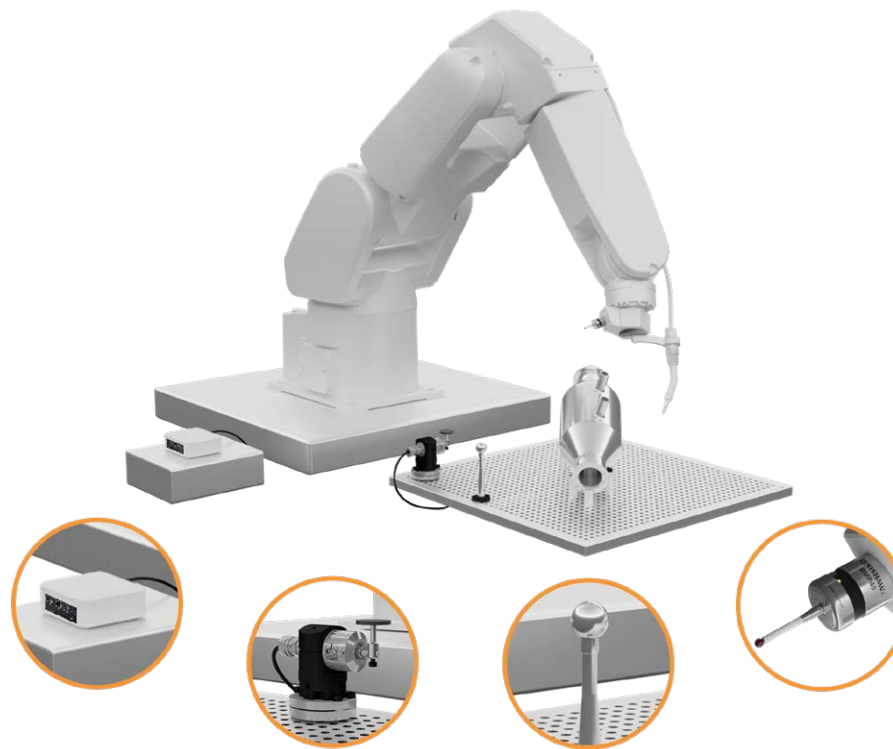


# RCS P-series



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## Legal information

### Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier.

Unless otherwise specifically agreed in writing between you and Renishaw, if you purchased the equipment from a Renishaw company, the warranty provisions contained in Renishaw's CONDITIONS OF SALE apply. You should consult these conditions in order to find out the details of your warranty but, in summary, the main exclusions from the warranty are if the equipment has been:

- neglected, mishandled or inappropriately used; or
- modified or altered in any way except with the prior written agreement of Renishaw.

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

### Packing material

Packaging component	Material	94/62/EC Code	94/62/EC number
Outer box	Non-corrugated fibreboard	PAP	21
Bag	Low density Polyethylene	LDPE	4

## Renishaw software EULA

Renishaw software is licensed in accordance with the Renishaw licence at:

[www.renishaw.com/legal/softwareterms](http://www.renishaw.com/legal/softwareterms).

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## US Government notice

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## International regulations and conformance

### EC declaration of conformity

Renishaw plc declares that the RCS P-series products comply with the applicable directives, standard and regulations. A copy of the full EC declaration of conformity is available upon request. 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 2000 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.

### Declaration of conformity

Renishaw plc hereby declares that RCS P-series products comply with the essential requirements and other relevant provisions of:

- the applicable EU directives
- the relevant statutory instruments under UK law

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

## 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.

## 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](http://www.renishaw.com/REACH)

## RoHS compliance

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

## China RoHS

The P-series China RoHS is available on request. Please contact Renishaw plc support for the full China RoHS tabulation.



## FCC

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.

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.

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 used in accordance with this user guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

## Supplier's Declaration of conformity

### 47 CFR § 2.1077 Compliance Information

**Unique Identifier: RCS P-series system**

**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

### ICES-001 (Canada only)

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.

# Safety information

## Overview

The RCS P-series system can be used in a variety of environments and applications.

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**WARNING:** To ensure the safety of the user and other personnel in the vicinity, it is recommended that a comprehensive risk assessment of the robot system under test is carried out before starting.

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The risk assessment should be carried out by qualified users (requiring machine competency, application technical knowledge and advice from a trained risk assessor) with consideration for the safety of all personnel. The risks identified must be mitigated prior to using the systems. The risk assessment should pay particular attention to robot system movement (in both manual and automatic modes), manual handling, and electrical safety.

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**CAUTION:** There are no user-serviceable parts inside the RCS P-series devices. Do not remove any part of the housing; to do so could cause personal harm and damage the system irreparably.

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Ensure that you have read and fully understood the RCS P-series user guide before using the devices.

## Mechanical safety

- When setting up and mounting the RCS P-series, be aware of pinch and/or crush hazards that may be created.
- Be aware of trip hazards that may be created between the cables of the RCS P-series devices, the robot processing unit (RPU), robot controller and the laptop or desktop computer.
- Exercise caution if either system is mounted to an external axis that moves or rotates. Beware of cables becoming entangled.
- If operating the robot system with guards or any safety features removed or disabled, it is the responsibility of the operator to ensure that alternative safety measures are taken in line with the robot systems operating instructions or relevant codes of practice.
- If operating the robot system within a guarded cell, it is the responsibility of the operator to ensure safe practice is followed.

## Electrical and power safety

- The RPU must not come into contact with fluids; for example, coolant.
- The RCS P-series must only be powered by the interface modules provided.
- Never connect the RCS RPU to devices which are not intended to be used as part of the RCS P-series.



## Robot user safety information

Renishaw plc has reduced the risk levels to as low as reasonably practicable for the use of the equipment, which are all covered by their CE marking.

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**NOTE:** It is recommended that appropriate safety wear should be worn during the installation and operation of the product within a robotic cell.

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## Intended use

The intended use of this equipment is to improve the precision and repeatability of the motion of industrial robots and any associated equipment. There are risks associated with installation and activities undertaken within the hazard zone of robotic machinery and other hazardous equipment. These risks should be fully considered and managed down to an acceptable level by the user.

## Electromagnetic compatibility

The Renishaw equipment complies with these electromagnetic compatibility (EMC) standards:

- EN 61326-1: 2013
- ETSI EN 301 489-17 V3.1.1
- ETSI EN 301 489-1 V2.1.1

The robot and its control system will be exposed to these EMC emissions.

The user must ensure that the use of this Renishaw equipment, when in close proximity to the industrial robot and other equipment, will not cause hazards, particularly from unintended motion.

## Radio transmission systems

Certain variations of the RCS P-series kits contain devices which utilise radio transmission systems.

The RCS P-series devices use the following radio transmission systems:

- band;
- frequency;
- power.

The robot and its control system will be exposed to these radio transmissions.

The user must ensure that the use of this Renishaw equipment, when in close proximity to the industrial robot and other equipment, will not cause hazards, particularly from unintended motion.

## Electrical safety

The RMI-QE must be wired into the electrical panel before use. This task must be performed by a competent person and, prior to doing so, they must first confirm that the electrical panel is made safe.

## System overview

The RCS probing kits are built around both radio and hard-wired probe and tool setter solutions. When calibrated, the probing system allows you to create advanced datums and recovery sequences.

The dedicated RCS RPU enables improved accuracy utilising proven Renishaw expertise in geometry and machine calibration to locate tool and part frames within automated systems. This assists with set-up and recovery as well as compensating for short and long-term drifts.

The RCS probe calibration process, along with the intuitive apps to set-up and program, allow an unprecedented level of control and speed of implementation. Permanent inclusion of probing within robotic cells can increase the accuracy of systems, automate set-up, allow for easy recovery and measure drift over time.



## RCS P-series set-up guidelines

### Tools required

The following tools are required for the installation of Renishaw probing systems on a robot controller:

- a small flat-head screwdriver;
- a bootlace ferrule crimping tool.

### RCS software required

One of the following software licences is required to operate the RCS probing solution:

- RCS Core;
- RCS Advanced probing;
- RCS Spindle cal+.

Prior to installation, users must download the RCS software suite and use the probing alignment feature to configure a complex datum, either using an imported CAD file, or nominal surface features.

A basic datum strategy can be built using the core licence file. Complex datum building can be undertaken using the advanced probing licence. Spindles can be calibrated in 5 degrees of freedom (DOF) using the spindle cal+ licence.

Contact your local Renishaw representative for further information.

## Radio probe installation

If you have a Renishaw radio probe, for example the RMI-QE or RMP40 (QE), follow the installation steps below.

### 1. RMI-QE setting switches

The RMI-QE has setting switches for custom probe configurations. These switches are configured for use. If, however, a different configuration is required, refer to the *RMI-QE radio machine interface* installation guide (Renishaw part no. H-6588-8520) for a detailed explanation of the setting switches.

### 2. RMI-QE to robot controller wiring

The RMI-QE probing interface must be wired into the Fanuc I/O interface. Refer to Figure 1, and to the *RMI-QE radio machine interface* installation guide for a detailed explanation.

### 3. Partnering probes with RMI-QE

To pair your probe(s) with the RMI-QE, download the Renishaw Probe Setup app for smartphones or tablets, and follow the on-screen instructions. Alternatively, refer to the *RMI-QE radio machine interface* installation guide.

The free-of-charge Probe Setup app is available globally on the App Store™ and on GooglePlay, and available in China via Tencent and Huawei.

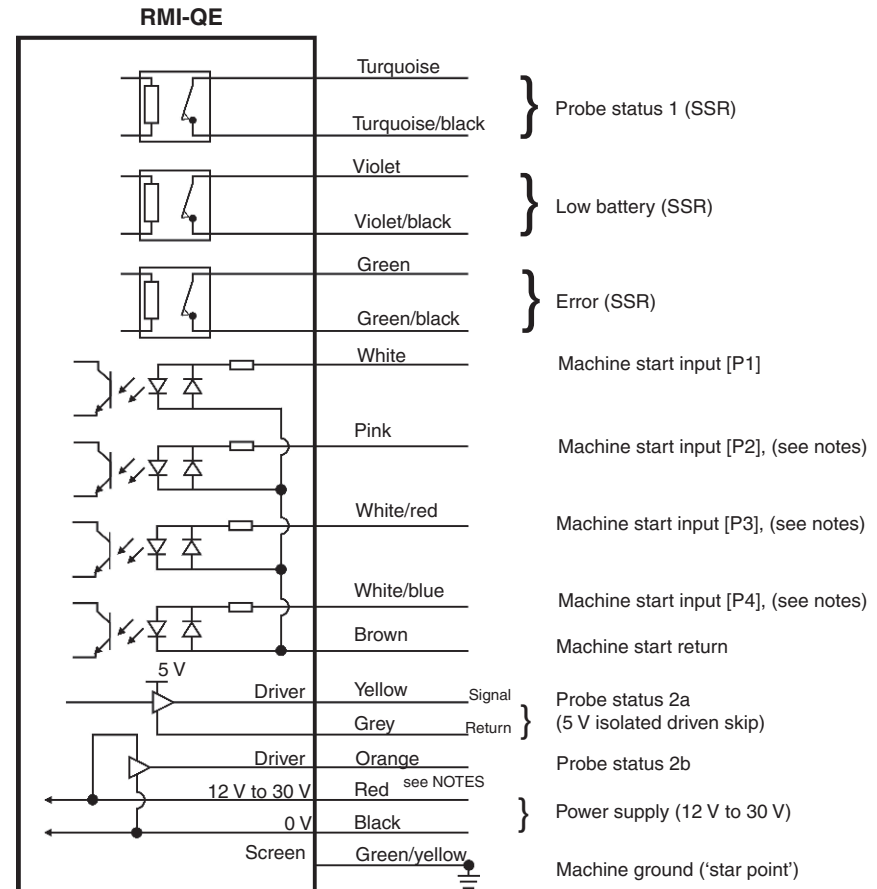


Figure 1 RMI-QE to robot controller wiring diagram

**CAUTION:** The power supply 0 V should be terminated at the machine ground ('star point'). A negative supply can be used when wired appropriately.

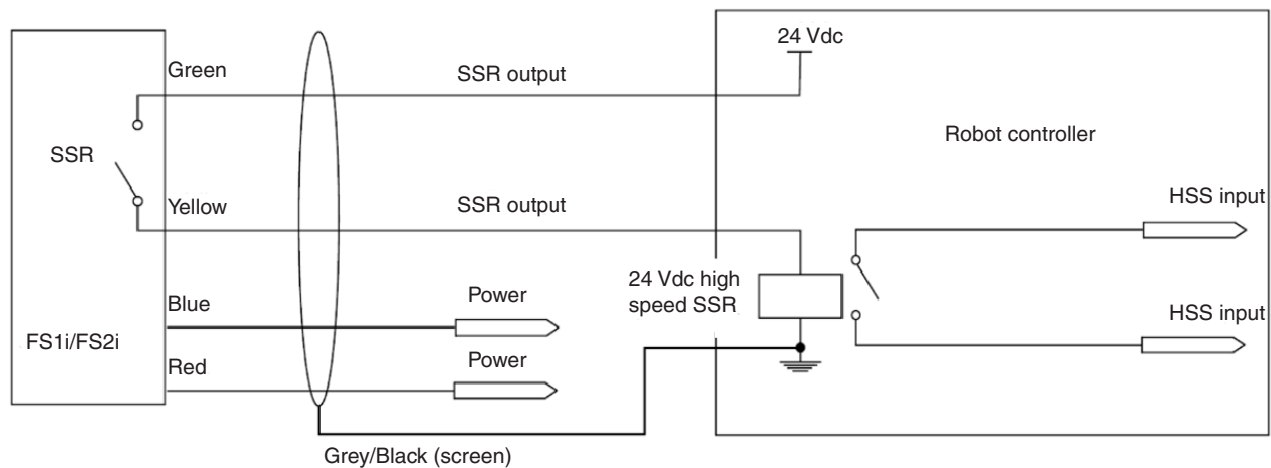
**NOTES:** A switch can be fitted between the machine power supply and the red wire, to aid powering up the RMI-QE when partnering.

Inputs P2–P4 are the difference between RMI and RMI-QE wiring, as these inputs allow multiple radio probes or tool setters to be used.

## Wired probe installation

If you have a Renishaw wired probe, for example the LP2 probe with FS1i/FS2i, refer to the installation diagram below. For additional information, refer to the *FS1i and FS2i sockets* data sheet (Renishaw part no. H-2000-2073).

### FS1i/FS2i to robot controller



**Figure 2** FS1i/FS2i to robot controller wiring diagram

### Connections

	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.

## Wired tool setter installation

If you have a TS27R tool setter and HSI-C, refer to the installation diagram below. Alternatively, refer to the *TS27R – tool setting probe* installation and user's guide (Renishaw part no. H-2000-5018) for further details.

### Recommended connection for TS27R with HSI-C interface

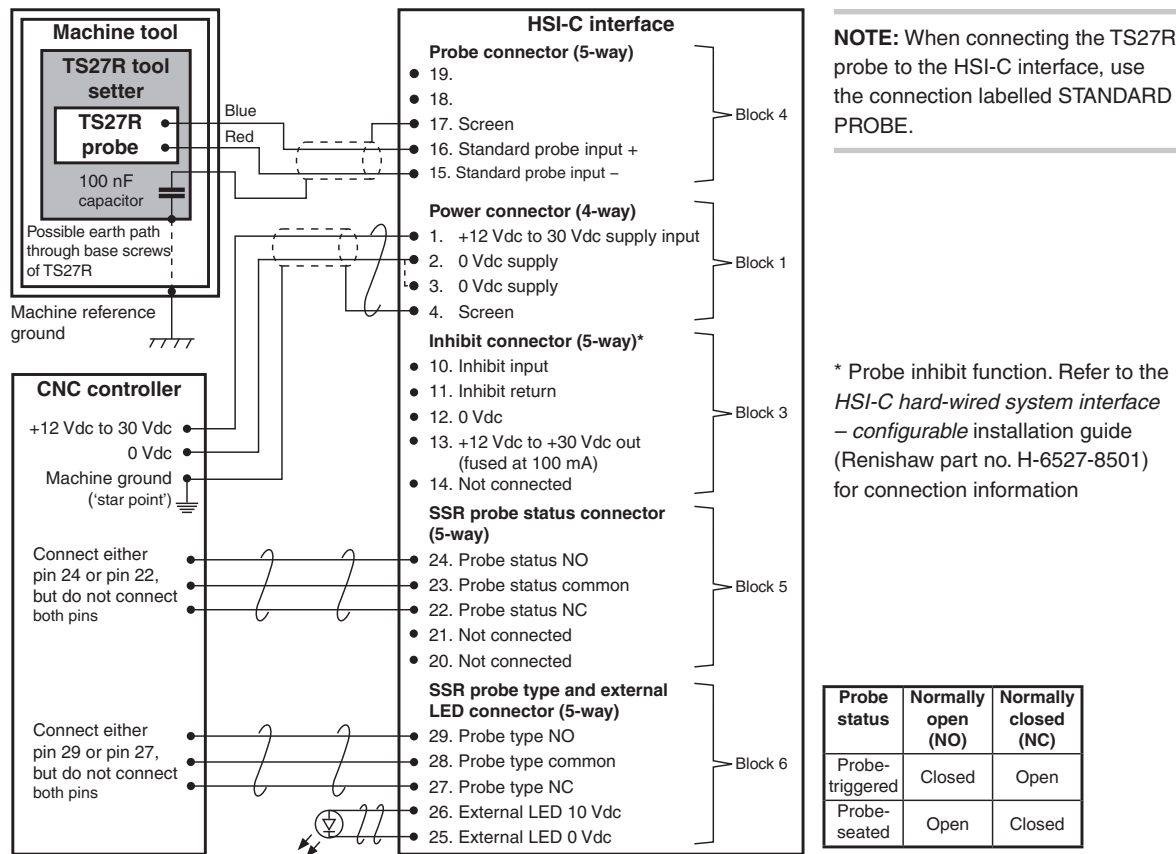


Figure 3 Tool setter wiring diagram

## Configure the RCS macros

- Touch parameters
- IP address of the RPU

### Parameters description

#### Touch parameters

There are two kinds of touch parameters; the variable parameters and the fixed parameters:

- The variables parameters can be dynamically modified using functions or direct access. These variable parameters have default values that are set during set-up that can be used dynamically via a reset default value function.
- The fixed parameters are only set during set-up and cannot be dynamically modified.

For further details, see the Touch parameters table, shown below.

## Communication parameters

There are two kinds of communication parameters:

- The IP address, which is the IP address of the RPU.
- The port number entered into the RPU should match that of the robot controller. The accepted port range information should be available within the robot manual.

Touch parameters				
	Name	Description	Type	Optional
<b>Variable</b>	Back-off distance	Back-off distance used for a touch at low speed	Distance	
	Search distance	Maximum distance of search during a touch	Distance	
	Move speed	Speed used for moves	Speed	
	Activate 'dual-touch'	Activate the use of dual touch during touch	Activate 'dual touch'	Dual touch
<b>Fixed</b>	Touch speed	Touch speed used for a touch at low speed	Speed	
	Nominal mobile probe diameter	Probe diameter used during calibration	Diameter	
	Nominal fix probe diameter	Probe diameter used during calibration	Diameter	
	Calibration sphere diameter	Calibration sphere diameter used for the mobile probe calibration	Diameter	
	Mobile probe input index	Reference to the mobile probe input	Input/Output index	
	Fix probe input index	Reference to the fix probe input	Input/Output index	
	Mobile probe output index	Reference to the mobile probe output	Input/Output index	Radio
	Fix probe output index	Reference to the fix probe output	Input/Output index	Radio
	Communication error output index	Reference to the communication error output	Input/Output index	Radio
	Low battery output index	Reference to the low battery output	Input/Output index	Radio
	Dual-touch touch speed	Touch speed used for a touch at high speed	Speed	Dual touch
	Dual-touch back-off distance	Back distance used for a touch at high speed	Distance	Dual touch



## Notes on touch parameter table

The touch macros allow the user to define its touch in two ways.

When using the touch macro, the user instructs the robot to search for the surface in a 3D direction. From the current position, the robot moves at the touch speed in the indicated direction. When the surface is touched, the robot's position is recorded. It stops and retracts for the back-off distance at the indicated move speed. The touch macro is useful when an inspection program is created on the teach pendant.

When using the target touch macro, the user indicates the target surface point and its surface normal. The robot moves to the approach point (the target point plus the approach distance along the surface normal) and issues a touch macro from the approach position.

The target touch is useful when the inspection program is created from a CAD package with nominal surface touch points; for example, in offline programming.

When the 'double touch' flag is set, the touch macro performs a double touch, where a first-touch move is performed at the faster dual-touch speed. The robot retracts from the first touch and returns to touch the surface a second time at the touch speed to ensure the best repeatability and accuracy of the touch points.

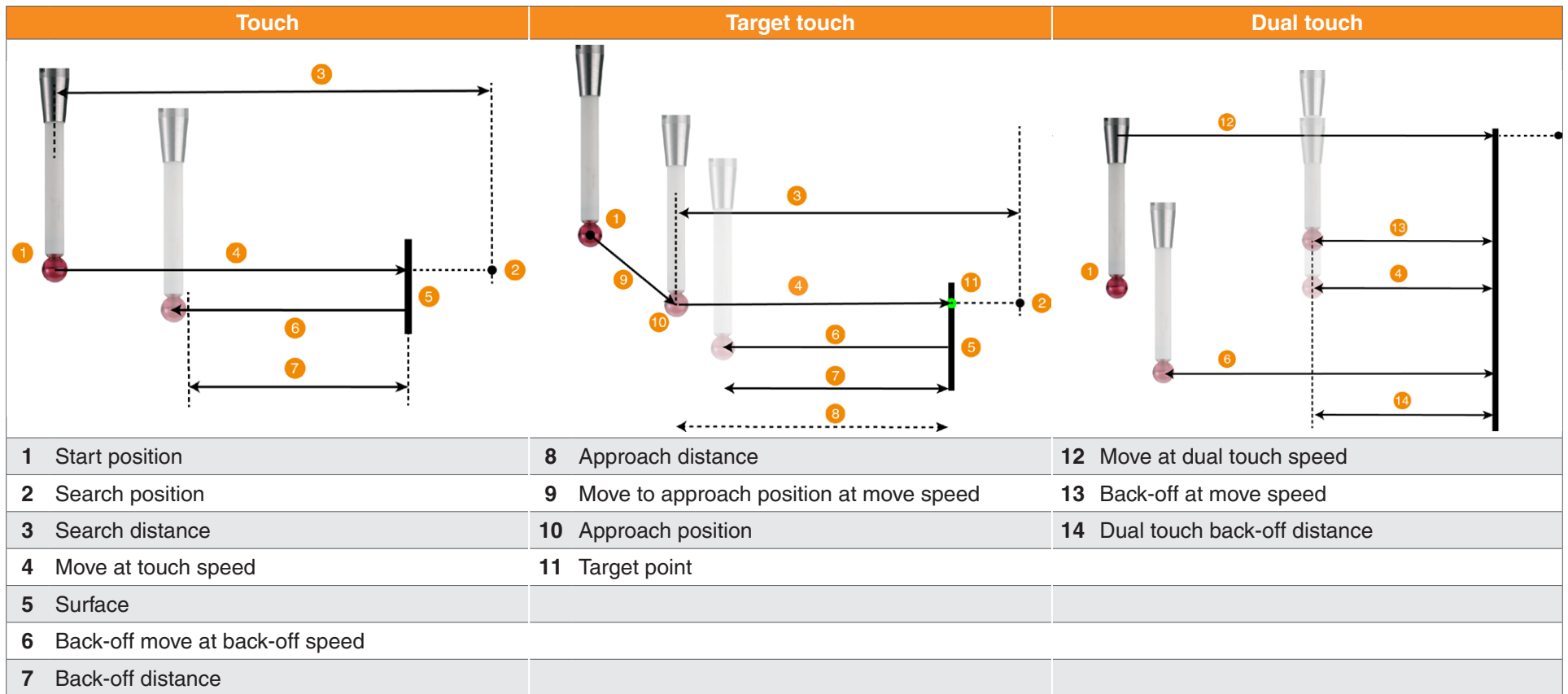


Figure 4 Touch sequences

For specific guidance relating to RCS P-series devices, refer to the relevant individual device user guides.

## Installing the robot macros on the robot controller

For guidelines on installing the robot macros on different robot systems, please refer to the specific RCS P-series robot installation guides. The files relating to your Renishaw products are available to download at MyRenishaw (<https://www.renishaw.com/my/>)

# RCS P-series overview matrix

	Probe	Toolsetter	Receiver/Interface	Styli	Controller
<b>Radio</b>	Example: RMP40 (QE)	RTS	RMI-QE	Example: M4 disc styli	RPU
<b>Wired</b>	Example: LP2	TS27R	FS2i		
<b>Optical</b>	Example: OMP40-2	TS27R	OMI receiver		

This matrix is for example purposes only. Other combinations of probe and styli are available, subject to requirements.

## RCS P-series kit examples

### RCS PK40 kit

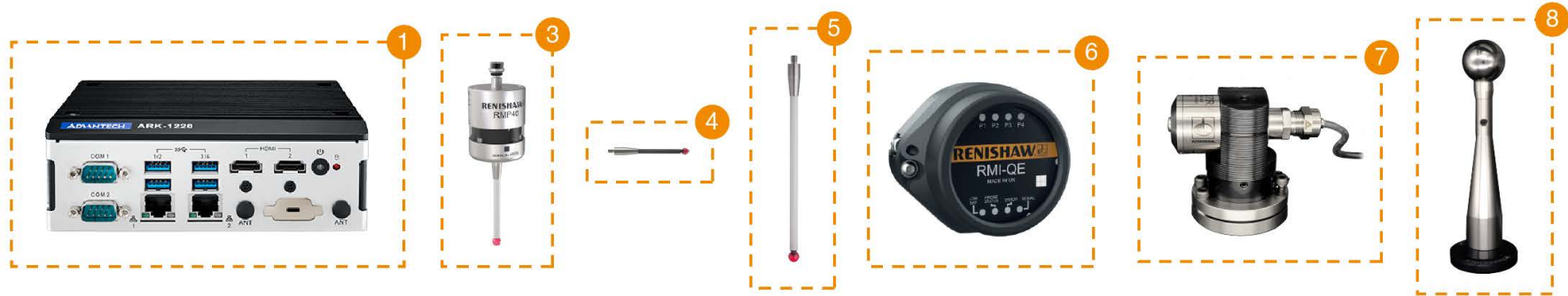


	Part number	Part name
	A-6852-6100	RCS radio probe kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-6588-0001	RMP40 (QE)
4	A-5003-7306	M4 styli L50
5	A-6551-0049	RMI-QE
6	A-6852-6600	Datum sphere assembly
7	N/A	RPU mains lead (not pictured – dependent on region)

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.

## RCS PK40+ kit

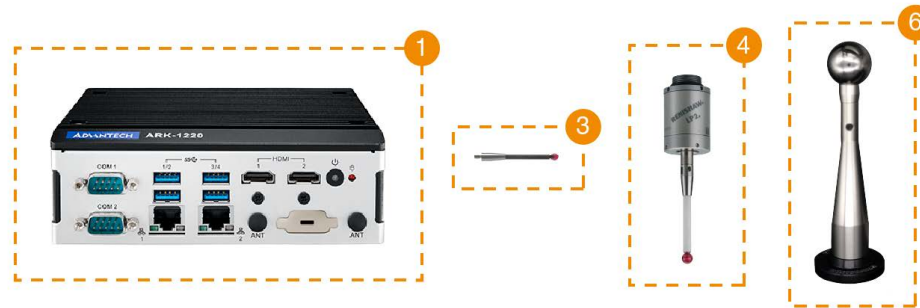


	Part number	Part name
	A-6852-6110	RCS radio probe kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-6588-0001	RMP40 (QE)
4	A-5003-7306	M4 styli L50
5	A-5003-6510	M4 styli L100
6	A-6551-0049	RMI-QE
7	A-2008-0397	RCS tool setter
8	A-6852-6600	Datum sphere assembly
9	N/A	RPU mains lead (not pictured – dependent on region)

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.

## RCS PK2 kit



	Part number	Part name
	A-6852-6200	RCS wired probe kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-5003-7306	M4 styli L50
4	A-2063-6098	LP2
5	A-4163-1000	FS1i (not pictured)
6	A-6852-6600	Datum sphere assembly
7	N/A	RPU mains lead (not pictured – dependent on region)

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.

## RCS PK2+ kit



	Part number	Part name
	A-6852-6210	RCS radio probe kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-5480-0001	LP2
4	A-5003-7306	M4 styli L50
5	A-5003-6510	M4 styli L100
6	A-2008-0397	RCS tool setter
7	A-6852-6600	Datum sphere assembly
8	N/A	RPU mains lead (not pictured – dependent on region)
9	A-4163-1000	FS1i (not pictured)

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.



## RCS TS27 kit

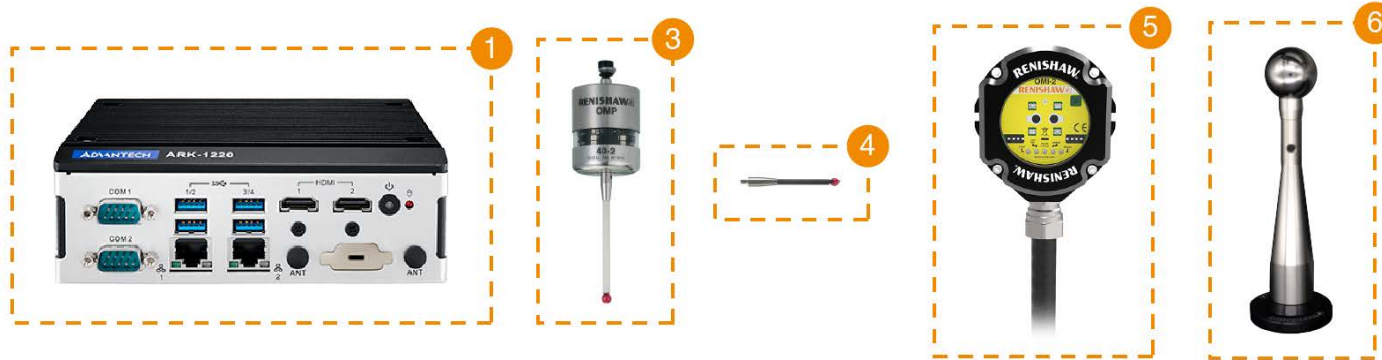


	Part number	Part name
	A-6852-6300	RCS wired tool setter kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-5003-6510	M4 styli L100
4	A-2008-0397	RCS tool setter

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.

## RCS PKO40 kit

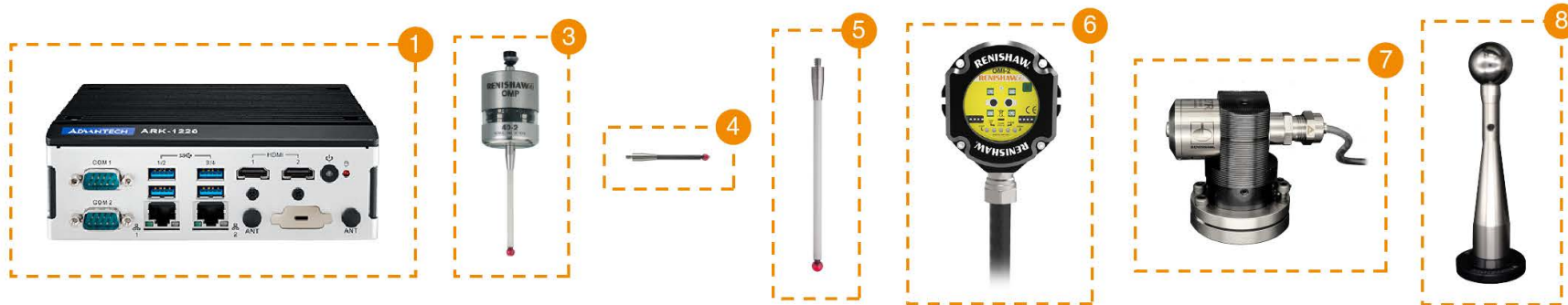


	Part number	Part name
	A-6852-6000	RCS optical probe kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-4071-2001	OMP40-2
4	A-5003-7306	M4 styli L50 c/f
5	A-5191-0050	OMI receiver (15m cable)
6	A-1034-0026	Datum sphere

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.

## RCS PKO40+ kit



	Part number	Part name
	A-6852-6010	RCS optical probe kit
1	A-6852-6400	RCS RPU
2	N/A	USB security dongle / licence key (not pictured)
3	A-4071-2001	OMP40-2
4	A-5003-7306	M4 styli L50 c/f
5	A-5003-6510	M4 styli L100
6	A-5191-0050	OMI receiver (15m cable)
7	A-2008-0397	RCS tool setter
8	A-1034-0026	Datum sphere

Refer to the respective device user guides for product-specific user information.

**NOTE:** The power cable supplied may vary depending on the region in which the kit was purchased.



## Further information

For further operational information, refer to the user guides supplied within the RCS Software Suite.

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[www.renishaw.com/contact](http://www.renishaw.com/contact)

 #renishaw

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