

OmniTurn - Trouble shooting guide

The Yellow power light won't come on

The yellow power light indicates that the 12V power supply is working. The 12V should come on when the system is turned on and the computer is working.

- Be sure there is power to the machine
- Check that disconnect on spindle cabinet is ON
- Check that the CNC Control is plugged into socket on back of machine
- Check the fuse on the back of the control box.
- Check fuses on step-down transformer in spindle cabinet

The Blue servo light won't come on

The Blue servo light indicates that the servos have been turned on. If this won't illuminate that means there is a problem with the drives or their control system.

- Check that the Emergency stop is released
- Check the relay on the connect card in the control, be sure it is plugged in

The Monitor won't come on

- If the rest of the system works (the yellow light comes on and, after 1 minute, you can turn on Caps Lock Light on keyboard) but you do not get an image on the screen there is a problem with the monitor; check the cable on the back of the monitor. Make sure 12V cable from CRT, is attached to J7 on connect card.
- If the Caps Lock Light won't light, the computer is probably not booting up.

The Red Motion Stop light come on every time you try to move the slide

- Check that the Spindle Drive is not faulted; press the reset button on the the spindle drive cabinet located at the left side of GT-75 and GT-Jr.
- Check the hatch on GT-Jr, or any interlocked doors on your system. To jog the machine with door open during setup, get the interlock bypass key from your supervisor.
- If you have a barfeeder, check that the end of bar circuit is not activated

“Servo Axis Error” when you try to jog the slide:

Most common cause is from over-travelling the slide and hitting a “hard stop”.

- Press “ESC”, this will reset the control. If the control shuts down again when you try to jog the axis go to the next step.
- Check Emergency Stop button on CNC; be sure it's reset
- Check the two thermal overloads in the control. These are located on the rear panel of the CNC. It can take a few minutes for the overload to cool enough to be reset. Press “Esc” and try to jog again.
- Turn the control off, wait 15 seconds, turn the control on again. This will reset the Servo driver card. If the control shuts down again when you try to jog, go to the next step.
- Check for loose motor cable; set power off, then disconnect and reconnect.

- If only one axis is giving you problems, do the following:
 - Turn the control off and swap the cables to the motors, Z to X and X to Z. When you try to jog in Z, the X motor should move; when you try to jog in X, the Z motor should move.
 - Turn the control back on and try to jog in the good axis; if the “bad” motor moves, the motor is probably ok and the motion control card is bad; if the motor doesn't move, it's probably bad. Try the other axis and verify your conclusions.

- If you have questions about this procedure, call the factory (541-332-7004)

OmniTurn - Trouble shooting guide

Positioning Problems:

The slide has problems with repeating a size

Using Ctrl-C & Ctrl-H to diagnose repeatability problems

These two tests will determine if the problem is in the control or the axis motor without needing any additional tooling or indicators.

NOTE: before starting this check to see that all connections on the MC-2 and servo cables are clean and have no obvious defects. Check to see all pins on the axis cables are level and not pushed back.

Ctrl-C and Ctrl-H are diagnostic tools to help determine the cause of repeatability problems.

If Ctrl-C does not indicate zero, the problem is internal to the MC2.

If Ctrl-H does not indicate zero, the problem could be the motor encoder or encoder circuitry on the MC2.

- Establish Home as normal (press 9, then Cycle Start), then move slightly away from Home and establish Home again (press 9, then Cycle Start) to clear all registers.
- Load “smallest”, which is a test program which makes a one inch circle inside a one inch square centered one half inch from machine home. If “smallest” is not available just run the following program:

```
g90g94f300  
x1  
z-1  
x0z0  
m30
```

- Set Cycle Repeat and let it run twenty times. Go to Jog Mode when program is done.
- Press H key, then X, then Z. Now press and hold Ctrl Key, then press C Key. X and Z readings should be zero. If the axis you're having trouble with is not zero, the problem is probably a bad motion control (MC2) card.
- Jog the slide a little ways from home, then Establish Home (press 9, then Cycle Start). Press and hold Ctrl Key, then press H Key. X and Z readings should be zero. If the axis you're having trouble with is not zero, the problem could be a bad MC2 card or a bad motor encoder.
- If the either Ctrl-C or Ctrl-H reports non-zero, press E-Stop to shut servos off, then swap motor connections at back of CNC, and test again.
- If same axis reports non-zero, the problem is a bad MC2. If opposite axis reports non-zero, the problem is bad motor encoder.

A repeatability or size problem which persists despite good readings with Ctrl-C and Ctrl-H indicates a mechanical problem: loose coupler, excess backlash, entire slide loose on ways, bad spindle, tooling, etc.

Review some of the suggestions on the next page for help in determining the mechanical cause of the repeatability or size problem.

OmniTurn - Trouble shooting guide

Positioning Problems:

The slide has problems with repeating a size

- The part is moving, check your work holding fixture
- Be sure the tooling is held tightly
- If you have an **attachment**, see if the slide is loose on the lathe
- The ball screw nut has come loose in it's housing
- Loose encoder at the end of the axis motor
- Loose coupling between the Servo motor and the ball screw for axis movement
- Bad motor-tach-encoder; bad cable; bad motion control card

To see if it is a mechanical problem position the slide close to the spindle, mount an indicator on the slide so it touches the headstock, zero out the indicator and then push and pull the slide with servos on. The indicator should show some movement as you push and pull on the slide. However it should return to Zero when you let go. If the slide does not come back to Zero then there is something loose, (Slide, Ballscrew nut, Ballscrew taper roller bearing, etc).

To check if the slide for repetition try running a simple program that will show the type of error that you are getting clearly. Run the program in "cycle repeat":

```
g90g94f300(TEST PROGRAM FOR Z AXIS)  
t30(Move the slide so indicator is 1 inch away from headstock)  
x0z1  
z.1  
f20z0 (Creep up on the indicator)  
g04f1(Read the indicator during the dwell)  
f300z1  
m30
```

```
g90g94f300(TEST PROGRAM FOR X AXIS)  
t31(Move the slide so indicator is 1 inch away from headstock)  
xlz0  
x.1  
x0f20  
g04f1(Read the indicator during the dwell)  
f300x1  
M30
```

After running the program and studying the way the indicator repeats, or doesn't, you should have an idea of what your mechanical problem could be. If not, call the factory and describe the type of error that you are seeing, for example: constant creeping in one direction, random movement in both directions, jumping.

OmniTurn - Trouble shooting guide

Computer won't complete start-up

- You get a message that the OmniTurn is "Initializing" and on the next line there is a number: ie. 255.
- This indicates that the OmniTurn Motion card is not found. This card has either come loose and needs to be resettled or replaced. See notes on replacing system cards.

The slide crashes whenever a program is run

- | | |
|-----------|--|
| Problem | <ul style="list-style-type: none">• The HOME position has been improperly set• Either the tool offsets have not been set or have been lost• Your program is incorrect• Check the XnZn statements after a tool change, be sure you have one for each and they are correct. |
| Solutions | <ul style="list-style-type: none">• Reset HOME• Check your tool offset table• Check your program• Reset the tool• Reload the tool offset table, see F10 in the automatic mode |

Spindle won't come on

- Check that both Emergency stops are reset, on control face and operator station
- Turn the "spindle override" pot on the control face full CW
- Turn the spindle switch on the control face to "AUTO"
- Check that the pin on the head of the hardinge to lock the spindle is pulled out
- Push the red button on the spindle drive box.

This is a reset for the inverter used to vary the spindle speed. This could be tripped for a number of reasons:

- Low or high voltage
- The duty cycle is too much; cycle time is too short and too often.
- Noise from coolant pump or other contacts
- Acceleration and Deceleration are too short. *Parameters can be set to change these: call the factory (541.332.7004)*
- Spindle drive box must be turned on (attachments only)
- Cables to the spindle drive box must be plugged in
- Check that MISC cable from the OmniTurn CNC to Spindle Cabinet is connected
- Check that Operator Station Cable is connected to Spindle Cabinet

OmniTurn - Trouble shooting guide

OMNITURN MOTOR REPLACEMENT INSTRUCTIONS

Removal:

1. You need to have the room to access the motor coupling on X or Z axis in order to change the motor, so first move the slide away from the motor.
2. Remove the sheet metal covering the slide nearest the motor you wish to change. On X-Axis this cover is held with acorn nuts on 1/4-20 all-thread; on Z-Axis the cover is held by the three phillips head screws through the scale. Remove the motor cover, which is held with one screw.
3. Loosen the cap screw holding the clamp on the coupling on the motor side. Turn the coupling as required to access the allen screw.
4. Remove two 3/8-18 cap screws that hold the motor mount and motor to the base. You may have to lightly tap the motor mount to remove it from the machine, as it is pinned with dowel pins.
5. Remove four 10-32 cap screws that hold the motor to the motor mount.

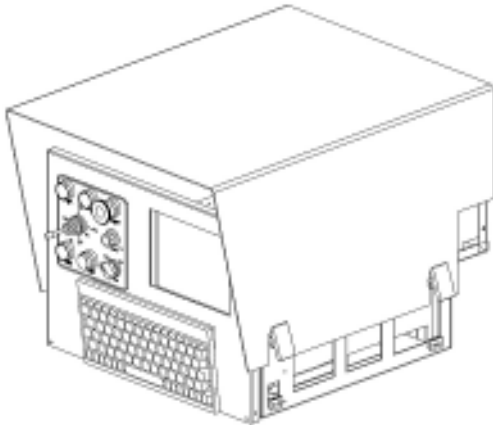
Replacement:

1. Attach the replacement motor to the motor mount with four 10-32 cap screws.
7. Notice the mark on the end of the motor shaft and another on the face of the motor. These marks are aligned when the motor is at "home". Turn the motor shaft so that the marks are 1/2 turn apart; that is 1/2 turn, or 0.100" from "home". If X-Axis, push the slide all the way down, against the stop; if Z-Axis, push the slide all the way to the right, against the stop.
8. Attach the motor mount to the base, slipping the shaft into the coupler. Don't let the shaft turn much. Tighten the motor mount to the machine before tightening the clamp on the coupler.
9. Replace the sheet metal as required.
10. After re-assembly, jog the axis to both ends and verify that the pointer will go just slightly past "12" and "0", then establish Home as usual. If the pointer does not indicate "0", loosen it and move it to zero.

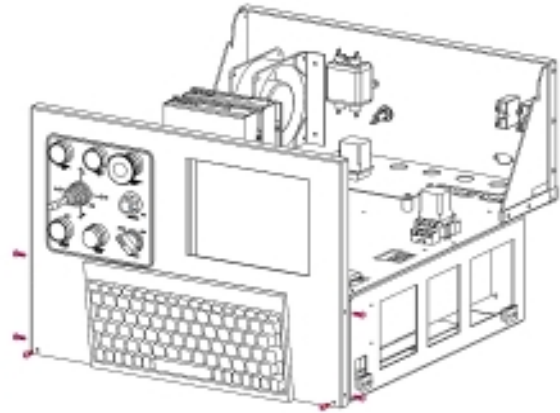
CAUTION - YOUR TOOL OFFSETS HAVE CHANGED. The slide will not home *exactly* where used to: if you are set up on a job you should re-set all offsets.

OmniTurn - Trouble shooting guide

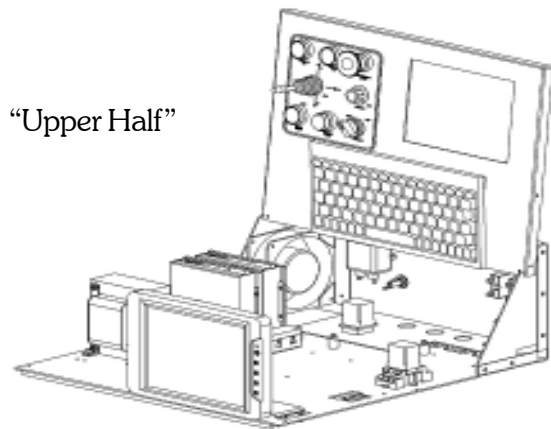
To Disassemble the CNC Control



Un-plug power cord, then remove the blue cover.

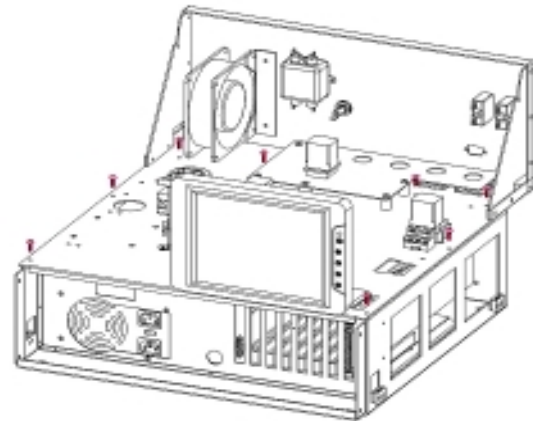


Remove six screws holding front panel.



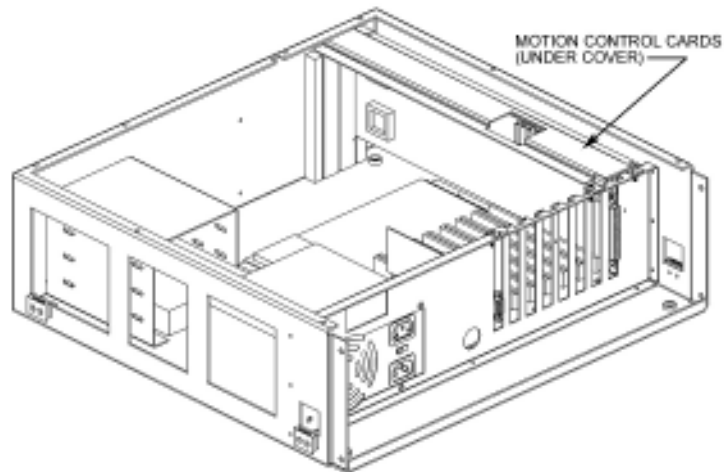
“Upper Half”

It is not necessary to disconnect cables to front-panel. Stow panel in notches at rear of top chassis



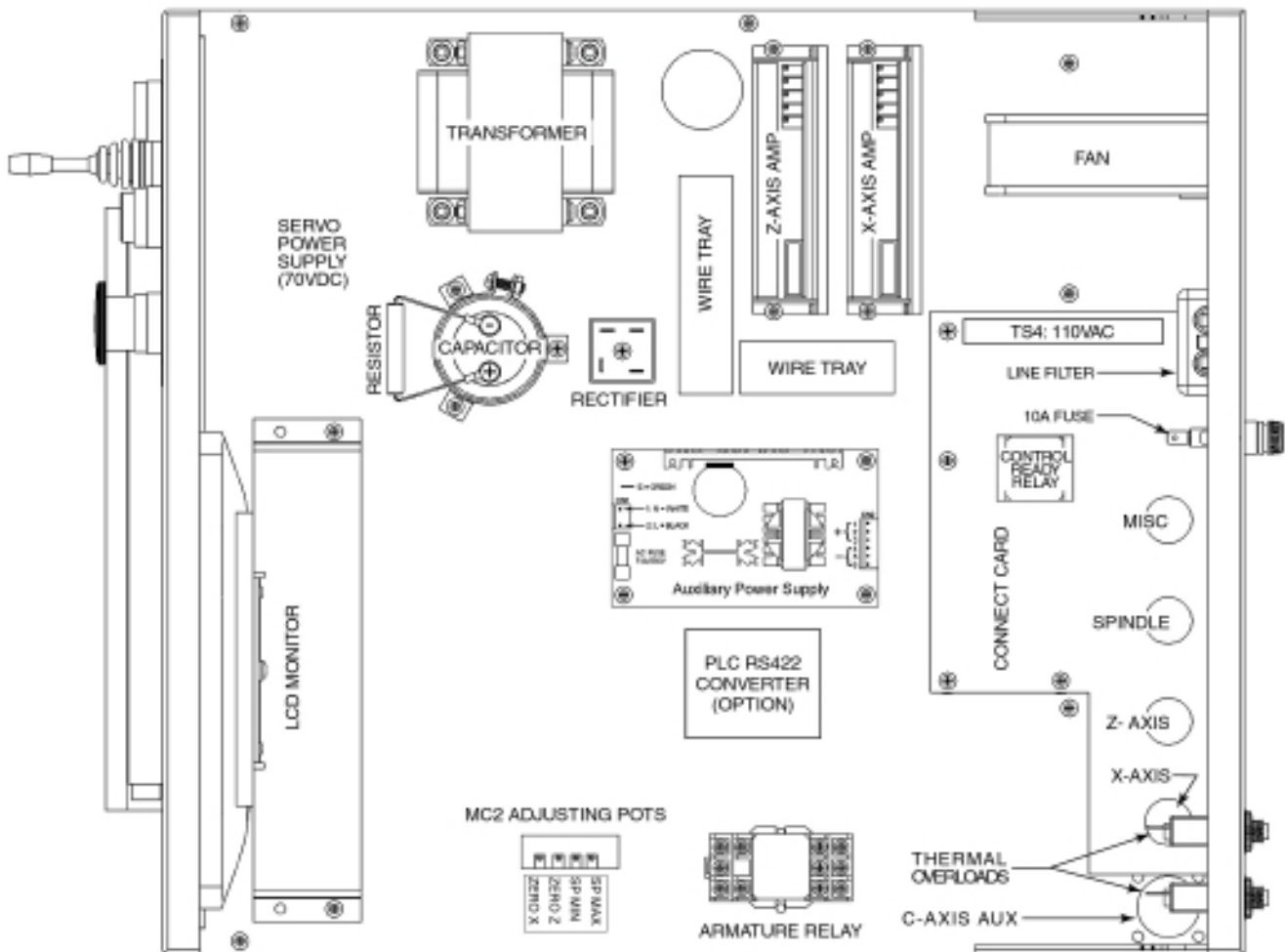
To gain access to the computer, disconnect all cables at rear of CNC, remove eight screws and set chassis aside.

“Lower Half”



OmniTurn - Trouble shooting guide

OmniTurn CNC “Top Half”

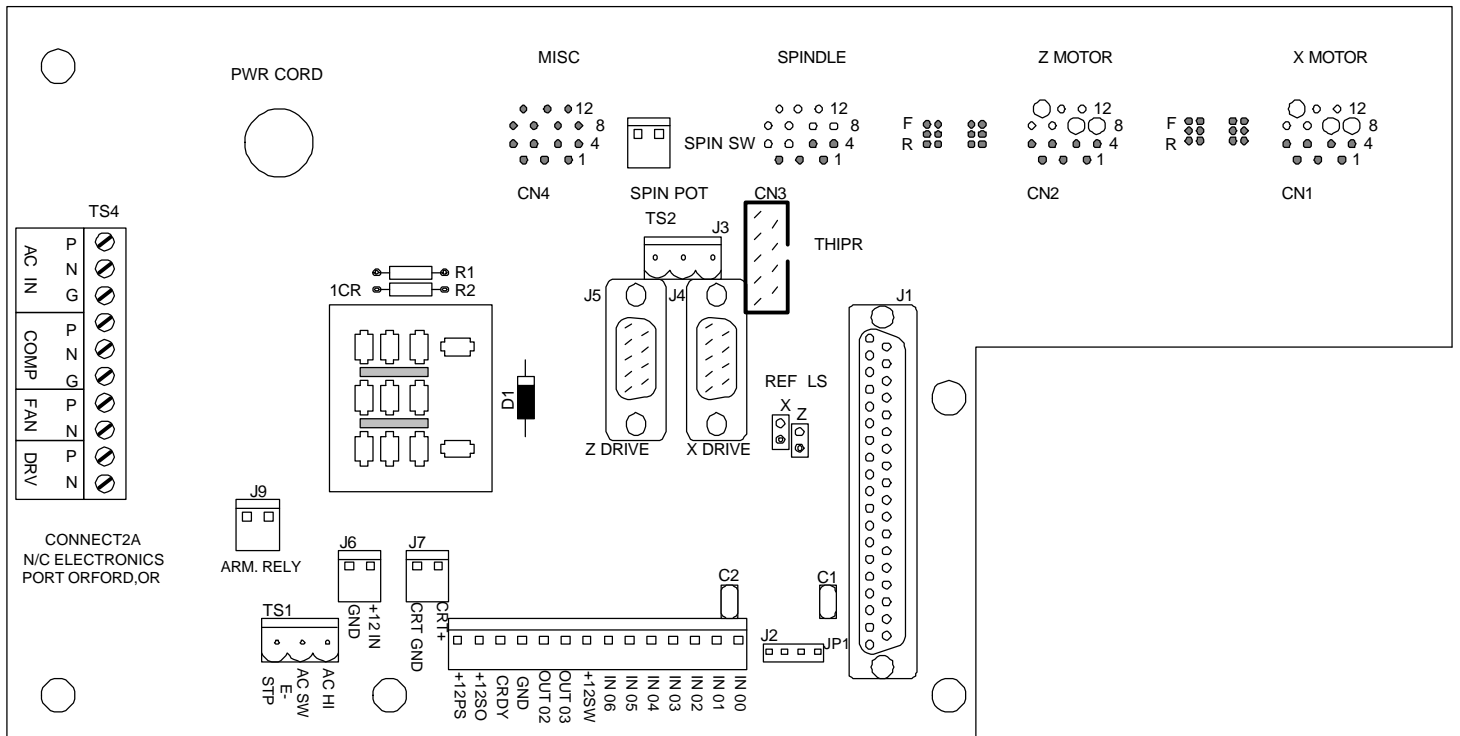


To adjust the spindle speed with a tach:

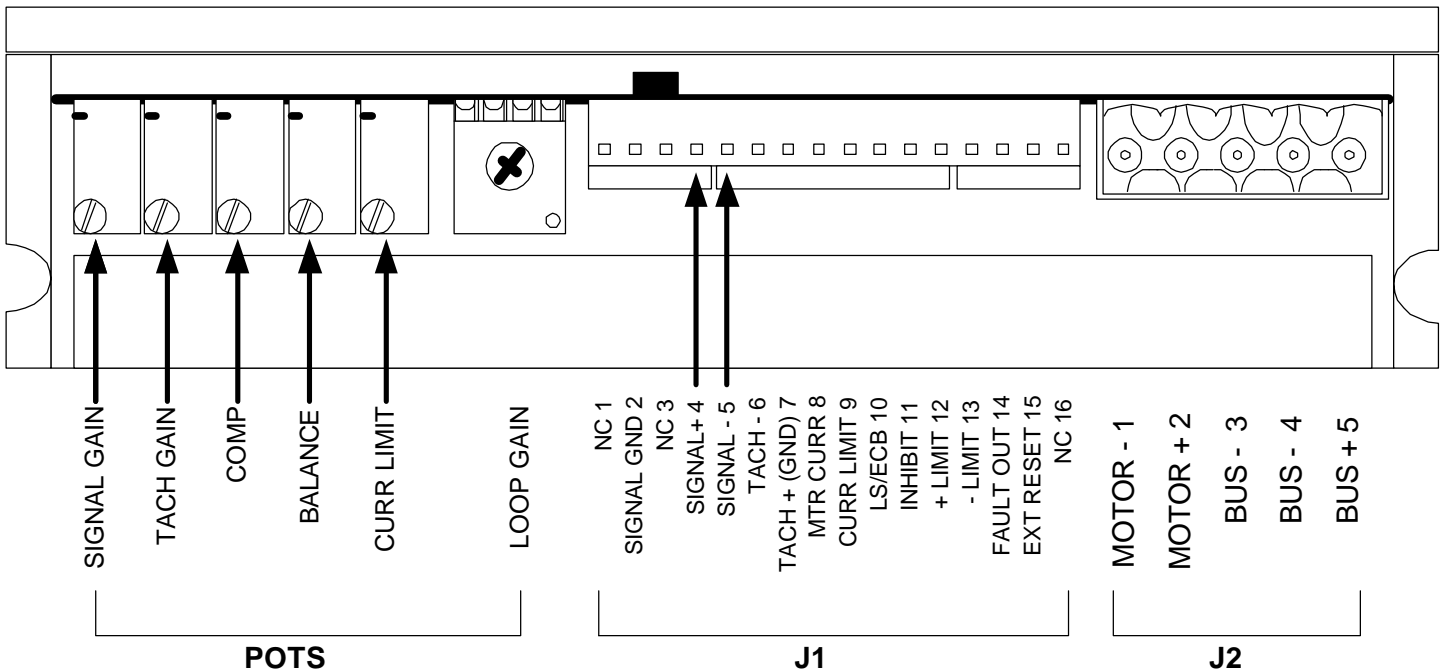
1. Issue M03 S0 from MDI; adjust SP MIN for no rotation.
2. Issue M03 S4000 (S3000 on attachments); adjust SP MAX for correct rpm.
3. Re-check M03 S0 and adjust as required.

OmniTurn - Trouble shooting guide

OmniTurn CNC "Connect Card"

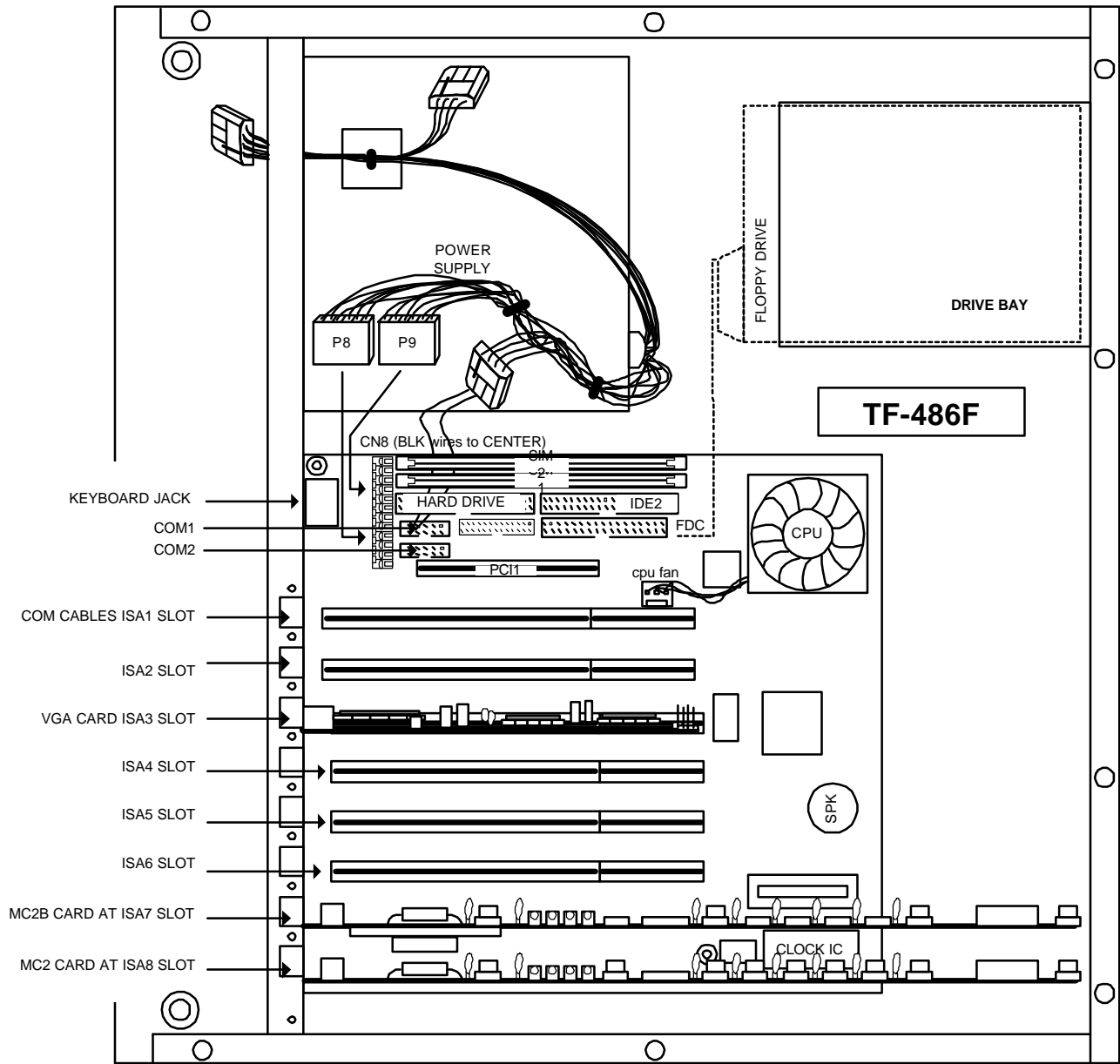


OmniTurn CNC Servo Amplifier



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OmniTurn CNC "Bottom Half"

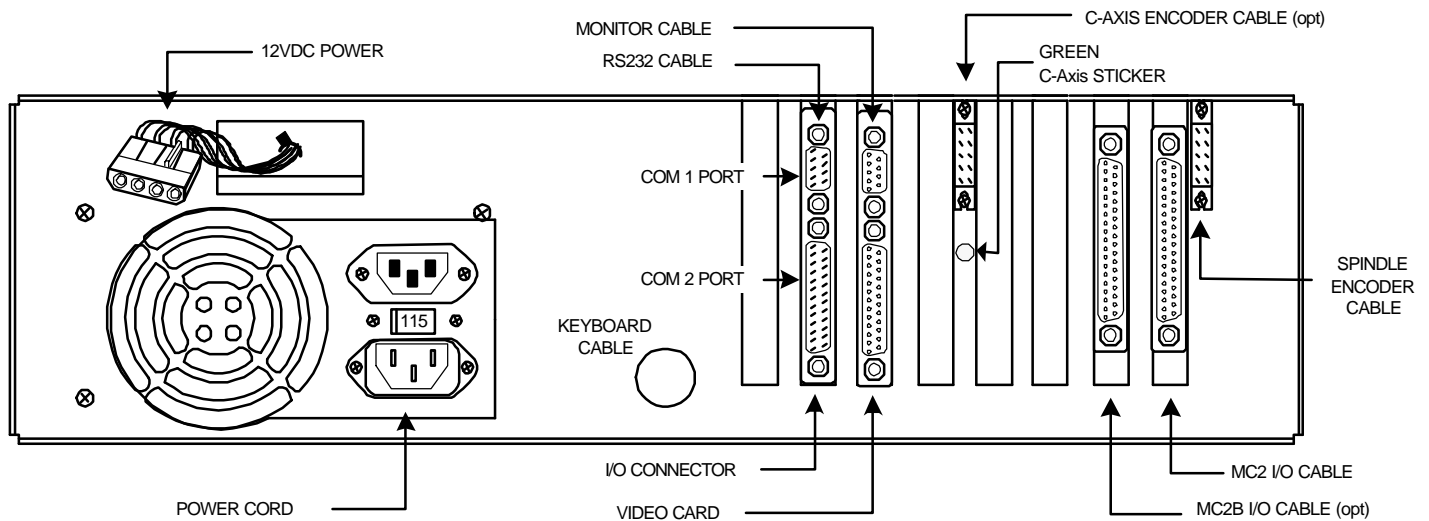


OmniTurn - Trouble shooting guide

Replacing the MC2 (Motion Control or C-AXIS cards)

To access these cards the entire “top half” of the control must be removed:

- Unplug the power cord.
- Disconnect the cables at the back (two axis motors, MISC, Encoder, PLC (optional)
- Remove the blue cover
- Remove front panel. (Two screws on the face and two on each side). Lift and set on top of control. Disconnect the keyboard cable from lower half of control.
- Unplug all cables going to control “lower half”, being careful not to damage cables on removal (12VDC power, Power Cord, RS232 Cable, Monitor Cable, C-Axis Encoder Cable (opt), MC2B I/O Cable (opt), Spindle Encoder Cable, MC2 I/O Cable)
- To remove upper half of control, unscrew (8 screws).
- Carefully lift controls upper half of control and set aside.



With computer facing as shown, you will see one or two motion control cards (depending on model), mounted on the right side. Remove top brace.

FOR MC2 CARD:

Remove 5” ribbon cable that is attached to this motion card and pull cable out of slot away from card. Pull card straight up out of motherboard. Place new card in same space, pushing straight down gently into motherboard. Carefully work 5” cable back through slot and attach to MC2 card.

FOR MC2B (C AXIS) CARD:

Remove 5” ribbon cable that’s attached to this motion card. Pull card straight up out of motherboard. Place new card in same space, pushing straight down gently into motherboard. Attach the MC2B’s 5” cable to card.

Replace top brace. Screw down tightly.

OmniTurn - Trouble shooting guide

Setting OMNITURN Servo Amps

This needs to be done if you ever have to replace a servo AMP

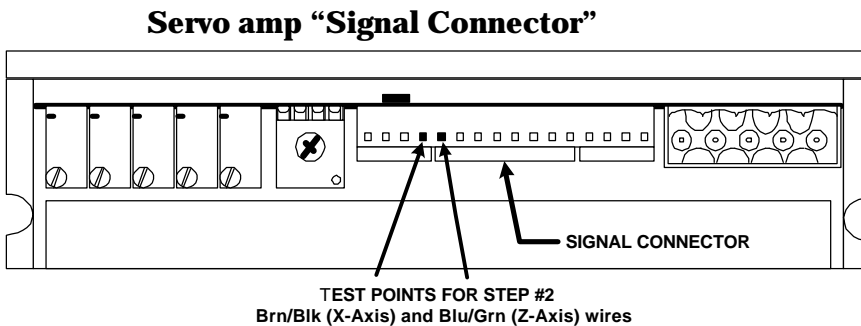
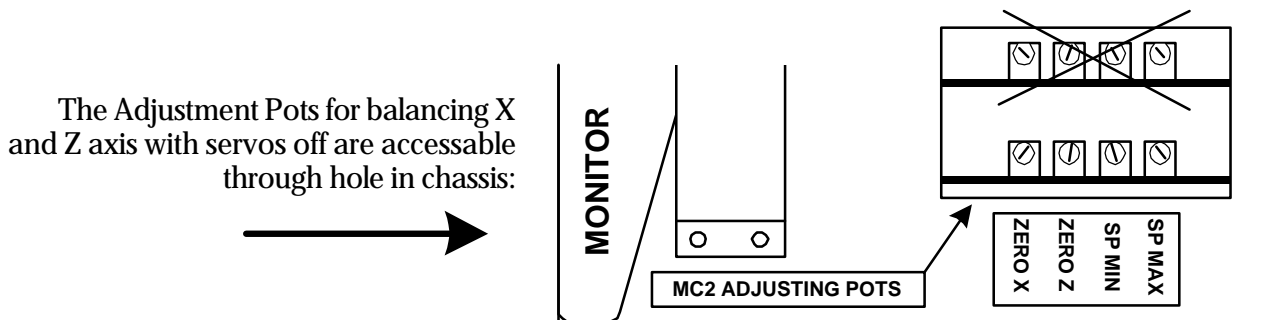
Tools required: A digital voltmeter (DMM or DVM)
Fine tipped probes, or paper clips
Jewlers common screwdriver or "tweaker"

1. With the OmniTurn control completely powered down, depress "CONTROL ON" and allow the control to boot up to the point where the message "PLEASE TURN ON SERVOS" is displayed.

DO NOT TURN SERVOS ON AT THIS TIME

2. With the computer turned on, but the servos still turned off set the balance pot on the MC2 card
 - To do this set your meter to measure DC voltage on lowest range, or Auto Range.
 - Put your meter on pins 4 and 5 of the Signal plug. This is a brown connector on the top of the card. Verify that your meter is making contact. If your meter tips are too large to make contact with the wires in the plug gently insert a small wire (a paper clip will work) into the top of the plug and test off of it.
 - With meter on Brown and Black wires for X axis, adjust "Zero X" pot through hole in monitor chassis for $0.000 \pm .005V$ on your meter. Refer to monitor drawing on page 6-12 to locate access hole in monitor chassis.
 - Put the meter on Green and Blue wires for Z axis, and adjust "Zero Z" pot through hole in monitor chassis for $0.000 \pm .005V$ on your meter.

This completes setting the balance pots on the MC2 card. Proceed to next page.



OmniTurn - Trouble shooting guide

Setting OMNITURN Servo Amps, con't

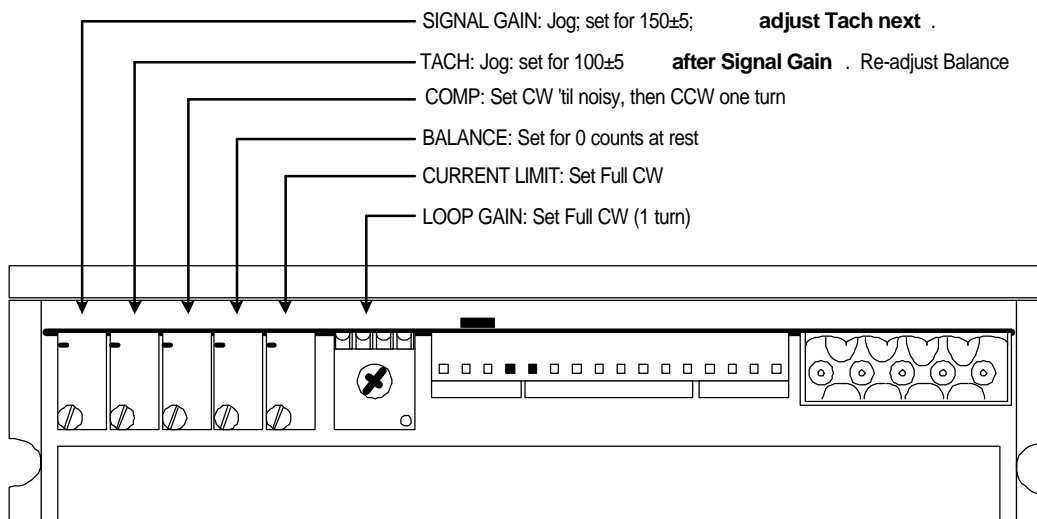
3. On both servo amps
adjust CURRENT LIMIT full CW (10 turns)
adjust COMP full CCW (10 turns)
adjust LOOP GAIN full CW (1 turn)

TURN SERVOS ON NOW

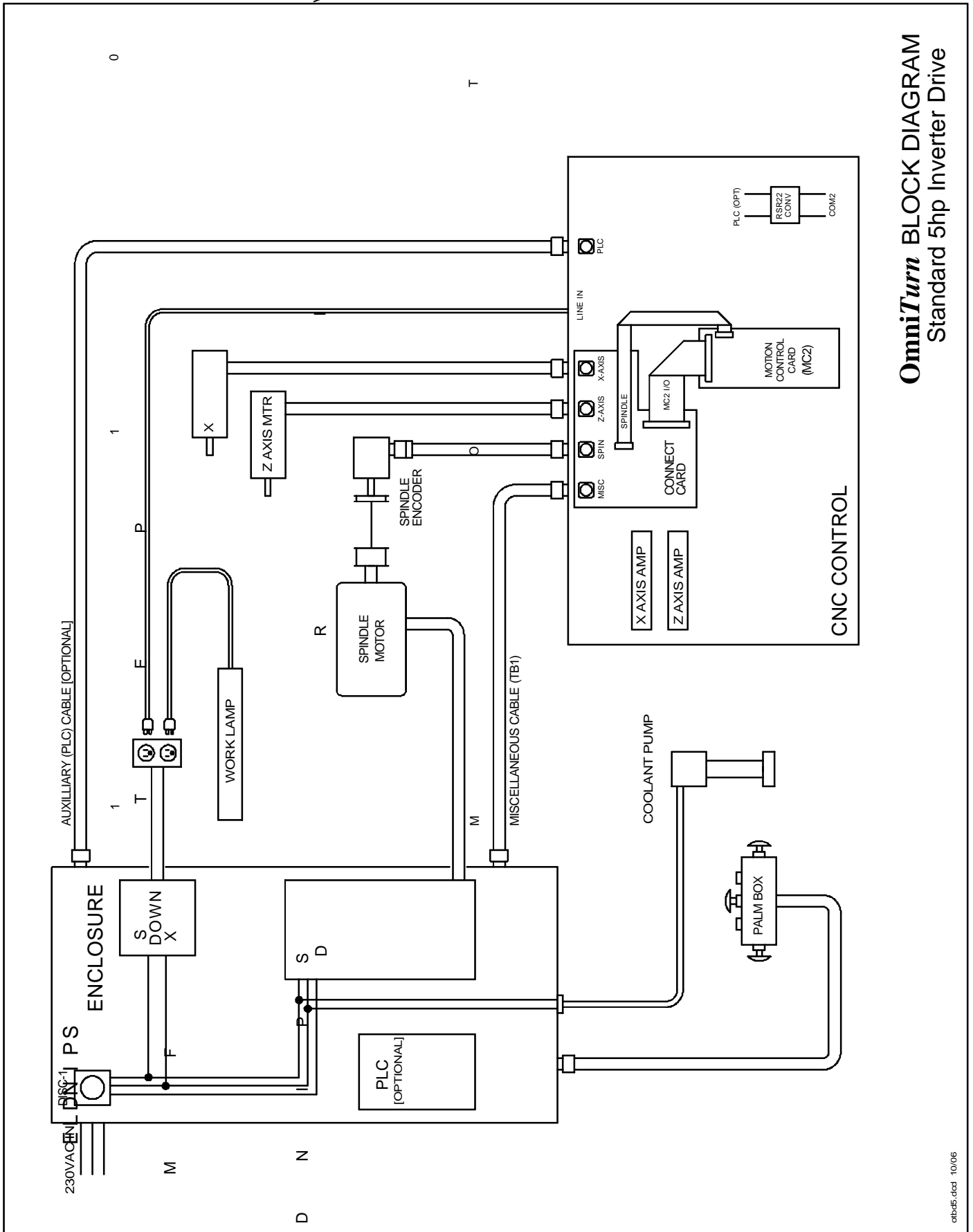
4. Turn the servos on now. Go to the Jog mode. The MC2 card has some built in diagnostics that help balance the card. To set the offset for the drive press and hold the Ctr and then E. This will pop up a window on the screen:

```
Set Test/Offset for 0 when slide is stopped
Set Ref In Gain for 100 in Med. Jog
Following Error
X: 0
Z: 0
```

5. Use a small screw driver to adjust the "BALANCE" pot on the OMNITURN AMP. Turn the pot until the value on the screen is 0. Do this procedure with the slide at rest, no motion. Do this for both the X and Z axes.
6. Now use the screw driver to adjust the "SIGNAL GAIN". To do this move the slide at medium jog speed (2 on Jog Menu). Adjust for 150 while jogging. Do this for both Axes. Re-adjust the BALANCE for zero at rest (not jogging).
6. Next, adjust the TACH pot for 100 while jogging at medium speed (2 on Jog Menu). Do this for both Axes. Re-adjust the BALANCE for zero at rest (not jogging).
7. Adjust the COMP pot CW 'til some noise is heard in the servo motor, then turn CCW one turn. If no noise is heard at rest, run the slide in Jog 3 and see if smoothness and response is improved by adjustment. Best results are obtained by repeating a simple program which runs the slides back and forth at 300 ipm and adjusting for best performance.

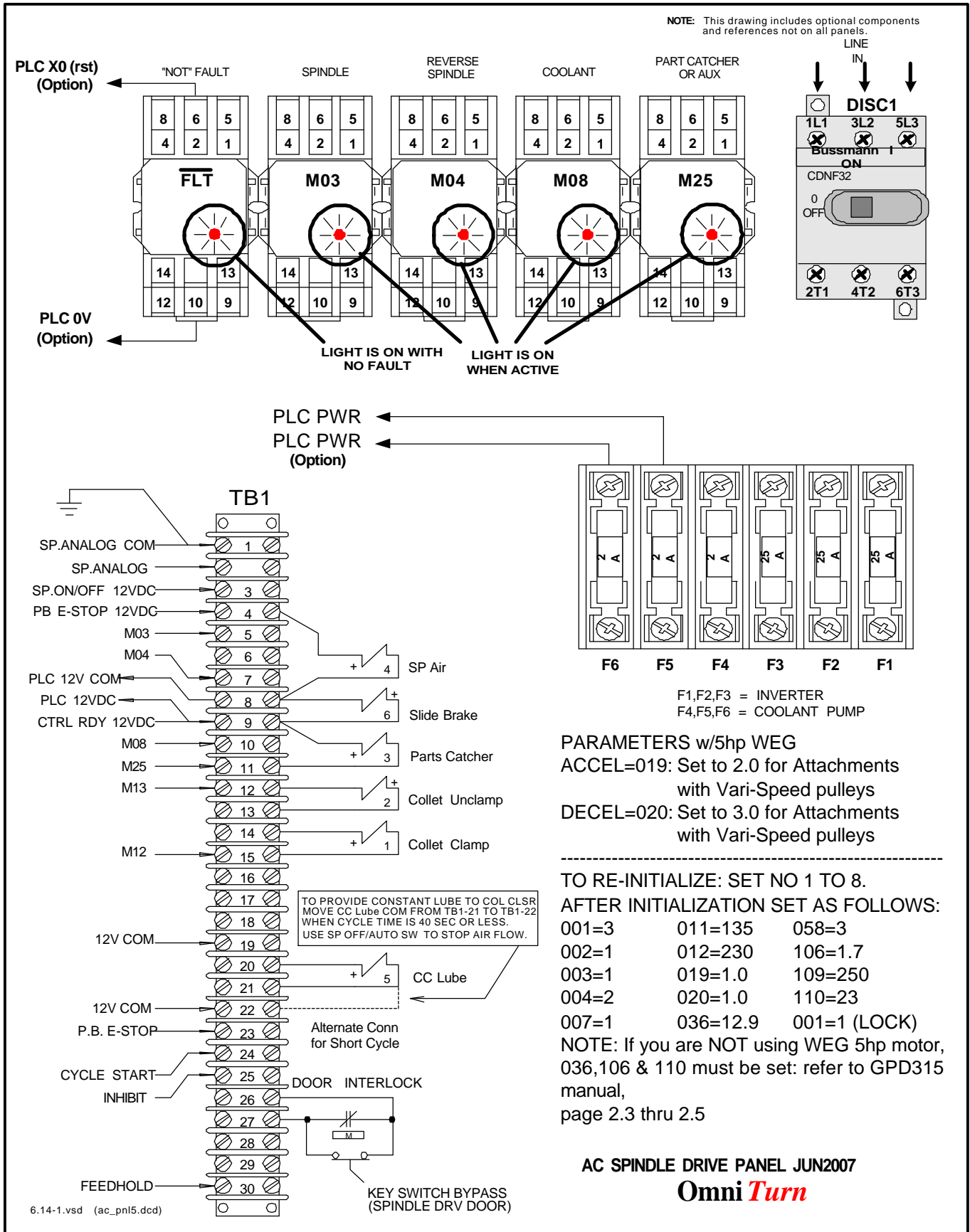


OmniTurn - Trouble shooting guide

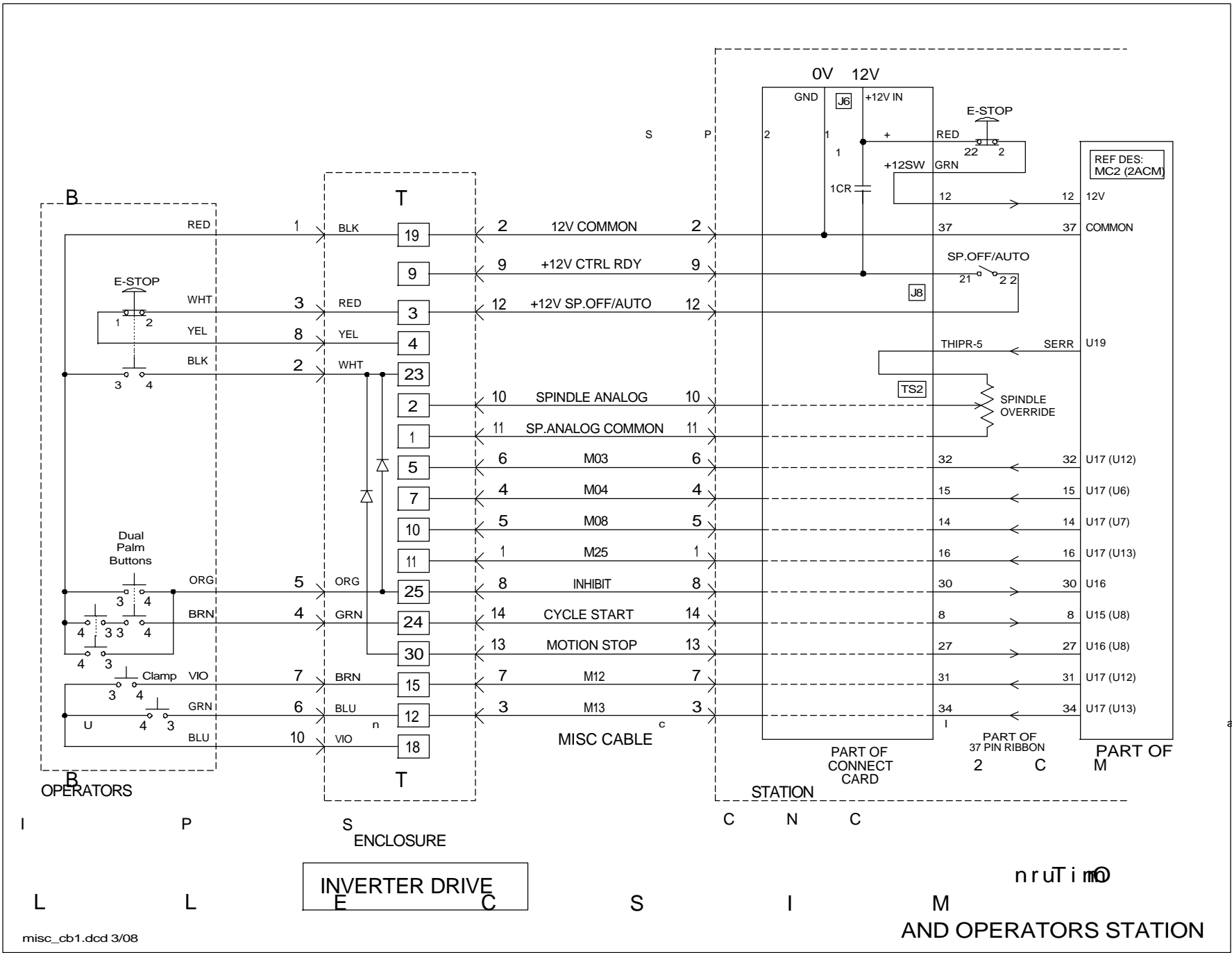


OmniTurn BLOCK DIAGRAM
Standard 5hp Inverter Drive

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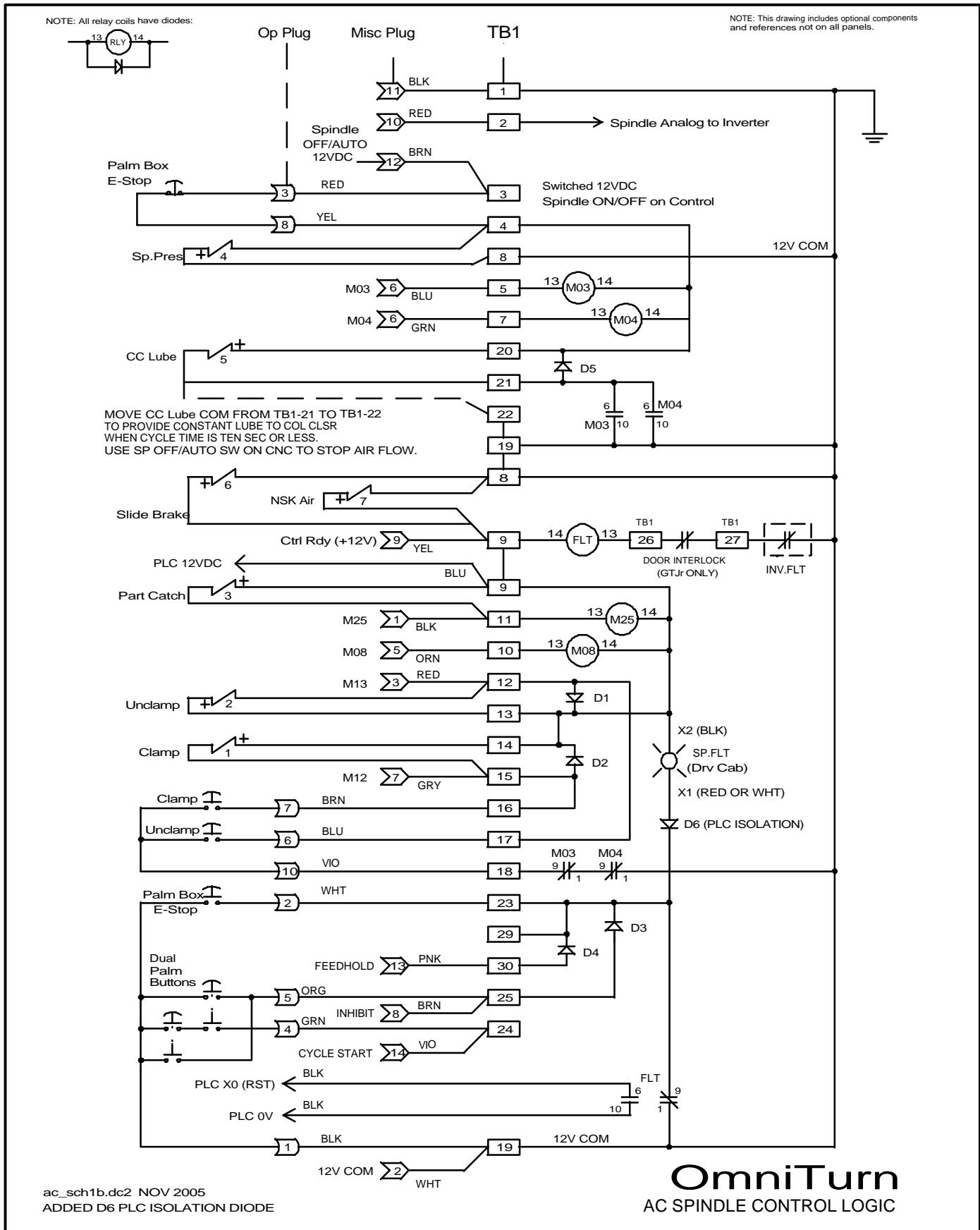


6.15



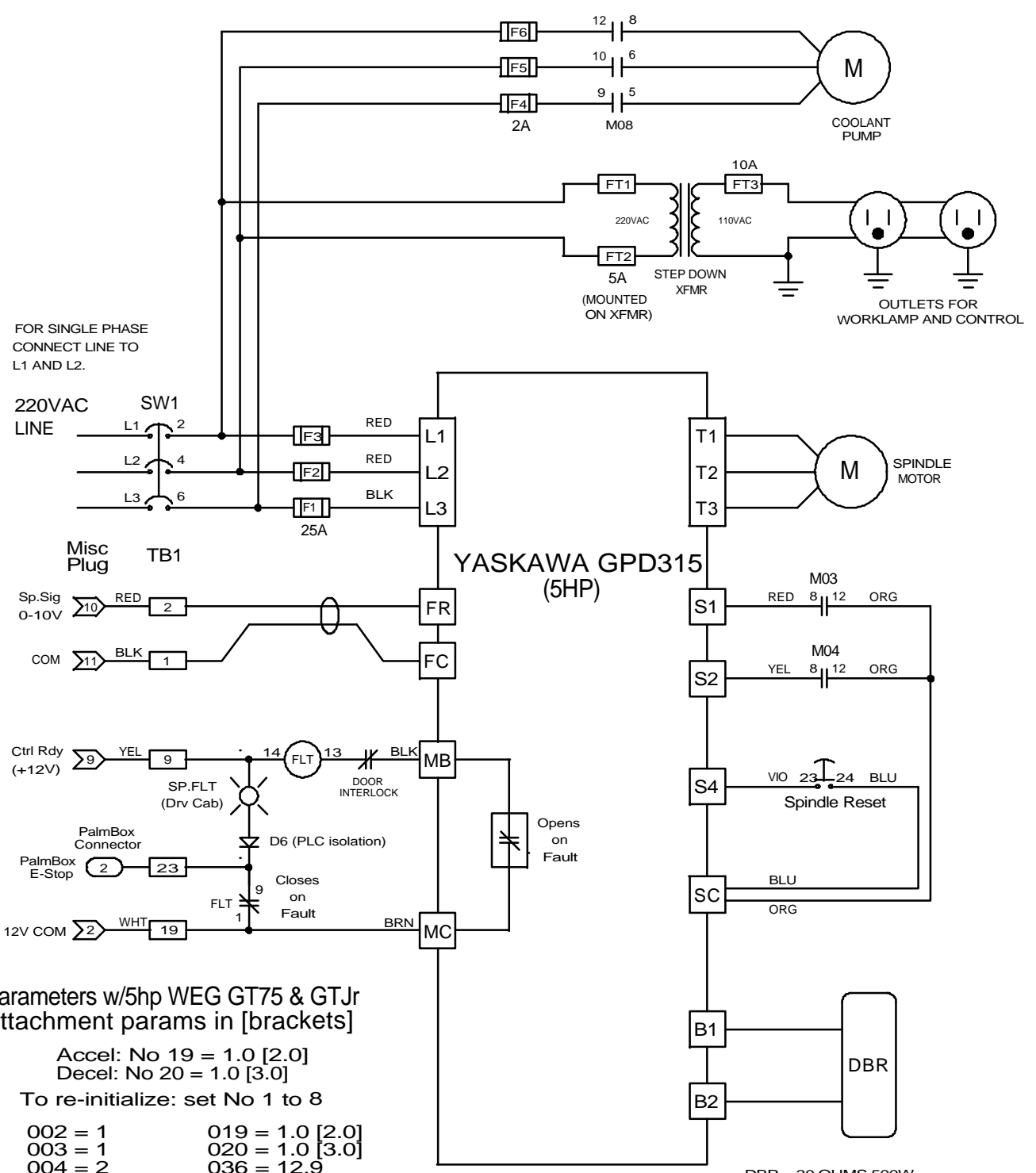
nruTim
AND OPERATORS STATION

OmniTurn - Trouble shooting guide



OmniTurn - Trouble shooting guide

NOTE: This drawing includes optional component and references not on all panels.



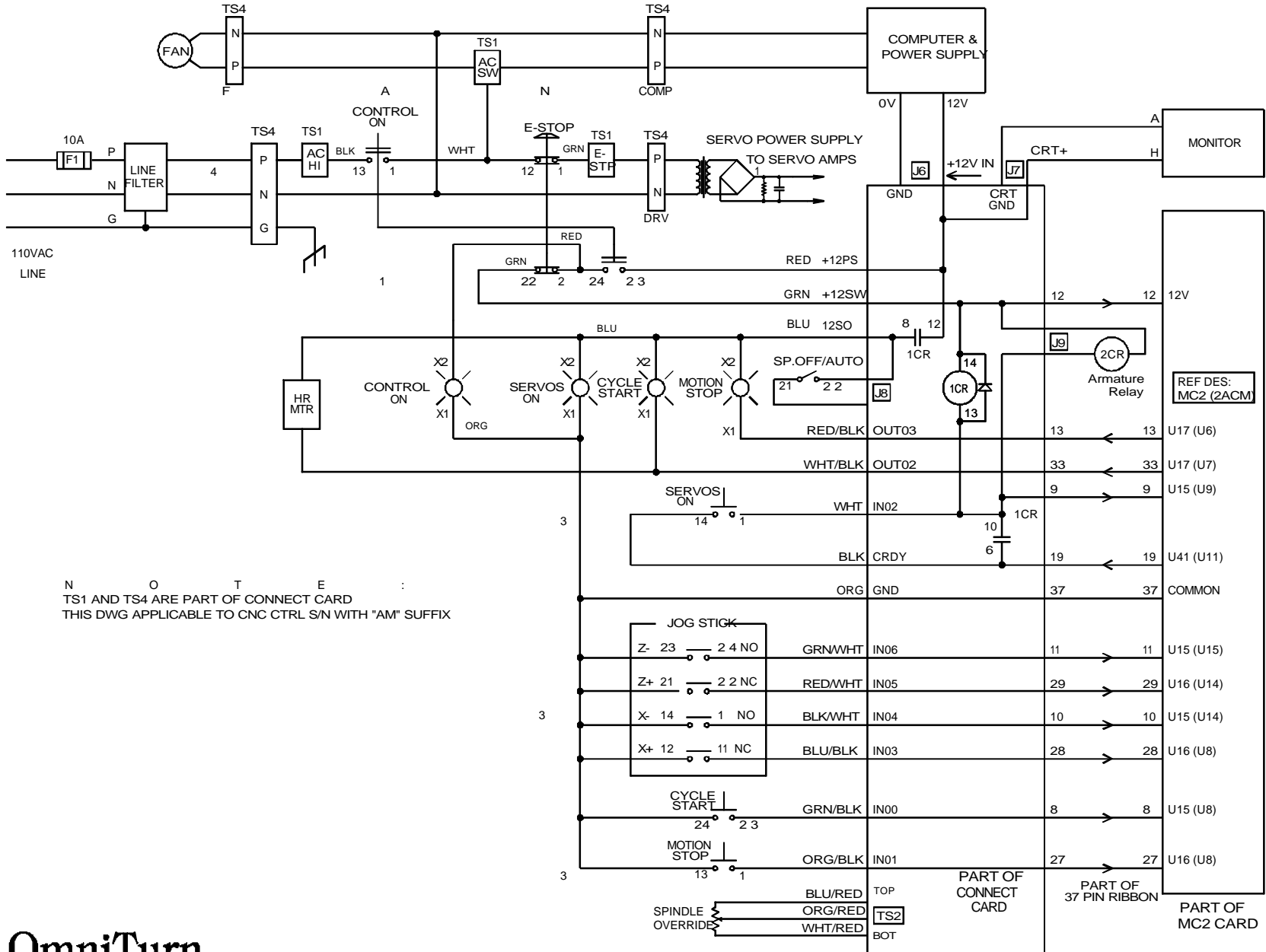
Parameters w/5hp WEG GT75 & GTJr Attachment params in [brackets]

- Accel: No 19 = 1.0 [2.0]
- Decel: No 20 = 1.0 [3.0]
- To re-initialize: set No 1 to 8
- 002 = 1 019 = 1.0 [2.0]
- 003 = 1 020 = 1.0 [3.0]
- 004 = 2 036 = 12.9
- 007 = 0 058 = 3
- 011 = 135 [120] 106 = 1.8
- 012 = 230 109 = 250
- 110 = 23

NOTE: If you are NOT using WEG 5hp motor, 036, 106 & 110 must be set: refer to GPD315 manual, page 2-3 thru 2-5.

DBR = 30 OHMS 500W
[DBR = 30 OHMS 250W]

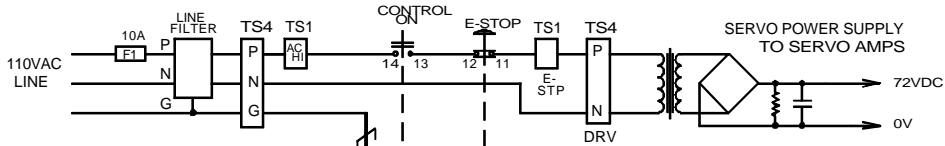
6.18



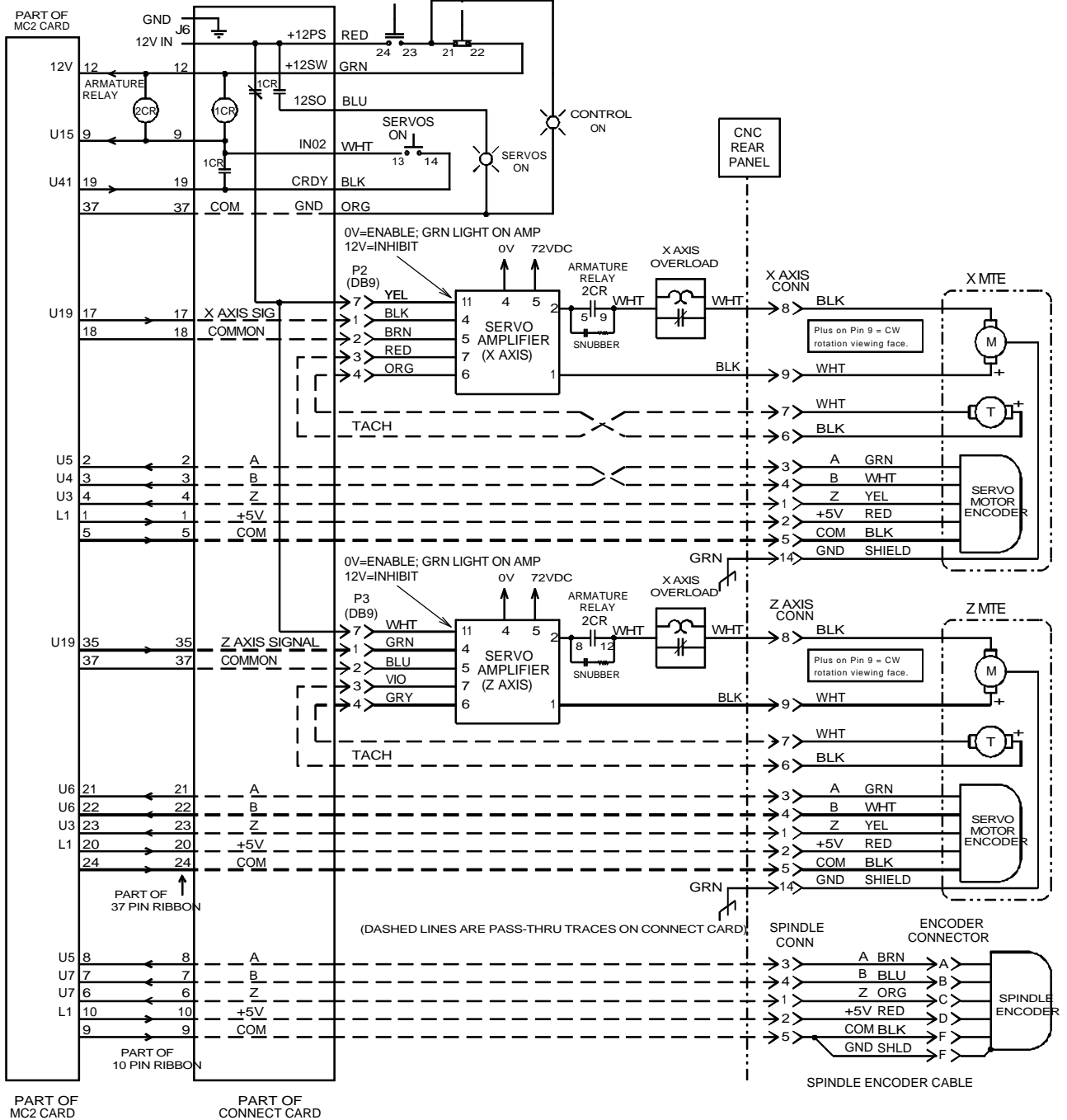
N O T E :
 TS1 AND TS4 ARE PART OF CONNECT CARD
 THIS DWG APPLICABLE TO CNC CTRL S/N WITH "AM" SUFFIX

OmniTurn
 FRONT PANEL INTERFACE

OmniTurn - Trouble shooting guide



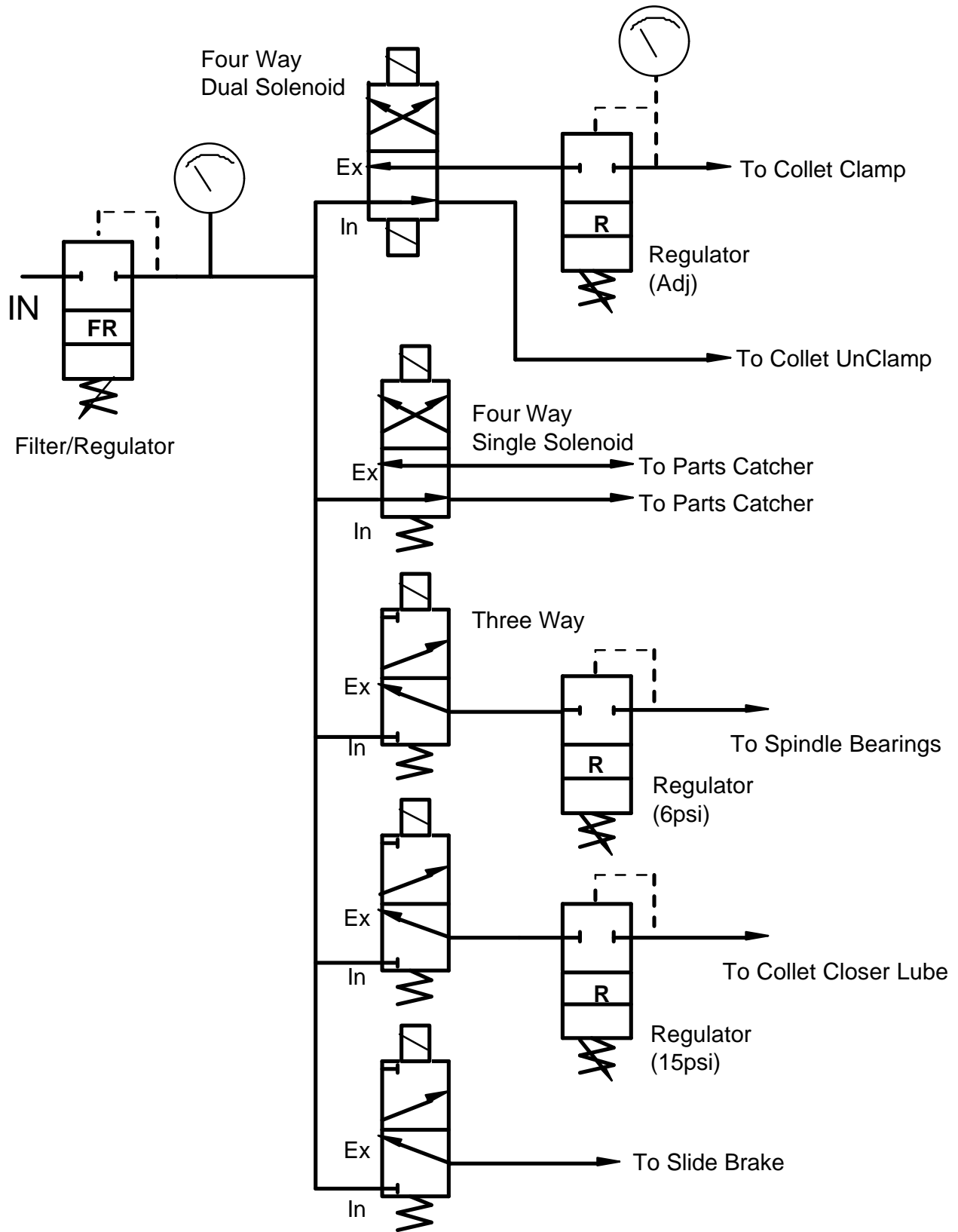
NOTE:
TS1 AND TS4 ARE PART OF CONNECT CARD
THIS DWG APPLICABLE TO CNC CTRL S/N WITH "A" SUFFIX



srvo_sch.dcd 1/2007
(changed AB overloads for panel mount)
(corrected Connect Card circuitry)
(corrected tach & motor colors)

OmniTurn
SERVO DRIVE INTERFACE

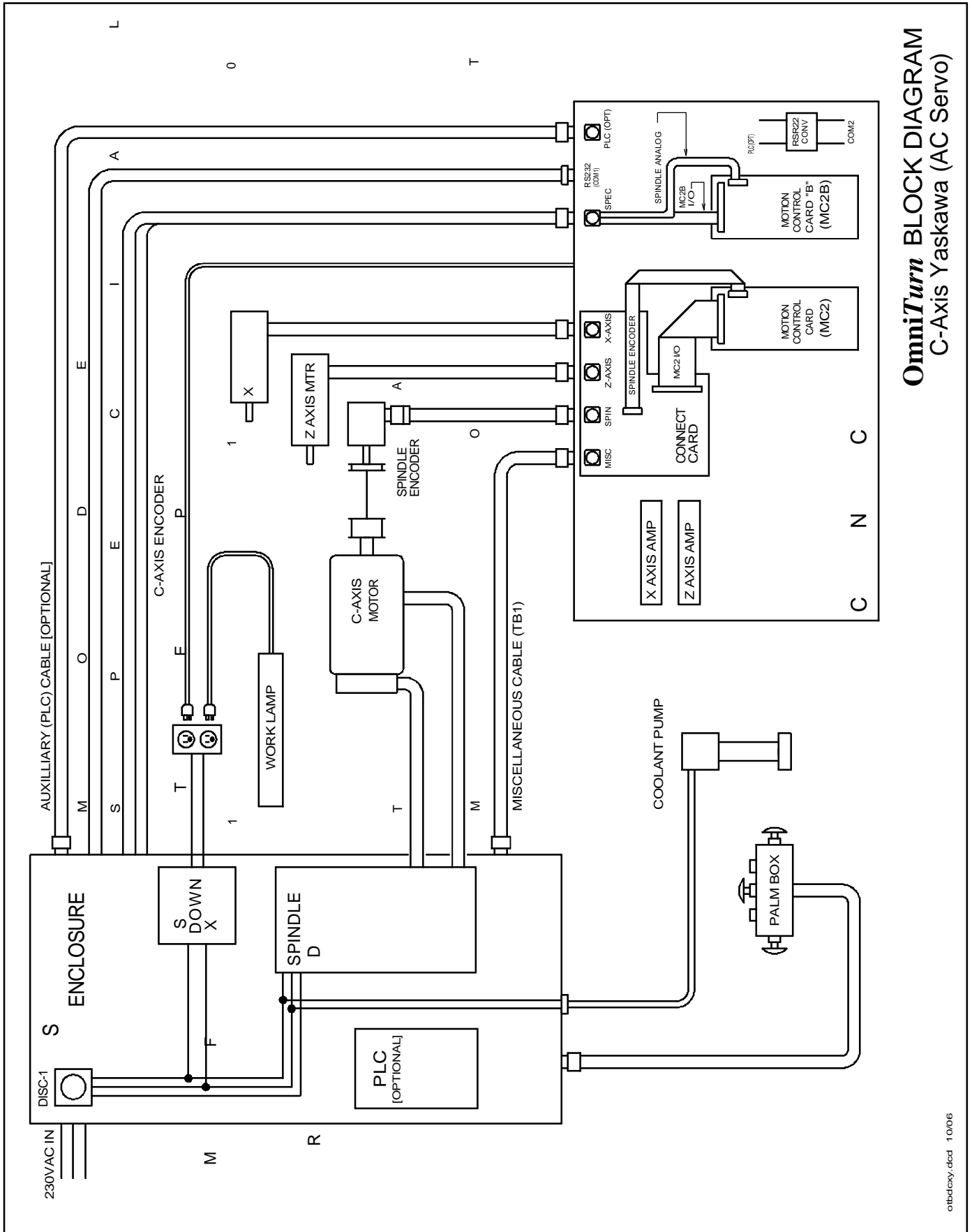
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GT75 AIR

3/08 gt_air3.cdd

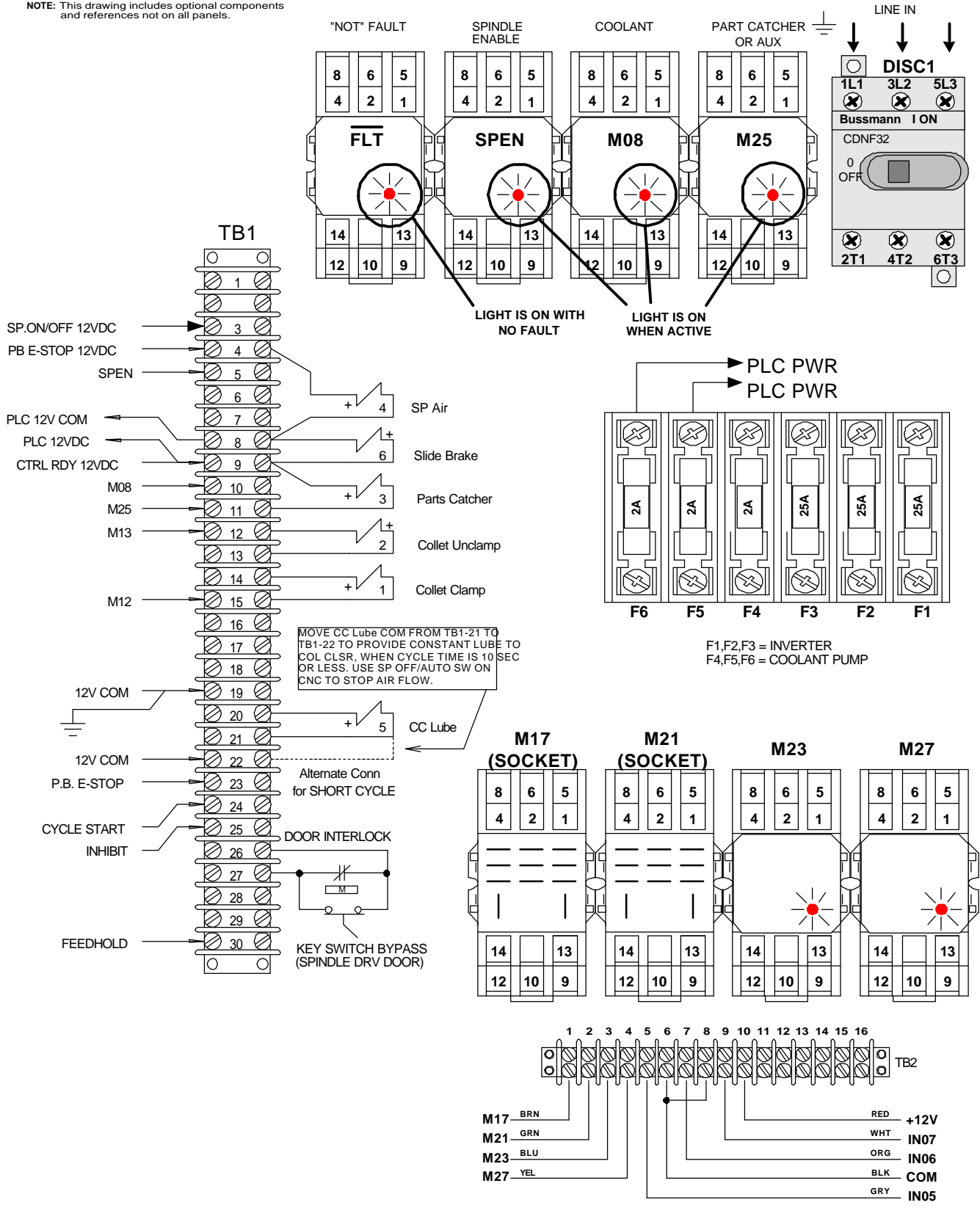
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OmniTurn BLOCK DIAGRAM
C-Axis Yaskawa (AC Servo)

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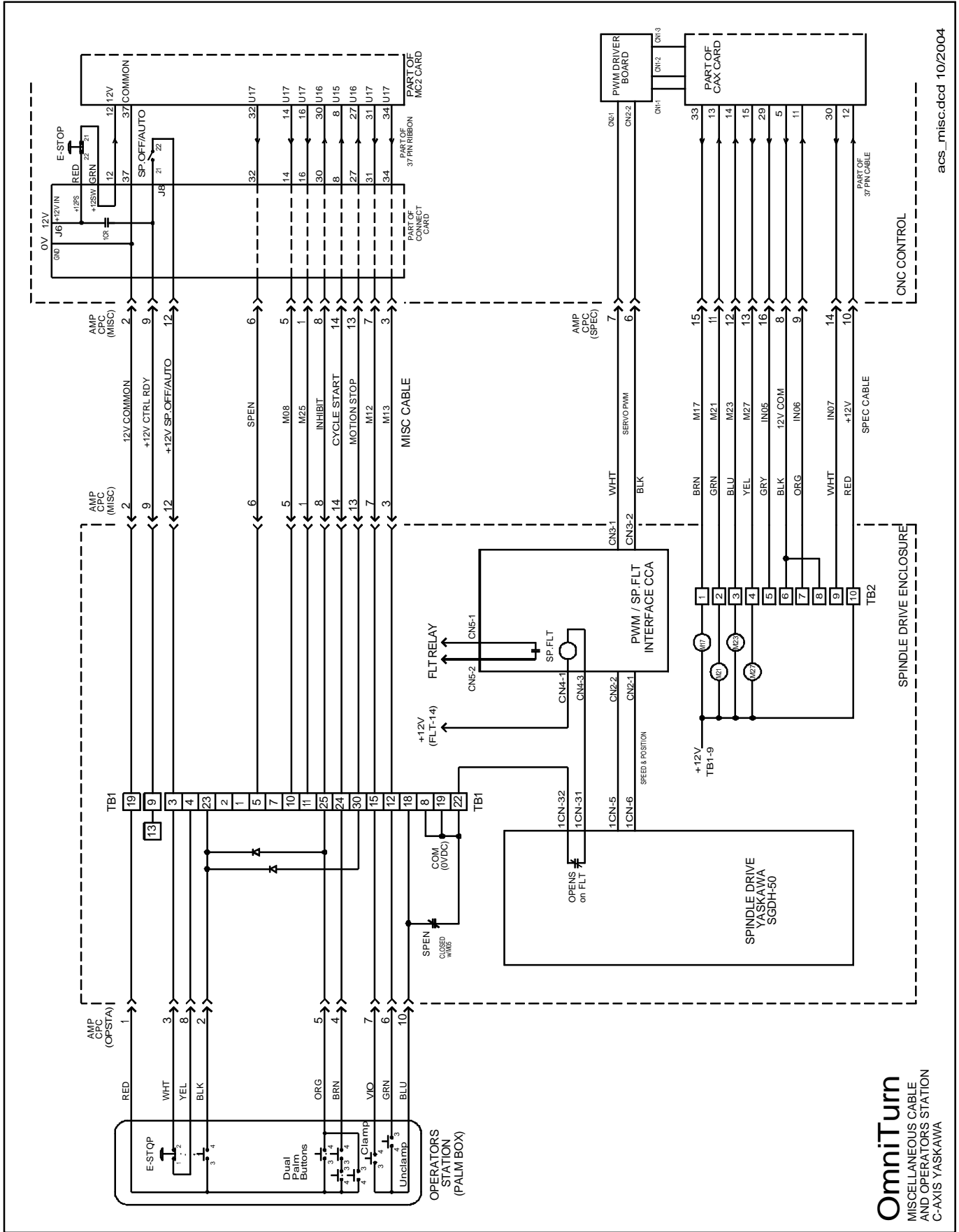
NOTE: This drawing includes optional components and references not on all panels.



SERVO SPINDLE DRIVE PANEL 10/2004
OmniTurn

acs_lb21.dcd jul 2004

OmniTurn - Trouble shooting guide



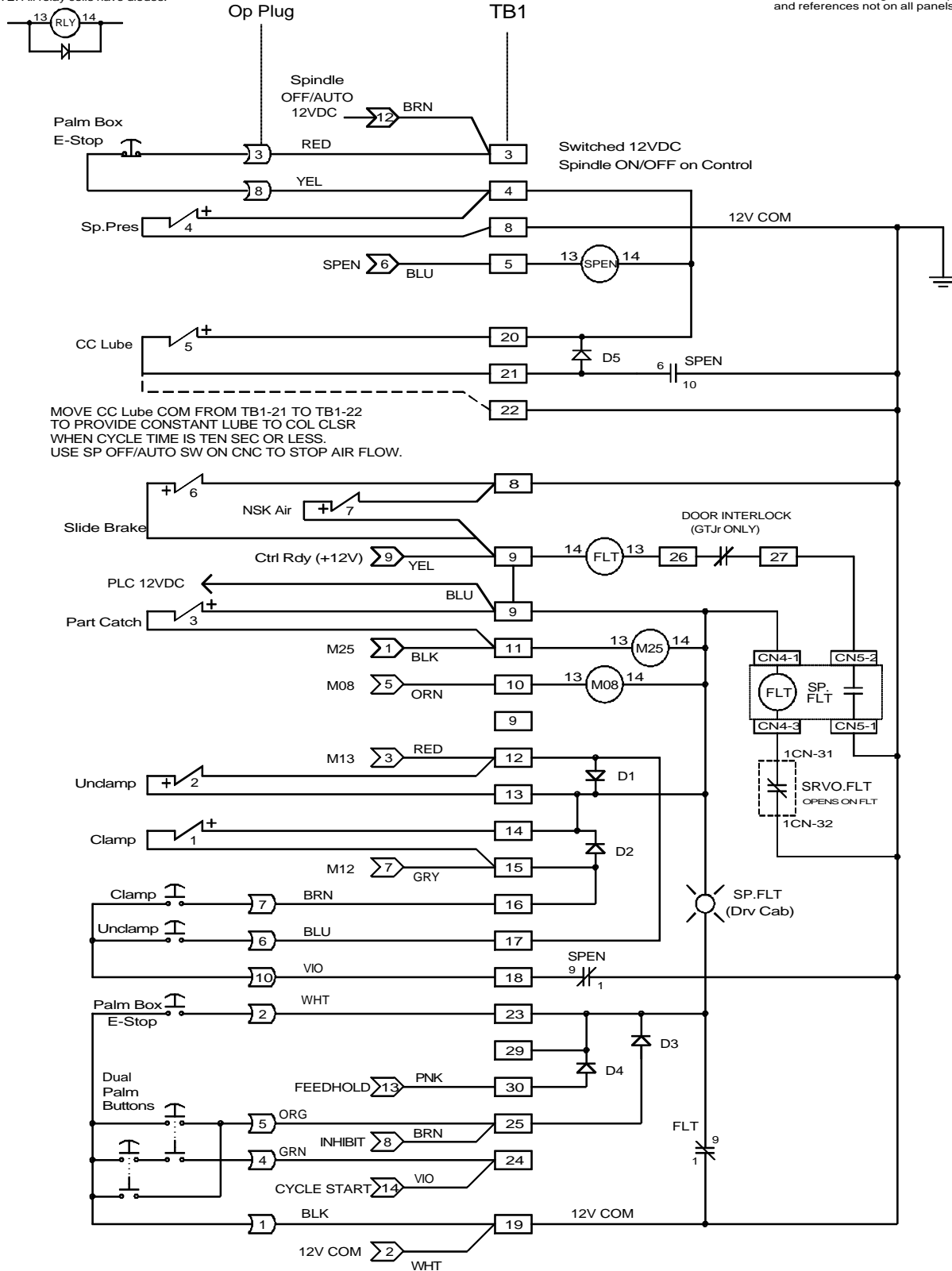
acs_misc.dcd 10/2004

OmniTurn
MISCELLANEOUS CABLE
AND OPERATORS STATION
C-AXIS YASKAWA

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NOTE: All relay coils have diodes:

NOTE: This drawing includes optional components and references not on all panels.

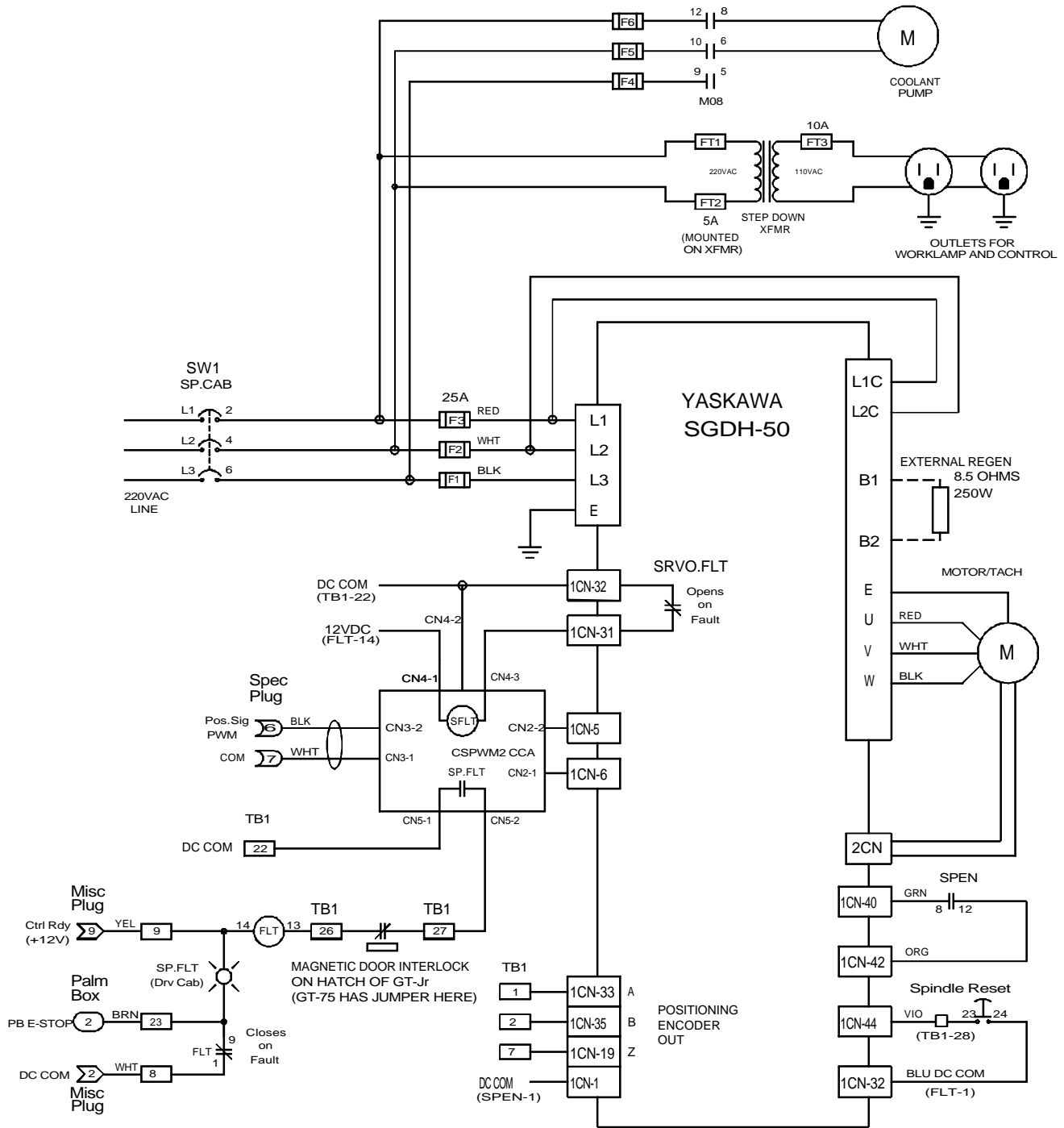


OmniTurn

YASKAWA SERVO SPINDLE CONTROL LOGIC

acs_sch1.dcd oct 2004

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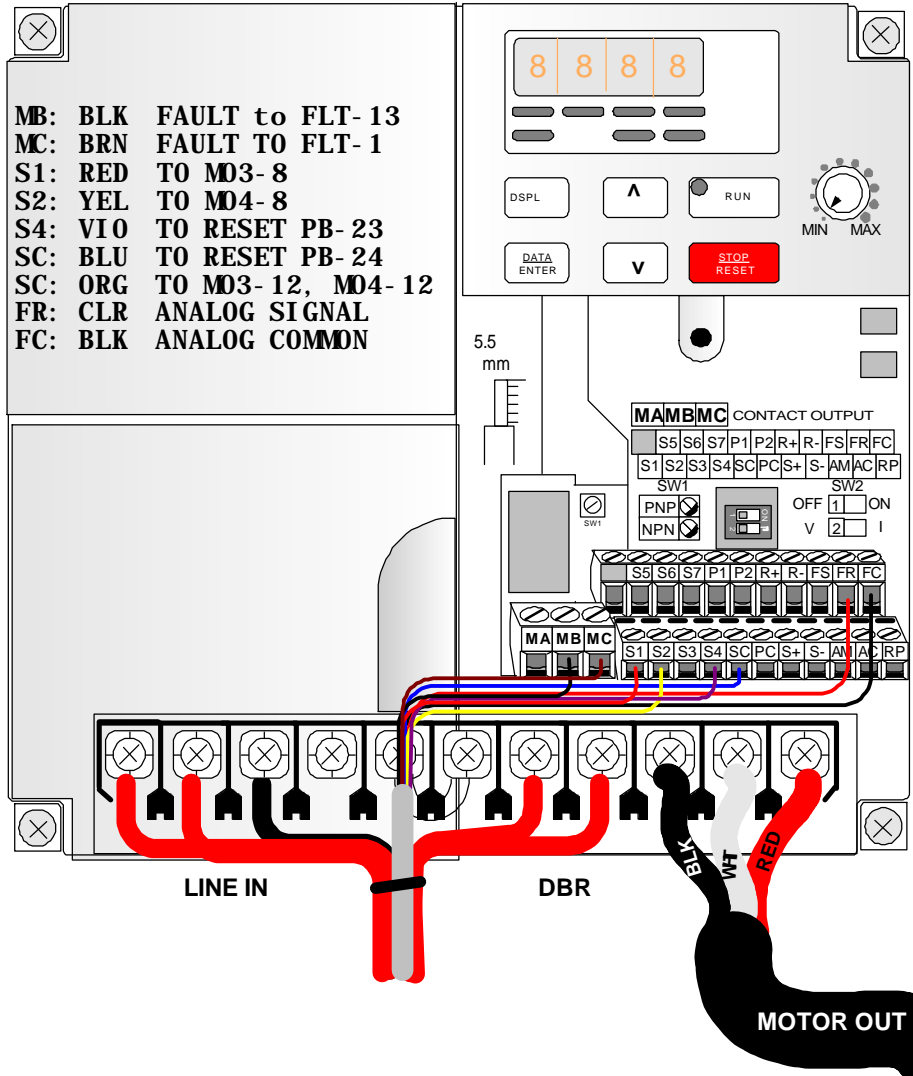


AC SERVO SPINDLE DRIVE
YASKAWA

OmniTurn

5HP SPINDLE DRIVE

YASKAWA GPD315



PARAMETERS w/5hp WEG
 ACCEL= 019
 DECEL= 020

TO RE-INITIALIZE: SET NO 1 TO 8.
 AFTER INITIALIZATION SET AS FOLLOWS:

001= 3	011= 120	036= 12.9
002= 1	012= 230	106= 1.8
003= 1	019= 1.0	109= 250
004= 2	020= 1.0	110= 23
007= 0		

NOTE: If you are NOT using WEG 5hp motor,
 036, 106 & 110 must be set: refer to GPD315 manual,
 page 2.3 thru 2.5