

**MOTOR CONTROLLER
MODEL H126/7PSI
FOUR AXIS**

Installation Instructions
H100 Series Programmable Stages

Connection of Stage System

- (a) The mains power cord is plugged into socket 'A' on the H126/7PSI.
- (b) If the H151V control box is fitted, it is connected by 24 way plugs between sockets 'C' and 'E' using cable H242. Alternatively the H401 Dummy Joystick Plug must be put in this position.
- (c) The stage is connected to the H126/7PSI using the flat ribbon cable H241, between sockets 'B' and 'F'.
- (d) If supplied, the focus motor, H120, is connected to stage socket 'G'.
- (e) RS232 input to the H126/7PSI control box is via socket 'H'. See appendix 2 for pin functions.
- (f) If the autofocus P.C.Bs, H202/3, have been fitted, a video signal from a camera must be supplied via a B.N.C plug to socket 'D'.
- (g) Socket 'J', which must be specified at the time of ordering, can be used to supply an output signal for ancillary equipment,(e.g rotate the objective changer), or be programmed to receive a signal from an external device.

The equipment should be assembled as shown in diagram 1 to the mains supply. The H126/7PSI motor controller, is protected by a T1A fuse and if used in the U.K., the 13A plug should have a maximum fuse rating of 3A.

The stage is protected by hard limit switches but position may be lost if it is driven into them.

<u>Issue</u>	<u>Date</u>	<u>Revision</u>
1.1	13.08.93	Interruptible Z move added.

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RS232 Communications

The communications protocol for this equipment is :-

8 bit word. 1 stop bit, 9600 baud,

No parity, No handshake.

The following are a list of the commands which can be sent to the control box from the host computer. The system will accept upper or lower case letters.

The column 'PC Send' details the command letter, data to set variables and the control code 0D Hex. The control code is shown as [0D]. All commands are sent as an ASCII string with no spaces between the characters. Where variables are set, the data is separated by commas (2C Hex). Where no data is required, the command letter followed by [0D] is all that is necessary.

The second column, 'REPLY', is the ASCII string that will be returned to the host computer when the operation has been completed. In the case of commands that set variables, the reply will be sent in less than 10 microseconds. In the case of those which initiate movement, the reply will be sent on completion of the operation.

The third column, 'OPERATION', specifies what action will occur or the purpose of the variables being defined. It also gives the limits that the control box will accept.

<u>PC SEND</u>	<u>REPLY</u>	<u>OPERATION</u>
Z[0D]	0[0D]	X,Y and Z Absolute positions set to zero. Used for initialising the stage at any position within the envelope of its travel. ALL variables set by these commands are retained in battery backed memory by the processor.
X,n,m[0D]	0[0D]	Where 'n' and 'm' are the number of pulses to be moved between fields in the X and Y axes of a raster pattern. The commas are essential to separate the data.
C,n[0D]	0[0D]	'n' is the number of pulses to be moved in the Z axis. Used to set the distance travelled when using the U and D commands.
V,n[0D]	R[0D]	Move to the Z absolute position 'n'. This value must be in the range ± 7000000 . The move can be stopped by sending the 'I' command and the focus will ramp down and stop.
N,n,m[0D]	0[0D]	Where 'n' and 'm' are the number of fields in X and Y respectively, used to set up the raster pattern. The number of fields to be viewed in the axis is 1 more than the data input. e.g N,0,5[0D] would set up a raster with a straight line in the X axis consisting of 6 positions. The 'X' command sets the distance between fields.

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<u>PC Send</u>	<u>REPLY</u>	<u>OPERATION</u>
E[0D]	R[0D]	Sets the raster X and Y position counters to zero and records the coordinates relative to the stage absolute zero. This must be done before starting to use the 'S' command.
S[0D]	R[0D]	Move to the next field in the raster pattern. At the end of the pattern the stage will return to the raster origin.
L[0D]	R[0D]	Move left the number of pulses as defined in the 'X' command (variable 'n').
R[0D]	R[0D]	As above but move to the right.
F[0D]	R[0D]	Move to the front the number of pulses as defined in the 'X' command (variable 'm').
B[0D]	R[0D]	As above but move to the back.
U[0D]	R[0D]	Move up the number of pulses as defined in the 'C' command.
D[0D]	R[0D]	As above but move down.
M[0D]	R[0D]	Move to stage absolute zero in X,Y and Z.
G,n,m[0D]	R[0D]	Move to the 'n' (X axis) and 'm' (Y axis) absolute positions. The permitted values of 'n' and 'm' must be between ± 7000000 . The move can be stopped by sending the 'I' command and the stage will ramp down to stop.
A[0D]	R[0D]	Initiate autofocus. This command must not be used if the system does not include the autofocus P.C.Bs, H202 & 3, as the system will lock up. If this happens, it is necessary to reset the controls by pressing the RESET button on the H151V or turning the power on and off on the H126V.
P[0D]		The reply is an ASCII string giving the X, Y and Z absolute positions in pulses from stage zero. Each value is separated by commas (2C Hex) and negative values are preceded by the ASCII '-', the string being terminated with the control code OD hex. e.g "-1090,2375,-231[0D]".
H[0D]	R[0D]	Turn off the joystick.
J[0D]	R[0D]	Turn on the joystick. This is the condition at power on.

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<u>PC SEND</u>	<u>REPLY</u>	<u>OPERATION</u>
O,n[0D]	0[0D]	The 'O' command allows you to alter the speed of the stage when using the joystick for continuous scanning. The value of 'n' can be between 0 and 100, this being the percentage of maximum speed of the system.

Commands for scanning circular objects

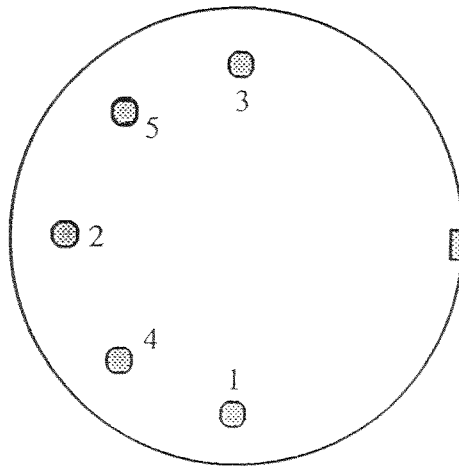
Q[0D]	0[0D]	After the stage has been positioned at the centre of the circular object, sending 'Q' records the point coordinates.
W,n[0D]	0[0D]	Records the diameter of the circle to be scanned in millimetres. 'n' is an integer between 1 and 155.
T[0D]	R[0D]	Move to the next field in the scan pattern. Initially the scan will start at the top of the circle and follow a chord line from one edge of the circle until the field of view overlaps the opposite side. It is <u>essential</u> that prior to using this, the 'X' command has been used to set the distance between fields. At each field you can :- (1) Send 'P' to report position. (2) Use the joystick to move around and to focus. (3) Use 'A' to autofocus. (4) Send 'Q' to quit the scan. At this point (or at the end of all fields), the stage returns to the centre point of the circle.
K,n[0D]	0[0d]	Where 'n' is the number of pulses required to move 1mm. The value will depend on the pitch of the lead screw.

Commands for the Virtual Joystick

3X,n[0D]	0[0D]	"n" is a value between 0 and 100 which represents the speed of the X axis as a percentage of maximum speed. It also changes the starting speed by the same percentage. The value 0 will run the X axis at the slowest setting of the pulse generator which is 25 pulses/sec.
3Y,n[0D]	0[0D]	As above for the Y axis.
3Z,n[0D]	0[0D]	As above for the Z axis (if fitted).

Prior Scientific Instruments

Connections to RS-423/232
Serial Port



Pin Functions :- (1) TXD
(2) GND
(3) RDX
(4) RTS
(5) CTS

Configuration :- 8 Bit word
1 Stop bit
9600 Baud
No parity
No handshake

