SILVERCNC
TURKEY

Machine tool touch probe

Specification manual

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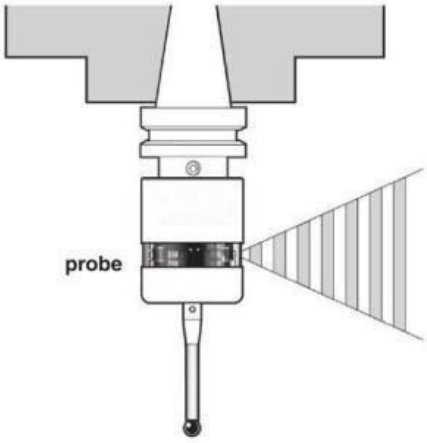
Probe system

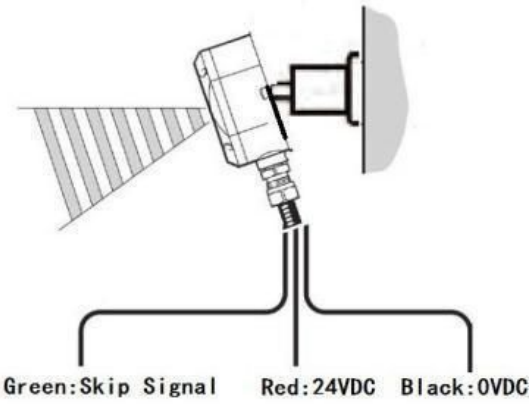
The probe consists of probe body and receiver. When the probe contacts the surface of the workpiece, the probe will deflect, resulting in the change of the internal circuit signal of the probe, and the trigger signal will be transmitted to the infrared receiver. The receiver converts the optical signal into an electrical signal and transmits it to the machine controller. After the controller detects the current position of each axis, it will generate the measurement results based on the current calibration data. It can be applied to milling machine, machining center and lathe, and the advantages of using probe are obvious：

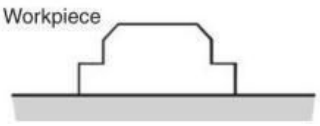
1. Set the workpiece before the product processing: directly measure the size and position of the tool or workpiece, divide the center and find the edge, automatically correct the coordinate system, and automatically correct the offset of the tool or workpiece according to the measurement results.

It can quickly find the fixture position, reduce manual adjustment time, eliminate expensive fixture and manual setting error, improve product processing quality and reduce waste.

2. Used for on-line measurement of product feature size and FAI, monitoring the size and position of workpiece, automatically correcting offset. It can improve process capability and traceability, reduce non production time and scrap, and improve productivity.







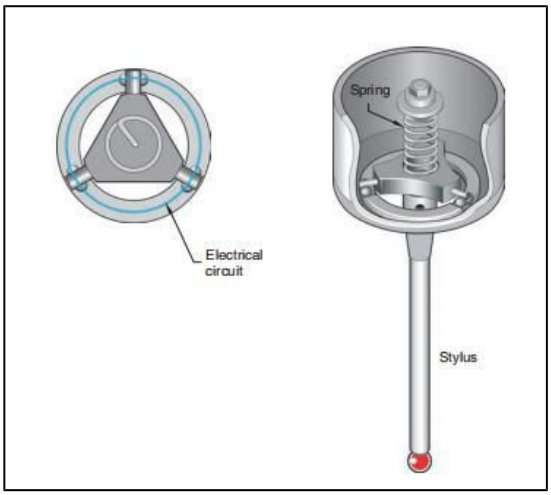
Principle of probe

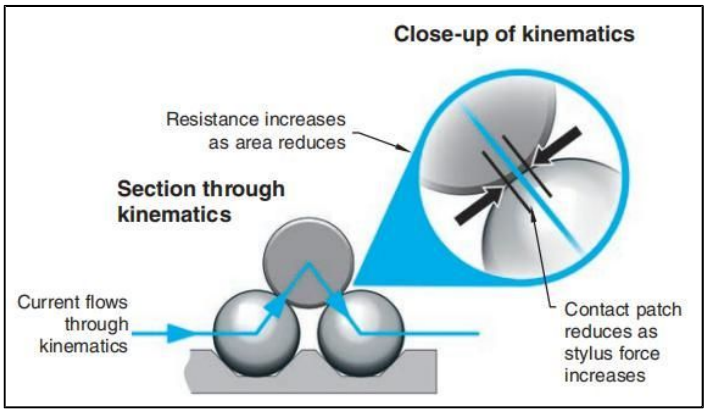
Principle of the probe is the same as Renishaw brand, Three equally spaced rods rest on six tungsten carbide balls to provide six points of contact.

Under load of the spring, contact patches are created between the balls and the rods through which the electrical current flows. Upon making contact with (touching) a work piece, the force translated through the stylus moves the balls and rods apart thus reducing the size of the contact patches and increasing their electrical resistance.

When a defined threshold is reached the probe is triggered.

Repeatable electrical triggering and mechanical reseating of the mechanism are critical to this process and fundamental to reliable metrology.

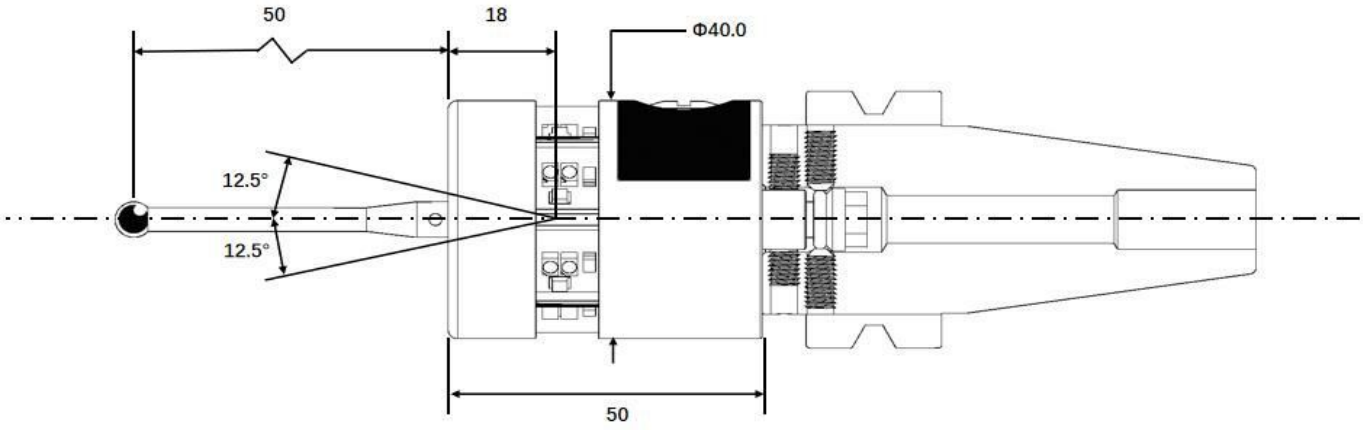




Specification

Model	SOMP40	
Unidirectional repeatability Use standard 50mm probe at 600mm/min speed	1um (2σ)	
Sense directions	±X,±Y,+Z	
Stylus trigger force Use standard 50mm probe	XY plane 0.4 - 0.8N	Z direction 4.0N
Trigger protection trip	XY plane +/-15°	Z direction 6.35mm
Signal transmission method	Optical transmission	
Operating range	5m	
Trigger life	>10 Million times	
Transmission angle	360 ° along the probe axis	
Transmission on/off style	smart switch	
Weight without shank (including batteries)	280g	
type of battery	2x lithium battery 14250	
battery life	Standby	>600 days
	5% use	>540 days
	continue use	>360 days
Sealing	IP68	
Operating temperature	0-60℃	

Dimensions



超行程限制

测针长度	±X/±Y	Z
50mm	13.5mm	6.25mm
100mm	24mm	6.25mm

2、Adjust the center：

2.1、Put the probe into the spindle of the CNC, the radial highest point of the stylus needs to touch the meter. And rotate the spindle 360° observe the circumferential run out of the measuring rod.

2.2、The probe is fixed to the handle surface by 2 tip screws on the handle. It is recommended to use torsion not more than 2 N*M.

2.3、Adjust the radial run out of the stylus through 4*M5 flat head screws on the top of the probe. (Adjustment method: the screw in the maximum direction of swing should be loosened, and the opposite screw should be locked immediately, check the value again, loosen the screw in the maximum direction of swing, and lock the opposite screw immediately. So cycle until swing <0.02 mm.)

2.4、When the swing value is less than 0.02 mm, there is no need to loosen the screw in the direction of the maximum swing. The direction screw with the minimum swing can be locked slightly until the swing is less than 0.01 mm. If the measurement accuracy is high, it is recommended to control to 0.002 mm.)

2.5、At this time, the handle above the two m5*12 pointed screws again locked. Rotate the spindle 360° observe whether the circumferential runout of the measuring rod is within the ideal range.

2.6、For ruby needles, the micrometer must touch the maximum diameter of the ruby sphere; for cylindrical flat needles, the micrometer is generally aligned with the position of moving up 1-2 mm at the bottom of the needle.

3.Probe tool length setting：

3.1、According to the tool face of the machining program, select the appropriate tool point. First use the handwheel 100 gear, the stylus to the knife point above 5-10 mm. Slowly move the stylus down until the green light (or blue light) of the probe lights up and flashes, and lift the stylus up to the head within 5 seconds.

3.2、Switch the handwheel to 10 gear and move the stylus down slowly until the green light (or blue light) of the probe lights up and flashes. Lift the stylus to the headlight out within 5 seconds.
3.3、Switch the handwheel to the 1 gear, move the stylus down slowly until the green light (or blue light) of the probe lights up and flashes, and lift the needle slowly within 5 seconds.

(Note: When the stylus is pressed for more than 5 seconds, the green/blue light flashes at the same time, and the probe enters configuration mode unless a remote signal is input or the stylus leaves the workpiece.)

Reciever

SIR-1 Introduction to Infrared Receiver

SIR-1 infrared probe receiver is our company's new design and development of measurement products, with the following advantages:

1. Compact structure and wide applicability. Receiver diameter only 52 mm, product installation is more convenient.
2. The universal adjusting mechanism is convenient to align the probe direction and is more flexible than the traditional mechanism.
3. Use strong magnets to install metal parts of machine tools to avoid the trouble of disassembling screws.
4. Use positive and negative power protection design to avoid problems caused by wiring errors.
5. 4 core installation mode, greatly simplify installation difficulty and risk.

SIR-1 Reciever specification

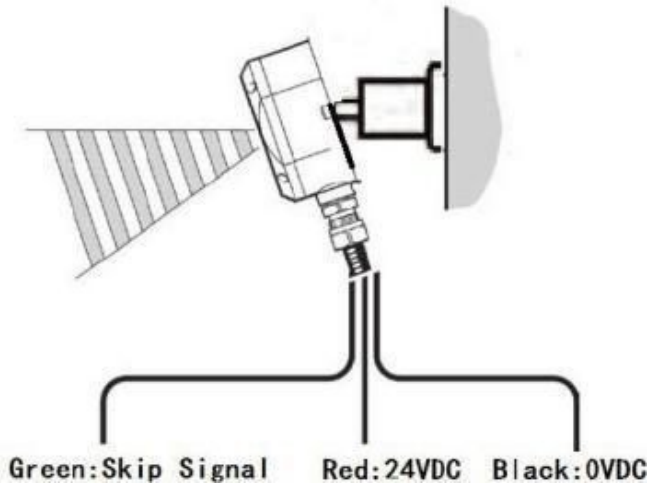
Mode	SIR-1
Principal application	Machine tool processing area
Output signal	Power On signal
	Trigger Signal
Mounting	Strong Magnetic Base / Universal Support
Supply voltage	24VDC +/-4VDC
Cable	5.0mm
Sealing	IP68
Operating temperature	10°- 60°
Storage temperature	-20°-70°

SIR-1 Installation

Red：+24V DC

Black：0V DC

Green：Skip signal to CNC Yellow：Low Battery signal



SOMP40 led light display：

LED with the following display features ：

- Installed battery: blue/red/yellow lights flashing ： 
- Low battery: yellow light ：
- Pressed for 5 seconds:blue / red light flashes: 

SIR-1 led light display：

- The receiver led uses 2 colors (blue / green) led display. It has the following display functions ：
- Turn on : blue / green light flashes ： 
- Trigger signal standby: green light always 

Installation and Replacement of Stylus

- In order to avoid damage to the probe and stylus during transportation, the company has removed the probe from the probe and packaged it separately before delivery; therefore, after the user receives the probe, Please install the stylus according to the following instructions.
- When installing the stylus, the special wrench of the product should be used; the opening wrench should be fixed on the stylus seat with screw hole to avoid the torsion during the tightening of the stylus; then the stylus should be rotated into the stylus seat. When the stylus is screwed to a fixed position, tighten it properly with a matching cylindrical wrench.
- The probe can be fitted with a variety of stylus with M4 coarse thread. After each replacement of the stylus, we must readjust the fine adjustment between the main body of the probe and the mounting handle, so that the position accuracy of the needle can reach a reasonable state.

Battery installation and replacement

- The SOMP40 probe uses two LS14250 lithium batteries as the power supply, which is a disposable battery of industrial standard specifications. When the power is exhausted, the yellow lamp of the probe will flicker slowly and remind that the battery should be replaced.
- When replacing the battery, use coins as a wrench to remove and install the battery bin cover. Special note: the positive and negative direction of the battery do not install errors. Do not mix new and old batteries or different types of electricity, as this will shorten battery life and damage the battery.
- During installation of the battery bin cover, special attention should be paid to the O sealing ring on its edge to prevent loss or damage during installation.

Calibrating the SOMP40

Why calibrate a probe?

A spindle probe is just one component of the measurement system which communicates with the machine tool. Each part of the system can introduce a constant difference between the position that the stylus touches and the position that is reported to the machine. If the probe is not calibrated, this

difference will appear as an inaccuracy in the measurement. Calibration of the probe allows the probing software to compensate for this difference.
During normal use, the difference between the touch position and the reported position does not change, but it is important that the probe is calibrated in the following circumstances:
•when a probe system is to be used for the first time;
•when the enhanced trigger filter delay is changed;
•when a new stylus is fitted to the probe;
•when it is suspected that the stylus has become distorted or that the probe has been crashed;
at regular intervals to compensate for mechanical changes of your machine tool.

Calibrating in a ring gauge

Calibrating a probe either in a ring gauge with a known diameter automatically stores one or more value for the radius of the stylus ball. The stored values are then used automatically by the measuring cycles to give the true size of the feature. The values are also used to give true positions of single surface features.

Calibrating the probe length

Calibrating a probe on a known reference surface determines the length of the probe, based on the electronic trigger point. The stored value for length is different from the physical length of the probe assembly. Additionally, the operation can automatically compensate for machine and fixture height errors by adjusting the probe length value that is stored.

Fault-finding

Symptom	Cause	Action
Light touch stylus, probe indicator light not on	Dead batteries.	Change batteries.
	Unsuitable batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion/polarity.
	Poor connection of battery.	Remove any dirt and clean.
Light touch stylus, probe indicator light on, but the receiver light not on	A/B channel do not match.	Check the color of the Lights.
	Dead batteries.	Change batteries.
	Machine power supply fault.	Check the machine power supply.
The measurement does not start the machine tool to alarm (such as obstacle alarm)	The skip signal fault.	Check the skip signal.
	False probe trigger.	Check machine tool's abnormal jitter.
	Receiver/machine fault.	Refer to machine user’s guide.
	Dead batteries.	Change batteries.
Accidental stop and alarm	Probe unable to find target.	Check workpiece position.

during measurement cycle (e.g. probe fail alarm)	Optical/magnetic interference.	Check the interference.
	Receiver/machine fault.	Check the Receiver.
	Workpiece obstructing probe path.	Review probing software.
Probe crashes.	Probe length offset missing.	Review probing software.
	Debris on part or stylus.	Clean part and stylus.
Poor probe repeatability and/or accuracy.	Poor tool change repeatability.	Redatum probe after tool change.
	Loose probe mounting on shank.	Check and tighten as appropriate.
	Probing speed too high/slow.	Review probing software.