Fitting Ah-ha to a machine with existing Stepper drives

If you have a machine with programmed functions such as spindle on/off, coolant on/off, tool changer, spindle speed etc. that still function it is a very good idea to operate all these individually if possible before disconnecting the old control and identifying the relays and contactors used along with the associated terminal numbers and making a careful note of what does what.

Before removing or disconnecting existing wiring switch off the Machine and Isolate from the mains!

Please note these instructions are for guidance. If you have any doubt on any particular point please check with us. If you have any difficulties in getting your machine running give us a call. We can always get your machine running, hopefully without an engineers visit and any great expense.
First check the items you need

We supply the following:-

1 Ah-ha IF card that fits in the PC as per the Ah-ha instruction manual.
1 EMT IF Card that fits in or near the machine electrics.
2 cables that connect the Ah-ha card to the EMT card. We supply 2 so that they can be joined through a slot cut in the cabinet wall saving having to make 37 connections!
You will need the following:-
A normally open push button that switches on the EMT IF card. We recommend adding a normally open contact to the existing machine ON button if there is one.
A normally closed Emergency stop button or additional normally closed contacts on any existing Emergency stops.
A normally open push button to act as the spindle enable.
24 volt DC power supply if there is not one on the machine.
You may need the following:-
A normally open push button to act as remote start if required.
A normally closed push button to act as remote feed hold if required.
Normally closed axis limit switches if they are not already fitted.

Suggested Procedure

Mount the EMT IF card in the existing cabinet (if possible) at a location where 1 of the 37 way cables can reach to a wall of the cabinet at a point where the second cable can reach the PC.
If you are fitting an EMT 16OP IF card to control a tool changer and spindle speed it is a good idea to mount this at the same time again siting the board where one of the 25 way cables can reach the cabinet wall close to the 37 way cable.
Locate the existing 24V DC power supply or mount a new one.
A 24V DC connection should be made to our IF terminal T3-1 (The EMT IF terminals are numbered from the bottom in 4 blocks. T3 means the 3rd block up and the 1 means the lowest terminal on that block. It is clearly marked +24VDC. If it is not you have identified the WRONG terminal DO NOT CONNECT and check again until you fully understand our terminology).
A 24V return connection should be made to EMT terminal T1-1.
Fit the Normally Closed contacts to the emergency stop switch(es) and take a 24V connection in series to EMT terminal T1-12 If you are not using any guards with interlock switches this is a good time to link out

the built in guard circuit by fitting a link between EMT terminal T1-11 and 24V

Fit the new ON push button or the normally open contact to the existing ON push button and make a connection from 24V to one side of the contact .

Connect the other side of the contact to the EMT terminal T1-10 (RESET)

Locate the machine limit switches and check they are normally closed.

Wire the limit switches normally closed as per the drawing. Taking Z + as an example first remove the existing wire from the common and trace it back to a suitable connection point where it can be disconnected safely Connect a new wire to the common and connect the other end in the machine cabinet to +24V DC. Connect the other side of the switch to EMT terminal T2-3.

Repeat For the Z - switch but using the terminals as the drawing. (The common can be just connected to the common of the Z + limit switch)

Now deal with the X and Y limit switches in the same way.

A N/O push button needs to be fitted to act as the spindle enable button and we normally fit a small button somewhere on the existing machine panel. Connect this new switch as per the circuit diagram supplied using 2 more new wires . Note the purpose of the enable button is to prevent the spindle running just from the PC control. Whenever the control issues a spindle command the programme operation is suspended until the enable button is pressed which also starts the spindle. To be used the Block allow parameter must be mapped to 202. If you use a N/O (normally Open) switch the polarity must be set in parameters to LOW=TRUE.

If you are going to use the remote cycle start and feed hold 2 more push buttons need to be fitted at a convenient position and wired back to the EMT board using AUXIN 3 for feed hold and AUXIN 4 for cycle start. These must be mapped in the parameters to 203 and 204 respectively. If you use a N/O (normally Open) switch the polarity must be set in parameters to LOW=TRUE and for a N/C (normally closed) switch HIGH=TRUE. We strongly recommend N/O (normally Open) switches for Enable and Cycle Start and N/C (normally closed) switch for Feed Hold

Fit the card supplied with the software into the PC as the Ah-ha instructions and connect the PC board and the machine interface using the 2 cables supplied joining the cables at the slot already cut in the cabinet. (If using Ah-ha drives, the 37 way cables run to the Ah-ha cabinet and the split cable runs from the back of the cabinet to the EMT IF board)

Check that the machine is connected correctly to the 3 phase mains and most important that the earth connection is properly made and of an adequate size. At this stage it should be safe to switch on the machine but take care in case any mistakes have been made in the new wiring. If all is well you can now press the on button which will switch on both the machine electrics and the new interface card. You should now see red LED's on indicating RLE1 is on and all the green LED's for limits that have been connected are on. If this is not the case switch off and carefully go through all the connections you have made looking for any errors.

Wire the Step and direction signals to existing drives as per the documentation or drawing for your make of drives.

If the machine is a lathe and you require threading you will need to connect a spindle encoder. There are 2 options. The first is to use our 16OP interface card and if you have purchased this you will have received separate documentation. The second option on simpler machines is to connect the spindle encoder direct to the ahha 25 way D type. The documentation for this starts on page 134 of the ahha manual. If you have a disc type encoder with only one channel and an index connect the index to pin 13 of the 25 way and the channel to phase A which is pin 21 of the 25 way. The signals must be 5 volt DC as specified.

Installing The Software

From DOS (Never Windows)
Insert Floppy Disc in Drive A and log onto A by typing in A: and pressing the enter key.
Type GO and press Enter
When the self-extracting process is complete you can run the software.

Reboot the computer and you will get an option screen enabling you to run Artisan version 4.0, the previous version of artisan or DOS. The option to run the earlier version of Artisan is only applicable if you have the old version and have upgraded.

If we have supplied a PCK file on disk do the following:-
After Running Ah-ha software and for the first time go into setup (ALT S and then into the CNC timing menu and make a note of the Linear master timer rate and circular timer rate. These are generated to match the speed of your computer.
Insert the disk with the PCK file and log onto A by typing in A: and pressing the enter key.

Type GO and press Enter. This will copy the PCK file

Run the software again by typing CNC40 followed by the enter key and then change the timer rates to the value previously noted (If necessary).
Make sure you have the output polarities set correctly for any switches you have fitted.

If the machine has programmable spindle speeds you will probably need to create an MCDMAP.AGC programme in the CNC40 directory. If we have provide an example this can be installed by typing A: enter and GO enter in the same way as the PCK file was installed. Please note that if you edit the MCDMAP.AGC programme from within the CNC software you must exit to DOS and restart the CNC software as otherwise your changes are not recognised. This is because if an MCDMAP programme is present in the CNC40 directory it is loaded into memory when the software is started.

Most Important

When you have the Computer set up copy all the PCK files to 2 floppy disks and LOCK one of them away with the original software disks for safety.

To do this log onto C if necessary by typing in C: and press "Enter". Type CD \CNC40 and press "Enter".
Insert the floppy disk. Log onto A by typing in A: and press "Enter".
Type Copy C:*.PCK and press "Enter".
Log back onto C by typing in C: and press "Enter".

We also include a tiny programme to do this. Insert a floppy disk and type PCK2A and press "Enter".

For you convenience we also include a tiny programme to copy all user programmes to a floppy. Insert a floppy disk and type AGC2A and press "Enter".

If you have any difficulties we can be contacted by telephone 01297-446000, fax 01297-446001 or email sales@eagland.co.uk

Last revised 23-1-2002

AUXIN4   TB2-12 ———○——○   Cycle Start Button
AUXIN3   TB2-11 ———○——○   Feed Hold Button

AXIS 4 -   TB2-8 ———○   W - LIMIT
AXIS 3 -   TB2-7 ———○   Z - LIMIT
AXIS 2 -   TB2-6 ———○   Y - LIMIT
AXIS 1 -   TB2-5 ———○   X - LIMIT
AXIS 4 +   TB2-4 ———○   W + LIMIT
AXIS 3 +   TB2-3 ———○   Z + LIMIT
AXIS 2 +   TB2-2 ———○   Y + LIMIT
AXIS 1 +   TB2-1 ———○   X + LIMIT

ESTOP   TB1-12 ———○   Emergency Stop
GUARD CLOSED TB1-11 ———○
RESET   TB1-10 ———○   On Button
ENABLE   TB1-9 ———○   Spindle Enable Button

+24V ———○

At least 1 limit switch per axis needed for Home operation

During Home (Datum) cycle
the limit switches are used
as Home switch
which one depends on Home
direction set in software

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Ahha connections to Digiplan CD drives & Rack

EMT 24V IF Board

CONNECTIONS ON GENUINE DIGIPLAN RACK
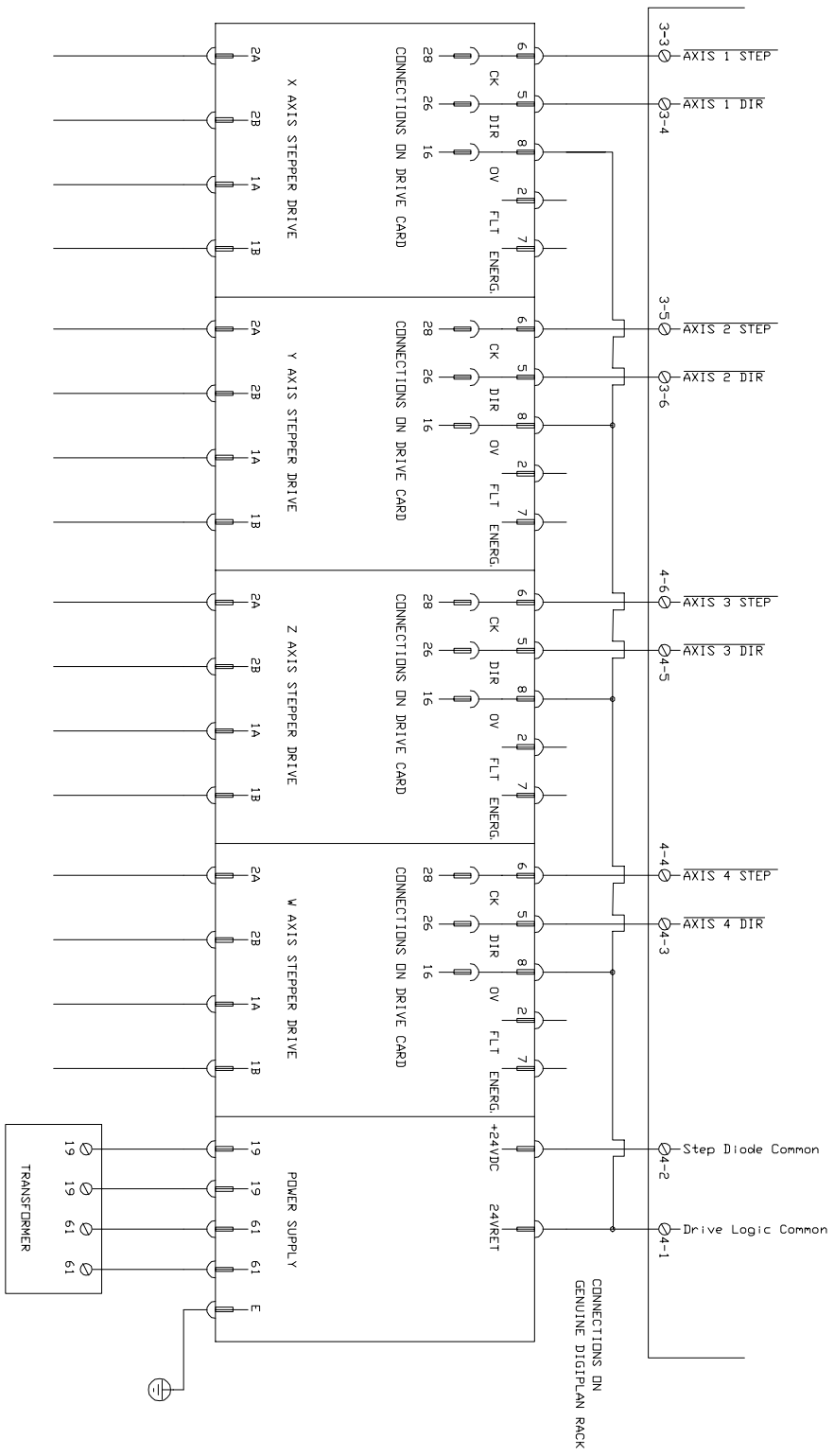
connections looking at pins on drive

C A

AXIS 1 MOTOR CONNECTIONS

X AXIS STEPPER DRIVE
CONNECTIONS ON DRIVE CARD

2A 2B 1A 1B 28 26 16 2 7
CK DIR 0V FLT ENERG.
6 5 8

AXIS 1 STEP 3-3
AXIS 1 DIR 3-4

AXIS 2 MOTOR CONNECTIONS

Y AXIS STEPPER DRIVE
CONNECTIONS ON DRIVE CARD

2A 2B 1A 1B 28 26 16 2 7
CK DIR 0V FLT ENERG.
6 5 8

AXIS 2 STEP 3-5
AXIS 2 DIR 3-6

AXIS 3 MOTOR CONNECTIONS

Z AXIS STEPPER DRIVE
CONNECTIONS ON DRIVE CARD

2A 2B 1A 1B 28 26 16 2 7
CK DIR 0V FLT ENERG.
6 5 8

AXIS 3 STEP 4-6
AXIS 3 DIR 4-5

AXIS 4 MOTOR CONNECTIONS

W AXIS STEPPER DRIVE
CONNECTIONS ON DRIVE CARD

2A 2B 1A 1B 28 26 16 2 7
CK DIR 0V FLT ENERG.
6 5 8

AXIS 4 STEP 4-4
AXIS 4 DIR 4-3

TRANSFORMER
19 19 61 61

POWER SUPPLY
19 19 61 61 E
+24VDC 24VRET

Step Diode Common 4-2
Drive Logic Common 4-1

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32

NB Numericon system often have a different rack – Check connections from Drive to terminals

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