WI 044- TP200 Setup	Date 13/02/17	Issue- 4	Author- Chris Walkley

TP200 setup.

The DEVA004 incorporates two Renishaw Product Interconnection System (PICS) compatible probe inputs.

Input PICSB (PICS Before) provides the correct signal conditioning to allow a volt-free contact type touch probe to be used.

Input PICSA (PICS After) allows an externally conditioned probe signal to be used.

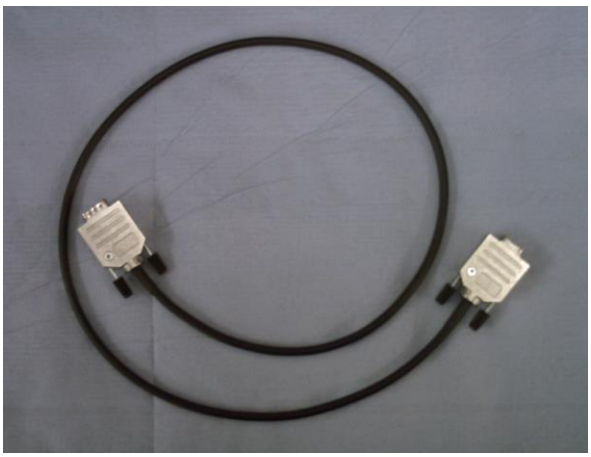
TP200 systems utilize the PICSA because the PI-200 conditions the probe signal.

Probe functions for PICS A and PICS B

Pin Number (9 way female 'D')	Pin Number (Header)	PICS A	PICSB
1	1	STOP	STOP
2	3	PPOFF	PPOFF
3	5	0v	0v
4	7	ERROR	PLED A
5	9	SYNC	PRB
6	2	HALT	+5v
7	4	PDAMP	PDAMP
8	6	LEDOFF	LEDOFF
9	8	READ	PRB RET
-	10	0v	0v

Attach the probe fly cable to PICS A on the DEVA004
You also have a link between pins 9 &10 of its internal PICSB connector. (See header diagram overleaf)

For PI200-2, (not necessary for PI200-3)
PICS cable (between PI200 and deva card) - Link pins 1 and 6 at the PC end of cable (When connecting the probe directly to the probe interface, the STOP pin 1 on the Probe Interface PICS input must be pulled up to +5V (usually provided on pin 6 of the same input).



9 Way D-type (plug)		9 Way D-type (socket)
Pin 3	LED C	Pin 3
Pin 4	LED A (link to pin 8)	Pin 4
Pin 5	Probe	Pin 5
Pin 9	Probe return	Pin 9
Shell		Shell

C – Cathode
A - Anode

The pics cable which links the computer to the PI200, link pins 1 to 6 at the computer end

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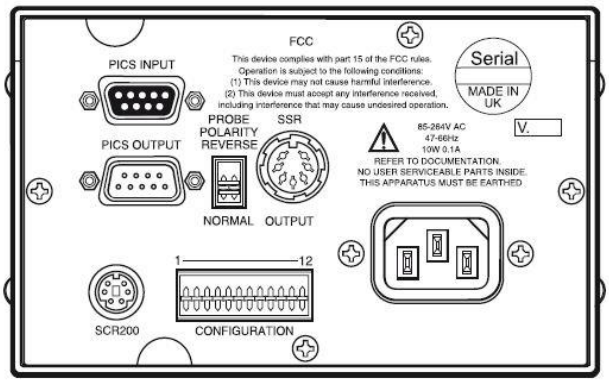
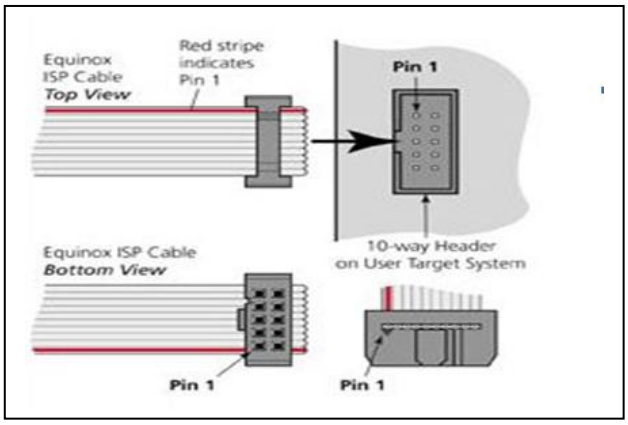
Rear of PI200 (Non integrated box)

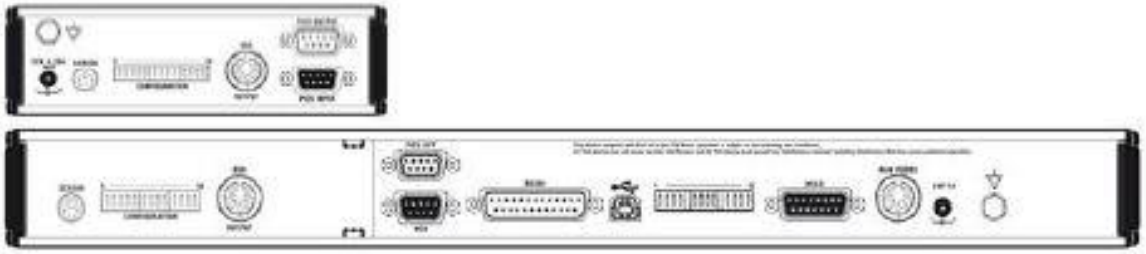


Pin designation on 10 way header on card



Rear of integrated unit PI200-3

Rear panel switches and connectors



Probe head switch configuration.

PHC10-2
Switches 1, 3, 11,15 and 16 up, remaining switches down.

PHC10-3
Switches 1, 3 , 7, 12, and 13 up (13 down if multiwire cable connected)

PI200-3 Section below, these settings will produce lowest sensitivity (trigger level 2) and longest de-bounce time, better for longer styli configurations.
See below for explanations of all settings.

Switch	Setting
1	Down
2	Down
3	Down
4	Down
5	Down
6	UP
7	Up
8	Down
9	Up
10	Up
11	Up
12	UP
13	Down

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.

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.

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PI200 Non integrated

Table 2 - 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 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 Refer to figure 8
7	Debounce mode		Selects SYNC debounce mode Refer to figure 8
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 12	PDAMP/HALT filter delay		Coded to select delay time Refer to table 3

PI200-3 Integrated

Configuration switch functions

Switch number	Function	Switch position	Description
1	HALT polarity	UP DOWN	HALT active HIGH HALT active LOW
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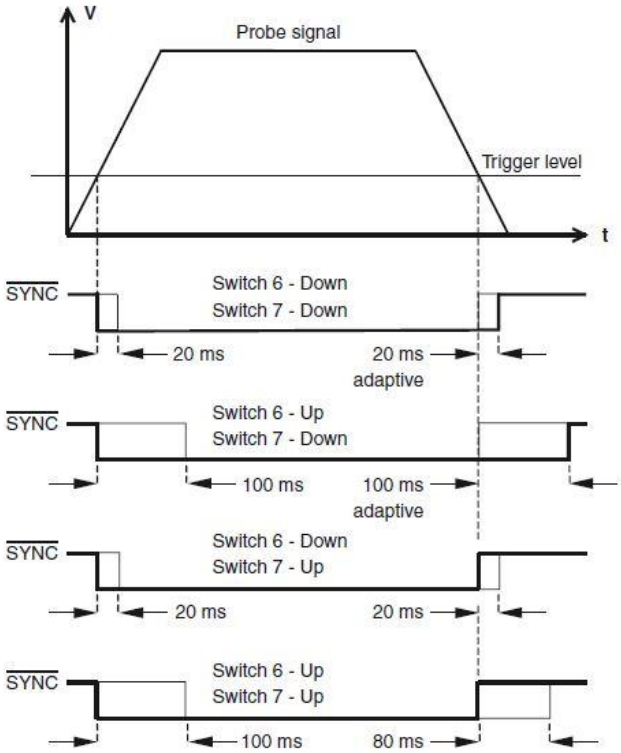
10	Trigger level	UP DOWN	Trigger level 2 selected Trigger level 1 selected
11	PDAMP/HALT filter delay		Coded to select delay time
12	PDAMP/HALT filter delay		Coded to select delay time Refer to table 3
13	Probe Polarity Reversal	UP DOWN	Reversed Normal

Switch 13 :

Correct polarity	Down
Inverted polarity	UP

Rev position Up is normal operation, and is to do with hard wiring configuration

Debounce time diagram



Recommended 6 up and 7 down

8 needs to down to activate these settings.

The de-bounce essentially is the time the probe signal must be below the trigger level before the controller deems the probe to have left the surface.

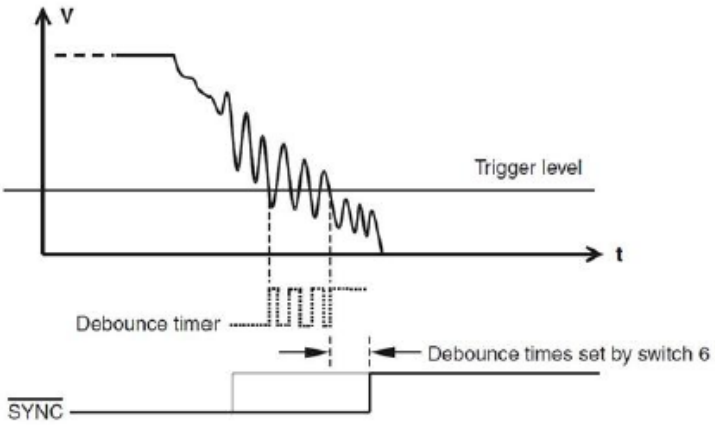
SYNC and HALT debounce

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.

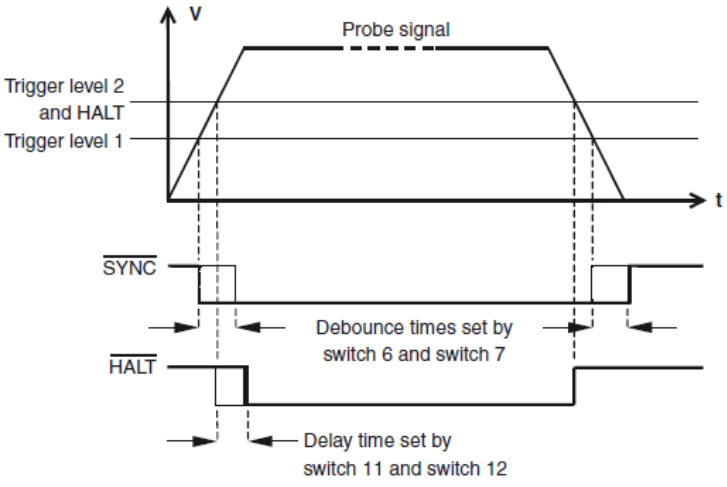
The 'adaptive' settings ensure that combinations of CMM vibration and large stylus assemblies do not cause a false indication of probe status during the back-off move. It may be seen that the debounce time increases in increments of either 20 milliseconds or 100 milliseconds until the probe signal remains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



Trigger levels.



Trigger levels

10 level 1 down (up for trigger level 2).

Typical (time delay setting)
11 up
12 down

The settings can affect the amount of machine over travel required when the probe needs to stop at higher speeds

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 reseat 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.

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. Refer to the description in 'trigger confirmation signal (HALT)' section.

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 indicated in table 3.

Table 3 - Function of switches 11 and 12

Time delay	Switch 11	Switch 12
2.0 ms	DOWN	DOWN
7.5 ms	DOWN	UP
15.0 ms	UP	DOWN
50.0 ms	UP	UP

PH10 controller settings, please note when using PICSA, the phc unit also has a switch setting to activate probe damping during machine traverse and indexing, it is also different between the PHC-2 and the PHC-3

The table below is a summary of the differences between PHC10-3 and PHC10-2 configuration switch settings that allows you to correctly configure your PHC10-3 when replacing a PHC10-2.

PHC10-2 switch	PHC10-3 switch equivalent	Function	Up	Down
Communications				
1	1#	Baud rate		
2	2#	Baud rate		
3	3#	Baud rate		
4 (not used)				
5 (not used)				
6	4*#	Stop bit	2 stop bits	1 stop bit
7	5*#	CTS protocol	CTS on	CTS off
8	6*#	LF protocol	LF on	LF off
9	9#	Command set	Extended	Basic
10	10	Probe reset time	2 (extended)	1 (standard)
Interface				
11	7	PPOFF	PPOFF - active during head index	PPOFF - inactive during head index
12	8	HCU1 probe, DAMP and probe reset buttons	Enabled	Disabled
13 (not used)				
14 (not used)				
15+16	12	Output configuration	PICS	DIN
17+18	11	Interface connection	PICS or 7 pin DIN operation	5 pin DIN operation only
	13	Probe wire isolation	Machine cable	Multiwire

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Aberlink settings.

It is advisory in order to protect the components within the probe to have a high probe acceleration, this reduces the amount of machine overtravel, especially regarding probing in the z direction. Suggested settings below.

Rapid feed 150, acceleration of 300 ensures machine is up to full velocity quickly.

Fast speed 100 acceleration 200

Probe acceleration 200 to decrease machine over travel to protect the probe.

It is also worth avoiding using MAXJERK within the axis.cfg as this again increases the over travel on the probe mechanism.

It is also worth mentioning, that the TP200 should be tailored to suit specific applications, machine may need to be slowed down in terms of speeds, to avoid false triggers. Trigger levels should be set depending on stylus lengths.

If altering any of the dip switch positions, hold down reset for 3 seconds and release.