Data sheet
H-2000-2110-14-A

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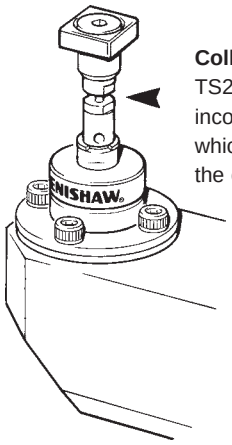
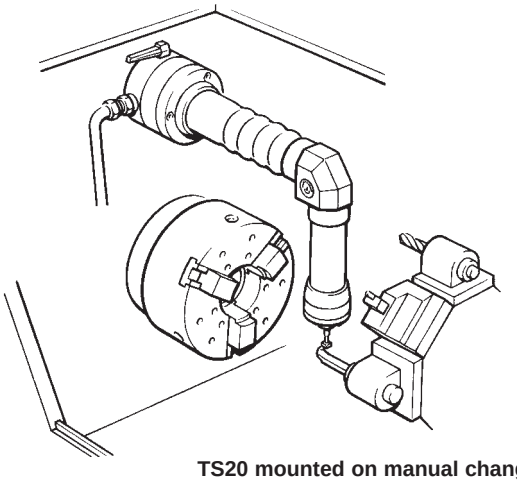
TS20 two axis tool setting probe for lathes



Collision protection
TS20 probes with straight styli incorporate a weak link stem, which protects the probe in the event of a collision

TS20 probe mounted on automatic arm



TS20 mounted on manual change high precision arm (HPA)

PROBE OPERATION

During a tool setting routine, each turret mounted tool is driven against the square tip stylus. When contact is made, a trigger signal is generated and tool offsets are automatically recorded in the machine control registers.

There are three versions of the TS20 probe for use with 25 mm, 32 mm and 40 mm tooling respectively.

The probe may be mounted on an automatic arm, which is retracted out of the machine's working envelope when the probe is not in use. Alternatively, the probe may be mounted on a Renishaw high precision arm (HPA).

During installation, the probe is set to align the stylus tip with the machine X or Z axes.

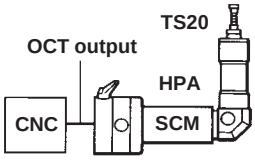
INTERFACE UNIT

The TS20 probe requires an interface unit to process signals between the probe and the CNC machine control. Signal processing options are given below.

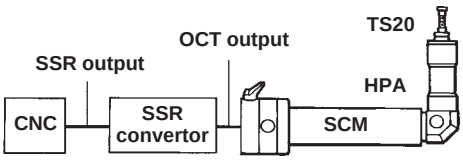
SPECIFICATION

Sense directions	Typically lathe ±X and ±Z axes using probe X and Y axes
Uni-directional repeatability. maximum mean 2 sigma (2σ) value	Dependent on stylus length and if stylus is straight or cranked. Please see charts on page 3
Stylus overtravel in probe X and Y axes	Please see charts on page 3
Stylus trigger force	0.60 to 1.60 N 60 to 160 gf (2.11 to 5.64 ozf) depending on sense direction
Temperature limits	
Operating	5° to 60° C (41° to 140° F)
Storage	–13° to 60° C (9° to 140° F)

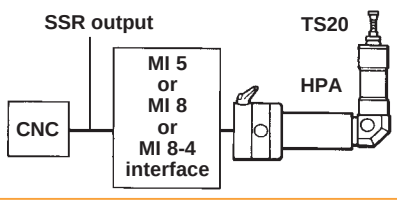
TS20 + HPA + signal conditioning module (SCM)
The SCM provides an OCT output.



TS20 + HPA + signal conditioning module (SCM) + SSR convertor
The SSR Convertor converts the OCT output to voltage free SSR output.



TS20 + HPA + MI 5 or MI 8 or MI 8-4 (no SCM).
The interface provides a voltage free SSR output (normally open or normally closed). An inhibit input enables a toolsetting probe and inspection probe to be used on the same machine input.



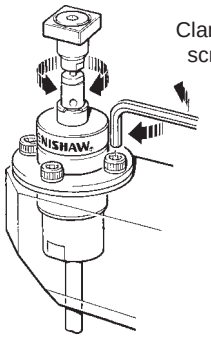
Installation

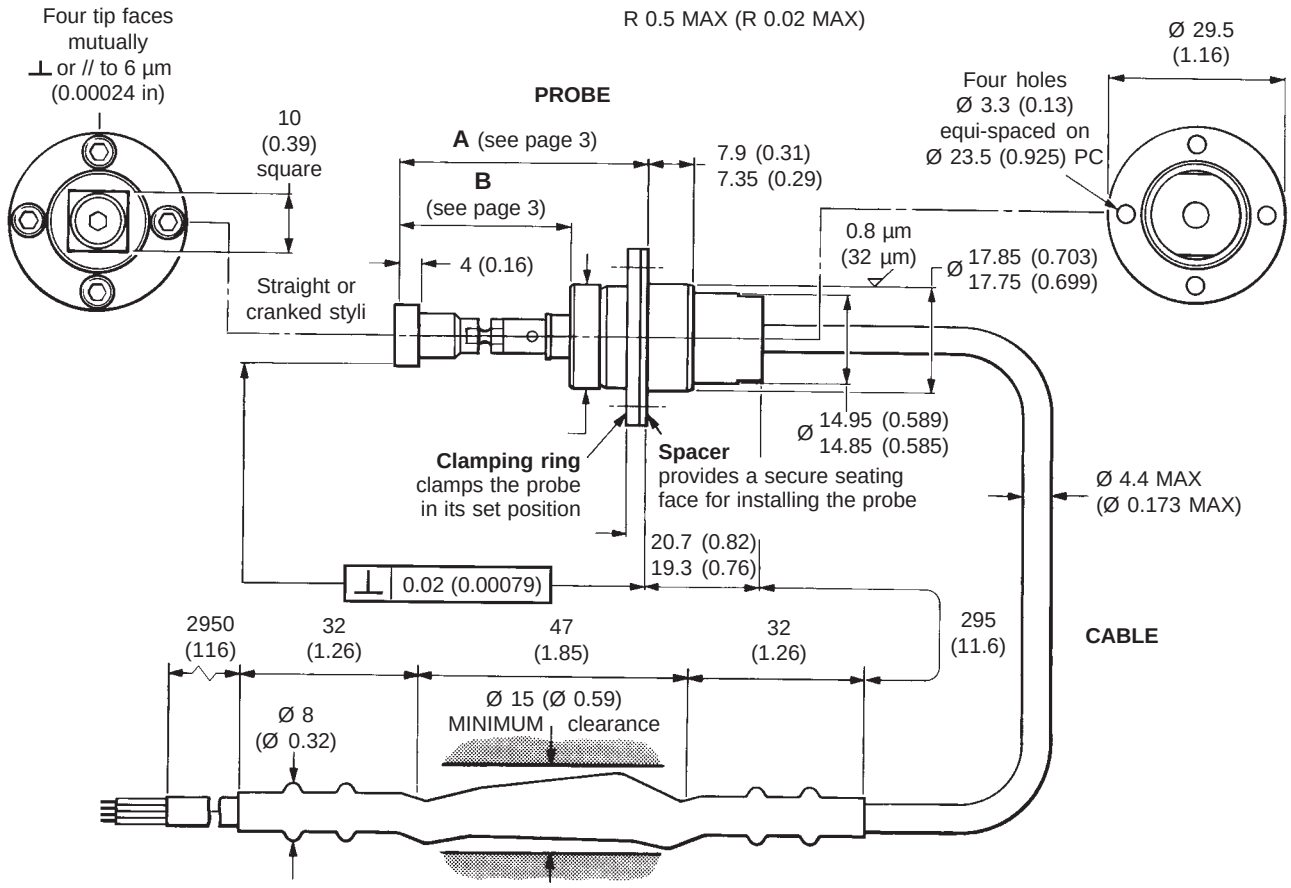
dimensions mm (in)

TS20 probe with signal conditioning module (SCM)

Stylus alignment in X and Z axes

Alignment of the stylus with the machine X and Z axes is obtained by slackening the four M3 x 8 mm clamping screws and rotating the probe body.
When alignment is achieved, tighten the clamping screws.



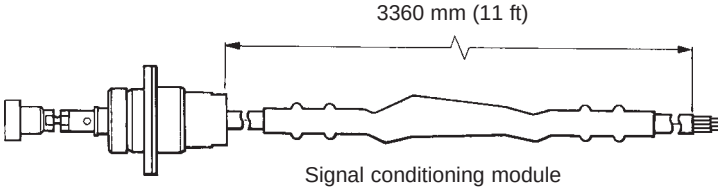


SIGNAL CONDITIONING MODULE

TS20 probe with straight stylus and signal conditioning module (SCM)

- ❑ Ø 15 mm (0.59 in) minimum clearance hole is required for the signal conditioning module.
- ❑ The TS20-SCM should be installed on machines which have a stable power supply i.e. interference free.

Tooling size	Part no.	
	TS20 probe with SCM	TS20 probe with SCM and SSR convertor
25 mm (0.98 in)	A-2008-0002	A-2008-0269
32 mm (1.26 in)	A-2008-0183	A-2008-0273
40 mm (1.57 in)	A-2008-0285	A-2008-0276

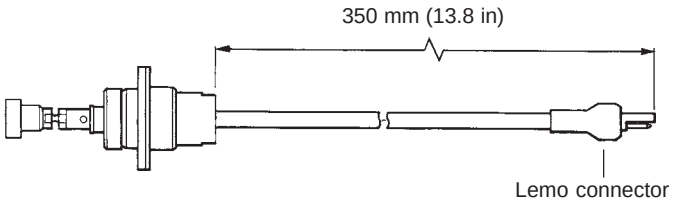


Signal conditioning module

TS20 probe with straight stylus and Lemo connector for installations with the high precision arm.

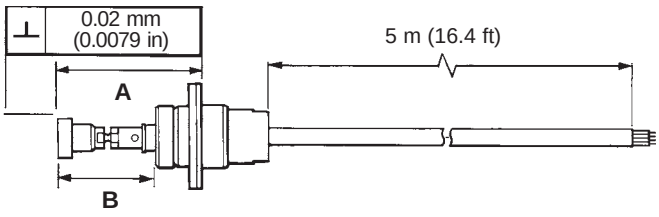
- ❑ Ø 15 mm (0.59 in) minimum clearance hole is required for the signal conditioning module.
- ❑ The TS20-SCM should be installed on machines which have a stable power supply i.e. interference free.

Tooling size	Part no.	
	TS20 probe with Lemo connector	TS20 probe with Lemo connector and MI 8 interface
25 mm (0.98 in)	A-2048-0500	A-2008-0272
32 mm (1.26 in)	A-2008-0110	A-2008-0275
40 mm (1.57 in)	A-2008-0121	A-2008-0279



TS20 probe with straight stylus and 5 m (16.4 ft) cable.

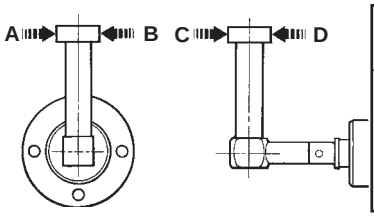
- ❑ Cables are 4 core, screened *(only red and blue cores are used).*
- ❑ Ensure the probe cables are routed away from other cables carrying high currents.
- ❑ Replacement styli can be fitted but the stylus squareness specification cannot be guaranteed, once the original stylus has been removed.



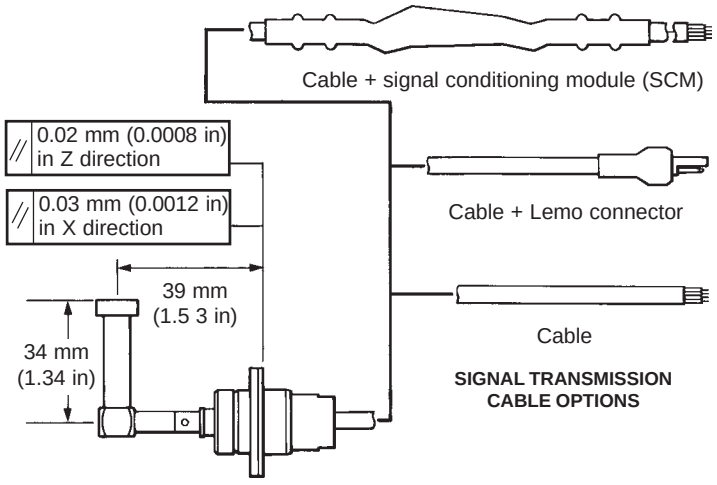
Tooling size	A (see page 2)	B (see page 2)	Stylus overtravel	Part no.		Uni-directional repeatability 2σ at a probing speed of 480 mm/min (1.57 ft/min)	Trigger force (dependant on probing direction)
				TS20 probe & cable	TS20 probe & cable + MI 8 interface		
25 mm (0.98 in)	41 mm (1.61 in)	28.25 mm (1.11 in)	±6 mm (±0.24 in)	A-2008-0151	A-2008-0270	2.0 µm (0.00008 in)	0.60 - 1.60 N 60 - 160 gf (2.12 - 5.64 ozf)
32 mm (1.26 in)	50 mm (1.96 in)	37.25 mm (1.46 in)	±7.5 mm (±0.30 in)	A-2008-0123	A-2008-0274	2.5 µm (0.0001 in)	0.47 - 1.26 N 47 - 126 gf (1.66 - 4.44 ozf)
40 mm (1.57 in)	58 mm (2.28 in)	45.25 mm (1.78 in)	±9 mm (±0.35 in)	A-2008-0277	A-2008-0278	3.0 µm (0.00012 in)	0.39 - 1.06 N 39 - 106 gf (1.38 - 3.74 ozf)

TS20 probe with cranked stylus for applications where straight stylus is not suitable

- ❑ Replacement styli can be fitted but the stylus parallelism specification cannot be guaranteed, once the original stylus has been removed.
- ❑ The tip specification of the cranked stylus, is the same as the straight stylus.
- ❑ Do not exceed the quoted overtravel distance for each direction, otherwise the tool tip may slip off the stylus edge, and could cause damage to the probe.



Direction	Overtravel mm (in)
A	3.0 (0.12)
B	3.0 (0.12)
C	1.2 (0.05)
D	2.3 (0.09)



Part no.		Uni-directional repeatability 2σ at a probing speed of 480 mm/min (1.57 ft/min) Note : The characteristics of cranked styli do not allow them to have as good a repeatability performance as straight styli.	Trigger force (dependant on probing direction)
TS20 probe with cranked stylus	Signal transmission cable options		
A-2008-0281	Cable only	2 µm (0.00008 in)	0.60 - 1.6 N 60 - 160 gf (2.12 - 5.64 ozf)
A-2048-0262	Cable + Lemo connector		

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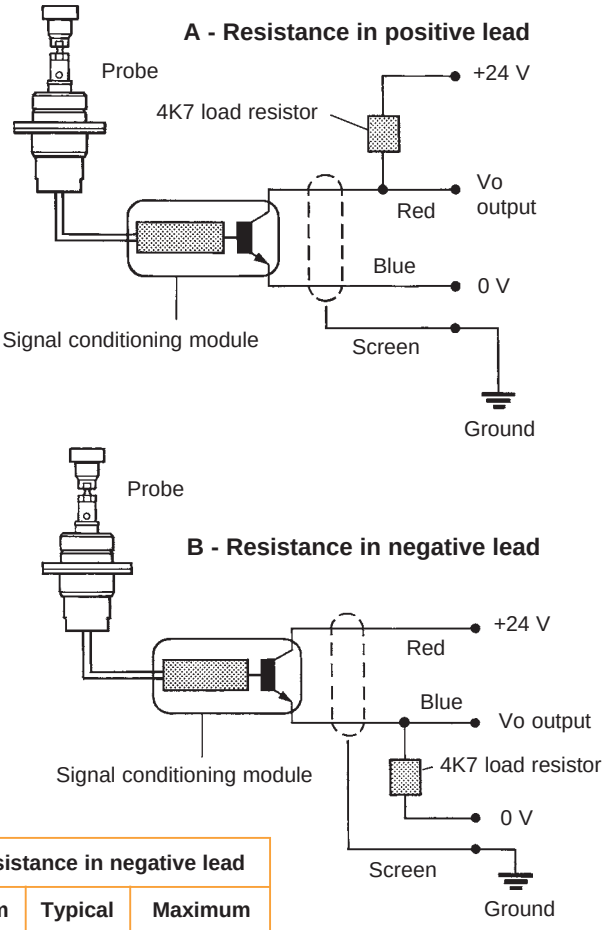
Electrical specification TS20 with signal conditioning module

The TS20 probe has been designed to be used wIth a load resistor

Minimum load resistor at 30 V	1K2 Ohms
Maximum supply voltage 30 V	Maximum current 25 mA - probe seated
Minimum supply voltage 9 V	Minimum current 2 mA - probe seated

Cable - Four core 7/0,2 mm insulated and screened cable.
The blue core is the negative lead.
The red core is the positive lead.
(yellow and green cores are not used).
The load resistor is connected in either positive or negative lead. It can be any value that does not cause the circuit to exceed the max/min current ratings. The probe is protected against reverse voltage within the specified ratings.

Typical performance with 4K7 load resistor and 24 V supply



Electrical characteristics at 20° C (68° F)

	Minimum	Typical	Maximum
Stand-by current (Probe deflected)		320 µA	500 µA
Voltage drop across output leads (Probe seated) Load current 25 mA 5 mA 2 mA		 4.5 V 3.5 V 2.8 V	 5.2 V 3.9 V 3.1 V
Output pulse length when probe deflects (trigger)	20.0 mS		

PROBE	A - Resistance in positive lead			B - Resistance in negative lead		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
Output voltage (Vo) (probe seated)			3.9 V	20.1 V	20.5 V	
Output voltage (Vo) (probe deflected)	21.7 V	22.5 V			1.5 V	2.3 V

Parts list - Please quote the Part no. when ordering equipment

Part no's and descriptions of TS20 probe systems are shown on previous pages.

Type	Part no.	Description
Straight stylus	A-2008-0601	Square tip stylus 10 x 10 mm (0.39 x 0.39 in) for 25 mm tooling.
Straight stylus	A-2008-0602	Square tip stylus 10 x 10 mm (0.39 x 0.39 in) for 32 mm tooling.
Straight stylus	A-2008-0603	Square tip stylus 10 x 10 mm (0.39 x 0.39 in) for 40 mm tooling.
Cranked stylus	A-2008-0249	Square tip stylus 10 x 10 mm (0.39 x 0.39 in).
Break stem	M-2008-0333	Break stem for stylus with straight stem and 25 mm tooling.
Break stem	M-2008-0604	Break stem for stylus with straight stem and 32 mm tooling.
Break stem	M-2008-0605	Break stem for stylus with straight stem and 40 mm tooling.
SSR convertor	—	See Data sheet H-2000-2117 SSR convertor.
MI 5 interface	—	See Data sheet H-2000-2180 MI 5 interface.
MI 8 interface	—	See Data sheet H-2000-2191 MI 8 interface.
MI 8-4 interface	—	See Data sheet H-2000-2185 MI 8-4 interface.
HPA	—	See Data sheet H-2000-2115 High precision arm (HPA).

When styli are ordered separately, Renishaw cannot guarantee the overall squareness and parallelism, will be to the same specification as the original stylus supplied with the probe.

For worldwide contact details, please visit our main website at www.renishaw.com/contact

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