

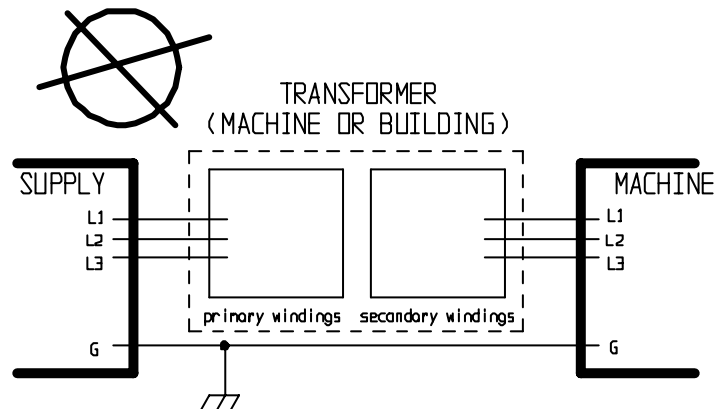
Electrical Manual

RW30C

Rev 1
10-24-02

***** CAUTION *****

DRIVES WILL BE DAMAGED BY INCORRECT POWER CONNECTION



Disconnect transformer entirely from power supply.

Check resistance between transformer ground wire and each secondary leg.
If resistance is more than 1 or 2 ohms, then the transformer ground wire is not connected to a neutral point within the secondary windings.

or

Disconnect transformer entirely from power supply.

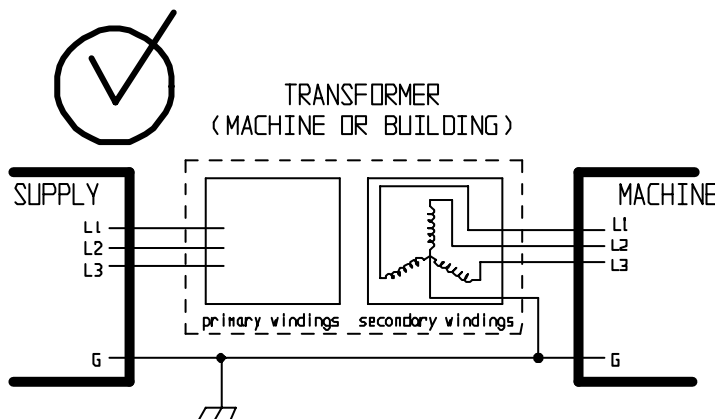
Remove transformer cover and follow transformer ground wire to determine if it is merely a case ground or if it actually goes to a neutral point within the secondary windings.

or

Check voltages between each secondary leg and ground.

If they are not equal, the secondary windings are “floating” with respect to ground.

THE GROUND WIRE GOING INTO THE MACHINE MUST BE CONNECTED TO A NEUTRAL POINT WITHIN THE SECONDARY WINDINGS AND TO EARTH GROUND.



The secondary windings must be grounded.

Voltages between each secondary leg and ground should be equal, half the voltage between secondary legs.

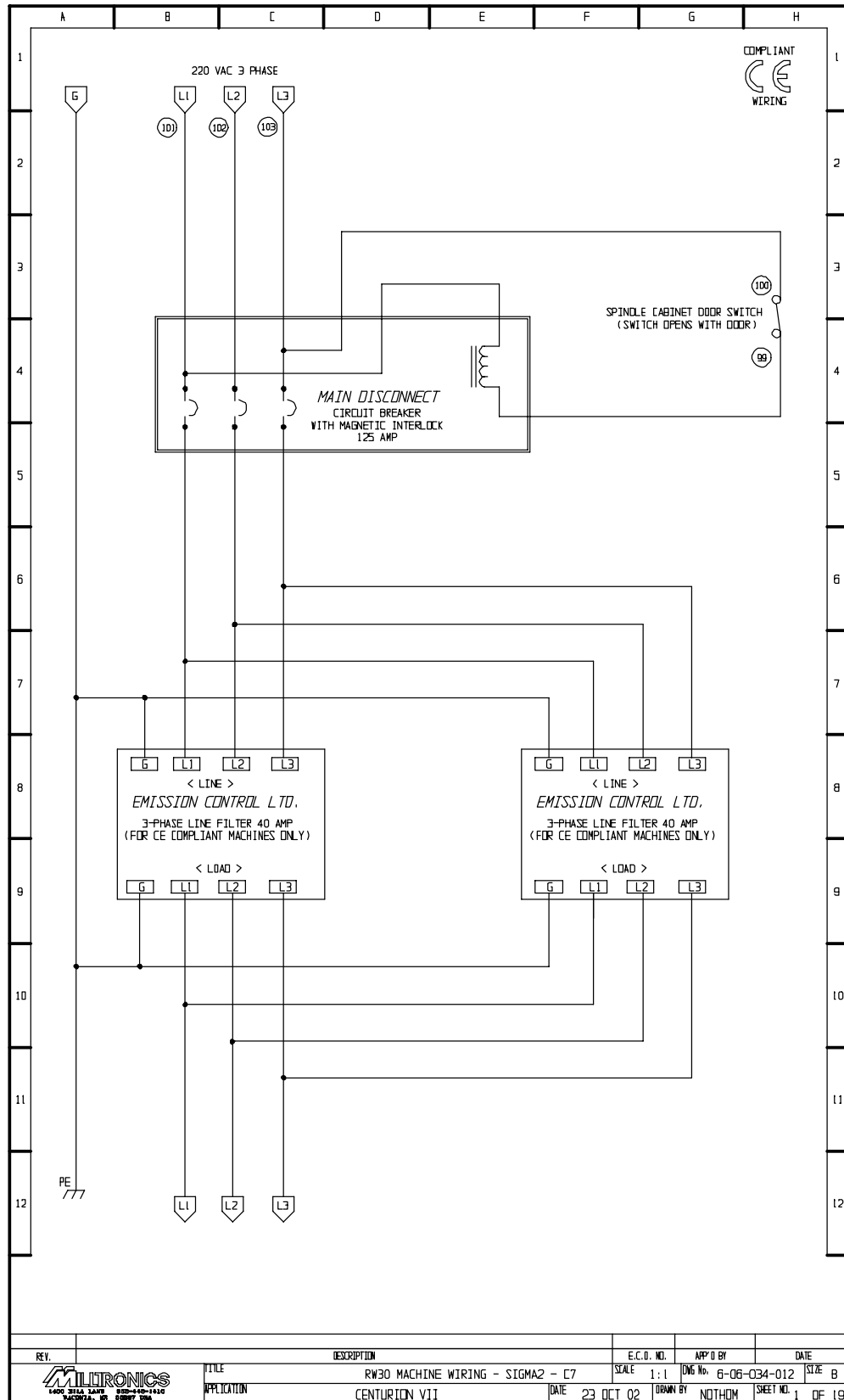
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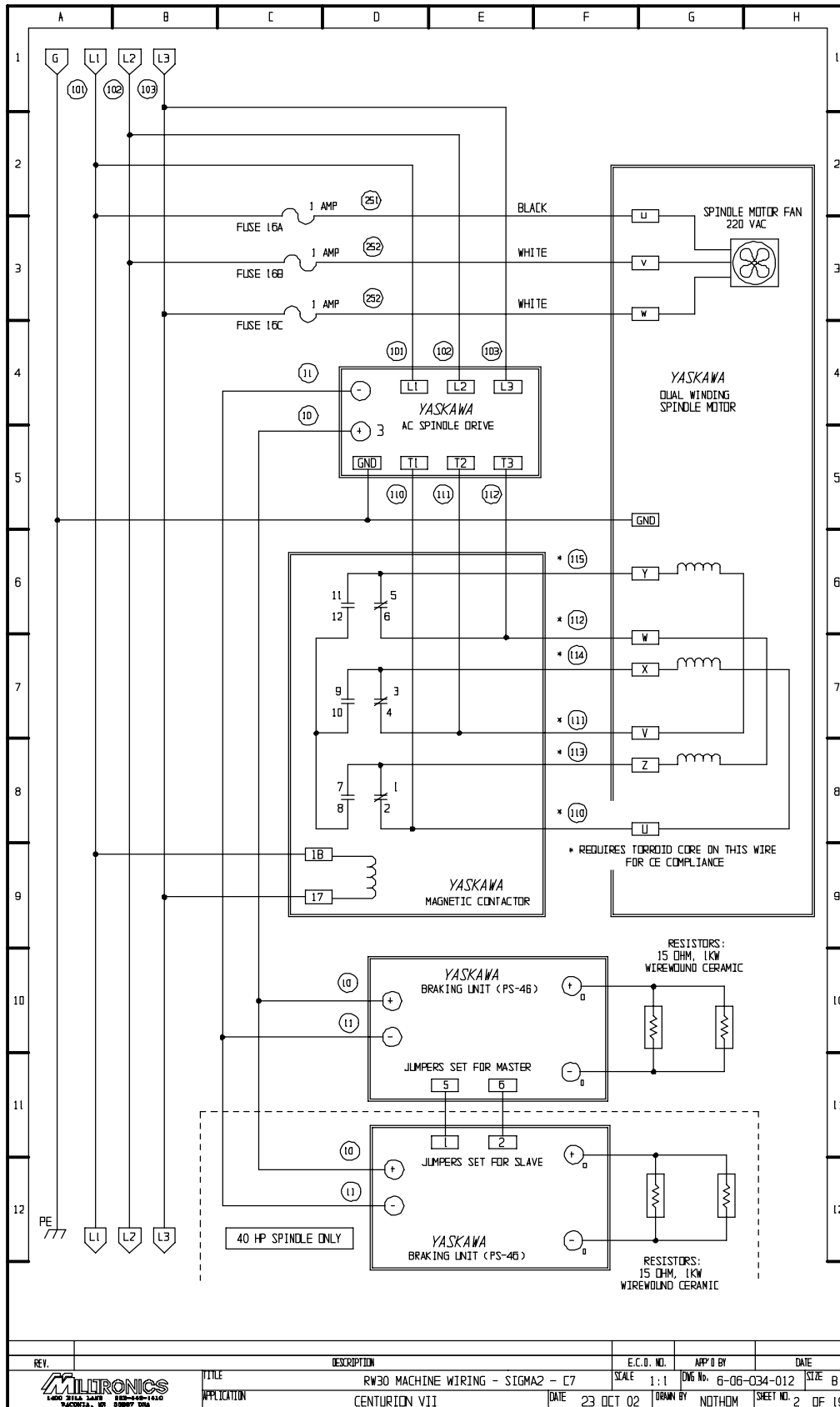
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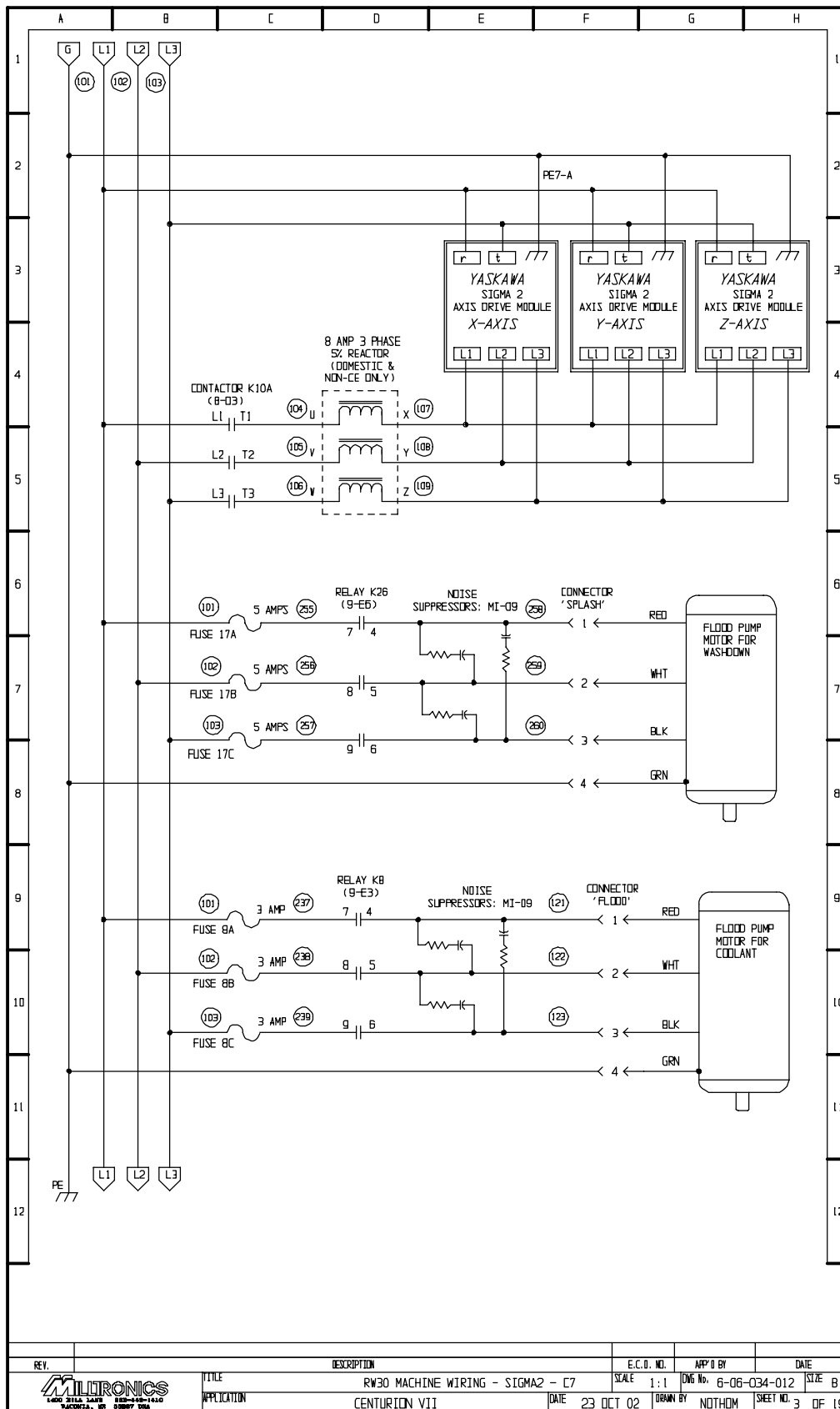
History

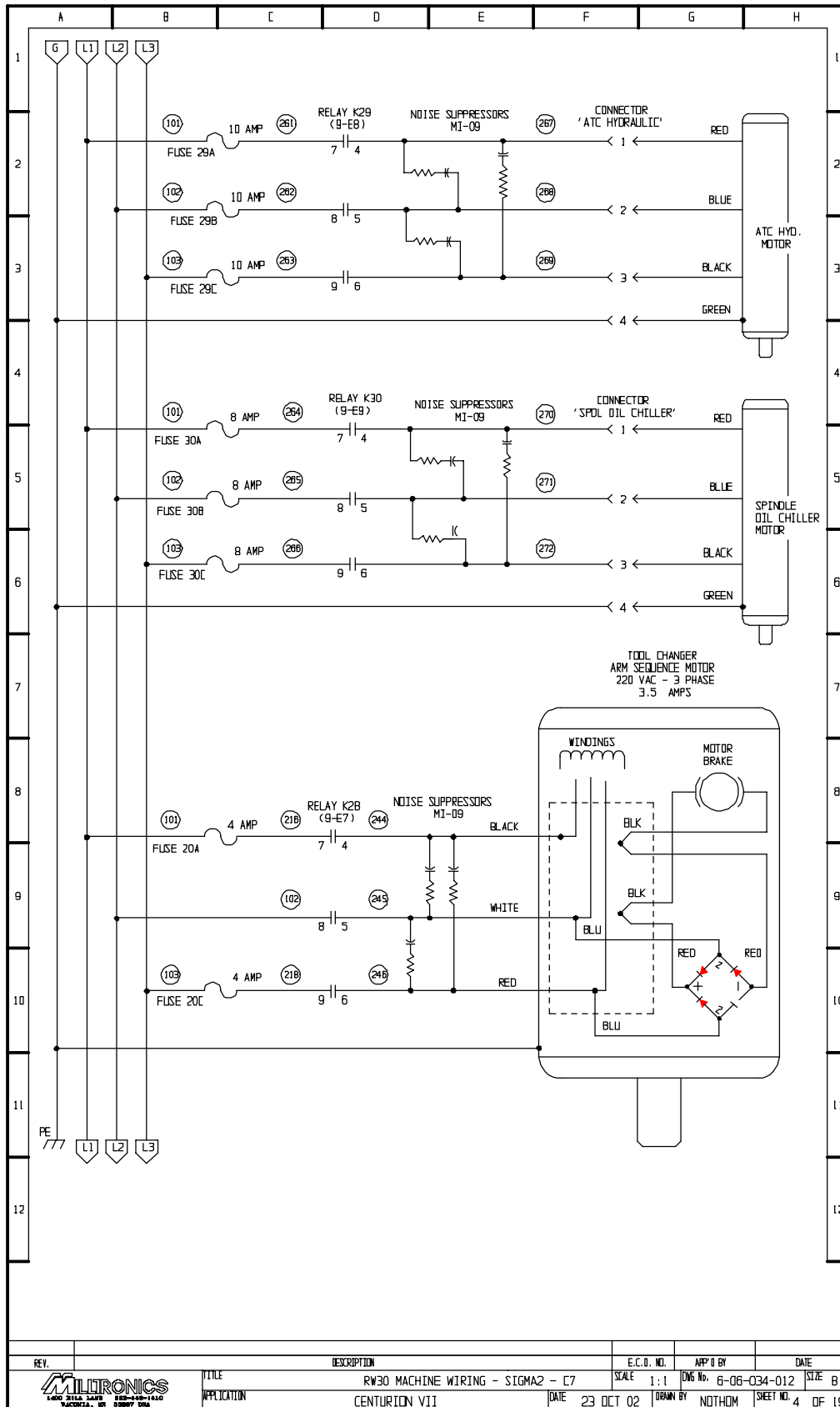
4-21-99	Original Version (RW20)
6-3-99	Update electrical drawings to rev D (reactors added).
7-12-99 Rev2	Added front panel drawings and SGDB15 drive parameters
7-28-99 Rev3	Added Auger / Flush circuit and updated panel drawing, new "RW20 only" schematic.
10-29-99	Added remote hand controller
2-8-01 Rev1	Convert to RW30A (from RW20) schematics and parameters
4-16-01 Rev2	Updated MC5 parameter listings
5-31-01 Rev3	Added new MC5 listing and prints for gearbox option, changed to m-rev B
10-24-02	Convert to RW30C including Sigma2 drives and Cent 7 control

Machine Schematic

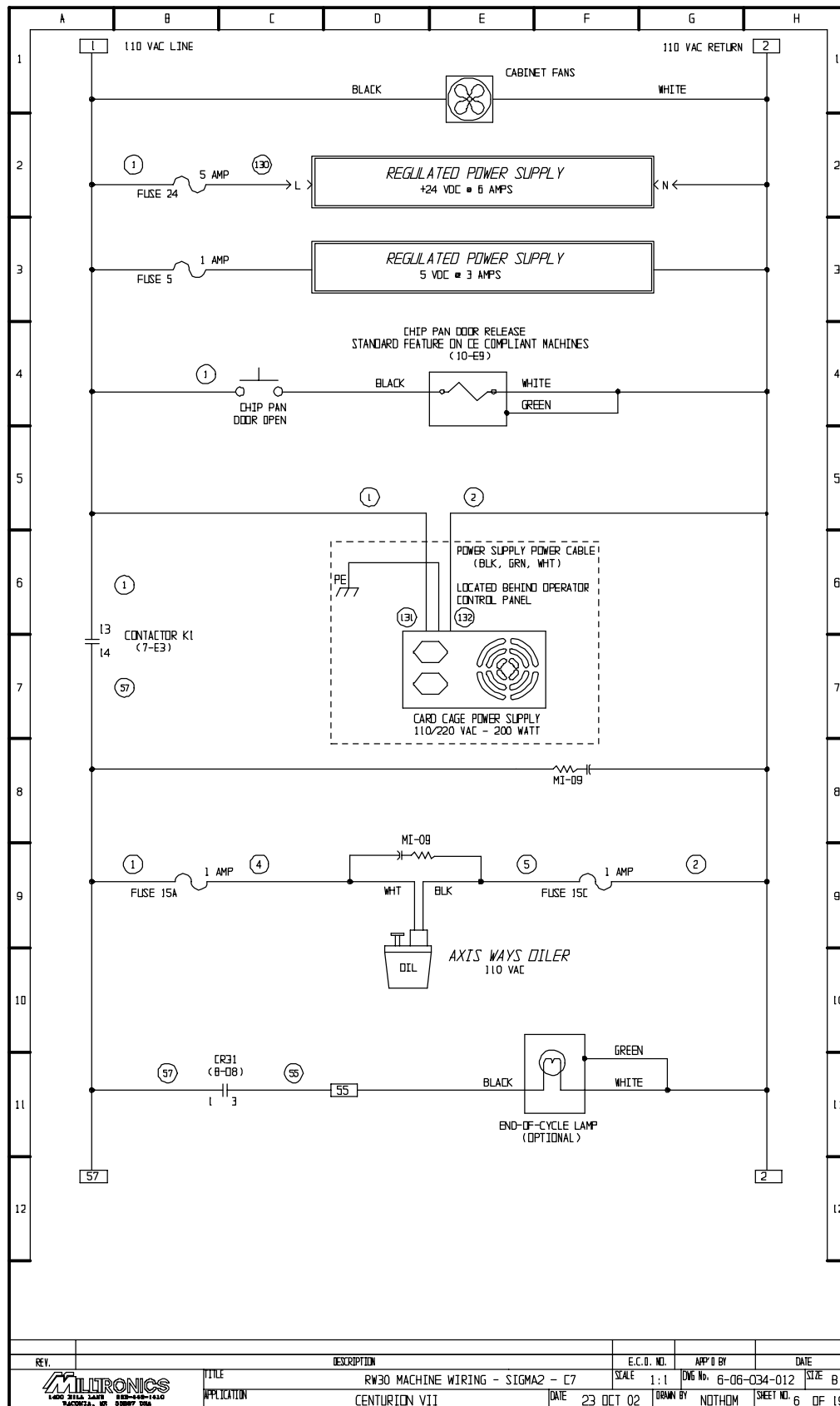


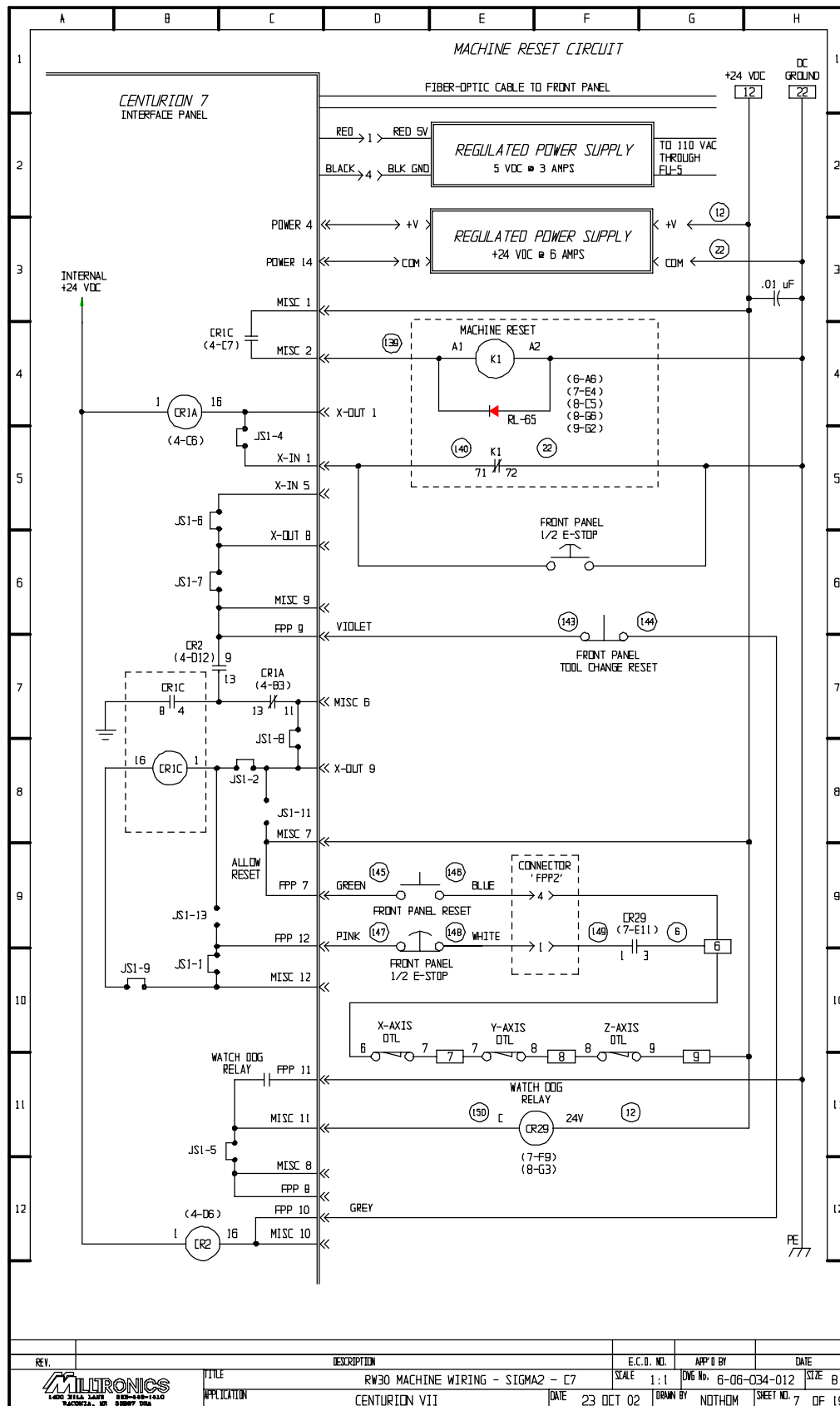


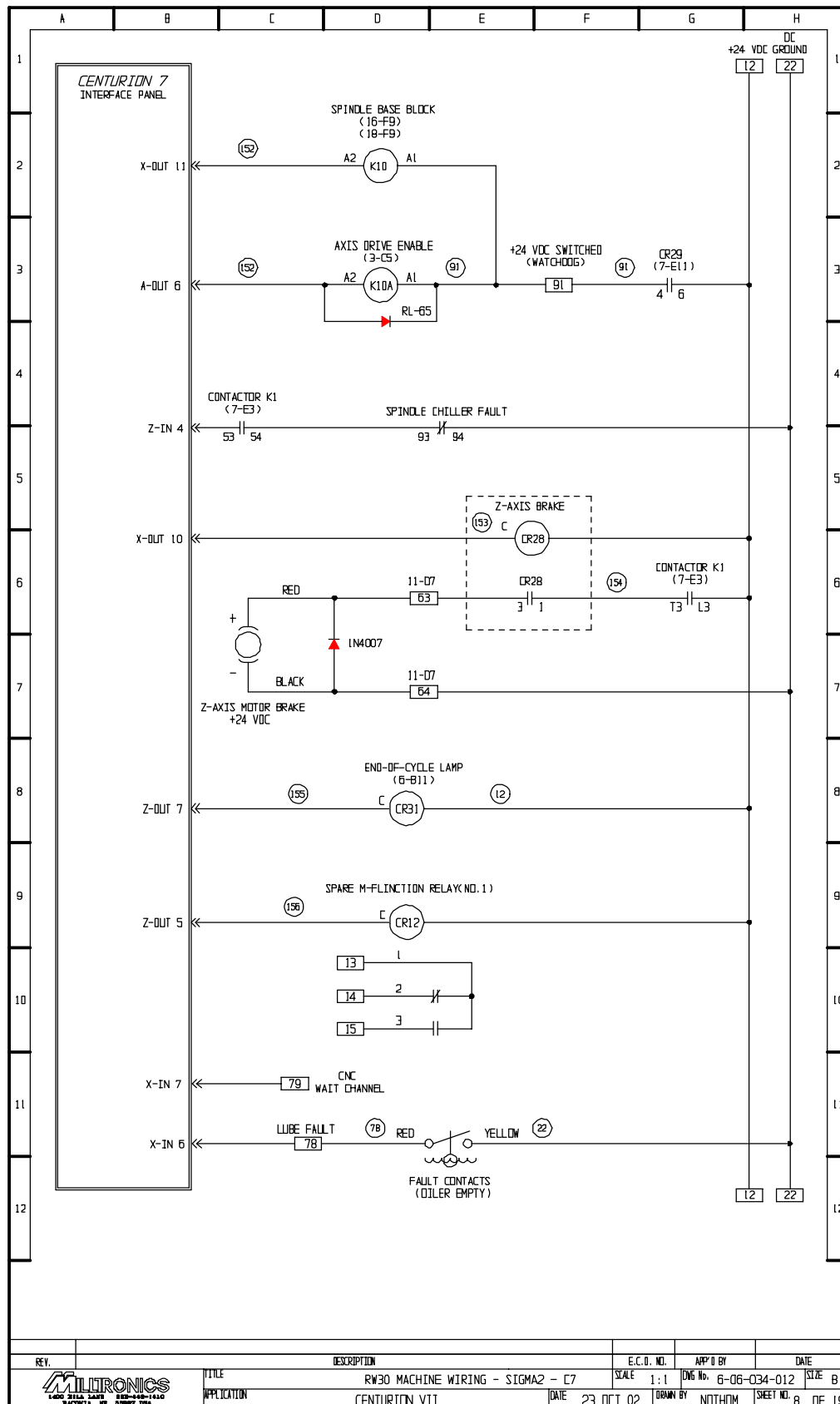


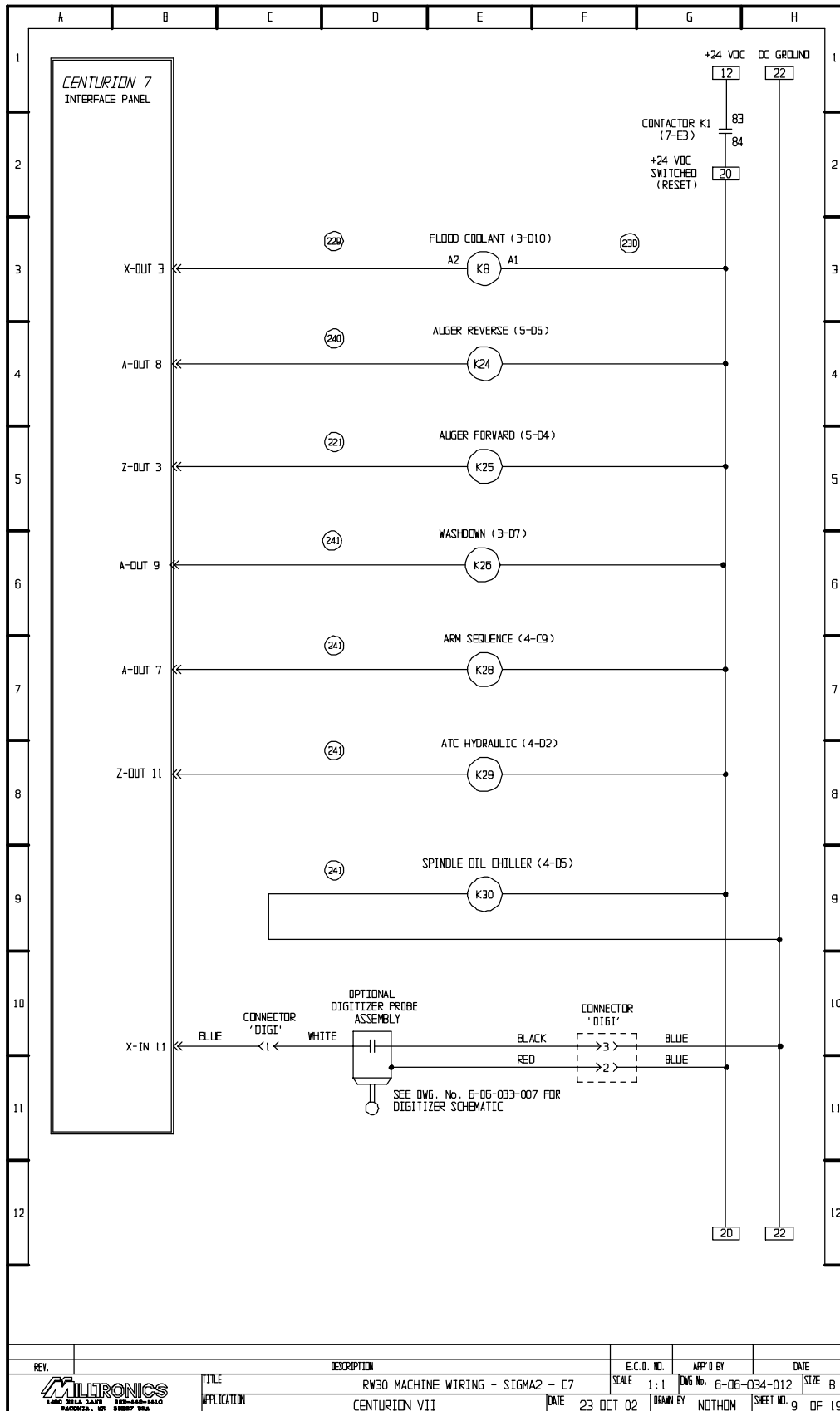


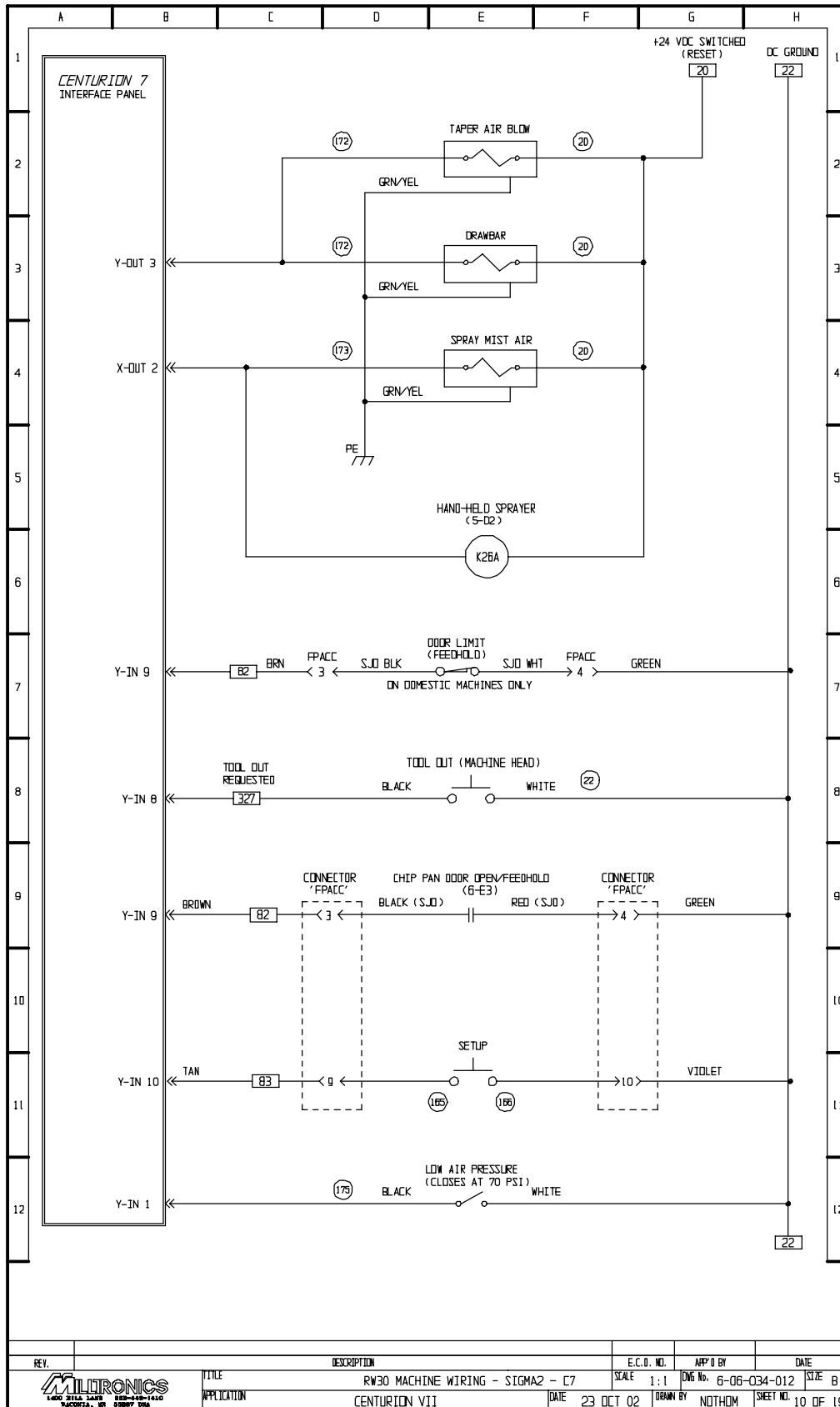


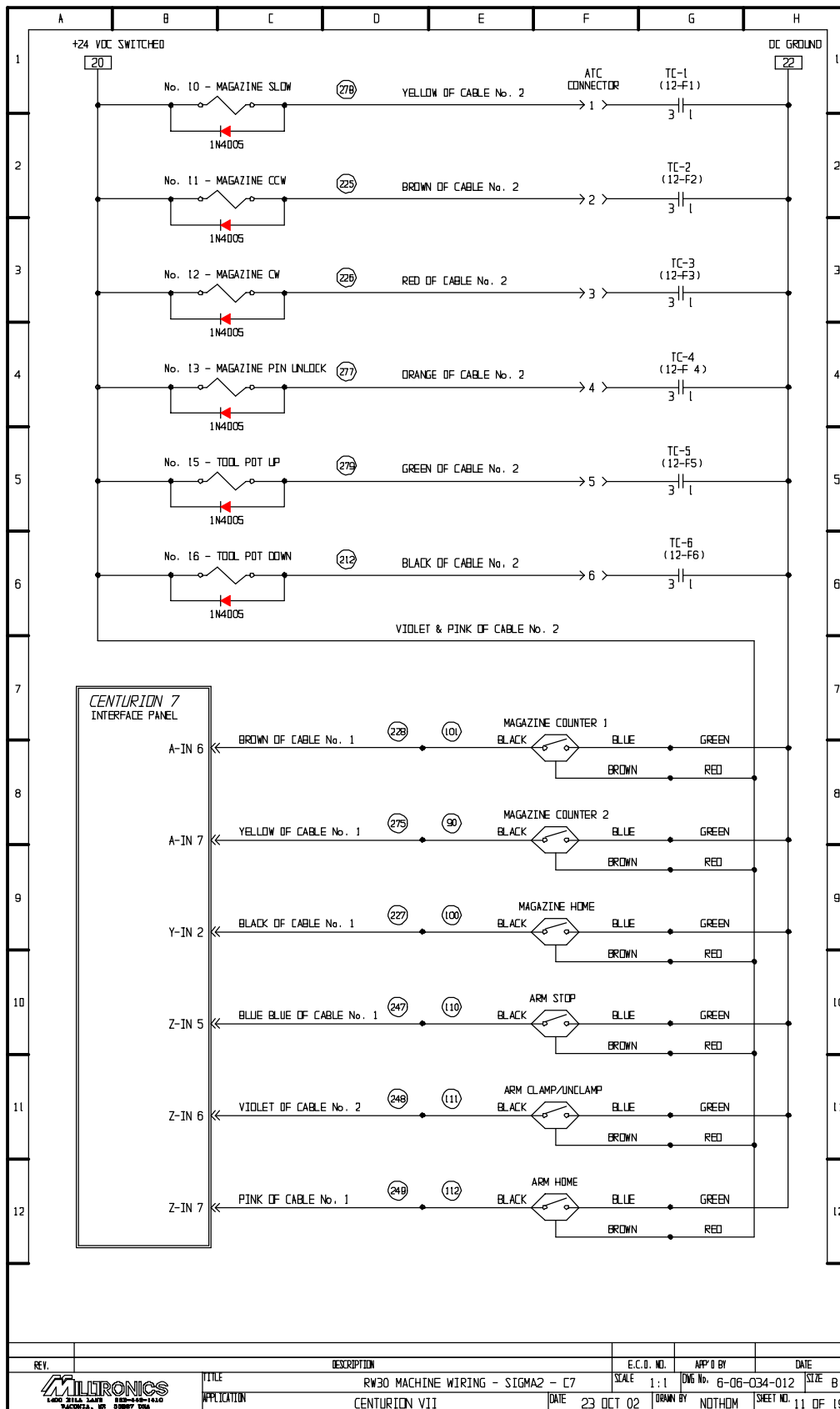


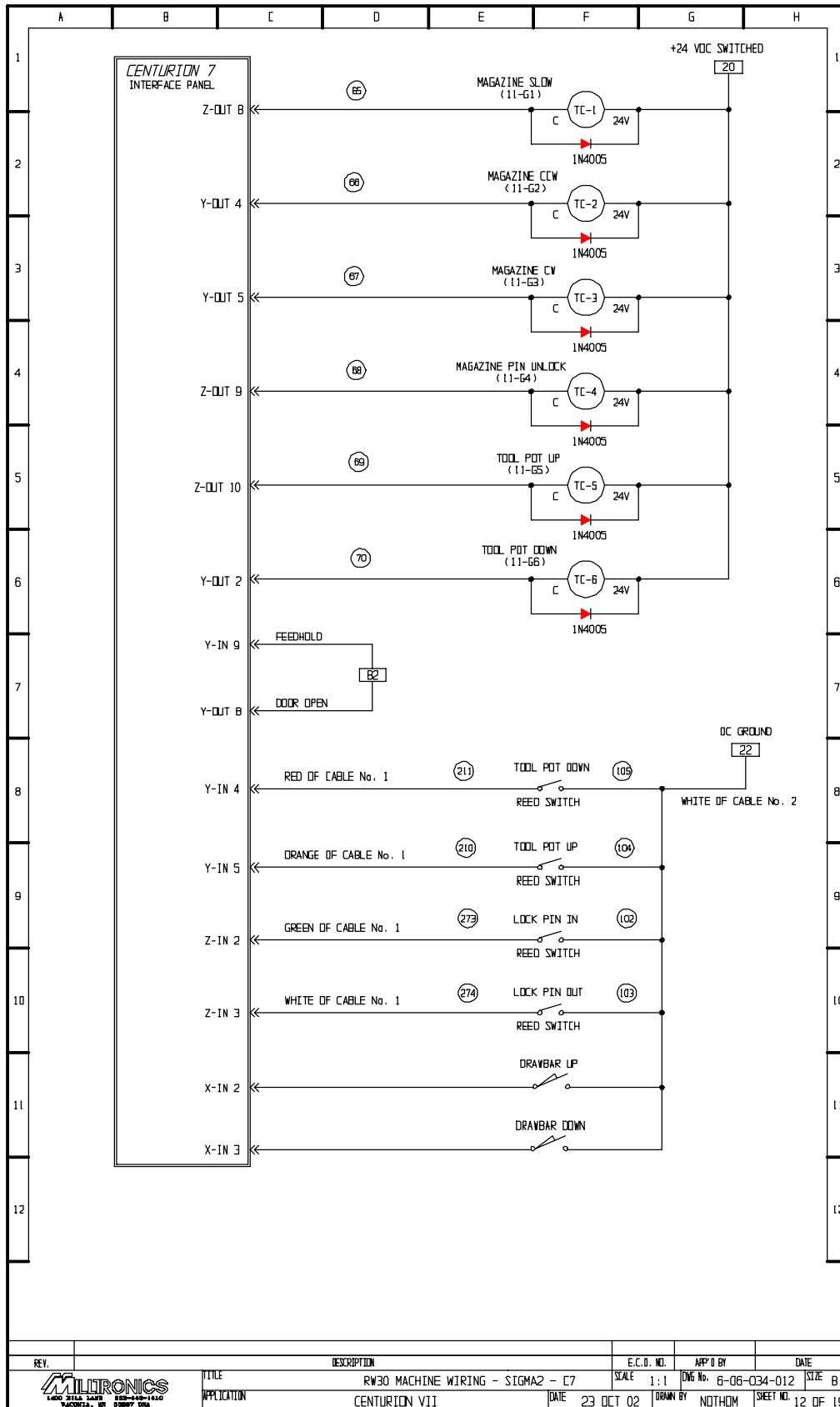


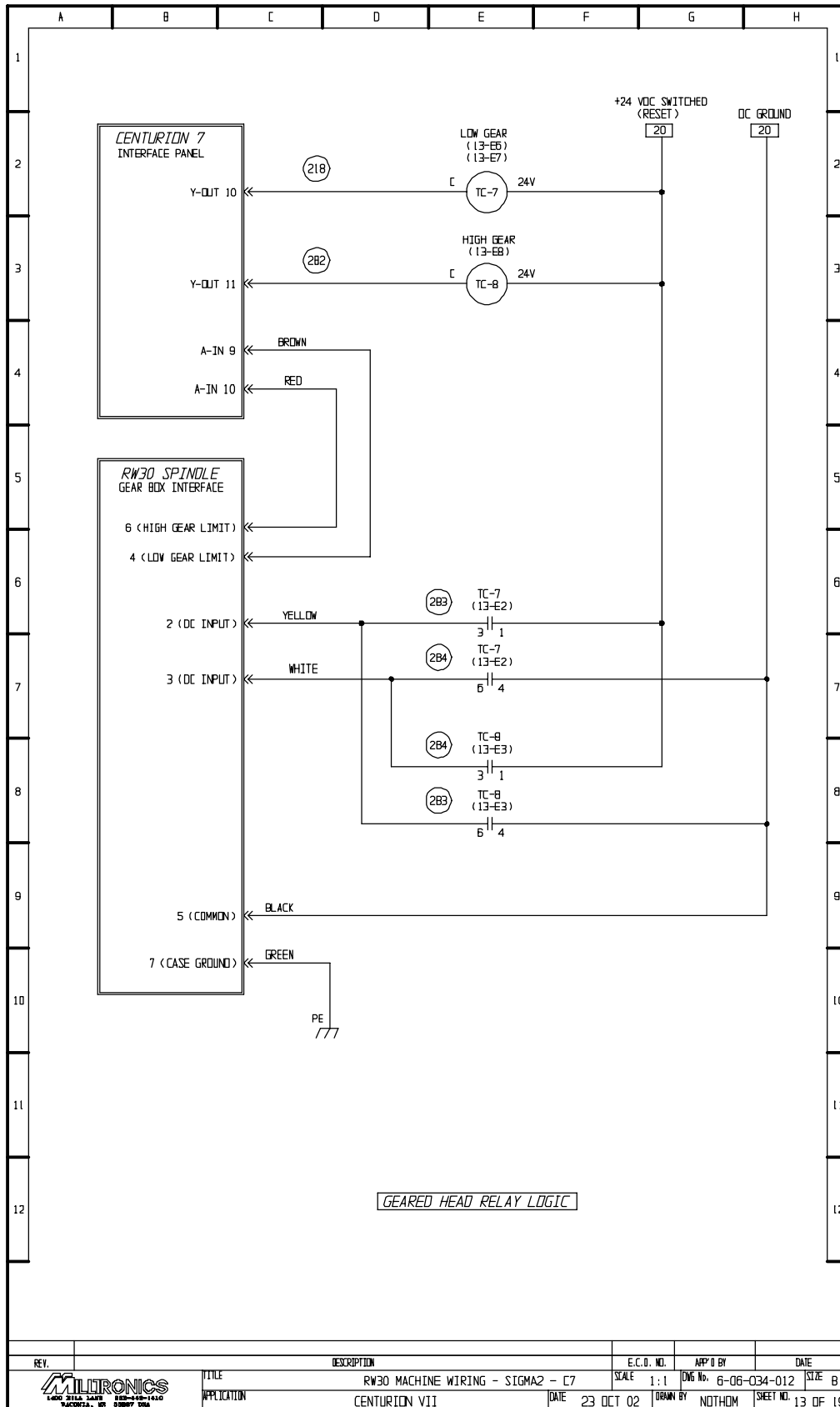


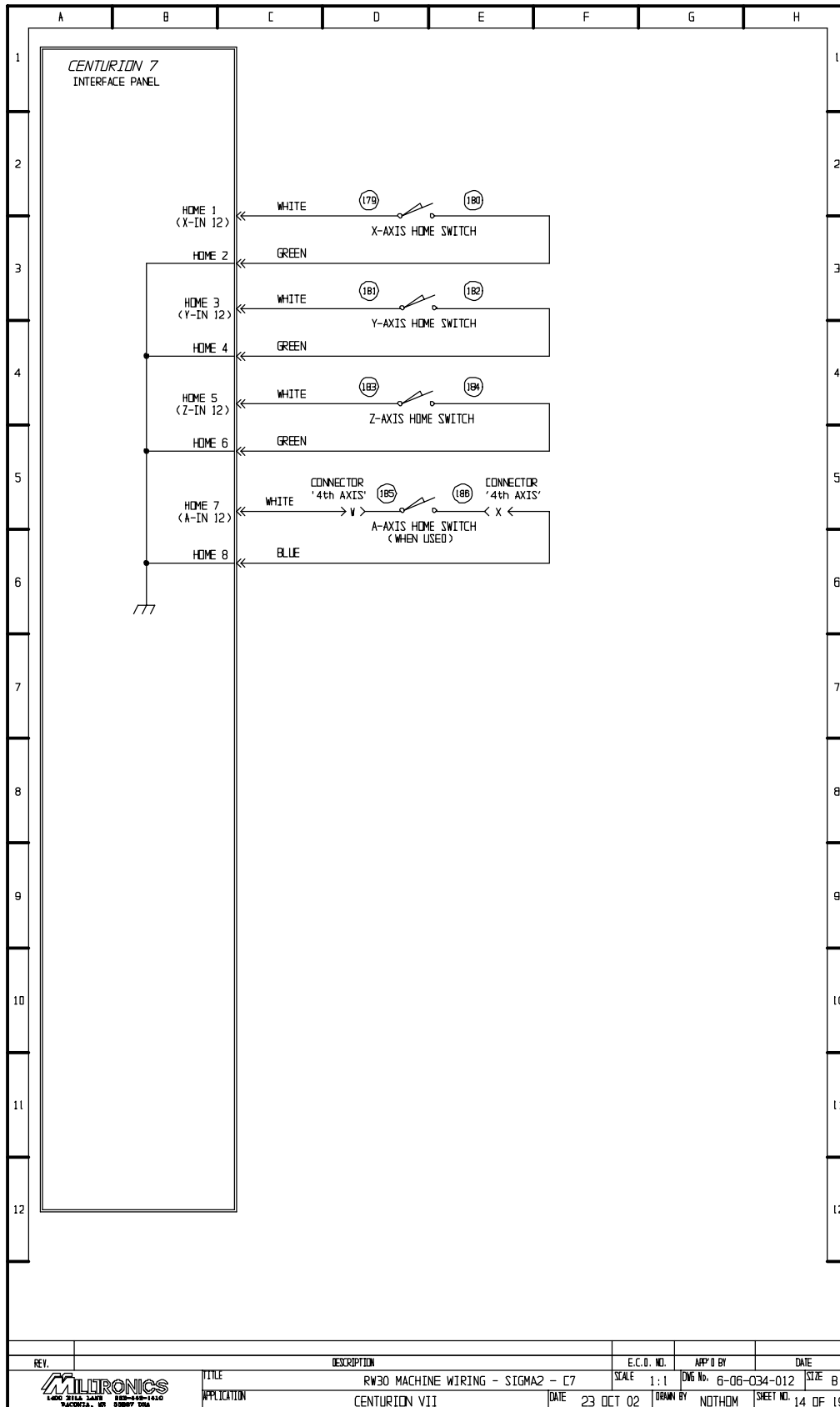


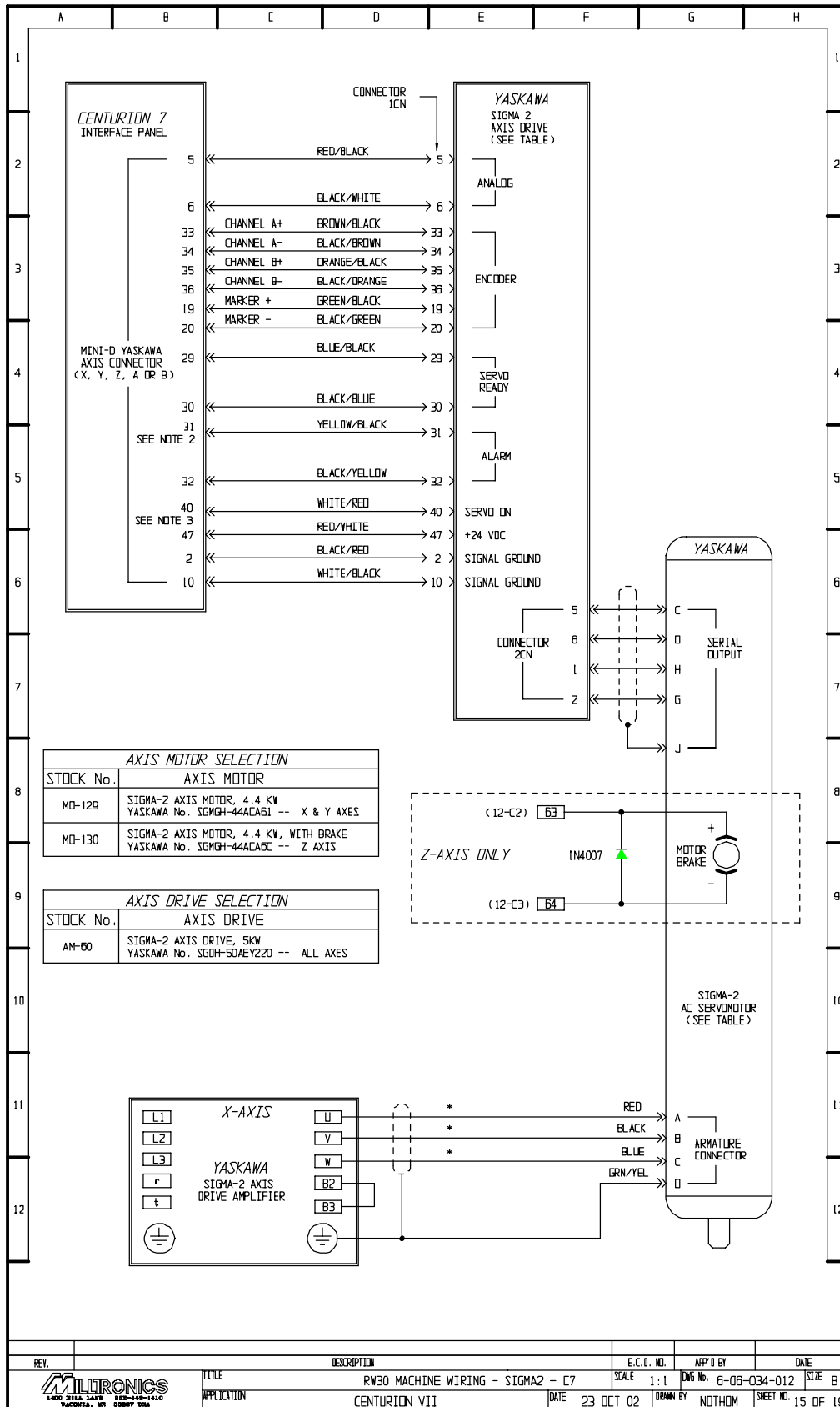


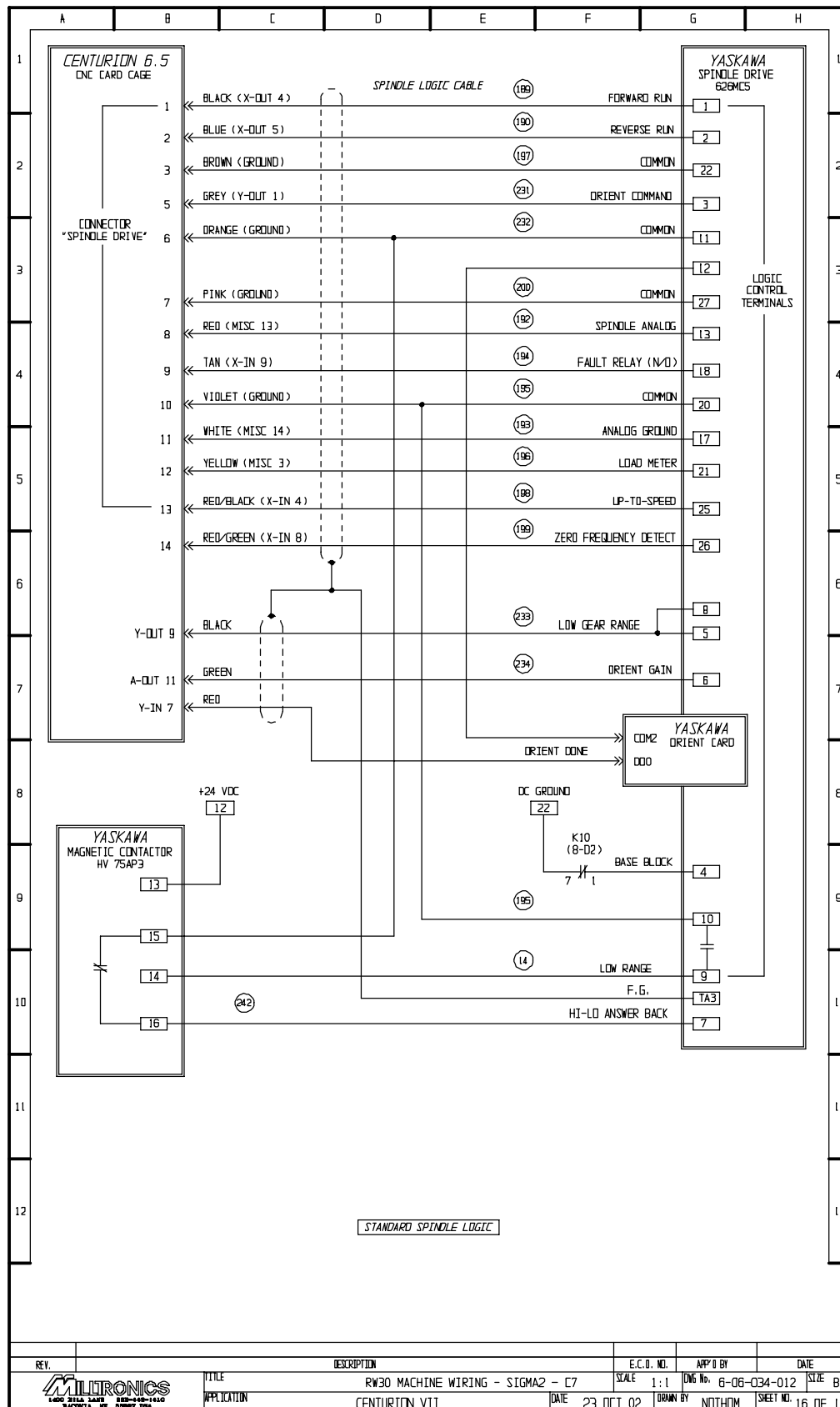


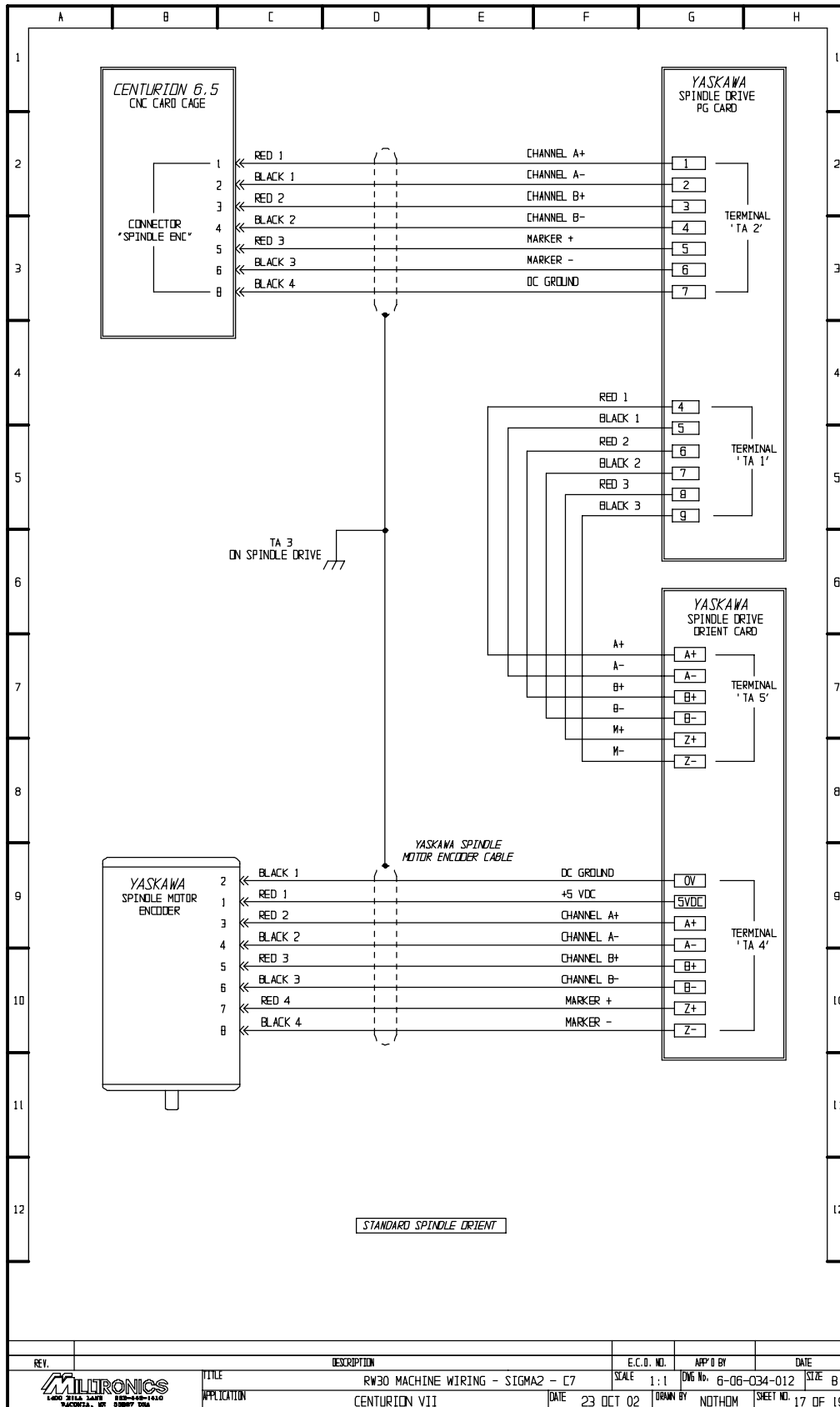


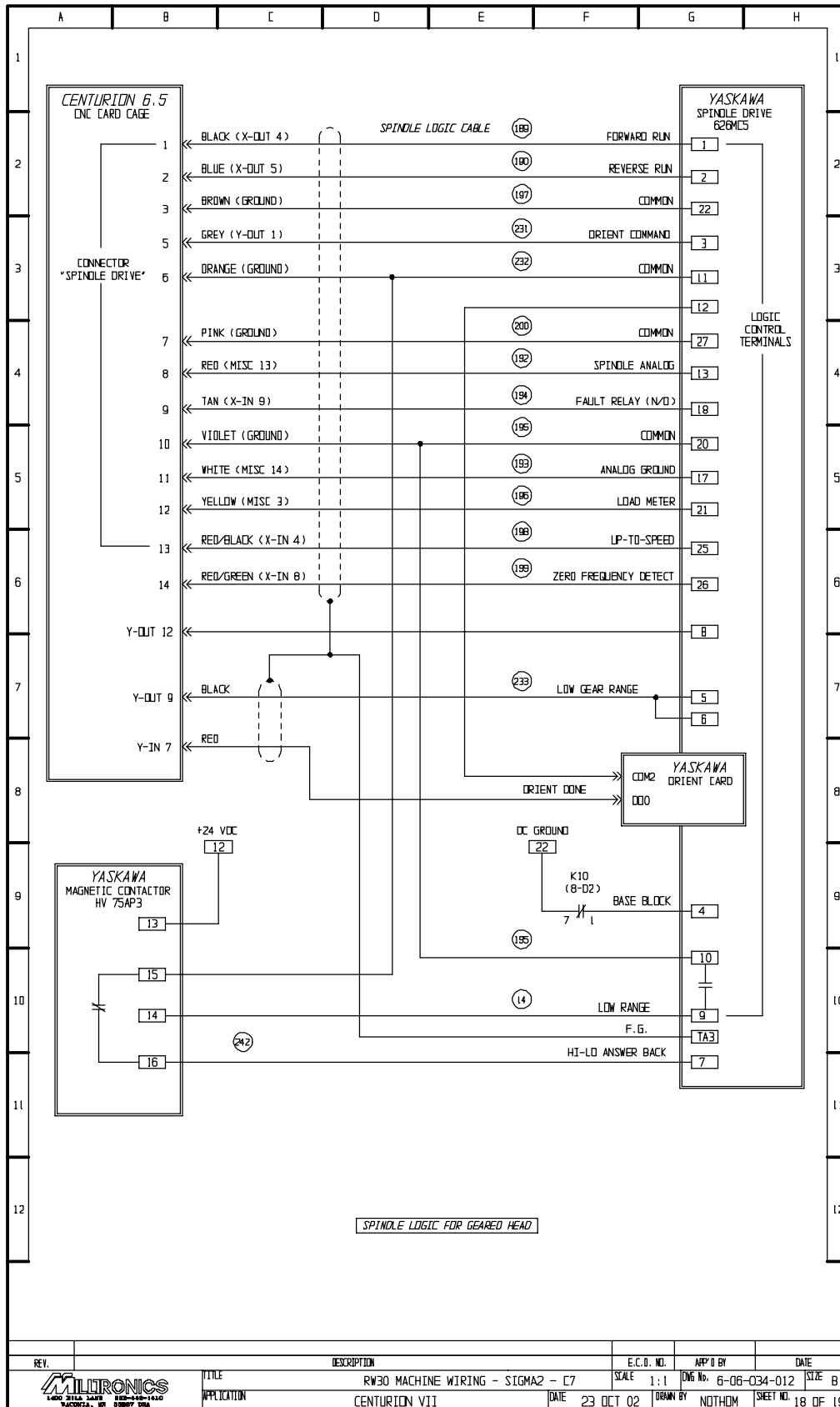


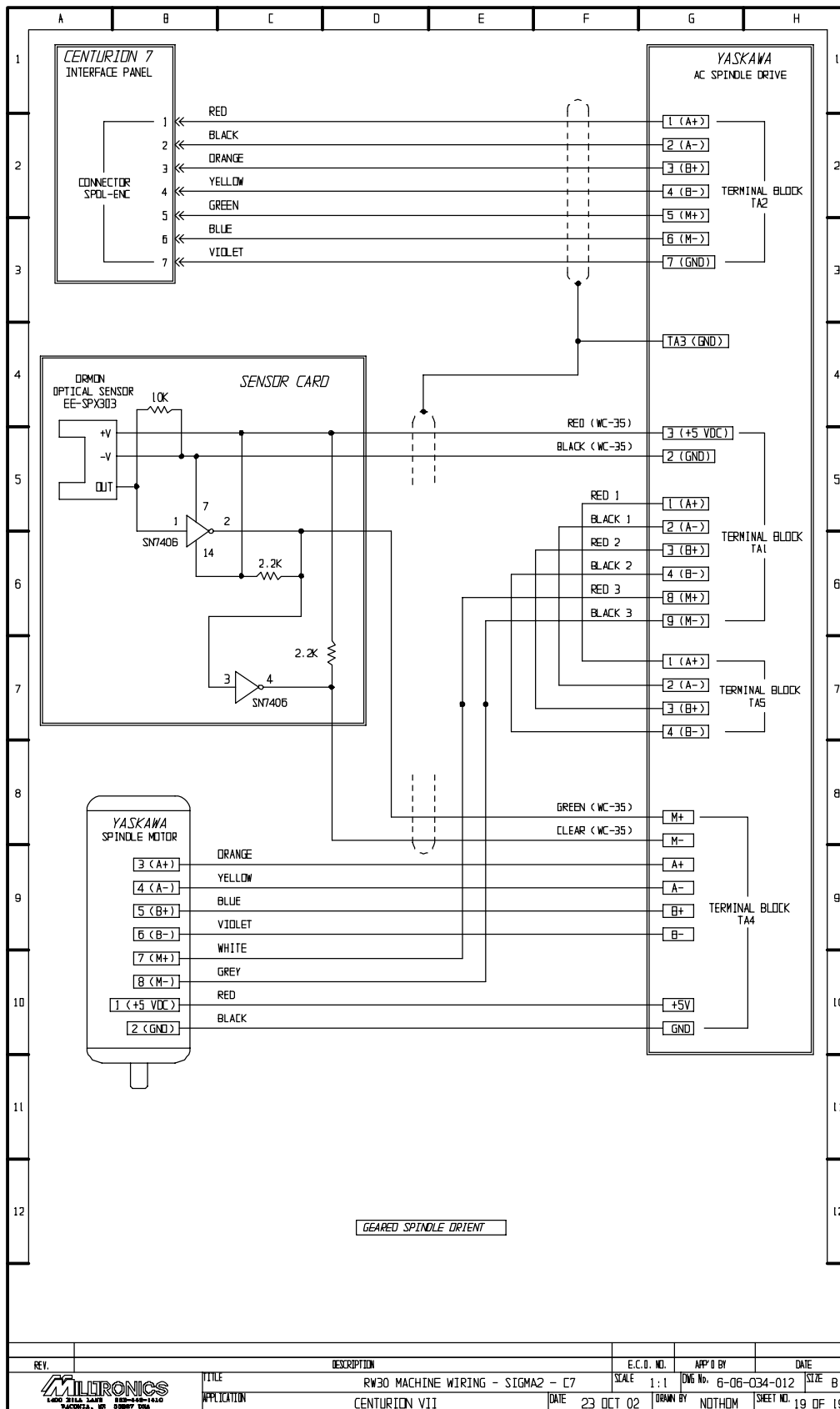




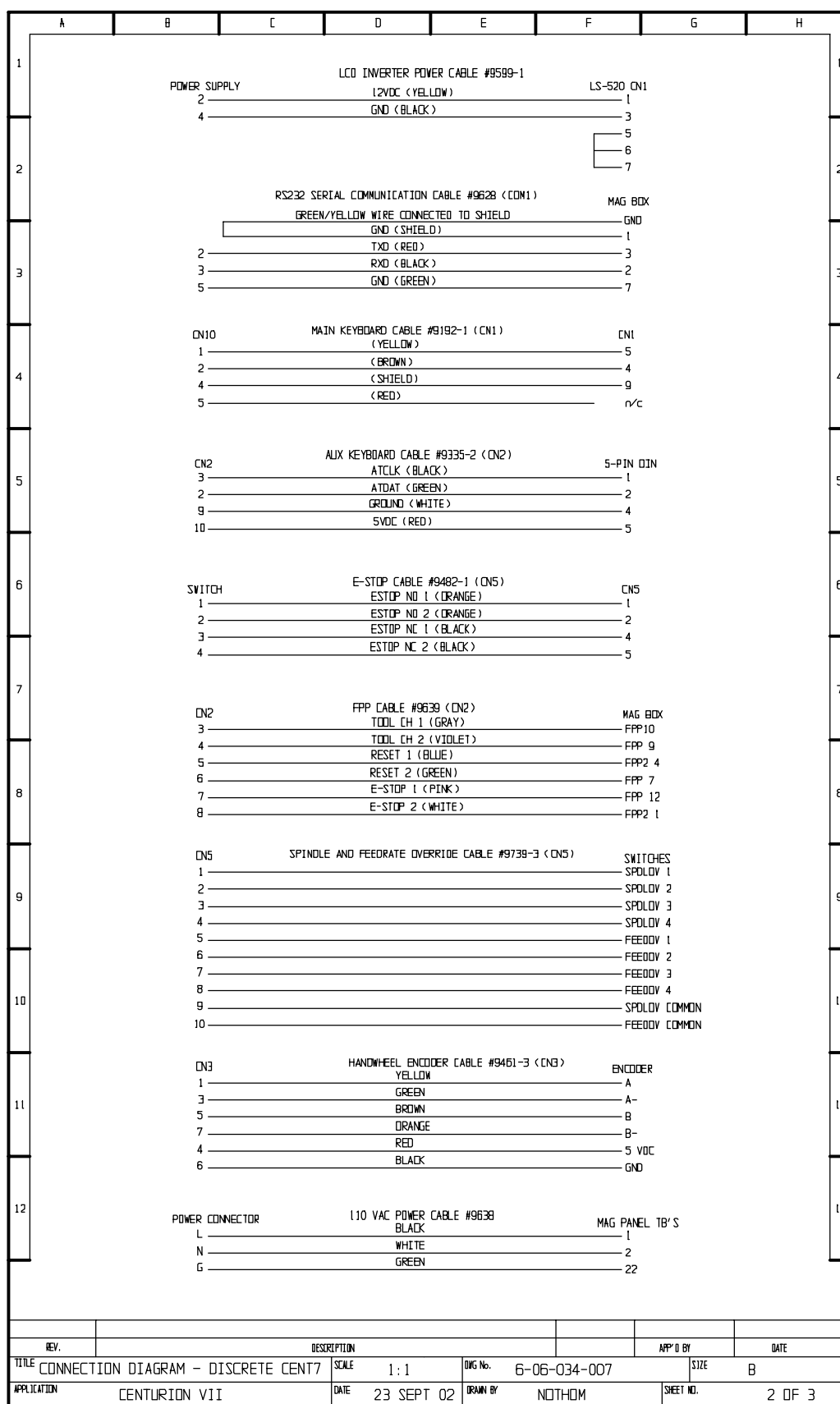


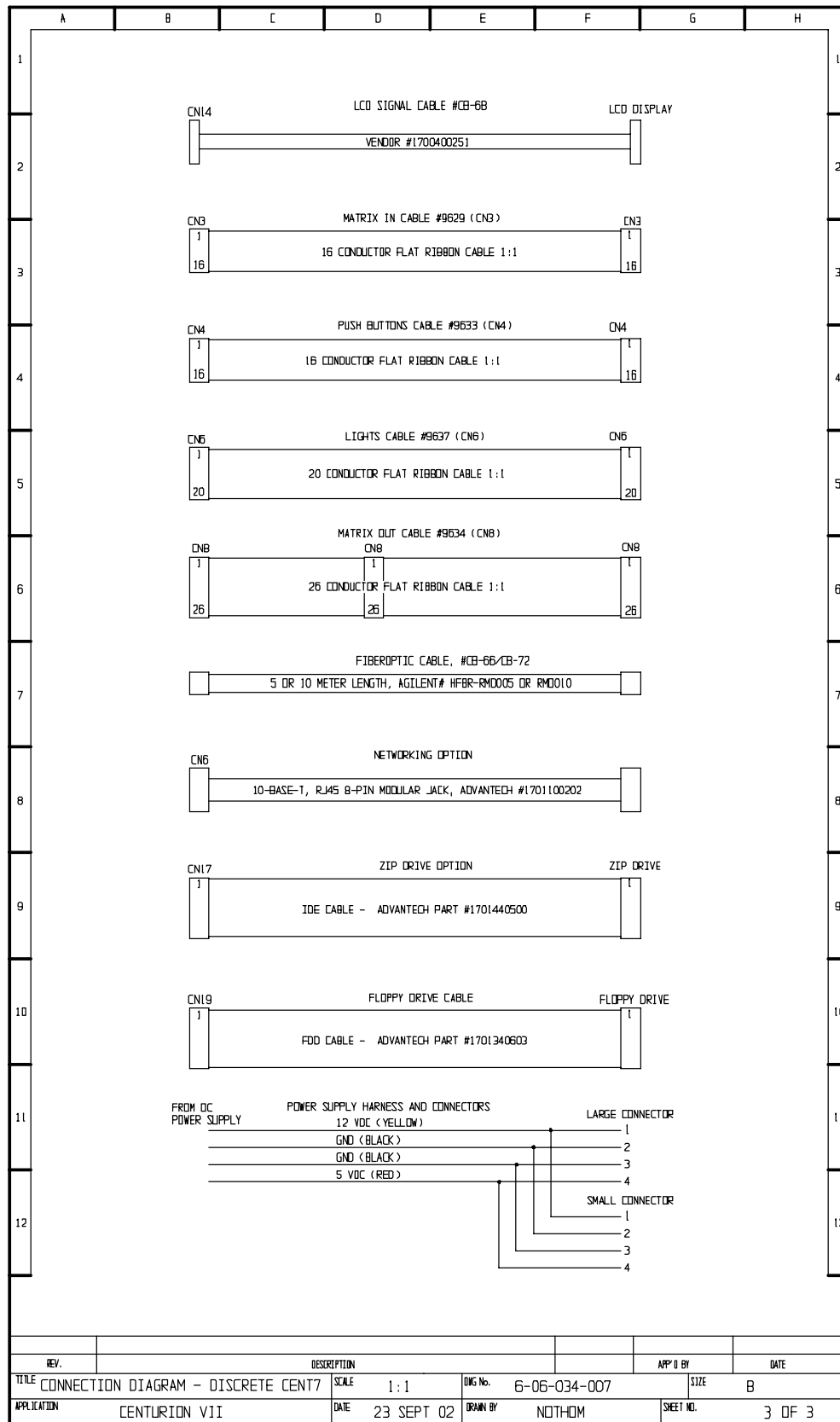




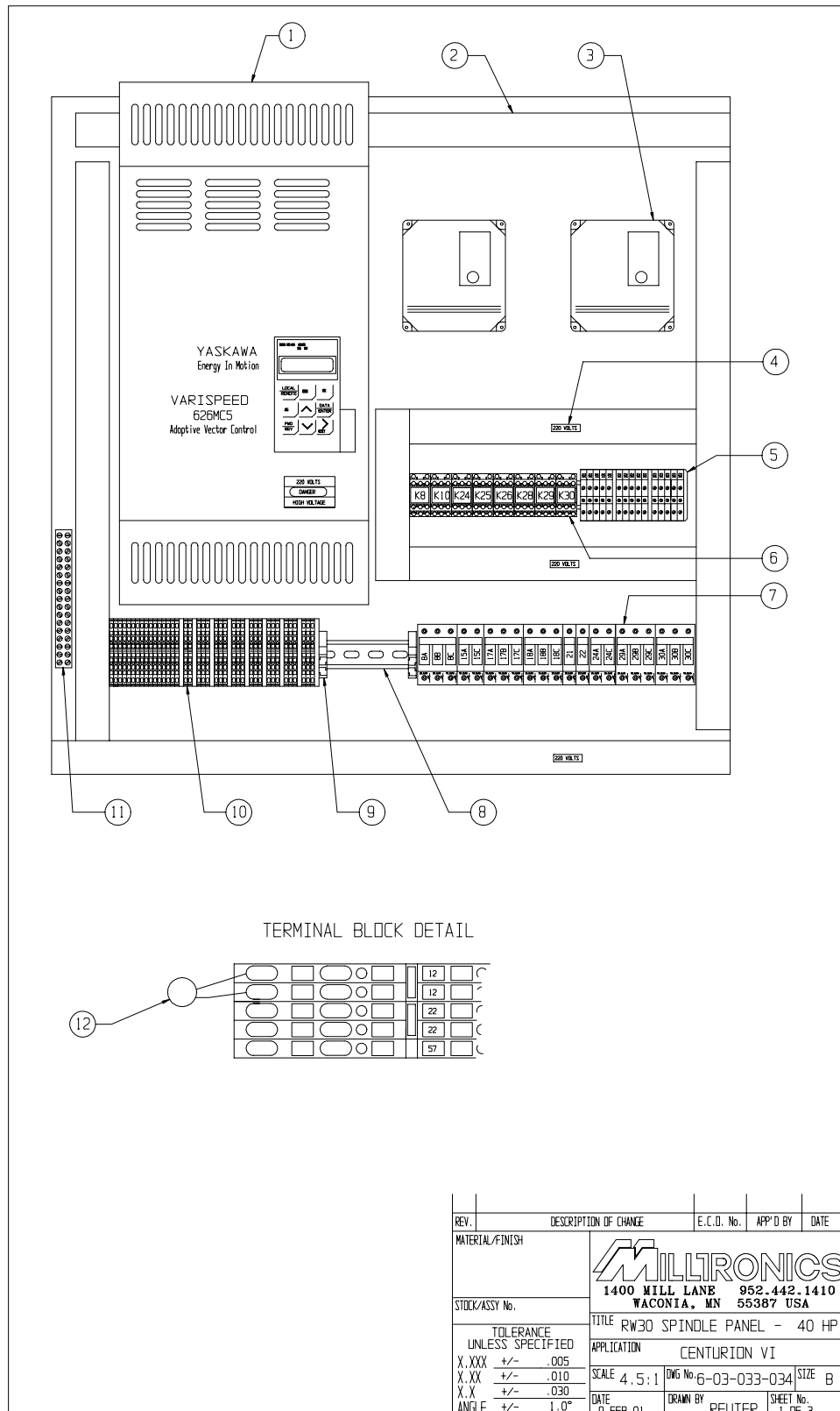


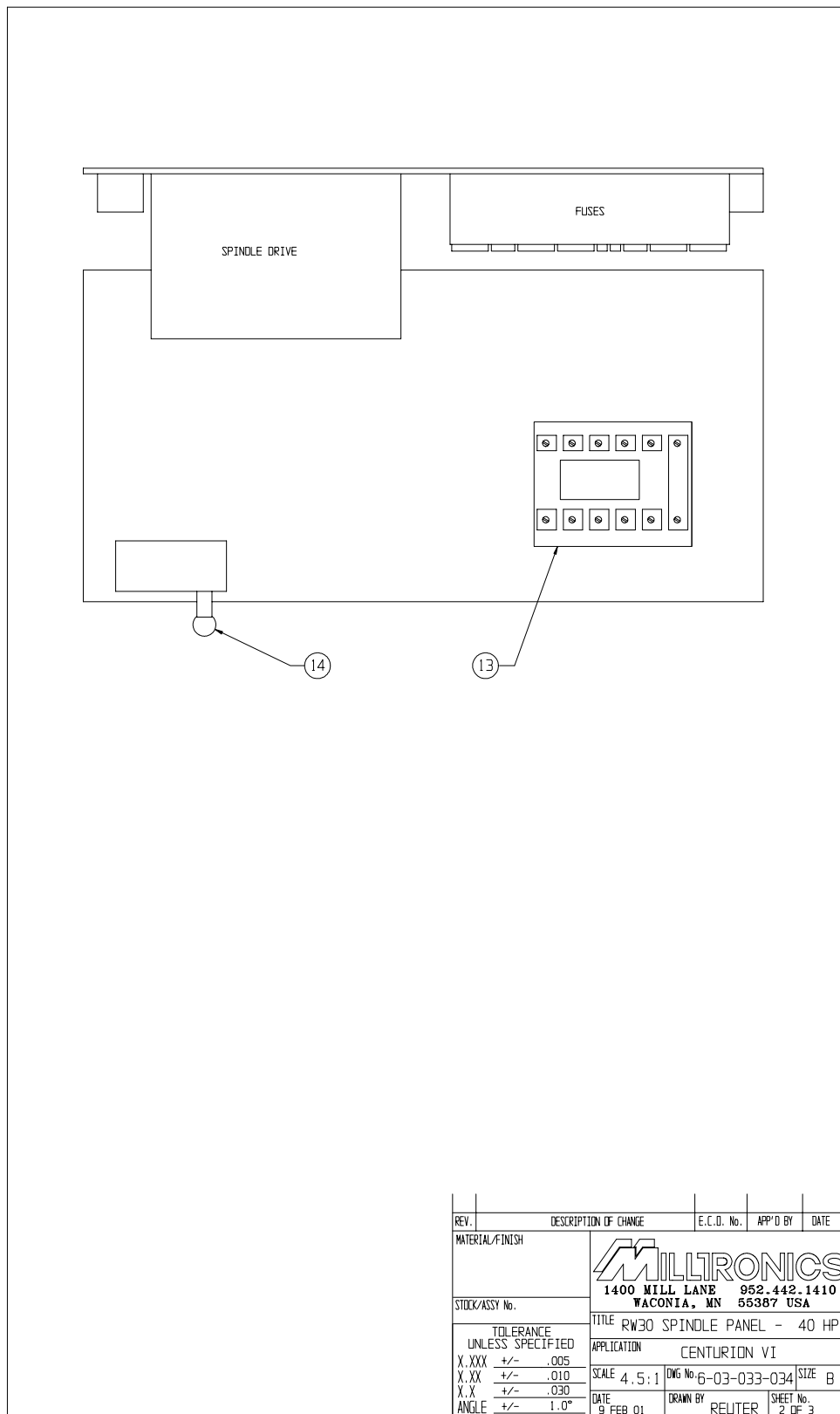






Drive Panel Layout





- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION	QTY	REMARKS
1	PS-50	AC SPINDLE DRIVE, DUAL WINDING, 22 KW YASKAWA CIMR 626MCSU2022	1	
4	WC-65	WIRE DUCT, 2 INCH	6.5 FT.	
	WC-66	WIRE DUCT COVER, 2 IN.	6.5 FT.	
3	PS-50	DYNAMIC SPINDLE BRAKING UNIT YASKAWA CDBR-2022	2	
4	LB-52	220 VOLTS LABEL	3	
5	TB-37	DISTRIBUTION TERMINAL BLOCKS	12	
6	RL-74	CONTROL RELAY, 24 VDC COIL, 3PDT 10 AMP TYCQ/SCHRACK PT370024	8	
	RL-75	RELAY SOCKET BASE, DIN RAIL TYCQ/SCHRACK PT70703	8	RELAYS: K8, K10, K24, K25, K26, K28, K29, K30
7	FU-77	IEC FUSE HOLDER, 10 x 38, SINGLE SQUARE D No. DF6-AB10	2	HOLDERS FOR FUSES 21 & 22
	FU-83	IEC FUSE HOLDER, 10 x 38, DUAL SQUARE D No. GK10D	2	HOLDERS FOR FUSES 15A/C & 24A/C
	FU-82	IEC FUSE HOLDER, 10 x 38, TRIPLE SQUARE D No. GK10F	5	HOLDER FOR FUSES 11A & 11C
	FU-72	CERAMIC FUSE, 1/2 AMP, DF No. 44000.5 CLASS AM BUSS EQUIVALENT: FNG-1/2	2	FUSES 24A & 24C
	FU-73	CERAMIC FUSE, 1 AMP, DF No. 420001 CLASS g/G BUSS EQUIVALENT: FNG-1	2	FUSES 15A & 15C
	FU-86	CERAMIC FUSE, 4 AMP, DF No. 420004 CLASS g/G BUSS EQUIVALENT: FNG-4	3	FUSES 17A, 17B & 17C
	FU-87	CERAMIC FUSE, 6 AMP, DF No. 440006 CLASS AM BUSS EQUIVALENT: FNG-6	5	FUSES 21, 22, 30A, 30B & 30C
	FU-	CERAMIC FUSE, 10 AMP, DF No. 440010 CLASS AM BUSS EQUIVALENT: FNG-10	3	FUSES 29A, 29B & 29C
8	WX-167	DIN RAIL, 35 x 7.5 mm	1	
9	TB-35	DIN RAIL ANCHOR BLOCK	2	
	TB-30	TERMINAL BLOCK, 4-POSN., TOP ENTRY	39	
	TB-32	TERMINAL BLOCK JUMPER, 10 POSN.	1	
	TB-33	TERMINAL BLOCK LABEL TAB, SHEET OF 100	39	
	TB-31	TERMINAL BLOCK END PIECE/DIVIDER	9	
11	BU-04	GROUNDING BUS BAR	1	
12	CA-16	CAPACITOR, CERAMIC DISC, .01 uF	2	ALSO ON CARD CAGE
13	RL-77	SPINDLE SPEED RANGE MAGNETIC CONTACTOR YASKAWA HV-150AP	1	ON FLOOR OF MAG BOX
14	SW-	LIMIT SWITCH, ROLLER ACTUATED	1	MAIN POWER SAFETY LOCKOUT

-TERMINAL BLOCK DIRECTORY-

- 1. - 110 VAC LINE (JUMPED x3)
- 2. - 110 VAC RETURN (JUMPED x2)
- 12. - +24 VDC (JUMPED x2)
- 20. - +24 VDC GROUND (JUMPED x2)
- 22. - DC GROUND (JUMPED x2)
- 57. - 110 VAC SWITCHED (JUMPED x2)
- 78. - LUBE FAULT
- 91. - +24 VDC SWITCHED/WATCHDOG
- <DIVIDER>
- 4. - AXIS WAYS OILER
- 5. - AXIS WAYS OILER
- <DIVIDER>
- 116. - WIRING AUGER CHIP , L1
- 117. - WIRING AUGER CHIP , L2
- 118. - WIRING AUGER CHIP , L3
- <DIVIDER>
- 121. - FLOOD PUMP , L1
- 122. - FLOOD PUMP , L2
- 123. - FLOOD PUMP , L3
- <DIVIDER>
- 213. - CHIP CONVEYOUR, L1
- 214. - CHIP CONVEYOUR, L2
- 215. - CHIP CONVEYOUR, L3
- <DIVIDER>
- 244. - ATC CW
- 245. - ATC COMMON
- 246. - ATC CCW
- <DIVIDER>
- 258. - CHIP WASHDOWN, L1
- 259. - CHIP FLUSH , L2
- 260. - CHIP FLUSH , L3
- <DIVIDER>
- 267. - ATC HYDRAULIC PUMP , L1
- 268. - ATC HYDRAULIC PUMP , L2
- 269. - ATC HYDRAULIC PUMP , L3
- <DIVIDER>
- 270. - SPINDLE CHILLER PUMP , L1
- 271. - SPINDLE CHILLER PUMP , L2
- 272. - SPINDLE CHILLER PUMP , L3

-FUSE DURECTORY-

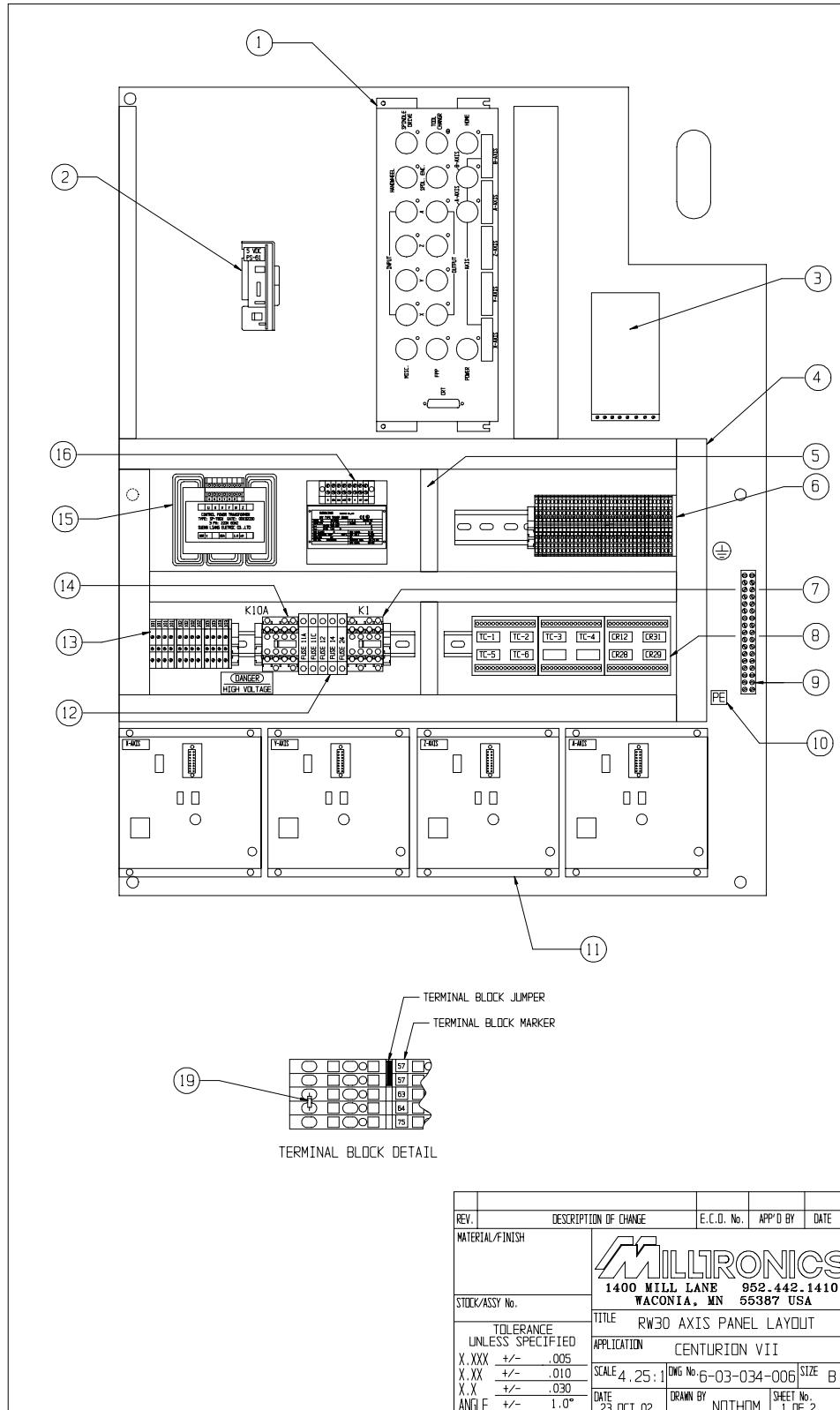
- FUSES 8A,8B,8C FLOOD PUMP (2 AMP)
- FUSES 15A,15C AXIS WAYS OILER (1 AMP)
- FUSES 17A,17B&17C CHIP FLUSH (4 AMP)
- FUSES 18A,18B&18C CHIP CONVEYOUR (2 AMP)
- FUSES 21&22 ATC MOTOR (6 AMP)
- FUSES 24A &24C SPINDLE MOTOR FAN (1/2 AMP)
- FUSES 29A,29B&29C ATC HYDRAULIC PUMP (10 AMP)
- FUSES 30A,30B&30C SPINDLE OILER CHILLER PUMP (6 AMP)

-RELAY & CONTACTOR DIRECTORY-

- K8 FLOOD COOLANT
- K10 SPINDLE ENABLE
- K24 AUGER REVERSE
- K25 AUGER FORWARD
- K26 CHIP FLUSH PUMP
- K28 ATC HYDRAULIC MOTOR
- K30 SPINDLE CHILLER PUMP

REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TITLE		RW30 SPINDLE PANEL - 40 HP		
APPLICATION		CENTURION VI		
TOLERANCE UNLESS SPECIFIED		SCALE	DWG No.	SIZE
X .XXX	+/- .005	1 : 1	6-03-033-034	B
X .XX	+/- .010			
X .X	+/- .030			
ANGLE	+/- 1.0°	DATE	DRAWN BY	SHEET No.
		9 FEB 01	REUTER	3 OF 3

Logic Panel Layout



- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION	QTY	REMARKS
1	7535-2	CENTURION 7 INTERFACE PANEL ASSEMBLY	1	
2	PS-61	REGULATED POWER SUPPLY, 5VDC @ 3 AMPS	1	
3	PS-52	SWITCHING POWER SUPPLY, +24 VDC, 150 WATT	1	
4	WC-104	WIRE DUCT, 1 INCH	6.5 FT.	
	WC-105	WIRE DUCT COVER, 1 IN.	6.5 FT.	
5	WC-67	WIRE DUCT, 1-1/2 INCH	26 IN.	
	WC-68	WIRE DUCT COVER, 1-1/2 INCH	26 IN.	
6	TB-30	TERMINAL BLOCK, 4-POSN., TOP ENTRY	37	
	TB-32	TERMINAL BLOCK JUMPER, 10 POSN.	2	
	TB-33	TERMINAL BLOCK LABEL TAB, SHEET OF 100	0.37	
	TB-31	TERMINAL BLOCK END PIECE/DIVIDER	1	
	TB-35	TERMINAL BLOCK DIN RAIL END STOP	4	
7	RL-68	CONTACTOR RELAY, DC COIL, 3HP SQUARE D/TELEMECANIQUE LP101210	1	
	RL-61	CONTACTOR AUXILIARY, 2-N/O, 2-N/C SQUARE D/TELEMECANIQUE LA1DN22	1	CONTACTOR K1
	RL-65	CONTACTOR NOISE SUPPRESSOR DIODE SQUARE D/TELEMECANIQUE LA4DCIU	1	
8	9107	M-FUNCTION QUAD RELAY BOARD MILLIRONICS PC-REL-02	3	DC RELAYS: TC-1, TC-2, TC-3, TC-4, TC-5, TC-6, CR12, CR28, CR29, CR31
9	BU-04	GROUNDING BUS BAR	1	
10	LB-81	ELECTRICAL SAFETY LABELS	1	
11	AM-60	AXIS DRIVE MODULE YASKAWA S6DH-50AEY220	3 or 4	
12	FU-77	IEC FUSE HOLDER, 10 x 38, SINGLE SQUARE D No. DFB-AB10	3	HOLDERS FOR FUSES 12, 14, 24
	FU-83	IEC FUSE HOLDER, 10 x 38, DUAL SQUARE D No. GK100	1	HOLDER FOR FUSES 11A & 11C
	FU-74	CERAMIC FUSE, 2 AMP, DF No. 420002 CLASS g/G BUSS EQUIVALENT: FNG-2	3	FUSES 11A, 11C, 24
	FU-75	CERAMIC FUSE, 4 AMP, DF No. 420004 CLASS g/G BUSS EQUIVALENT: FNG-4	2	FUSES 12, 14
13	TB-37	DISTRIBUTION TERMINAL BLOCKS	12	
14	RL-64	CONTACTOR RELAY DC COIL, 3HP SQUARE D/TELEMECANIQUE LP101810	1	CONTACTOR K10A
	RL-65	CONTACTOR NOISE SUPPRESSOR DIODE SQUARE D/TELEMECANIQUE LA4DCIU	1	
15	JA-19	3-PHASE LINE REACTOR, 25 AMP, 1.8-H	1	FOR NON-CE MACHINES ONLY
16	TR-46	TRANSFORMER, 0.56 VKA, 50/60Hz	1	
17	MI-10	LINE FILTER, 110 VAC, 10 AMP	1	

- TERMINAL BLOCK DIRECTORY -

TERMINAL BLOCKS LISTED LEFT TO RIGHT

<TERMINAL BLOCK END STOP>
 <TERMINAL BLOCK END PIECE>
 1. 110 VAC LINE (x3 JUMPERED)
 2. 110 VAC RETURN (x3 JUMPERED)
 6. X-AXIS LIMIT SWITCHES
 7. X & Y AXIS LIMIT SWITCHES
 8. Y & Z AXIS LIMIT SWITCHES
 9. Z LIMIT SWITCHES
 12. +24 VDC (x3 JUMPERED)
 13. SPARE M-FUNCTION, COMMON
 14. SPARE M-FUNCTION, M/C
 15. SPARE M-FUNCTION, M/O
 20. +24 VDC SWITCHED (x4 JUMPERED)
 22. DC GROUND (x7 JUMPERED)
 55. END-OF-CYCLE LAMP
 57. 110 VAC SWITCHED (x2 JUMPERED)
 63. Z-AXIS BRAKE +
 64. Z-AXIS BRAKE -
 78. AXIS LUBE FAULT
 79. CNC WAIT CHANNEL
 82. CHIP PAN OODOR SWITCH N/O
 83. SETUP BUTTON
 91. WATCHDOG-SWITCHED +24 VDC
 327. TOOL OUT REQUESTED
 <TERMINAL BLOCK END STOP>

FUSES

FUSE 11A & 11C - TRANSFORMER PRIMARY, 2 AMP
 FUSE 12 - 110 VAC, 4 AMP
 FUSE 14 - WORKLAMP TRANSFORMER, 4 AMP
 FUSE 24 - 24 VDC POWER SUPPLY, 2 AMP

- RELAY & CONTACTOR DIRECTORY -

RELAYS
 CR12. SPARE M-FUNCTION
 CR29. WATCHDOG
 CR28. RELAYS AXIS BRAKE
 CR31. END-OF-CYCLE LAMP
 TC- 1. MAGAZINE SLOW
 TC- 2. MAGAZINE C/W
 TC- 3. MAGAZINE C/W
 TC- 4. MAGAZINE P/N UNLOCK
 TC- 5. TOOL POT UP
 TC- 6. TOOL POT DOWN
 CONTACTORS
 K1. MACHINE RESET
 K10A. AXIS DRIVES ENABLE

REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.		1400 MILL LANE 952.442.1410 WACONIA, MN 55387 USA		
TOLERANCE UNLESS SPECIFIED		TITLE RW30 AXIS PANEL LAYOUT		
X.XXX +/- .005		APPLICATION CENTURION VII		
X.XX +/- .010		SCALE 1:1	QWG No. 6-03-034-006	SIZE B
X.X +/- .030		DATE 23 OCT 02	DRAWN BY NOTHOM	SHEET No. 2 OF 2
ANGLE +/- 1.0°				

MC5 Spindle Drive Parameters

for

RW-20, RW-30 Models

5-31-01 (Added geared head RW30)

Parameter	Name	MC5 2011 20/15HP	MC5 2015 30/22 HP	MC5 2015 40/30 HP	MC5 2015 40/30 HP	Unit
		6422	6422	6422	6422	
		Electronic Orient	Electronic Orient	Electronic Orient	Electronic Orient	
		19 KVA	24 KVA	37 KVA	37 KVA	
INITIALIZE CONSTANTS		Belted Head	Belted Head	Belted Head	Geared Head	
A1-01	Access Level	4	4	4	4	
A1-02	Control Method	3	3	3	3	
PROGRAM CONSTANTS						
B1-01	Reference Selection	1	1	2.5	2.5	
B1-07	LOC/REM RUN Sel	1	1	1	1	
B1-02	Operation Method	5	5	5	5	
B2-03	D/C Injection Braking	.25	.25	.25	.25	
AUTO TUNING CONSTANTS						
C1-01*	Accel Time 1	2.0	2.0	3.5	3.5	sec
C1-02*	Decel Time 1	5.0	5.0	5.5	5.5	sec
C1-03*	Accel Time 2	0.4	0.4	.5	.5	sec
C1-04*	Decel Time 2	0.4	0.4	.2	.2	sec
C1-07*	Accel Time 4	1.0	1.0	2.0	2.0	sec
C1-08*	Decel Time 4	2.0	2.0	4.5	4.5	sec
C1-11	Acc/Dec SW Freq	133.0	133.0	135.	135.	Hz
C2-01	SCrv Acc @ Start	.20	.20	.1	.1	
C2-02	SCrv Acc @ End	.20	.20	.25	.25	
C2-03	SCrv Dec @ Start	.4	.4	.4	.4	
C2-04	SCrv Dec @ End	.3	.3	.2	.2	
C5-01*	ASR P Gain	20	20	10	55	
C5-02*	ASR I Gain	.5	.5	.25	.25	
C5-03*	ASR P Gain 2	30.00	30.00	65.	65.	
C5-04*	ASR I Time 2	0.300	0.300	.25	.25	sec
C5-06	ASR Delay Time	0	0	0	0	
C6-01	Carrier Freq Max	4.0	4.0	4.0	4.0	KHz
C8-02	Special	0.10	0.10	0.10	0.10	
C8-03	Special	0.0	0.0	0.0	0.0	
C8-04	Special	5	5	5	5	%
C8-06	Special	0.0	0.0	0.0	0.0	Ms
C8-07	Special	5	5	5	5	%
C8-27	Inverse rate current	49.0	49.0	49.0	49.0	A
C8-28	DCCT Gain	1.154	1.154	1.154	1.154	
D1-09	Jog Reference	1.00	1.00	1.00	5.5	Hz
MOTOR CONSTANTS						
E1-02	Motor Selection	1	1	1	1	
E1-04*	Max Frequency	200.	200.	266.7	266.7	Hz
E1-05	Max Voltage	157.1	122.4	160	160	V
E1-06	Base Frequency	67.3	40.0	50.	50.	Hz
E1-13	Base Voltage	145.3	118.7	160.	160.	V
E2-01	Motor Rated FLA	50.	67.4	91.	91.	A

		MC5 2011	MC5 2015	MC5 2015	MC5 2015	
Parameter	Name	20/15HP	30/22 HP	40/30 HP	40/30 HP	Unit
		6422	6422	6422	6422	
E2-02	Motor Rated Slip	.83	0.62	.68	.68	Hz
E2-03	No-load Current	11.9	32.4	50.9	50.9	A
E2-04	Number of Poles	4	4	4	4	
E2-05	Term Resistance	.171	0.156	.065	.065	Oh m
E2-06	Leak Inductance	11.0	9.4	9.4	9.4	%
E2-07	Saturation Comp1	.49	0.40	.41	.41	
E2-08	Saturation Comp2	.72	0.69	0.69	0.69	
E3-01	Control Method	3	3	3	3	
E4-01	Max Frequency 2	50.0	50.0	50.0	50.0	Hz
E4-02	Max Voltage 2	112.9	115.3	139.8	139.8	VAC
E4-03	Base Frequency 2	16.7	20.0	25	25	Hz
E5-01	Motor Rated FLA2	58	64.7	88.5	45	A
E5-02	Mot Rated Slip2	1.11	0.86	1.35	1.35	Hz
E5-03	No-load Current 2	17.9	23.5	30.8	30.8	A
E5-05	Term Resistance2	.555	0.290	.170	.170	Oh m
E5-06	Leak Inductance2	13.0	14.2	14.2	14.2	%
OPTION CONSTANTS						
F1-01	FG Constant	1024	1024	1024	1024	
F1-02	PG Fdbk Loss Sel	1	1	1	1	
F1-03	PG Overspeed Sel	1	1	1	1	
F1-04	PG Deviation Sel	3	3	3	3	
F1-05	PG Rotation Sel	1	1	1	1	
F1-06	PG Output Ratio	1	1	1	1	
F1-08	PG Overspd Level	150%	150%	115%	115%	
F1-11	PG Deviate Time	.5	.5	.5	.5	
F1-14	PGO Time	2	2	2	2	
F4-03	A0 Ch2 Select	5	5	5	5	
INPUTS						
H1-01	Terminal 3 Sel	2	2	2	2	
H1-02	Terminal 4 Sel	8	8	8	8	
H1-03	Terminal 5 Sel	80	80	80	80	
H1-04	Terminal 6 Sel	77	77	77	7	
H1-05	Terminal 7 Sel	82	82	82	82	
H1-06	Terminal 8 Sel	7	7	7	6	
OUTPUTS						
H2-01	Terminal 9 and10 Sel	1C	1C	1C	1C	
H2-02	Terminal 25 Sel	13	13	13	13	
H2-03	Terminal 26 Sel	1	1	1	1	
H3-01	Terminal 13 Sel	0	0	0	0	
H3-02	Terminal 13 Sel	100%	100%	100%	100%	
H3-05	Terminal 16 Sel	0	0	0	0	
H4-01	Terminal 21 Sel	3	3	3	3	
RS 232						
H5-01	Serial Comm Adr	1F	1F	1F	1F	
H5-02	Serial Comm Sel	3	3	3	3	
H5-03	Serial Corn Sel	0	0	0	0	
H5-04	Serial Fault Sel	3	3	3	3	
H5-05	Serial Flt Dtct	1	1	1	1	

		MC5 2011	MC5 2015	MC5 2015	MC5 2015	
Parameter	Name	20/15HP	30/22 HP	40/30 HP	40/30 HP	Unit
		6422	6422	6422	6422	
L1-01	Motor Protect OFF	0	0	0	0	
L3-04	Stall P Decel Sel	0	0	0	0	
L8-05	Ph Loss In Sel	0	0	0	0	
L8-07	Ph Loss Out Sel	1	1	1	1	
WINDING CHANGE CONSTANTS						
P1-02	Frequency Width	6.0	6.0	6.0	6.0	Hz
P1-03	Ansback Det Time	0.50	0.50	0.50	0.50	Sec
P1-04	Wye Winding Sel	1	1	1	1	
P1-05	CASE Param 5	.01	.01	.01	.01	
ELECTRONIC ORIENT CONSTANTS						
P3-01**	Orient Position	0 to 4095	0 to 4095	0 to 4095	0 to 4095	
P3-02	Position Gain H	20	20	20	20	
P3-05	Ore Set Pulse	10	10	10	10	
P3-06	Ore Reset Pulse	10	10	10	10	
P3-07*	Orient Speed	150	150	150	150	
P3-08	Gear Ratio	1	1	1	1	
P3-11	Gear Direction	0	0	0	0	
P3-12	Dither Level	0	0	0	0	

***Parameters will vary depending on RPM option of machine**

**** Orient Position will vary on every machine.**

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 from Yaskawa.

Consult Milltronics Manufacturing for current parameters.

Sigma 2 Axis Drive Parameters For RW Series

The following table lists the axis drive parameters changed by Milltronics. All other parameters remain set to the Yaskawa factory default settings. RW20 not implemented as of this date.

P#	RW30		
	X	Y	Z
000	0000H	0000H	0001H
100	96	90	93
101	285	285	327
201	1181	1181	1476
300	433	436	543
401	30	32	44
408	0101H	0101H	0100H
409	330	350	2000
40A	170	160	70
40B	700	700	2000
40C	150	150	70

Centurion 7 CNC Connector Signal Listing

Input Plugs

Connector X-Input

Pin 1 - Machine emergency stopped	Pin 8 - Spindle zero speed
Pin 2 - Spare	Pin 9 - Spindle drive fault
Pin 3 - Spare	Pin 10 - Spool Reverse
Pin 4 - Spindle up-to-speed	Pin 11 - Digitizing probe signal
Pin 5 - Tool Change	Pin 12 - Key (jumped to Home-1 and X-axis10)
Pin 6 - Lube Fault (oiler empty)	Pin 13 - No connect
Pin 7 - CNC wait channel	Pin 14 - No connect

Connector Y-Input

Pin 1 - Air pressure	Pin 8 - Tool out switch pushed – (requested)
Pin 2 - Tool carousel at home (jumped to TCH-8)	Pin 9 - Chip pan door is open (feedhold)
Pin 3 - Tool carousel at pocket (jumped to TCH-9)	Pin 10 - Set-up button
Pin 4 - Tool changer arm is in (jumped to TCH-10)	Pin 11 - Edit switch (keylock)
Pin 5 - Tool changer arm is out (jumped to TCH-11)	Pin 12 - Key (jumped to Home-3)
Pin 6 - Spare Y-axis 10)	Pin 13 - No connect
Pin 7 - Orient roller is in - prox signal (jumped to TCH-12)	Pin 14 - No connect

Connector Z-input

Pin 1 - Remote HW Enable	Pin 8 - Tool Setting
Pin 2 - Remote FOV1	Pin 9 - High/Low Gear
Pin 3 - Remote FOV2	Pin 10 - Arm Parked
Pin 4 - OverTemp	Pin 11 - Auger Switch
Pin 5 - Top (on arm tool changer)	Pin 12 - Key (jumped to home 5 and Z-axis 10)
Pin 6 - Middle (on arm tool changer)	Pin 13 - No connect
Pin 7 - Bottom (on arm tool changer)	Pin 14 - No connect

Connector A-Input

Pin 1 - X-axis drive OK/Fault (jumped through JS3 to X-axis 9)	Pin 8 - Remote HW Coord 1
Pin 2 - Y-axis drive OK/Fault (jumped through JS3 to Y-axis 9)	Pin 9 - Remote HW Coord 2
Pin 3 - Z-axis drive OK/Fault (jumped through JS3 to Z-axis 9)	Pin 10 - Remote HW Coord 3
Pin 4 - A-axis drive OK/Fault(jumped through JS3 to A-axis 9)	Pin 11 - Remote HW set Coord
Pin 5 - B-axis drive OK/Fault (jumped through JS3 to B-axis 9)	Pin 12 - Key (jumped to home 7 and A-axis 10)
Pin 6 - Remote HW Axis 1	Pin 13 - No connect
Pin 7 - Remote HW Axis 2	Pin 14 - No connect

Output Plugs

Connector X-Output

Pin 1 - Excess Error	Pin 8 - Tool change
Pin 2 - Spray mist coolant	Pin 9 - Allow Reset
Pin 3 - Flood coolant	Pin 10 - Delayed reset
Pin 4 - Spindle clockwise	Pin 11 - Spindle latch
Pin 5 - Spindle counter clockwise	Pin 12 - Rotary clamp
Pin 6 - Spindle drive OK	Pin 13 - Key
Pin 7 - Drawbar Enable (VK5 & MB-Auto only)	Pin 14 - No connect

Connector Y-Output

Pin 1 - Creep speed	Pin 8 - Blowoff/Drumdoor/FeedHold (jumped to TCH-Yin9)
Pin 2 - Tool changer arm in/ pot down (jumped to TCH-1)	Pin 9 - Gear 1 of 4 Gear
Pin 3 - Power drawbar (jumped to TCH-2)	Pin 10 - Low range - Gear 2 of 4
Pin 4 - Tool carousel clockwise (jumped to TCH-3)	Pin 11 - Medium range – Gear 3 of 4
Pin 5 - Tool carousel counter clockwise (jumped to TCH-4)	Pin 12 - High range - Gear 4 of 4
Pin 6 - Spindle enable	Pin 13 - Key

Centurion 7 CNC Connector Signal Listing

Pin 7 - Orient roller (jumped to TCH-5)

Pin 14 - No connect

Connector Z-Output

Pin 1 - MC1G / Optical Probe On

Pin 8 - Miscellaneous M-code No. 2

Pin 2 - MC1D / Hard Tap

Pin 9 - Miscellaneous M-code No. 3

Pin 3 - MC1C / Auger for Chip removal
M38/M39

Pin 10 - Miscellaneous M-code No. 4

Pin 4 - MC1B

Pin 11 - Miscellaneous M-code No. 5

Pin 5 - MC1A

Pin 12 - Spindle reverse

Pin 6 - Miscellaneous M-code No. 1

Pin 13 - Key

Pin 7 - End-of-cycle lamp

Pin 14 - No connect

Connector A-Output

Pin 1 - X-Axis drive enable (jumped through JS3 to X-axis 13)

Pin 8 - Spare

Pin 2 - Y-Axis drive enable (jumped through JS3 to Y-axis 13)

Pin 9 - Spare

Pin 3 - Z-Axis drive enable (jumped through JS3 to Z-axis 13)

Pin 10 - Spindle Running

Pin 4 - A-Axis drive enable (jumped through JS3 to A-axis 13)

Pin 11 - Door Open

Pin 5 - B-Axis drive enable (jumped through JS3 to B-axis 13)

Pin 12 - Door Close

Pin 6 - Axis drives enable

Pin 13 - Key connect

Pin 7 - Arm (on Swing-Arm TlChngr)

Pin 14 - No

Connectors X, Y, Z, A and B Axis

Pin 1 - 0 VDC

Pin 20 - Marker -

Pin 34 - Channel A -

Pin 2 - 0 VDC

Pin 29 - Servo ready

Pin 35 - Channel B +

Pin 5 - Axis analog signal

Pin 30 - 0 VDC

Pin 36 - Channel B -

Pin 6 - 0 VDC

Pin 31 - Alarm output

Pin 40 - Servo ON

Pin 10 - 0 VDC

Pin 32 - 0 VDC

Pin 47 - +24 VDC

Pin 19 - Marker +

Pin 33 - Channel A +

All other pins are no connect

Axis Home Connector

Pin 1 - X-axis home switch signal (jumped to X-axis 10 & X-input 12)

Pin 8 - A-axis home switch ground

Pin 2 - X-axis home switch ground

Pin 9 - B-axis home switch signal (jumped to B-axis 10 & A-input 11)

Pin 3 - Y-axis home switch signal (jumped to Y-axis 10 & Y-input 12)

Pin 10 - B-axis home switch ground

Pin 4 - Y-axis home switch ground

Pin 11 - Key

Pin 5 - Z-axis home switch signal (jumped to Z-axis 10 & Z-input 12)

Pin 12 - No connect

Pin 6 - Z-axis home switch ground

Pin 13 - No connect

Pin 7 - A-axis home switch signal (jumped to A-axis 10 & A-input 12)

Pin 14 - No connect

Spindle Drive Connector

Pin 1 - Forward Run (jumped to X-out 4)

Pin 8 - Spindle analog signal (jumped to Misc-13)

Pin 2 - Reverse Run (jumped to X-out 5)

Pin 9 - Spindle fault contacts (jumped to X-in 9)

Pin 3 - Ground

Pin 10 - Ground

Pin 4 - Key

Pin 11 - Spindle analog signal ground (jumped to Misc-14)

Pin 5 - Creep speed (jumped to Y-out 1)

Pin 12 - Spindle load meter (jumped to Misc-3)

Pin 6 - Ground

Pin 13 - Up-to-speed (jumped to X-in 4)

Pin 7 - Ground

Pin 14 - Zero speed (jumped to X-in 8)

Spindle Encoder Connector

Pin 1 - Channel A +

Pin 6 - Marker +

Pin 11 - DC ground

Pin 2 - Channel A -

Pin 7 - DC ground

Pin 12 - DC ground

Pin 3 - Channel B +

Pin 8 - +5 VDC

Pin 13 - DC ground

Pin 4 - Channel B -

Pin 9 - DC ground

Pin 14 - Key

Pin 5 - Marker -

Pin 10 - No connect

Centurion 7 CNC Connector Signal Listing

Miscellaneous Connector (Misc)

Pin 1 - Machine reset - CR1C (+24 VDC)	Pin 8 - Reset 2 (jumped to FPP-8)
Pin 2 - Machine reset - K1 coil	Pin 9 - Tool change 1
Pin 3 - Load meter analog	Pin 10 - Tool change 2
Pin 4 - DC ground	Pin 11 - E-stop 1
Pin 5 - Key	Pin 12 - E-stop 2
Pin 6 - Excess error latch	Pin 13 - Spindle analog
Pin 7 - Reset 1 (jumped to FPP-7)	Pin 14 - DC ground

Front Panel Connector (FPP) and J2 on keyboard encoder card

Pin 1 - No connect	Pin 8 - Front panel reset switch (jumped to Misc-8)
Pin 2 - Front panel DC ground	Pin 9 - Front panel tool change reset switch (jumped to Misc-9)
Pin 3 - Key	Pin 10 - Front panel tool change reset switch (jumped to Misc-10)
Pin 4 - Front panel +24 VDC	Pin 11 - Front panel emergency stop switch (jumped to Misc-11)
Pin 5 - Front panel +12 VDC	Pin 12 - Front panel emergency stop switch (jumped to Misc-12)
Pin 6 - No connect	Pin 13 - No connect
Pin 7 - Front panel reset switch (jumped to Misc-7)	Pin 14 - No connect

Power Connector

Pin 1 - +5 VDC	Pin 6 - +12 VDC	Pin 11 - DC ground
Pin 2 - +5 VDC	Pin 7 - -12 VDC	Pin 12 - DC ground
Pin 3 - +5 VDC	Pin 8 - No connect	Pin 13 - DC ground
Pin 4 - +24 VDC	Pin 9 - Key	Pin 14 - DC ground
Pin 5 - No connect	Pin 10 - DC ground	

Connector Handwheel for remote handwheel option

Pin 1 - Channel A +	Pin 6 - No connect	Pin 11 - DC ground
Pin 2 - Channel A -	Pin 7 - DC ground	Pin 12 - DC ground
Pin 3 - Channel B +	Pin 8 - +5 VDC	Pin 13 - DC ground
Pin 4 - Channel B -	Pin 9 - DC ground	Pin 14 - Key
Pin 5 - No connect	Pin 10 - No connect	

Connector Tool Changer

Pin 1 - Tool changer arm in (jumped to Y-out 2)	Pin 8 - Tool carousel at home prox (jumped to Y-in 2)
Pin 2 - Power drawbar (jumped to Y-out 3)	Pin 9 - Tool carousel at pocket (jumped to Y-in 3)
Pin 3 - Tool carousel clockwise (jumped to Y-out 4)	Pin 10 - Tool changer arm in (jumped to Y-in 4)
Pin 4 - Tool carousel counter clockwise (jumped to Y-out 5)	Pin 11 - Tool changer arm out (jumped to Y-in 5)
Pin 5 - Tool carousel orient roller cylinder (jumped to Y-out 7)	Pin 12 - Tool carousel orient prox (jumped to Y-in 7)
Pin 6 - 20 pocket tool changer door open (jumped to Y-out 8)	Pin 13 - No connect
Pin 7 - Key	Pin 14 - No connect

Connector COM1 (Card Cage)

Pin 2 -	TXD
Pin 3 -	RXD
Pin 5 -	DC ground
All other pins	no connect

Connector Floppy Disk

Standard PC floppy disk drive data port

Centurion 7 CNC Connector Signal Listing

Connectors in the CNC control box

Connector FPACC

Pin 1 - Front panel fan +24 VDC	Pin 8 - Front panel emergency stop common
Pin 2 - Front panel fan DC ground	Pin 9 - Setup switch signal
Pin 3 - Chip pan door open feedhold signal	Pin 10 - Setup switch common
Pin 4 - Chip pan door open ground	Pin 11 - Chip pan door open 110 VAC
Pin 5 - Tool out switch signal	Pin 12 - Chip pan door open 110 return
Pin 6 - Tool out switch common	Pin 13 - End-of-cycle lamp signal
Pin 7 - Front panel emergency stop signal	Pin 14 - End-of-cycle lamp common

Connector P2

Pin 1 - Front panel handwheel channel A +	Pin 6 - Serial I/O RXD
Pin 2 - Front panel handwheel channel A -	Pin 7 - Keyboard ATCLK
Pin 3 - Front panel handwheel channel B +	Pin 8 - Keyboard ATDAT
Pin 4 - Front panel handwheel channel B -	Pin 9 - DC ground
Pin 5 - Serial I/O TXD	Pin 10 - DC ground

Keyboard DIN Connector (J1)

Pin 1 - Keyboard EXCLK	Pin 4 - DC ground
Pin 2 - Keyboard EXDAT	Pin 5 - +5 VDC
Pin 3 - No connect	

Connectors in the Mag Box

Connectors ATC1 and 1-1E

Pin 1 - Tool changer carousel power – return	Pin 9 - Tool changer arm out prox
Pin 2 - Tool changer carousel power – clockwise	Pin 10 - Tool arm in/tool arm out prox
Pin 3 - Tool changer carousel power - counter clockwise	DC ground
Pin 4 - Home/at pocket prox DC ground	Pin 11 - Key
Pin 5 - Home/at pocket prox +24 VDC	Pin 12 - Tool changer arm in/out signal
Pin 6 - Tool carousel home prox	Pin 13 - 20 pocket tool changer door open signal
Pin 7 - Tool carousel at pocket prox	Pin 14 - Tool changer arm & door solenoids common
Pin 8 - Tool changer arm in prox	

Connector ATC2

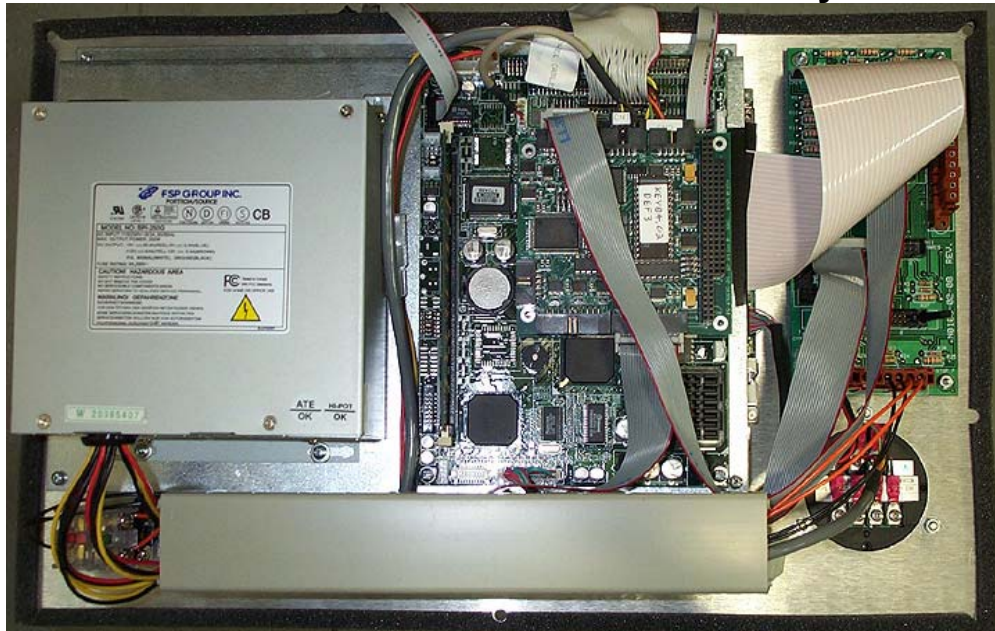
Pin 1 - Spindle orient solenoid signal	Pin 8 - Spindle orient prox chassis ground
Pin 2 - Power drawbar solenoid signal	Pin 9 - Drawbar solenoid chassis ground
Pin 3 - Spray mist air solenoid signal	Pin 10 - Key
Pin 4 - Spindle orient solenoid +24 VDC	Pin 11 - Spray mist solenoid chassis ground
Pin 5 - Power drawbar solenoid +24 VDC	Pin 12 - Spindle orient prox signal
Pin 6 - Tool Out switch	Pin 13 - Spindle orient prox +24 VDC
Pin 7 - Spray mist air solenoid +24 VDC	Pin 14 - Spindle orient prox DC ground

Connector on +24 VDC Regulated Power Supply

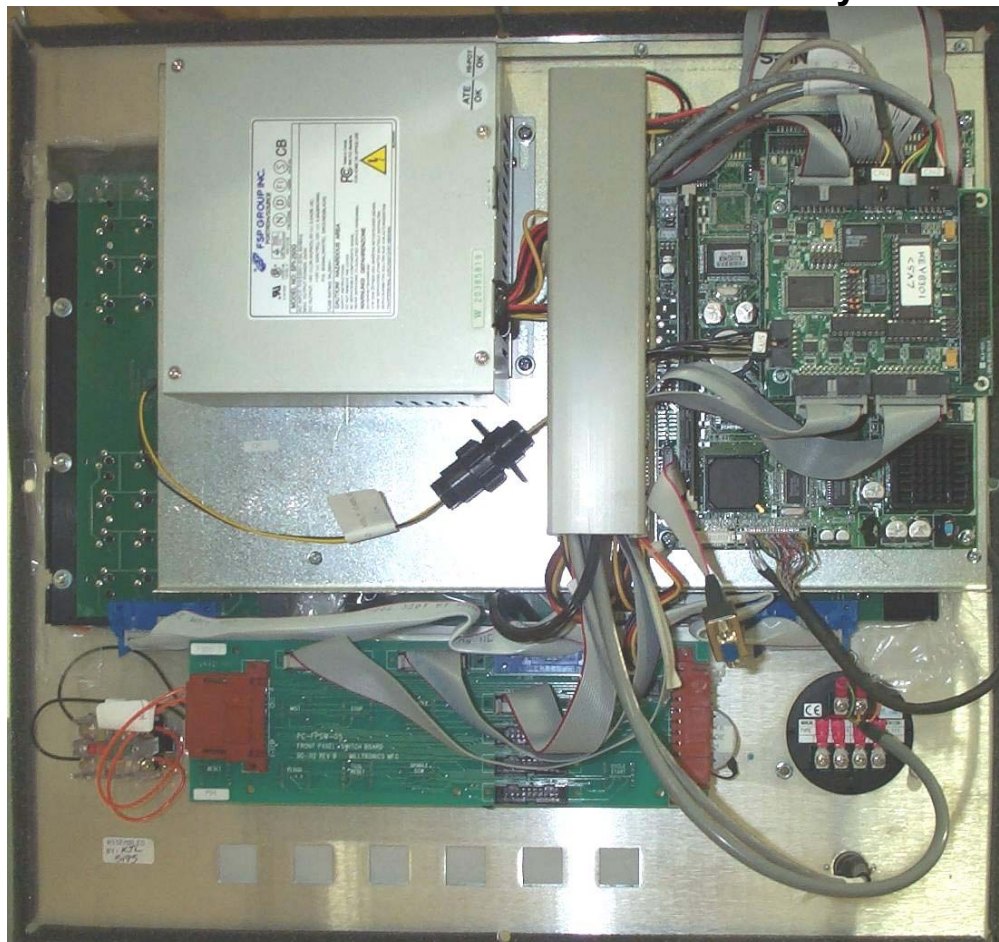
Pin 1 - 110 VAC line	Pin 8 - No connect
Pin 2 - 110 VAC return	Pin 9 - No connect
Pin 3 - No connect	Pin 10 - No connect
Pin 4 - +24 VDC	Pin 11 - DC ground
Pin 5 - +24 VDC	Pin 12 - DC ground
Pin 6 - Key	Pin 13 - DC ground
Pin 7 - No connect	Pin 14 - DC ground

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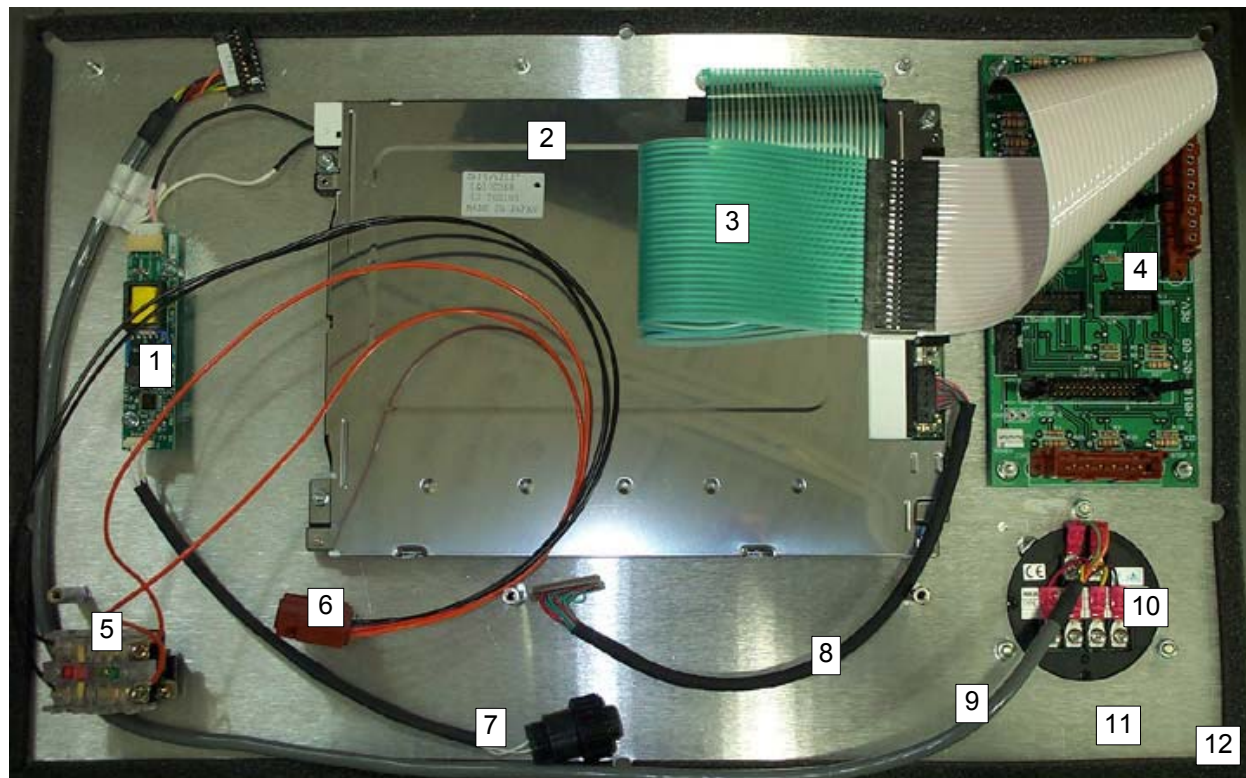
Centurion 7 Tactile Control Assembly



Centurion 7 Discrete Control Assembly

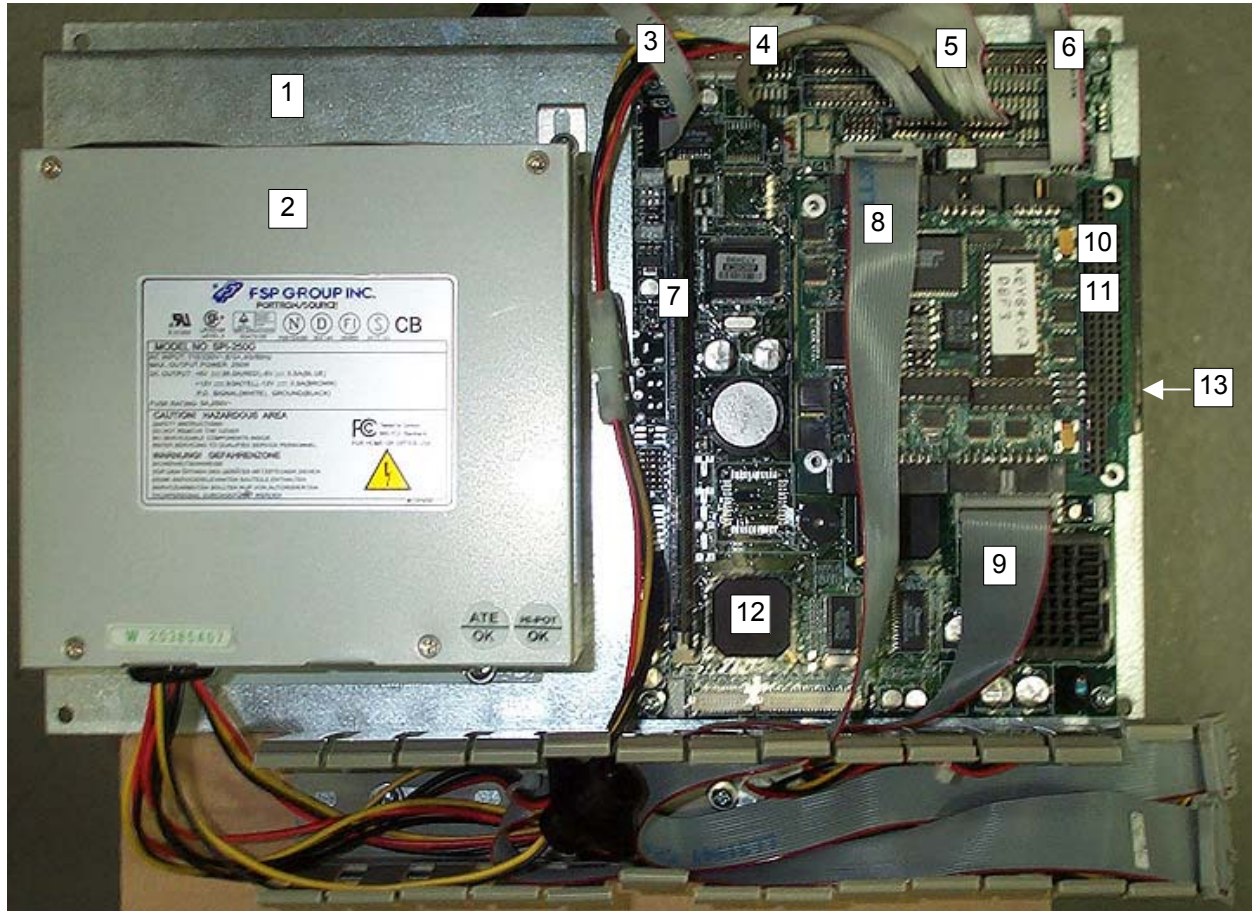


Centurion 7 Tactile Control Front Panel Assembly



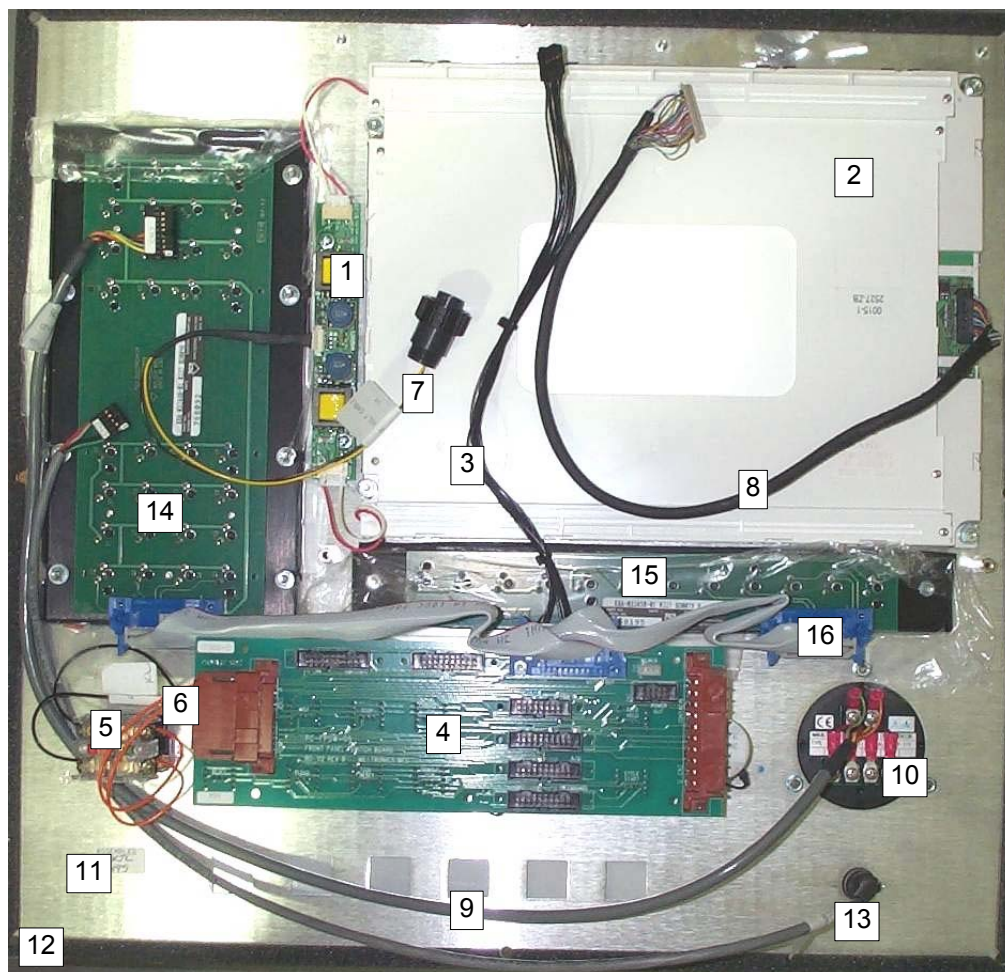
Item	Part #	Assembly # 5193 Parts List	Qty	Remarks
1	PS-62	LS-320 Backlight Inverter	1	
2	MI-48	10" LCD Display, Sharp LQI0D368	1	
3	FP-100	Membrane Front Panel Overlay	1	
4	BD-126	LED Board For Centurion 7 Membrane Panel	1	
5	SW-162	Twist To Release E-Stop Button	1	
	SW-39	V-40 Contact Block, N/C	1	
	SW-40	V-50 Contact Block, N/O	1	
6	9482-2	E-Stop Cable, CN5	1	
7	9599-2	LCD Power Cable	1	
8	CB-69	LDC Signal Cable	1	
9	9461-3	Handwheel Cable	1	
10	EO-34	Handwheel Encoder	1	
11	FP-99	Front Panel Metalwork	1	
12	FP-77	Front Panel Gasket	1	

Centurion 7 Tactile Control Power Supply Panel Assembly



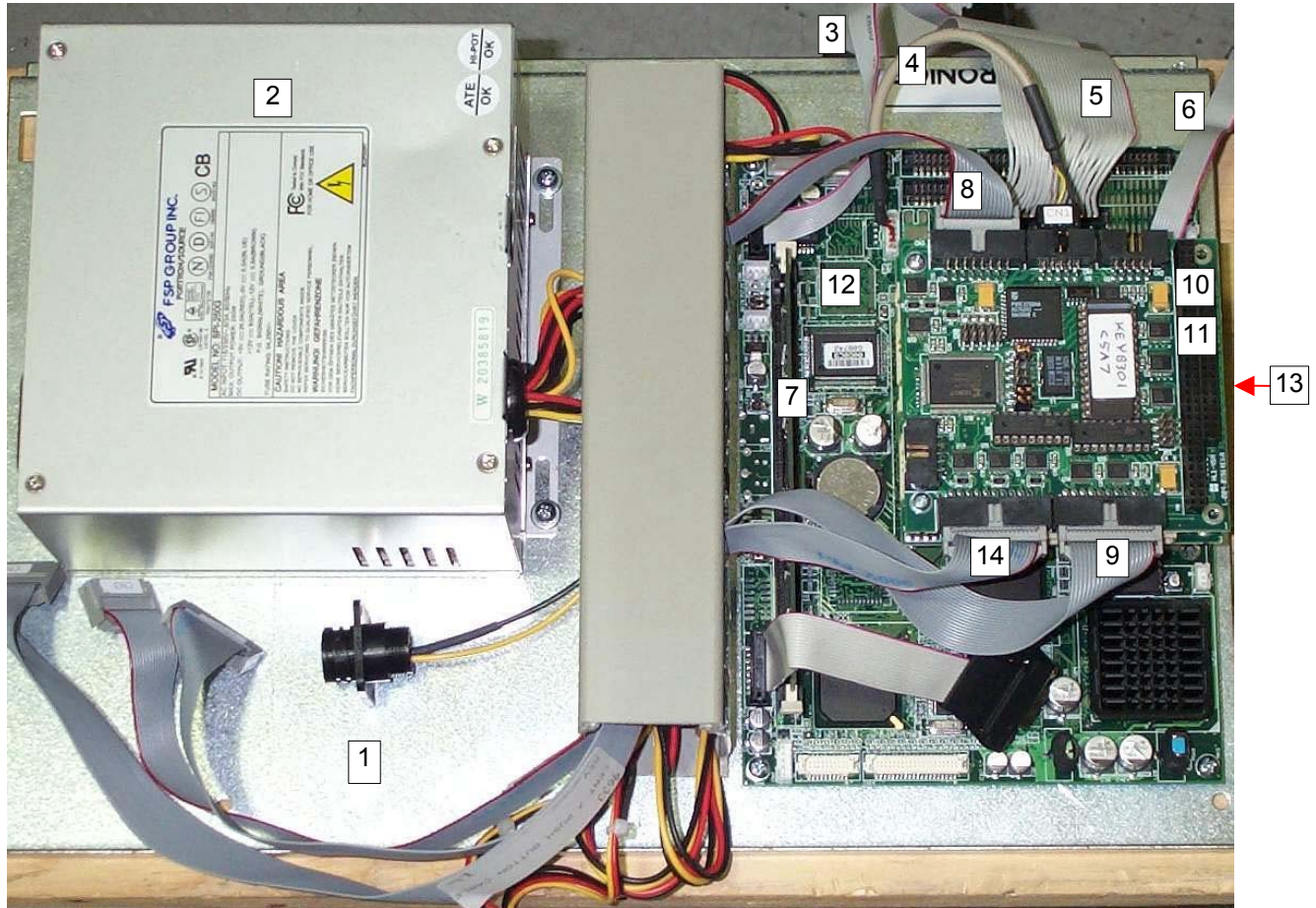
Item	Part #	Assembly # 5194 Parts List	Qty	Remarks
1	PL-80	Centurion 7 Sub Panel Metalwork	1	
2	9706-1	Centurion 7 Power Supply	1	
3	---	Network Adaptor Cable	1	Supplied with BD-125
4	9192-1	Centurion 7 Keyboard Cable, CN1	1	
5	---	Floppy Drive Data Cable	1	Supplied with BD-125
6	---	Com Port Cable	1	Supplied with BD-125
7	---	Ram Module	1	Supplied with BD-125
8	9629	Matrix In Cable, CN3	1	
9	9637	Lights Cable, CN6	1	
10	BD-101	Centurion 7 Keyboard Card	1	
11	BD-100	Centurion 7 NCB II Motion Control Card	1	
12	BD-125	Centurion 7 Motherboard	1	See 3, 5, 6, 7
13	IC-192	8 MB Disk On Chip, IC-??? ? MB Optional	1	Not visible

Centurion 7 Discrete Control Front Panel Assembly



Item	Part #	Assemblies # 5195,5197,5198 Parts List	Qty	Remarks
1	PS-44	LS-520 Backlight Inverter	1	
2	MI-46	12" LCD Display, Sharp LQ121S1DG11	1	
3	9739-3	Override Assembly With Switches, CN5	1	Switch only = SW-14
4	7300-2	FPSW Board For Centurion 7 Discrete Panel	1	
5	SW-162	Twist To Release E-Stop Button	1	
	SW-39	V-40 Contact Block, N/C	1	
	SW-40	V-50 Contact Block, N/O	1	
6	9482-1	E-Stop Cable, CN5	1	
7	9599-1	LCD Power Cable	1	
8	CB-68	LDC Signal Cable	1	
9	9461-3	Handwheel Cable	1	
10	EO-34	Handwheel Encoder	1	
11	FP-102	Front Panel Metalwork	1	Short = FP-101
12	FP-77	Front Panel Gasket	1	Short = FP-79
13	9335-2	Aux Keyboard Cable, CN2	1	
14	BD-98	Alpha-numeric Keypad	1	
15	BD-97	F-Key Keypad	1	
16	9634	Matrix Out Cable, CN8	1	

Centurion 7 Discrete Control Power Supply Panel Assembly



Item	Part #	Assembly # 5196 Parts List	Qty	Remarks
1	PL-80	Centurion 7 Sub Panel Metalwork	1	
2	9706-1	Centurion 7 Power Supply	1	
3	---	Network Adaptor Cable	1	Supplied with BD-125
4	9192-1	Centurion 7 Keyboard Cable, CN1	1	
5	---	Floppy Drive Data Cable	1	Supplied with BD-125
6	---	Com Port Cable	1	Supplied with BD-125
7	---	Ram Module	1	Supplied with BD-125
8	9629	Matrix In Cable, CN3	1	
9	9637	Lights Cable, CN6	1	
10	BD-101	Centurion 7 Keyboard Card	1	
11	BD-100	Centurion 7 NCB II Motion Control Card	1	
12	BD-125	Centurion 7 Motherboard	1	See 3, 5, 6, 7
13	IC-192	8 MB Disk On Chip, IC-??? ? MB Optional	1	Not visible
14	9633	Push Buttons Cable, CN4	1	