃
2. Material temperature sensor: ±0.1℃(0~40)℃, resolution: 0.01℃
3. Atmospheric humidity sensor: ±5% (0~95%)
4. Atmospheric pressure sensor: ±0.1kPa (65~115)kPa

Linearity measurement:
1. Measuring range: (0~80)m
2. Measuring accuracy: 0.5ppm (0~40)℃
3. Measuring resolution: 1nm
4. Maximum measuring speed: 4m/s

Angle measurement:
1. Axial range: (0~15)m
2. Measuring range: ±10°
3. Measuring accuracy: ±(0.02%R+0.1+0.024M)″  (R is indicating value, unit: ″; M is measured length in m)
4. Measuring resolution: 0.1″

Flatness measurement:
1. Axial range: (0~15) m
2. Flatness measuring range: ±1.5 mm
3. Measuring accuracy: ±(0.2%R+0.02M) μm (R is indicating value in μm; M is measured length in meters)
4. Substrate size: 180mm adjustable, 360mm adjustable
5. Measuring resolution: 0.1μm

Straightness measurement:

<table>
<thead>
<tr>
<th>Item</th>
<th>Axis range</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short straightness</td>
<td>(0.1~4)m</td>
<td>±3.0mm</td>
<td>±(0.5+0.25%R+0.15M)μm/m</td>
<td>0.01μm</td>
</tr>
<tr>
<td>Long straightness</td>
<td>(1~20)m</td>
<td>±3.0mm</td>
<td>±(5.0+2.5%R+0.015M)μm/m</td>
<td>0.1μm</td>
</tr>
</tbody>
</table>

Note: R is indicating value in μm; M is measured length in meters

Squareness measurement:

<table>
<thead>
<tr>
<th>Item</th>
<th>Axis range</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short distance</td>
<td>(0.1~3)m</td>
<td>±3.0M mm/m</td>
<td>±(2.5+0.25%R+0.08M)μm/m</td>
<td>0.01μm</td>
</tr>
<tr>
<td>Long distance</td>
<td>(1~15)m</td>
<td>±3.0M mm/m</td>
<td>±(2.5+2.5%R+0.08M)μm/m</td>
<td>0.1μm</td>
</tr>
</tbody>
</table>

Note: R is indicating value in μm; M is measured length in meters

Rotary axis measurement:
1. Measuring range of angle: 0-360°
2. Power supply: Li-battery
3. Max axis rotation speed: 10rpm
4. Communication type: Bluetooth
5. Weight: 1.9kg
6. Size: Φ112*H148mm
Equipped with Precision turntable WR50 and Angle prism, Laser interferometer SJ6000 is capable to calibrate rotary axis 0~360°. Precision turntable WR50 is installed to the rotary axis as angle master.

Parameters

- Model No.: WR50
- Measuring range: (0~360)°
- Accuracy: ±1°
- Resolution: 0.1°
- Max axis rotation speed: 10rpm
- Max tracking speed: 2rpm
- Weight: 1.9kg
- Size: Φ112*H148mm
- Communication type: Bluetooth
- Power supply: Li-battery
[Application]

- Rotary axis measurement of CNC
- Electric spindle measurement of CNC
- Swing axis measurement of CNC
- Angle measurement of CNC index plate
- Angle measurement of turntable
- Angle measurement of CNC turntable

[Software]

- Motion control
- Tools
- Value window
- Signal strength
- Sampling window
- Data curve
[ Eccentric Axis Measurement ]

Equipped with angle prism, precision turntable WR50, dedicated jig and dedicated software, SJ6000 is capable to calibrate eccentric axis rotation accuracy.

Eccentric axis meas. kit:
1. Magnet, 3pcs
2. 90° Jig
3. Dedicated software

Measurement Principle

The measurement principle is to use the synchronous movement of the object table and the main spindle, as shown in the figure below. It is important to make sure that angle prism should be always aligned with WR50.
Displacement Measurement

Application

Eccentric axis measurement

Software Setting
Wireless Ballbar MT21

Fast Diagnosis Tool for Machine

MT21 Wireless Ballbar is a simple, fast, economical and efficient solution to diagnose performance of machine tools, and helps to improve the machining quality of machine tools.

The measurement software with guided operation can generate the machine running program automatically. With simple setting, the round track test on three orthogonal planes can be completed in 10~15 minutes.

Comprehensive diagnosis report provides a full and professional assessment of machine performance. Taking 360 degree measurement at the XY plane as an example, it can analyze: backlash X, backlash Y, reverse jump X, reverse jump Y, lateral gap X, lateral gap Y, period error X, period error Y, servo Mismatch, perpendicularity, straightness X, straightness Y, proportional mismatch, scale error X, scale error Y, thread pitch X, thread pitch Y, feed rate, center offset X, center offset Y, position tolerance, the best fitting radius, roundness.

Data is transferred to the laptop computer via Bluetooth in real time.

Features

Simple, Fast

Powerful Function

Wireless
MT21 software with guided operation can implement the round track test on three orthogonal planes quickly and simply. After measurement, software calculates the overall measurement values (roundness, roundness deviation) of the positional accuracy automatically, then generates the analysis report with the graphic format according to GB17421-4, ISO230-4. MT21 achieves the real spatial diagnosis for machine tools.

### Parameters

- Communication: Bluetooth (Typical 10m)
- Power supply: Li-battery
- Resolution: 0.1μm
- Measuring accuracy: ±(0.7+0.3%L)μm
- Measuring range: ±1.0mm
- Sensor range: ±2.0mm
- Sample rate: 1000Hz
- Working Temperature: (0~40)°C
- Size: 150mm×26mm×21mm

### Configuration

1. MT21 Wireless Ballbar 1pc
2. Master gauge 1pc
3. Offset setting ball 1pc
4. Centric holder 1pc
5. Tool cup 1pc
6. Extension bar 50, 100, 150mm 1pc of each
7. Software
8. Portable suitcase

### Application

Roundness inspection of machine tool
PO series contains 3-point trigger unit inside the probe, which is the most stable structure. When the stylus is moved radially or axially by external force, the trigger unit is triggered. Then the circuit inside of probe sends a triggering signal to the receiver, and the receiver transmits it to the machine tool, consequently the present coordinates of each axis of the machine tool are recorded automatically. Finally measurement results are calculated according to the coordinate records of related points.

[Features]

*High repeatability: One-way repeatability <1μm
*Long standby time: As long as 6 months
*Omnidirectional energy-absorbing design: 360° omnidirectional energy-absorbing design, which helps to cushion the spindle in impact when an operating accident occurs
*Waterproof design: IP68 for probe and receiver
*Intelligent LED indicators: Show current working status of the probe
1. Technical parameters of the probe:
   1) Storage temperature: (-25-70)°C
   2) Working temperature: (5~55)°C

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PO40</th>
<th>PO60</th>
<th>PO40L</th>
<th>PL20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Φ40mm* L50mm</td>
<td>Φ63mm* L76mm</td>
<td>Φ40mm* L52mm</td>
<td>Φ25mm* L41mm</td>
</tr>
<tr>
<td>Weight(Without Holder)</td>
<td>260g</td>
<td>880g</td>
<td>280g</td>
<td>65g</td>
</tr>
<tr>
<td>Transmission Type</td>
<td>360° IR</td>
<td>360° IR</td>
<td>360° IR</td>
<td>Cable</td>
</tr>
<tr>
<td>Transmission Distance</td>
<td>5m</td>
<td>6m</td>
<td>5m</td>
<td>No limit</td>
</tr>
<tr>
<td>Starting Mode</td>
<td>Code M</td>
<td>Code M, Revolve</td>
<td>Code M</td>
<td>/</td>
</tr>
<tr>
<td>Rotational Speed</td>
<td>Max 1000rev/min</td>
<td>Max 1000rev/min</td>
<td>Max 1000rev/min</td>
<td>Max 1000rev/min</td>
</tr>
<tr>
<td>Power Supply</td>
<td>1/2AA 3.6V battery*2</td>
<td>AA1.5V/3.6V battery*2</td>
<td>1/2AA 3.6V battery*2</td>
<td>/</td>
</tr>
<tr>
<td>Triggering Direction</td>
<td>±X/±Y/-Z</td>
<td>±X/±Y/-Z</td>
<td>±X/±Y/-Z</td>
<td>±X/±Y/-Z</td>
</tr>
<tr>
<td>Repeatability of One-way triggering 2δ(*1)</td>
<td>1µm</td>
<td>2µm</td>
<td>1µm</td>
<td>0.5µm</td>
</tr>
<tr>
<td>Max overrun(*2)</td>
<td>XY:12.5mm +Z:6mm</td>
<td>XY:21mm +Z:11mm</td>
<td>XY:12mm +Z:6mm</td>
<td>XY:12.5mm +Z:6mm</td>
</tr>
<tr>
<td>XY Trigger Force(*3)</td>
<td>0.5 N~0.9N</td>
<td>0.5 N~1.6N Adjustable</td>
<td>0.3 N~1.6N Adjustable</td>
<td>0.5 N~1N Adjustable</td>
</tr>
<tr>
<td>Z Trigger Force</td>
<td>5.8N</td>
<td>3.5N~14N Adjustable</td>
<td>4N~10N Adjustable</td>
<td>5.9N</td>
</tr>
<tr>
<td>Application</td>
<td>Small and medium-sized 3-axis, 5-axis machining center</td>
<td>Large gantry machine tool, horizontal machining center</td>
<td>CNC lathe or turning-milling composite machining center</td>
<td>Small engraving and milling machine tool</td>
</tr>
</tbody>
</table>

Note:
*1: Test with a 50mm straight stylus under speed 480mm/min
*2: Test with a 50mm straight stylus
*3: Test with a 50mm straight stylus under speed 480mm/min

2. Technical parameters of the receiver:
   1) Transmission type: IR, 360°
   2) Working range: Max 8m
   3) Weight: 926g
   4) Input voltage: 12V~30V
   5) Input current: <100mA, receiving <40mA
   6) Cable to machine controller: dedicated 13PIN shielded cable, 8 meters or 15 meters
   7) Storage temperature: (-25-70)°C, working temperature: (5~55)°C

COMI Receiver