

## PI 200-3 installation guide

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# PI 200-3 installation guide

Document part number: H-1000-7542-05-B

Stand alone unit



Card option to fit inside PHC10-3 PLUS



## PI 200-3 installation guide

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# PI 200-3 general information

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 ORIGINAL LANGUAGE VERSION

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## 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.

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### Care of equipment

Renishaw probes and associated systems are precision tools used for obtaining precise measurements and must therefore be treated with care.

### Changes to Renishaw products

Renishaw reserves the right to improve, change or modify its hardware or software without incurring any obligations to make changes to Renishaw equipment previously sold.

### Company registration details

Renishaw plc. Registered in England and Wales. Company no: 1106260. Registered office: New Mills, Wotton-under-Edge, Gloucestershire, GL12 8JR, UK.

### Packaging

To aid end user recycling and disposal the materials used in the different components of the packaging are stated here:

Packaging component	Material	94/62/EC code	94/62/EC number
Outer box	Corrugated fibreboard	PAP	20
Packaging insert	Polyurethane	PU	7
Packing foam	Polyurethane	PU	7
Bag	Low density polyethylene	LDPE	4

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# PI 200-3 product compliance

## EU declaration of conformity

Contact Renishaw plc or visit [www.renishaw.com/EUCMM](http://www.renishaw.com/EUCMM) for the full EU declaration.

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## UK declaration of conformity

Contact Renishaw plc or visit [www.renishaw.com/UKCMM](http://www.renishaw.com/UKCMM) for the full UK declaration.

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## EMC conformity

This equipment must be installed and used in accordance with this installation guide. This product is intended for industrial use only and should not be used in a residential area or connected to a low voltage power supply network which supplies buildings used for residential purposes.

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## FCC (USA only)

### Information to user (47 CFR 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 you will be required to correct the interference at your own expense.

### Information to user (47 CFR 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.

### Equipment label (47 CFR 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.
  2. This device must accept any interference received, including interference that may cause undesired operation.
-

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### 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.

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### 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)

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### China RoHS

Contact Renishaw plc or visit [www.renishaw.com/ChinaRoHSCMM](http://www.renishaw.com/ChinaRoHSCMM) for the full China RoHS tabulation.



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# PI 200-3 safety

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

There are no user serviceable parts inside the equipment.

The PI 200-3 probe interface is to be used with the provided PSU - Emerson DP4024N3M. See manufacturer's datasheet at [www.emerson.com](http://www.emerson.com)

PSU electrical ratings	
Supply voltage range	100 Vac - 240 Vac +10%,-10%
Frequency range	50 Hz / 60 Hz
Power consumption	49 W max
Transient voltages	Installation category II

The PI 200-3 is isolated from ac power by disconnection of the IEC mains connector from the supplied PSU. If any additional means of isolation is required, it must be specified and fitted by the machine manufacturer or installer of the product. The isolator / disconnection device must be sited within easy reach of the operator and comply with any applicable national wiring regulations for the country of installation.

Your Renishaw probe and accessories are precision instruments. Please use and maintain the products in accordance with these instructions.

Please retain the transit box for storing the components when not in use.



**CAUTION:** The TP200 probe contains sensitive silicon strain sensors. Permanent damage may be caused if the probe is dropped or subjected to severe shock as may be caused by misuse.

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# PI 200-3 environmental conditions

The following environmental conditions comply with those defined in BS EN61010-1:2001:

Indoor use	IP30 (no protection against water)
Altitude	Up to 2000 m
Operating temperature	0 °C to +50 °C
Storage temperature	-10 °C to +70 °C
Relative humidity	80% maximum for temperatures up to +31 °C Linear decrease to 50% at +50 °C
Pollution degree	2

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# PI 200-3 introduction

The TP200 probe system comprises the TP200 probe sensor and stylus module, the PI 200-3 interface and the optional SCR200 stylus change rack.

The TP200 is a 13.5 mm diameter touch-trigger probe with the facility to quickly change stylus configurations without the need for requalification. This is achieved by carrying the stylus on a detachable module that is located on the probe sensor body by a highly repeatable kinematic coupling and held in place by magnetic force. After initial qualification of the stylus tip, the module may be removed and replaced as required without additional requalification by simply recalling the initial qualification data.

The probe sensor uses electronic strain sensing techniques that provide better form measuring accuracy and operating life than can be achieved with kinematic switching probes.

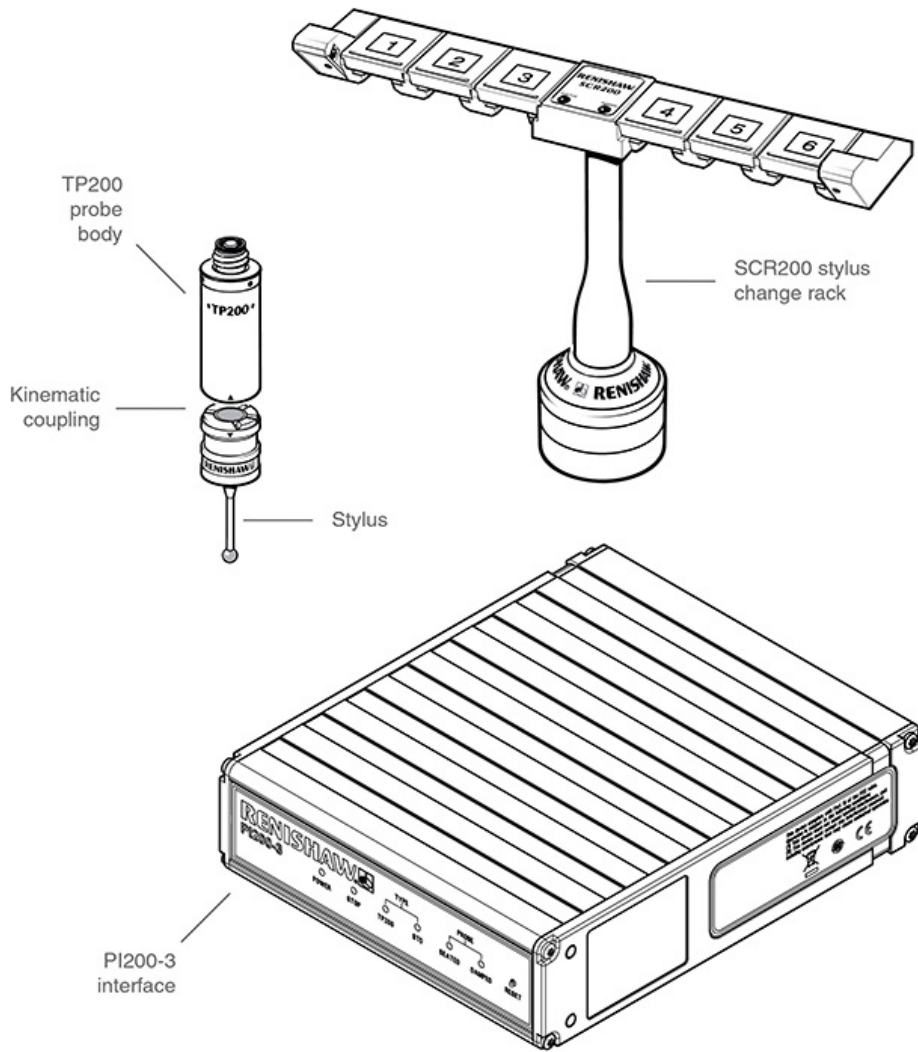
The SCR200 stylus change rack provides storage for pre-qualified stylus assemblies and facilitates automatic stylus changing under measurement programme control.

The dedicated PI 200-3 interface supplies power and controls the operation of the TP200 probe and SCR200 rack. Communication with other Renishaw equipment and the CMM controller is via the PICS (product interconnection system) ports.



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The image below shows the PI 200-3 stand alone version (A-5707-0100):

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The image below shows the PI 200-3 integrated card version (A-5707-0200) that is intended to be used in conjunction with PHC10-3 PLUS:



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# PI 200-3 product description

## System overview

A small deflection of the stylus tip produces a force which is applied via the stylus module and kinematic coupling to the strain sensing structure housed in the probe body. Electronic processing based on a customised, mixed signal integrated circuit and hybrid microcircuit construction contained within the probe converts the sensor responses to a current proportional to strain. The probe output requires only two wires for transmission to the PI 200-3 interface, enabling the TP200 to use the existing M8 mounting connector system fitted to a wide range of probe heads and extension bars.

In the PI 200-3 interface, the probe current is compared with pre-set reference levels to determine the status of the probe, which may be armed (seated) or triggered. The probe status (SYNC) and the trigger confirmation (HALT) signals are asserted when the appropriate conditions are met.

At power-up, or when a probe is first connected, the PI 200-3 recognises whether the probe is a kinematic switching probe (TP20 / TP6 / TP2 type) or a TP200, and automatically selects the appropriate operating mode.

When using the SCR200 change rack to perform automatic stylus changing, the PI 200-3 inhibits probe triggers and resets the TP200 probe sensor to account for the loading effects of the new stylus assembly on the strain sensors. Collision damage is prevented by an overtravel mechanism and a limit switch in the base of the SCR200. A small displacement will cause the PI 200-3 to assert the SYNC, HALT and STOP signals to stop CMM motion.

## Probe status signal (SYNC)

SYNC is the real time PICS trigger signal used to trigger recording of the machine scale coordinates when taking a gauge point. SYNC may also initiate the process of stopping and reversing CMM motion (sometimes called 'back-off') to the pre-hit point.

When the stylus contacts the workpiece, a change of strain occurs in the sensing structure causing the probe current to increase. SYNC is asserted when the probe current exceeds the trigger reference level. When the stylus backs off from the workpiece, the probe current will fall below the trigger reference level and SYNC will be cleared to the armed state.

The timing relationships for an idealised probe signal are indicated later in this document.

A solid state relay (SSR) output is provided which mimics the PICS-SYNC output for connection to older CMM controllers that require voltage-free contacts to simulate the trigger signal of a kinematic switching probe.

## Trigger confirmation signal (HALT)

To allow the CMM controller to distinguish between a valid trigger and a spurious trigger caused by vibration or shock, a trigger confirmation signal (HALT) is provided on the PICS port. HALT will be asserted if the probe current remains greater than trigger level 2 for a pre-set delay time, determined by the settings of configuration switches 11 and 12.

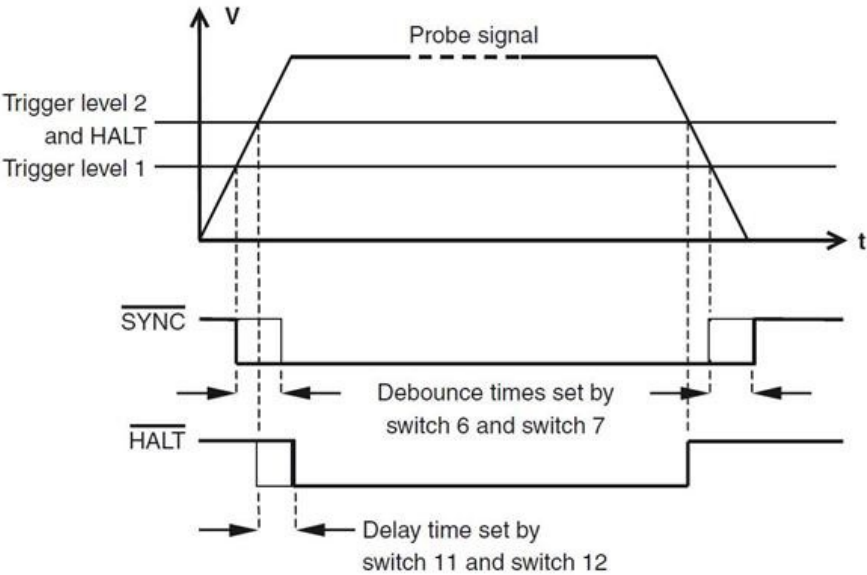
Should the probe current fail to reach the trigger level or drop below the reset level before the delay time has expired, as might be the case for a vibration-induced signal, HALT will not be asserted. The CMM controller may then assume the trigger was spurious and reject the coordinate data.

When a kinematic switching probe (TP20, TP6, TP1, TP2) is connected, the HALT delay time is fixed at 5 milliseconds.

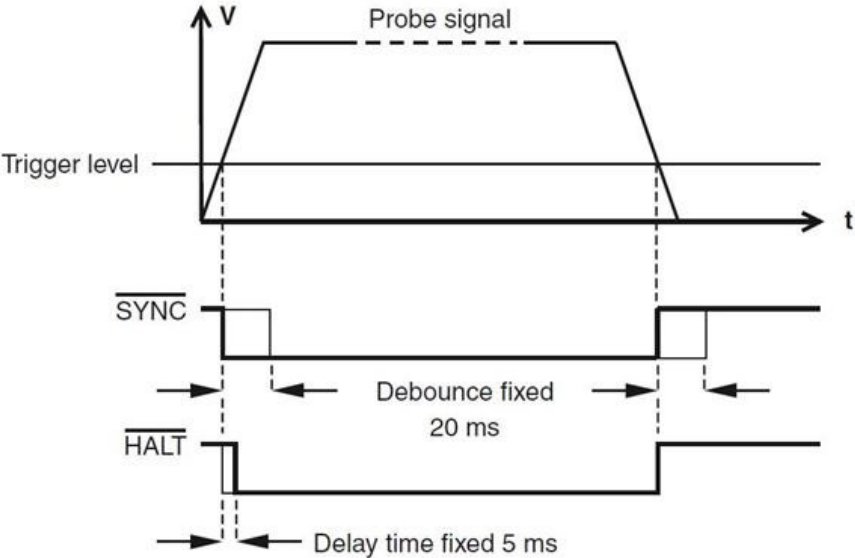
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## SYNC and HALT signal timing for a TP200 gauge point



## SYNC and HALT signal timing for a gauge point when a kinematic probe is connected



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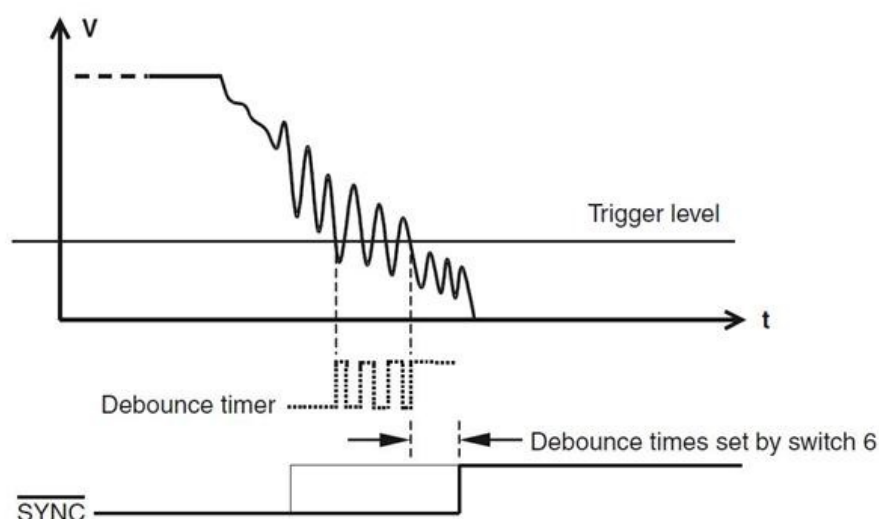
### SYNC and HALT debounce

The SYNC and HALT signals are debounced to prevent spurious triggers occurring as a result of CMM or stylus vibration when the stylus makes contact with or leaves the surface of the workpiece. A range of switch selectable timing options is provided to suit the requirements of different types of CMM. Alternatively, the debounce may be switched off to allow greater flexibility for the CMM's controller to manage the PICS signals.

The 'adaptive' settings ensure that combinations of CMM vibration and large stylus assemblies do not cause a false indication of probe status during the back-off move. It may be seen that the debounce time increases in increments of either 20 milliseconds or 100 milliseconds until the probe signal remains below the trigger level for one complete timing period.

When a kinematic switching probe (TP20, TP6, TP1, TP2) is connected, the debounce times are fixed.

#### Adaptive debounce



### Probe damped signal (PDAMP)

During high-speed position moves (fast traverse), it is necessary to reduce probe sensitivity to prevent vibration causing unwanted triggers. The CMM controller must assert the PDAMP signal on the PICS port, to switch the PI 200-3 into the low sensitivity mode known as 'probe damped'. In this mode, deflection of the stylus will generate SYNC and HALT simultaneously, but only if the probe signal remains above the damped trigger level for longer than the time delay selected by switches 11 and 12.

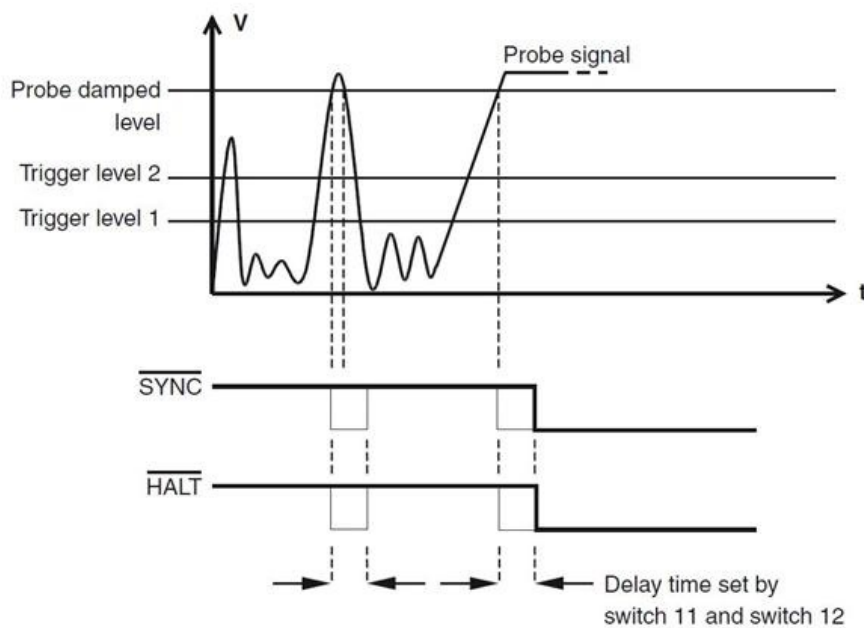


**NOTE:** The probe cannot take accurate points when damped mode is active, and the CMM controller must clear the PDAMP signal to return the probe to normal sensitivity before taking a gauge point. It is important that PDAMP is only cleared when vibrations of the CMM and probe stylus have reduced to a sufficiently low level to avoid spurious re-triggering at the end of the position move. Probe damped mode is indicated by an LED on the PI 200-3 front panel.

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### SYNC and HALT signal timing for a trigger in damped mode



## Stylus mass and ambient temperature compensation

In the TP200 probe, a reference strain sensor outside the strain path adjusts the current in the active strain sensors to provide compensation for slow, uniform changes of ambient temperature.

Fine compensation for thermal drift is provided by a system known as 'autozero' that nulls the sensor amplifiers at a slow rate when the probe is armed. Under the control of the PI 200-3 interface, the autozero automatically switches to a fast rate to reset the probe sensors during a stylus change with the SCR200 change rack or during reorientation of a motorised probe head.

When the probe is in the triggered state, the compensation is switched off. If the stylus remains deflected for longer than ten seconds, drift of the zero reference may occur. The audible warning will sound after this period to indicate that the probe must be reset manually.

## RESET button

**CAUTION:** Probe triggers are inhibited when the RESET button is pressed. Before pressing the button, the CMM must be stationary in manual mode with the probe stylus clear of the workpiece.

The RESET button on the front panel selects fast autozero to rapidly null the sensor amplifiers.

This may be necessary when:

1. The probe does not arm after manually changing the stylus.
2. The audible alarm is sounding a continuous tone to warn that the stylus has been deflected for longer than 10 seconds.

**NOTE:** The probe may also be reset by the action of unlocking and locking the PH10T PLUS or PH10M PLUS motorised head.

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### Front panel indicators

#### PI 200-3 front panel indicators

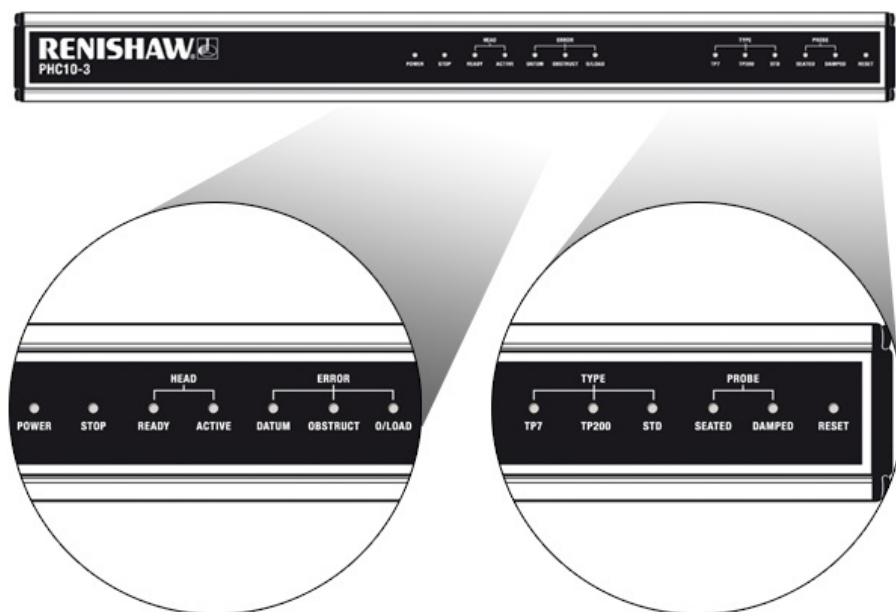


Indicator	Colour	Function
POWER ON	Green	Power on
STOP	Red	PICS - STOP asserted
TYPE TP200	Green	TP200 probe selected
TYPE STD	Green	Kinematic probe selected
PROBE SEATED	Green	ON - probe armed (seated) OFF - probe triggered or no probe connected
PROBE DAMPED	Yellow	PICS - PDAMP asserted

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### PHC10-3 PLUS front panel indicators



Indicator	Colour	Function
POWER ON	Green	Power on
STOP	Red	PICS - STOP asserted
HEAD READY	Green	Head ready
HEAD ACTIVE	Amber	Head active
ERROR DATUM	Red	Error datum
ERROR OBSTRUCT	Red	Error obstruct
ERROR O/LOAD	Red	Error o/load
TYPE TP7	Green	TP7 probe selected
TYPE TP200	Green	TP200 probe selected
TYPE STD	Green	TP20 probe selected
PROBE SEATED	Green	ON - probe armed (seated) OFF - probe triggered or no probe connected
PROBE DAMPED	Yellow	PICS - PDAMP asserted

### Audible indicator

The audible indicator has two functions:

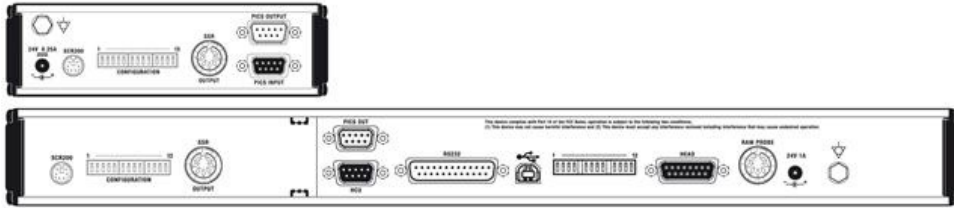
The first is to provide a brief indication that a probe trigger has occurred, this function may be disabled by configuration switch 5. The second function is to warn, by a continuous tone, that the stylus has remained deflected for longer than ten seconds. The alarm can be cleared by operation of the RESET button on the front panel.



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### Rear panel switches and connectors



### Configuration switches

All switches are hardware controlled and a change to any switch setting is effective immediately.

### Configuration switch functions

Switch number	Function	Switch position	Description
1	HALT polarity	UP DOWN	HALT active HIGH HALT active LOW
2	Head LED control	UP DOWN	External control via PICS LED mimics SYNC
3	STOP disabled	UP DOWN	PI 200-3 ignores PICS - STOP STOP asserts HALT/SYNC
4	SYNC polarity	UP DOWN	SYNC HIGH and SSR closes on trigger SYNC LOW and SSR opens on trigger
5	Audible indicator	UP DOWN	No beep on trigger Indicator beeps on trigger
6	Debounce time		Selects SYNC debounce time
7	Debounce mode		Selects SYNC debounce mode
8	Zero debounce	UP DOWN	Sets debounce time <2 ms Debounce set by switches 6 and 7
9	Probe signal filter	UP DOWN	Filter active Filter off
10	Trigger level	UP DOWN	Trigger level 2 selected Trigger level 1 selected
11	PDAMP / HALT filter delay		Coded to select delay time
12	PDAMP / HALT filter delay		Coded to select delay time Refer to table 3
13	Probe polarity reversal	UP DOWN	Reversed Normal

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### Switch 1:

Inverts the polarity of the HALT output.

### Switch 2:

Selects control of the LEDOFF output to either internal PI 200-3 control according to the status of SYNC, or sets the output to high impedance for control of the head LED by external switching.

### Switch 3:

Sets the PI 200-3's response to STOP when asserted from an external source. When enabled, the PI 200-3 will assert SYNC, HALT and open the SSR relay.

### Switch 4:

Inverts the polarity of the SYNC and SSR relay outputs.

### Switch 5:

When enabled, a tone will sound for approximately 160 milliseconds when the probe triggers and SYNC is asserted. When disabled, the tone will activate only when the stylus has remained deflected for 10 seconds.

### Switches 6 and 7:

These switches select the debounce time and mode of operation.

### Switch 8:

Overrides the settings of switches 6 and 7, reducing the trigger and reseat debounce times to less than 2 milliseconds.

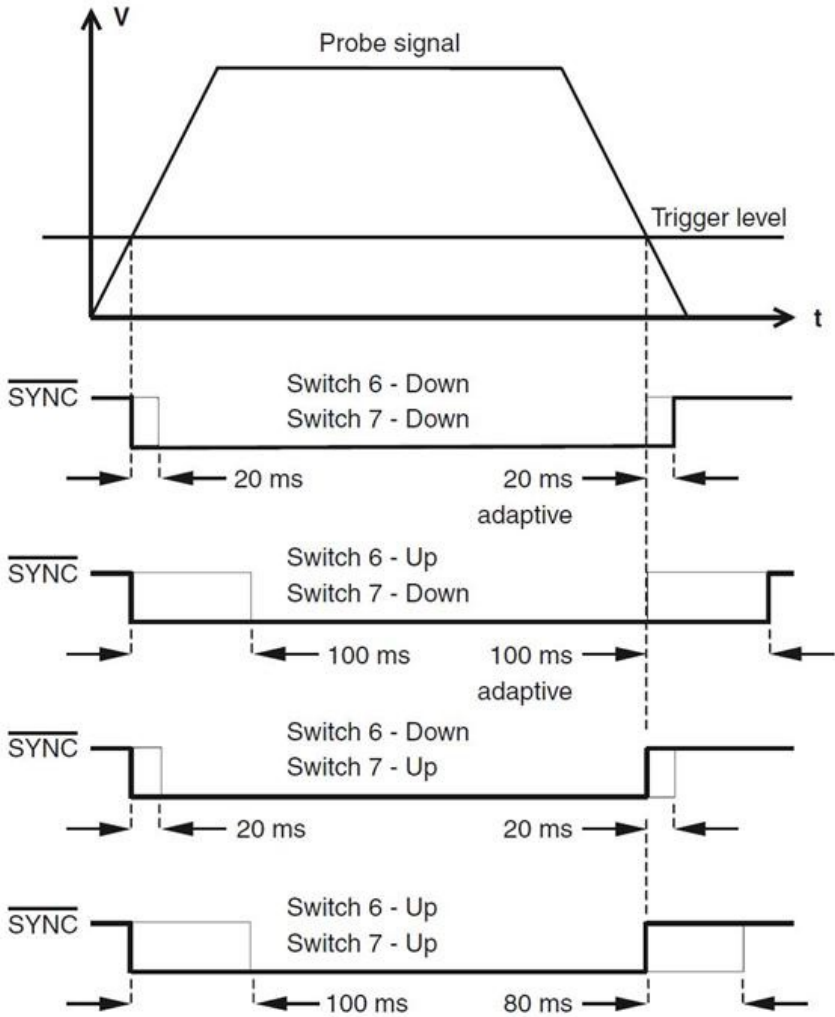
### Switch 9:

The probe signal filter has a 300  $\mu$ s time constant to reduce the effects of stylus vibration when the stylus makes contact with the workpiece. Renishaw recommends that this switch is set to the UP position for normal use.

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## SYNC debounce options



### Switch 10:

In operating situations where there is an unusually high level of background vibration, it may be necessary to reduce the sensitivity of the TP200 to avoid false 'air' triggers. These may occur on some types of CMM when large steel stylus arrangements are used or where the CMM is inadequately isolated from the floor transmission of vibration from nearby machinery or vehicle traffic.

Trigger level 1	Is the highest sensitivity mode and provides the best measuring performance.
Trigger level 2	Reduces the vibration sensitivity from level 1 for a small loss of measuring accuracy.

**CAUTION:** All stylus tips must be requalified if the trigger level is changed.

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### Switches 11 and 12:

To prevent a HALT signal (or HALT and SYNC if probe damped mode is set) from being falsely asserted when the probe is subjected to vibration, a time delay filter is applied.

If a collision occurs at fast traverse speed (i.e. a position move), the filter delay time will incur additional CMM overtravel before motion stops. It is important that the CMM motion can stop within the available overtravel, particularly if collisions can occur directly along the main axis of the probe in the +Z direction. To minimise the overtravel in a collision situation, the filter delay time must be set to the shortest possible time that will prevent 'air' triggers from occurring during fast traverse moves when probe damped mode is asserted.

Switches 11 and 12 are used to select the nominal filter times.

### Function of switches 11 and 12:

Time delay	Switch 11	Switch 12
2 ms	DOWN	DOWN
7.5 ms	DOWN	UP
15 ms	UP	DOWN
50 ms	UP	UP

### Switch 13:

Correct polarity	Down
Inverted polarity	UP

The TP200 probe is polarity sensitive and must be connected to the PI 200-3 such that the centre contact of the M8 connector is positive and the thread is ground (0 V). A reversed polarity connection will cause the POWER and STOP indicators to be illuminated on the front panel.

Sliding the switch to the REV position should allow normal operation. Incorrect setting of the polarity switch should not damage the probe.

When the PI 200-3 is added to the PHC10-3 PLUS, the STOP light will flash at approximately 3 Hz. All PI 200-3 interface LEDs should be OFF.

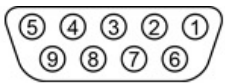
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# Connector pin-outs

## PICS input connector

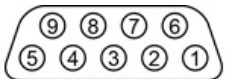
The PICS input connector is a 9 pin 'D' type socket. The pin numbers are illustrated and their functions are shown in table.



Pin number	Description	Pin number	Description
1	STOP	6	STOP +5 V pull-up
2	PPOFF	7	PDAMP
3	Ground (0 V)	8	LEDOFF
4	LED anode	9	Probe signal ground
5	Probe signal input	Shell	Screen

## PICS output connector

The PICS output connector is a 9 pin 'D' type plug. The pin numbers are illustrated and their functions are shown in the table.



Pin number	Description	Pin number	Description
1	STOP	6	HALT
2	PPOFF	7	PDAMP
3	Ground (0 V)	8	LEDOFF
4	Reserved	9	Not used
5	SYNC	Shell	Screen

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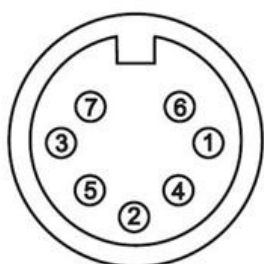
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### SSR output connector

The solid state relay output connector is a 7 pin DIN socket. The pin numbers are illustrated and their functions are shown in the table.

The SSR relay is rated to 30 Vac / dc (limited by the DIN connector) at 50 mA (limited by the relay).

#### Raw probe output connector (view on rear panel)

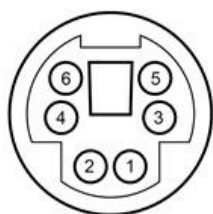


Pin number	Description	Pin number	Description
1	Not used	5	SSR 2
2	Screen	6	Not used
3	Not used	7	Not used
4	SSR 1	Shell	Screen

### Stylus change rack (SCR) output connector

The SCR200 stylus change rack is connected to the PI 200-3 via a 6-pin miniature DIN socket. The pin numbers are illustrated and their functions are shown in the table.

#### SCR200 output connector (view on rear panel)



Pin number	Description	Pin number	Description
1	Reset	4	+5 V
2	Fault	5	Ground (0 V)
3	Inhibit	6	Not used

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### Remote reset

There are two methods of connection to a remote push button that will achieve the same effect as the RESET button on the front panel of the PI 200-3 interface. This may be useful if manual stylus changing is frequent, or if the PI 200-3 is difficult for the operator to access.

A momentary action push button or switch may be connected to pins 1 and 5 on the SCR200 miniature DIN connector on the rear panel. If the connector is already in use for connection of a SCR200 stylus change rack, a dual rack cable type PL97 may be used to provide an additional connector.

Alternatively, the button may be directly wired to the PPOFF and ground (0 V) pins (pins 2 and 3) on either of the PICS connectors on the rear panel of the PI 200-3.

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# PI 200-3 dimensions and cable data

Dimensions	1/3 rack wide × 1U high 155 mm × 44 mm × 180 mm deep
Weight	1.25 kg
Mounting method	19 in rack or freestanding
Mounting screws	M5 × 6 mm maximum penetration
Probe voltage (open circuit)	12.4 V
Probe cable resistance	Maximum 5 Ω / conductor
Probe cable length	Maximum 50 m
Wire gauge	0.22 mm <sup>2</sup>



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# Part number summary

### Interfaces

Description	Part number
PI 200-3 interface	A-5707-0100
PI 200-3 integrated interface (used with PHC10-3)	A-5707-0200

### Probe kits

Description	Part number
TP200 probe kit 1 (including standard force module)	A-1207-0001*
TP200 probe kit 2 (including low force module)	A-1207-0002*

### TP200 stylus modules

Description	Part number
TP200 standard force stylus module	A-1207-0010
TP200 low force stylus module	A-1207-0011

### Rack mounting hardware

Description	Part number
1/3 × 1U blanking panel	A-1018-0179
1 U rack mounting bracket	A-1018-0189
PI 200-3 to PHC10-2	A-1018-0173

### SCR200 stylus change rack

Description	Part number
SCR200 kit - active six port change rack for use with TP200 (including 3 × standard force modules)	A 1207-0030#
SCR200 kit - active six port change rack for use with TP200 (including 3 × low force modules)	A-1207-0070#

### MSR1 module storage rack

Description	Part number
MSR1 - manual storage rack with wall mounting brackets	A-1371-0330
MSR1 - manual storage rack with leg and mounting base	A-1371-0347

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### Accessories

Refer to 'Probing systems for coordinate measuring machines' (Renishaw part number H-1000-5050) for details of the available range of probe heads, extension bars and other accessories.

Description	Part number
M12 location piece (re: SCR200)	M-1371-0298
PL63 (5 m) SCR200 to PI 200-3 cable	A-1016-7630
PL64 (10 m) SCR200 to PI 200-3 cable	A-1016-7631
PL65 (20 m) SCR200 to PI 200-3 cable	A-1016-7632
PL97 (0.26 m) dual adaptor cable for connecting 2 × SCR200 racks to PI 200-3 (requires 2 × cables PL63 / PL64 / PL65) in addition	A-1016-7660
High performance GF stylus kit	A-5003-2310
Autojoint to M8 adaptor: PAA1	A-1051-0417
Rotary adjustment module: M8 - M8	A-1047-7022
Rotary adjustment module: autojoint to M8	A-1051-0679

### Replacements

Description	Part number
User's guide: TP200 probe system (English)	H-1000-5014
Installation guide: PI 200-3 interface for TP200 probe system (English)	H-1000-5029
CK200 cleaning material	A-1085-0016
S1 'C' spanner	A-1042-1486
S9 double-ended 'C' spanner	A-1047-3932
S7 stylus tool	M-5000-3540
Hexagon key 1.5 mm AF	P-TL03-0150
Datuming stylus (PS2R)	A-5000-3603
Rubber feet (for PI 200-3)	P-FE01-0003
Torx key	P-TL10-OT10

\* TP200 / TP200B probe kit contents:

- TP200 probe body
- Stylus module
- Tools / cleaning kit
- Test certificate
- User's guide

# SCR200 stylus change rack kit contents:

- SCR200 rack
- Stylus modules (×3)
- Mounting kit
- Datuming stylus

## PI 200-3 installation guide

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# Installation procedure



**WARNING:** Ensure the PI 200-3 is disconnected from the power adapter during installation.



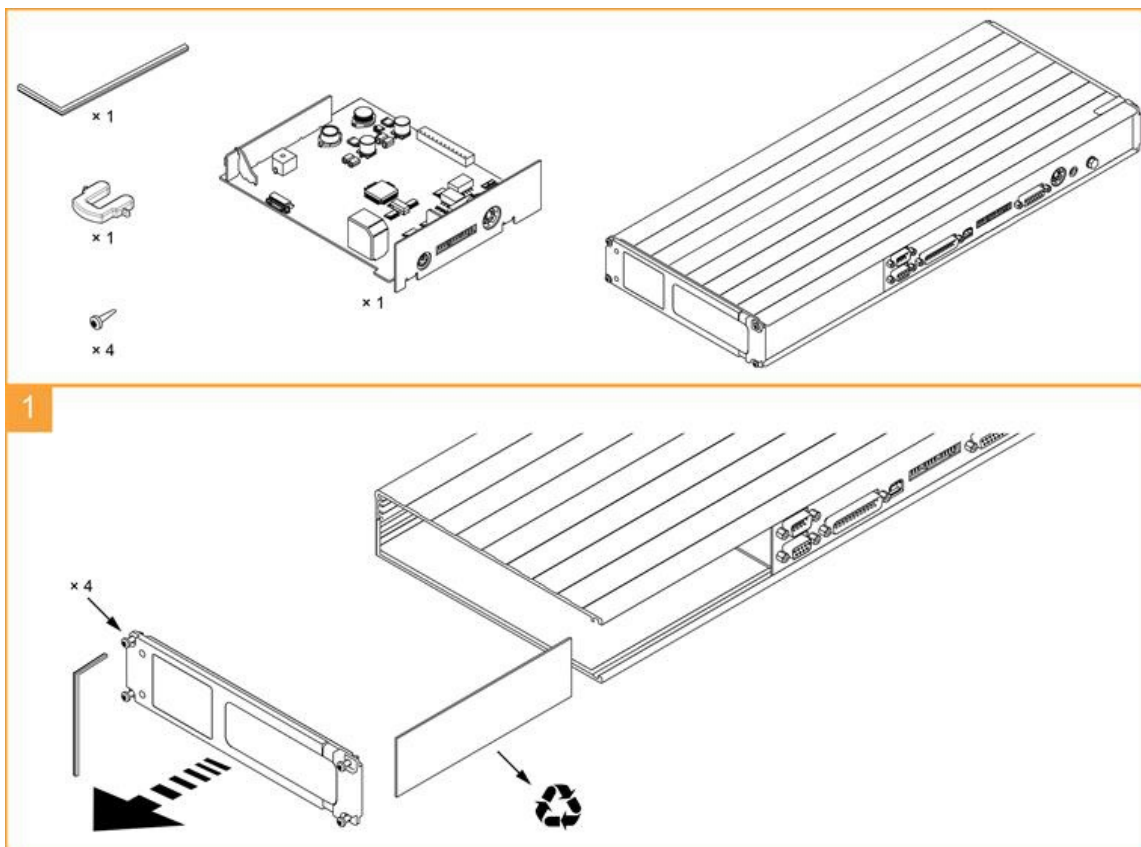
**WARNING:** Take care not to exceed the operation ambient of 50 °C around the unit. Do not install near sources of heat. Forced cooling may be required in final installation.

## Inserting PI 200-3 card into PHC10-3 PLUS

Remove the end panel of the PHC10-3 PLUS with a hex-key and slide out the blanking plate.

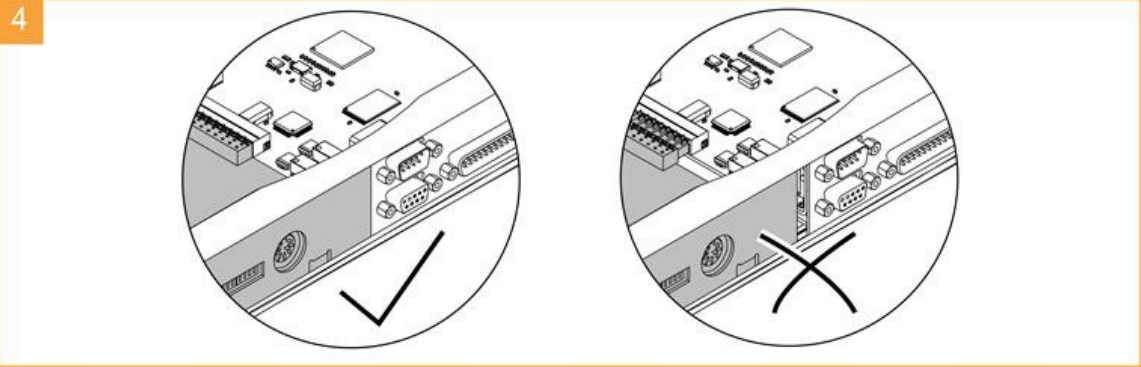
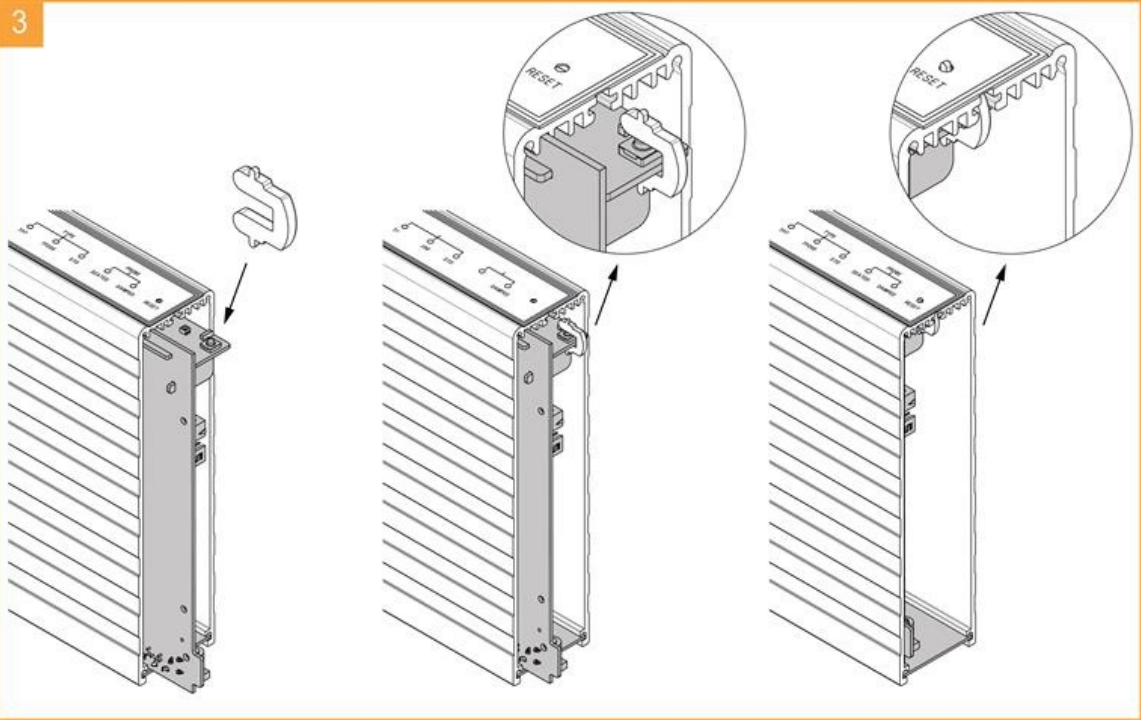
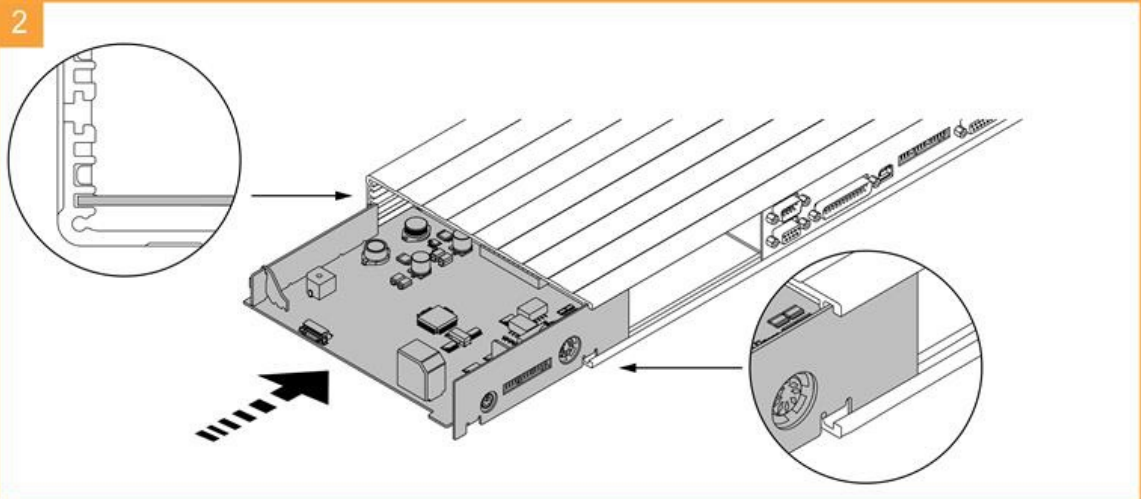
Insert the PI 200-3 card, ensuring that the card is located in the correct grooves shown in the illustration below.

Insert the reset actuator over the top of the reset button on the PI 200-3 card and then replace the end panel.



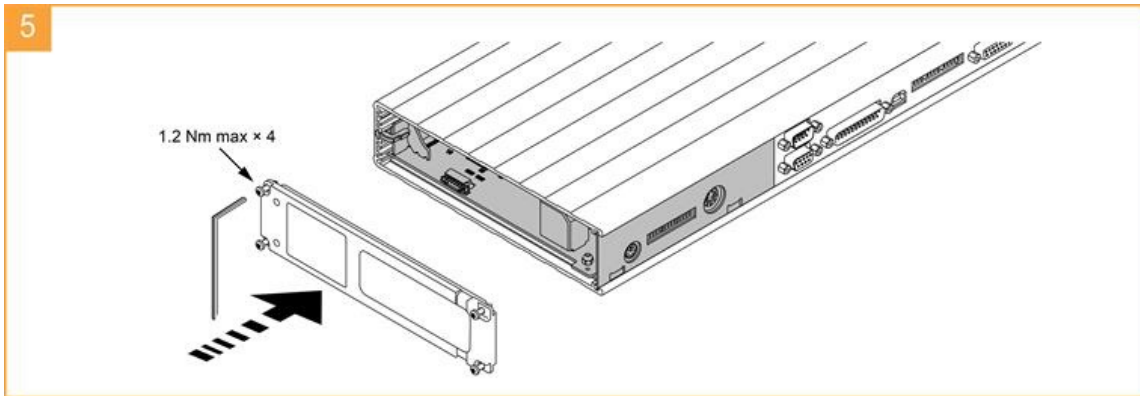
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## PI 200-3 installation guide

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### Upgrading to TP200 (retrofit)

To successfully retrofit a TP200 probe system, the following points will need to be considered:

- The CMM controller must service the PICS - PDAMP control signal - upgrade of the controller may be necessary if this signal is not available
- The probe signal wires from the M8 connector on the probe head must be routed directly to the PI 200 interface - if an in-line interface for kinematic switching probes (TP1 / TP2 / TP6) is present, it must be removed
- The signal wire resistance must be less than 5 ohms per conductor
- Some experimentation with typical stylus arrangements may be necessary to obtain a satisfactory setting for the PDAMP / HALT filter delay time - the trigger / reseal debounce time and other configuration options will also need to be set (refer to the 'configuration switches' section for more information)
- If upgrading from TP2, measurement programs may need to be changed to suit the length of the TP200, which is 5 mm longer than the TP2
- If upgrading from TP2, star or offset (cranked) stylus arrangements will require a minimum 5 mm extension piece to be added for use with the TP200
- If cables other than those supplied by Renishaw are used, equivalent cable screening and connector bonding must be used to maintain compliance with the EMC standards

# PI 200-3 installation guide

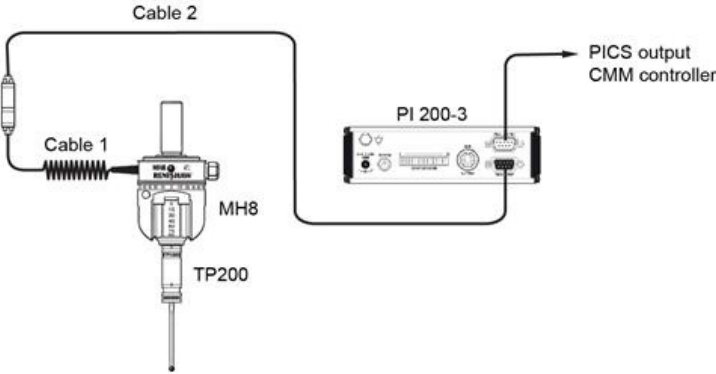
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## System interconnection

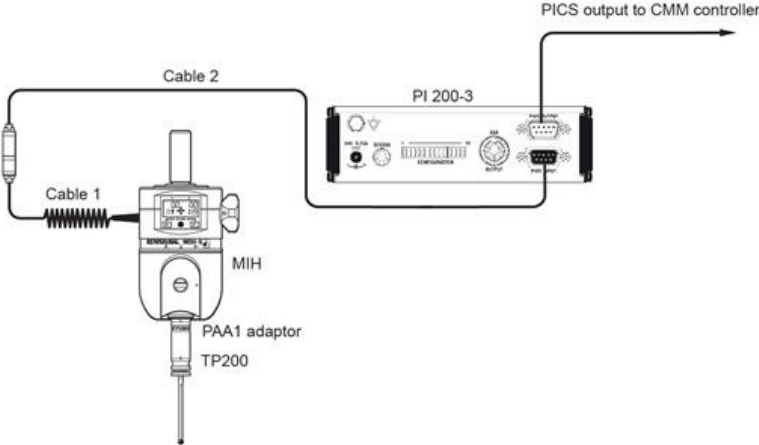
Interconnection diagrams for the most common product combinations. Consult the appropriate product installation guide for information about setting the configuration switches of the PHC10-3 PLUS or ACC2-2 system controllers:

- PH10 PLUS series installation and user's guide (Renishaw part number H-1000-7592)
- Autochange system installation guide (Renishaw part number H-1000-6010)

### PI 200-3 interconnection with MH8



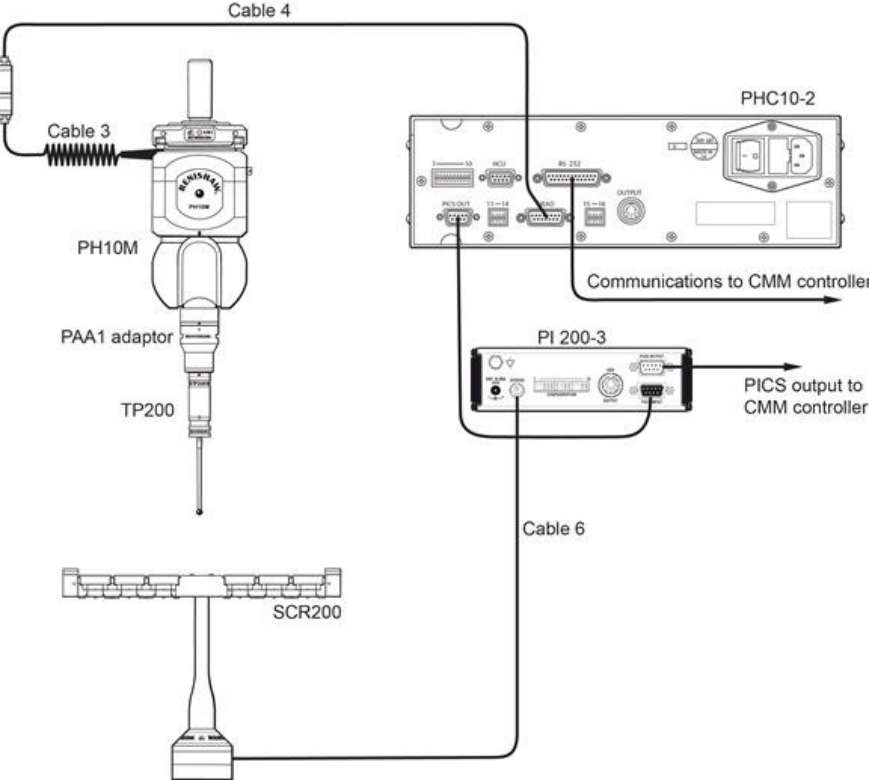
### PI 200-3 interconnection with MIH head



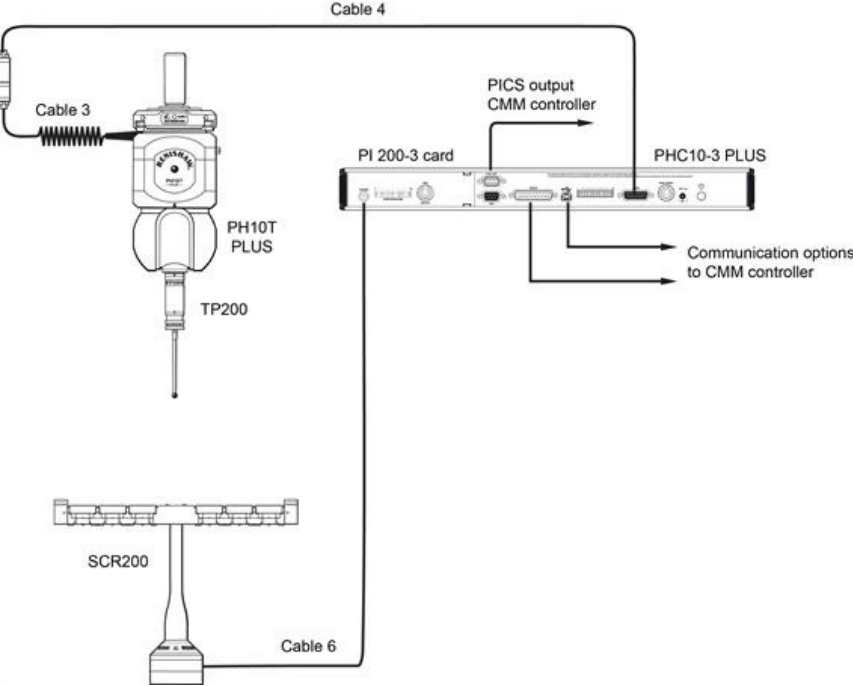
# PI 200-3 installation guide

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## PHC10-2 and PI 200-3 interconnection with PH10M



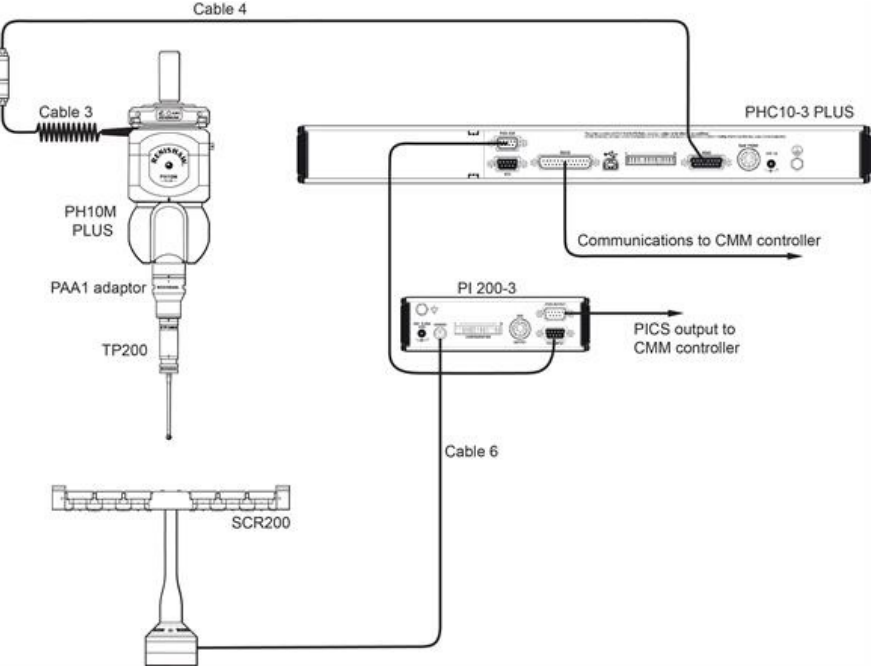
## PI 200-3 card with PHC10-3 PLUS interconnection with PH10T PLUS and SCR200



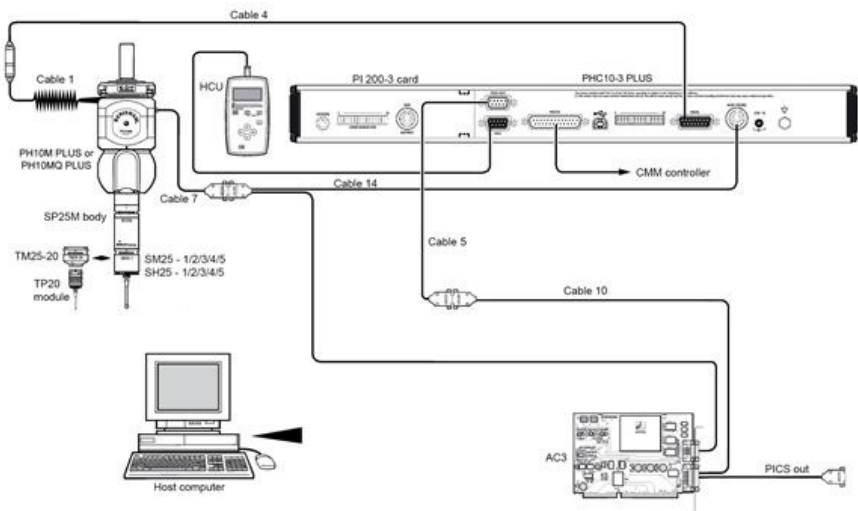
# PI 200-3 installation guide

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## PI 200-3 with PHC10-3 PLUS interconnection with PH10M PLUS and SCR200



## PI 200-3 card and PHC10-3 PLUS interconnection with PH10 PLUS and AC3

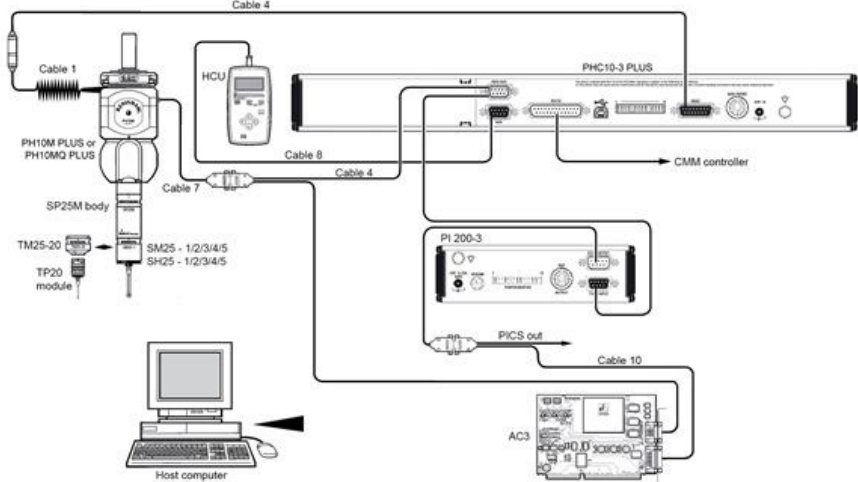




# PI 200-3 installation guide

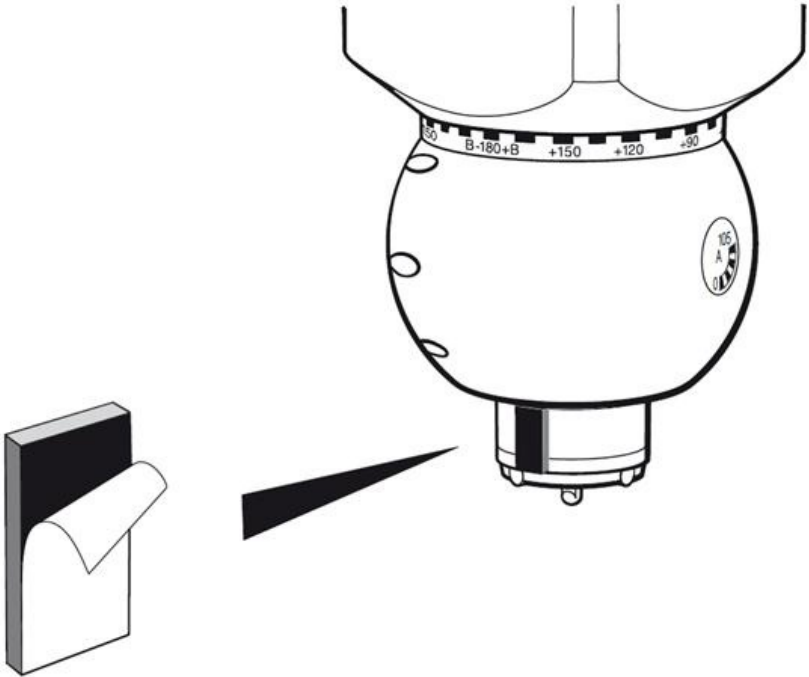
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## PI 200-3 and PHC10-3 PLUS interconnection with PH10 PLUS and AC3



## Using TP200 with the ACR1 autochange system

The CMM controller must assert the probe damping signal (PDAMP) on the PICS port when the probe is approaching the rack, to prevent a false trigger being generated when the probe contacts the docking port lid. If this is not possible, a shock absorbing pad (part number A-1085-0294 supplied with ACR1) must be fitted to the autojoint connector on the probe head at the point of contact with the port lid.



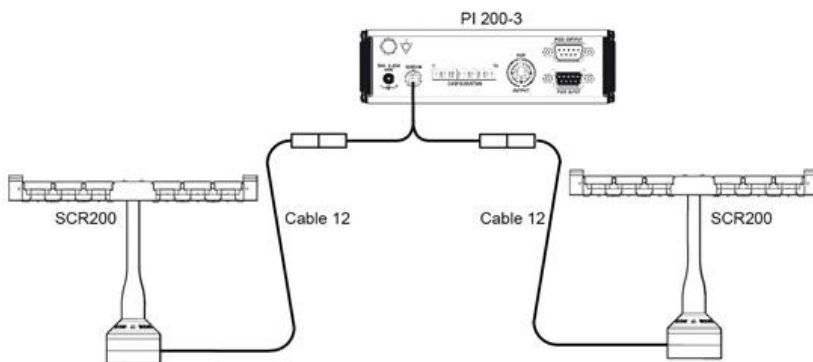
## PI 200-3 installation guide

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### SCR200 stylus change rack

#### PI 200-3 and two SCR200 racks

The miniature DIN connector on the base of the SCR200 rack is connected to the SCR200 connector on the PI 200-3 rear panel using cable PL63 / PL64 / PL65 according to the length required. For applications requiring two racks, a dual rack splitter cable is needed. SCR200 adaptor cable must be fitted at the PI 200-3 end.



## PI 200-3 installation guide

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### Interconnection cables

Cable number	Cable ident	Length	Part number	Notes
1	PL1	260 mm to 710 mm (10.24 in to 27.95 in)	A-1016-0004	Coiled
1	PL2	410 mm to 1.27 m (16.14 in to 50 in)	A-1016-0006	Coiled
1	PL3	680 mm to 2.32 m (26.77 in to 91.34 in)	A-1016-0012	Coiled
1	PL4	4.5 m (177.17 in)	A-1016-0001	Plain
1	PL27	225 mm to 450 mm (8.86 in to 17.72 in)	A-1016-6370	Coiled
1	PL29	740 mm to 1.48 m (29.13 in to 58.27 in)	A-1016-6420	Coiled
2	PL22	0.4	A-1057-0131	
3	PL5	400 mm to 800 mm (15.75 in to 31.5 in)	A-1016-0131	Coiled
3	PL6	800 mm to 1.6 m (61.5 in to 62.99 in)	A-1016-7673	Coiled
3	PL12	100 mm (3.94 in)	A-1016-7674	Plain
3	PL13	100 mm to 200 mm (3.94 in to 7.87 in)	A-1016-7675	Coiled
4	PLM6	6 m (236.22 in)	A-1016-7564	Unterminated on end
4	PLM7	4 m (157.48 in)	A-1016-7563	Unterminated on end
4	PLM8	6 m (236.22 in)	A-1016-7677	
4	PLM9	4 m (157.48 in)	A-1016-7678	
5	PL25	300 mm (11.81 in)	A-1016-0124	
6	PL63	5 m (196.85 in)	A-1016-7630	
6	PL64	10 m (393.7 in)	A-1016-7631	
6	PL65	20	A-1016-7632	
7	PL38	25 m (984.25 in)	A-1016-7625	Unterminated on end
7	PL42	15 m (590.55 in)	A-1016-7624	Unterminated on end
7	PL56	12 m (472.44 in)	A-1016-7626	Unterminated on end
7	PL44	8 m (314.96 in)	A-1016-7627	Unterminated on end
7	PL46	3.7 m (145.67 in)	A-1016-7628	Unterminated on end
7	PL45	1.8	A-1016-7629	Unterminated on end
8	PL70	2	A-1016-7634	
9	PL76	1	A-1016-7643	
10	PL112	1	A-2172-0004	
11	PL97	0.25	A-1016-7660	
12	PL63	5 m (196.85 in)	A-1016-7630	
12	PL64	10 m (393.7 in)	A-1016-7631	
13	PL65	20	A-1016-7632	
14	PL172	0.75	A-5684-1000	

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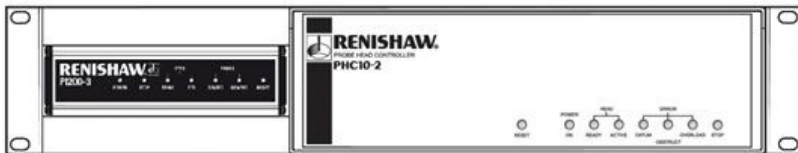
### Rack mounting

#### Mounting PI 200-3



To mount the PI 200-3 in a 19 inch cabinet, two 1/3 blanking panel kits are required (Renishaw part number A-1018-0179). Fit the panels using the M5 × 6 mm long screws provided.

#### Mounting PI 200-3 with PHC10-2



To mount a PI 200-3 next to a PHC10-2 controller in a 19 inch cabinet, a bracket kit is required (Renishaw part number A-1018-0173). Fit the panels using the M5 × 6 mm long screws provided.

## PI 200-3 installation guide

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

# PICS terminations

The Renishaw product interconnection system (PICS) has been developed to standardise the format for real-time communications between Renishaw products and the CMM controller. PICS facilitates the integration of multiple probe interfaces and system controllers without the need for additional hardware or software overheads on the CMM controller.



**NOTE:** The order in which the system components are connected is important. In particular, the autochange controller (ACC2-2) should be the last in the chain before the CMM controller to allow it to disable probe damping (PDAMP) during the ACR1 set-up procedure.

## PI 200-3 installation guide

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

# PI 200-3 maintenance

Periodically check the security of the mounting screws and electrical connectors.

Remove dust from the external surfaces with a dry, lint free cloth.

## PI 200-3 installation guide

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

# Power supply

## Powering the PI 200-3

The PI 200-3 TP200 interface is to be used with the provided PSU - (Emerson DP4024N3M AC power adaptor). [www.emerson.com](http://www.emerson.com) This is a 24 Vdc 49 W supply and is connected to the PI 200-3 via Ø5.5 mm dc jack plug.

PI 200-3 does not require a protective earth, however an equipotential bonding point is provided on the rear panel for connection to the rest of the installation.

- PI 200-3 interface is rated to operate at +24 Vdc 0.25 A max input current

If an internal interface is fitted with the PHC10-3, it will obtain its power internally from the PHC10-3 controller.

## PI 200-3 installation guide

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# PI 200-3 fault finding

The CMM will not register a probe trigger but the probe operates normally when the stylus is deflected by hand:

PI 200-3 indicators	Possible causes	Remedy
STOP LED is ON. TP200 LED is ON. SEATED LED operates normally.	The CMM controller or a Renishaw system has activated the STOP signal. The SCR200 overtravel mechanism is deflected.	Check the status of the Renishaw motorised probe head or other systems.

The probe fails to trigger and the probe LEDs glow only dimly when the stylus touches the workpiece, but the probe operates normally when the stylus is deflected by hand:

PI 200-3 indicators	Possible causes	Remedy
SEATED LED is ON.	The trigger speed is too slow. The stylus is too heavy.	Probe normally to the work piece. Increase the gauging.

The probe will not arm or the probe does not stay armed when the RESET button is released. The probe LEDs are always OFF:

PI 200-3 indicators	Possible causes	Remedy
STD LED is ON. SEATED LED is OFF.	The probe sensor is faulty. The probe wiring is open circuit.	Remove the probe and test by substitution. Check the wiring from the probe to the PI 200-3 interface.

False ("air") triggers occur while the CMM is stationary and the probe LEDs flicker:

PI 200-3 indicators	Possible causes	Remedy
TP200 LED is on. SEATED LED operates normally.	The probe sensor is faulty. The probe is loose in the probe head. There is excessive vibration from an external source. There is excessive vibration from the CMM.	Remove the probe and test by substitution. Correctly tighten the probe. Remove the cause or isolate the CMM. Check the CMM's air supply. Maintain the CMM's air bearings.

False ("air") triggers occur at gauging speed and the probe LEDs flicker:

PI 200-3 indicators	Possible causes	Remedy
DAMPED LED is OFF. SEATED LED operates normally.	The stylus is too large or too heavy. There is excessive vibration from the CMM.	Use stylus arrangements within recommendations. Check the CMM's air supply. Maintain the CMM's air bearings.



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