NSK AE-2280 or AE-3000 Field Installation

This document describes installation of a wiring harness (cable and connector) which enables M-function control of an NSK AE-2280 or AE-3000 live tool controller mounted on an OmniTurn GT-75 lathe equipped with Spindle Cabinet Printed Wiring Board (PWB).

NOTE: The wiring is different for 2280/3000; pay careful attention to labels & instructions.

Components are described as follows:

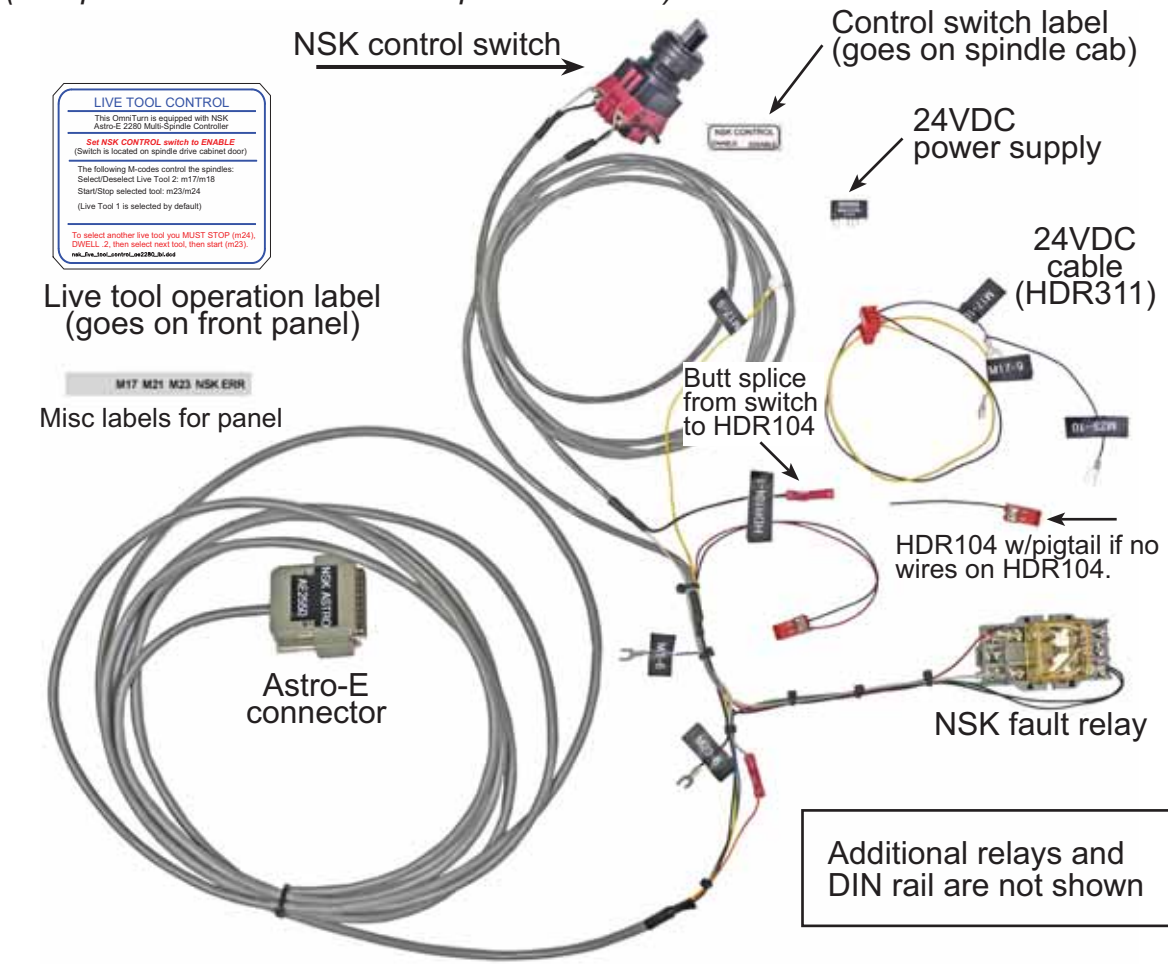
1. The NSK Fault Relay (lower right) stops the OmniTurn lathe if the live-tool system faults.
2. The NSK Control Switch (top center) allows the GT-75 to be used with live-tool system removed or turned off.
3. The NSK Astro-E connector (lower left) plugs into NSK 'A' connector.
4. The 24VDC cable provides necessary signal voltage to the NSK.

Installation is described in detail on the following pages, but the general steps are as follows:

1. Mount Control Switch in spindle-drive panel door.
2. Disassemble the Astro-E connector housing and route it out of the spindle-drive cabinet and up to back of CNC.
3. Mount the Fault Relay on DIN rail.
4. Plug 24V power supply into PWB.
5. Connect the six fork-terminals to appropriate points on the M-function relays and plug the two red connectors into headers on circuit card assembly,
6. Splice into the external fault line at HDR104.

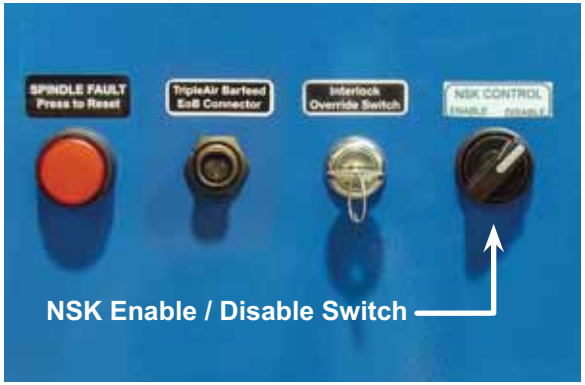
NSK Astro-E Control Harness and component parts

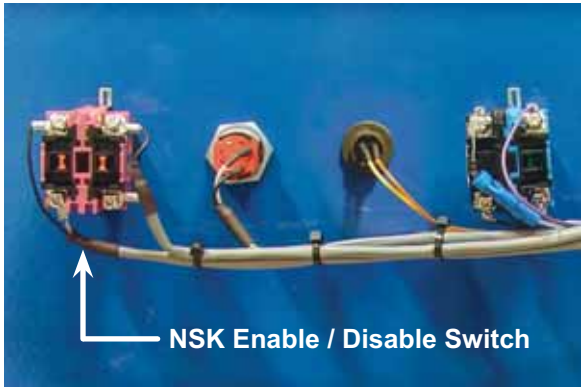
(This picture illustrates AE-2280 specific harness)



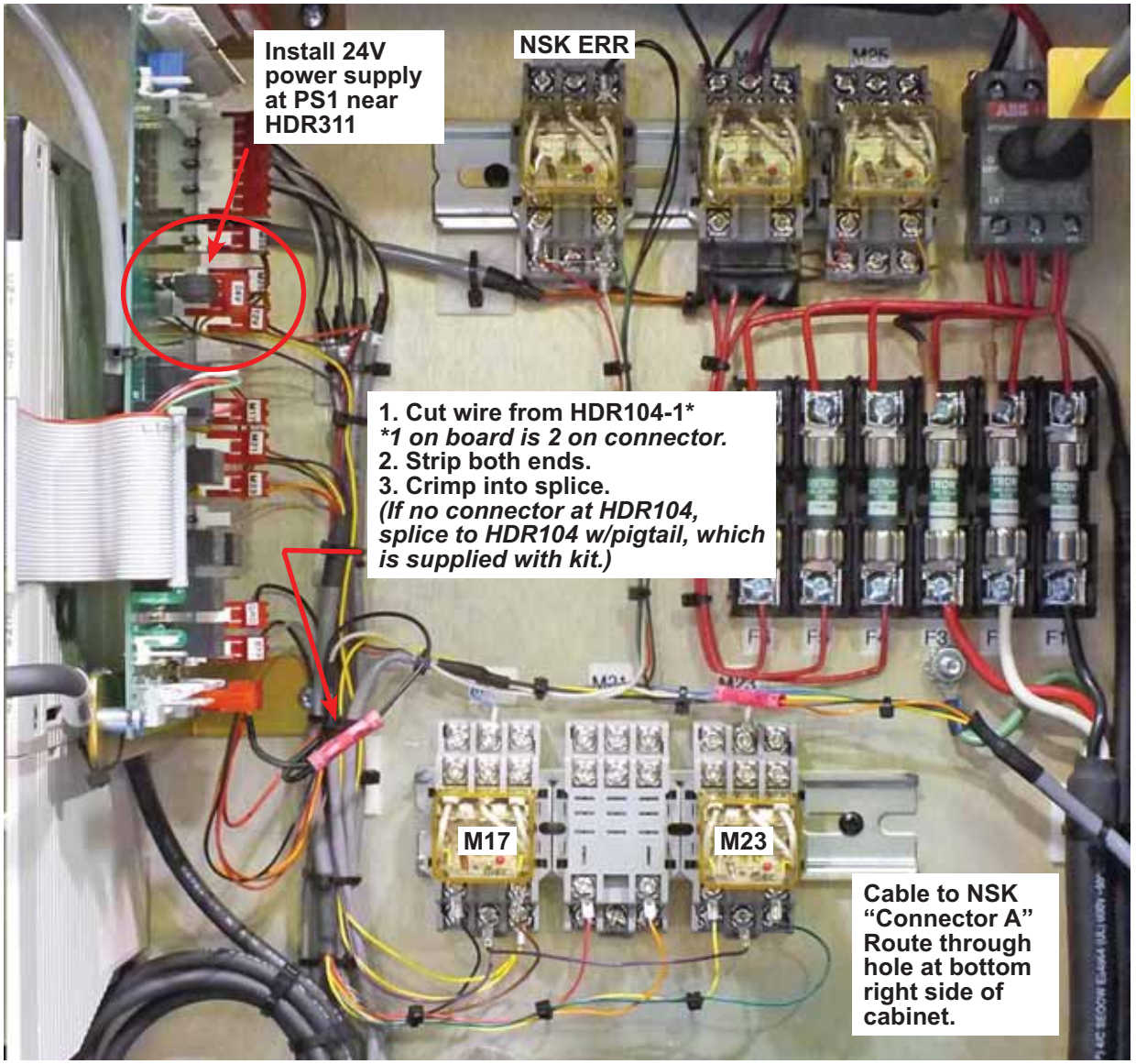
Spindle Panel Door

Use 1/2KO or 7/8” punch for NSK Control Switch installation. Route cables along with existing cables into the electronics cabinet.



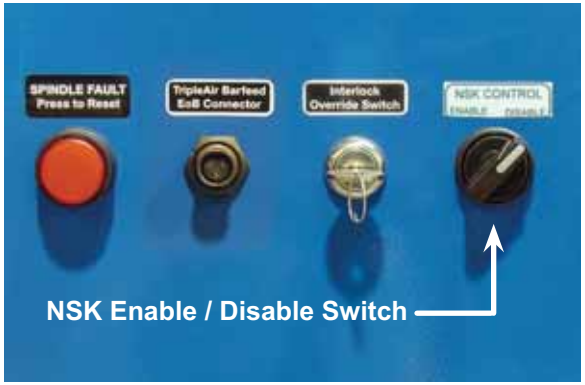


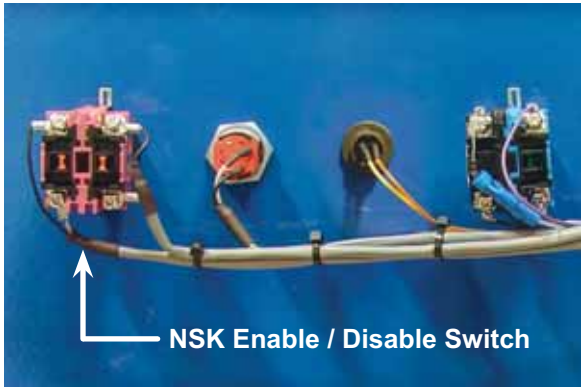
Spindle Panel AE-2280



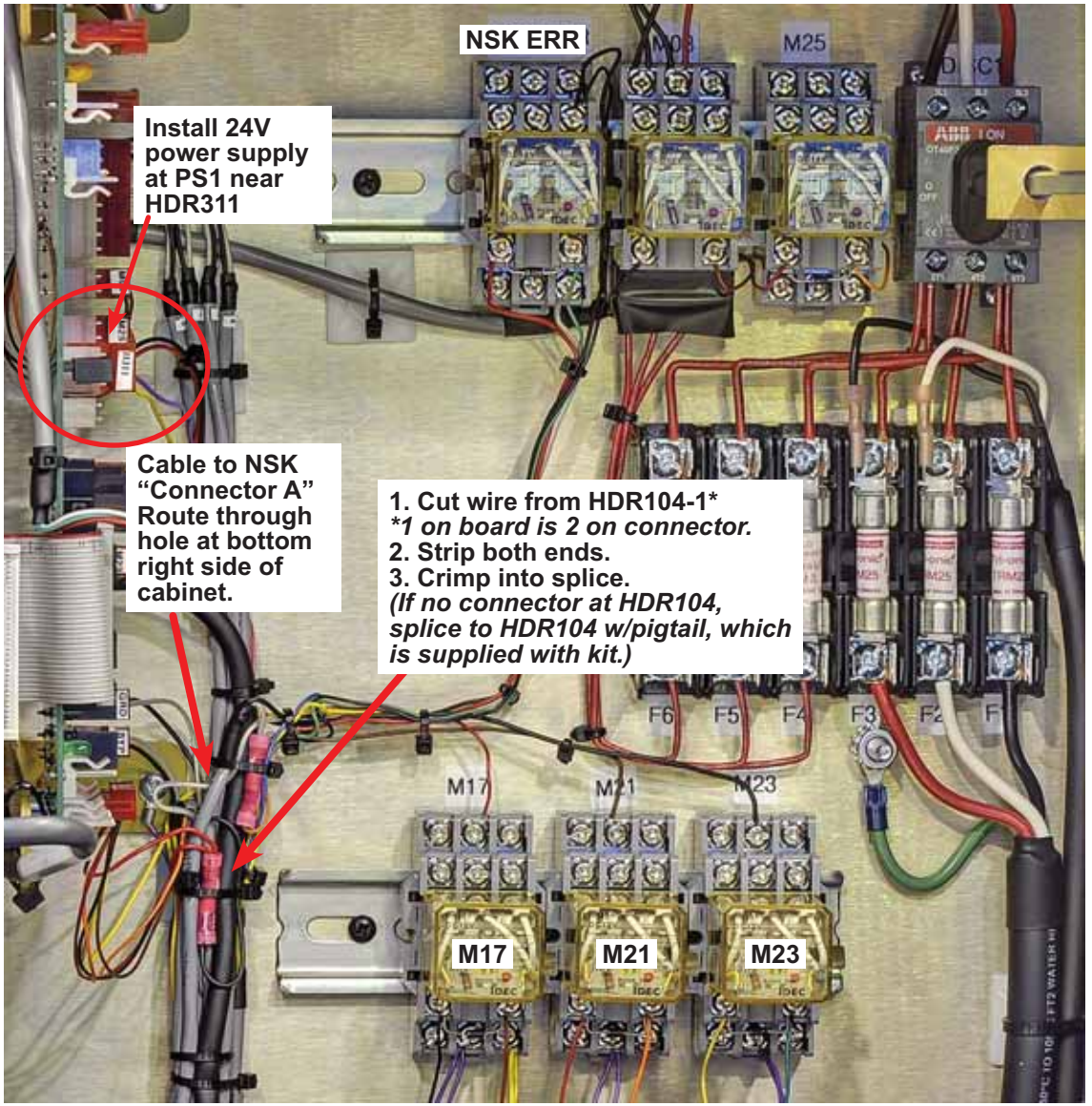
Spindle Panel Door

Use 1/2KO or 7/8” punch for NSK Control Switch installation. Route cables along with existing cables into the electronics cabinet.

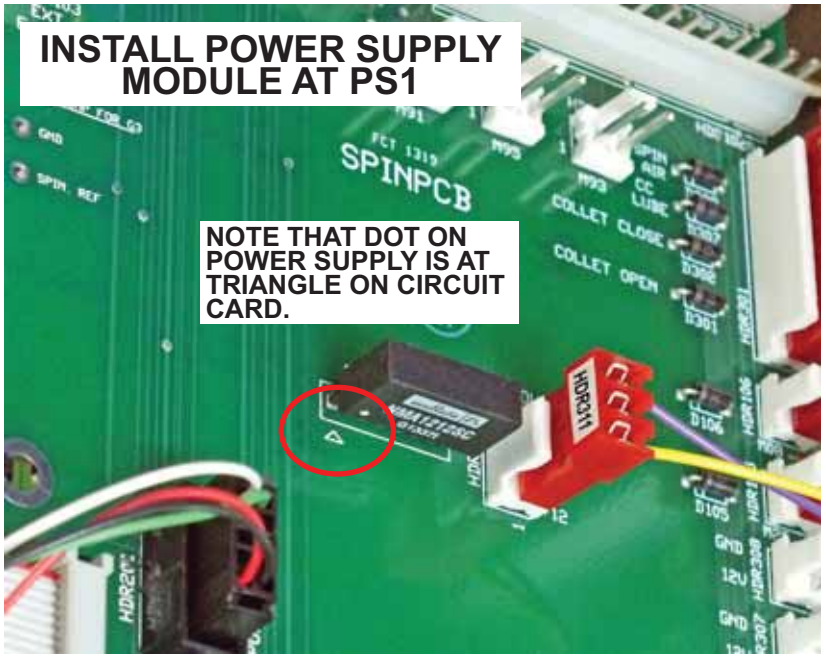




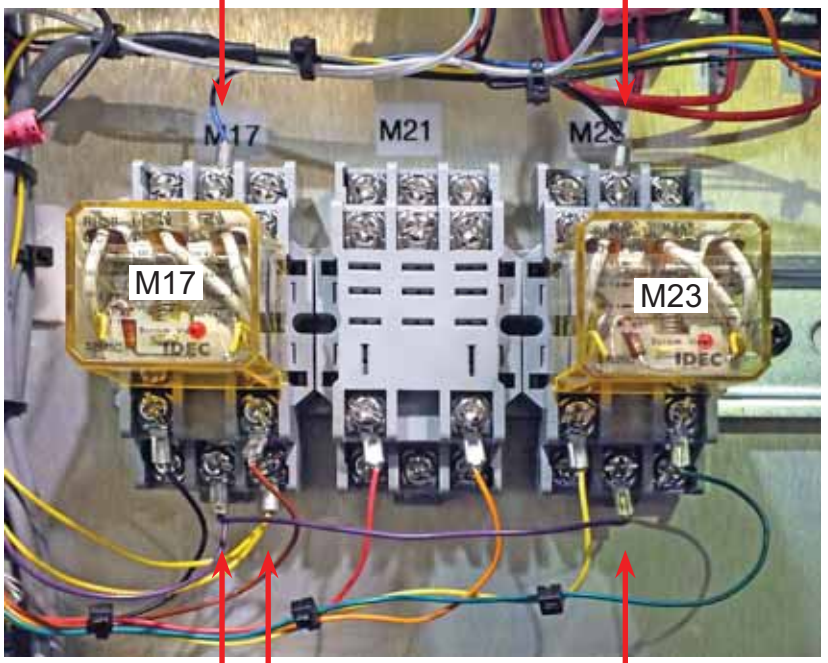
Spindle Panel AE-3000



Installation Details AE-2280

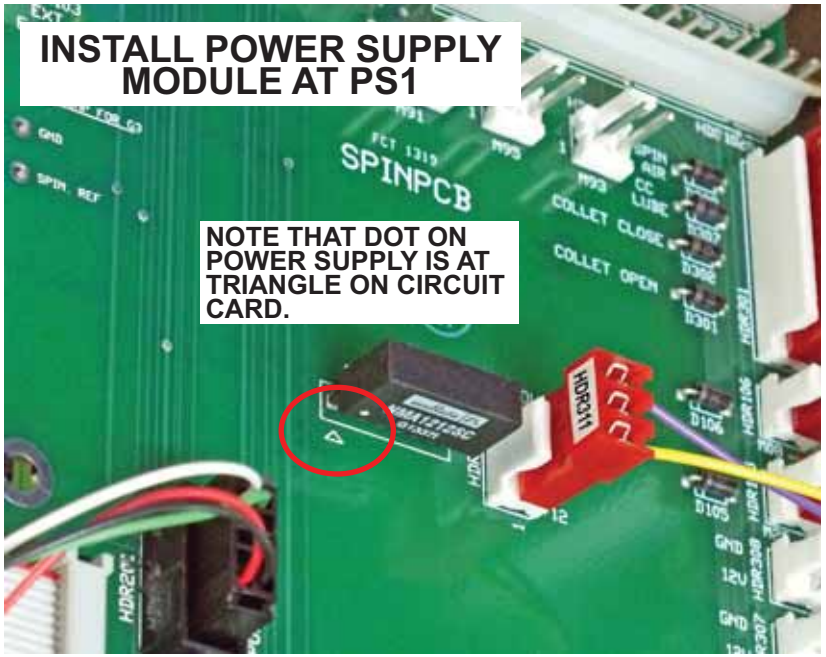


CONNECTIONS TO M17 & M23

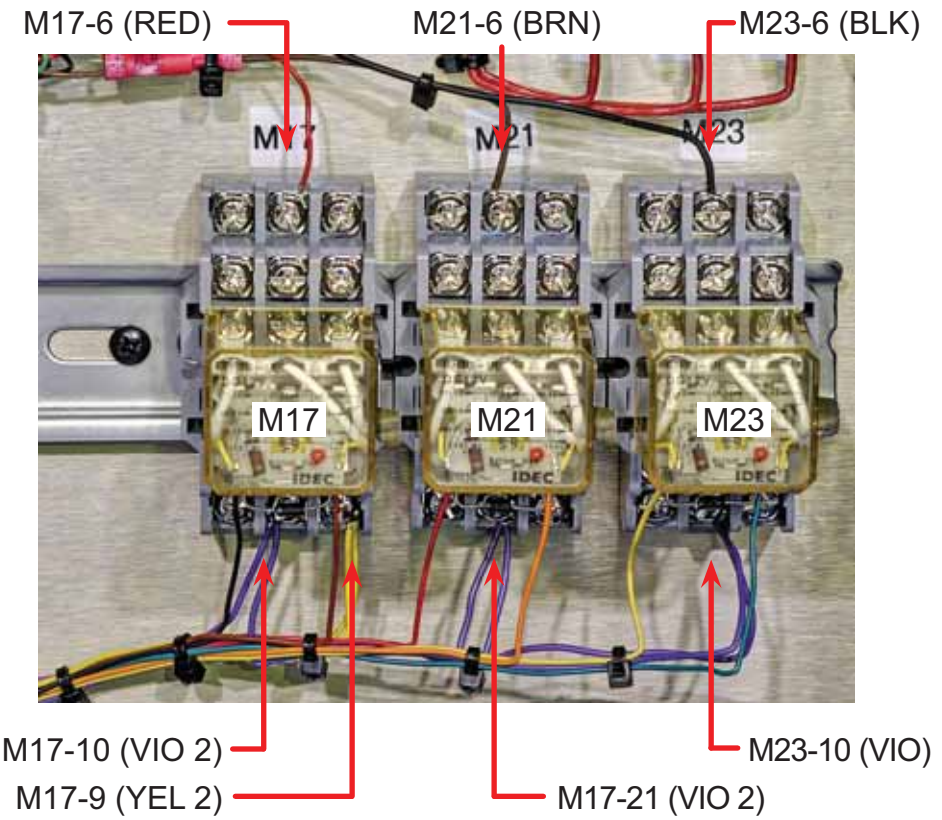


TO CONNECT BUTT-SPLICE TO HDR104-1*
1. Cut wire that comes from HDR104-1*
*__*NOTE: Pin 1 on board is pin 2 on red header*__.
2. Strip both ends about 1/4".
3. Put them into un-crimped side of butt-splice and crimp as shown.
NOTE: If there are no wires at HDR104, splice to HDR104 w/pigtail, which is supplied with kit.

Installation Details AE-3000



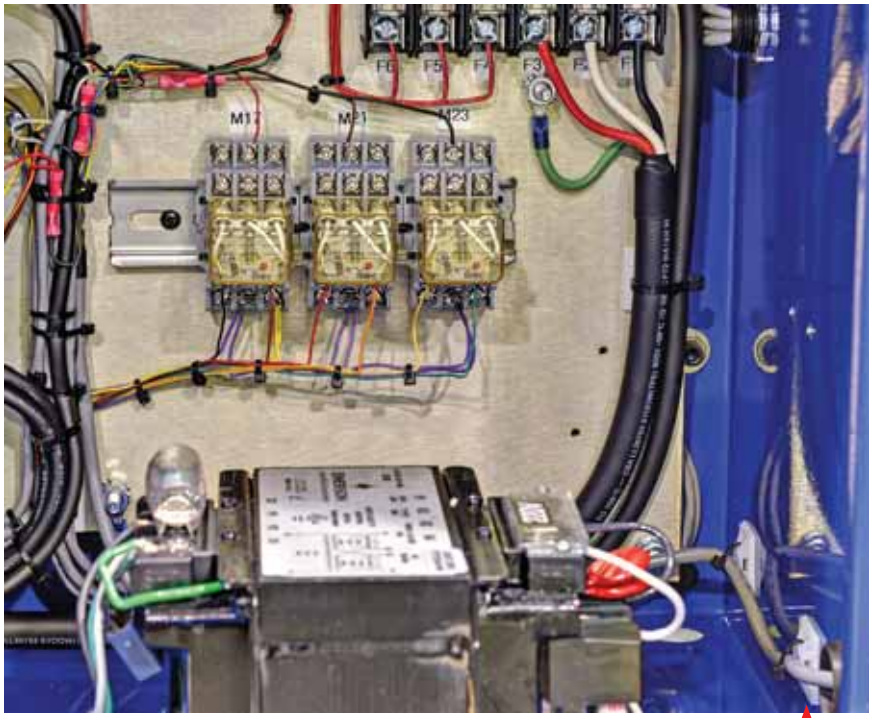
CONNECTIONS TO M17, M21 & M23



TO CONNECT BUTT-SPLICE TO HDR104-1*
1. Cut wire that comes from HDR104-1*
*__NOTE: Pin 1 on board is pin 2 on red header__.
2. Strip both ends about 1/4".
3. Put them into un-crimped side of butt-splice and crimp as shown.
NOTE: If there are no wires at HDR104, splice to HDR104 w/pigtail, which is supplied with kit.

To route cable out of spindle-drive cabinet

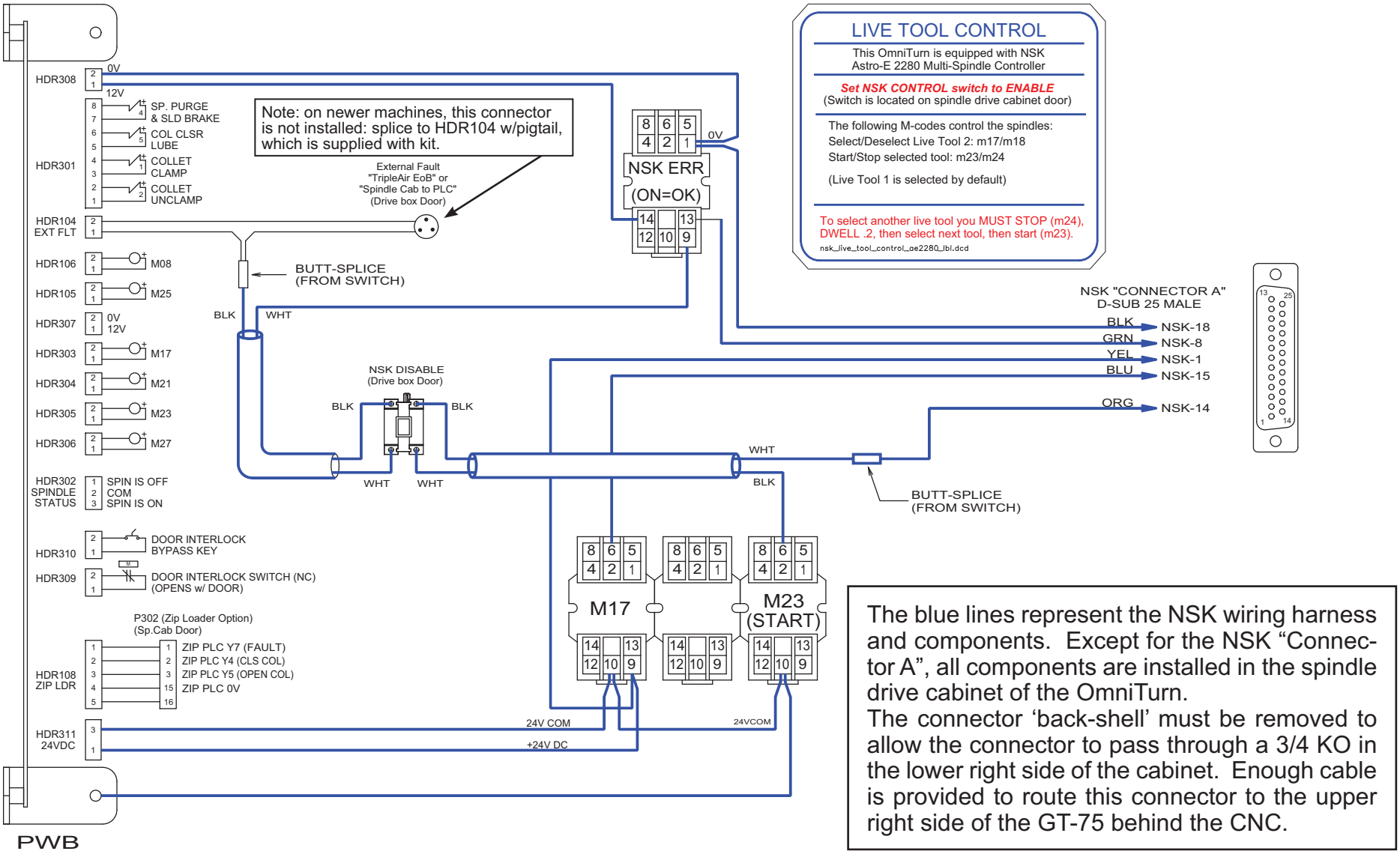
Disassemble Astro-E connector backshell and bend connector over wire as shown.



Remove rubber plug at side of spindle-drive cabinet. Route connector through hole. Cut slot in rubber plug and push connector through.

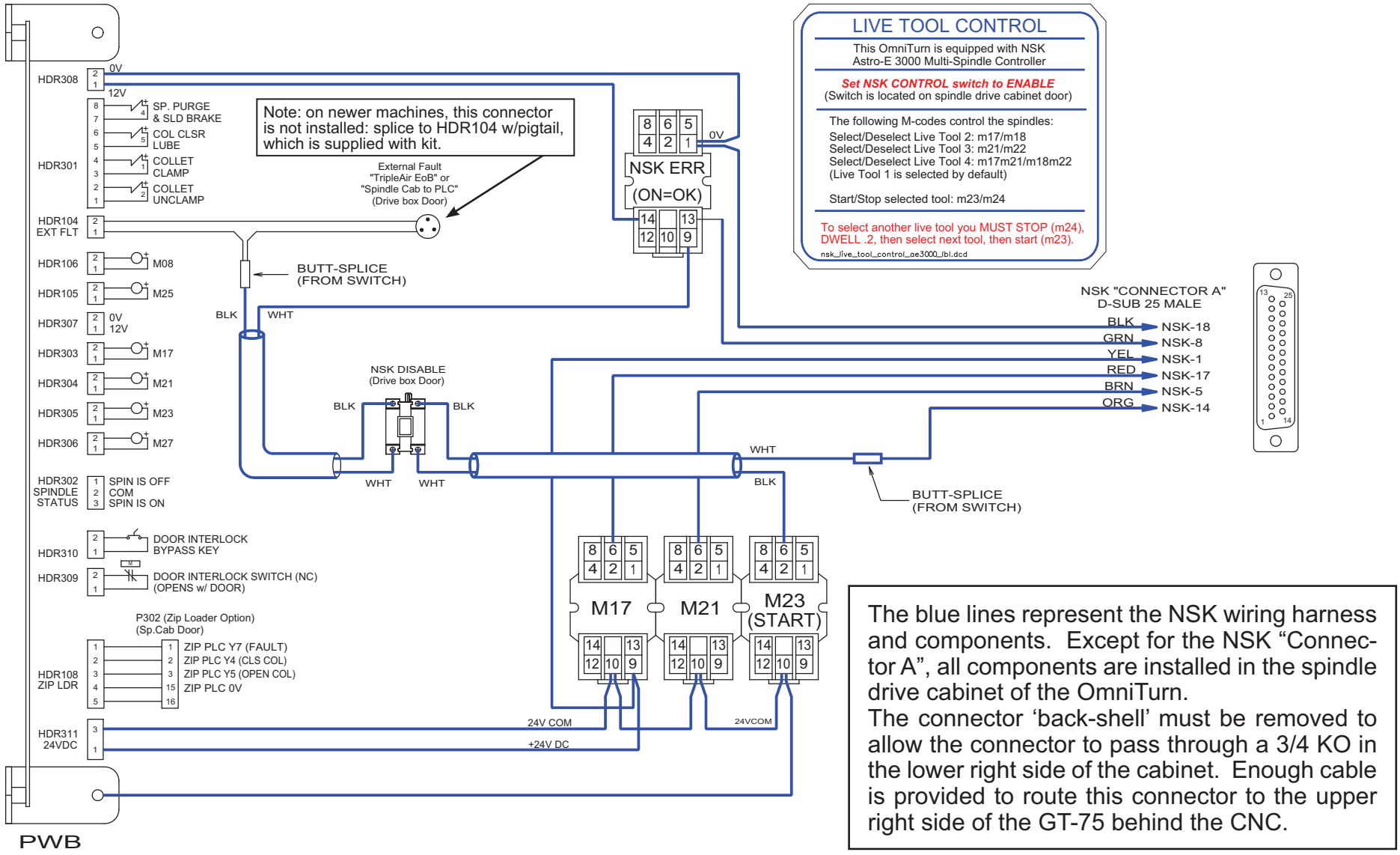
Replace plug, and route cable along back panel of GT-75 and up through any hole in white hopper, then up through any hole in top panel behind CNC.

AE-2280 Wiring Diagram



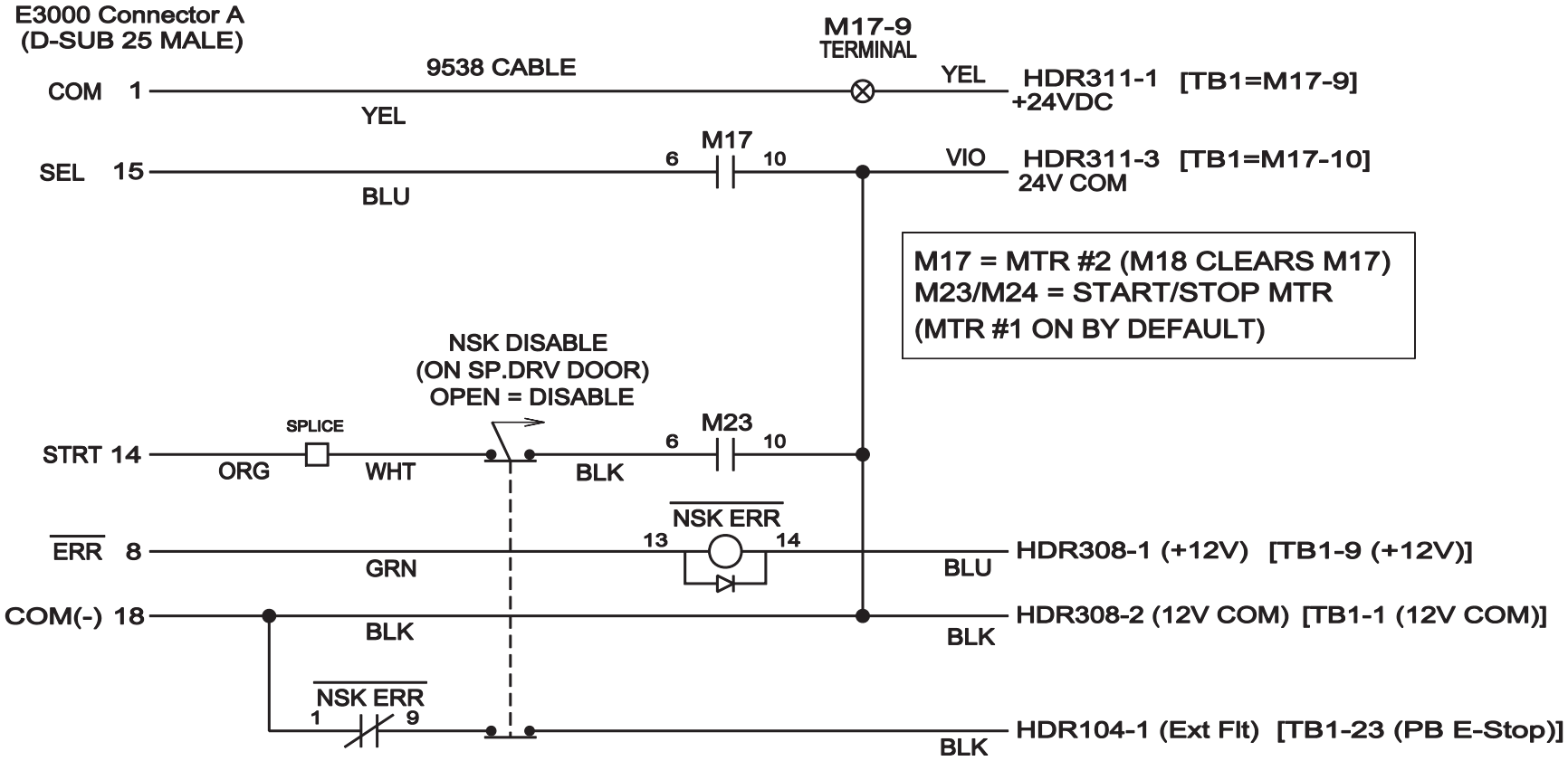
The blue lines represent the NSK wiring harness and components. Except for the NSK “Connector A”, all components are installed in the spindle drive cabinet of the OmniTurn.
The connector ‘back-shell’ must be removed to allow the connector to pass through a 3/4 KO in the lower right side of the cabinet. Enough cable is provided to route this connector to the upper right side of the GT-75 behind the CNC.

AE-3000 Wiring Diagram

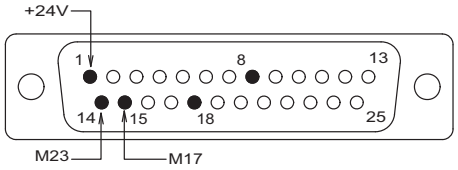


The blue lines represent the NSK wiring harness and components. Except for the NSK “Connector A”, all components are installed in the spindle drive cabinet of the OmniTurn.
The connector ‘back-shell’ must be removed to allow the connector to pass through a 3/4 KO in the lower right side of the cabinet. Enough cable is provided to route this connector to the upper right side of the GT-75 behind the CNC.

AE-2280 Wiring & Test



NSK AE2280 CONNECTOR 'A'



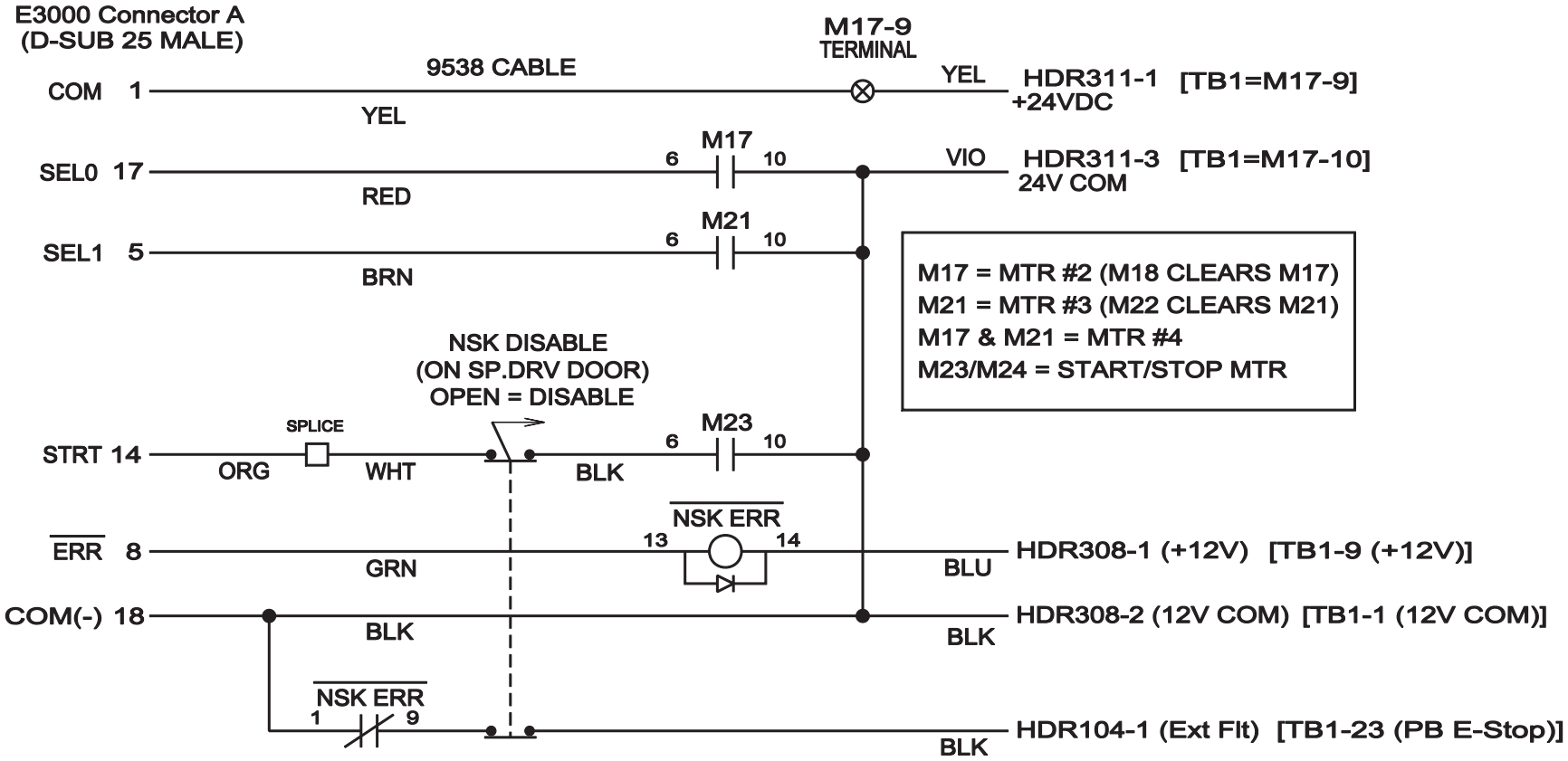
DB25(M) FRONT VIEW

TO TEST:

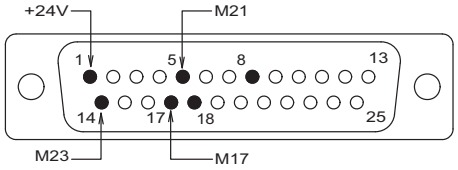
EACH M-FUNCTION PULLS TO 24V COM

1. REMOVE NSK ERR RELAY; SET NSK CONTROL SWITCH TO "ENABLE"
2. PUT RED LEAD ON PIN 1: PINS 14 AND 15 SHOULD READ 0V TO BLACK LEAD
   PIN 8 SHOULD READ ABOUT 14V; PIN 18 SHOULD READ ABOUT 27V
3. ISSUE M17: PIN 15 SHOULD NOW READ ABOUT 27V (RED LEAD ON PIN 1)
4. ISSUE M23: PIN 14 SHOULD NOW READ ABOUT 27V (RED LEAD ON PIN 1)
5. *REPLACE NSK ERR RELAY:* VERIFY EXTERNAL FAULT EXISTS (SPINDLE FAULT LIGHT LIT)
6. SHORT PIN 8 TO PIN 18: VERIFY NO EXTERNAL FAULT (SPINDLE FAULT LIGHT NOT LIT)
7. SET NSK CONTROL SWITCH TO "DISABLE"
8. VERIFY NO EXTERNAL FAULT (SPINDLE FAULT LIGHT NOT LIT)

AE-3000 Wiring & Test



NSK AE3000 CONNECTOR 'A'



DB25(M) FRONT VIEW

TO TEST:

EACH M-FUNCTION PULLS TO 24V COM

1. REMOVE NSK ERR RELAY; SET NSK CONTROL SWITCH TO "ENABLE"
2. PUT RED LEAD ON PIN 1: PINS 5, 14 AND 17 SHOULD READ 0V TO BLACK LEAD
   PIN 8 SHOULD READ ABOUT 14V; PIN 18 SHOULD READ ABOUT 27V
3. ISSUE M17: PIN 17 SHOULD NOW READ ABOUT 27V (RED LEAD ON PIN 1)
4. ISSUE M21: PIN 5 SHOULD NOW READ ABOUT 27V (RED LEAD ON PIN 1)
5. ISSUE M23: PIN 14 SHOULD NOW READ ABOUT 27V (RED LEAD ON PIN 1)
6. *REPLACE NSK ERR RELAY:* VERIFY EXTERNAL FAULT EXISTS (SPINDLE FAULT LIGHT LIT)
7. SHORT PIN 8 TO PIN 18: VERIFY NO EXTERNAL FAULT (SPINDLE FAULT LIGHT NOT LIT)
8. SET NSK CONTROL SWITCH TO "DISABLE"
9. VERIFY NO EXTERNAL FAULT (SPINDLE FAULT LIGHT NOT LIT)

NSK AE2280 Interface

The NSK AE2280 control interfaces to the OmniTurn CNC via M-code relay closures as follows:

m23. . . . . Start selected spindle (#1 selected by default)
m24. . . . . Stop selected spindle
m17 / m18. . . . . Select/Deselect spindle #2

Before selecting another spindle, you MUST STOP the current spindle, dwell, select next spindle, then start the spindle. The code to switch from spindle #1 to #2 looks like this:

m24 (Stop spindle)
g04f.2 (Dwell 0.2 second)
m17 (Select spindle #2)
m23 (Start spindle)

The OmniTurn will E-Stop if the NSK control unit faults for any reason. The OmniTurn spindle and X-Z slide will stop. The OmniTurn slides cannot be moved until the NSK fault is cleared. If it is necessary to jog the OmniTurn while the NSK is in fault condition, set the “NSK Control” switch to “DISABLE”. The “NSK Control” switch is mounted on the OmniTurn spindle drive door.

If the NSK AE2280 control is removed from the OmniTurn, or switched off, the OmniTurn WILL NOT JOG. Set the “NSK Control” switch to “DISABLE” if the NSK is switched off or removed. Set the switch to “ENABLE” when the NSK control is in the ready mode.

OmniTurn provides only the electrical interface for the live tool controller. We recommend that cooling air be provided by NSK Air Line Kit AL-C1204.

NSK AE3000 Interface

The NSK AE3000 control interfaces to the OmniTurn CNC via M-code relay closures as follows:

m23. . . . . Start selected spindle (#1 selected by default)
m24. . . . . Stop selected spindle
m17 / m18. . . . . Select/Deselect spindle #2
m21 / m22. . . . . Select/Deselect spindle #3
m17m21 / m18m22. . Select/Deselect spindle #4

Before selecting another spindle, you MUST STOP the current spindle, dwell, select next spindle, then start the spindle. The code to switch from spindle #1 to #2 looks like this:

m24 (Stop spindle)
g04f.2 (Dwell 0.2 second)
m17 (Select spindle #2)
m23 (Start spindle)

The OmniTurn will E-Stop if the NSK control unit faults for any reason. The OmniTurn spindle and X-Z slide will stop. The OmniTurn slides cannot be moved until the NSK fault is cleared. If it is necessary to jog the OmniTurn while the NSK is in fault condition, set the “NSK Control” switch to “DISABLE”. The “NSK Control” switch is mounted on the OmniTurn spindle drive door.

If the NSK AE2280 control is removed from the OmniTurn, or switched off, the OmniTurn WILL NOT JOG. Set the “NSK Control” switch to “DISABLE” if the NSK is switched off or removed. Set the switch to “ENABLE” when the NSK control is in the ready mode.

OmniTurn provides only the electrical interface for the live tool controller. We recommend that cooling air be provided by NSK Air Line Kit AL-0201.