User Guide for Radio Frequency Probe

Contact:

Mr. Jom
E-mail: *jom.lin@joyoshine.com*

Website: *www.joyoshine.com*

Safety Information to the user

The probe is supplied with non-rechargeable batteries. For specific battery operating, safety and disposal guidelines refer to the battery manufacturers' literature.

- Do not attempt to recharge the batteries.
- Replace the batteries only with the specified type.
- Do not mix new and used batteries in the product.
- Do not mix different types or brands of batteries in the product.
- Ensure that all batteries are inserted with the correct polarity in accordance with the instructions in this manual and indicated on the product.
- Do not store the batteries in direct sunlight.
- Do not expose the batteries to water.
- Do not expose the batteries to heat or dispose of batteries in a fire.
- Avoid forced discharge of the batteries.
- Do not short circuit the batteries.
- Do not disassemble, apply excessive pressure, pierce, deform or subject the batteries to impact
- Do not swallow the batteries.
- Keep the batteries out of the reach of children.
- If the batteries are swollen or damaged do not use them in the product and exercise caution when handling them.
- Dispose of waste batteries in accordance with your local environmental and safety laws. Ensure that you comply with international and national battery transport regulations when transporting batteries or this product with the batteries inserted.

  To reduce the risk of shipment delays, should you need to return this product to us for any reason, do not return any batteries.
- There is a glass window on the probe, please do be careful from injury if the glass is broken.

Information to the equipment installer

It is the responsibility of the equipment installer to ensure that the following guidelines are adhered to, in order for the product to function in accordance with these regulations:

- any interface MUST be installed in a position away from any potential sources of electrical noise, (for example power transformers, servo drives).
- all 0 V/ground connections should be connected to the machine "star point" (the "star point" is a single point return for all equipment ground and screen cables). This is very important and failure to adhere to this can cause a potential difference between grounds.
- all screens must be connected as outlined in the user instructions.
- cables must not be routed alongside high current sources (for example, motor power supply cables), or be near high-speed data lines.
- cable lengths should always be kept to a minimum.

Equipment operation

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired

Introduction

The Radio transmission probe operates through radio signal transmission, it employs 2.4GHz radio frequency hopping transmission technology, which can avoid any potential interference and transmission dead zones.

Being switched-on and switched-off without requiring M-code control, it automatically measures the origin of the workpiece and dimensions after machining at high speed and with high precision. Mainly, it allows machine tools and robots to reduce setup time, prevent machining defects, improve cycle time, and eliminate dependence on skilled operators and jigs.

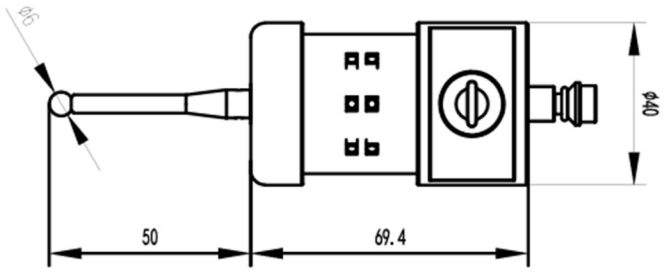
It maintains excellent reliability even in high-density radio frequency environments. Therefore, the wireless probe is an ideal choice for operation on all size of machine.

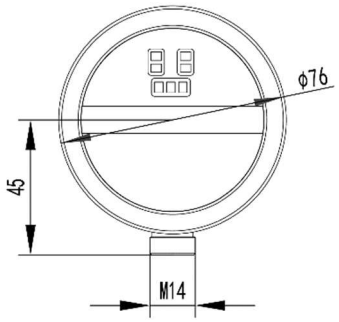
Probe modes

The JPM400 probe can be in one of three modes:

- Standby mode: where the probe is awaiting a switch-on signal.
- Operational mode: activated by touching the stylus, the probe is ready for use.
- Low-power consumption mode: the probe will be in Low-power consumption mode if the stylus is not touched exceed three seconds.

JPM400 Dimensions





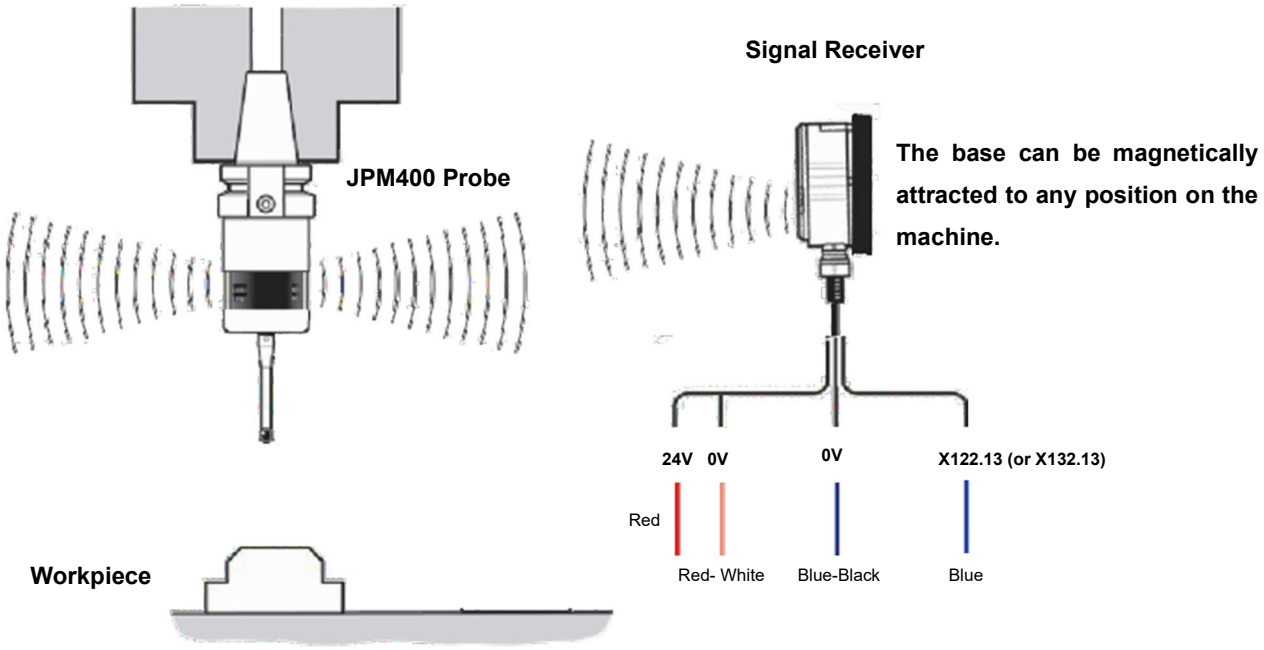
Stylus overtravel limits		
Stylus length	**±X/±Y**	**+Z**
50mm	12.5°	5mm
100mm	12.5°	5mm

Green light	Power
Red light	Inspection
Yellow light	Signal

JPM400 Specifications

Item	Specifications
Size	Length：69.4mm，Diameter:40mm
Weight without Shank (including batteries)	320g
Transmission Type	2.4GHz radio frequency hopping transmission
Stylus Overtravel Limits	XY±15°, Z+5.0mm
Stylus Trigger Force	XY=1.0N, Z=6.0N
Unidirectional Repeatability	≤1μm(2σ)
Operating Range	≤15m
Sealing	IP68
Operation Temperature	0°C to 60°C
Battery	2 × ½ AA 3.6 V Lithium-thionyl chloride
Battery Life	240 hours (5% usage per shift)
Shank(optional)	BT40, BT50, HSK63A, HSK63F, HSK40E,HSK100
Hard Wire(optional)	5.0m,10.0m,15.0m,20.0m
Feature	Collision Protection

Installing the JPM400 with a signal receiver



Radio transmission does not require line-of-sight between the probe and transmitter, and will pass through very small gaps and machine tool windows. This allows easy installation, either inside or outside the machine enclosure.

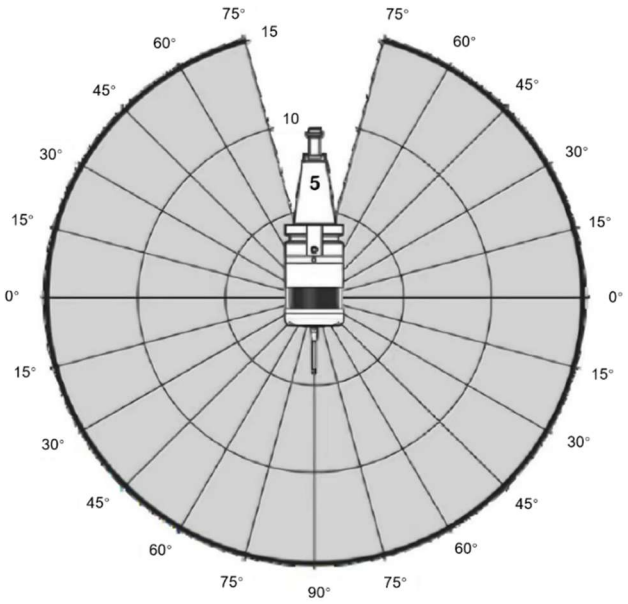
Coolant and swarf residue accumulating on the probe and signal receiver may have a detrimental effect on transmission performance. Wipe clean as often as is necessary to maintain unrestricted transmission.

Positioning the signal receiver

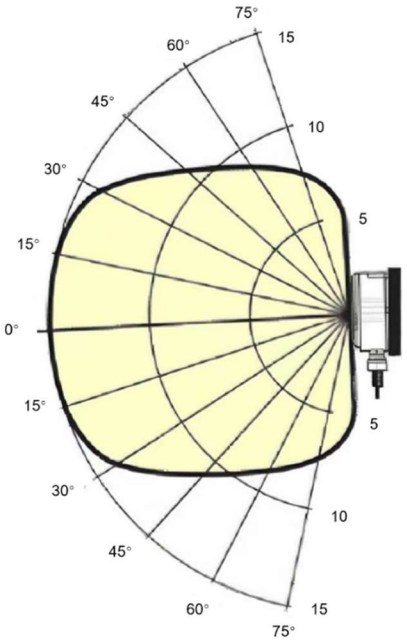
The probe system should be positioned so that the optimum range can be achieved over the full travel of the machine's axes. Always face the front cover of the receiver in the general direction of the machining area and the tool magazine, ensuring both are within the performance envelope shown below.

Generally, the probe and signal receiver must be within each other's performance envelope, as shown below. The performance envelope shows line-of sight performance, however, radio transmission does not require this, as any reflected radio paths will be less than the 15m operating range.

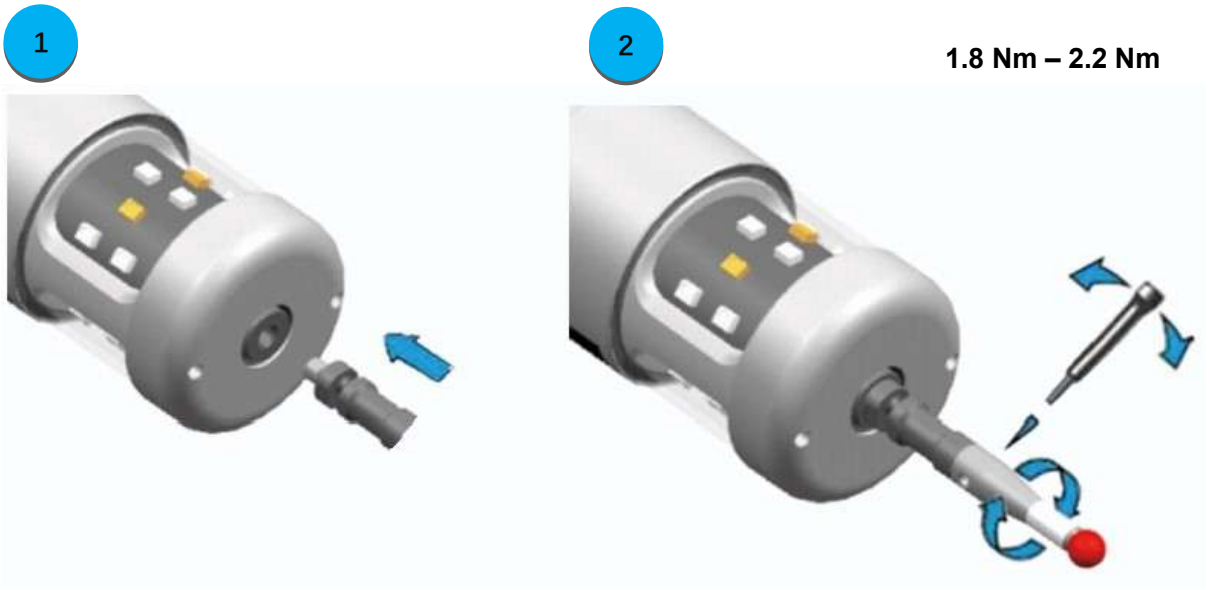
JPM400 probe



Signal receiver



Stylus fitting



To avoid damage to the probe and stylus during transportation, we have disassembled the stylus from the probe and packaged them separately. Please follow the instructions as below before fitting the stylus.
As shown in the figure above, Firstly, fit the break stem to the probe with an open-ended wrench; Then screw the stylus into the break stem, when the stylus is tightened to the fixed position, use the matching cylindrical wrench to tighten it appropriately (as shown in Figure 2).

The probe can be equipped with various styli with M4 threads. When the user needs to replace the stylus, please follow the above instructions.

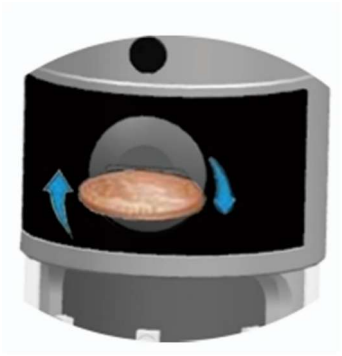
Installing and changing the batteries

The probe is equipped with two ½ AA lithium-thionyl chloride (3.6 V) batteries which are non-rechargeable batteries that meet industrial standards. When the batteries are running out of power, the LEDs will short flash in red.

- Do not leave dead batteries in the probe.
- When changing batteries, do not allow coolant or debris to enter the battery compartment.
- When changing batteries, check that the battery polarity is correct.
- Take care to avoid damaging the battery cassette gasket.
- Always ensure that the cassette gasket and mating surfaces are clean and free from dirt before reassembly.
- Only use specified batteries.
- Do not mix new and used batteries or battery types, as this will result in reduced life and damage to the batteries.

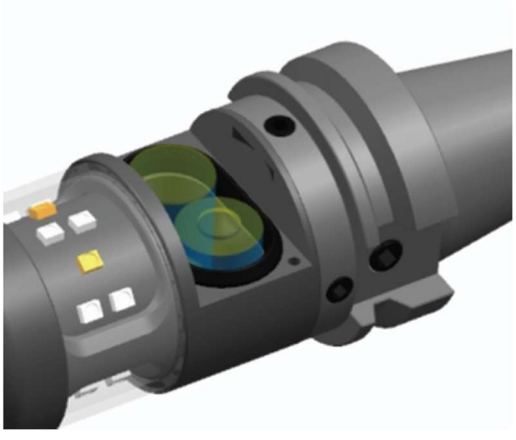
CAUTION: Dispose of dead batteries in accordance with local regulations. Never dispose of batteries in a fire.

1



2

3

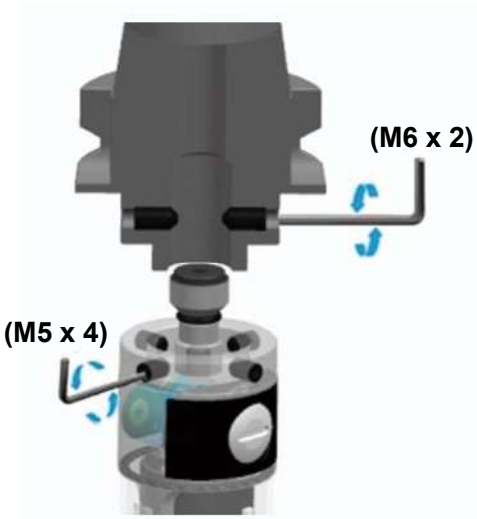


4

Mounting the probe and Stylus on-center adjustment

If a probe and shank assembly is dropped or the stylus is replaced for a new one, it must be rechecked for correct on-center adjustment. Do not hit or tap the probe to achieve on-center adjustment.

1



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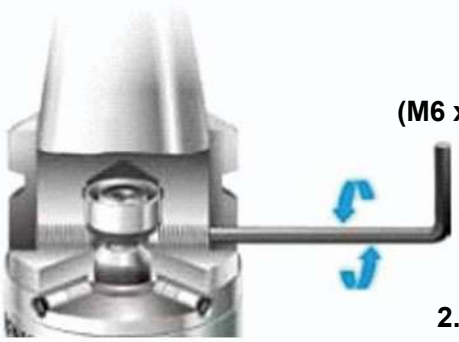
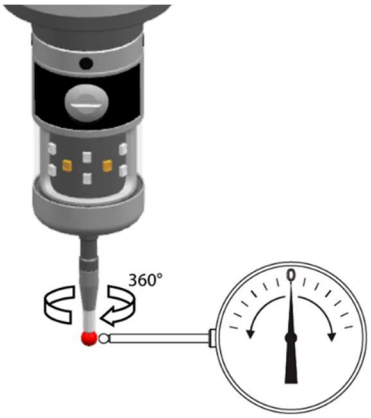


2.0 Nm – 3.0 Nm

3



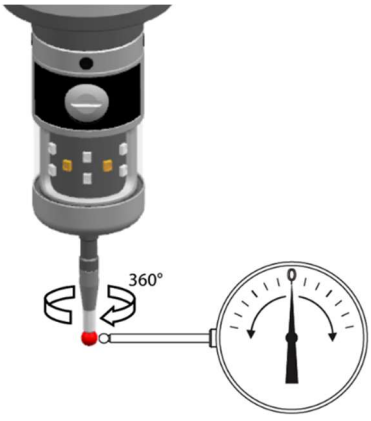
±10um

4

(M5 x 4)

1.5 Nm – 2.0 Nm

5



±2.0um

Calibrating the probe

Why calibrate a probe?

A 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 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;
- if repeatability of relocation of the probe shank is poor. In this case, the probe may need to be recalibrated each time it is selected.

It is good practice to set the tip of the stylus on-center, because this reduces the effect of any variation in spindle and tool orientation. A small amount of run-out is acceptable, and can be compensated for as part of the normal calibration process.

Calibrating in a ring gauge or on a datum sphere

Calibrating a probe either in a ring gauge or on a datum sphere 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.

Note: The stored radius values are based on the true electronic trigger points. These values are different from the physical sizes.

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.

Cleaning the probe

Wipe the windows of the probe and the receiver with a clean cloth to remove machining residue. This should be done on a regular basis to maintain optimum transmission.

Fault-finding

Symptom	Cause	Action
The probe fails to power up (No LEDs illuminated) by touching the stylus lightly	Dead batteries	Change batteries
	Unsuitable batteries	Fit suitable batteries
	Batteries inserted incorrectly	Check battery insertion/polarity
	Poor connection between battery cassette mating surfaces and contacts	Remove any dirt and clean the contacts before reassembly
By touching the stylus lightly, the LEDs on the probe flash, but the LEDs on the receiver don't flash	The probe and the receiver match fault	Check the series No. of the probe and the receiver and keep them the same
	Low battery	Change the batteries
	Power for receiver supplied abnormally	Check the power supplied of 24V
The machine alarms before a probing cycle	Excessive machine vibration causing false probe trigger.	Eliminate abnormal vibration of the machine
	Probe/receiver or machine fault	Contact the supplier
The machine stops unexpectedly during a probing cycle	Dead batteries	
	The probe unable to find target surface	Check that workpiece is correctly positioned and that stylus has not broken.
	External radio interference	Eliminate the external radio interference
	The receiver fault	Check the receiver
The probe crashes	Workpiece obstructing probe path	Check the probing program
	Probe length offset missing	Check the probing program
Poor probe repeatability and/or accuracy	Debris on workpiece or stylus	Clean the workpiece and stylus
	Poor tool change repeatability	Re-datum probe after each tool change
	Loose probe mounting on shank or loose stylus	Check and tighten as appropriate
	Excessive machine vibration	Change trigger filter setting. Eliminate vibrations
	Calibration out of date and/or incorrect offsets	Check the probing program
	Calibration and probing speeds not the same	Check the probing program and keep speeds the same
	Probing speed too high or too low	Check the probing program
	Temperature variation causes machine and workpiece movement	Minimise temperature changes

Parts List

No.	Item	Part No.	Qty	Unit	Remark
1	Probe	JPM400	1	Pcs	
2	Shank	BT40	1	Pcs	The shank type is optional: BT30, BT40, BT50, HSK63A, HSK40E, HSK63F
3	Pull stud	-	1	Pcs	
4	Receiver	HMI-10	1	Pcs	
5	Mounting base	-	1	Pcs	
6	Cable	-	10	M	
7	Battery	LS14250	2	Pcs	Batteries are not included due to regulatory restrictions on the export of Li/$SOCl_2$ battery.
8	Stylus	RCD4100	1	Pcs	1pc ceramic stylus 100 mm long with Ø4 mm ball
9	Break stem	L12	1	Pcs	
10	Wrench	1.5	1	Pcs	
11	Wrench	2.5	1	Pcs	
12	Screw	M5	6	Pcs	

- The shank and stylus are optional. For details, please contact us by email.