RENISHAW
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FS sockets and extension bars

Compliance information for this product is available by scanning the QR code or visiting **www.renishaw.com/mtpdoc**

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Contents

Before you begin

Warranty

Unless you and Renishaw have agreed and signed a separate written agreement, the equipment and/or software are sold subject to the Renishaw Standard Terms and Conditions supplied with such equipment and/or software, or available on request from your local Renishaw office.

Renishaw warrants its equipment and software for a limited period (as set out in the Standard Terms and Conditions), provided that they are installed and used exactly as defined in associated Renishaw documentation. You should consult these Standard Terms and Conditions to find out the full details of your warranty.

Equipment and/or software purchased by you from a third-party supplier is subject to separate terms and conditions supplied with such equipment and/or software. You should contact your third-party supplier for details.

CNC machines

CNC machine tools must always be operated by fully-trained personnel in accordance with the manufacturer's instructions.

Care of the equipment

FS sockets are precision devices and must therefore be treated with care.

Always ensure the probe holder is clean and dry before inserting the probe.

Patents

Features of the FS sockets and features of similar Renishaw products, are the subject of one or more of the following patents and/or patent applications:

None applicable

Intended use

FS1, FS2, and FS3 are probe sockets that are compatible with LP2 3D kinematic probe. They transmit the signal from the probe to the interface (for example MI 8-4).

FS1i and FS2i are probe sockets that are compatible with LP2 3D kinematic probe. They provide a built-in simple machine interface which allows for direct connection to the CNC controller.

FS10 and FS20 are probe sockets that are compatible with MP250 3D RENGAGE™ technology probe. They transmit the signal from the probe to the interface (HSI-C).

Extension bars are used to extend the distance between the probe and the socket. They can be used with both LP2 and MP250.

Safety

Information to the user

In all applications involving the use of machine tools, eye protection is recommended.

FS sockets and extension bars must be installed by a competent person, observing relevant safety precautions. Before starting work, ensure that the machine tool is in a safe condition with the power switched OFF.

Refer to the machine supplier's operating instructions.

Information to the machine supplier / installer

It is the machine supplier's responsibility to ensure that the user is made aware of any hazards involved in operation, including those mentioned in Renishaw product literature, and to ensure that adequate guards and safety interlocks are provided.

If the probe system fails, the output signal may falsely indicate a probe seated condition. Do not rely on probe signals to halt the movement of the machine.

Information to the equipment installer

All Renishaw equipment is designed to comply with the relevant UK, EU and FCC regulatory requirements. 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.

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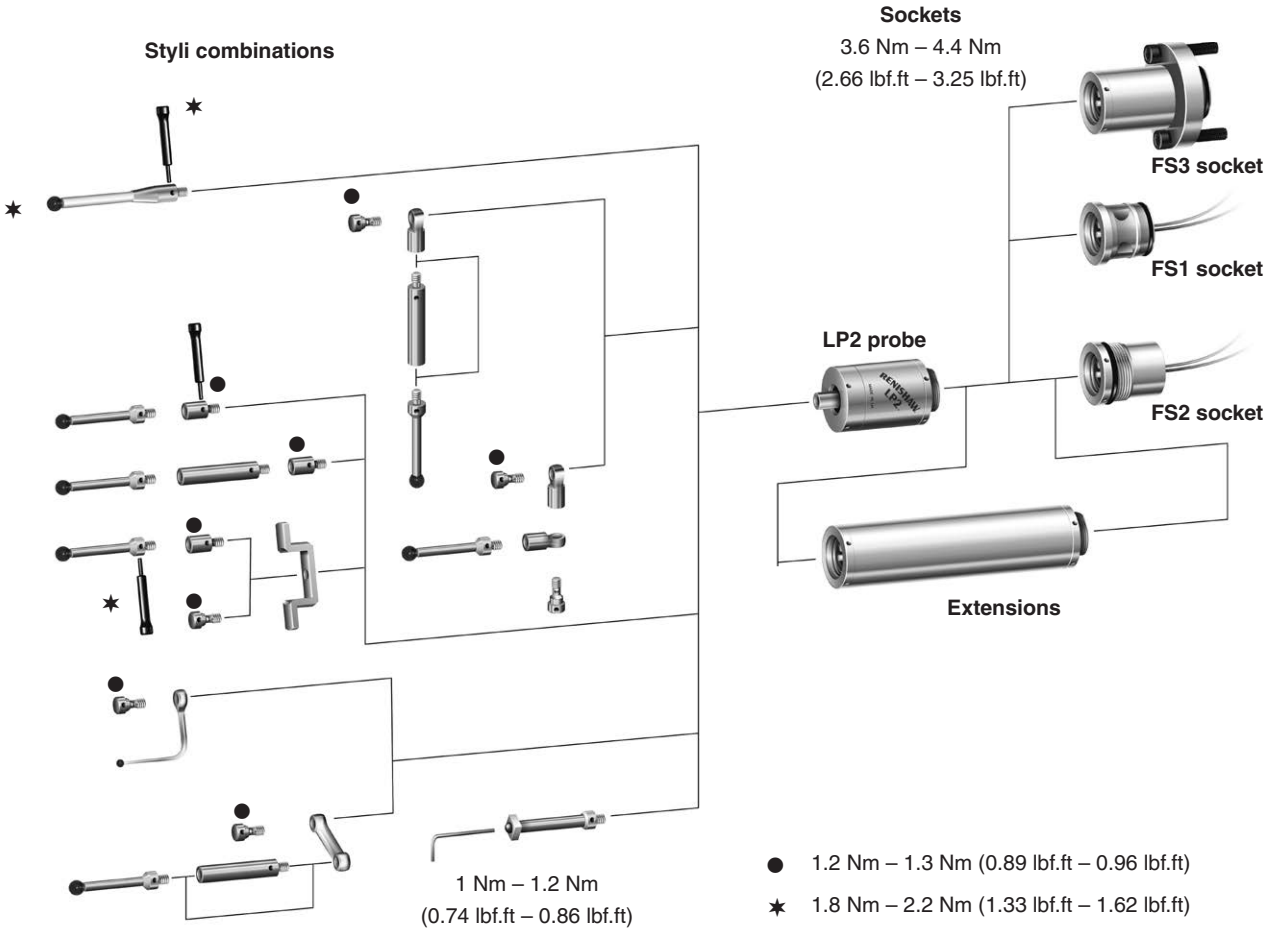
FS1, FS2 and FS3 sockets basics

Socket and stylus configuration when using LP2 or LP2H



Introduction

The FS1, FS2 and FS3 sockets are used for holding the LP2 and LP2H.

Specific versions can be customised to meet with your individual requirements.

Extension bars

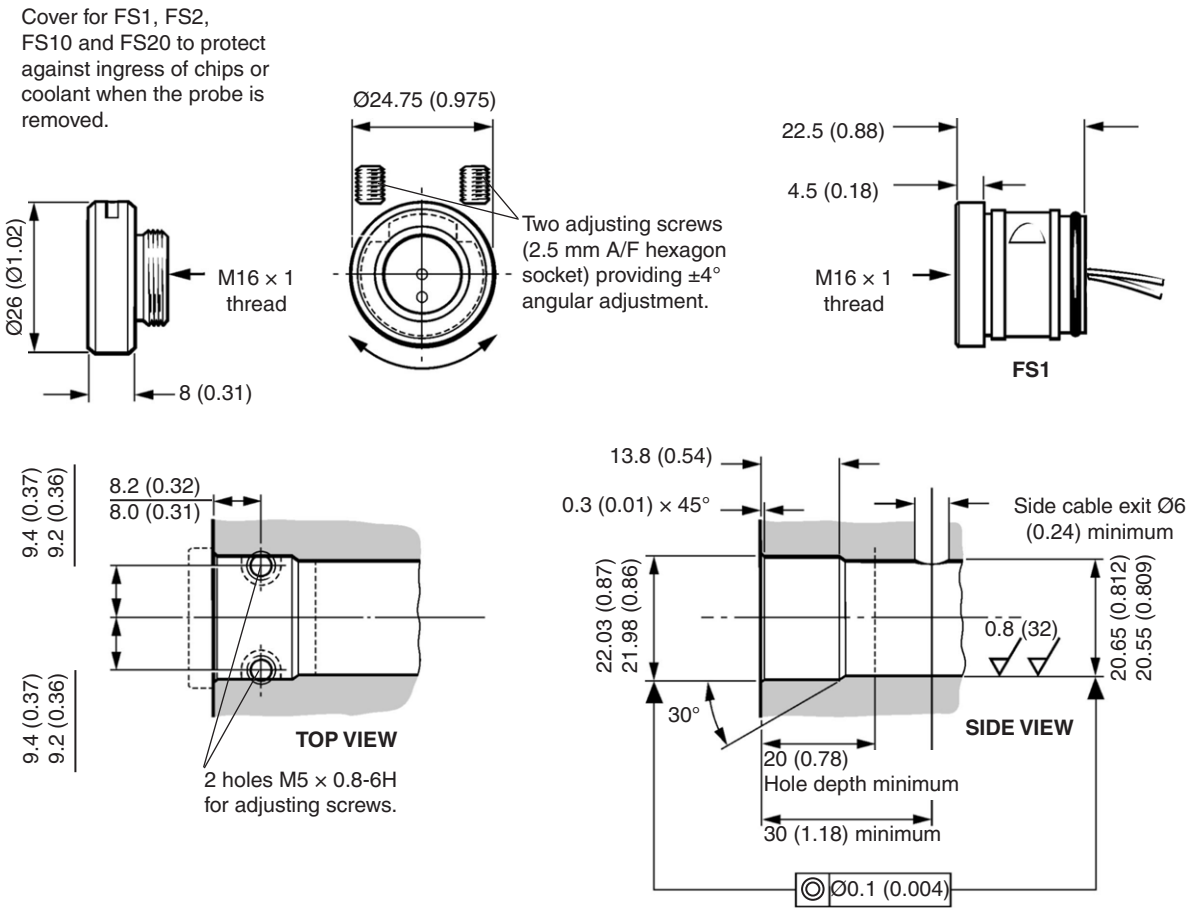
Features with restricted access can be reached by adding an LPE extension bar between the probe and FS socket.

LPE extension bars are available in three different lengths.

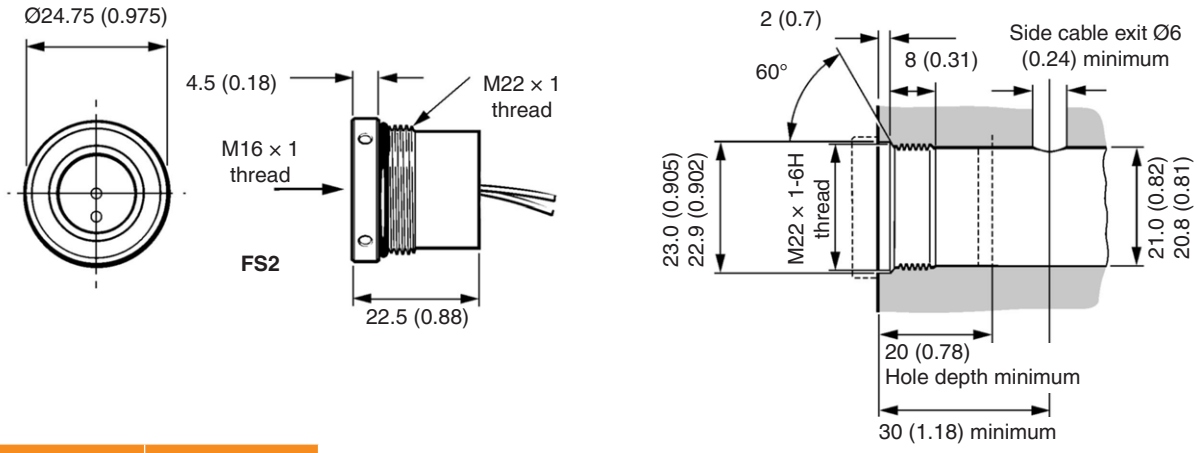
- LPE1 (50 mm long)
- LPE2 (100 mm long)
- LPE3 (150 mm long).

FS1 and FS2 dimensions

Machining details for mounting hole (FS1)



Machining details for mounting hole (FS2)

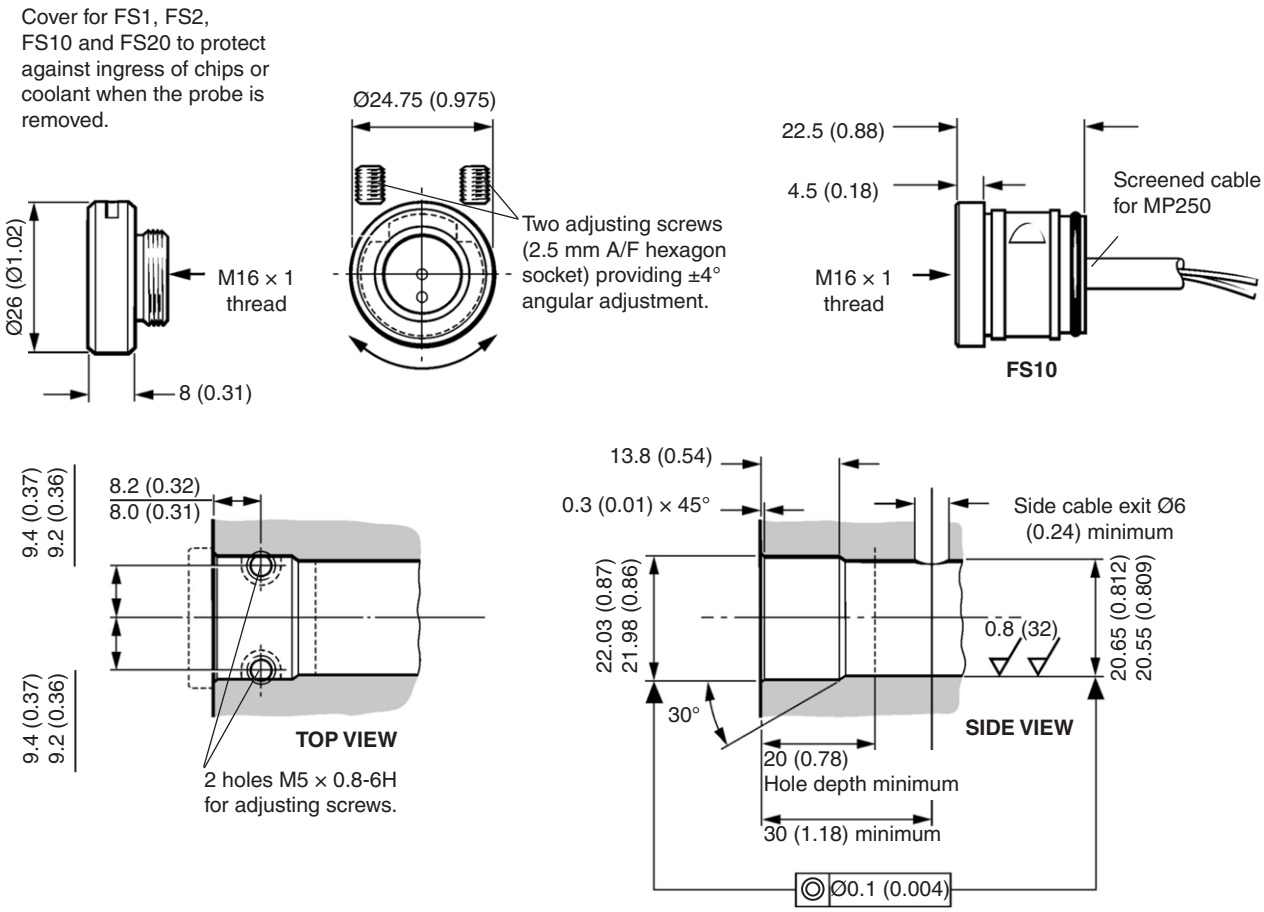


Wire colour	Pin connection
Blue	Inner spring pin
Green	Outer spring pin

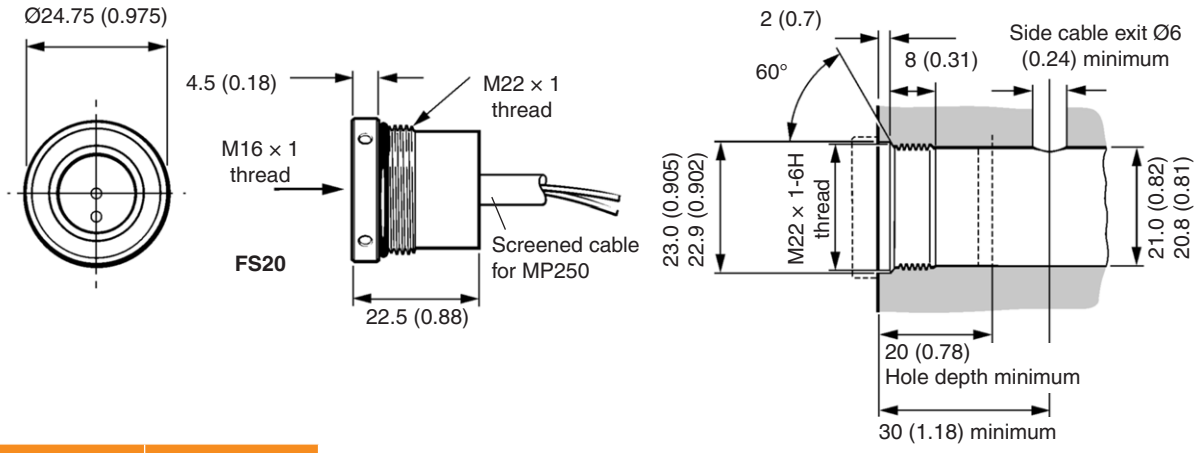
Dimensions in mm (in)

FS10 and FS20 dimensions

Machining details for mounting hole (FS10)



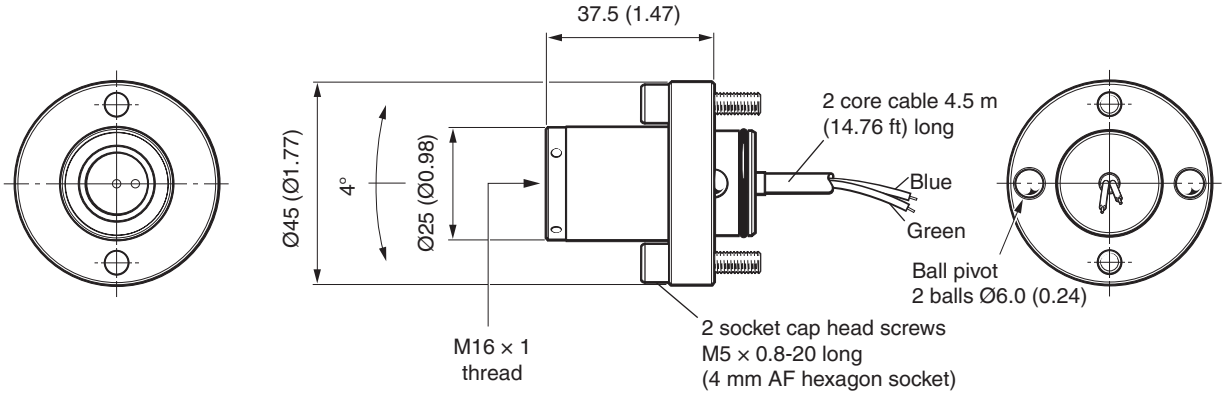
Machining details for mounting hole (FS20)

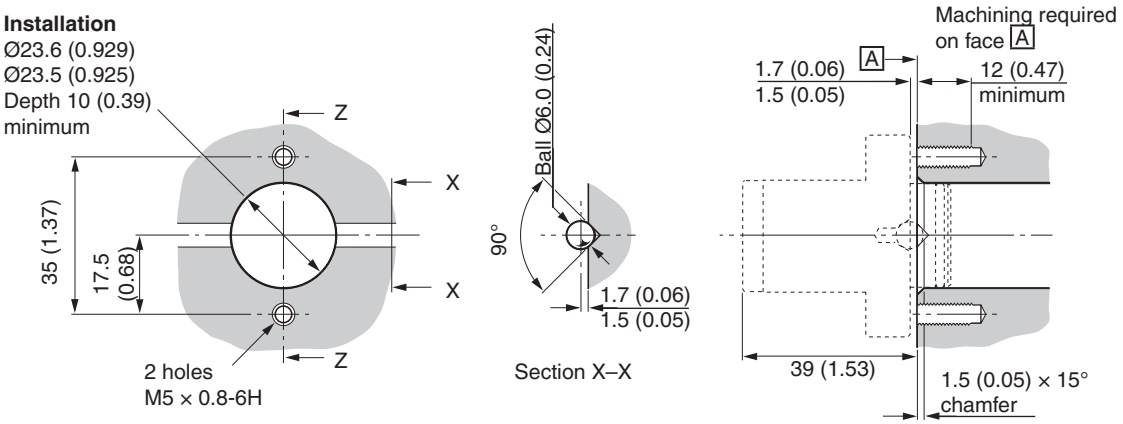


Wire colour	Pin connection
Blue	Inner spring pin
Green	Outer spring pin

Dimensions in mm (in)

FS3 dimensions





Dimensions in mm (in)

FS1, FS2, FS10, FS20 and FS3 sockets specification

Variants		FS1 / FS2	FS10 / FS20	FS3
Weight		44 g (1.55 oz)		441 g (15.56 oz) with 5 m cable
Cable		**FS1 / FS2 cable** = (2x) Single core equipment wire with PTFE sheath. 1/0.4mm insulated. Ø = 0.9 mm	**FS10 / FS20 cable** = 2 core screen cable with Polyurethane sheath. Each core 2/0.08 mm insulated. Ø = 5.2 mm	4 core screen cable with Polyurethane sheath. Each core 7/0.1 mm insulated. Ø = 3.4 mm
Environment	IP rating	IPX8, BS EN 60529:1992+A2:2013		
	Storage temperature	–10 °C to +70 °C (14 °F to +158 °F)		
	Operating temperature	+10 °C to +40 °C (+50 °F to +104 °F)		

FS1i and FS2i sockets basics

Introduction

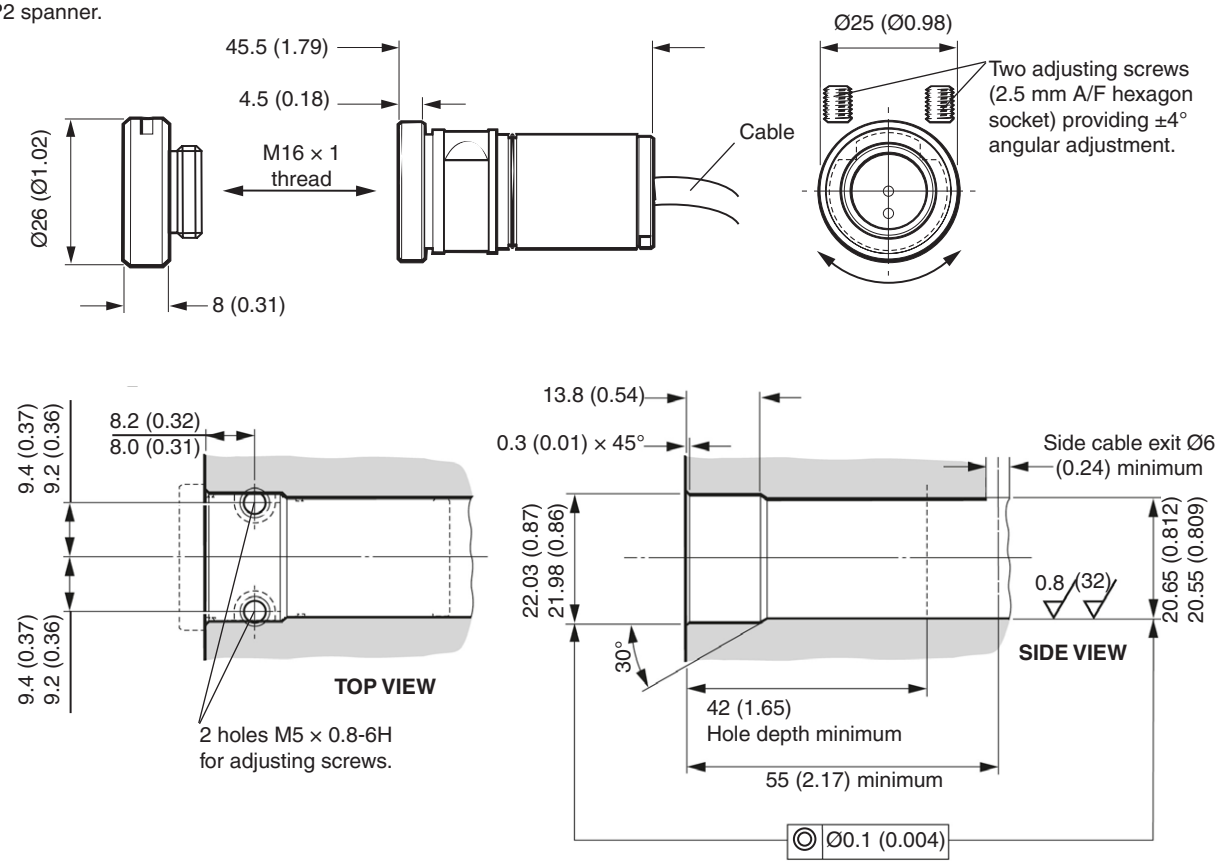
The FS1i and FS2i sockets are used for holding the LP2 or LP2H probe. Each contains an integral interface, which converts the probe signal into a voltage-free solid state relay (SSR) output, for connection to the CNC machine's controller.

CAUTION: SSRs are susceptible to electromagnetic interference, so the cable must be routed so as to avoid power cables or other sources of high frequency electromagnetic interference.

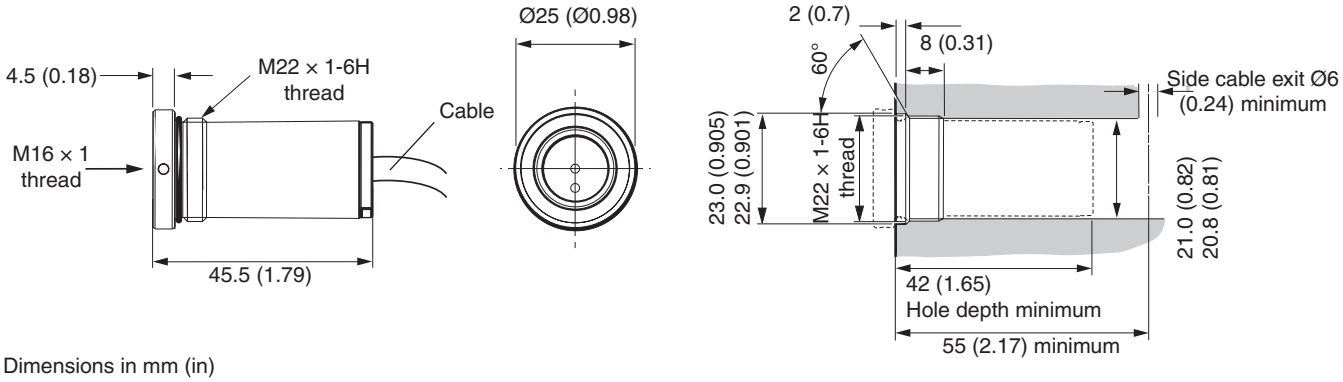
FS1i and FS2i dimensions

FS1i - adjustable female socket

Protective cover for FS1i and FS2i. Protects against chips and coolant when probe is removed. Hand fitted, may be removed with LP2 spanner.



FS2i - adjustable female socket



Dimensions in mm (in)

FS1i and FS2i sockets specification

Variants		FS1i / FS2i
Weight		70 g (2.47 oz)
Cable		4 core screen cable with polyurethane sheath. Each core 7/0.2 insulated. Ø4.35 mm × 1.0 m (3 ft 3 in)
Environment	IP rating	IPX8, BS EN 60529:1992+A2:2013
	Storage temperature	–10 °C to +70 °C (14 °F to +158 °F)
	Operating temperature	+10 °C to +40 °C (+50 °F to +104 °F)

System installation

Connection

Colour	Normally closed*	Normally open*
Red	12 Vdc to 30 Vdc	0 Vdc
Blue	0 Vdc	12 Vdc to 30 Vdc
Yellow	Probe status, voltage free SSR	
Green	Probe status, voltage free SSR	
Grey/Black	Cable screen, machine GND	

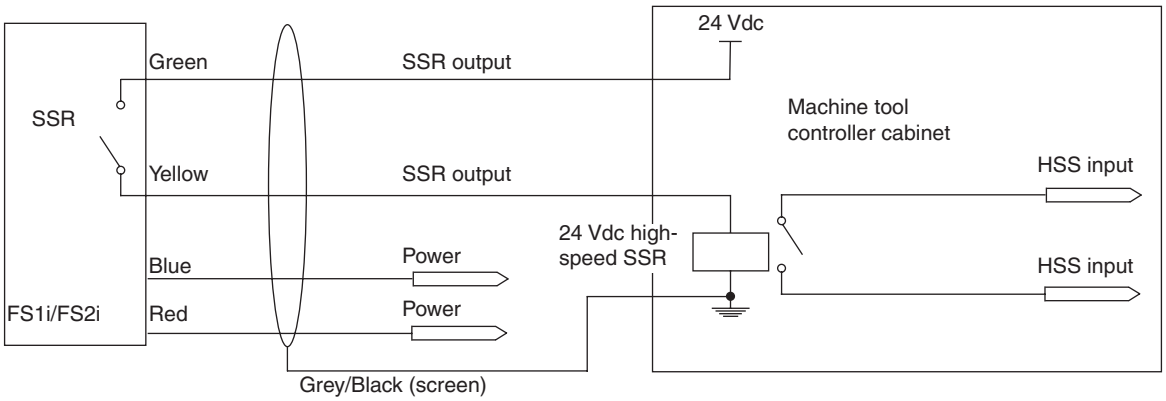
* Refers to the SSR contacts when the probe is in seated state.

Electrical

Supply voltage	12 Vdc to 30 Vdc
Supply current	18 mA nominal, 25 mA maximum
Output current maximum	50 mA
Output type	Voltage free SSR
Protection	Short circuit protected output. **CAUTION:** The interface must be powered from a suitably fused supply.

High-speed skip installation

5 V high-speed skip (HSS) inputs may be susceptible to electromagnetic interference, hence the cable should be run in ducting used for signal cables. Where this is not possible, a 24 V high-speed SSR can be used to switch the 5 V to the HSS input inside the controller cabinet, as shown in the diagram below. This will provide greater isolation and noise immunity.



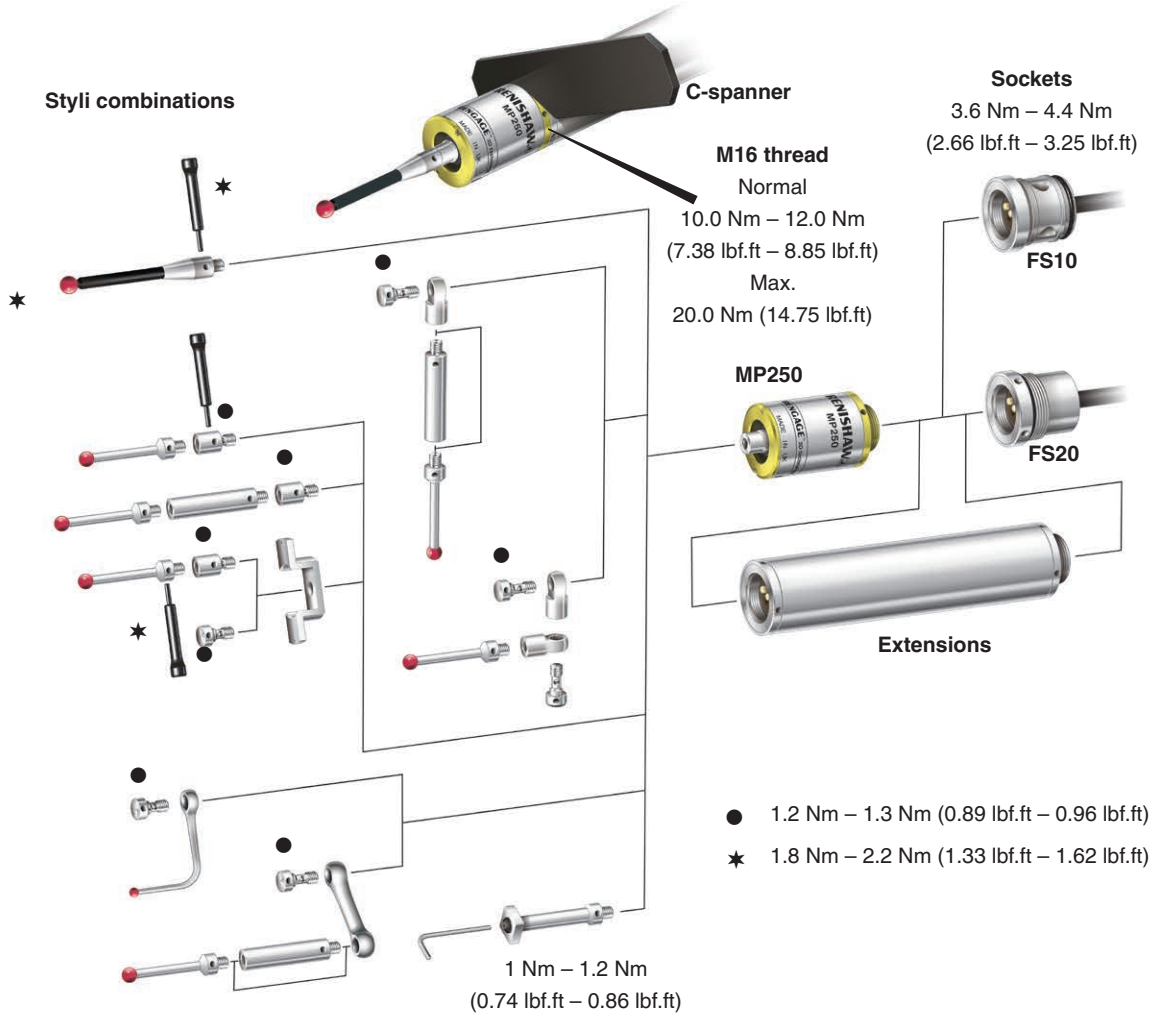
Socket and stylus configurations when using an MP250 probe

The modular stylus range can be configured to suit the application requirements. Fit a weak link to protect the probe from damage in the event of excessive overtravel.

Styli are fully described in the *Styli and accessories* technical specification (Renishaw part no. H-1000-3200).

Screw torque values

CAUTION: To prevent damage occurring to the MP250 probe and associated components, the screw torque values given below must be used when assembling component parts together.



Fitting the MP250 into a probe socket

Mounting the probe socket to your machine

NOTES:

The MP250 probe is not electrically compatible with the FS1i or FS2i probe sockets with integral interface.

The MP250 probe must not be connected to the cable previously installed for LP2 application. The MP250 must be used with either a FS10 or FS20 probe sockets which have screened cables.

FS10 and FS20 probe sockets are compatible with LP2 and LP2H as well.

For more information on installing the FS10 and FS20 probe sockets and for machining details, see **page 2-3**, “FS10 and FS20 dimensions”.

Extension bars for LP2, LP2H and MP250 probes

Dimensions in mm (in)

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Parts list

Item	Part number	Description
FS1 socket for LP2 or LP2H probes	A-2063-6697	FS1 adjustable female socket (angular rotation) with 2 wires 0.5 m long.
FS2 socket for LP2 or LP2H probes	A-2063-5431	FS2 fixed female socket (rigid mounting) with 2 wires 0.5 m long.
FS3 socket for LP2 or LP2H probes	A-2063-5308	FS3 single axis adjustable holder (pivots)
FS1i socket for LP2 or LP2H probes	A-4163-1000	FS1i adjustable socket assembly, two adjusting screws, protective cover.
FS2i socket for LP2 or LP2H probes	A-4163-2000	FS2i fixed socket assembly, protective cover.
FS10 socket for MP250 probes	A-5500-1710	FS10 adjustable probe socket with 10.0 m (32.81 ft) of screened cable.
FS20 socket for MP250 probes	A-5500-1810	FS20 fixed probe socket with 10.0 m (32.81 ft) of screened cable.
LPE1	A-2063-7001	LPE1 extension bar - 50 mm long.
LPE2	A-2063-7002	LPE2 extension bar - 100 mm long.
LPE3	A-2063-7003	LPE3 extension bar - 150 mm long.
C spanner	A-2063-7587	C spanner.
Protective cover	M-2063-7628	Cover protects against chips and coolant when probe is removed.
Adjusting screw	P-SC11-0508	Grubscrew M5 × 0.8 - 8 mm long.
Publications. These can be downloaded from our website at **www.renishaw.com**.		
Styli	H-1000-3200	Technical specifications: Styli and accessories – or visit our Online store at **www.renishaw.com/shop**.
Adaptors, extensions and holders	H-2000-2120	Data sheet: Adaptors, extensions and holders.

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Part no.: H-2000-2073-02-A
Issued: 03.2023