HCU1 User Guide

H-1000-5016-04-A

HCU1 disclaimers

FCC (USA)

Information to user (47CFR§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 installation 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 (47CFR§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.

Labelling requirements (47CFR§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.

WEEE

The use of this symbol on Renishaw products and/or accompanying documentation indicates that the product should not be mixed with the 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 save valuable resources and prevent potential negative effects on the environment. For more information, please contact your local waste disposal service or Renishaw distributor.

HCU1 care of equipment

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 equipment

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.

Warranty

Renishaw plc warrants its equipment provided that it is installed exactly as defi ned in associated Renishaw documentation. Prior consent must be obtained from Renishaw if non-Renishaw equipment (e.g. interfaces and/or cabling) is to be used or substituted for Renishaw equipment. Failure to comply with this will invalidate the Renishaw warranty.

Claims under warranty must be made from authorised service centres only, which may be advised by the supplier or distributor.

HCU1 introduction

The HCU1 is a hand control unit for use with Renishaw motorised probe head systems.

The HCU1 enables the probe head to be used in a manual mode and is invaluable for component set-up, operator-controlled inspection and teach cycle programming.

It has a two-speed action, with a choice of jog or sweep moves.

The LCD matrix display with contrast adjustment provides head angle and system status information as well as error analysis.

A transmit key is provided for teach cycle programming.

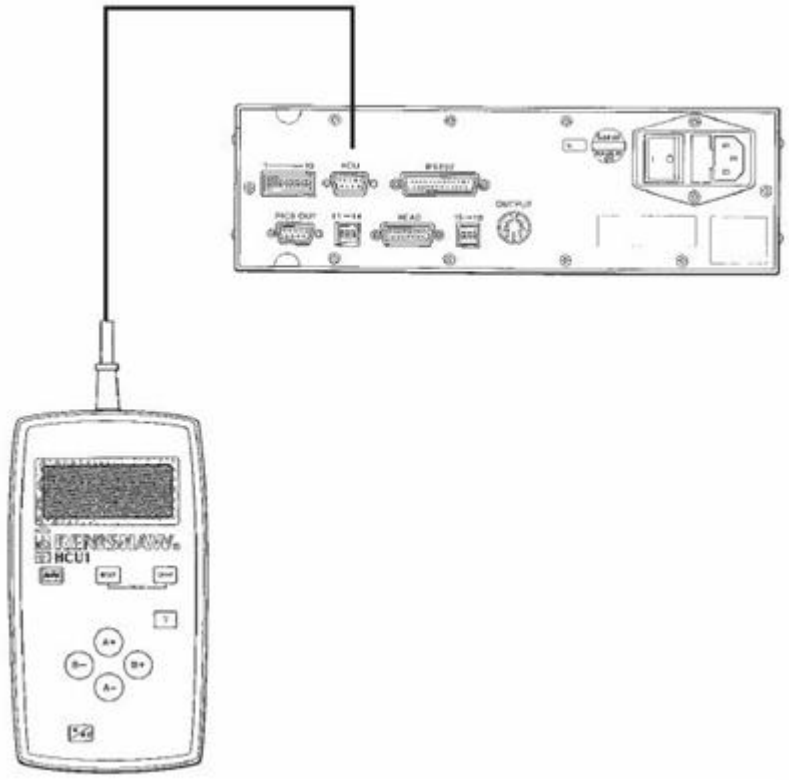
The unit comes complete with probe DAMPing and probe reset functions (see Probe Function page).

The audible key press confirmation facility can be selected.

The unit is supplied with a 5 m long cable, which can be extended to up to 25 m if required.

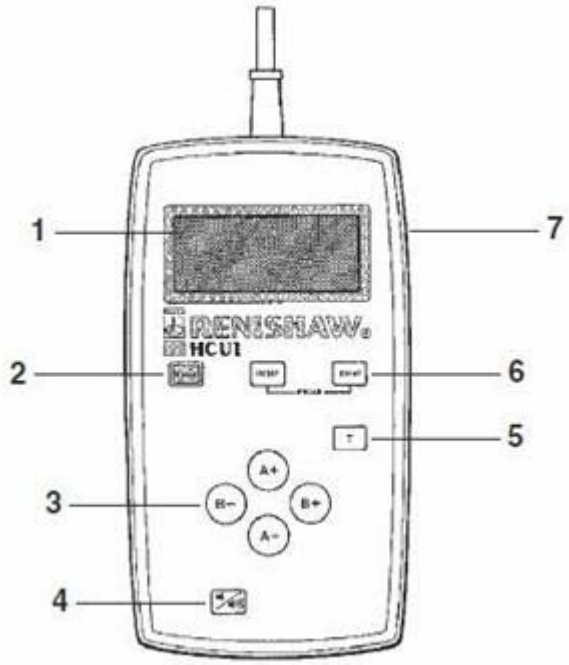
HCU1 installation

The HCU1 is plugged into the 9-way ‘D’ socket marked HCU on the rear panel of the motorised head controller as shown below.



Using HCU1

Layout



Key

1. LCD display
2. Head initialisation key (PH50 only)
3. Direction keys
4. Audible key press confirmation toggle key
5. Transmit key
6. Probe function keys (see Probe function page)
7. LCD contrast adjustment

Manual and automatic modes

Manual and automatic modes are selected by the CMM computer.

Manual mode

In manual mode the HCU1 is used to control the motorised head manually or to set probe functions.

The LCD display indicates MANUAL.

If the HCU1 is connected to the motorised head controller when power is applied, the system will enter manual mode.

Automatic mode

In automatic mode the motorised head system is under control of the CMM computer.

The LCD display indicates AUTO.

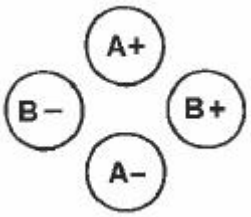
The HCU1 displays information, but it is not possible to use it to move the head or set probe functions.

If the HCU1 is not connected to the motorised head controller when power is applied, the system will enter automatic mode.

Jog move

This feature is used to move the probe head in single steps.

Press and immediately release the appropriate direction key.



The head will unlock and the LCD will display ACTIVE. The head will rotate by a single 7.5° step.

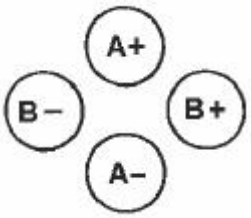
If the direction key is pressed again before the head begins to lock, the head will rotate by another 7.5° step.

If no further keys are pressed, the head will lock, the LCD will display READY and the motorised head will be ready for measurement.

Sweep move

This feature is used to move the probe head in one continuous movement.

Press and hold down the appropriate direction key.



The head will unlock, and the LCD will display ACTIVE. The head will rotate by a single 7.5° step.

After a short delay the head will continue to rotate smoothly in this direction until either the key is released or the axis limit is reached.

There will be another short delay, then the head will lock and the LCD will display READY.

Transmit signal

The T (transmit) key is used to send a signal to the CMM computer.

The action and use of this signal are dependent on the integration of this function by your CMM supplier.

When the operator is “teaching” the CMM a sequence of positions to follow, the T key is pressed to signal that a required position has been reached. It can also be used to instruct the CMM computer to memorise the angle of the probe head during a teach cycle.

Please refer to the relevant CMM-specifi c documentation provided by your CMM supplier for details of the use of the T key.

Home (PH50 only)

> **NOTE:** PH50 is now discontinued from the range of Renishaw probe heads**.**

If the PH50 probe head is switched off whilst unlocked, overloaded or obstructed, the internal reference system within the PH50 will be lost and the head will have to be initialised.

The HCU1 LCD display will show the message INITIALISE HEAD and the PHC50 front panel HOME LED will be lit.

The PH50 can be initialised by pressing the HOME key on the HCU1.

> **NOTE:** This button is inactive unless head initialisation is required. Pressing it will have no effect unless the HOME LED is lit or the INITIALISE HEAD message displayed.

> **CAUTION:** When initialisation is started, the probe head will move slowly in both axes simultaneously until their limits are reached. It is therefore essential that the PH50 is moved clear of any obstructions before initialisation is requested.

Please refer to section 4.4 of the PH50 motorised probe head system user’s guide (part number H-1000-5092) for further details (available on Renishaw website - www.renishaw.com).

Probe functions

Probe reset

NOTE: The probe reset function is only available if it has been integrated by your CMM supplier.

Some Renishaw probe interfaces have a probe reset button mounted on the front panel. The function of this button is to reset the probe sensor to a seated condition, for instance following a manual stylus change. This button has been reproduced on the HCU1 for ease of access. Probe reset is only available from the HCU1 if the motorised probe head is in manual mode.

Please refer to your probing system user's guide or to your CMM supplier for details of the use of this feature.

CAUTION: This button should only be pressed when the probe is physically seated and clear of the workpiece.

Probe DAMPing

Probe DAMPing is a feature of your Renishaw probe interface which reduces the sensitivity of the probing system and helps to reduce unwanted triggering caused by CMM acceleration or vibration during position moves.

It is normally used by the CMM computer to filter unwanted triggers during automatic position moves.

The HCU1 enables probe DAMPing to be set manually to eliminate unwanted triggers during manual position moves. Probe DAMPing is only available from the HCU1 if the motorised head system is in manual mode. In automatic mode probe DAMPing is controlled from the CMM aplication software and motorised head controller and this key has no effect.

The DAMP key toggles between probe DAMPing ON and OFF.

Probe DAMPing display summary

System mode	Probe DAMPing	HCU1 LCD display
Manual or automatic	OFF	
Manual or automatic	ON	DAMPED

CAUTION: Probe DAMPing must be switched off when measurement points are being taken. Use of probe DAMPing during measurement will significantly affect measurement accuracy.

Audible key press confirmation

To confirm that a key has been pressed, it is possible to switch on an audible indicator which emits a tone when any key is pressed. The Audible key press confirmation toggle key toggles between audible tone ON and OFF.

The HCU1 powers up with the audible indicator OFF.

Effect of STOP

If a STOP signal is sent to the motorised head system by the CMM controller while it is in manual mode, the motorised head will react as follows:

Manual mode STOP reactions

Action	Reaction	Removal of STOP
STOP sent while direction key on HCU1 is being pressed.	Continuous head movement immediately disabled. Head will continue to move in single steps. Head will lock up as normal when movement key released.	Continuous movement enabled.
Direction key on HCU1 pressed after STOP has been sent.	Single step manual movement only. Head will lock up as normal when movement key released.	Continuous movement enabled.

HCU1 error reporting

The HCU1 LCD display gives information on head and system errors.

Datum error

Fault	The motorised probe head has not locked up to the required level of accuracy.
Action	Refer to your motorised head user's guide for further information concerning this error condition.

Obstruct error

Fault	The motorised probe head has been obstructed while rotating to the required position.
Action	Refer to your motorised head user's guide for further information concerning this error condition.

Overload error

Fault	The motorised probe head head has been overloaded during a machine quill move.
Action	Refer to your motorised head user's guide for further information concerning this error.

Initialise head (PH50 only)

Fault	The PH50 probe head has been switched off whilst unlocked and the internal reference system has been lost.
Action	Head must be initialised. See Home (PH50 only) page for instructions.

Head not present

Fault	The motorised head is not electrically connected to the probe head controller.
Action	Check the head is electrically connected. Check cable connections. Check cable integrity. Contact your CMM supplier for further assistance.

HCU1 not recognised

Fault	There is a communications error between the HCU1 and the motorised head controller.
Action	Check cable connections. Contact your Renishaw representative for further assistance.

No response from controller

Fault	There is a communications error between the HCU1 and the probe head controller.
Action	Check the cable connections. Return both units to your Renishaw representative for service.

System error

Fault	Internal motorised head system failure.
Action	No user recovery action. Return motorised head to your Renishaw representative for service.