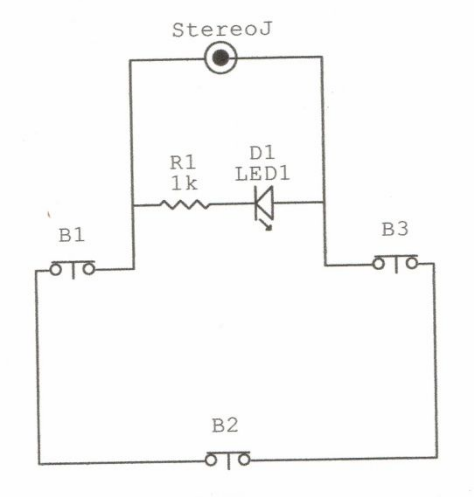
WILDHORSE INNOVATIONS
Cutting edge machine shop tools

Econo-Probe Wiring



Econo-Probe Schematic

In the schematic above, B1, B2 and B3 are the "switches" internal to the Econo-Probe. These are the devices that sense a "touch". These switches are normally closed such that the circuit through the probe is a dead short.

When a touch occurs, one of more of the switches opens and current from the sensing circuit (DRO, CNC controller, etc.) flows through R1 and D1. This allows D1 to light. This is strictly for the convenience of the operator. R1 and D1 can be removed from the circuit and the probe will still function with a DRO, CNC controller, etc.

If D1 fails to light on a touch, it is likely that the Econo-Probe is hooked up with the polarity of the connections reversed (see next page for more information). If D1 fails to light on a touch, the first test in diagnosing the problem is to reverse the connections between the Econo-Probe and the device.

Some devices (DRO, CNC controller, etc.) have probe sensing circuits that are so sensitive that the presence of R1 and D1 will allow enough current to flow that the device cannot recognize a touch. If this is the case, you may open the probe (remove only the top cover, the portion with the spindle shaft) and either remove R1 and D1, or merely clip the wire connecting the two.

DO NOT CUT ANY OF THE CABLE WIRES. YOU WILL RENDER THE ECONO-PROBE INOPERATIVE.

DO NOT REMOVE THE BOTTOM COVER OF THE ECONO-PROBE. DOING SO WILL DAMAGE THE INTERNAL CIRCUITRY OF THE ECONO-PROBE. The bottom cover is the end from which the probe tip protrudes. This cover has been sealed with medium strength Lock-Tite to prevent accidental removal. However, the Lock-Tite will release given sufficient twisting pressure if internal repairs are needed.

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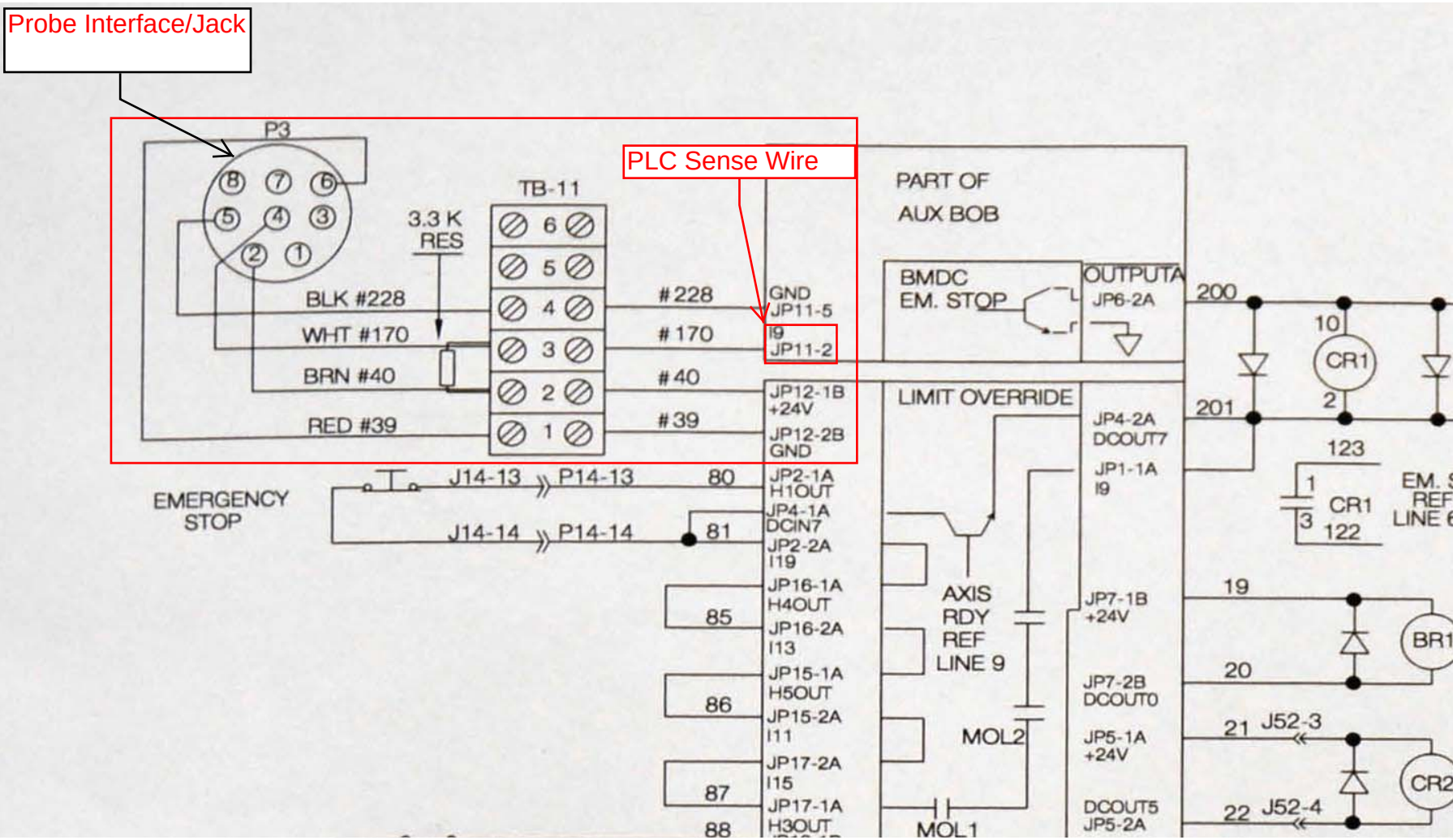
Probe Interface/Jack
PLC Sense Wire
P3
TB-11
3.3 K
RES
BLK #228
WHT #170
BRN #40
RED #39
#228
#170
#40
#39
GND
JP11-5
I9
JP11-2
JP12-1B
+24V
JP12-2B
GND
PART OF
AUX BOB
BMDC
EM. STOP
OUTPUTA
JP6-2A
LIMIT OVERRIDE
JP4-2A
DCOUT7
JP1-1A
I9
EMERGENCY
STOP
J14-13
P14-13
J14-14
P14-14
80
81
JP2-1A
H1OUT
JP4-1A
DCIN7
JP2-2A
I19
JP16-1A
H4OUT
JP16-2A
I13
JP15-1A
H5OUT
JP15-2A
I11
JP17-2A
I15
JP17-1A
H3OUT
85
86
87
88
AXIS
RDY
REF
LINE 9
MOL2
MOL1
JP7-1B
+24V
JP7-2B
DCOUT0
JP5-1A
+24V
DCOUT5
JP5-2A
200
201
10
CR1
2
123
1
3
CR1
122
19
20
21
22
J52-3
J52-4
BR1
CR2

Bridgeport TC22 Probe

If yours is like the TC3 and TC22 of comparable vintage that I have looked at, the probe plug on the head is an 8-pin AMP circular plastic connector.

Pins 2 and 6 are a 24VDC supply to power the probe: +24V on pin 2, 0V ("GND") on pin 6.
Pin 4 goes to a PLC input point.
Pin 5 goes to PLC common ("GND"), presumably as the common point for the probe input.

There is evidently a 3.3K resistor on the terminal block inside the head cover, which pulls pin 4 up to 24V when the input is otherwise open. The probe would pull pin 4 down when it trips, by closing it to pin 5.

So any probe that will work on the 24VDC supply, and which will close pin 4 to pin 5 when tripped, should work.

handles high current for switching relays, two 4 pin connectors (JP7 and 8) that handle the jog knob and feedrate override, and three 10 pin connectors (JP9, 10, and 11) for handling general purpose low current inputs.

Function - This card delivers to the BMDC board the status of all the main interface switches. Over and above the front panel switches connected to it, as described above, the following switches are also connected to it. These switches and connectors are mounted on the front of the spindle cover and are available to the machine operator when the front doors are open.

Tool Eject Switch - The function of this switch is to assist the operator in loading the tool carousel and manually changing the tool. This switch is a normally open push button. It is active while the TOOL SAFE light is lighted. +12 DC is brought to the switch from FU19 through wire 79. The signal is returned to the AUX card at J11 pin 3 through wire 102. This signal goes to +12 volts when the switch is closed.

The Index Carousel Switch - This switch is a normally open push button. The function of this switch is to rotate the carousel one tool slot each time that the button is pushed. This switch is active when the machine is in the load carousel state. +12 volts DC is brought to the switch from FU19 through wire 79. The signal is returned to the AUX card at connector JP 11 pin 4 through wire 103. This signal goes to +12 volts when it is activated.

Probe Connector - There is a separate connector supplied at the operator's station panel that is designed to supply voltage to and accept the signal from a probe attachment. +24 volts is supplied to the probe from JP12 pin 1A on the AUF board through wire 40 to pin 2 on connector P3. 0 volts (ground reference) is supplied from JP12 pin 2A on the AUF board through wire 39 to pin 6 on connector P3. The switch in the probe is supplied a signal 0 volts (5 volt ground reference) from JP11 pin 5 on the AUX board through wire 228 to pin 5 on connector P3. The return signal is brought to the AUX board at JP11 pin 2 from pin 4 on connector P3 through wire 170. The signal is pulled up to 24 volts by a resistor on terminal block TB5 and it goes to 0 volts when the probe is displaced from neutral.

AUX OUTPUTS - The AUX has two outputs that are capable of sinking 1 amp of DC current from the 24 volt dc power supply. The power transistor for these switches is located on the BMDC board. The signal is connected to the AUX through the 50 pin ribbon cable.

High Gear Output - The High Gear solenoid is used to shift the spindle transmission from low gear to high gear when a spindle speed of greater than 1463 RPM for a 6K machine, 1825 for a 7500 RPM machine is requested. 24 Volts DC is supplied to the solenoid from JP11 pin 1A on the AUF card through wire 58. The solenoid is switched to ground through wire 59 and connector JP6 pin 2B on the AUX board.

Emergency Stop Output - The remaining output from the AUX at JP6 pin 2A is used to turn off the Emergency Stop relay when the BMDC finds a major variation between the desired position of the axis and actual position of the axis. This output is discussed later under the paragraph titled Emergency Stop Circuit.

Communication Ports - The AUX board has the ability to communicate to the AUF board through connector JP3 and the LcTLAUF board through connector JP4. Further expansion is available through connector JP2. The communication protocol is RRS485. The transmission from the AUX to the LcTLAUF is by optic coupled components. Therefore, the 5 Volts DC to supply power to the communication chips is brought over to the AUF from the LcTLAUF. Plus transmission from the AUX at pin 5 on connector JP3 is connected to JP18 on the AUF at pin 4 through wire

Probe is super simple. My old notes show:

Pin 2 = +24vdc
Pin 4 = return
Pin 5 = 0vdc-5vdc ground ref to switch
Pin 6 = 0vdc ground ref