



MILLTRONICS
C N C M A C H I N E S

Electrical Manual
VM4325
Sigma5 Axis Drives
With M5 Spindle Drive

Rev 4
8-11-2015

Table Of Contents

Electrical Safety Rules	vi
Machine Schematic.....	1
8200b Control Front Panel Connections	19
Electrical Panel Layout.....	20
Mag Panel Electrical Parts List.....	21
Yaskawa Parameters	22
M5 Spindle Drive Parameters, 2-speed Mill	22
Sigma 5 Axis Drive Parameters	23
VM Series CNC I/O Listing.....	24
8200b Series Front Panel	25
Front view	25
Rear view.....	25
8200b Panel Assembly Parts List	26

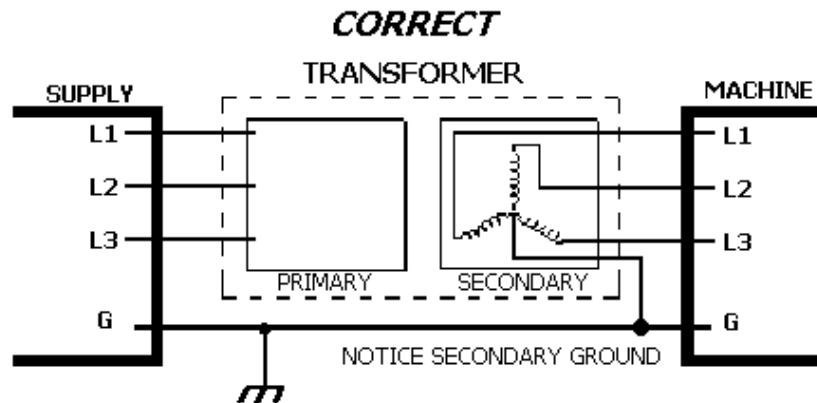
History

12-19-2014	Rev 2 manual based on VM Series Rev34, but with M5 spindle system.
4-29-2015	Rev 3, Schematic changes; drawbar prox, chiller signal.
8-11-2015	Rev 4, Schematic corrections. Supersedes rev 3 manual.

POWER AND TRANSFORMER CONNECTION ALERT

CAUTION: MACHINE WILL BE DAMAGED IF MAIN POWER PHASE-TO-PHASE VOLTAGE EXCEEDS **240 VAC** OR IF POWER IS CONNECTED INCORRECTLY.

If a transformer is used at the machine or in the building, the ground wire going into the machine must be connected to a neutral point within the secondary windings of the transformer and to earth ground as shown below. This is to insure stable phase voltage. A transformer case ground is not adequate. Computer controlled machines require properly grounded and stable power in order to operate correctly.

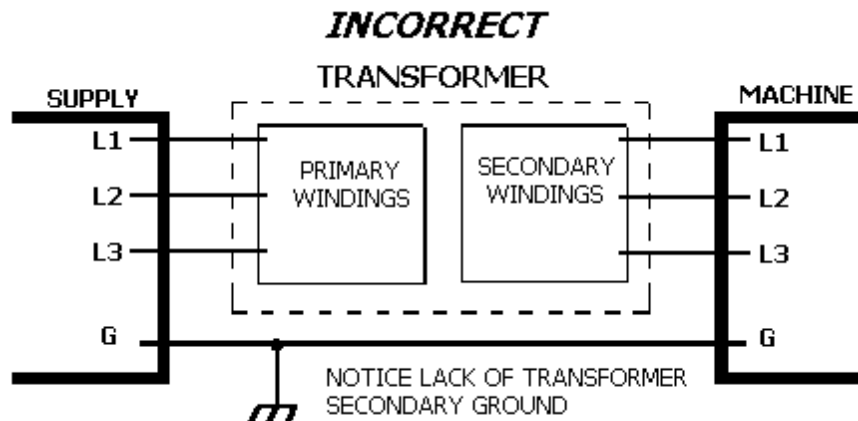


To determine if the secondary windings within the transformer are properly grounded:

Disconnect transformer from power supply and machine.

Check resistance between transformer ground wire and each secondary leg.

If resistance is more than 3 ohms, then the transformer ground wire is not connected to a neutral point within the secondary windings.



In no case may conduit or wire raceways be used as ground.

Use nonconductive conduit or drop cord to route power into machine.

Do not attach conductive conduit to electrical panel. This is to prevent a ground loop condition that can cause erratic control operation.

The ground wire must be attached to the ground terminal bar inside the machine electrical panel. The ground bar is labeled 'PE'.

Measure the voltage from each phase to ground. The 'wild' phase needs to be attached to L2 on the machine main disconnect switch.

Phase-to-phase voltage must not exceed 240 VAC as machine damage will result.
If voltage exceeds 240 VAC, it must be reduced before connecting to machine.

Electrical Safety Rules

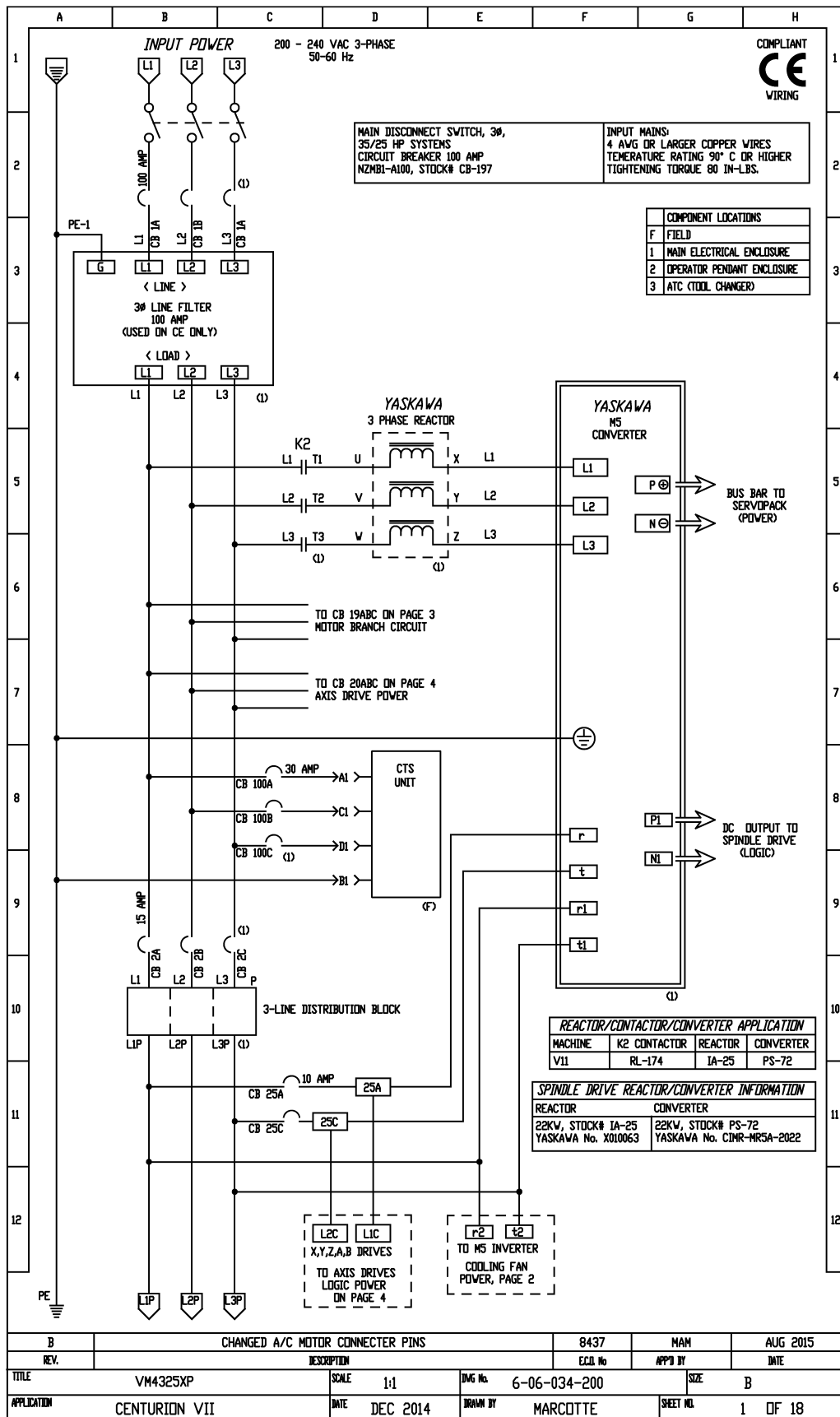
Read and understand the following list of cautions before attempting to perform service on this equipment. **Failure to observe these rules can result in death or serious injury.**

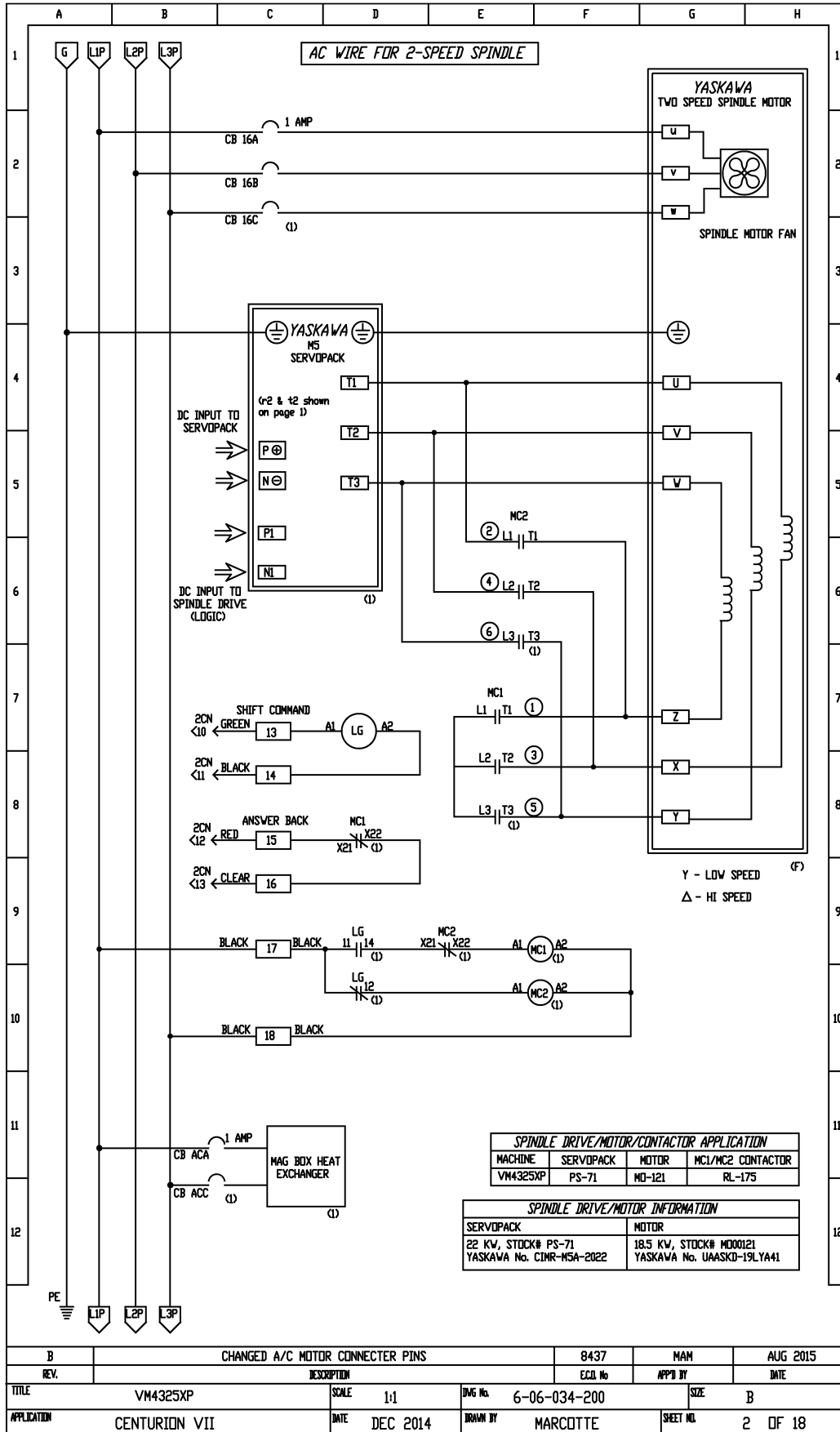
Caution

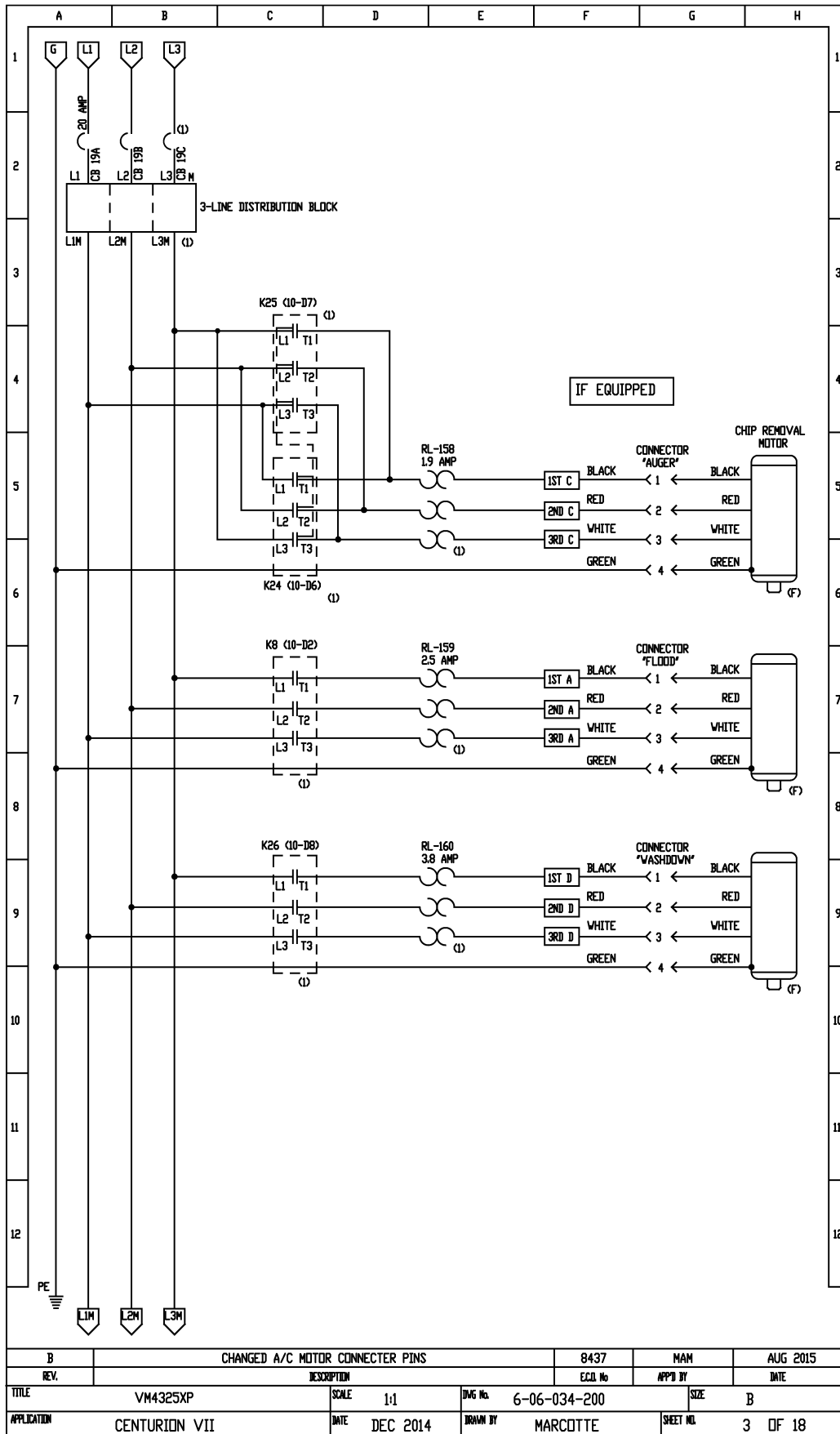
- Beware of High Voltage present within the machine's electrical cabinet
- Do not attempt to service electrical components unless you are qualified to work on them safely
- Only qualified personnel should attempt to make current and voltage readings
- Always turn the main power off before servicing components within the electrical cabinet
- Always keep hands and fingers away from live electrical terminals
- Remove jewelry while servicing the machine to avoid shorting any electrical circuits
- Allow all components to discharge before servicing them, wait at least 15 seconds after powering off, before servicing

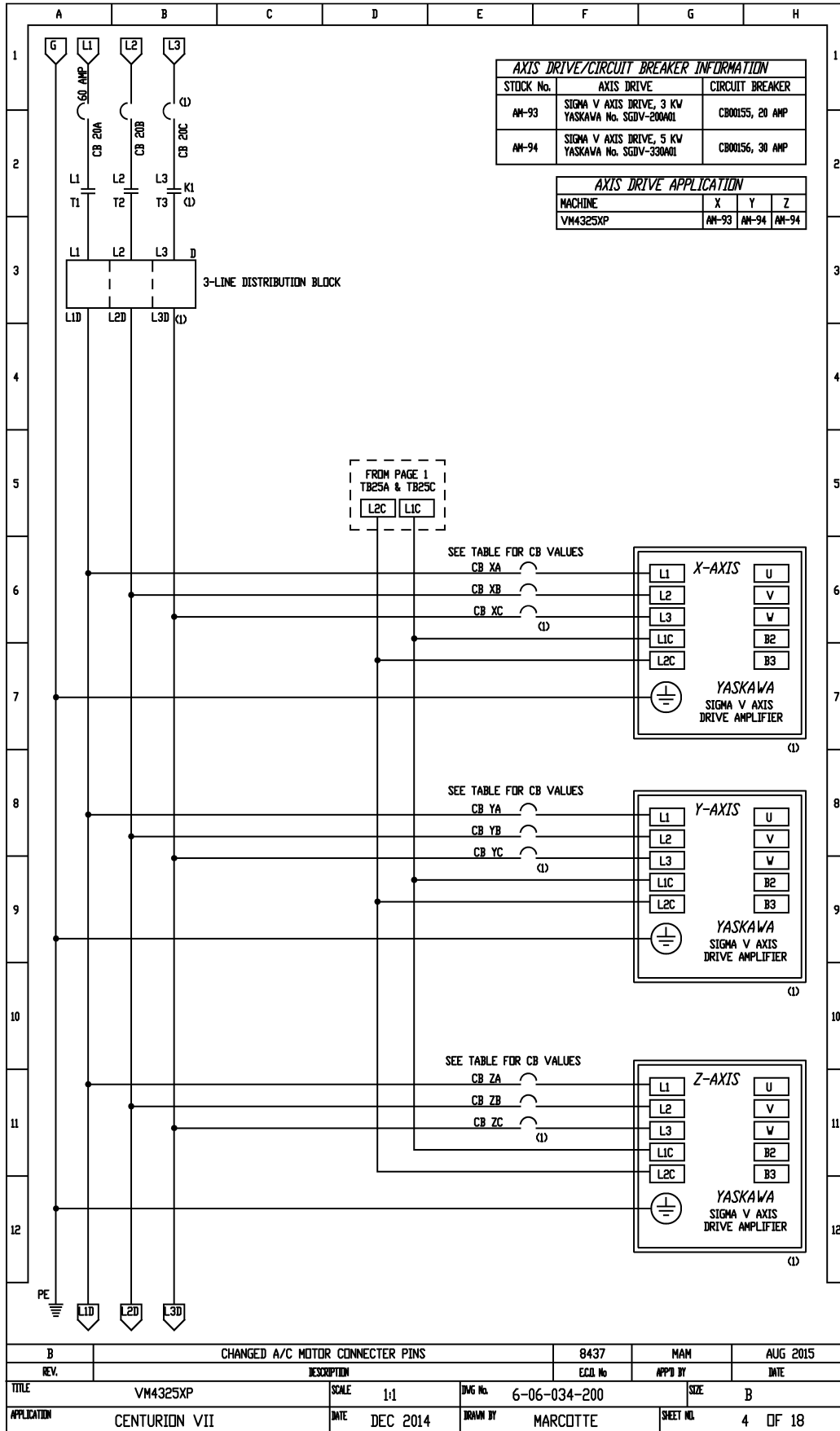
FAILURE TO FOLLOW THESE RULES CAN RESULT IN SERIOUS INJURY OR DEATH

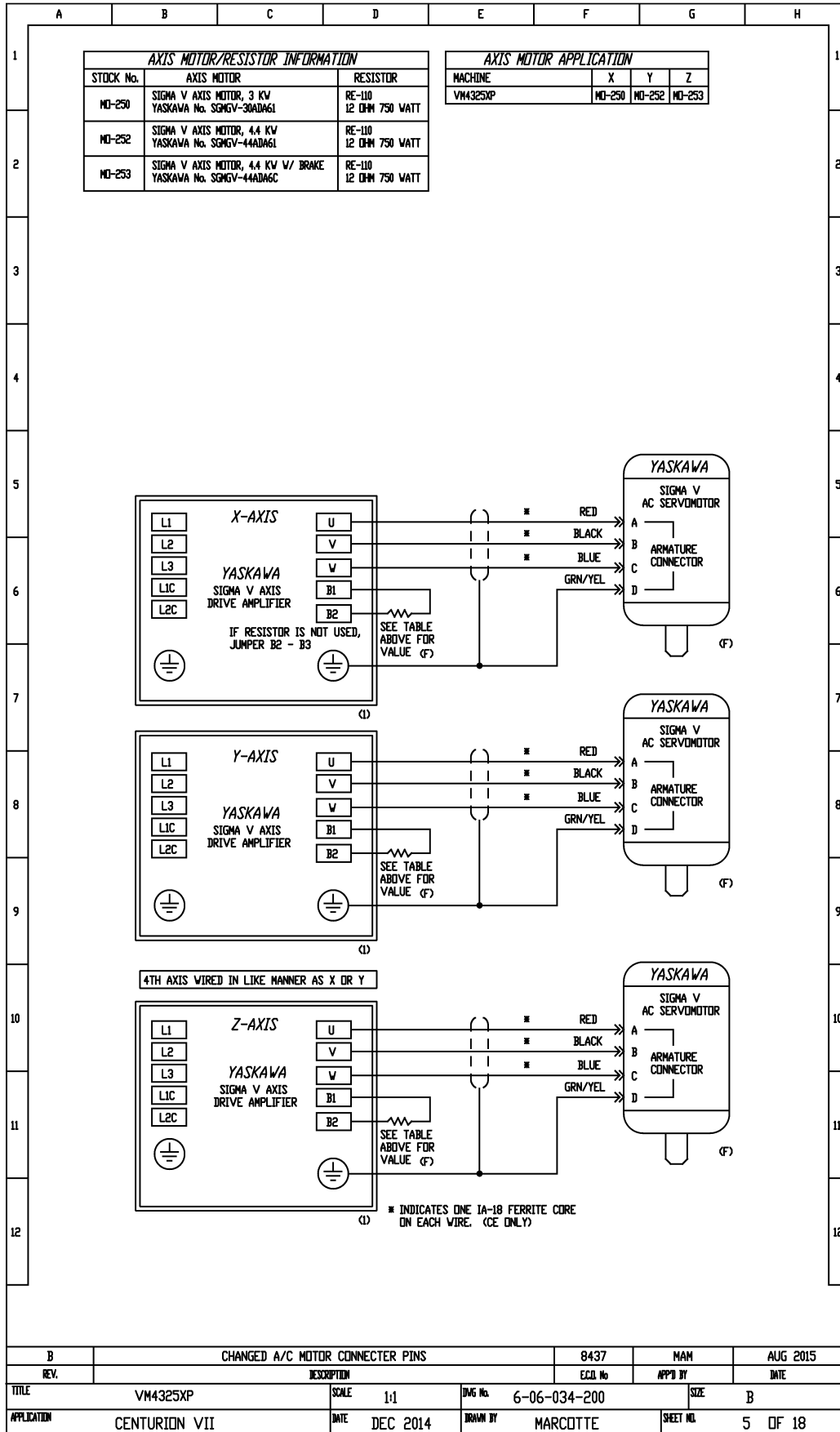
Machine Schematic

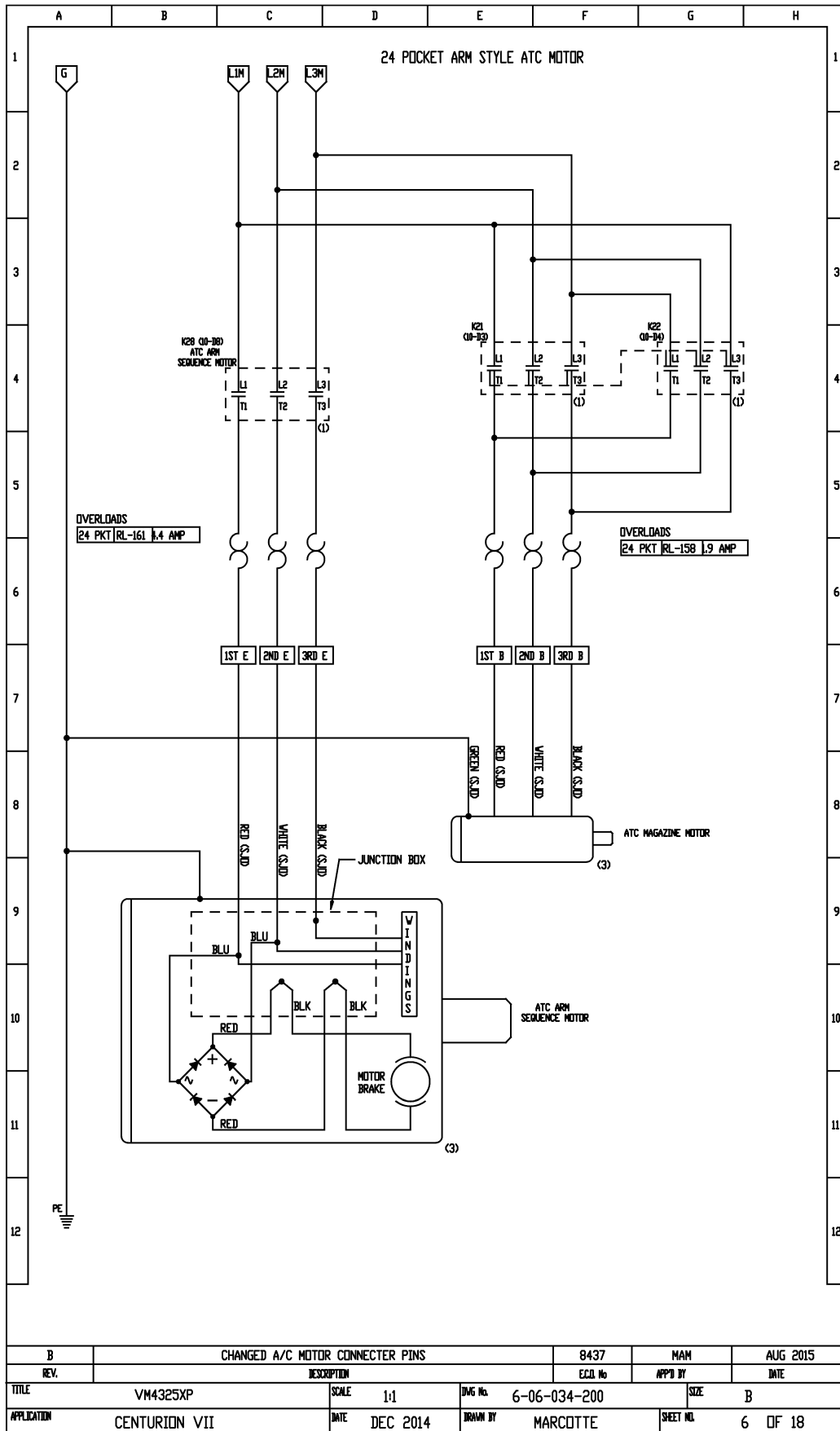


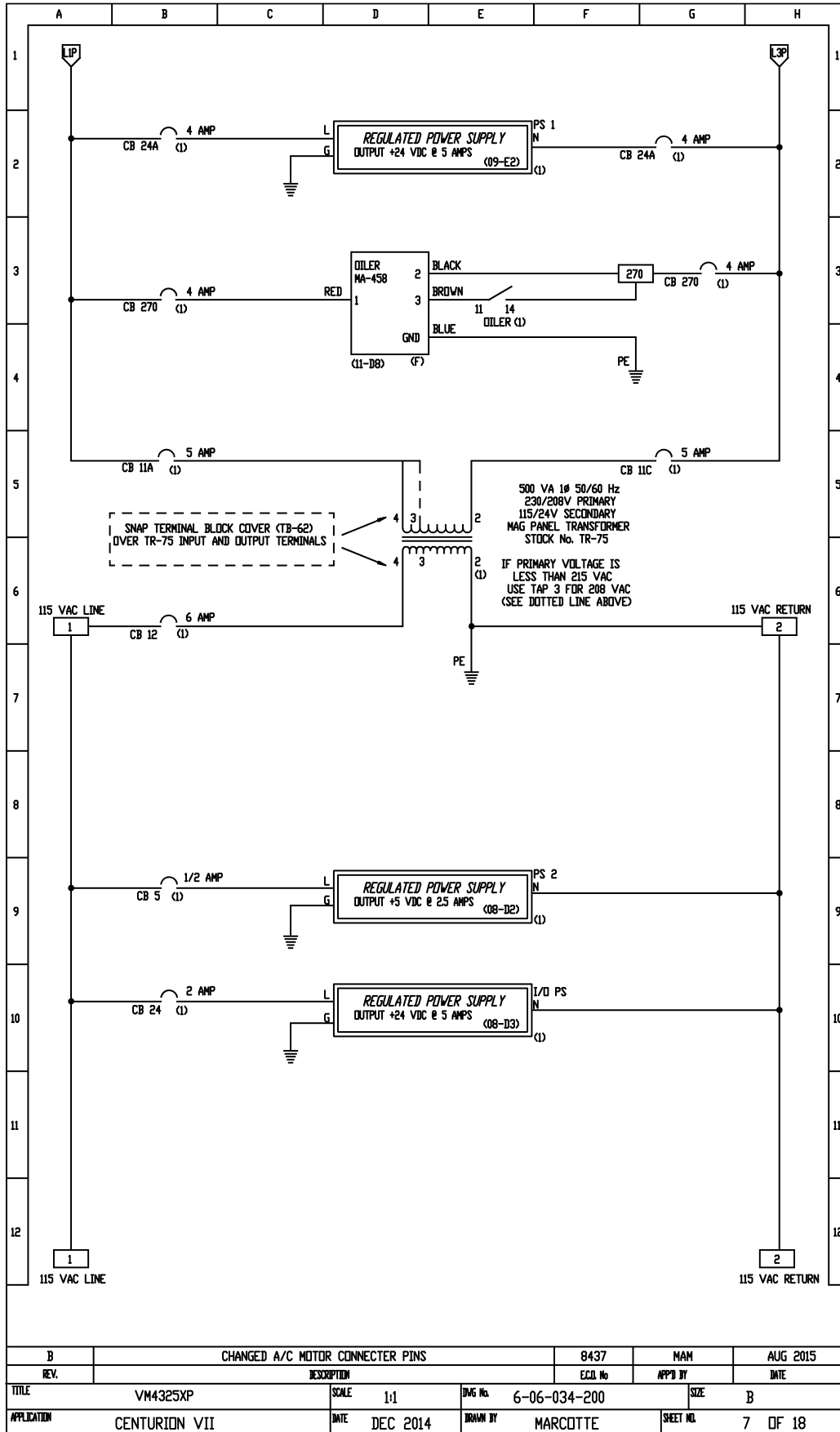


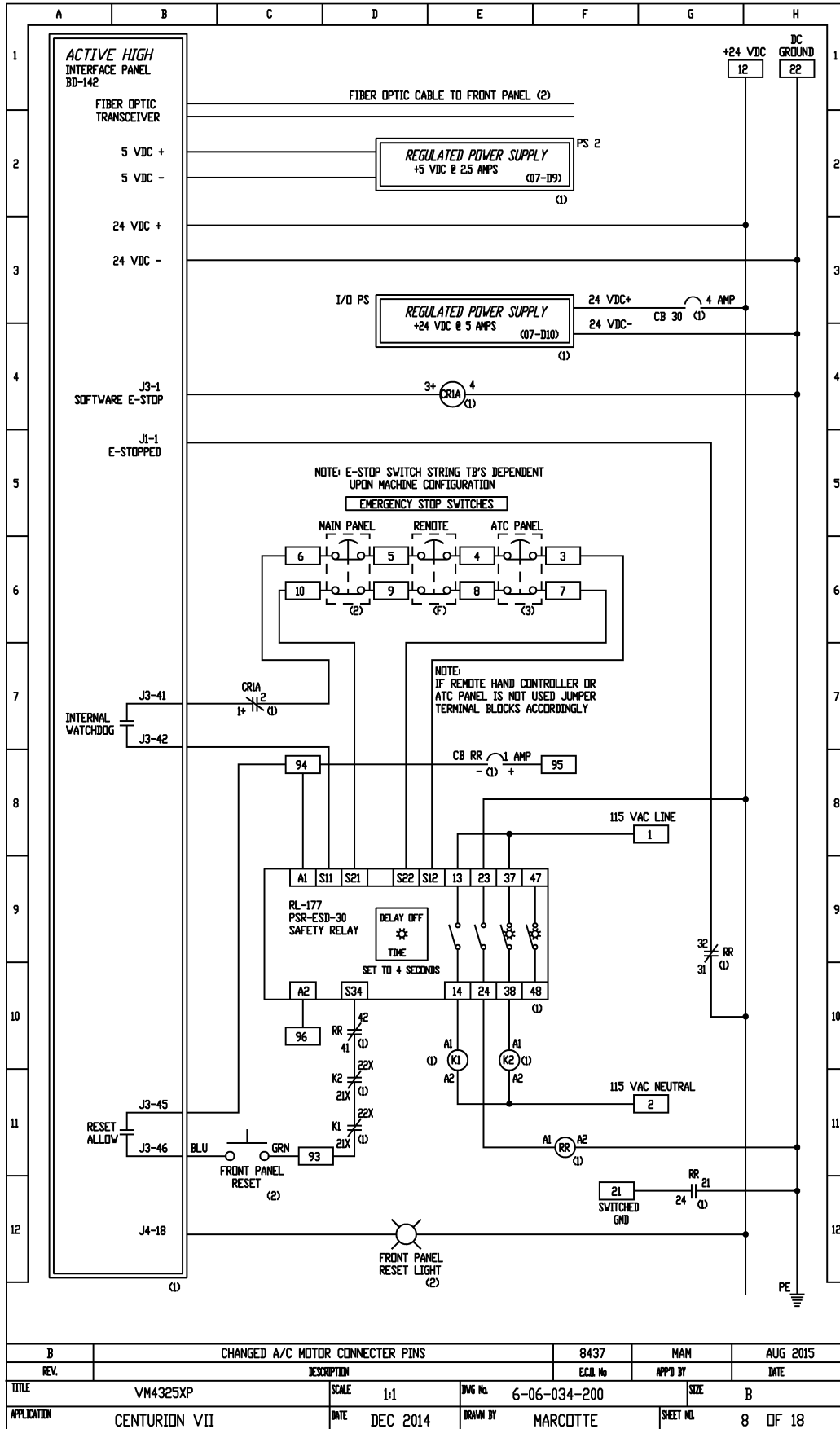


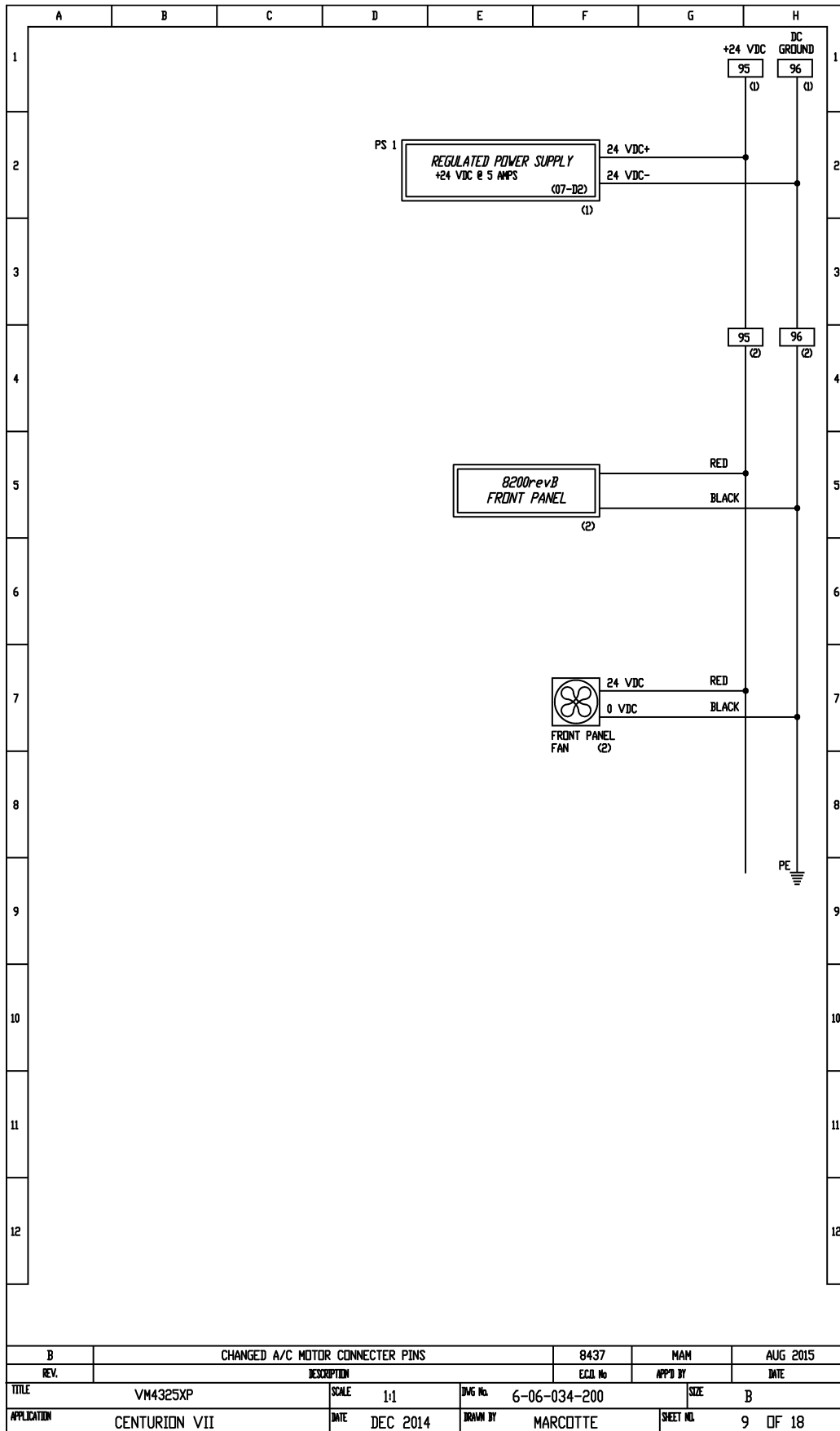




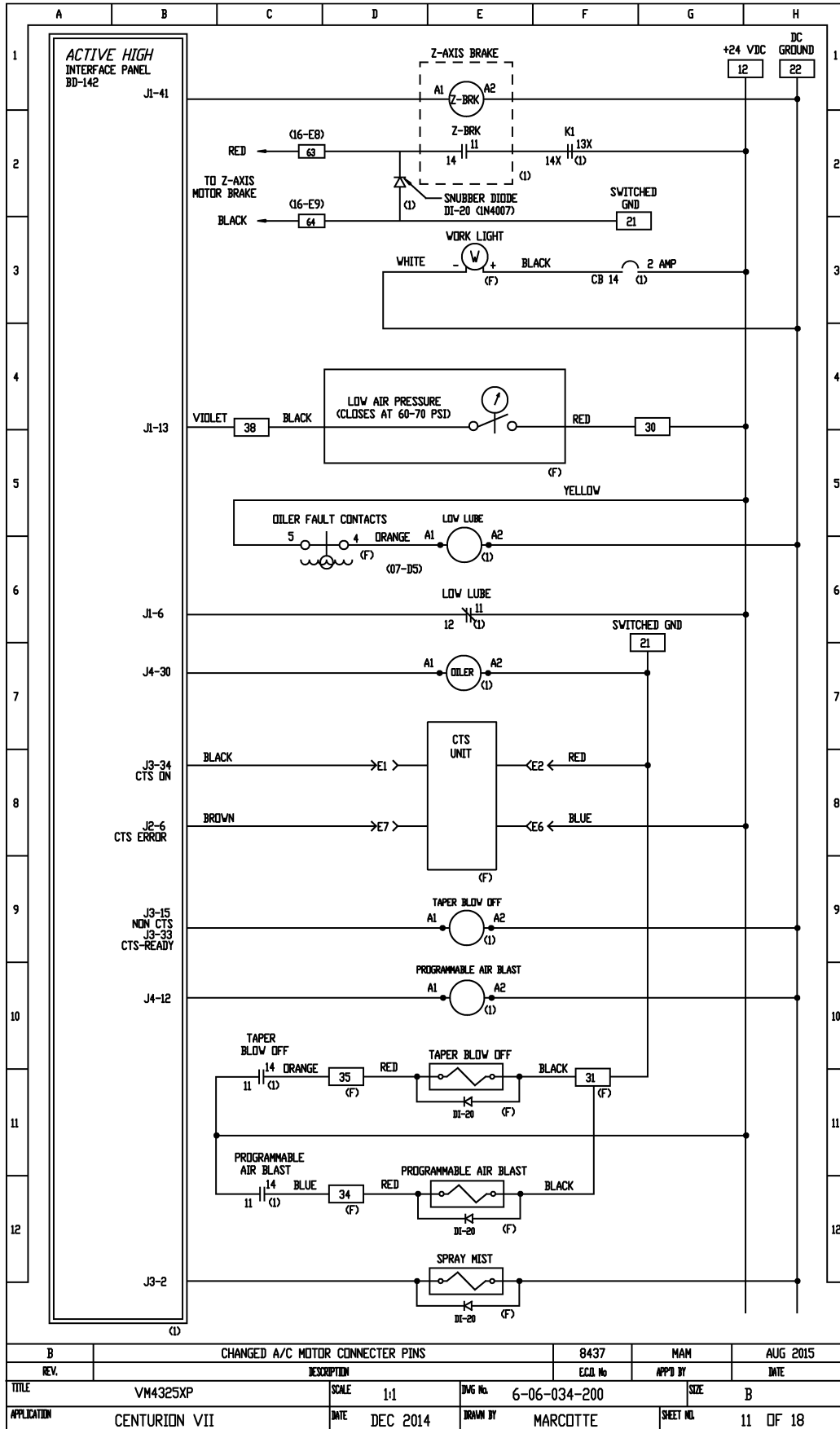


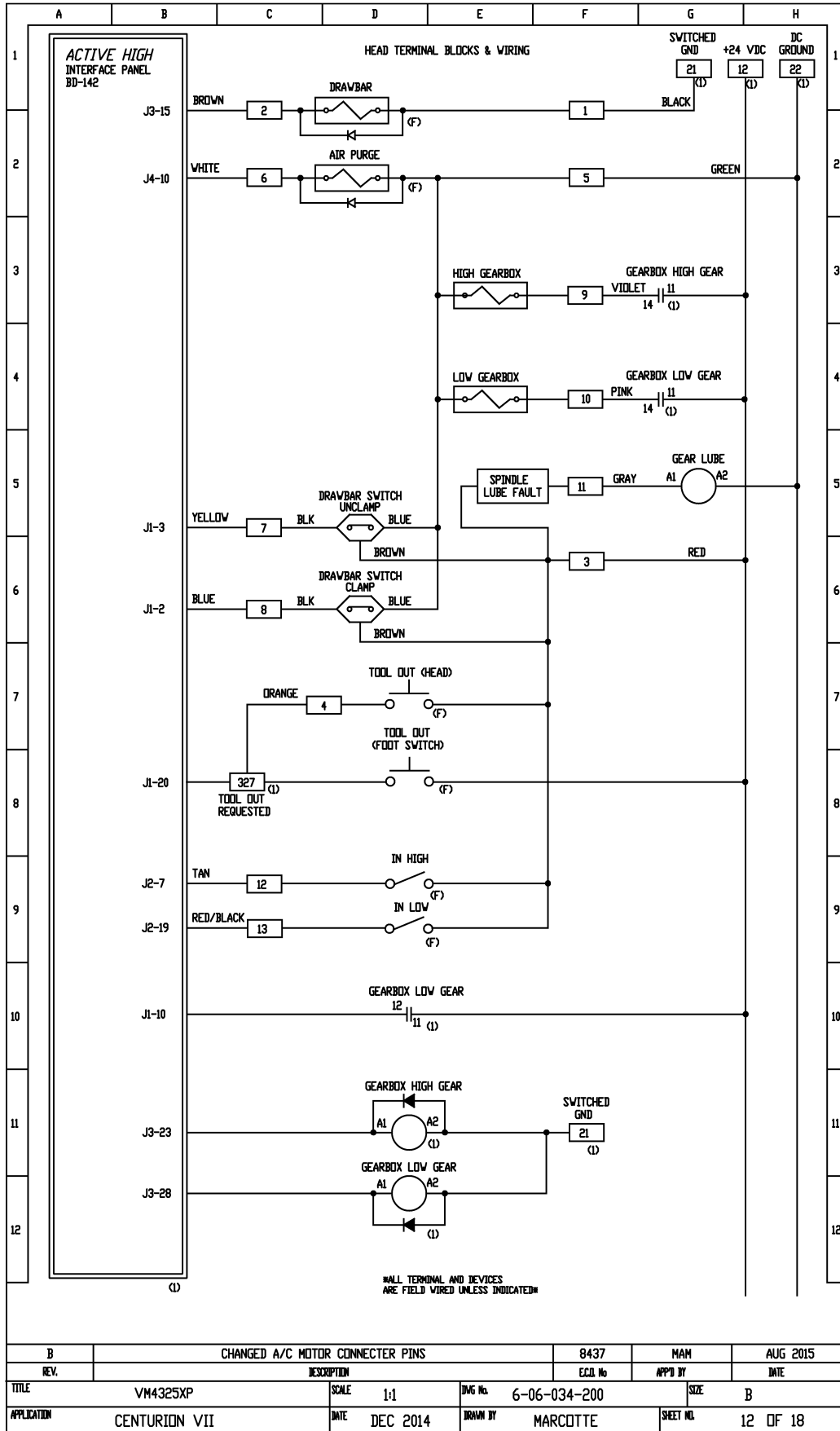


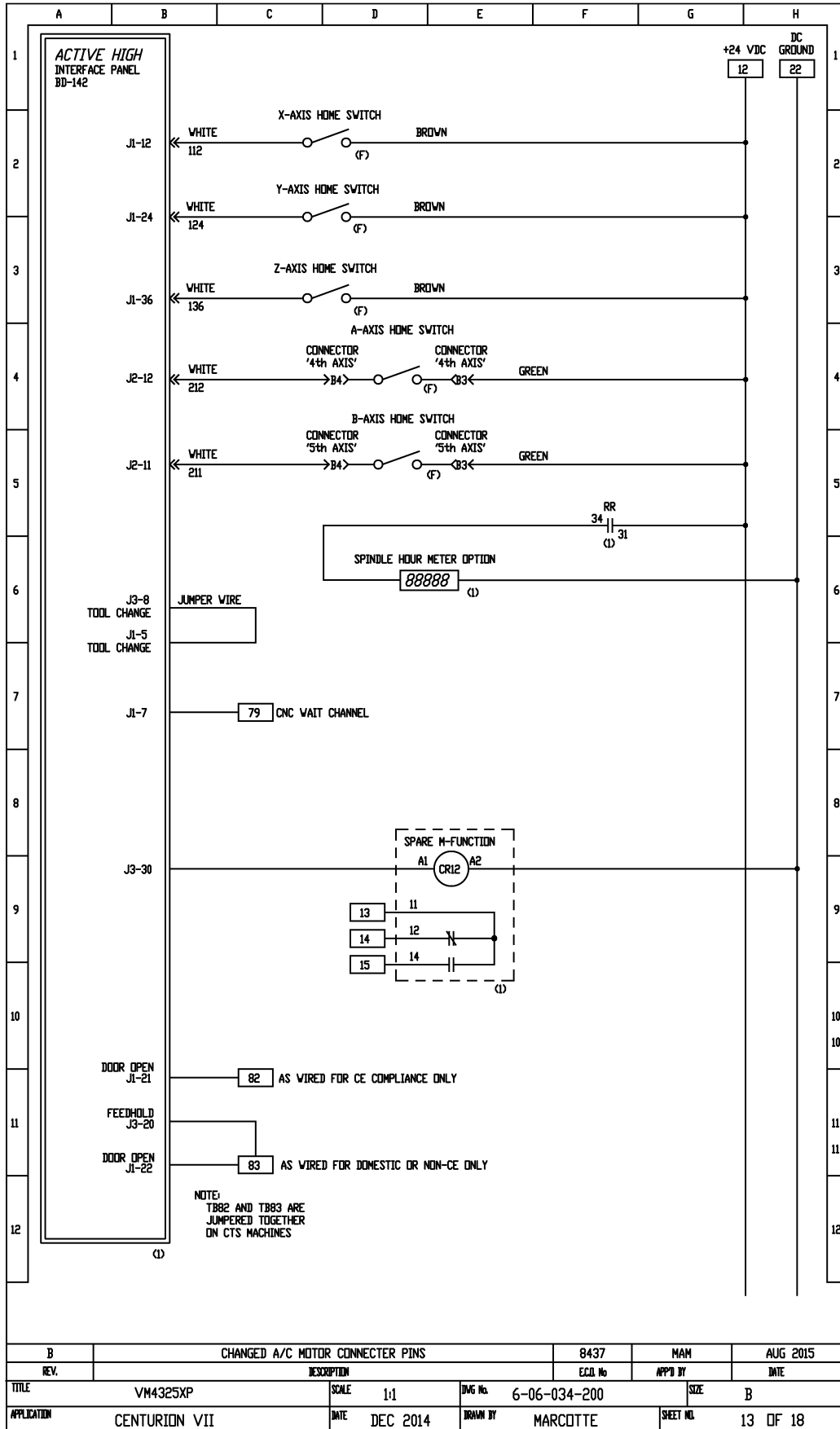


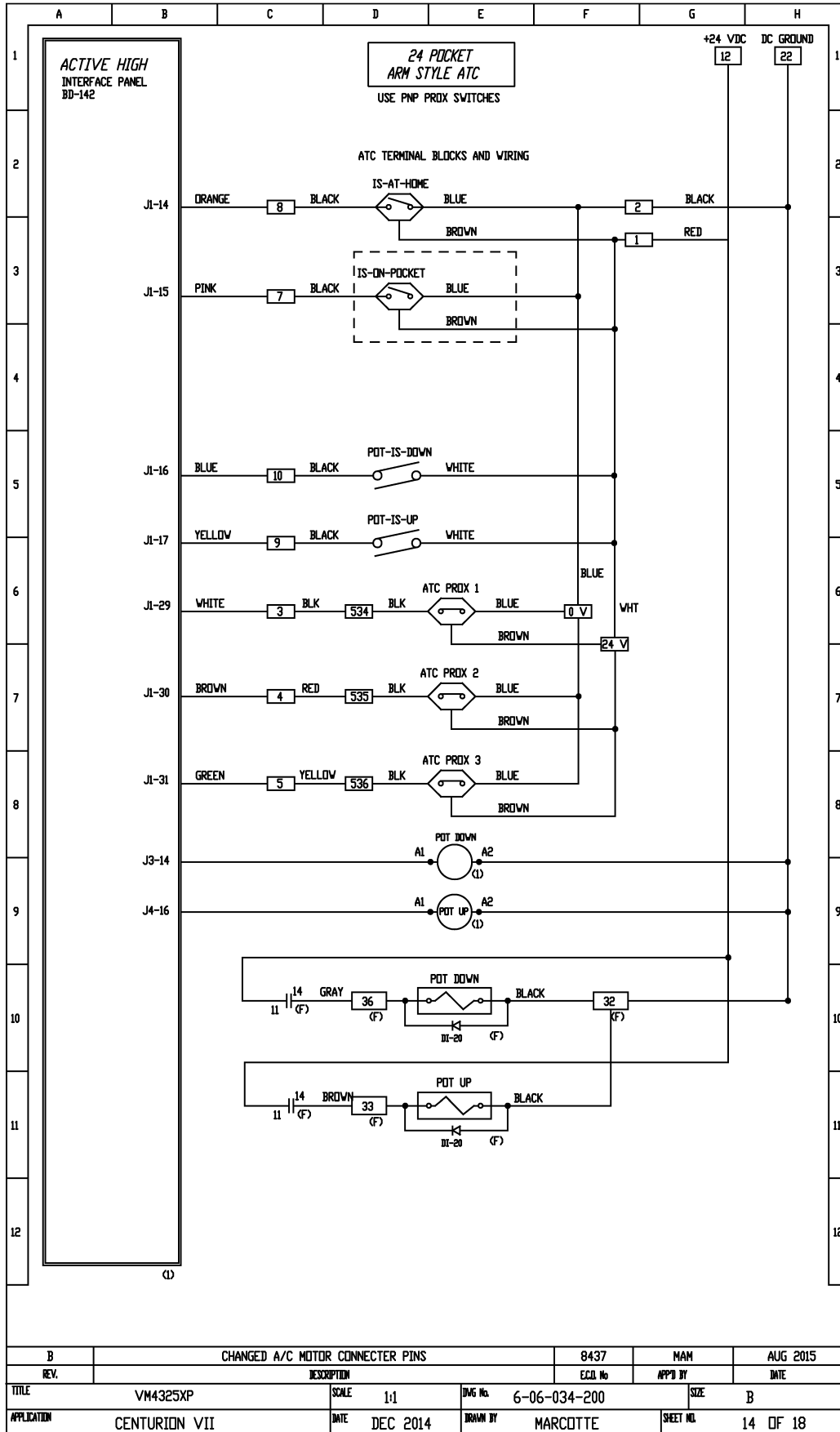












B
REV.

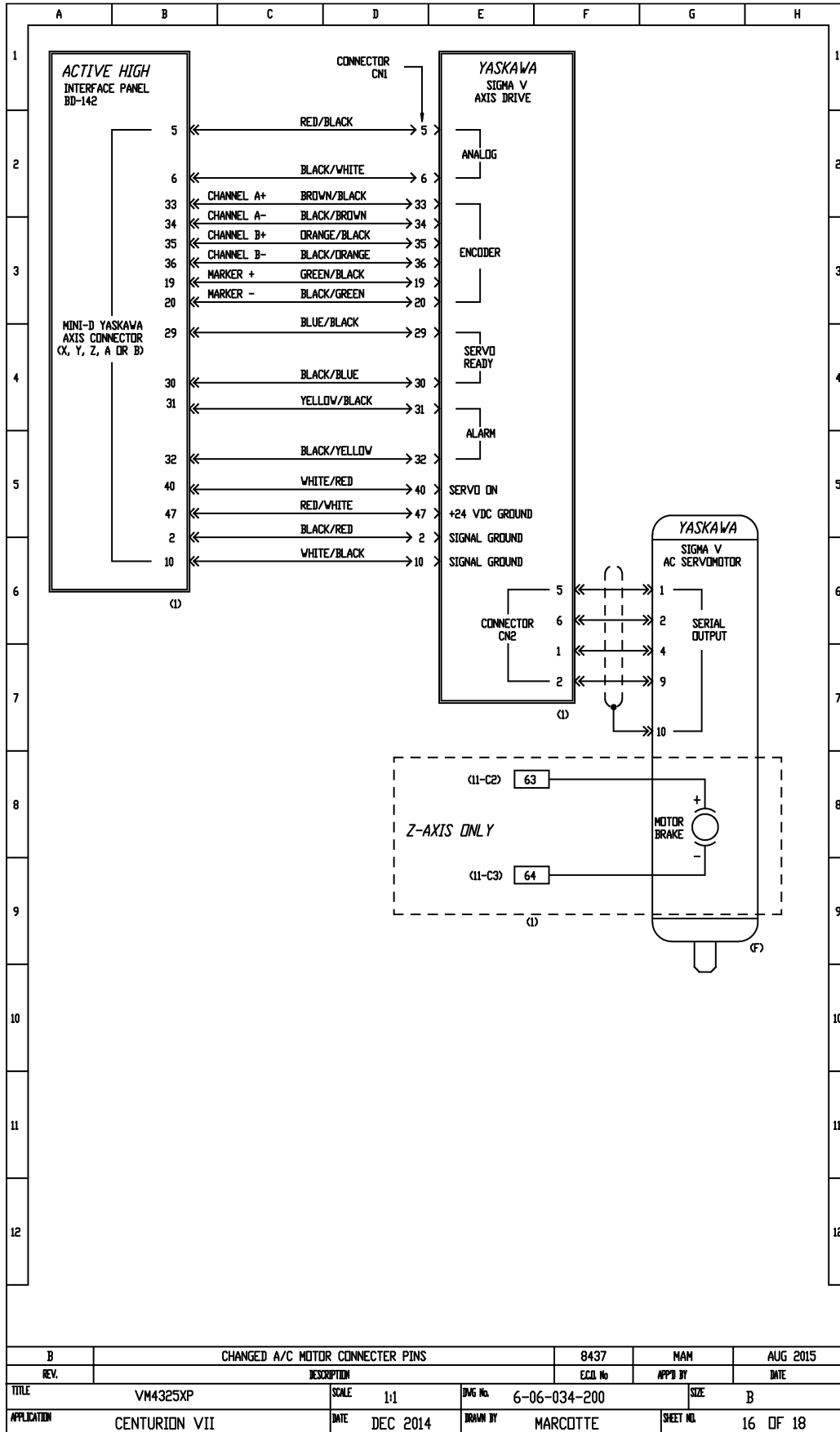
CHANGED A/C MOTOR CONNECTER PINS
 DESCRIPTION

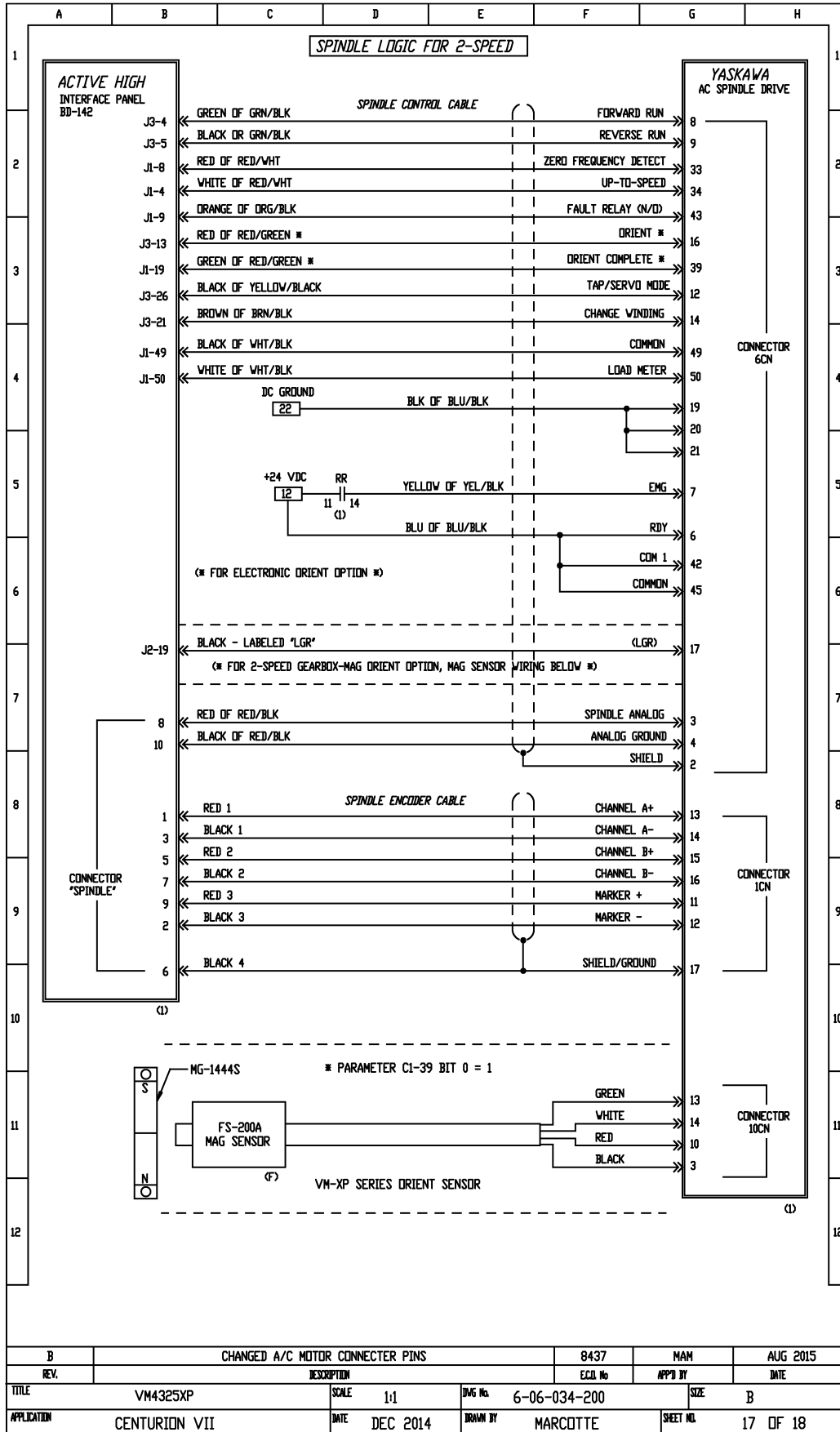
8437
ECN No

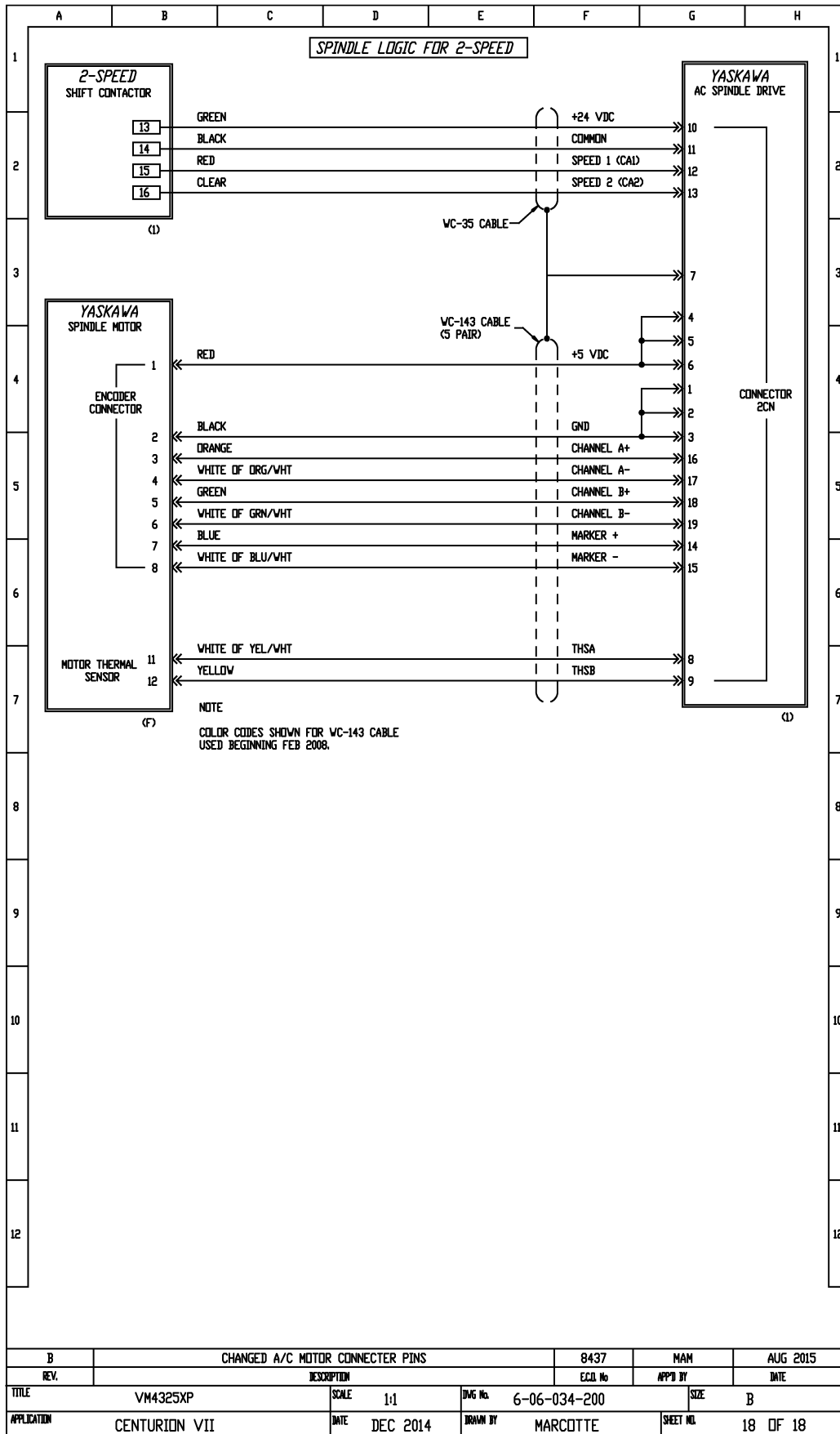
MAM
APP'D BY

AUG 2015
DATE

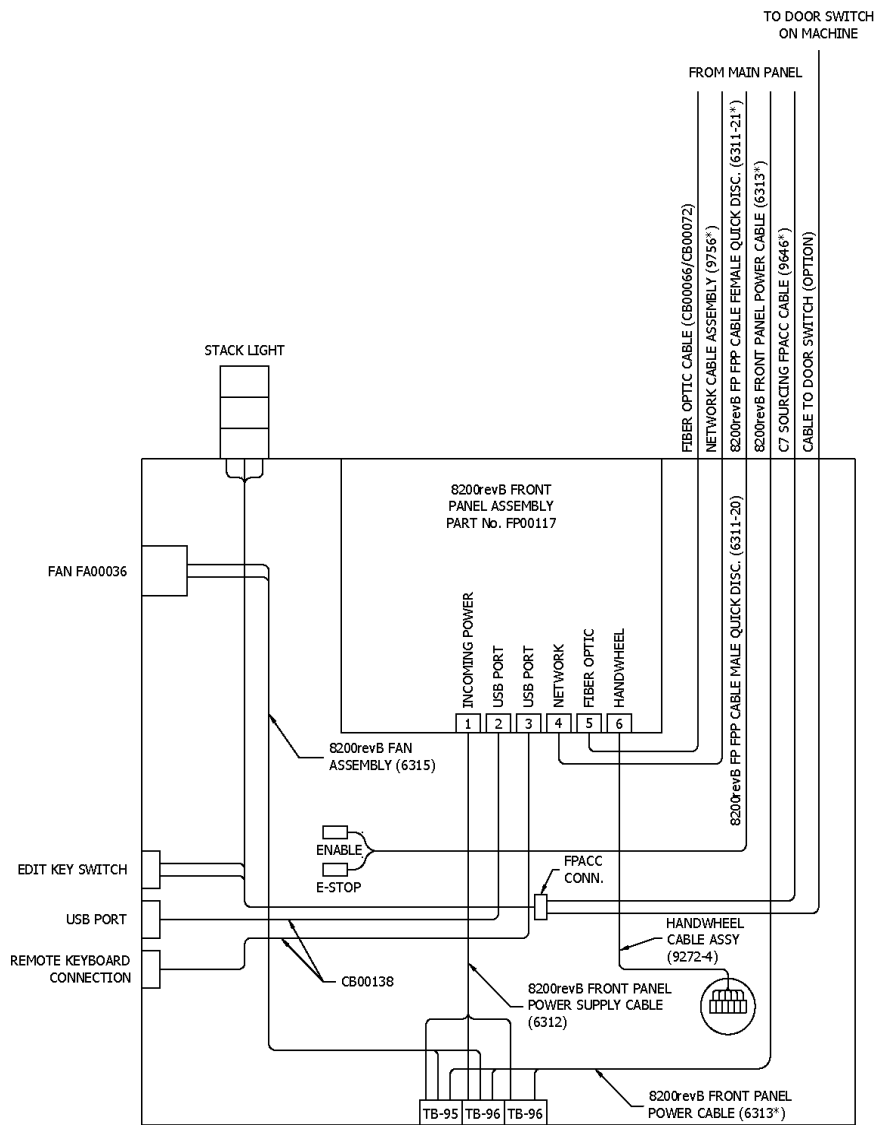






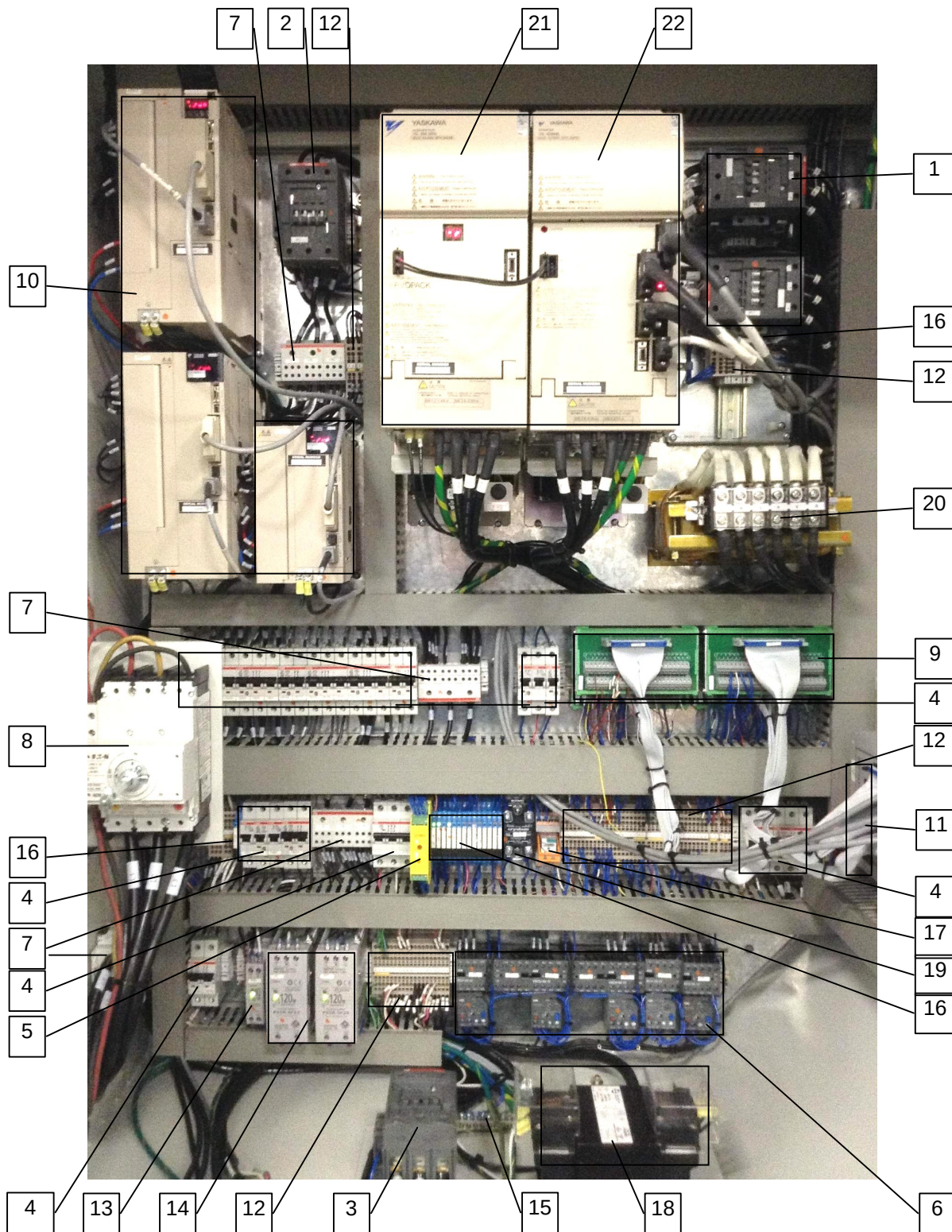


8200b Control Front Panel Connections



DESCRIPTION: 8200revB FRONT PANEL CONNECTIONS		C	5/2014	MTT	8248	VARIOUS CHANGES TO CABLE NAMES & No.	REVISION
		B	1/2014	MTT	8123	UPDATED TB-12 & 22 TO TB-95 & 96	
		A	1/2014	MTT	8106	UPDATED KEYBOARD CONNECTION LOCATION	
		REV.	DATE	NAME	ECO #	CHANGES	
STOCK/ASSY #:	DRAWING #	DRAWN BY:			DATE:		C
----	6-06-043-000	EBERT			11/21/2013		
 MILLTRONICS CNC MACHINES 1400 MILL LANE 952.442.1410 WACONIA, MN 55387, USA					CERTAIN INFORMATION CONTAINED HEREIN IS THE EXCLUSIVE PROPERTY OF MILLTRONICS MFG. CO. IT IS GIVEN IN CONFIDENCE AND IS NOT TO BE USED OR DISCLOSED TO OTHER THAN THE INTENDED RECIPIENT WITHOUT EXPRESSED WRITTEN CONSENT OF MILLTRONICS MFG. CO.		

Electrical Panel Layout



Actual machine may vary depending on configuration.

Mag Panel Electrical Parts List

ITEM	STOCK NO.	DESCRIPTION	QTY	REMARKS
1	RL-175	CONTACTOR AF96-30-11-13, 96 AMP	2	MC1, MC2
2	RL-174	CONTACTOR AF80-30-11-13, 80 AMP	1	K1
3	RL-174	CONTACTOR AF80-30-11-13, 80 AMP	1	K2
4	CB-154	UL489 THREE POLE 15AMP CIRCUIT BREAKER	1	CB 2ABC
	CB-187	THREE POLE 1AMP CIRCUIT BREAKER	1	CB 16ABC
	CB-115	SINGLE POLE .5AMP CIRCUIT BREAKER	1	CB 5
	CB-166	SINGLE POLE 4AMP CIRCUIT BREAKER	1 to 3	CB14, CB30
	CB-183	SINGLE POLE 1 AMP DC CIRCUIT BREAKER	1	CB RR
	CB-117	SINGLE POLE 2AMP CIRCUIT BREAKER	1	CB 14, CB24
	CB-167	UL489 TWO POLE 4A CIRCUIT BREAKER	2	CB 24A, CB270
	CB-176	UL489 TWO POLE 5AMP CIRCUIT BREAKER	1	CB 11AC
	CB-178	TWO POLE 10AMP CIRCUIT BREAKER	1	CB 25AC
	CB-143	TWO POLE 1AMP CIRCUIT BREAKER	1	CB ACA/ACC
	CB-175	UL489 SINGLE POLE 6AMP CIRCUIT BREAKER	1	CB 12
	CB-185	UL489 THREE POLE 5AMP CIRCUIT BREAKER	0 or 1	CB-102
	CB-161	UL489 THREE POLE 60AMP CIRCUIT BREAKER	1	CB 20ABC SEE SCH PAGE 5
	CB-155	UL489 THREE POLE 20AMP CIRCUIT BREAKER	1	CB 19ABC
	CB-156	UL489 THREE POLE 30AMP CIRCUIT BREAKER	0 or 1	CB 100ABC Chip Blaster CTS
5	RL-177	RELAY, SAFETY, 2981100	1	
6	RL-102	CONTACTOR, STANDARD	1 to 3	K8, K26, K28
	RL-103	CONTACTOR, REVERSING	2	K21/22, K24/25
	RL-158	OVERLOAD, 2.3 AMP	2	K21/22 K24/25
	RL-159	OVERLOAD, 3.1 AMP	1	K8
	RL-160	OVERLOAD, 4.2 AMP	1	K26
	RL-161	OVERLOAD, 5.7 AMP	1	K28
7	TB-46	DISTRIBUTION BLOCK, 3-POLE	4	MAIN, P, M, D
8	CB-197	CIRCUIT BREAKER & DISCONNECT SWITCH ASSEMBLY	1	MAIN POWER DISCONNECT
9	PR-038	BREAKOUT BOARD	4	FOR SOURCING INTERFACE
10	AM-93	AXIS DRIVE SERVO SIGMA5 YASKAWA, SGD V-200	1	X AXIS
	AM-94	AXIS DRIVE SERVO SIGMA5 YASKAWA, SGD V-330	2	Y & Z AXES
11	7538	AC INTERFACE ASSY, SOURCING	1	
12	TB-30	TERMINAL BLOCK 4-POSN., TOP ENTRY	71	
	TB-32	TERMINAL BLOCK JUMPER, 10 POSN.	3.6	
	TB-33	TERMINAL BLOCK LABEL TAB, SHEET OF 110	1	
	TB-31	TERMINAL BLOCK END PLATE	9	
	TB-35	TERMINAL BLOCK END STOP	18	
13	PS-77	REGULATED POWER SUPPLY, 5 VDC, 2.5 AMPS	1	PS2
14	PS-76	REGULATED POWER SUPPLY, 24 VDC, 5 AMPS	2	I/O, PS1
15	BU-04	BUS BAR	1	GROUND BUS
16	RL-130	24V 6AMP MINI RELAY & BASE	13	LG, CR12, OILER, Z-BRK, POT UP, POT DOWN, LUBE LOW, GEARBOX HIGH, GEARBOX LOW, SPDL GEAR LUBE, AIR BLAST, DRAWBAR, BLOWOUT
17	RL-178	CONTROL RELAY, +24 VDC COIL RELAY SOCKET BASE	1	RR
18	TR-75	TRANSFORMER, 0.5 VKA, 50/60 HZ	1	MAG PANEL TRANSFORMER
	TB-62	FINGER GUARD FOR TR-75	2	
19	RL-164	RELAY-SOLID STATE N/C 24VDC W/BASE DC6055-B&HS501DR	1	CR1A
20	IA-25	YASKAWA REACTOR	1	
21	PS-72	AC SPINDLE CONVERTER, M5	1	
22	PS-71	AC SPINDLE INVERTER, M5	1	

Yaskawa Parameters

M5 Spindle Drive Parameters, 2-speed Mill

PARAMETER	DESCRIPTION	VM4325XP
C1-01	P Gain / High gear	175
C1-02	I Gain / High gear	300
C1-03	Proportional Gain / Low gear	230
C1-04	I Gain / Low gear	100
C1-05	Proportional Gain / SV Mode / High gear	50
C1-10	Soft Start Time	3.5
C1-11	Speed ref offset adjustment value	56
C1-12	Motor speed adjustment value	0.9882
C1-19	Zero speed signal detection level	5
C1-25	Motor code selection	B6
C1-26	Rated speed setup	8000
C1-27	Transmission ratio 1 (H gear)	0.8860
C1-28	Transmission ratio 2 (M gear)	1.000
C1-29	Transmission ratio 3 (L gear)	0.1770
C1-33	Servo mode magnetic flux level (M,L)	85
C1-36 Bit 3	6CN pin 12 signal selection ("0"=SSC,"1"=SV)	1
C1-38 Bit 1	Load Meter Filter 2 ("10"=100ms,"11"=500ms)	1
C1-39 Bit 0	Orientation control method (0=encoder, 1=mag)	1
C1-40 Bit 0	Speed deviation (AL-32) delay 00=0.0 sec, 01=0.3 sec	1
C1-40 Bit 1	Speed deviation (AL-32) delay 10=0.4 sec, 11=0.5 sec	1
C1-56	Inverter capacity selection	A
C3-01	Load axis positioning origin	0.25
C3-05	Speed control proportional gain (H,ORT)	30
C3-06	Speed control time constant (H,ORT)	750
C3-07	Speed control proportional gain (M,L,ORT)	15
C3-08	Speed control integral time constant (M,L,ORT)	750
C3-09	Position completion detection width	0.5
C3-11	Orientation speed	150
C3-12	BCD stop position offset	0.9
C3-20	Magnetic sensor signal standardization angle	7.0
C3-22 Bit 4	Tune-up mode (0=enabled, 1=disabled (normal))	0

This listing contains the spindle drive parameters that have been changed by Milltronics Manufacturing. All other parameters remain unchanged and are the factory default settings by Yaskawa.

Sigma 5 Axis Drive Parameters

P#	VM4325XP		
	X	Y	Z
000	0000H	0000H	0001H
100	533	636	180
101	1194	1000	690
102	799	954	300
103	126	67	132
170	1400H	1400H	1400H
212	5000	5000	5000
300	575	575	575
401	27	21	42
409	265	360	500
40C	460	520	2000
40D	159	158	70
506	0	0	30
50A	8100H	8100H	8100H
50B	6548H	6548H	6548H
520	262144	262144	262144
524	7	7	7
600	20	20	25

The table above lists the axis drive parameters changed by Milltronics. All other parameters remain set to the Yaskawa factory default settings.

VM Series CNC I/O Listing

Inputs

01 Estopped
 02 Drawbar Off
 03 Drawbar On
 04 Up To Speed
 05 Tool Change
 06 Lube Fault
 07 Wait Channel
 08 Zero Speed
 09 Drive Fault
 10 15k Spndl Lube
 11 PROBE
 12 X Home Switch
 13 Air Pressure
 14 Carousel at Home
 15 On Pocket
 16 Arm is In (or)
 Pot is Down
 17 Arm is Out (or)
 Pot is Up
 18 Remote C-Start
 19 Oriented
 20 Tool Out Pushed
 21 Door is Open
 22 ArmPrk/ClfIt/FdHid
 23 Edit Switch
 24 Y Home Switch
 28 Chiller Fault
 29 Arm Prox 1
 30 Arm Prox 2
 31 Arm Prox 3
 32 Tool Setter
 33 Back Gear Reverse
 36 Z Home Switch
 37 X Axis Drive OK
 38 Y Axis Drive OK
 39 Z Axis Drive OK
 40 A Axis Drive OK
 41 B Axis Drive OK
 42 CTS pressure
 43 Gearbox In High
 48 A Home Switch
 49 Rmt HDW Axis3
 50 Rmt HDW FOV1
 51 Rmt HDW FOV2
 52 Rmt HDW Axis1
 53 Rmt HDW Axis2
 54 Rmt HDW SetCoord
 55 Gearbox In Low
 67 PROBE ERROR
 68 LOW BATTERY

Outputs

01 Software Estop
 02 Mist Coolant
 03 Flood Coolant
 04 Spindle CW
 05 Spindle CCW
 06 Spindle OK
 07 Drawbar Enable
 08 Tool Change
 09 Allow Reset
 11 Spindle Latch
 12 Rotary Clamp
 13 Orient
 14 Arm In (or)
 14 PotDown
 15 Drawbar
 16 Carousel CW
 17 Carousel CCW
 20 NotParked/Fdhld
 21 Low Range
 22 Coolant Fault FDHLD
 23 Gearbox High Range
 24 Creep
 26 Tap / No Ramps
 27 Chip Remove
 28 Air Blow (or)
 Gearbox Low Range
 29 B axis Brake
 30 Misc Mcode
 32 TOOL SETTER ON (or)
 Misc Mcode 1
 33 PROBE ON (or)
 Coolant Blowout
 34 Misc Mcode 3 (or)
 Pressure Pump
 35 Misc Mcode 4
 36 Spindle Reverse
 37 Xaxis Drv Enabled
 38 Yaxis Drv Enabled
 39 Zaxis Drv Enabled
 40 Aaxis Drv Enabled
 41 Baxis Drv Enabled
 42 Axis Drvs Enabled
 44 Auger Reverse
 45 Wash Down
 46 Spindle Air Purge
 47 Spindle Gain
 48 Air Blast
 64 AuxSetup Door Unlock

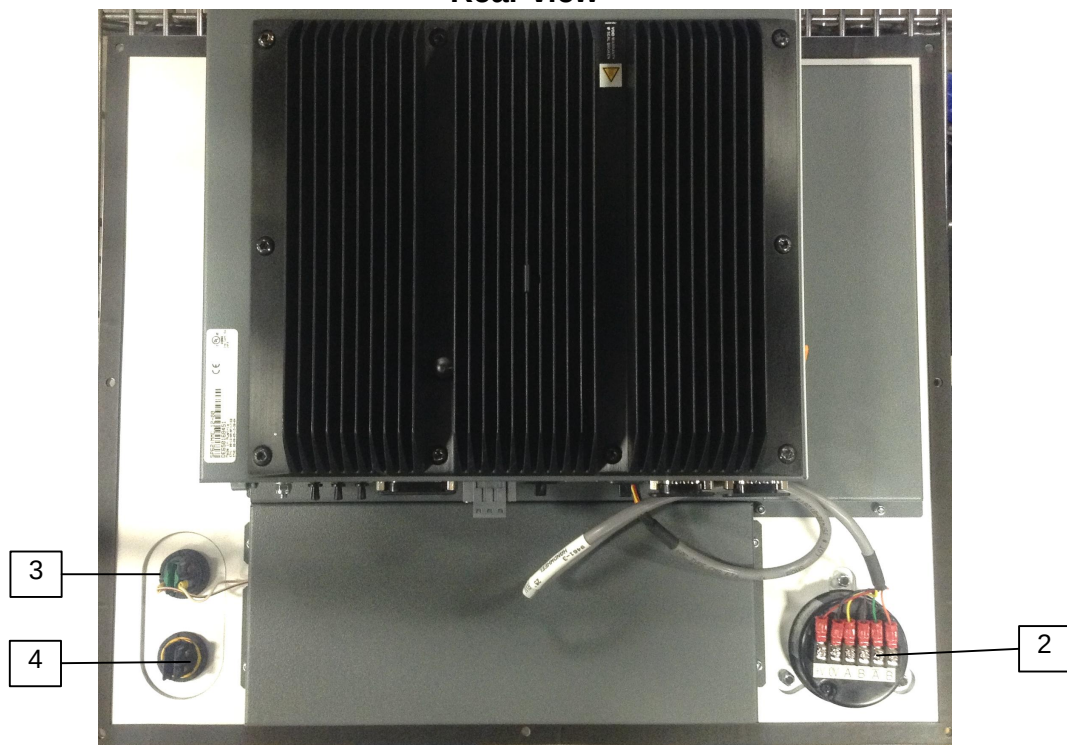
8200b Series Front Panel

ITEM	STOCK NO.	DESCRIPTION	QTY	REMARKS
1	FP-117	8200b SERIES FRONT PANEL ASSY	1	

Front view



Rear view



8200b Panel Assembly Parts List

Item	Part #	Description	Qty
1	FP-117	8200b Front Panel Assy	1
2	9461-3	Front Panel Handwheel with Cable Assy	0 or 1
3	TBD	Enable Switch Assy	1
4	TBD	E-Stop Switch Assy	1
5	TBD	Override knob for Feedrate or Spindle	2

