Installation guide

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RCS TS1 robot tool setter

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Contents

Legal information

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. If you purchased the equipment from any other supplier, you should contact them to find out what repairs are covered by their warranty.

Regulations and conformance

EU and UK

Declaration of conformity

Renishaw plc hereby declares that RCS T-series system complies with the essential requirements and other relevant provisions of:

- the applicable EU directives and regulations
- the relevant statutory instruments under UK law
- the full text of the declaration of conformity is available upon request

Safety

In compliance with BS EN 61010-1:2010 the product is safe to use in the following environmental conditions:

- Indoor use only
- Altitude up to 2,000 m
- Maximum relative humidity (non-condensing) of 80% for temperatures up to 31° C, decreasing linearly to 50% relative humidity at 40° C
- Pollution degree 2

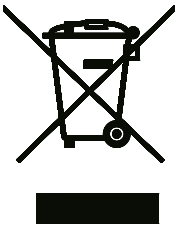
REACH regulation

Information required by Article 33(1) of Regulation (EC) No 1907/2006 (“REACH”) relating to products containing substances of very high concern (SVHCs) is available at: **www.renishaw.com/REACH**.

RoHS compliance

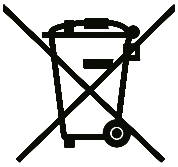
Compliant with EC directive 2011/65/EU (RoHS)

Disposal of waste electrical and electronic equipment



The use of this symbol on Renishaw products and/or accompanying documentation indicates that the product should not be mixed with general household waste upon disposal. It is the responsibility of the end user to dispose of this product at a designated collection point for waste electrical and electronic equipment (WEEE) to enable reuse or recycling. Correct disposal of this product will help to save valuable resources and prevent potential negative effects on the environment. For more information, contact your local waste disposal service or Renishaw distributor.

Disposal of batteries



The use of this symbol on the batteries, packaging or accompanying documents indicates that used batteries should not be mixed with general household waste. Dispose of the used batteries at a designated collection point. This will prevent potential negative effects on the environment and human health which could otherwise arise from inappropriate waste handling. Contact your local authority or waste disposal service concerning the separate collection and disposal of batteries. All lithium and rechargeable batteries must be fully discharged or protected from short circuiting prior to disposal.

USA

FCC Compliance Statement

Supplier's Declaration of Conformity
47 CFR section 2.1077 compliance information
Unique Identifier: RCS TS1 robot tool setter
Responsible Party – U.S. Contact Information

Renishaw Inc.
1001 Wesemann Drive
West Dundee
Illinois
IL 60118
United States
Telephone number: +1 847 286 9953
Email: **usa@renishaw.com**

47 CFR Section 15.19

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

47 CFR Section 15.21

The user is cautioned that any changes or modifications not expressly approved by Renishaw plc or authorised representative could void the user's authority to operate the equipment.

47 CFR Section 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Canada

ICES information to user (Canada only)

Class A Equipment Statement

This ISM device complies with Canadian ICES-001(A) / NMB-001(A).

Cet appareil ISM est conforme à la norme ICES-001(A) / NMB-001(A) du Canada.

China

China RoHS

For more information on China RoHS, visit:
www.renishaw.com.cn/zh/probes-china-rohs--45886

Australia

Australia regulatory compliance mark (RCM) scheme

The full text of the declaration of conformity is available upon request.

Safety

Information to the user

In all applications involving the use of industrial robots, appropriate PPE is recommended.

The RCS TS1 system must be installed by a competent person, observing safety precautions. Before starting work, ensure that the robot is in a safe condition with the power switched OFF. Refer to the robot controller user manual for operating instructions.

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:

- Any device 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 robot “star point” (the “star point” is a single point return for all equipment ground and screen cables). 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 RCS TS1 is a tool setter designed for use with industrial robots. It enables precise alignment of tool and part frames for robot set up and automated cell recovery.

Intended use

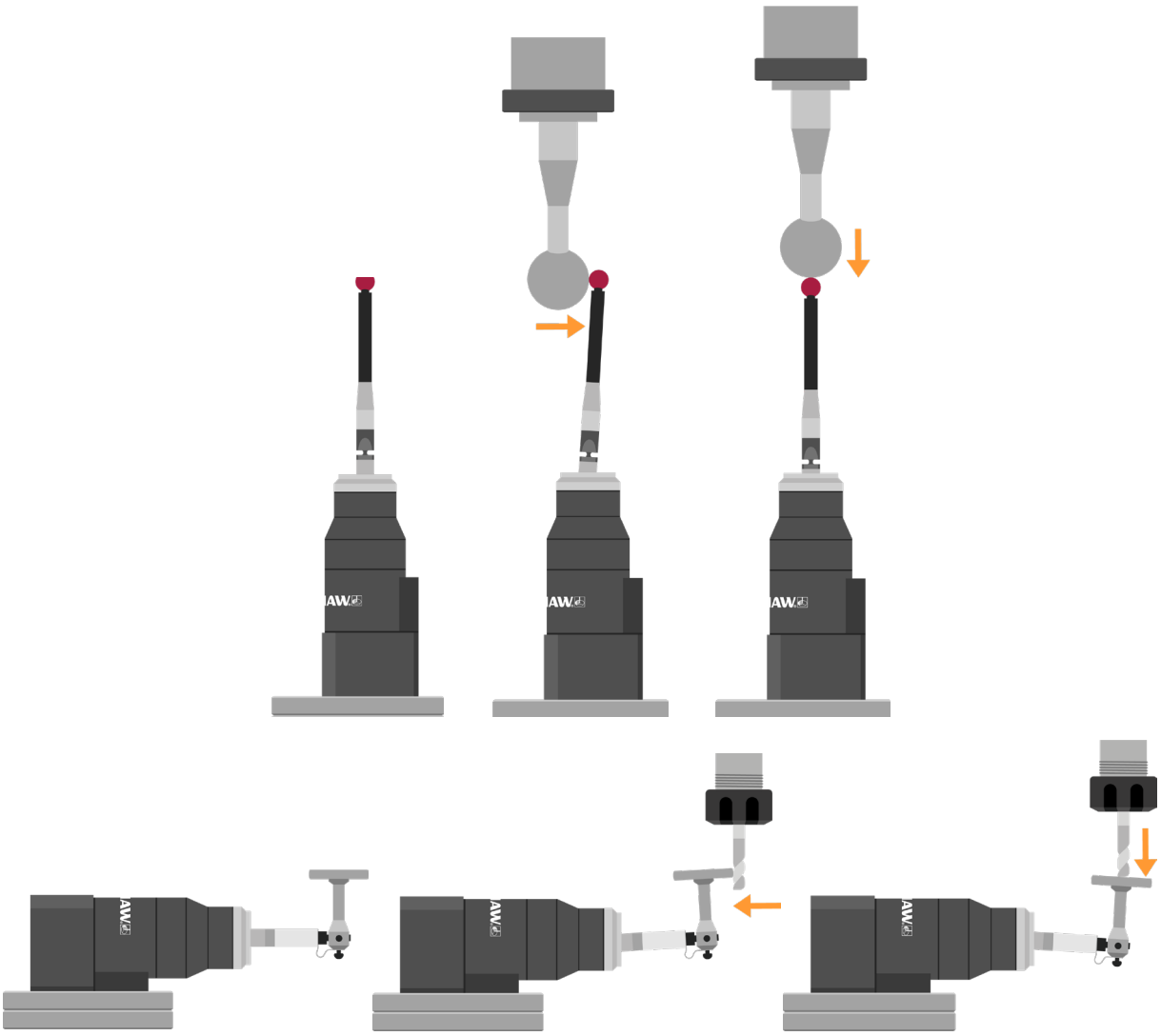
The RCS TS1 tool setter is designed to be mounted vertically or horizontally. The mounting orientation should be chosen based on the robots reach and position, providing access to the type of stylus installed. The tool setter can be used to calibrate any end-of-arm tooling, such as; spindles, grippers, welding torches, and spray guns.

Probe trigger

The RCS tool setter generates a trigger signal when the tip of the stylus touches a surface. The robot controller will listen for the signal and a trigger will be displayed in the I/O of the robot.

A probe trigger signal is generated when the tool setter stylus encounters a surface. The robot controller records the contact position, and this data can be used by the robot controller or RPU. When installing the RCS TS1 in an RCS P-series set-up, there are certain parameters that must be considered to operate the tool setter. The touch speed parameters will be set to a default value but may need to be adjusted to allow the robot to stop within the limits of the stylus overtravel and robot capability. If any adjustment is required contact your local Renishaw representative.

To ensure a trigger signal is being generated, manually deflect the stylus within the limits of the stylus overtravel. Observe the teach pendant to witness the I/O being triggered.



Specification

Recommended styli		M4 50 mm to a maximum of M4 100 mm stylus material depends on application. Use of an in-line break stem advised. Disc stylus is required for spindle calibration
Weight		480 g
Sense directions		Radial (XY) / Axial (Z)
Unidirectional reliability		1.00 µm (40 µin) 2s [1]
Stylus trigger force [2 3] **Radial low force** **Radial high force** **Axial direction**		 1.00 N, 102 gf (3.59 ozf) 1.85 N, 188 gf (6.65 ozf) 7.40 N, 754 gf (26.61 ozf)
Stylus overtravel limits radial plane		14.87 mm (0.55 in) ±12.5°
Stylus overtravel limits axial plane		6.5 mm (0.26 in)
Mounting		Mounting base plate. Single bolt (M10) or 3 x M4 (hole pitch as detailed below).
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 (+41 °F to +131 °F)
Cable		4 Core screen cable with polyurethane sheath. Each core 7/0.2 insulated. Ø4.35 mm x 1.0m (3 ft 3 in).
Contact type		Normally closed or normally open
Supply voltage		12 Vdc to 30 Vdc
Supply current		18 mA nominal, 25 mA max
Output current		50 mA max
Protection		Short circuit

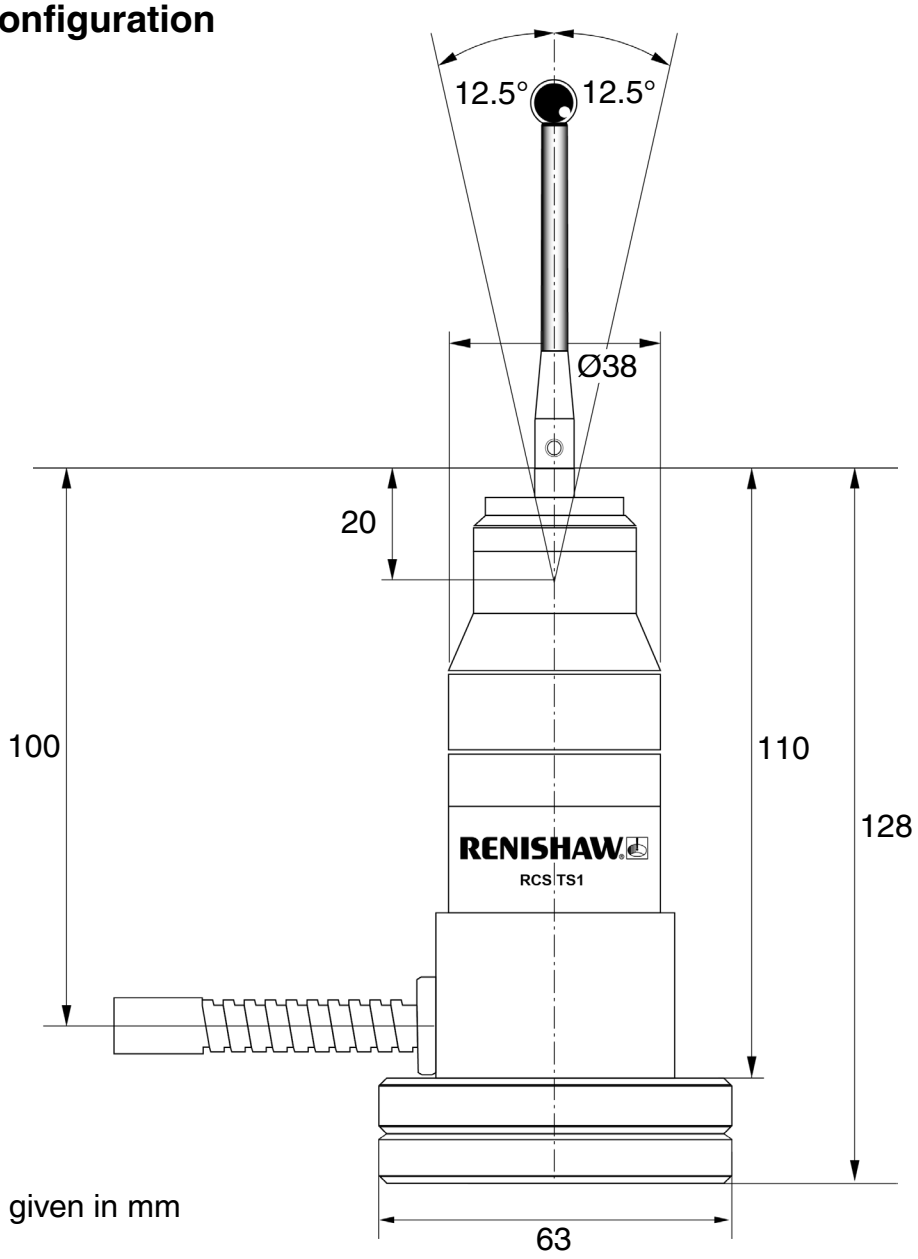
1 Performance specification is tested at a standard test velocity of 480 mm/min (18.9 in/min) with a 35 mm stylus. Significantly higher velocity is possible depending on application requirements.

2 Trigger force, which is critical in some applications, is the force exerted on the component by the stylus when the probe triggers. The maximum force applied will occur after the trigger point (overtravel). The force value depends on related variables including measuring speed, robot deceleration and latency.

3 These are the factory settings, manual adjustment is not possible.

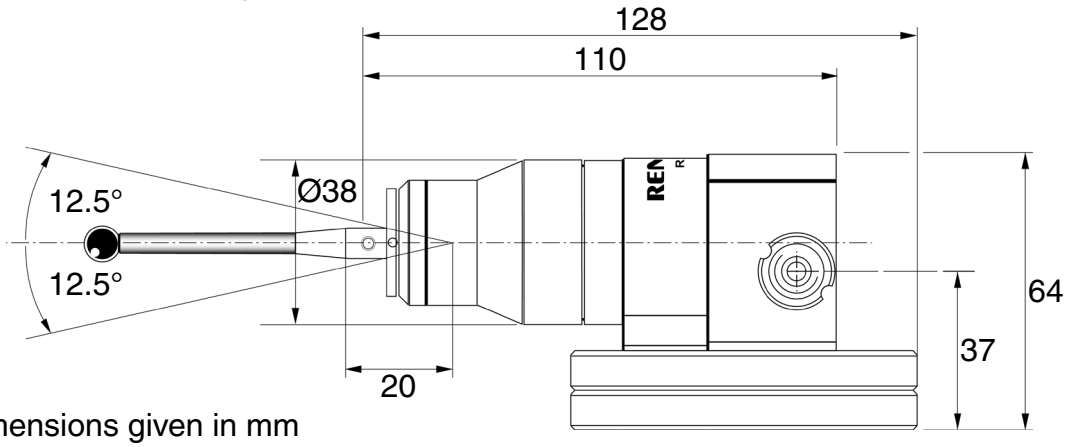
Dimensions

Vertical configuration



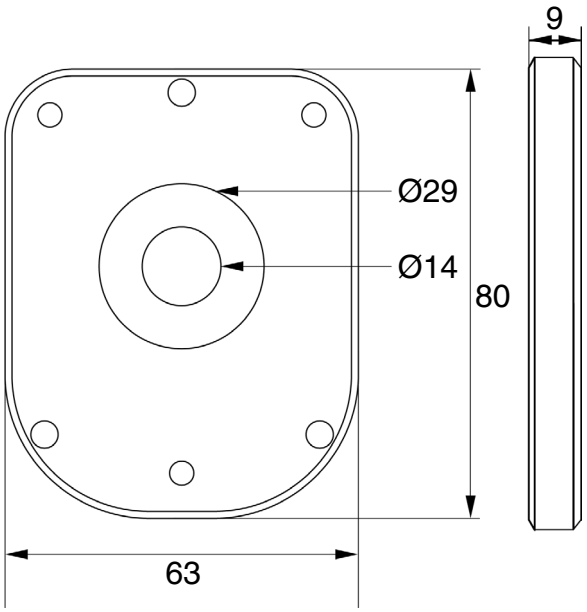
Dimensions given in mm

Horizontal configuration



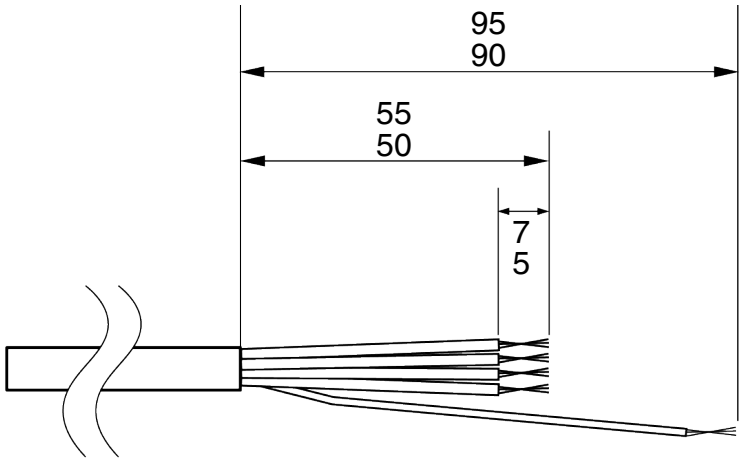
Dimensions given in mm

Base plate



Dimensions given in mm

Cable



Dimensions given in mm

NOTES: Mounting hole suitable for bolt installation, maximum M12 with washer (not supplied).

System installation

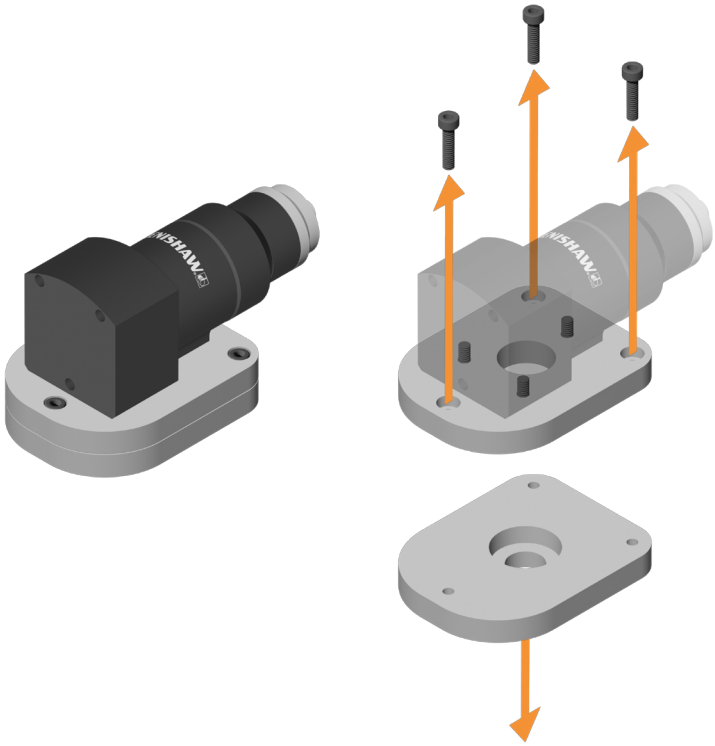
Positioning

When installing the RCS TS1, consider appropriate placement and orientation for the device.

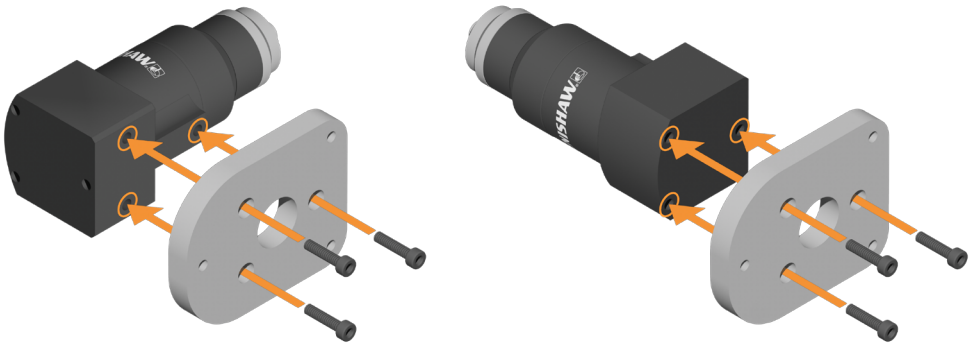
- The device is best positioned within the robots reach.
- Ensure there is adequate clearance for movement and that the tool setter doesn’t interfere with other components of the robot cell.
- Select a sturdy and secure surface/fixture to securely attach the tool setter.
- The mounting position should be subject to minimal vibration and shock to prevent false triggers.
- For good practice, the tool setter position should allow access for maintenance and calibration.
- The probe should be mounted in a position to minimise contamination.

Mounting the RCS TS1

1. Separate the bottom plate from the tool setter by unfastening the three M4 screws.

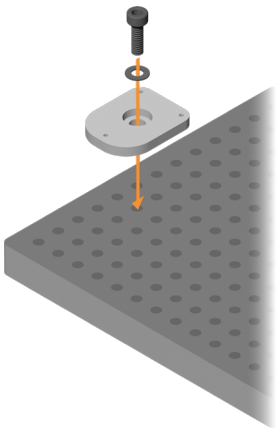


2. The RCS TS1 can then be separated from the attached plate and positioned for horizontal or vertical mounting.

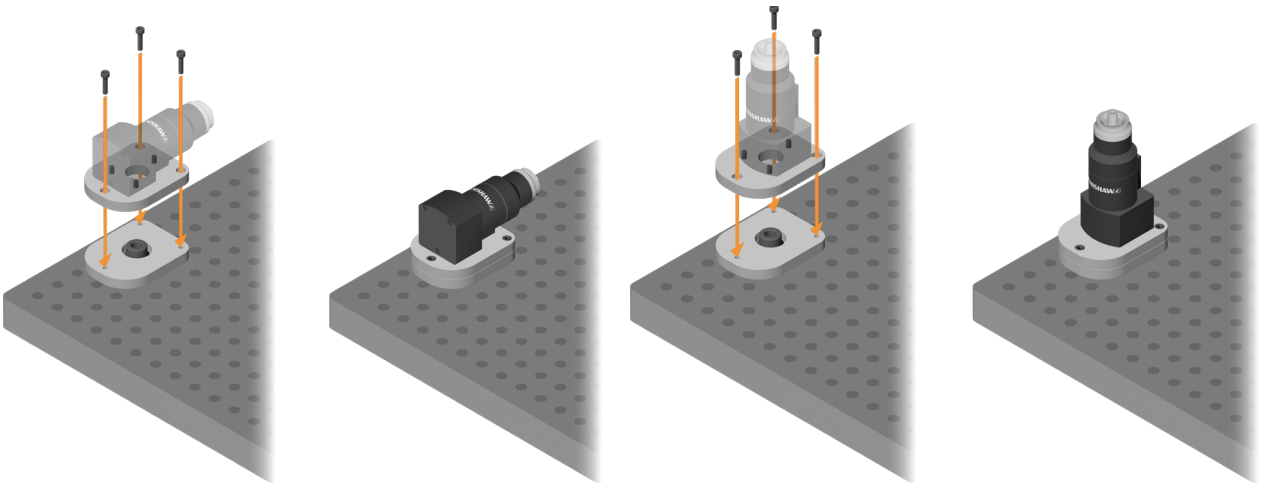


3. Fasten the bottom plate to a stable surface within the working area of the robot.

NOTE: Fastener to be supplied by user, bolt diameter M12 maximum.



4. Affix the remaining parts of the tool setter to the base plate.



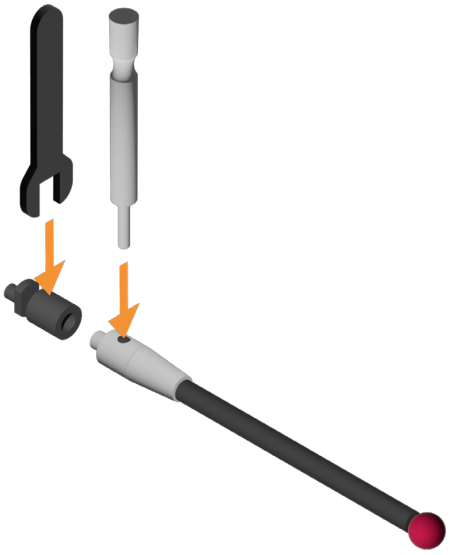
Connecting the cable

The RCS TS1 has a permanently fixed cable that is protected by a detachable conduit.

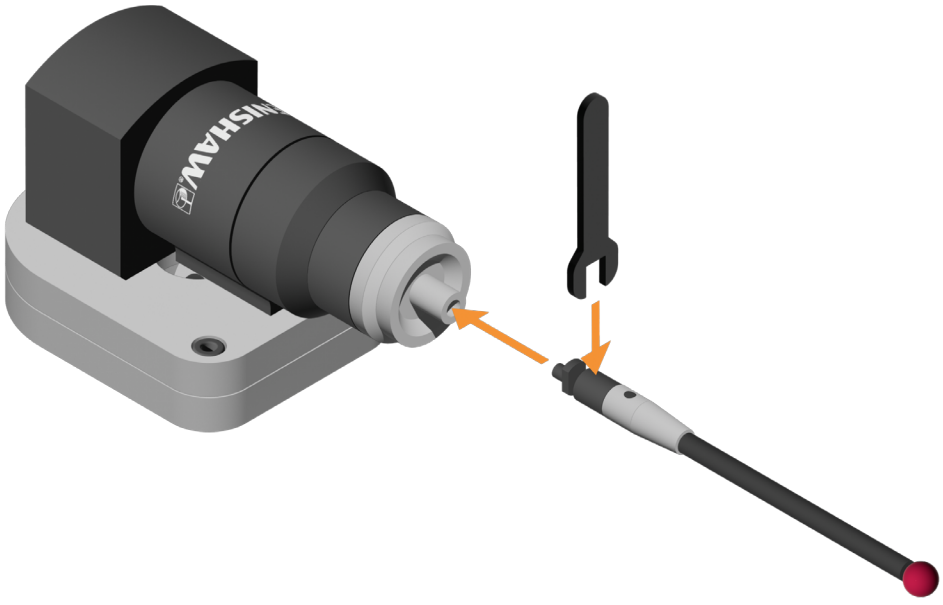
CAUTION: Failure to protect the cable can result in system failure due to either cable damage or coolant ingress through the cores. Failure due to inadequate cable protection will invalidate the warranty.

Straight stylus option

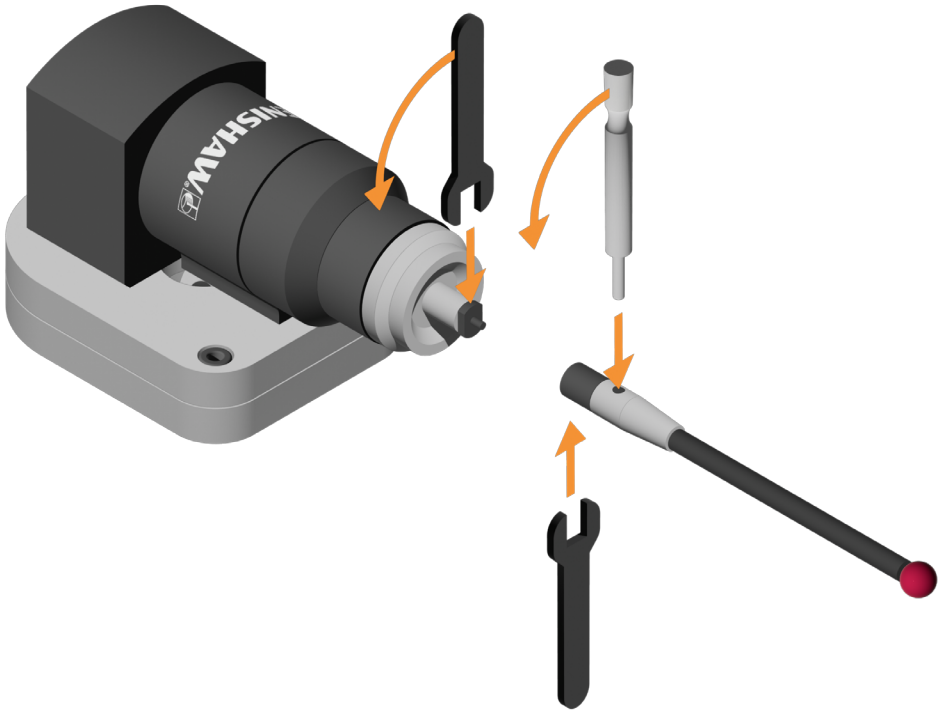
1. Attach the break stem to the stylus using the included C-spanner and stylus tool.



2. Using the C-spanner, attach the break stem and stylus to your tool setter.



3. To remove a broken break stem, use the C-spanner to unscrew the broken piece from the tool setter. Use the stylus tool and C-spanner to remove the remainder of the break stem from the stylus.

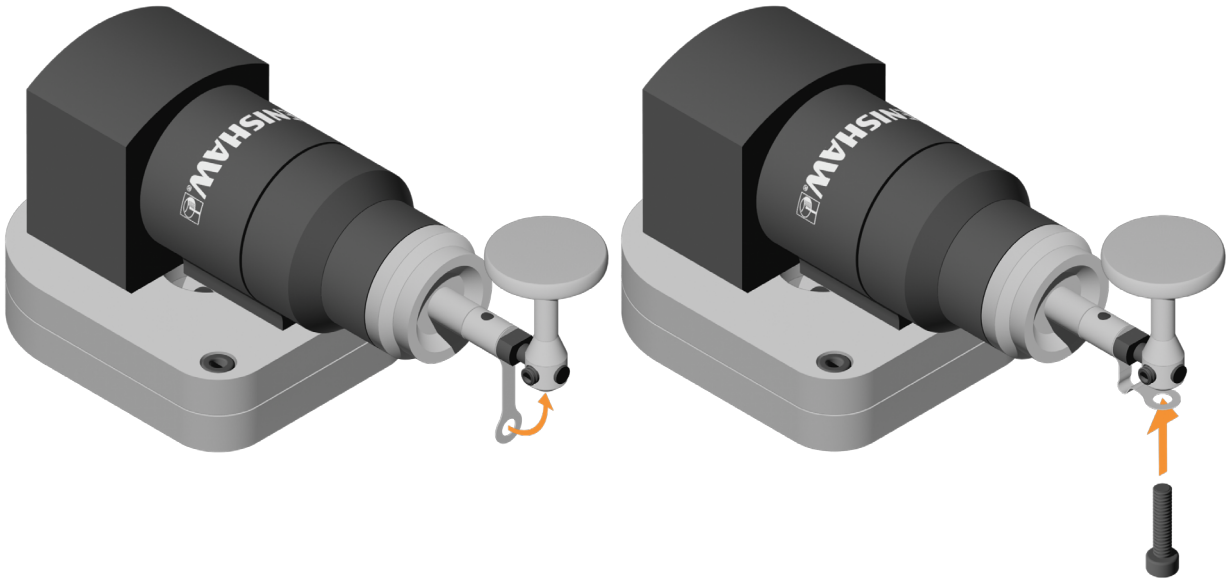


Disc stylus option

For spindle calibration, fix the disc stylus to the tool setter.

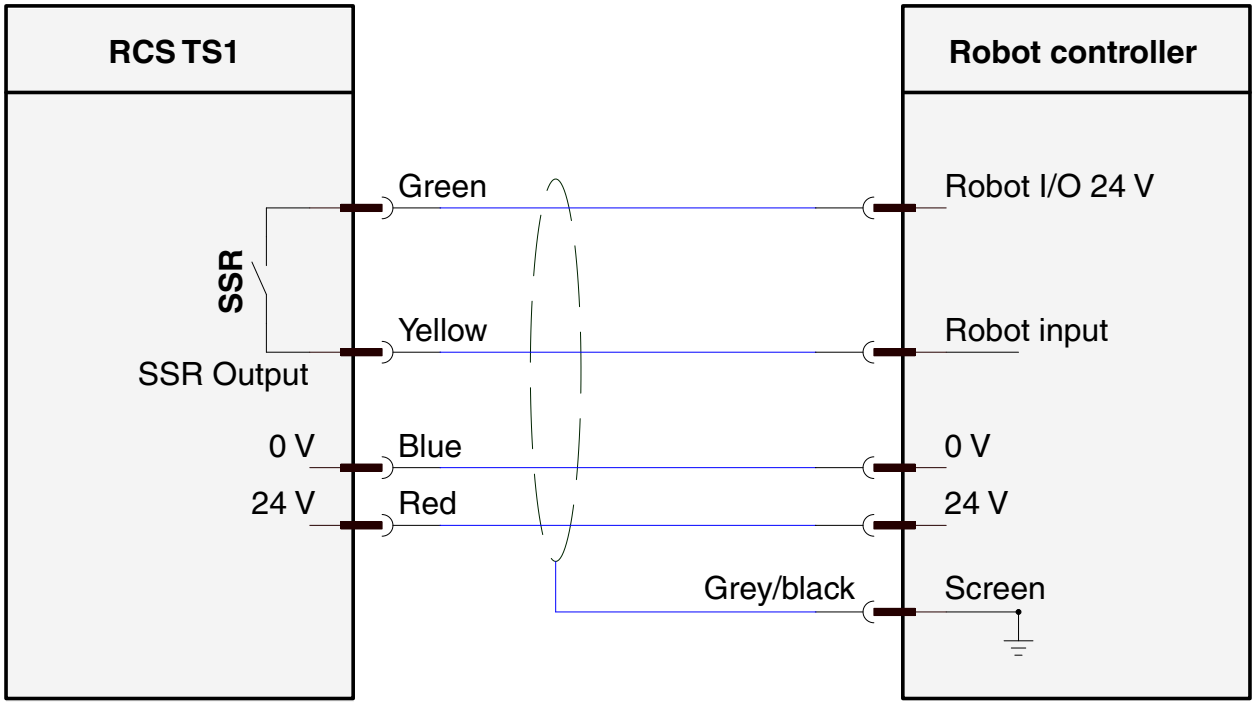
1. Attach the disc stylus to the 10 mm extension, ensuring that one loop of the captive link is in between. Fix the assembly to the RCS TS1.

2. Connect the opposite loop of the captive link to the disc stylus.



Recommended connection diagram

RCS TS1 to robot controller



NOTE: For normally open contact (Blue to 24 V, Red to 0 V)

Electrical connections

CAUTION: Solid state relays (SSR) are susceptible to electromagnetic interference, the cable must be routed to avoid power cables or other sources of high frequency electromagnetic interference.

Calibrating a probe

The RCS TS1 is a single component of the measurement system that communicates with the robot controller. Each part of the system can introduce a constant difference between the actual position at which the tool triggers the RCS TS1 and the position which is reported to the robot controller.

If the RCS TS1 is not calibrated and the device will not be able to take accurate measurements, which will affect the robot's intended task. It is important that the RCS TS1 is calibrated in the following circumstances:

- when it is to be used for the first time.
- when environmental conditions have changed.
- at regular intervals as part of its maintenance routine.
- when it is suspected that the tool setter has become distorted, or a crash has occurred.
- when equipment settings are changed.

Calibrating with a disc stylus

The tool setter can be used to set spindle tools when a tool frame is calibrated with the disc stylus. The spindle calibration routine includes all of the steps required to calibrate the tool setter before setting your spindle tool frame.

Calibrating with a straight stylus

If your tool setter is using a straight stylus, you can calibrate it using your mobile probe, or with a datum sphere mounted to the end of the robot. Using a mobile probe to calibrate your tool setter requires the mobile probe to be calibrated first.

NOTE: When calibrating a tool setter with a mobile probe (probe mounted on a robot), ensure that the tool setter stylus is equal to or greater than the length of the mobile probe stylus.

For calibration software routines, refer to the relevant RCS P-series macro instructions documentation for more information visit **www.renishaw/rcs-support**.

Maintenance

WARNING: Before carrying out any maintenance operations, ensure that the machine is safe to work on and electrical power to the interface unit is switched off.

Service

Only the maintenance routines described in these instructions may be undertaken.

Further dismantling and repair of Renishaw equipment must be carried out at an authorised Renishaw service centre.

Equipment requiring repair, overhaul or attention under warranty should be returned to your supplier.

Cleaning

CAUTION: The probe must be handled with care.

- Do not allow debris to build up around the probe body.
- Do not allow dirt or liquids to enter the sealed working parts.
- Keep system mating surfaces clean.
- Do not wash with high pressure jets.

Once a month, remove the stylus front cap (the C-spanner is provided for easy cap removal) then remove all residue by washing with deionised water.

WARNING: Do not use a sharp tool or a degreasing agent.

The cleaning interval may be extended or reduced, depending on the rate at which dirt accumulates. If the inner diaphragm is damaged, return the probe to your supplier for repair.

Parts list

Item	Part number	Description
RCS TS1	A-6967-6130	The RCS TS1 is a hard-wired tool setter with multi-positional mounting plate. Complete with C-spanner and M4 stylus tool
C-spanner	A-2063-7587	C-spanner
M4 Stylus tool	A-5004-7587	M4 stylus tool
RCS PK Service kit	A-6967-6201	RCS PK service kit comprises front cover, eyelid seal, spring and O-rings.
Conduit extension kit (5m)	A-5475-0409	A kit extending the length of the cable conduit by 5 m
Conduit extension kit (2m)	A-5475-0408	A kit extending the length of the cable conduit by 2 m
Conduit bulkhead kit	A-5475-0407	-

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