

UCC T3-2 installation guide

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UCC T3-2 installation guide

Documentation part number: H-1000-5254-03-D



UCC T3-2 installation guide

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UCC T3-2 general information

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 ORIGINAL LANGUAGE VERSION

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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.

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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	Cardboard - 70% recycled content	PAP	20
Packing foam	Polyurethane	PU	7
Packing foam	Cross-linked polyethylene	LDPE	4
Plastic bags	Low density polyethylene bag	LDPE	4

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UCC T3-2 product compliance

EU declaration of conformity

Contact Renishaw plc or visit www.renishaw.com/EUCMM for the full EU declaration.

UK declaration of conformity

Contact Renishaw plc or visit www.renishaw.com/UKCMM for the full UK declaration.

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.

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.

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

China RoHS

Contact Renishaw plc or visit www.renishaw.com/ChinaRoHSCMM for the full China RoHS tabulation.



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UCC T3-2 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 UCC T3-2 controller is only warranted and approved for use with the provided PSU - Cincon TRG70A240-02E02.

PSU electrical ratings

Supply voltage	100 V to 240 Vac \pm 10%
Frequency range	50 Hz to 60 Hz
Power consumption	3 A
Output voltage	24 Vdc
Transient voltages	Installation category II

The UCC T3-2 is isolated from the 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.

The UCC T3-2 is provided with an equipotential bonding point which must be used to connect it to the rest of the installation's grounded structures.



WARNING: Switching off or isolating the UCC T3-2 may NOT prevent unexpected machine movement. The user is advised to isolate the machine from the electricity supply, compressed air or other energy sources and ensure the machine is at rest and in accordance with the machine manufacturer's instructions before entering the danger zone or performing any maintenance operations.

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UCC T3-2 environmental conditions

Indoor use	IP10* (BS EN60529:1992)
Altitude	Up to 2000 m
Operating temperature	+5 C to +50 C
Storage temperature	-25 C to +70 C
Relative humidity	80% maximum (non-condensing) for temperatures up to +31 °C Linear decrease to 50% at +50 °C
Transient voltages	Installation category II
Pollution degree	2



* **NOTE:** It may be necessary to house UCC T3-2 in a suitable enclosure according to the installation's environmental conditions to obtain a higher IP rating.

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UCC T3-2 references and associated documents

It is recommended that the following documentation is referenced when installing the UCC T3-2:

Renishaw documents

Title	Document number
Installation guide: PICS	H-1000-5000
Installation guide: SPA3-2	H-1000-5364
Installation and user's guide: MCU	H-1000-5182
UCCassist-2 help	Found within UCCassist-2
User's guide: TP200 and SCR200 probe system	H-1000-5014
Installation guide: PI 200-3	H-1000-7542

External documents

National and international standards including the following may be applicable to the finished machine or installation: -

EN 292-2:1991 (Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications).

EN (IEC) 60204-1:1997 (Safety of machinery - Electrical equipment of machines - Part 1: General requirements).

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UCC T3-2 introduction

The UCC T3-2 is the latest generation Renishaw CMM controller product range. It supports the complete range of Renishaw two wire touch-trigger probes along with the high performance TP200 probe.



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Key	Description
1	Machine motors
2	Machine scales and readheads
3	Probe head - manual or fixed - connects to the UCC T3-2 via the machine cabling
4	UCCassist-2 commissioning software and application software
5	UCC T3-2 and power amplifier SPA3-2 - these connect to the machine cabling
6	MCU joystick - MCULite-2, MCU5-2 or MCU W-2 - connects to SPA3-2
7	PC - connects to UCC T3-2 via an ethernet cable

The UCC T3-2 is a controller in a 19 inch rack-mountable enclosure. It is coupled to the CMM host computer by an ethernet link and to the CMM via external cable interface connectors.

The UCC T3-2 controller in conjunction with the SPA3-2 has the capability of:

- controlling three axes of a CMM (accepting digital readhead signals and generating three axes of motor drive signals)
- accepting input signals from emergency stop, air pressure, crash detector, digital SPA, amplifier faults and all axis inner and outer travel limit switches
- accepting two uncommitted general purpose input signals and generating one uncommitted general purpose output signal via SPA3-2
- directly supporting the TP1, TP2, TP6, TP20 and TP200 touch-trigger probes
- providing a +24 V supply for use by the CMM switches
- supporting the MCULite-2, MCU5-2 and MCU W-2 joysticks

This guide gives information on physical installation, system connections and communications, as well as assistance in fault finding during the installation of the UCC T3-2.



WARNING: UCC T3-2 is not compatible with PH9, PH10, PHS, PH20 and REVO systems. No attempt should be made to connect these system components to the UCC T3-2 as this will result in damage to the product or attached equipment.

Please use this guide in conjunction with the SPA3-2 and PICS user's guide in order to fully understand the system's features, capabilities and operation.

The UCC T3-2 **does not** support TP7.

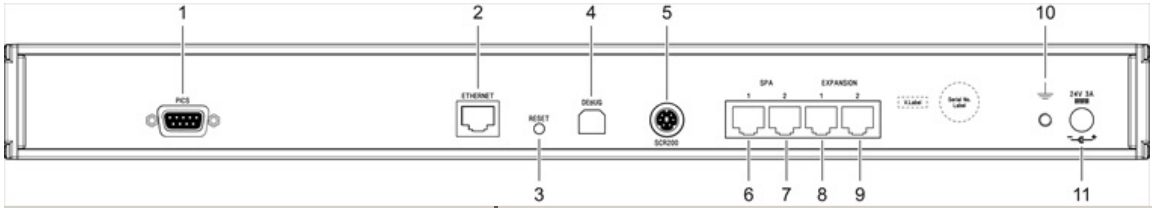
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Front panel layout



Rear panel layout



Key	Description	Connector polarity
1	PICS	SOCKET
2	Ethernet communications connector to CMM computer	SOCKET
3	Reset button / IP configure button	
4	Reserved - do not connect	
5	SCR200 rack input (TP200)	SOCKET
6	RJ45 connector to SPA3-2	SOCKET
7	RJ45 connector to second SPA3-2	SOCKET
8	Reserved	
9	Reserved	
10	Equipotential bond point	BOLT
11	DC power jack 24 V	SOCKET

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Connecting the UCC T3-2 to the host PC

Hardware connection

The host PC must have a dedicated ethernet connection to the CMM controller. It is recommended that this is not a USB plug-in adapter because of the reduction in speed these devices can produce.

If the host PC is connected to a network, it is necessary to install additional hardware to allow a dedicated connection for UCC T3-2 communication. For details on how to install additional hardware on the host PC, please refer to the manufacturer user's guide.

A 5 m ethernet cable is provided for this link as part of the CMM controller kit. The cable included is a CAT 5E, cross-over type. Other lengths may be used, but the maximum length is determined by the generic specification for ethernet connections.

It is recommended that a shielded ethernet cable is used if there is a likelihood of EMC disruption due to the environment or location of the routed cable.

It is recommended that the cross-over cable is labelled to avoid being mistaken for a non cross-over cable.

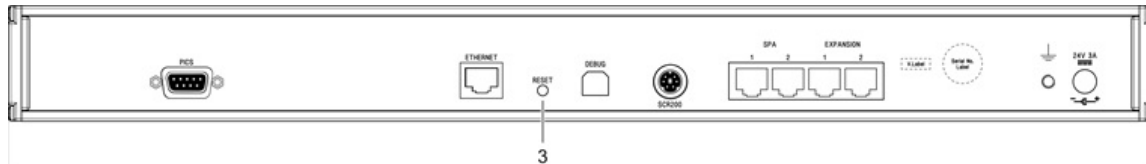
Software installation

UCCsuite 4.7 service pack 2 (SP2) or newer software must be installed on the host PC prior to connection of the UCC T3-2. The UCC software suite can be downloaded from the [Renishaw website](#). After the software has been installed, run UCCassist-2 to set up and configure the CMM controller.

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IP configure / reset button



Number 3 on the rear panel is the reset button which has two different functions. The function depends on the operational state of the controller.

1. Pressing and releasing the reset button within fifteen seconds of switching on or rebooting the unit will force the controller into IP configuration state.
2. Pressing and releasing the reset button after the download or whilst operating will cause the unit to restart.

To enter IP configuration state when the unit is already powered, press and release the reset button twice.

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Installation and connection details

Dimensions

Width	Depth	Height	Weight
440 mm (17.3 in)	180 mm (7.1 in)	44 mm (1.7 in)	2.1 kg (4 lb 10 oz)

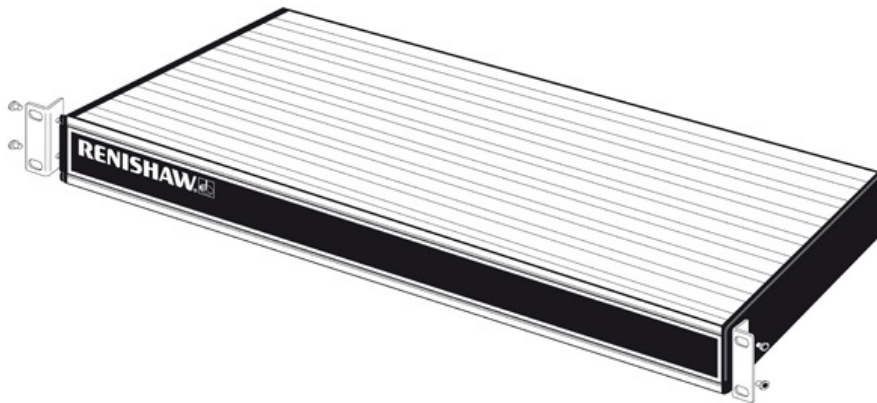
UCC T3 -2 can either be free standing or used in a 19 inch rack system.

Stand-alone installation

The CMM controller unit draws air from the right hand side when viewed from the front and expels air out of the left hand side. A minimum clearance gap of 10 mm is necessary between the sides of the unit and any potential obstruction.

Mounting in a 19 inch rack

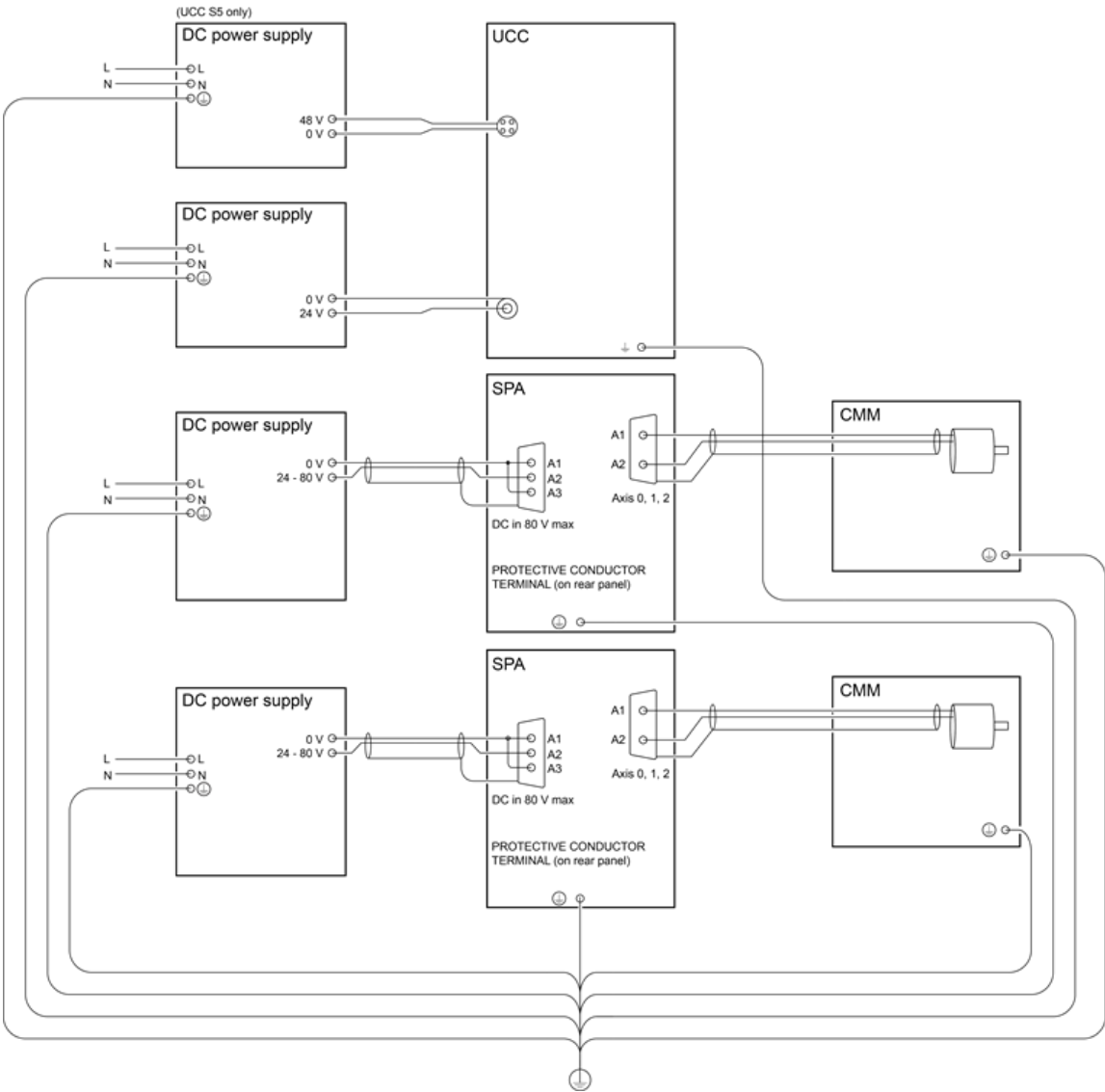
The rack mounting kit (Renishaw part number A-5518-0005) contains two brackets and four M5 × 6 mm screws. Assemble the brackets to the CMM controller as shown below:



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Earth bonding scheme

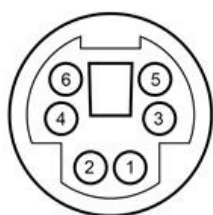


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Stylus change rack (SCR) connector

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



SCR200 connector (view on rear panel)

Pin number	Description	Pin number	Description
1	Reset	5	0 V
2	Fault	6	Reserved
3	Inhibit	Shell	Screen
4	+5 V		

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UCC T3-2 to SPA3-2 connection

The units must be linked by the supplied shielded CAT 5E 300 mm cable(s), no other cables are to be used.

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Ethernet cable link to PC

This is a standard ethernet CAT 5E cable, a 5 m cable is supplied as part of the CMM controller kit. Lengths up to 100 metres can be used.

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PICS interface configuration

Configuration of the PICS (product interconnection system) is via UCCassist-2.

Renishaw's PICS allows a standard method of connection for real-time signals used by current Renishaw products.

Please refer to the PICS installation guide (Renishaw part number H-1000-5000) for further information when interfaces are fitted.



NOTE: TP7 is not supported with this product.

Cable connection

Renishaw supply a short 0.3 m PICS cable (PL25) with the PHC10-3 PLUS and ACC2-3 units. This cable is designed to connect between Renishaw controllers and interfaces.

A 5 m PICS cable (PL24) is available to connect the final output stage of the Renishaw system to the CMM controller.

Both cables are terminated with 9 way 'D' type connectors.

Cable specification

The maximum recommended cable length to interconnect between the Renishaw controllers and interfaces is 0.3 m.

The maximum recommended cable length to connect between the Renishaw system and the CMM controller is 5 m.

If greater lengths are required please discuss this issue with Renishaw.

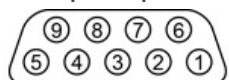
The cable should be a minimum of 9 cores 7/0.2 overall screened.

The screen must be terminated to the body of each connector.

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Output pin connections



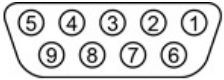
The pin connections for the 9-way 'D' type output socket are:

Pin	Function
1	STOP
2	PPOFF
3	0 V
4	ERROR
5	SYNC
6	HALT
7	PDAMP
8	LED off
9	READ
Screen	Cable screen

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Input pin connections



The pin connections for the 9-way 'D' type input plug are:

Pin	Function
1	STOP
2	PPOFF
3	0 V
4	LED anode *
5	Probe signal (input)
6	STOP 'pull up'
7	PDAMP
8	LED off *
9	Probe signal (return)
Shell	Screen

NOTE: LED OFF



This signal passes through all products and is connected to the LED anode in the probe head or probe head controller. Any product can turn off the LED by connecting LED OFF to 0 V.

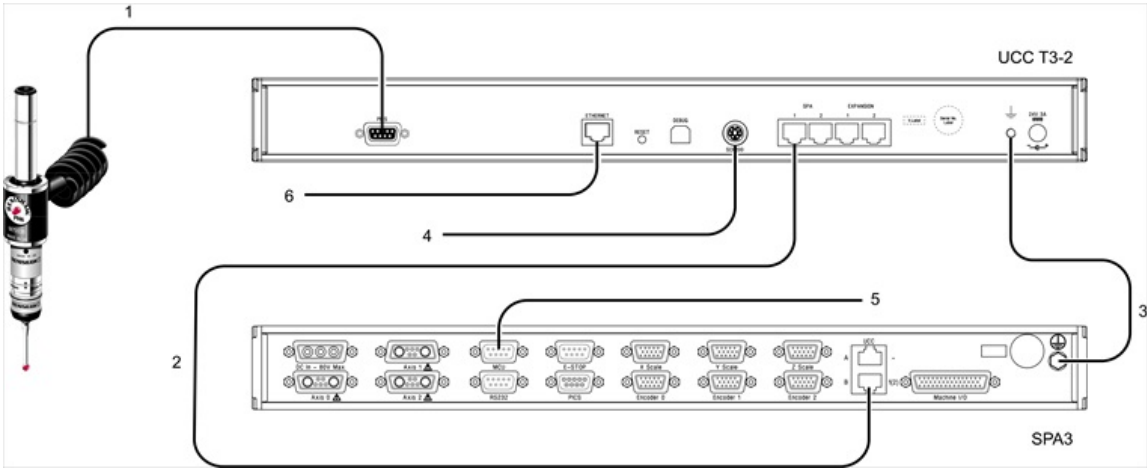
Termination resistors must not be used, but a series current limiting resistor of between 39 Ohms and 56 Ohms is strongly recommended.

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System interconnection diagrams

Standard two wired touch-trigger probe



Key	Description
1	Head cable(s)
2	Shielded CAT5E cable (supplied)
3	16 / 0.2 mm earth connection
4	SCR200 rack connection
5	MCU connection
6	CAT5E cross-over cable to host PC

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Connecting the UCC controller

Hardware connection

The host PC must have a dedicated ethernet connection to the UCC controller. It is recommended that this is NOT a USB plug-in adapter because of the reduction in speed of operation these devices normally produce.

If the host PC is also to be connected to a network, it is necessary to install additional hardware within the host PC to permit a dedicated connection to be available for UCC controller communication. For details on how to install additional hardware into the host PC, please refer to the PC's installation / users guide.

The UCC controller is capable of using 10 Mbps, 100 Mbps and 1 Gbps ethernet. The selection is determined by the capability of the network adaptor to which it is connected. It is recommended that a 100 Mbps network adaptor is used.

A 5 m CAT 5E cross-over ethernet cable is provided for this link as part of the UCC controller kit. Other lengths may be used, but the maximum is governed by the generic specification for ethernet connections (i.e. a hundred metres) which is sufficient for any CMM installation.

If there are concerns about EMC disruption due to the environment, or the routing of the cable, then the using a shielded cable is recommended.

It is suggested that the cross-over cable is labelled as a cross-over cable looks identical to a normal ethernet cable.

Software installation

The UCCassist-2 software must be installed on the host PC prior to connection of the UCC controller.

The latest version of UCCsuite can be downloaded from the Renishaw website for anyone with a MyRenishaw account. UCCsuite will install UCCassist-2 and UCCserver to enable the hardware set-up.

After the software has been installed, one of the utility sequences available is "IP Configurer" which is used to give the UCC controller an IP address and establishes the pairing of the PC and the UCC controller.

Configuration of IP addresses

This section describes the steps needed to connect the UCC controller to the host PC and configure the ethernet communication link.

 **NOTE:** The examples used in this section are for Windows10 Professional and will vary for other operating systems.

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IP addressing

Choose an IP address for the UCC controller and an IP address for the PC's network adaptor that are of the same class:

class A 1.0.0.1 – 126.255.255.254	For class A networks, a network is defined by the first number.
class B 128.0.0.1 – 191.255.255.254	For class B networks, a network is defined by the first two numbers.
class C 192.0.0.1 – 223.255.255.254	For class C networks, a network is defined by the first three numbers.

NOTE: The last number must not be 0 or 255.

If there is more than one network connection in the PC, choose a network class for the UCC - PC connection that is not currently in use to keep the connections clearly separate. To find out which IP address the other network interfaces use, bring up the command prompt, then type "ipconfig". Its output will look similar to this:

```

C:\> Command Prompt

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : renishaw.com

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter WiFi:

    Connection-specific DNS Suffix  . : renishaw.com
    IPv4 Address. . . . . : 172.17.1.130
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 172.17.0.1

Mobile Broadband adapter Mobile:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Z:\>
    
```

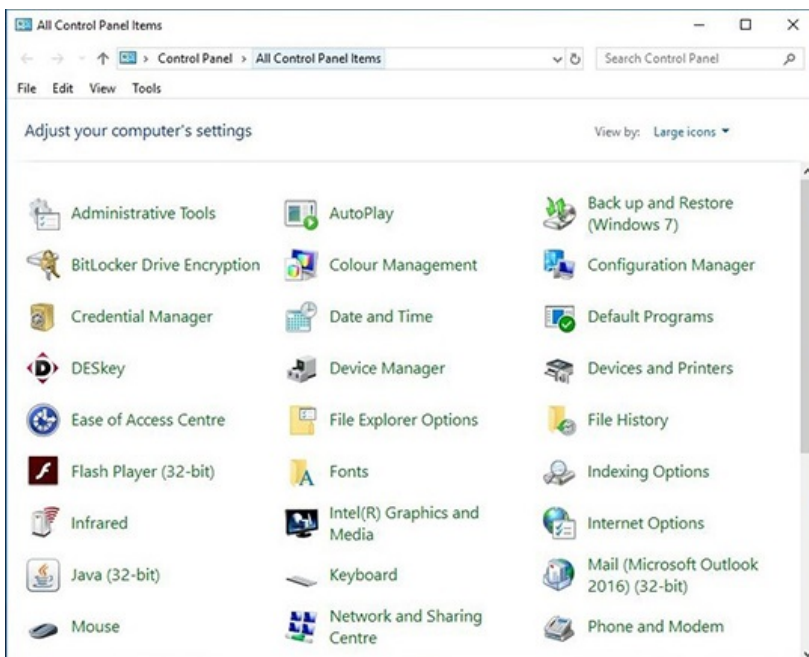

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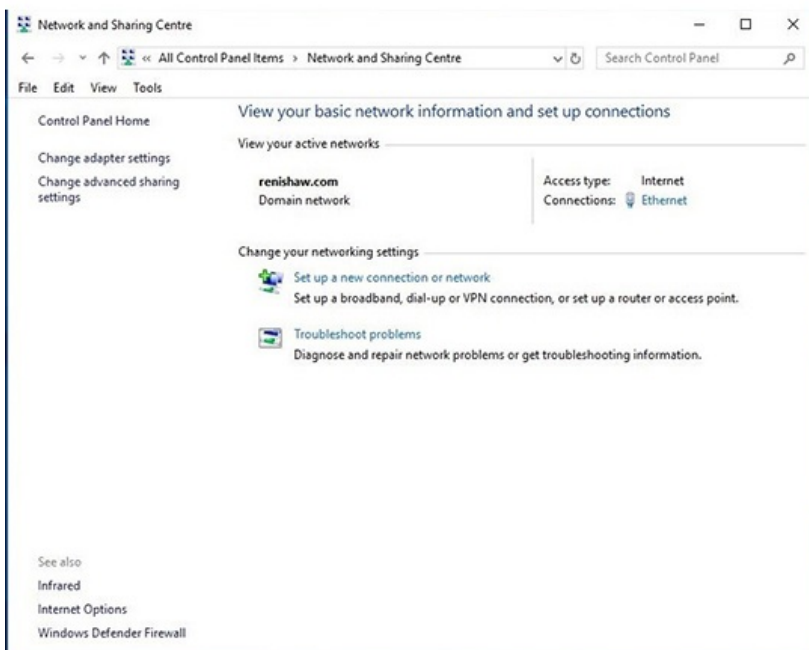
Setting the IP address of the PC

The process to set the IP address on the PC varies with each version of Windows. Administrator rights are needed in order to perform this operation.

a) Navigate to 'Control Panel', then select 'Network and sharing centre':



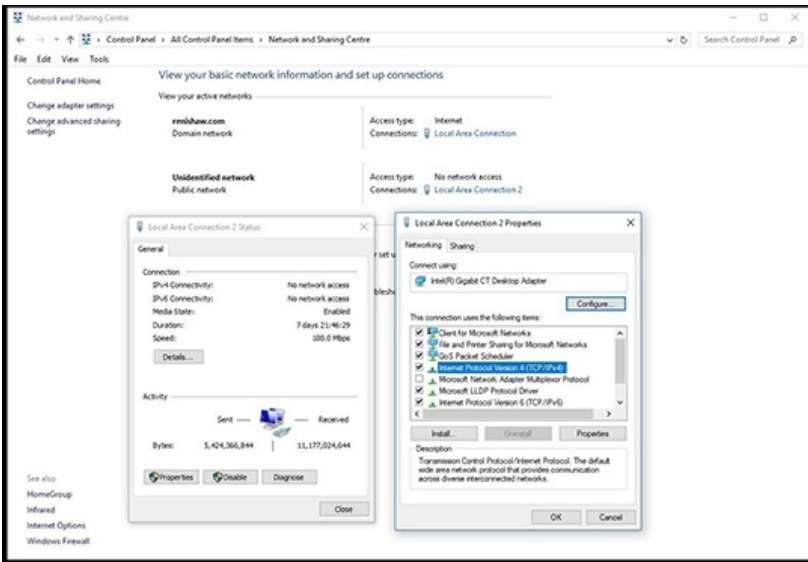
b) Select 'Ethernet' in 'Access type connections':



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c) Click on 'Properties' and select 'Internet Protocol (TCP/IPv4)' and click 'Properties'.

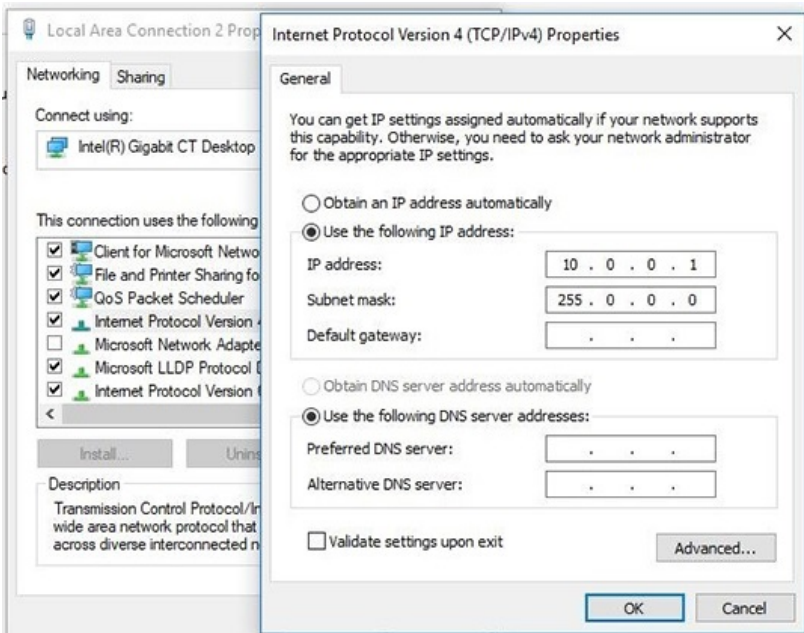


d) Select 'Use the following IP address' and type in the IP address to use for the PC end of the comms link. Click in the Subnet mask field. On Windows10 the Subnet mask will already be filled in. If you have to fill it in for yourself, here are the values:

Class of network IP address belongs to	Subnet mask to use
A	255.0.0.0
B	255.255.0.0
C	255.255.255.0

Leave the 'Default gateway' field blank.

Example:



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e) Click 'OK' and then 'OK' again. On earlier versions of Windows the PC needs to be rebooted.

Setting the IP address of the UCC controller

The UCC controller is not intended to be used on a corporate network. It is extremely important that the setting of the IP address of the UCC controller is on a dedicated connection. It is also important that the connection is not “firewalled” at the PC end. Administrator rights are needed in order to perform this operation.

Turn on the UCC controller and press the reset button (within 15 seconds), then wait for it to boot up.

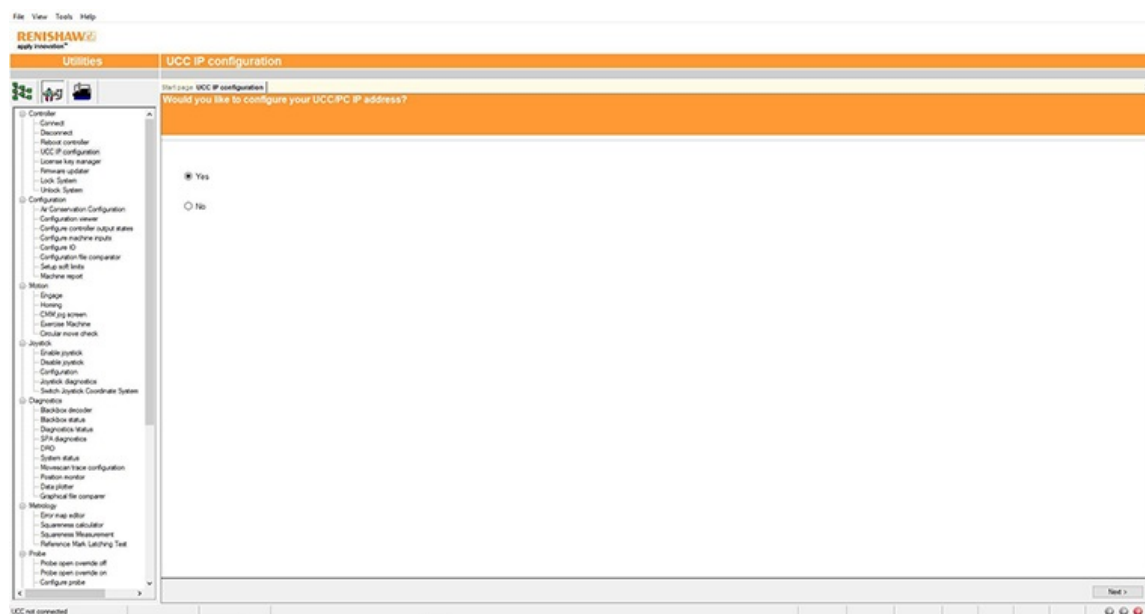


NOTE: This will take about 15 seconds.

It will enter its IP configuration state, shown by the 'Error' LED flashing rapidly.

Now start UCCassist-2 and the UCC IP configuration utility or commissioning sequence on the PC.

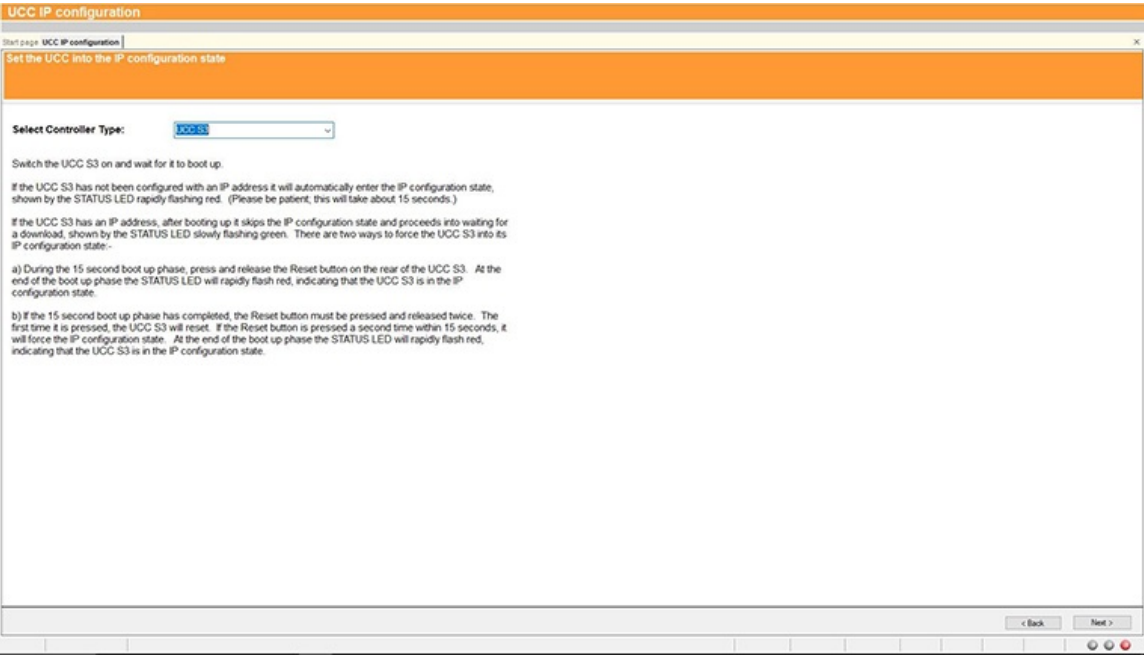
a) Login to UCCassist-2 → Go to 'Utilities bar' → Select 'IP Configure':



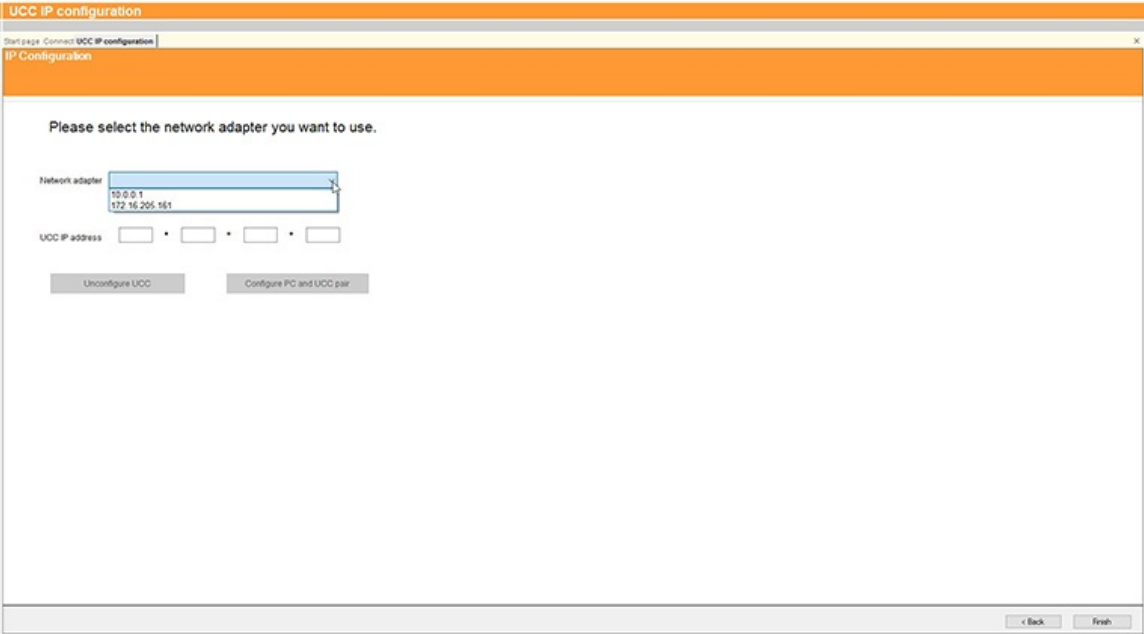
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b) Pressing 'Next' will bring up a screen to allow the specific controller to be selected. It will also give instructions on getting the controller into IP configure mode depending on if it has already been configured or has no current configuration.



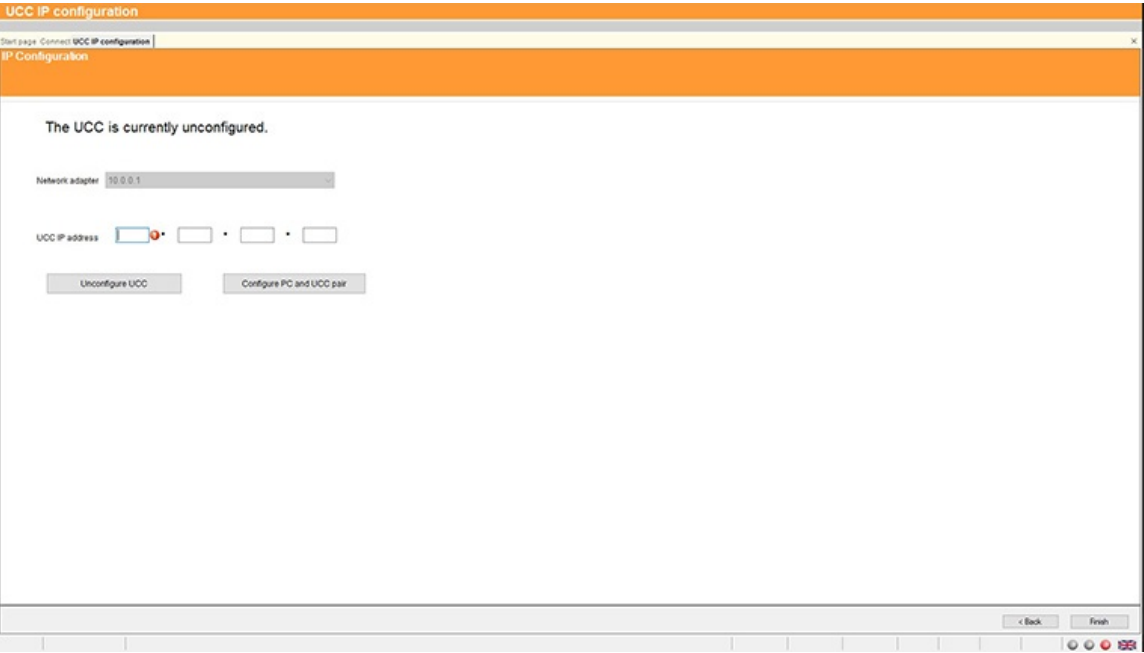
c) Click on the drop-down icon and select the IP address of the network adapter into which the UCC controller is plugged (this should be the one on which the IP address was set in 'Setting the IP address of the PC').



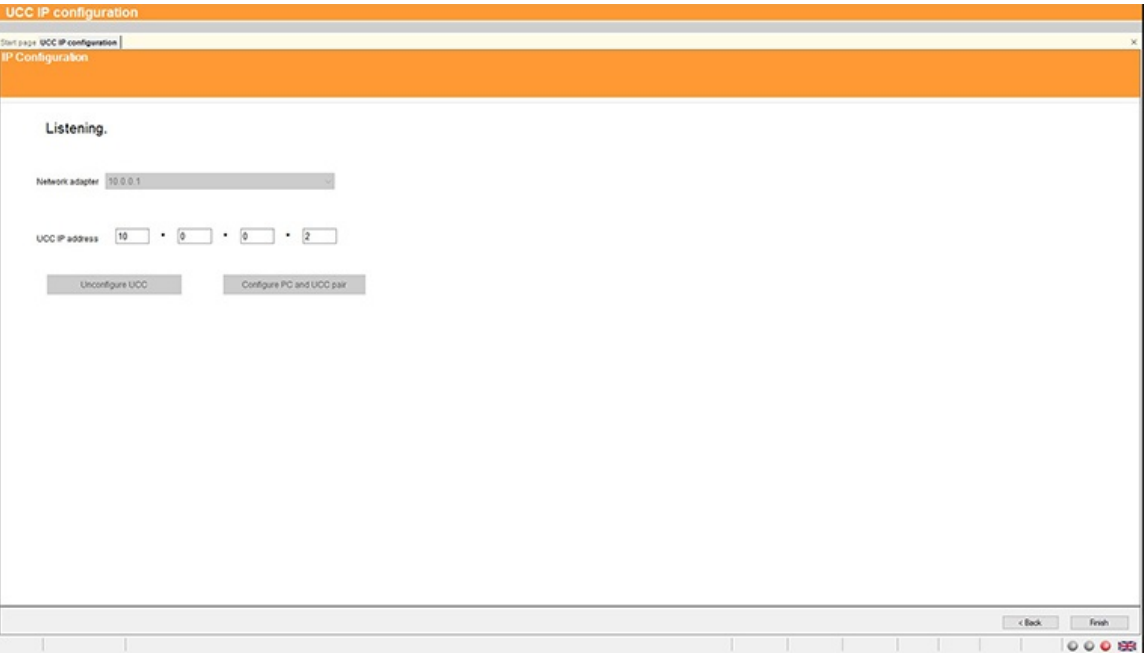
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d) The UCC controller does not have an IP address. Type in the relevant address to match the network adapter in the PC. In the case below this is 10.0.0.1:



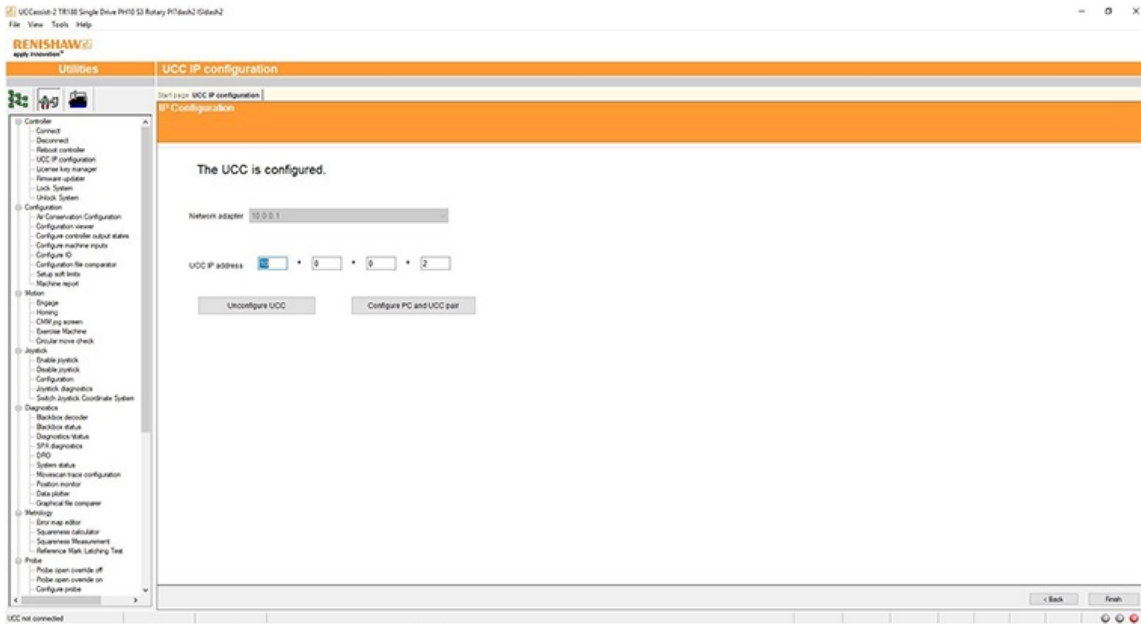
e) Fill in the desired IP address. The IP configuration software has given you a head start by filling in the network part of the address appropriate for the network adapter selected (see section 'IP addressing' for a discussion of the choice and of IP addresses in general).



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f) Click on 'Configure PC and UCC pair'. If all is well this will result in the address being applied to the controller and the IP configure screen will close. If the controller is already configured a dialogue box saying the UCC is configured will open. Click 'Next' to finish.



NOTE: Whenever one of the items in this pairing is changed, e.g. by connecting a different UCC controller to the PC, the UCCassist-2 IP configuration software must be re-run to establish the new UCC controller to the PC system.

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Changing the IP address of the UCC

If the UCC controller already has an IP address, after booting up it skips its IP configuration state and proceeds into waiting for a download, shown by the status LED flashing slowly. There are two ways to force the UCC controller into its IP configuration state:

- a) During the 15 second power up phase, before the error LED comes on, press and release the 'Reset' button on the rear of the UCC controller. At the end of the power up phase the error LED will flash rapidly indicating it is in the IP configuration state.
- b) If the UCC controller has already powered up with the error light flashing slowly, i.e. about once per second, or even if the control software has been downloaded, the reset switch will need to be pressed twice. The first time to reset the controller then a second time, within 15 seconds, to force the IP configuration state.

The UCC controller is now in its IP configuration state, and the UCCassist-2 IP configuration software can be run on the PC, selecting the appropriate network adapter required. The current IP address of the UCC controller will be displayed. Type in the new one and click on 'Configure PC and UCC pair'.

Establishing a new UCC - PC pairing

If a different UCC controller is connected to the PC, or a different PC to the UCC controller or even if the network settings on the PC are modified, ensure that they are a matched pair. To do this, go through the procedure in the 'Setting the IP address of the PC' section, even if you do not wish to change the IP address of the UCC controller (if the IP address is already suitable, then you do not need to re-type it). Clicking on 'Configure PC and UCC pair' will establish the new pairing.

Downloading

The name of the downloadable file is specific to the controller so the correct controller needs to be selected to select the correct downloadable. Other controller downloadables will not work on a different controller. Remember to change the name in any configuration settings appropriate for the front-end.

The UCC controller system should now be established.

UCC T3-2 installation guide

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UCC T3-2 troubleshooting

Front panel LEDs

UCC T3-2 visual diagnostics
















LED status key:

LED	Description
	LED on
	LED flashing off / on
	LED flashing green / red
	LED off
	LED flashing red / blue

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LED colour	Function
	No LED - no power to UCC T3-2, downloadable unable to start, power cycle and try again
	Continuous LED - problem with comms link - reboot UCC T3-2 and configure IP
	Slow flash - waiting for download
	Continuous light - download successful
	Fast flash (5 Hz) - IP configuration mode
	Dual flash - controller booting
	Internal timeout - reboot UCC T3-2
	Fast flash (5 Hz) - communications error - reboot required
	Slow flash - scale error - reboot required
	Slow flash - problem with download - reboot required (check file type e.g. UCC2)
	Continuous LED - UCC T3-2 overheated
	Slow flash - unit does not have controller ID - return to Renishaw
	Fast flash (5 Hz) - no controller ID in IP configuration mode - return to Renishaw



NOTE: A scale error will cause the UCC T3-2 to enter an error state which is not recoverable within a metrology application environment. If a scale error occurs it will be necessary to reinitialise the installation due to the possibility of lost scale counts and metrology being effected.

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UCC T3-2 maintenance



WARNING: Maintenance should only be carried out after the machine has been isolated from the electrical supply, compressed air supply or other energy sources in accordance with the machine manufacturer's instructions.

Periodically check that all mounting screws and electrical connectors are securely tightened. Electrical safety checks should include inspecting the mains cable for damage and the safety of the connections. Periodical safety checks should also include the function of the emergency stop system, including operation of all switches integrated into the system. After operating the emergency stop system, the servo amplifier system should be checked to ensure servo power can be engaged.

Advisory

It is recommended that periodical metrology tests are performed in order to identify any faults in subsystems eg air bearings, structure, cables, software etc.

Cleaning

Cleaning should be carried out with a lint free cloth on outer surfaces only as the unit is not sealed against liquid.

Filter replacement

Positive air flow is employed within the enclosure for cooling purposes. This equipment has a replaceable filter to protect it from the ingress of dust. The machine operator should inspect the condition of the filter on a regular basis. It is recommended that the filter is removed and checked / replaced as necessary during the machine installer or retrofitter's regular maintenance routine.

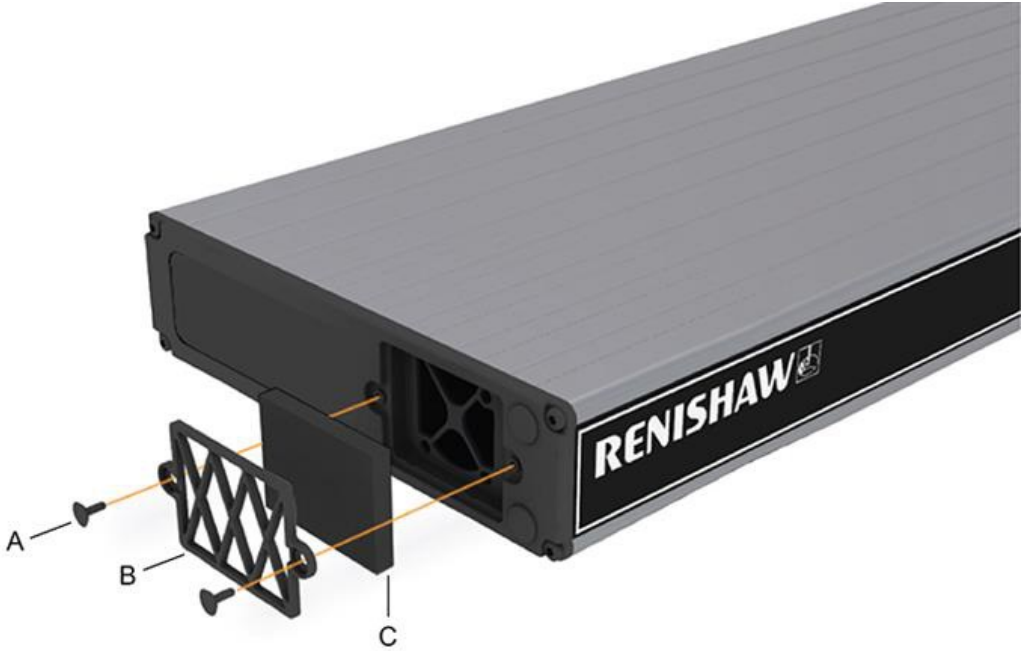
Exchanging / removing the air filter

The following procedure is recommended when exchanging / removing the air filter:

1. Isolate the controller via the ac power.
2. Remove the 19 inch rack mounting brackets (if fitted) by removing the two fixing screws on each side.
3. Pull both the filter retaining clips [A] away from the unit, this should permit the external filter cover [B] to be removed.
4. Remove the filter material [C] from the filter recess (replacement part number of filter is A-5518-0011).
5. Refit the filter cover and mounting brackets in the reverse order above.

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i NOTE: There are no user serviceable parts inside this unit.

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