

Electrical Manual

BR Series 10HP

Rev.6
3-8-2001

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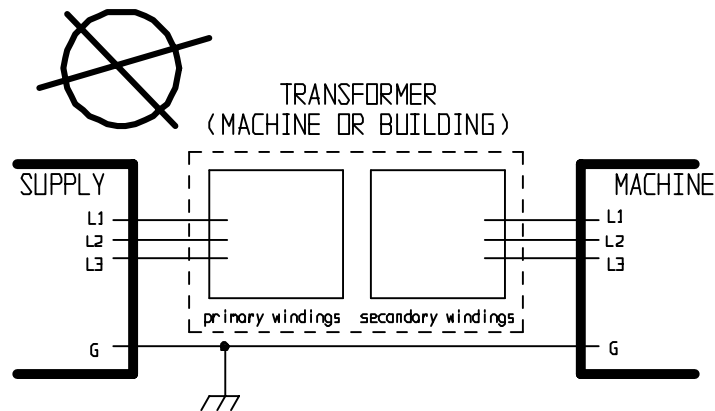
History

4-21-99	Original version
7-12-99 Rev 2	Add LCD front panel drawing and RevD electricals (reactors added).
10-29-99	Added remote hand controller
1-28-00 Rev3	Skipped rev number 3 to match other manuals
1-28-00 Rev4	Added SBC control and electrical safety notes
2-4-00 Rev5	Update to revE electrical schematics, ECO # 4387
3-8-01 Rev6	Updated axis parameters to current values

Transformer Connection Alert

***** 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.

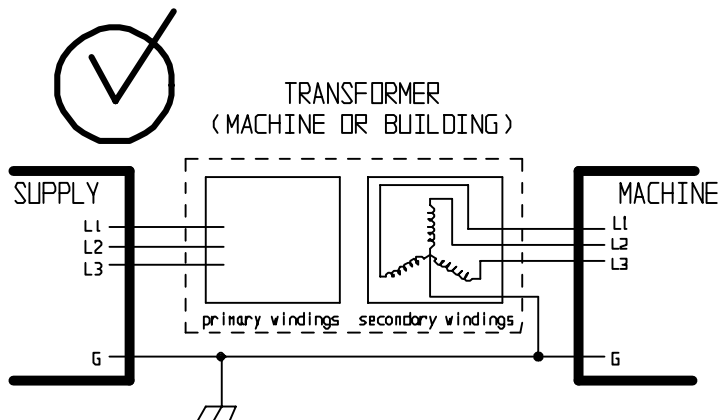
Remove transformer cover and follow transformer ground wire to determine if it is merely a case ground or if it actually goes to a neutral point within the secondary windings.

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.

Electrical Safety Rules

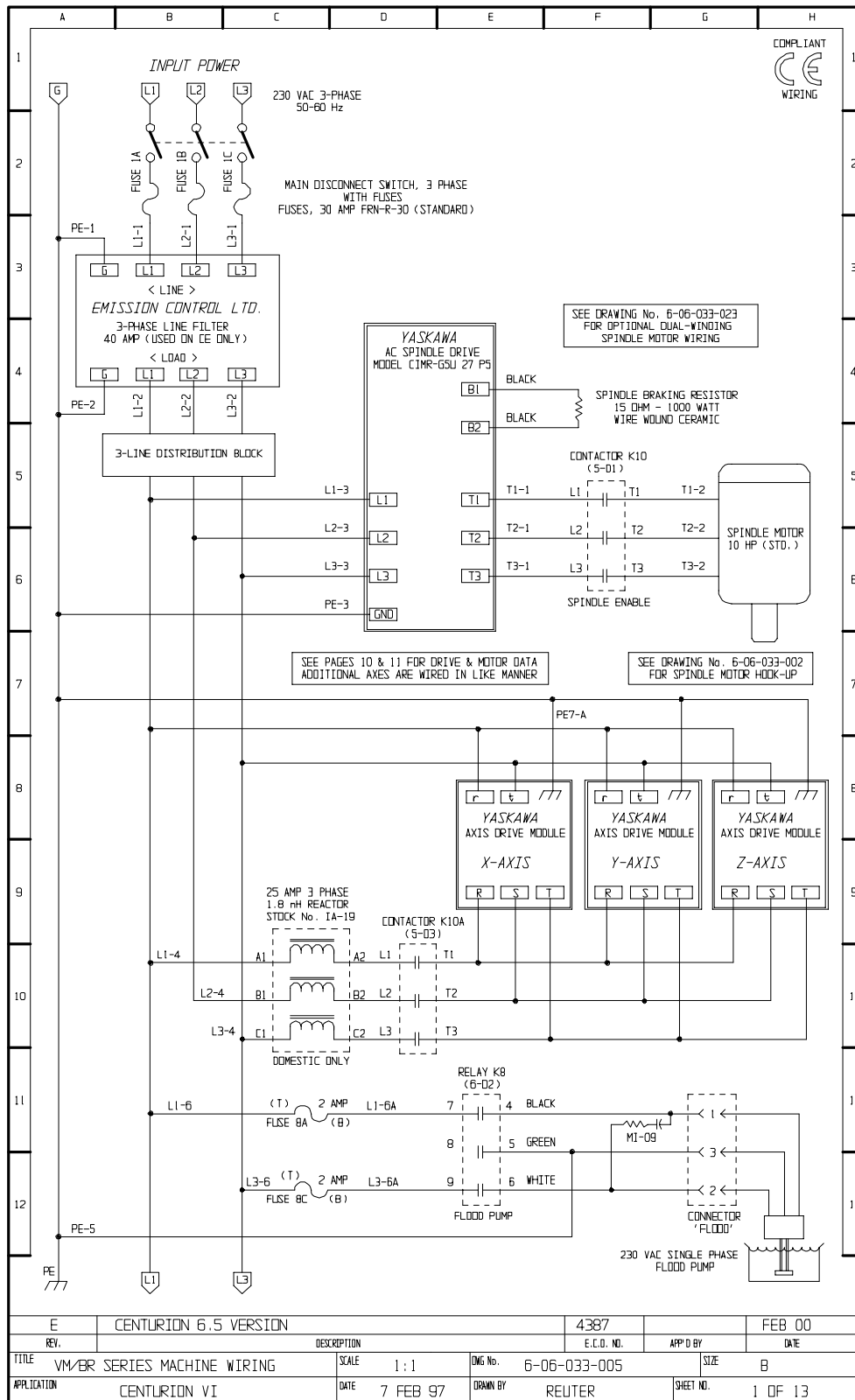
Read and understand the following list of cautions before attempting to perform service on this equipment. **Failure to observe these rules can result in death or serious injury.**

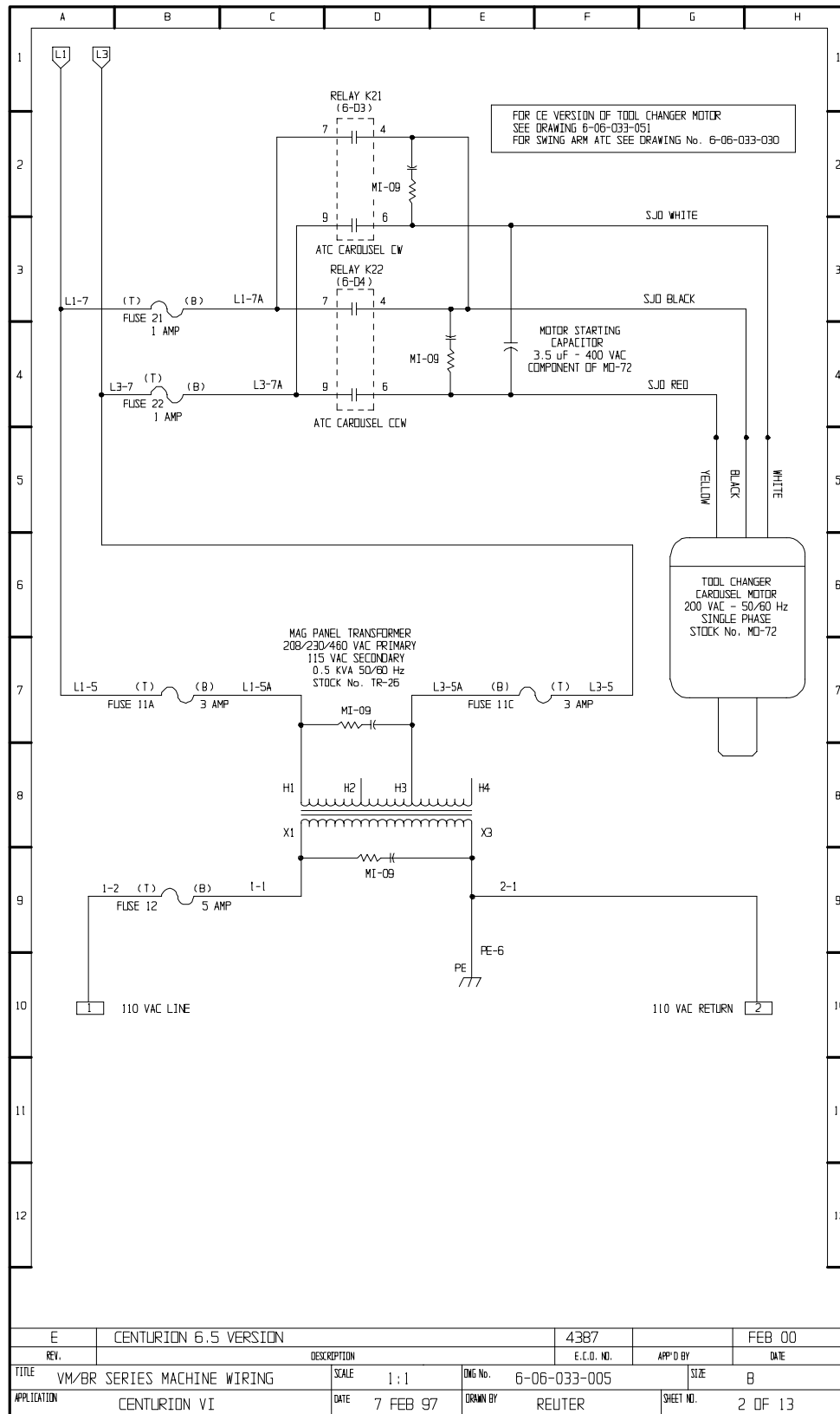
Caution

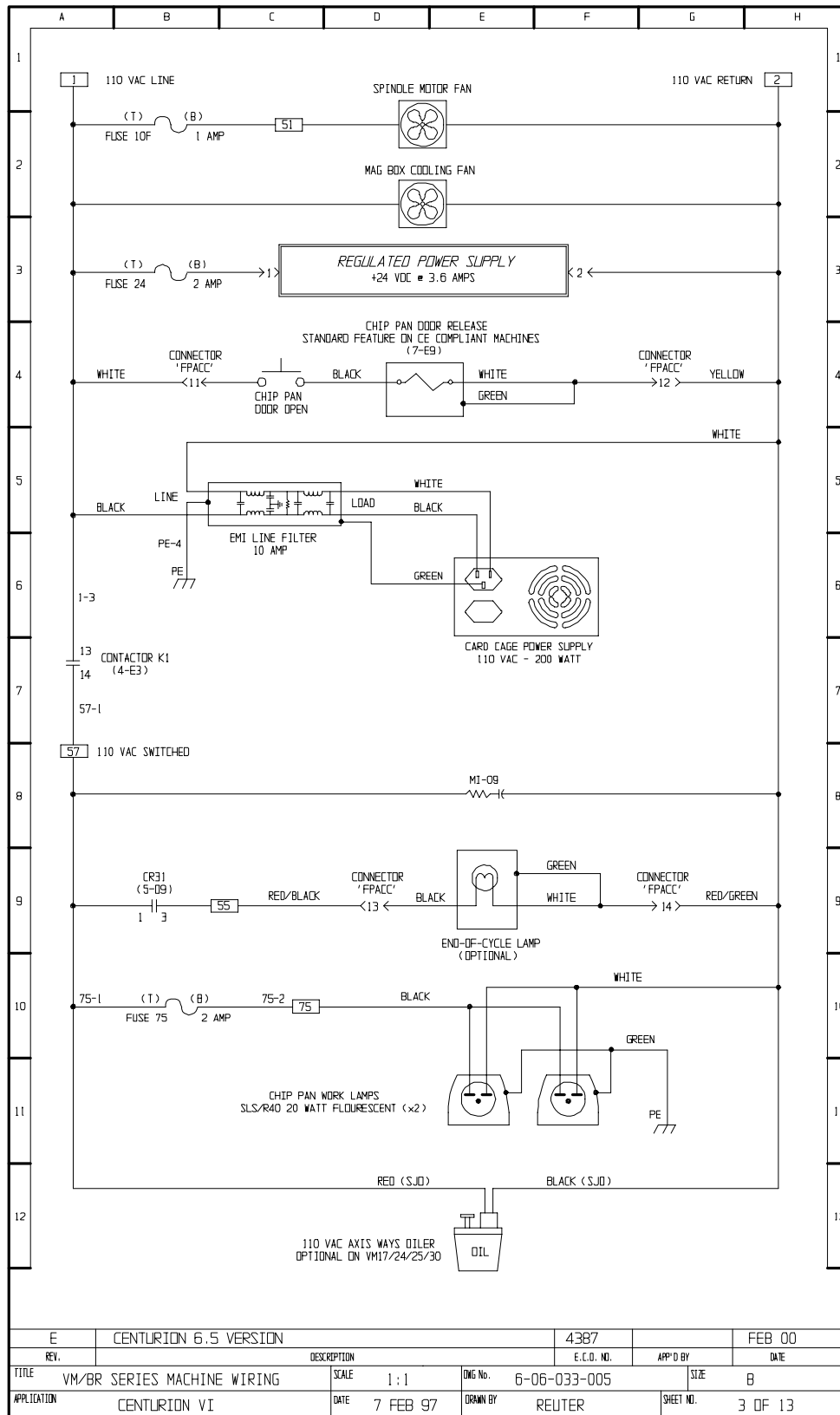
- Beware of High Voltage present within the machine's electrical cabinet
- Do not attempt to service electrical components unless you are qualified to work on them safely
- Only qualified personnel should attempt to make current and voltage readings
- Always turn the main power off before servicing components 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

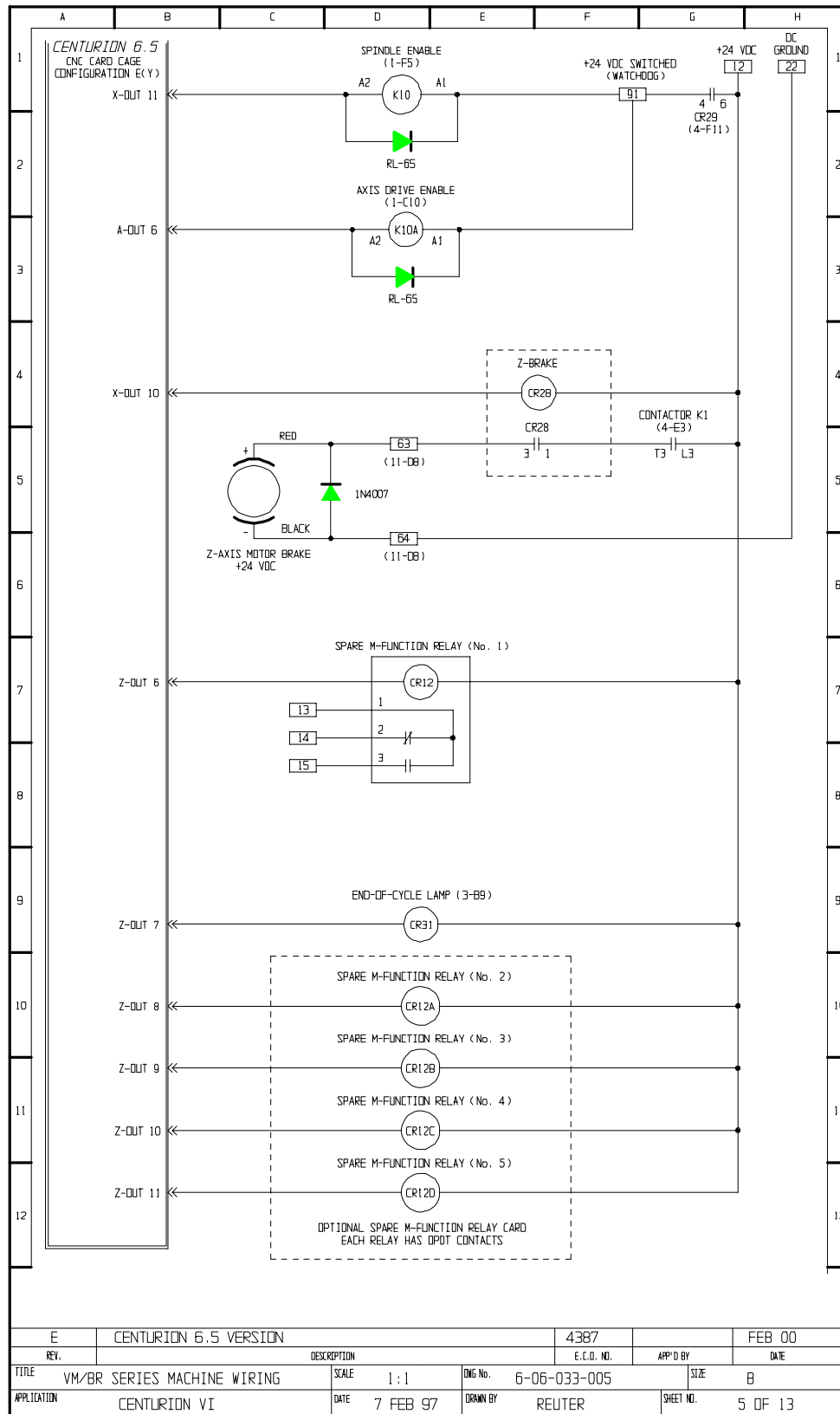
Machine Schematic

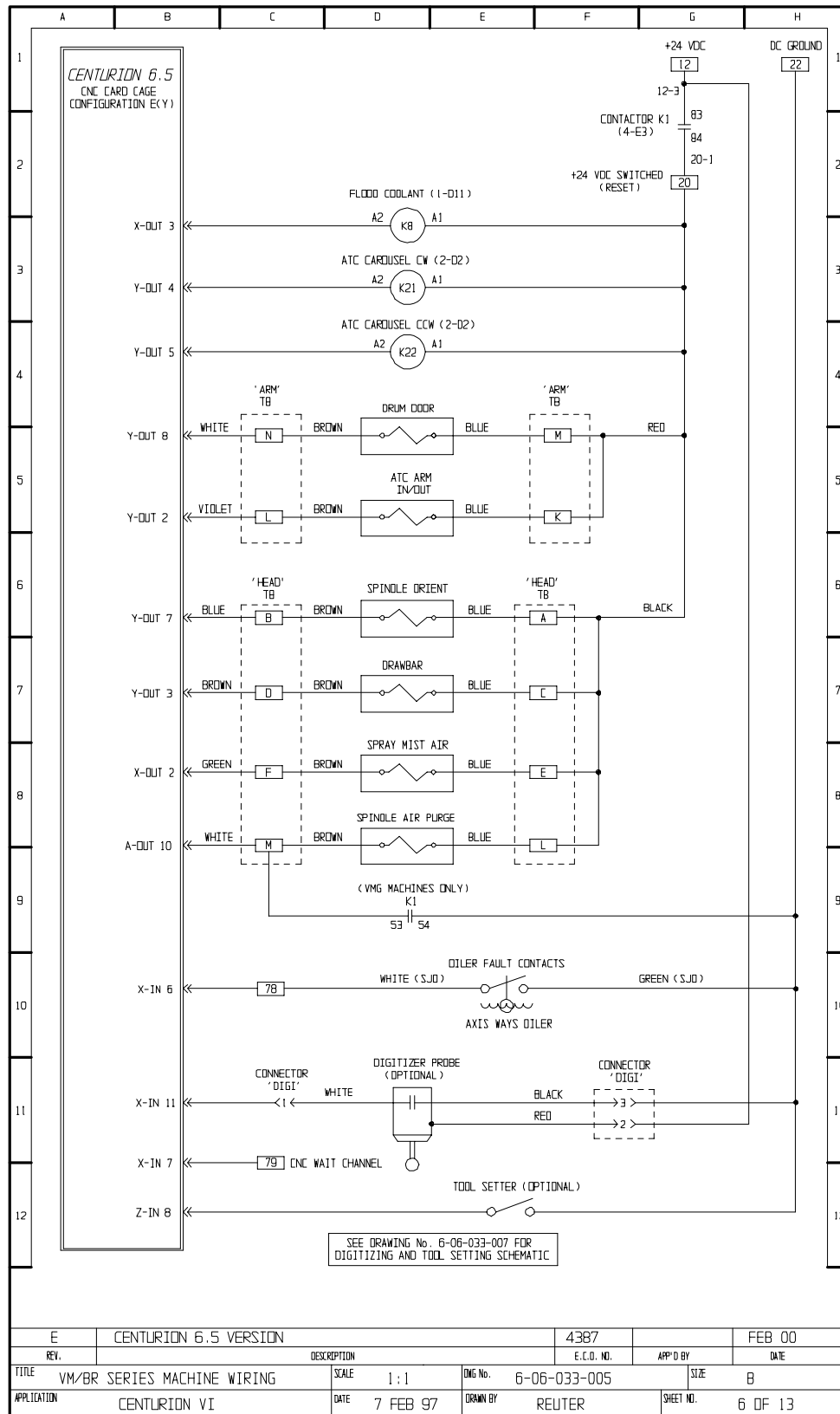


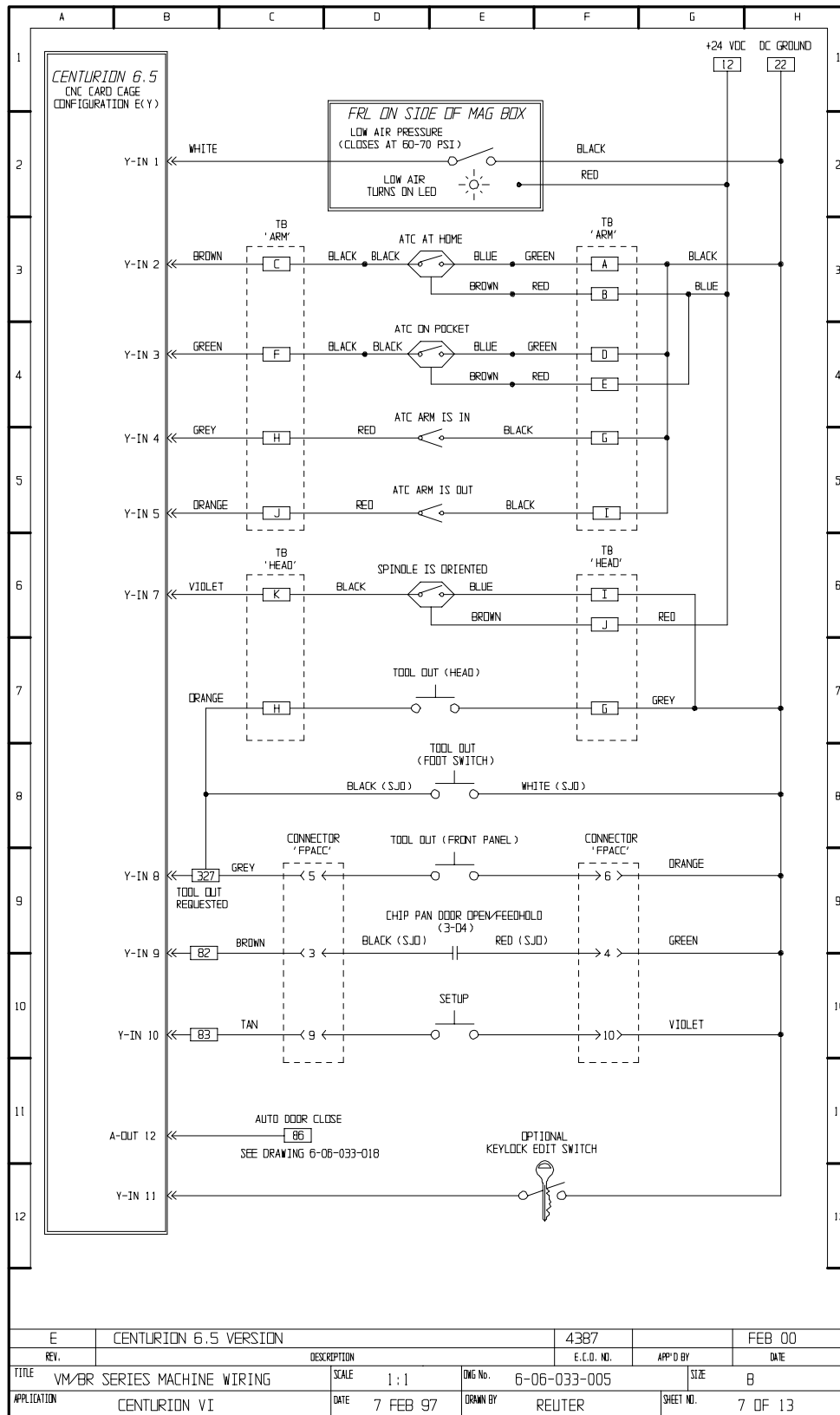


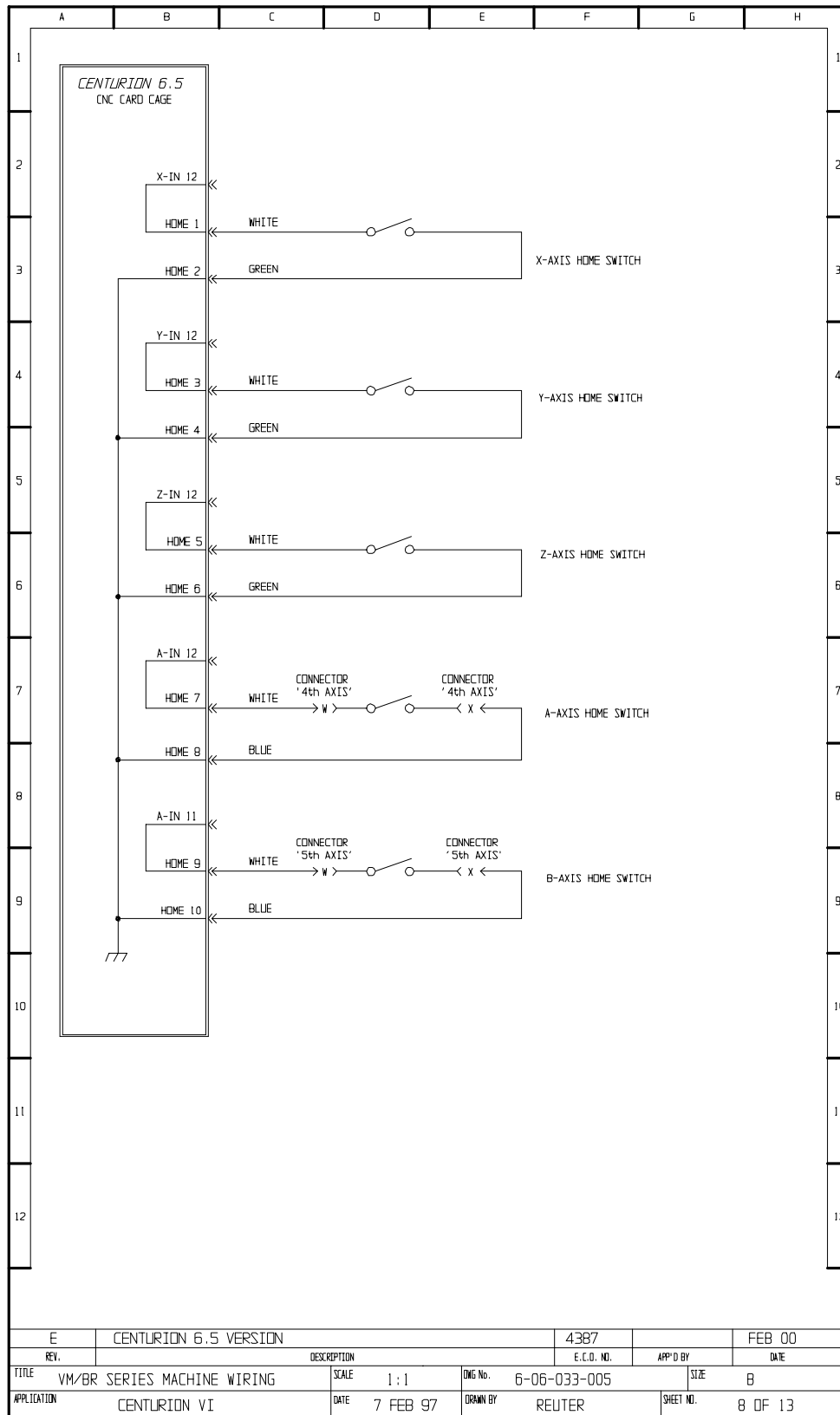


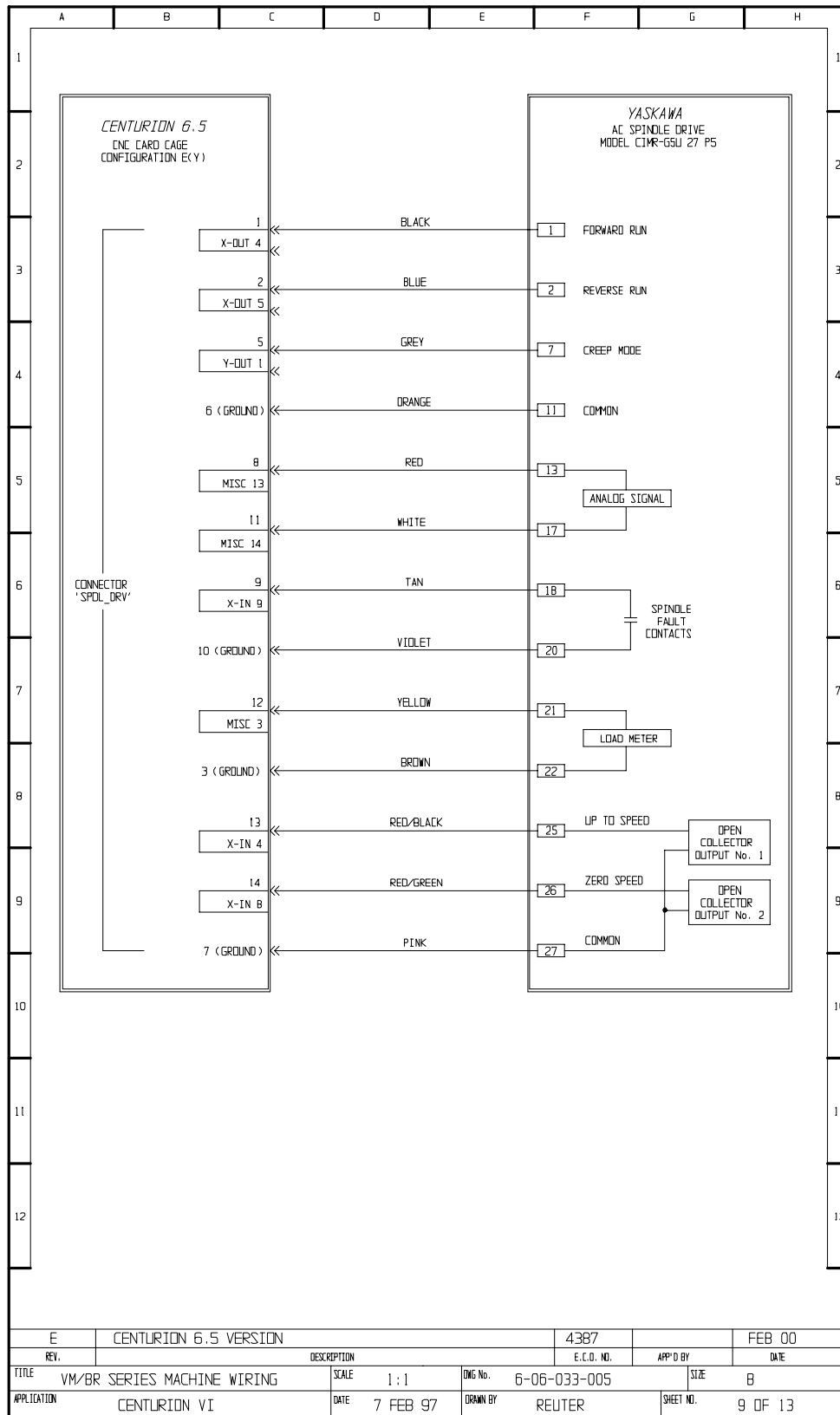


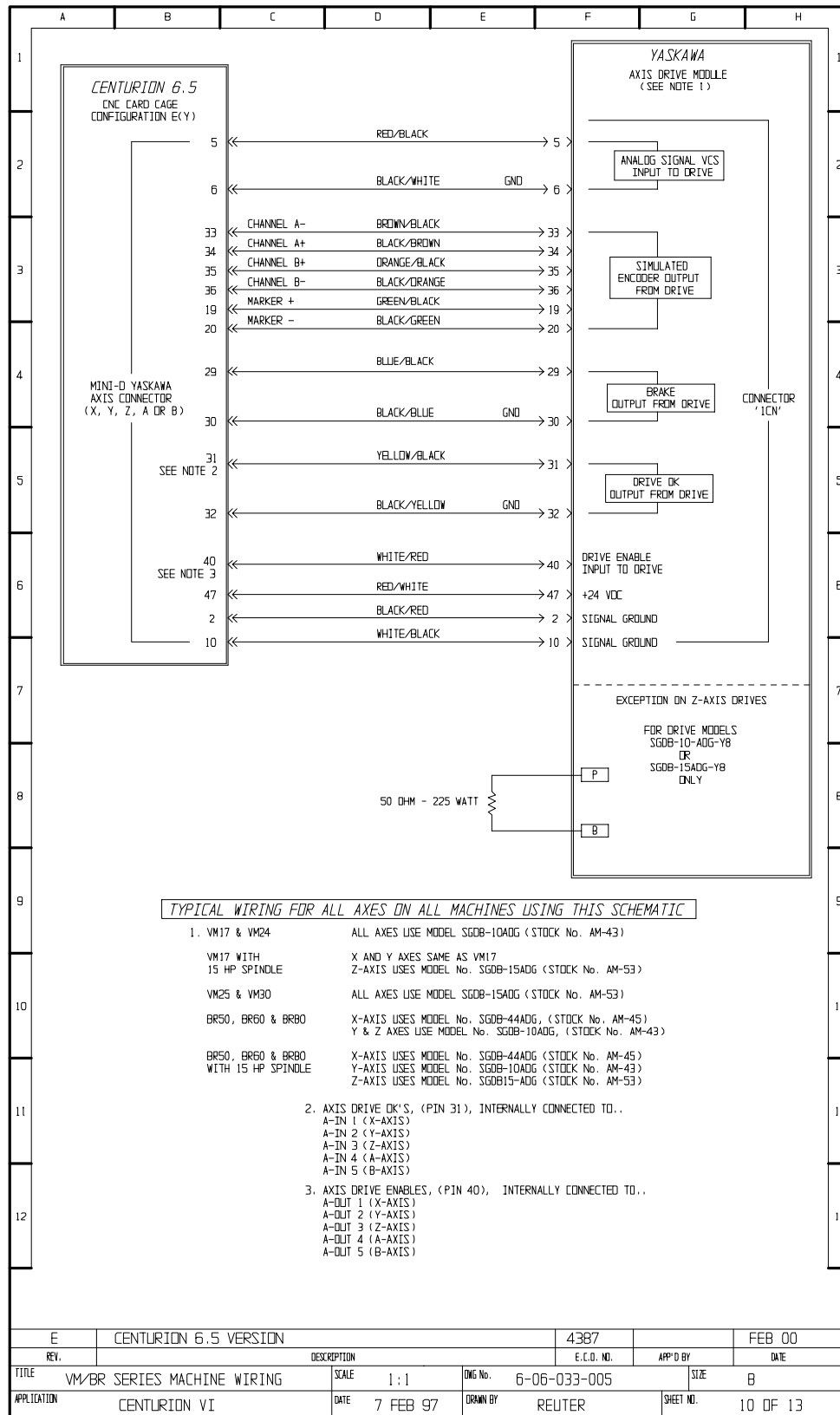


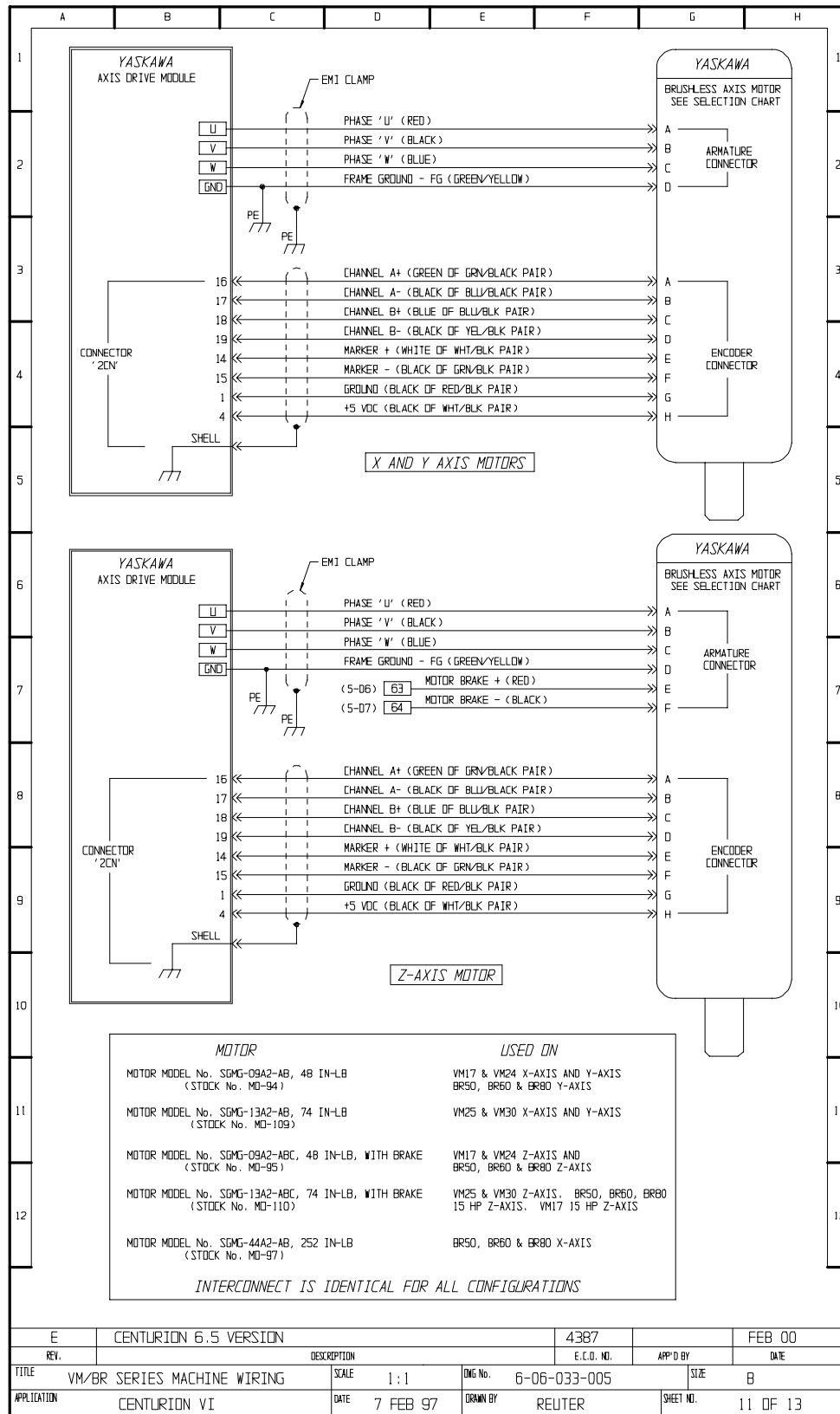


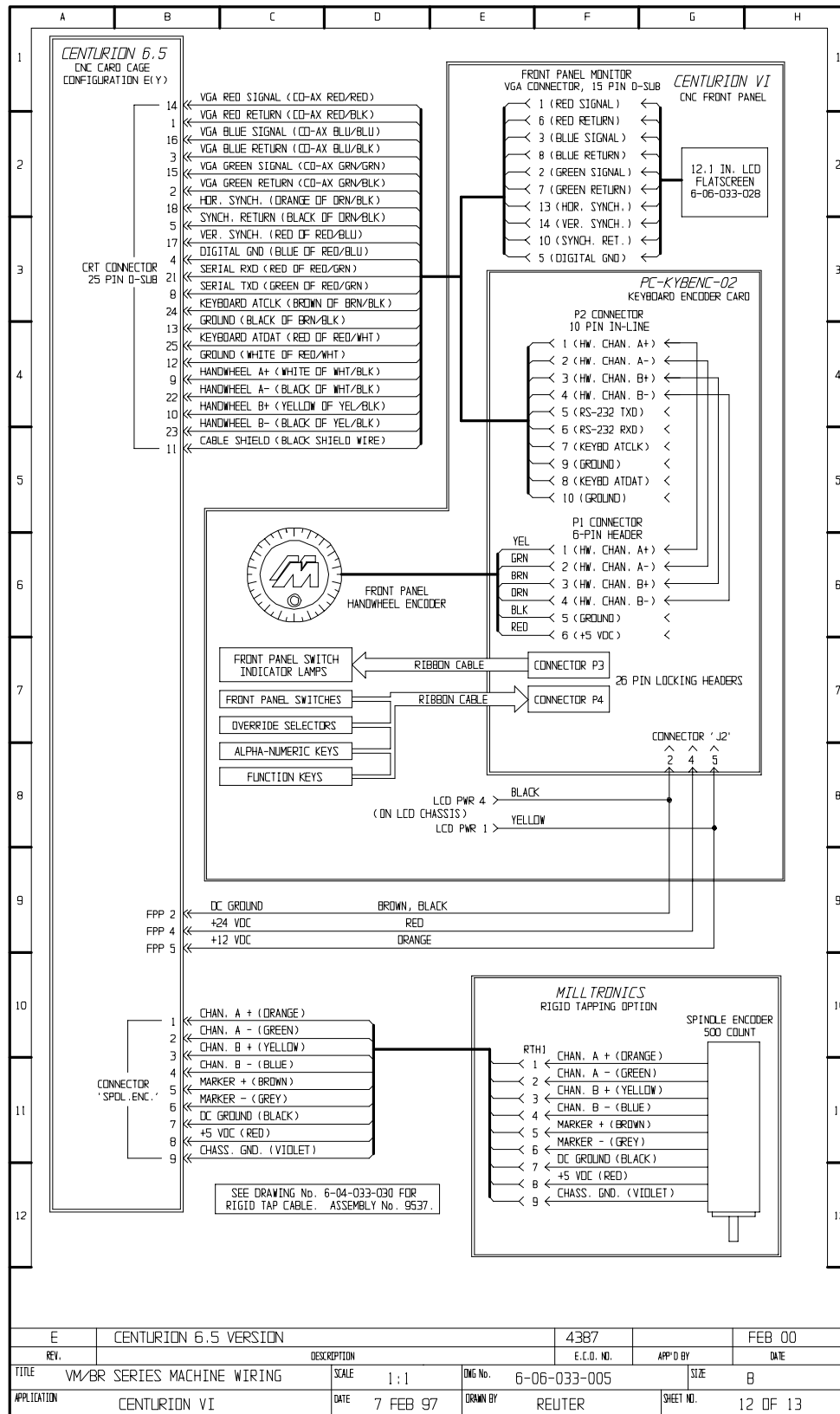


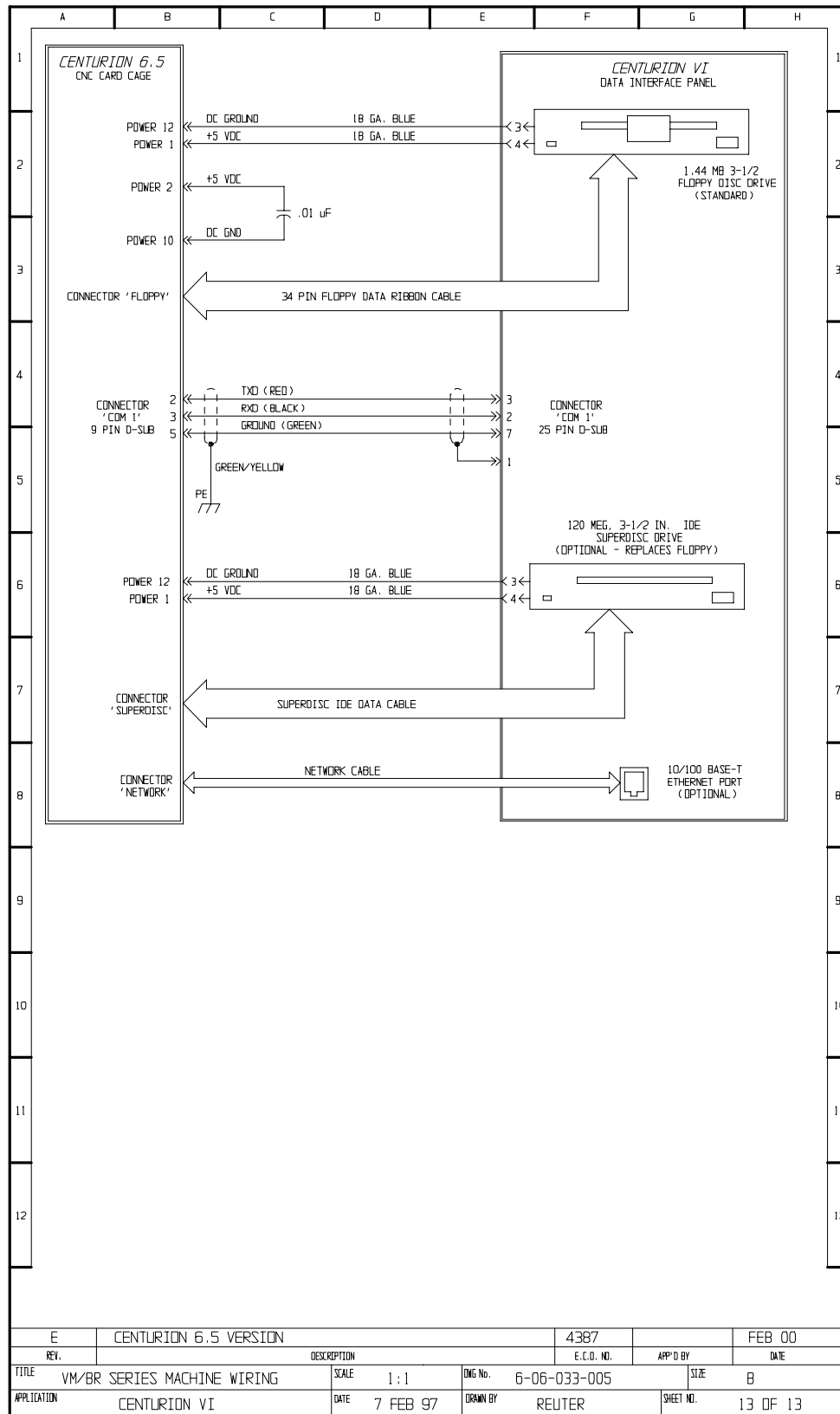




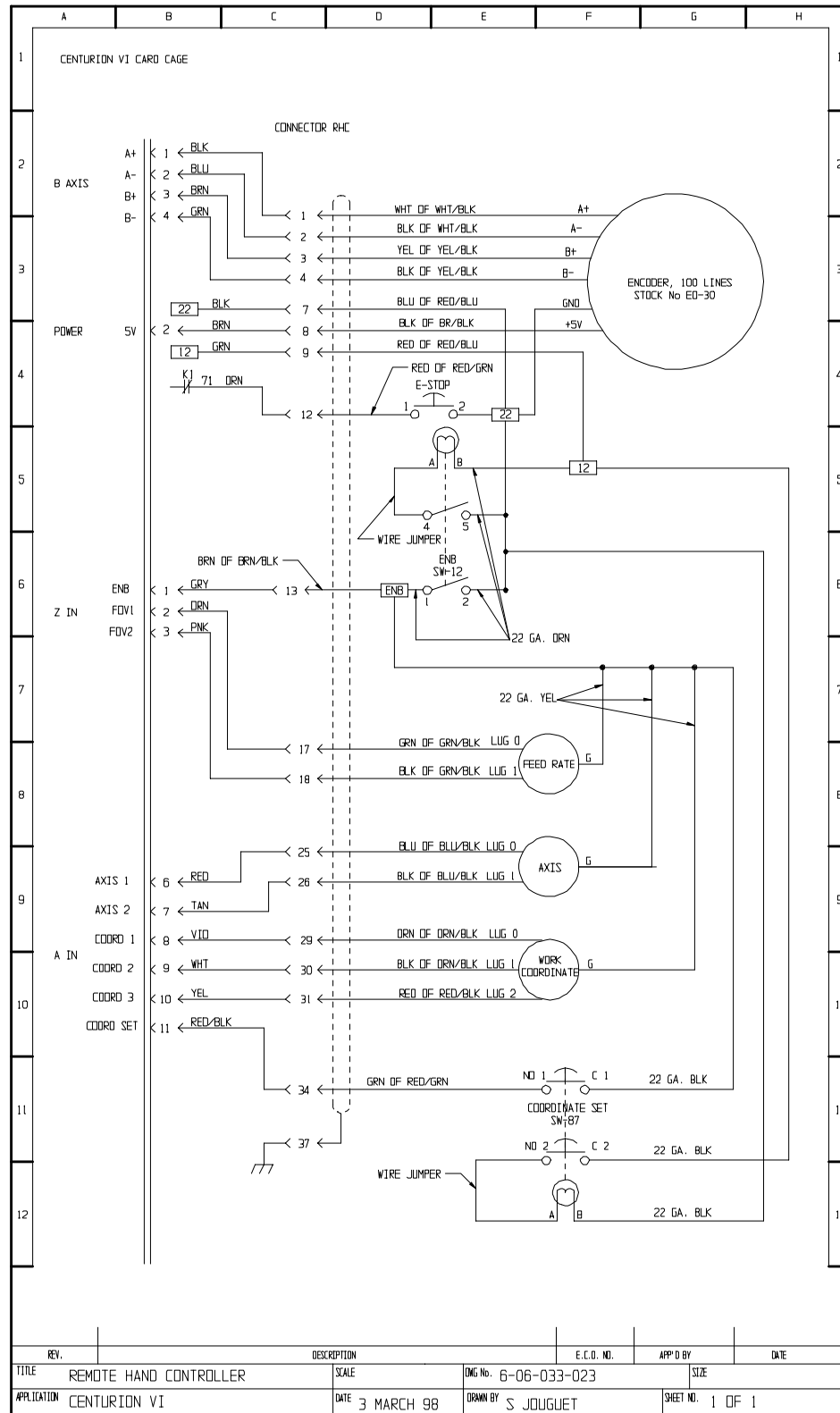








Remote Hand Controller Electrical Schematic



Remote Hand Controller Operation Notes

Remote Handwheel Option

The remote option is only available on a Cent6 mill with software version of CNC6.6121 or higher. The remote can be used to control the X, Y, Z, and A axes independently. The reason that an optional fifth axis cannot be cranked is that the remote uses the B-axis encoder channel for the input from the hand crank. Another stipulation on the remote working is that the optional dual handwheel must be disabled. To do this, the power parameters, 2nd and 3rd Handwheel Encoder Axis, must be set to zero.

On the remote are two four-position switches, one six-position switch, one momentary switch, a handwheel crank, an enable button and an E-Stop button. To enable the remote handwheel, the user must be in the handwheel mode and press the “Enable” button on the side of the box. With the remote enabled, the only buttons on the front panel that can be used are the Z-Tool button for setting tool length offsets and the ESC button to exit out of the handwheel mode.

One of the four-position switches is used to select the axis to be cranked. To select the axis to crank, the user switches the “Axis select” switch until the desired axis is chosen. The selected axis will be the highlighted axis on the screen. As the switch is moved to a different axis, the control will update the screen accordingly. If the remote is enabled, the buttons on the front panel for changing the axis to crank are disabled. As stated earlier there are only four options available for axes to handwheel.

The other four-position switch is used to change the feedrate override. The options are 10, 20, 40, and 50%. As with the axis select, the feedrate override on the remote will lock out the feedrate override that is present on the front panel.

The six-position switch is used to change the work coordinate that the user wishes to set. With the six-position switch the user has six options for choosing the work coordinate system, G54-G59. Just like the axis select, the control will update the screen and display the coordinate system that the user selected with the remote handwheel.

The momentary switch is used for actually setting the work coordinate. When the user has found the position in the appropriate work coordinate system that is to be set to zero, the button for setting the work coordinate is to be pushed. To set the G54-X the axis select must be set to X. To then change the G54-Y, the axis select must be changed to Y followed by pressing the coordinate set switch. If there is an optional fourth axis, the axis select switch must be set to A, followed by pressing the coordinate set button. For precautionary purposes, an E-stop button has been placed on the side opposite the enable button.

1 2 3 4 5 6 7

8 9 10 11 12 13 14 15 16

17 18 19 20 21 22 23 24 25 26 27 28

LENGTH OF WIRE TRACK: 16 IN.

LENGTH OF DIN RAIL: 14.25 IN.

LENGTH OF WIRE TRACK: 16 IN.

LENGTH OF DIN RAIL: 7 IN.

Y-AXIS Z-AXIS

1400 MILL LANE WACONIA, MN 55387 USA

BRIDGE MILL MAG PANEL - 10 HP

UNLESS SPECIFIED

TOLERANCE

X.XXX +/- .005

X.XX +/- .010

X.X +/- .030

ANGLE +/- 1.0°

DATE 24 FEB 97

DRAWN BY REUTER

SHEET NO. 1 OF 3

SCALE 3.5:1

WING No 6-03-033-014

SIZE C

APPLICATION CENTURION VI

REV. CHANGE SPOL DRV 3966 E.C.D. NO. APP'D BY DATE

MATERIAL/FINISH

STOCK/ASSY No. 5020

TITLE

MILTRONICS

1400 MILL LANE WACONIA, MN 55387 USA

612.442.1410

55387 USA

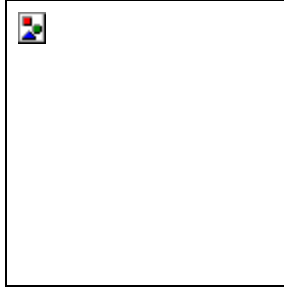
- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION	QTY	HDW	REMARKS
1	PL-54	37 x 45 PLATED MAG PANEL, DWG 6-01-033-007	1	G	
2	7530	CENTURION VI CNC CARD CAGE	1	SEE ITEMS 3 & 29	
3	HD-63	CARD CAGE SPRING HANGER	2		
4	FU-04	FUSE BLOCK, DOUBLE FRN-R SMALL	1	B	
	FU-33	FUSE, FRN-R-3, 3 AMP, (FUSES 11A & 11C)	2		
5	TB-20	3-LINE DISTRIBUTION BLOCK	1	C	
	FU-09	FUSE CLIP, SINGLE MOL/MDA	8	A	
	FU-28	FUSE, 2 AMP MOL GLASS, (FUSES 8A & 8C)	2		
6	FU-01	FUSE, 5 AMP MOL GLASS, (FUSE 12)	1		
	FU-46	FUSE, 1 AMP MOL GLASS, (10F, 21, 22, 24 & 75)	5		
	SW-42	SWITCH, MAIN DISCONNECT	1	C	
	FU-35	SWITCH FUSE CLIP KIT	1	G	
	FU-30	FUSE, FRN-R-30, 30 AMP, (FUSES 1A, 1B & 1C)	3		
8	TR-14	TRANSFORMER, 0.5 VKA, 220-110 V, 50/60 Hz	1	E	
9	BR-88	LINE FILTER MOUNTING BRACKET	0 or 1	E	FOR CE COMPLIANT MACHINES ONLY
	MI-40	LINE FILTER, 220 VAC 3 PHASE, 40 AMP, 2-STAGE	0 or 1	E	
10	IA-19	3-PHASE REACTOR, 25 AMP - 1.8 nH	1	E	
11	PS-33	REGULATED POWER SUPPLY, +24 VDC @ 3.6 AMPS	1	C	
12	WX-167	7.5 x 35 mm DIN RAIL, 3 IN. PIECE	8	B	
	RL-67	CONTACTOR RELAY, DC COIL, 10 HP TELEMECANIQUE No. LP1D3210	1	H	
13	RL-65	CONTACTOR NOISE SUPPRESSOR DIODE TELEMECANIQUE No. LA4DC1U	1	J	
	RL-64	CONTACTOR RELAY, DC COIL, 5 HP TELEMECANIQUE No. LP1D1810	1	H	
14	RL-65	CONTACTOR NOISE SUPPRESSOR DIODE TELEMECANIQUE No. LA4DC1U	1	J	
15	9107	QUAD RELAY BOARD	1	H	
16	RE-85	RESISTOR, WIRE WOUND CERAMIC, 15 OHM - 1000 WATT	1	E	
17	BU-04	GROUNDING BUS BAR, 23 POST	1	G	
18	PS-36	AC SPINDLE CONTROLLER YASKAWA No. GSU27P51	1	E	
19	WC-65	WIRE DUCT, 2 x 2 IN.	72 IN.	B	
	WC-66	WIRE DUCT COVER, 2 IN.	72 IN.		
20	AM-43	AXIS DRIVE MODULE YASKAWA No. SGOB-10ADG	2	D	
21	AM-45	AXIS DRIVE MODULE YASKAWA No. SGOB-44ADG	1	D	
22	MO-72	ATC MOTOR CAPACITOR, 3.5 uF / 400 V	1	C	
23	MI-09	NOISE SUPPRESSOR, 600 VOLT	6	I	
	RL-68	CONTACTOR RELAY, DC COIL, 3 HP TELEMECANIQUE No. LP1D1210	1	H	
	RL-61	CONTACTOR AUXILIARY, 2-N/O, 2-N/C TELEMECANIQUE No. LA1DN22	1	J	
24	RL-65	CONTACTOR NOISE SUPPRESSOR DIODE TELEMECANIQUE No. LA4DC1U	1	J	
25	MI-10	LINE FILTER, 110 VAC, 10 AMP	1	B	
	TB-30	TERMINAL BLOCK, 4-POSN., TOP ENTRY	36	H	
	TB-32	TERMINAL BLOCK JUMPER, 10 POSN.	28	K	
26	TB-33	TERMINAL BLOCK LABEL TAB, SHEET OF 100	36	K	
	TB-31	TERMINAL BLOCK END PIECE	1	K	
	RL-48	CONTROL RELAY, +24 VDC COIL, 10 AMP, 3POT	3		
	RL-06	RELAY SOCKET BASE	3	H	
28	WX-129	RUBBER SHOCK MOUNT, 8-32 UNC M/F	4	M	

HARDWARE SPECIFICATION

- A - 6-32 x 3/8 RHMS
- B - 8-32 x 5/16 RHMS WITH No. 8 INTERNAL LOCKWASHER
- C - 8-32 x 1/2 RHMS WITH No. 8 INTERNAL LOCKWASHER
- D - 10-32 x 1/2 RHMS WITH No. 10 INTERNAL LOCKWASHER
- E - 1/4-28 x 3/4 HHCS WITH 1/4 LOCKWASHER FROM BOTTOM AND 1/4 LOCKWASHER AND 1/4-28 NUT ON TOP
- F - 1/4-28 x 1 HHCS WITH 1/4 LOCKWASHER FROM BOTTOM AND 1/4 LOCKWASHER AND 1/4-28 NUT ON TOP
- G - HARDWARE INCLUDED WITH PART
- H - DIN RAIL MOUNTED COMPONENT
- I - USE CYANOACRYLATE ADHESIVE, (SUPER GLUE)
- J - ATTACHES TO CONTACTOR
- K - ATTACHES TO TERMINAL BLOCK
- L - 8-32 x 3/4 SHCS AND No. 8 INTERNAL LOCKWASHER FROM BOTTOM AND No. 8 INTERNAL LOCKWASHER & NUT ON TOP
- M - No. 8 INTERNAL LOCKWASHER AND 8-32 NUT ON BOTTOM.
- N - 10-32 x 5/8 SHCS WITH No. 10 INTERNAL LOCKWASHER FROM BOTTOM AND TWO 10-32 NUTS WITH THREE No. 10 INTERNAL LOCKWASHERS ON TOP.

A	CHANGE SPINDLE DRIVE	3966		5/99
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 812.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No. 5020		TITLE BRIDGE MILL MAG PANEL - 10 HP		
TOLERANCE UNLESS SPECIFIED		APPLICATION CENTURION VI		
X.XXX +/- .005		SCALE 1:1 DWG No. 6-03-033-014 SIZE C		
X.XX +/- .010		DATE 24 FEB 97		
X.X +/- .030		DRAWN BY REUTER		
ANGLE +/- 1.0°		SHEET NO. 2 OF 3		



Yaskawa Varispeed-616G5 Spindle Drive Parameters

Parameters Modified For Toshiba 10 HP spindle motor

Set parameter A1-01 to 4 (parameter access level = advanced) to give you access to all the parameters.

PARAMETER	DESCRIPTION	VALUE	Units
B2-01	DC Injection Braking start frequency	10	Hz
B2-02	DC Injection Brake Current	100	%
B2-04	DC injection Brake at Stop	.25	sec
C1-01*	Acceleration Time 1	1.0	sec
C1-02*	Deceleration Time 1	3.0	sec
D1-09	Jog Frequency Reference (Creep)	1.50	Hz
E1-04	Maximum Output Frequency	180	Hz
E1-09	Minimum Output Frequency	1	Hz
E2-01	Full Load Current (FLA)	26.6	Amps
E2-02	Rated Slip	.8	Hz
E2-03	No Load Current	11.9	Amps
E2-05	Line-to-line Resistance	.36	Ohms
E2-06	Inductance Leakage	15.5	%
E2-07	Saturation Coefficient 1	.38	
E2-08	Saturation Coefficient 2	.58	
H2-02	Terminal 25 Select	2	(up-to-speed)
H2-03	Terminal 26 Select	1	(zero speed)
		5.25	
H4-01	Terminal 21 Select	3	(load meter)
		5.23	
L1-01	Motor OL Protection	0	(disabled)
L3-04	Deceleration Stall Prevent	0	(disabled)
L8-05	Input Open Phase Detection	1	(enabled)

* For single-phase operation, set both C1-01 and C1-02 to 6 seconds.

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.

Spindle Drive Parameter List

For Yaskawa 616G5

Parameter	Function	Default
A1-00	Language Selection	0
A1-01	Parameter Access Level	2
A1-02	Control Method Selection	2
A1-03	Initialize Parameters	0000
A1-04	Enter Password	0000
B1-01	Reference Selection	1
B1-02	Operation Method Selection	1
B1-03	Stopping Method Selection	0
B1-04	Reverse Operation Prohibit	0
B1-05	Zero Speed Operation	0
B1-06	Logic Input Scan Rate	1
B1-07	Local/Remote Run Selection	0
B2-01	DC Injection Braking Start Frequency	.5
B2-02	DC Injection Braking Current	50
B2-03	DC Injection Braking Time at Start	0.00
B2-04	DC Injection Braking Time at Stop	0.00
B3-01	Speed Search Selection	0
B3-02	Speed Search Current	150
B3-03	Speed Search Deceleration Time	2.0
B4-01	Timer Function Timer ON-delay Time	0.0
B4-02	Timer Function Timer OFF-delay Time	0.0
B5-01	PID Control Mode Selection	0
B5-02	PID Proportional Gain	1.00
B5-03	PID Integral Time	1.0
B5-04	PID Integral Limit	100.0
B5-05	PID Differential Time	0.00
B5-06	PID Output Limit	100.0
B5-07	PID Offset Adjustment	0.0
B5-08	PID Primary Delay Time Constant	0.00
B6-01	Dwell Frequency at Start	0.0
B6-02	Dwell Time at Start	0.0
B6-03	Dwell Frequency at Stop	0.0
B6-04	Dwell Time at Stop	0.0
B7-01	Droop Control Gain	0.0
B7-02	Droop Control Delay Time	0.05
B8-01	Energy-Saving Gain	80
B8-02	Energy-Saving Frequency	0.0
B9-01	Zero-Servo Gain	5
B9-02	Zero-Servo Completion Width	10
C1-01	Acceleration Time 1	10.0
C1-02	Deceleration Time 1	10.0
C1-03	Acceleration Time 2	10.0
C1-04	Deceleration Time 2	10.0
C1-05	Acceleration Time 3	10.0
C1-06	Deceleration Time 3	10.0
C1-07	Acceleration Time 4	10.0

Parameter	Function	Default
C1-08	Deceleration Time 4	10.0
C1-09	Fast Stop Deceleration Time	10.0
C1-10	Accel/Decel Time Setting Unit	1
C1-11	Accel/Decel Time Switching Frequency	0.0
C2-01	S-Curve Characteristic at Accel. Start	0.20
C2-02	S-Curve Characteristic at Accel. End	0.20
C2-03	S-Curve Characteristic at Decel. Start	0.20
C2-04	S-Curve Characteristic at Decel. End	0.20
C3-01	Slip Compensation Gain	1.0
C3-02	Slip Compensation Primary Delay Time	200
C3-03	Slip Compensation Limit	200
C3-04	Slip Compensation Selection During recognition	0
C4-01	Torque Compensation Gain	1.00
C4-02	Torque Compensation Time Constant	20
C5-01	ASR Proportional Gain 1	20.00
C5-02	ASR Integral time 1	0.500
C5-03	ASR Proportional Gain 2	20.00
C5-04	ASR Integral time 2	0.500
C5-05	Automatic Speed Regulator, (ASR), Integral limit	5.0
C5-06	ASR Primary Delay Time	0.004
C5-07	ASR Switching Frequency	0.0
C6-01	Carrier Frequency Upper Limit	15.0
C6-02	Carrier Frequency Lower Limit	15.0
C6-03	Carrier Frequency Proportional Gain	0
C7-01	Hunting Prevention Selection	1
C7-02	Hunting Prevention Gain	1.00
C8-08	AFR Gain	1.00
C8-30	Carrier Frequency During Auto-tuning	0
D1-01	Frequency Reference 1	0.00
D1-02	Frequency Reference 2	0.00
D1-03	Frequency Reference 3	0.00
D1-04	Frequency Reference 4	0.00
D1-05	Frequency Reference 5	0.00
D1-06	Frequency Reference 6	0.00
D1-07	Frequency Reference 7	0.00
D1-08	Frequency Reference 8	0.00
D1-09	Jog Frequency Reference	6.00
D2-01	Frequency Reference Upper Limit	100.0
D2-02	Frequency Reference Lower Limit	0.0
D3-01	Critical Frequency Rejection 1	0.0
D3-02	Critical Frequency Rejection 2	0.0
D3-03	Critical Frequency Rejection 3	0.0
D3-04	Critical Frequency Rejection Width	1.0
D4-01	Frequency Reference Hold Function Selection	0
D4-02	+/- Speed Limits	10

Parameter	Function	Default
D5-01	Torque Control Selection	0
D5-02	Torque Reference Delay Time	0
D5-03	Speed Limit Selection	1
D5-04	Speed Limit	0
D5-05	Speed Limit Bias	10
D5-06	Speed/Torque Control Switching Timer	0
E1-01	Input Voltage Setting	230
E1-02	Motor Selection	0
E1-03	V/f Pattern Selection	F
E1-04	Maximum Output Frequency	60.0
E1-05	Maximum Voltage	230.0
E1-06	Base Frequency	60.0
E1-07	Mid. Output Frequency A	0.0
E1-08	Mid. Output Voltage A	0.0
E1-09	Minimum Output Frequency	0.5
E1-10	Minimum Output Voltage	0.0
E1-11	Mid. Output Frequency B	0.0
E1-12	Mid. Output Voltage B	0.0
E1-13	Base Voltage	0.0
E2-01	Motor Rated Current	19.60
E2-02	Motor Rated Slip	1.50
E2-03	Motor No-load Current	5.10
E2-04	Number of Motor Poles	4
E2-05	Motor Line-to-line Resistance	.399
E2-06	Motor Leakage Inductance	18.2
E2-07	Motor Iron Core Saturation Coefficient 1	0.50
E2-08	Motor Iron Core Saturation Coefficient 2	0.75
E2-09	Motor Mechanical Loss	0.0
F1-01	Encoder (PG) Constant	1024
F1-02	Operation Selection at PG Open Circuit	1
F1-03	Operation Selection at Over speed	1
F1-04	Operation Selection at Speed Deviation	3
F1-05	PG Rotation	0
F1-06	PG Division Rate (PG Pulse Monitor)	1
F1-07	Integral Value During Accel/Decel Selection	0
F1-08	Over speed Detection Level	115
F1-09	Over speed Detection Delay Time	0.0
F1-10	Excessive Speed Deviation Detection Level	10
F1-11	Excessive Speed Deviation Detection Delay Time	0.5
F1-12	Number of PG Gear Teeth 1	0
F1-13	Number of PG Gear Teeth 2	0
F1-14	PGo Detect Time	2.0
F2-01	AI-14 Bi-Polar or Uni-Polar Input Selection	0
F3-01	DI-16 Digital Input Option	0
F4-01	AO-08 / AO-12 Channel 1 Monitor Selection	2
F4-02	AO-08 / AO-12 Channel 1 Gain	1.00
F4-03	AO-08 / AO-12 Channel 2 Monitor Selection	3
F4-04	AO-08 / AO-12 Channel 2 Gain	0.50
F5-01	DO-02 Channel 1 Output Selection	0
F5-02	DO-02 Channel 2 Output Selection	1

Parameter	Function	Default
F6-01	DO-08 Output Mode Selection	0
F7-01	PO-36F Frequency Multiple Selection	1
H1-01	Multi-Function Input Terminal 3	24
H1-02	Multi-Function Input Terminal 4	14
H1-03	Multi-Function Input Terminal 5	3
H1-04	Multi-Function Input Terminal 6	4
H1-05	Multi-Function Input Terminal 7	6
H1-06	Multi-Function Input Terminal 8	8
H2-01	Multi-Function Output Terminal 9 & 10	0
H2-02	Multi-Function Output Terminal 25-27	1
H2-03	Multi-Function Output Terminal 26-27	2
H3-01	Auto Speed Reference Signal Level Selection Terminal 13	0
H3-02	Auto Speed Reference Signal Gain Terminal 13	100.0
H3-03	Auto Speed Reference Signal Bias Terminal 13	0.0
H3-04	Multi-Function Analog Input 1 Signal Level Selection Terminal 16	0
H3-05	Multi-Function Analog Input 1 Selection Terminal 16	0
H3-06	Multi-Function Analog Input 1 Gain Terminal 16	100.0
H3-07	Multi-Function Analog Input 1 Bias Terminal 16	0.0
H3-08	Multi-Function Analog Input 2 Signal Level Selection Terminal 14	2
H3-09	Multi-Function Analog Input 2 Selection Terminal 14	1F
H3-10	Multi-Function Analog Input 2 Gain Terminal 14	100.0
H3-11	Multi-Function Analog Input 2 Bias Terminal 14	0.0
H3-12	Analog Input Filter Time Constant	0.000
H4-01	Multi-Function Analog Monitor 1 Selection Terminal 21	2
H4-02	Multi-Function Analog Monitor 1 Gain Terminal 21	1.00
H4-03	Multi-Function Analog Monitor 1 Bias Terminal 21	0.0
H4-04	Multi-Function Analog Monitor 2 Selection Terminal 23	3
H4-05	Multi-Function Analog Monitor 2 Gain Terminal 23	0.50
H4-06	Multi-Function Analog Monitor 2 Bias Terminal 23	0.0
H4-07	Multi-Function Analog Monitor Signal Level Selection Terminal 21 & 23	0
H5-01	Serial Comm. Station Address	1F
H5-02	Serial Comm. Baud Rate	3

Parameter	Function	Default
H5-03	Serial Comm. Parity Rate	0
H5-04	Stopping Method After Serial Comm. Error	3
H5-05	Serial Comm. Error Detection	1
L1-01	Motor Overload Protection Selection	0
L1-02	Motor Overload Protection Time constant	1.0
L2-01	Momentary Power Loss Detection Selection	0
L2-02	Momentary Power Loss Ride-Thru Time	2.0
L2-03	Momentary Power Loss Min. Base Block Time	0.7
L2-04	Momentary Power Loss Recovery Ramp Time	0.3
L2-05	Under voltage Detection Level	190
L2-06	KEB Frequency	0.0
L3-01	Stall Prevention Selection During Accel	1
L3-02	Stall Prevention Level During Accel	150
L3-03	Stall Prevention Limit During Accel (CHP)	100
L3-04	Stall Prevention Selection During Decel	1
L3-05	Stall Prevention Selection During Running	1
L3-06	Stall Prevention Level During Running	160
L4-01	Speed Coincidence Frequency	0.0
L4-02	Speed Coincidence Width	2.0
L4-03	Speed Coincidence Frequency (+/-)	0.0
L4-04	Speed Coincidence Width (+/-)	2.0
L4-05	Frequency Reference Loss Detection	0
L5-01	Number of Auto Restart Attempts	0
L5-02	Auto Restart Operation Selection	0
L6-01	Torque Detection Selection 1	0
L6-02	Torque Detection Level 1	150
L6-03	Torque Detection Time 1	0.1
L6-04	Torque Detection Selection 2	0
L6-05	Torque Detection Level 2	150
L6-06	Torque Detection Time 2	0.1
L7-01	Forward Torque Limit	200
L7-02	Reverse Torque Limit	200
L7-03	Forward Regenerative Torque Limit	200
L7-04	Reverse Regenerative Torque Limit	200
L8-01	Internal Dynamic Braking Resistor Protection	0
L8-02	Overheat Protection Alarm Level	95
L8-03	Operation Selection After Overheat Pre-alarm	3
L8-05	Input Open-phase Protection Selection	0
L8-07	Output Open-phase Protection Selection	0
o1-01	Monitor Selection	6
o1-02	Monitor Selection After Power-up	1
o1-03	Digital Operator Display Selection	0
o1-04	Digital Operator Display Units	0
o1-05	Parameter Address Display Selection	0
o2-01	LOCAL/REMOTE Key Selection	1
o2-02	STOP Key Function During Remote Run	1
o2-03	User Parameter Default Value	0

Parameter	Function	Default
o2-04	kVA Selection (Drive Model Number)	5
o2-05	Digital Operator "Motor Operated Pot"	0
o2-06	Operation Selection When Digital Operator is Disconnected	1
o2-07	Elapsed Operating Hour Timer Set	0
o2-08	Elapsed Operating Hour Timer Selection	0
o2-09	Initial Mode Selection	1
U1-01	Frequency Reference	
U1-02	Output Frequency	
U1-03	Output Current	
U1-04	Control Method	
U1-05	Motor Speed	
U1-06	Output Voltage	
U1-07	DC Bus Voltage	
U1-08	Output Power	
U1-09	Torque Reference	
U1-10	Input Terminal Status	
U1-11	Output Terminal Status	
U1-12	Operation Status	
U1-13	Elapsed Operation Time	
U1-14	Software Version (Flash I.D. No.)	
U1-15	Control Circuit Terminal 13 Input Voltage	
U1-16	Control Circuit Terminal 14 Input Voltage	
U1-17	Control Circuit Terminal 16 Input Voltage	
U1-18	Motor Secondary Current (Iq)	
U1-19	Motor Exciting Current	
U1-20	Output Frequency After Soft-start	
U1-21	Automatic Speed Regulator Input	
U1-22	Automatic Speed Regulator Output	
U1-23	Speed Deviation Regulator Input	
U1-24	PID Feedback Amount	
U1-25	DI-16H Input Status	
U1-26	Output Voltage Reference (Vq)	
U1-27	Output Voltage Reference (Vd)	
U1-28	Software Number (CPU I.D. No.)	
U1-32	ACR (q-Axis) Output	
U1-33	ACR (d-Axis) Output	
U1-34	OPE Detected	
U2-01	Current Fault	
U2-02	Last Fault	
U2-03	Frequency Reference	
U2-04	Output Frequency	
U2-05	Output Current	
U2-06	Motor Speed	
U2-07	Output Voltage	
U2-08	DC Bus Voltage	
U2-09	Output Kilowatts	
U2-10	Torque Reference	
U2-11	Input Terminal Status	
U2-12	Output Terminal Status	
U2-13	Inverter Status	
U2-14	Elapsed Time	
U3-01	Last Fault	
U3-02	Fault Message 2	

Parameter	Function	Default
U3-03	Fault Message 3	
U3-04	Fault Message 4	
U3-05	Elapsed Time 1	
U3-06	Elapsed Time 2	
U3-07	Elapsed Time 3	
U3-08	Elapsed Time 4	

Yaskawa Axis Drive Parameters

Partner BR50

X-Axis	Y-Axis	Z-Axis
Model SDGB-44ADG	Model SDGB-10ADG	Model SDGB-10ADG
Cn-01=008CH	Cn-01=008CH	Cn-01=008CH
Cn-02=1000H	Cn-02=0000H	Cn-02=0001H
Cn-03=00156	Cn-03=00247	Cn-03=00370
Cn-04=00020	Cn-04=00028	Cn-04=00040
Cn-05=00500	Cn-05=00500	Cn-05=00400
Cn-06=00800	Cn-06=00800	Cn-06=00800
Cn-07=00000	Cn-07=00000	Cn-07=00000
Cn-08=00800	Cn-08=00800	Cn-08=00800
Cn-09=00800	Cn-09=00800	Cn-09=00800
Cn-0A=02625	Cn-0A=01661	Cn-0A=01107
Cn-0B=00020	Cn-0B=00020	Cn-0B=00020
Cn-0C=00200	Cn-0C=00800	Cn-0C=00800
Cn-0D=00000	Cn-0D=00000	Cn-0D=00000
Cn-0E=00000	Cn-0E=00000	Cn-0E=00000
Cn-0F=00000	Cn-0F=00000	Cn-0F=00000
Cn-10=00110	Cn-10=00100	Cn-10=00100
Cn-11=08192	Cn-11=08192	Cn-11=08192
Cn-12=00050	Cn-12=00050	Cn-12=00050
Cn-13=00030	Cn-13=00030	Cn-13=00030
Cn-14=10000	Cn-14=10000	Cn-14=10000
Cn-15=03000	Cn-15=03000	Cn-15=03000
Cn-16=00010	Cn-16=00010	Cn-16=00010
Cn-17=00010	Cn-17=00020	Cn-17=00020
Cn-18=00100	Cn-18=00100	Cn-18=00100
Cn-19=00100	Cn-19=00100	Cn-19=00100
Cn-1A=00040	Cn-1A=00028	Cn-1A=00028
Cn-1B=00007	Cn-1B=00007	Cn-1B=00007
Cn-1C=00000	Cn-1C=00000	Cn-1C=00000
Cn-1D=00000	Cn-1D=00000	Cn-1D=00000
Cn-1E=01024	Cn-1E=01024	Cn-1E=01024
Cn-1F=00120	Cn-1F=00100	Cn-1F=00100
Cn-20=00120	Cn-20=00200	Cn-20=00200
Cn-21=00120	Cn-21=00300	Cn-21=00300
Cn-22=00010	Cn-22=00006	Cn-22=00006
Cn-23=00000	Cn-23=00000	Cn-23=00000
Cn-24=00004	Cn-24=00004	Cn-24=00004
Cn-25=00001	Cn-25=00001	Cn-25=00001
Cn-26=00000	Cn-26=00000	Cn-26=00000
Cn-27=00000	Cn-27=00000	Cn-27=00000
Cn-28=00000	Cn-28=00000	Cn-28=00000
Cn-29=00010	Cn-29=00002	Cn-29=00002
Cn-2A=00147	Cn-2A=00143	Cn-2A=00143
Cn-2B=00000	Cn-2B=00000	Cn-2B=00000
Cn-2C=52500	Cn-2C=52500	Cn-2C=52500
Cn-2D=00410	Cn-2D=00410	Cn-2D=00410

Partner BR60

X-Axis	Y-Axis	Z-Axis
Model SDGB-44ADG	Model SDGB-10ADG	Model SDGB-10ADG
Cn-01=008CH	Cn-01=008CH	Cn-01=008CH
Cn-02=1000H	Cn-02=0000H	Cn-02=0001H
Cn-03=00208	Cn-03=00247	Cn-03=00370
Cn-04=00020	Cn-04=00028	Cn-04=00040
Cn-05=00500	Cn-05=00500	Cn-05=00400
Cn-06=00800	Cn-06=00800	Cn-06=00800
Cn-07=00000	Cn-07=00000	Cn-07=00000
Cn-08=00800	Cn-08=00800	Cn-08=00800
Cn-09=00800	Cn-09=00800	Cn-09=00800
Cn-0A=01968	Cn-0A=01661	Cn-0A=01107
Cn-0B=00020	Cn-0B=00020	Cn-0B=00020
Cn-0C=00200	Cn-0C=00800	Cn-0C=00800
Cn-0D=00000	Cn-0D=00000	Cn-0D=00000
Cn-0E=00000	Cn-0E=00000	Cn-0E=00000
Cn-0F=00000	Cn-0F=00000	Cn-0F=00000
Cn-10=00110	Cn-10=00100	Cn-10=00100
Cn-11=08192	Cn-11=08192	Cn-11=08192
Cn-12=00050	Cn-12=00050	Cn-12=00050
Cn-13=00030	Cn-13=00030	Cn-13=00030
Cn-14=10000	Cn-14=10000	Cn-14=10000
Cn-15=03000	Cn-15=03000	Cn-15=03000
Cn-16=00010	Cn-16=00010	Cn-16=00010
Cn-17=00010	Cn-17=00020	Cn-17=00020
Cn-18=00100	Cn-18=00100	Cn-18=00100
Cn-19=00100	Cn-19=00100	Cn-19=00100
Cn-1A=00040	Cn-1A=00028	Cn-1A=00028
Cn-1B=00007	Cn-1B=00007	Cn-1B=00007
Cn-1C=00000	Cn-1C=00000	Cn-1C=00000
Cn-1D=00000	Cn-1D=00000	Cn-1D=00000
Cn-1E=01024	Cn-1E=01024	Cn-1E=01024
Cn-1F=00120	Cn-1F=00100	Cn-1F=00100
Cn-20=00120	Cn-20=00200	Cn-20=00200
Cn-21=00120	Cn-21=00300	Cn-21=00300
Cn-22=00010	Cn-22=00006	Cn-22=00006
Cn-23=00000	Cn-23=00000	Cn-23=00000
Cn-24=00004	Cn-24=00004	Cn-24=00004
Cn-25=00001	Cn-25=00001	Cn-25=00001
Cn-26=00000	Cn-26=00000	Cn-26=00000
Cn-27=00000	Cn-27=00000	Cn-27=00000
Cn-28=00000	Cn-28=00000	Cn-28=00000
Cn-29=00010	Cn-29=00002	Cn-29=00002
Cn-2A=00147	Cn-2A=00143	Cn-2A=00143
Cn-2B=00000	Cn-2B=00000	Cn-2B=00000
Cn-2C=52500	Cn-2C=52500	Cn-2C=52500
Cn-2D=00410	Cn-2D=00410	Cn-2D=00410

Partner BR80

X-Axis	Y-Axis	Z-Axis
Model SDGB-44ADG	Model SDGB-10ADG	Model SDGB-10ADG
Cn-01=008CH	Cn-01=008CH	Cn-01=008CH
Cn-02=0000H	Cn-02=0000H	Cn-02=0001H
Cn-03=00208	Cn-03=00308	Cn-03=00370
Cn-04=00040	Cn-04=00028	Cn-04=00040
Cn-05=00960	Cn-05=00700	Cn-05=00400
Cn-06=00800	Cn-06=00800	Cn-06=00800
Cn-07=00000	Cn-07=00000	Cn-07=00000
Cn-08=00800	Cn-08=00800	Cn-08=00800
Cn-09=00800	Cn-09=00800	Cn-09=00800
Cn-0A=01968	Cn-0A=01329	Cn-0A=01107
Cn-0B=00020	Cn-0B=00020	Cn-0B=00020
Cn-0C=00200	Cn-0C=00800	Cn-0C=00800
Cn-0D=00000	Cn-0D=00000	Cn-0D=00000
Cn-0E=00000	Cn-0E=00000	Cn-0E=00000
Cn-0F=00000	Cn-0F=00000	Cn-0F=00000
Cn-10=00500	Cn-10=00100	Cn-10=00100
Cn-11=08192	Cn-11=08192	Cn-11=08192
Cn-12=00050	Cn-12=00050	Cn-12=00050
Cn-13=00030	Cn-13=00030	Cn-13=00030
Cn-14=10000	Cn-14=10000	Cn-14=10000
Cn-15=03000	Cn-15=03000	Cn-15=03000
Cn-16=00010	Cn-16=00010	Cn-16=00010
Cn-17=00007	Cn-17=00020	Cn-17=00020
Cn-18=00100	Cn-18=00100	Cn-18=00100
Cn-19=00100	Cn-19=00100	Cn-19=00100
Cn-1A=00016	Cn-1A=00028	Cn-1A=00028
Cn-1B=00007	Cn-1B=00007	Cn-1B=00007
Cn-1C=00000	Cn-1C=00000	Cn-1C=00000
Cn-1D=00000	Cn-1D=00000	Cn-1D=00000
Cn-1E=01024	Cn-1E=01024	Cn-1E=01024
Cn-1F=00100	Cn-1F=00100	Cn-1F=00100
Cn-20=00200	Cn-20=00200	Cn-20=00200
Cn-21=00300	Cn-21=00300	Cn-21=00300
Cn-22=00010	Cn-22=00006	Cn-22=00006
Cn-23=00000	Cn-23=00000	Cn-23=00000
Cn-24=00004	Cn-24=00004	Cn-24=00004
Cn-25=00001	Cn-25=00001	Cn-25=00001
Cn-26=00000	Cn-26=00000	Cn-26=00000
Cn-27=00000	Cn-27=00000	Cn-27=00000
Cn-28=00000	Cn-28=00000	Cn-28=00000
Cn-29=00010	Cn-29=00002	Cn-29=00002
Cn-2A=00147	Cn-2A=00143	Cn-2A=00143
Cn-2B=00000	Cn-2B=00000	Cn-2B=00000
Cn-2C=52500	Cn-2C=52500	Cn-2C=52500
Cn-2D=00410	Cn-2D=00410	Cn-2D=00410

Parameters for Troyke Indexer

For 6 in.	For 9 in.	For 10 in.	For 20 in.
Cn-01=008CH	Cn-01=008CH	Cn-01=008CH	Cn-01=008CH
Cn-02=0001H	Cn-02=0001H	Cn-02=0001H	Cn-02=0000H
Cn-03=00408	Cn-03=00409	Cn-03=00818	Cn-03=00819
Cn-04=00028	Cn-04=00028	Cn-04=00028	Cn-04=00028
Cn-05=02000	Cn-05=02000	Cn-05=02000	Cn-05=02000
Cn-06=00800	Cn-06=00800	Cn-06=00800	Cn-06=00800
Cn-07=00000	Cn-07=00000	Cn-07=00000	Cn-07=00000
Cn-08=00800	Cn-08=00800	Cn-08=00800	Cn-08=00800
Cn-09=00800	Cn-09=00800	Cn-09=00800	Cn-09=00800
Cn-0A=01000	Cn-0A=00500	Cn-0A=00500	Cn-0A=00250
Cn-0B=00020	Cn-0B=00020	Cn-0B=00020	Cn-0B=00020
Cn-0C=00800	Cn-0C=00800	Cn-0C=00800	Cn-0C=00800
Cn-0D=00000	Cn-0D=00000	Cn-0D=00000	Cn-0D=00000
Cn-0E=00000	Cn-0E=00000	Cn-0E=00000	Cn-0E=00000
Cn-0F=00000	Cn-0F=00000	Cn-0F=00000	Cn-0F=00000
Cn-10=00100	Cn-10=00100	Cn-10=00100	Cn-10=00100
Cn-11=08192	Cn-11=08192	Cn-11=08192	Cn-11=08192
Cn-12=00050	Cn-12=00050	Cn-12=00050	Cn-12=00050
Cn-13=00034	Cn-13=00034	Cn-13=00034	Cn-13=00034
Cn-14=10000	Cn-14=10000	Cn-14=10000	Cn-14=10000
Cn-15=03000	Cn-15=03000	Cn-15=03000	Cn-15=03000
Cn-16=00010	Cn-16=00010	Cn-16=00010	Cn-16=00010
Cn-17=00030	Cn-17=00030	Cn-17=00030	Cn-17=00030
Cn-18=00100	Cn-18=00100	Cn-18=00100	Cn-18=00100
Cn-19=00100	Cn-19=00100	Cn-19=00100	Cn-19=00100
Cn-1A=00028	Cn-1A=00028	Cn-1A=00028	Cn-1A=00028
Cn-1B=00007	Cn-1B=00007	Cn-1B=00007	Cn-1B=00007
Cn-1C=00000	Cn-1C=00000	Cn-1C=00000	Cn-1C=00000
Cn-1D=00000	Cn-1D=00000	Cn-1D=00000	Cn-1D=00000
Cn-1E=01024	Cn-1E=01024	Cn-1E=01024	Cn-1E=01024
Cn-1F=00100	Cn-1F=00100	Cn-1F=00100	Cn-1F=00100
Cn-20=00200	Cn-20=00200	Cn-20=00200	Cn-20=00200
Cn-21=00300	Cn-21=00300	Cn-21=00300	Cn-21=00300
Cn-22=00006	Cn-22=00006	Cn-22=00006	Cn-22=00006
Cn-23=00000	Cn-23=00000	Cn-23=00000	Cn-23=00000
Cn-24=00004	Cn-24=00004	Cn-24=00004	Cn-24=00004
Cn-25=00001	Cn-25=00001	Cn-25=00001	Cn-25=00001
Cn-26=00000	Cn-26=00000	Cn-26=00000	Cn-26=00000
Cn-27=00000	Cn-27=00000	Cn-27=00000	Cn-27=00000
Cn-28=00000	Cn-28=00000	Cn-28=00000	Cn-28=00000
Cn-29=00002	Cn-29=00002	Cn-29=00002	Cn-29=00002
Cn-2A=00143	Cn-2A=00143	Cn-2A=00143	Cn-2A=00143
Cn-2B=00000	Cn-2B=00000	Cn-2B=00000	Cn-2B=00000
Cn-2C=52500	Cn-2C=52500	Cn-2C=52500	Cn-2C=52500
Cn-2D=00410	Cn-2D=00410	Cn-2D=00410	Cn-2D=00410

Card Cage Gain Setting Procedure

Note: Perform only at the advice of a factory representative.

The motion control cards are pre-adjusted in the assembly area by commanding a move of 0.2048" and adjusting the gain pot so the analog is 5 volts. This adjustment can be made on the machine as well, but some parameters should be noted before making the adjustments.

Note 1: Before making any adjustments on the Centurion 6 make sure that the AXIS parameters "Velocity Gain" are set to zero and the machine is re-homed.

Note 2: The offset pots should be adjusted to show zero following error when the machine is at rest before making gain adjustments.

The gain adjustments done in the assembly area are done for moves on axes that have 10,000 pulses/inch. If the PPU on the machine is something other than 10,000 you must move a different distance. The 5 volts should be tuned in for a 2,048 pulse move.

Example 1:

A rotary axis has 500 pulses/degree. You should see 5 volts after a move of 4,096 degrees, (I.E. $10,000/500 \times 0.2048$)

Example 2:

A machine has a PPU of 10,160. You should see 5 volts after moving 0.2016 inches (I.E. $10,000/10,160 \times 0.2048$). In most cases this small difference is not significant.

Note 3: The encoder multiplier parameter will have no affect on the above adjustments.

Drive Setting Procedure

Note: Perform only at the advise of a factory representative.

After the motion control cards have been adjusted, the drives are tuned.

1. In AXIS parameters, check once again that Velocity Gain values are 0 (see above); check that Excess Error is set to 0.500; re-home the machine.
2. Use the hand-held digital operator to set CN-03 on Yaskawa axis drives. The correct value on all VM machines is 328. CN-03 is the equivalent of a gain pot. Move an axis at 100 ipm and observe the following error. It should be 0.050 for all axes on all machines, except rotary axes. Tweak the motion control card gain pot for final adjustment, to get as close to 0.050 as necessary.
3. If the machine has analog drives, then adjust the drive gain pot to set the following error at 100 ipm to 0.050 for all axes on all machines. Once again, the final adjustment may be made by tweaking the motion control card gain pot, if necessary.
4. If the axis PPU is something other than 10,000 you must tune the drives accordingly.
Example: A rotary axis has a PPU of 500. You should move the axis at 2,000 degrees per minutes (I.E. $10,000/500 \times 100$) and tune the drive so you see a following error of 1.000 degree (I.E. $10,000/500 \times 0.050$).
5. Test that you can achieve max rapid and that the following error at max rapid is correct. Check in AXIS parameters to see the value for max rapid, then use the following formula:

Following error at max rapid = max rapid/100 x 0.050.

Example: A VM24 has max rapids of 800 ipm. You should see a following error of .400 at full rapid (I.E. $800/100 \times .050 = .400$).

6. Go back into AXIS parameters and set Velocity Gain to 100. Re-home machine.

Centurion 6 CNC Connector Signal Listing

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 Yaskawa drive OK/Fault (jumped through JS3 to X-axis 9)	Pin 8 - Remote HW Coord 1
Pin 2 - Y-axis Yaskawa drive OK/Fault (jumped through JS3 to Y-axis 9)	Pin 9 - Remote HW Coord 2
Pin 3 - Z-axis Yaskawa drive OK/Fault (jumped through JS3 to Z-axis 9)	Pin 10 - Remote HW Coord 3
Pin 4 - A-axis Yaskawa drive OK/Fault(jumped through JS3 to A-axis 9)	Pin 11 - Remote HW set Coord
Pin 5 - B-axis Yaskawa 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

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

Centurion 6 CNC Connector Signal Listing

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
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 (For no ramps on CSM)	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 (DC Brush Drives)

Pin 1 - Channel A +	Pin 8 - +5 VDC
Pin 2 - Channel A -	Pin 9 - Axis fault/OK (jumped through JS3 to A-Input)
Pin 3 - Channel B +	Pin 10 - Axis home switch (also found on Home Connector)
Pin 4 - Channel B -	Pin 11 - Axis analog signal
Pin 5 - Marker -	Pin 12 - Axis analog ground
Pin 6 - Marker +	Pin 13 - Axis Enable/Disable (jumped through JS3 to A- Output)
Pin 7 - DC ground	Pin 14 - Key

Connectors X, Y, Z, A and B Axis (Yaskawa Brushless Drives)

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

Centurion 6 CNC Connector Signal Listing

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	

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	

Centurion 6 CNC Connector Signal Listing

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 COM2 For rigid tapping option

Pin 1 - Channel A +	Pin 4 - Channel B -	Pin 7 - +5 VDC
Pin 2 - Channel A -	Pin 5 - Marker +	Pin 8 - DC Ground
Pin 3 - Channel B +	Pin 6 - Marker -	Pin 9 - No connect

Connector Floppy Disk

Standard IBM personal computer floppy disk drive data port

Connector CRT (Video)

Pin 1 - VGA red signal return	Pin 14 - VGA red signal
Pin 2 - VGA green signal return	Pin 15 - VGA green signal
Pin 3 - VGA blue signal return	Pin 16 - VGA blue signal
Pin 4 - Digital ground	Pin 17 - VGA vertical synch.
Pin 5 - VGA synch. Return	Pin 18 - VGA horizontal synch.
Pin 6 - No connect	Pin 19 - No connect
Pin 7 - No connect	Pin 20 - No connect
Pin 8 - Serial I/O TXD	Pin 21 - Serial I/O RXD
Pin 9 - Front panel handwheel channel A +	Pin 22 - Front panel handwheel channel A -
Pin 10 - Front panel handwheel channel B +	Pin 23 - Front panel handwheel channel B -
Pin 11 - Cable shield	Pin 24 - Keyboard ATCLK
Pin 12 - DC ground	Pin 25 - Keyboard ATDAT
Pin 13 - DC ground	

Connectors in the CNC control box

Connector CRT (Monitor Power)

Pin 1 -	Monitor power 110 VAC line
Pin 3 -	Monitor power 110 VAC return
Pin 14 -	Monitor chassis ground
(All other pins are no connect)	

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

Centurion 6 CNC Connector Signal Listing

- | | |
|---|-----------------------------------|
| 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 |

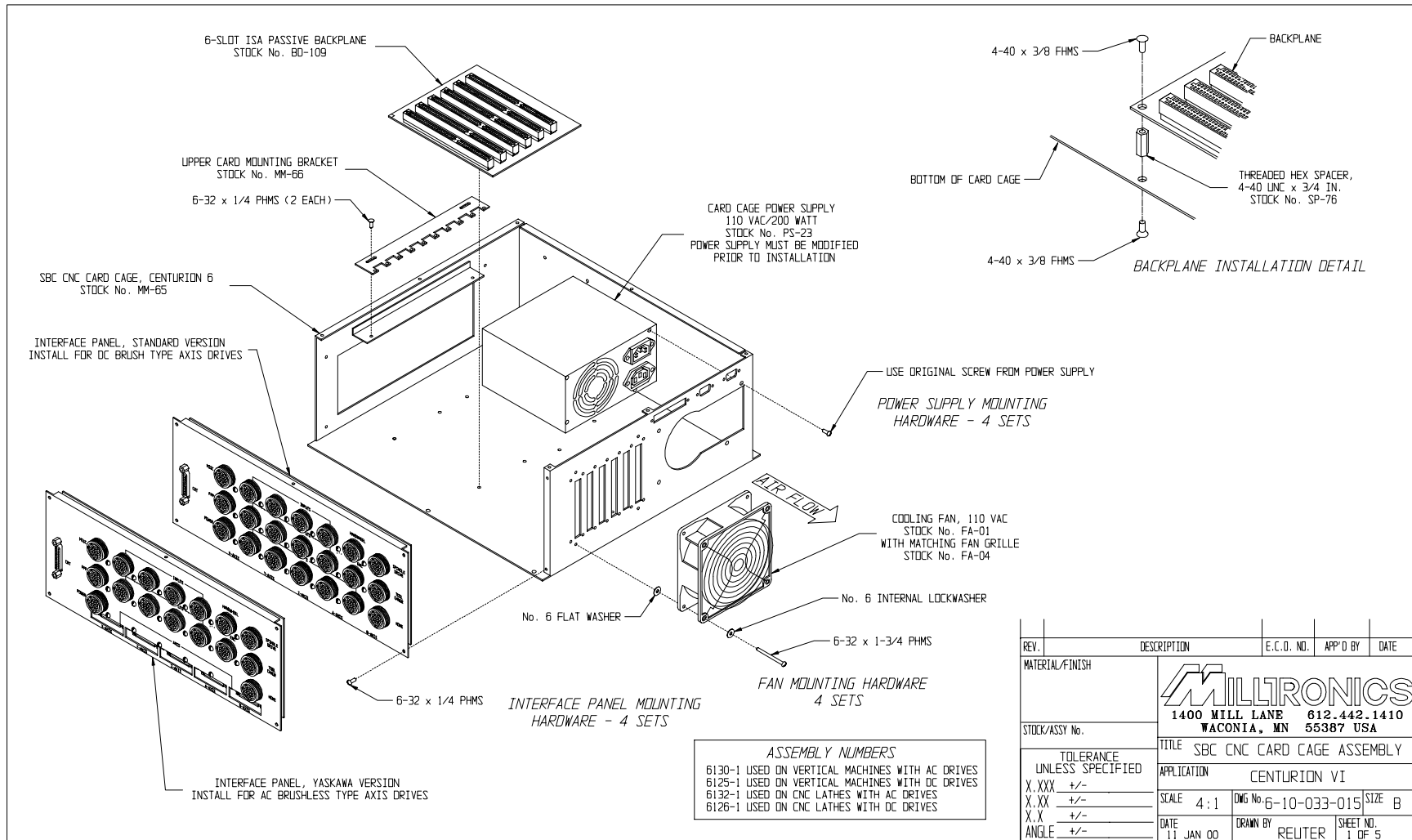
Connector on +24 VDC Regulated Power Supply

- | | |
|------------------------|---------------------|
| 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 |

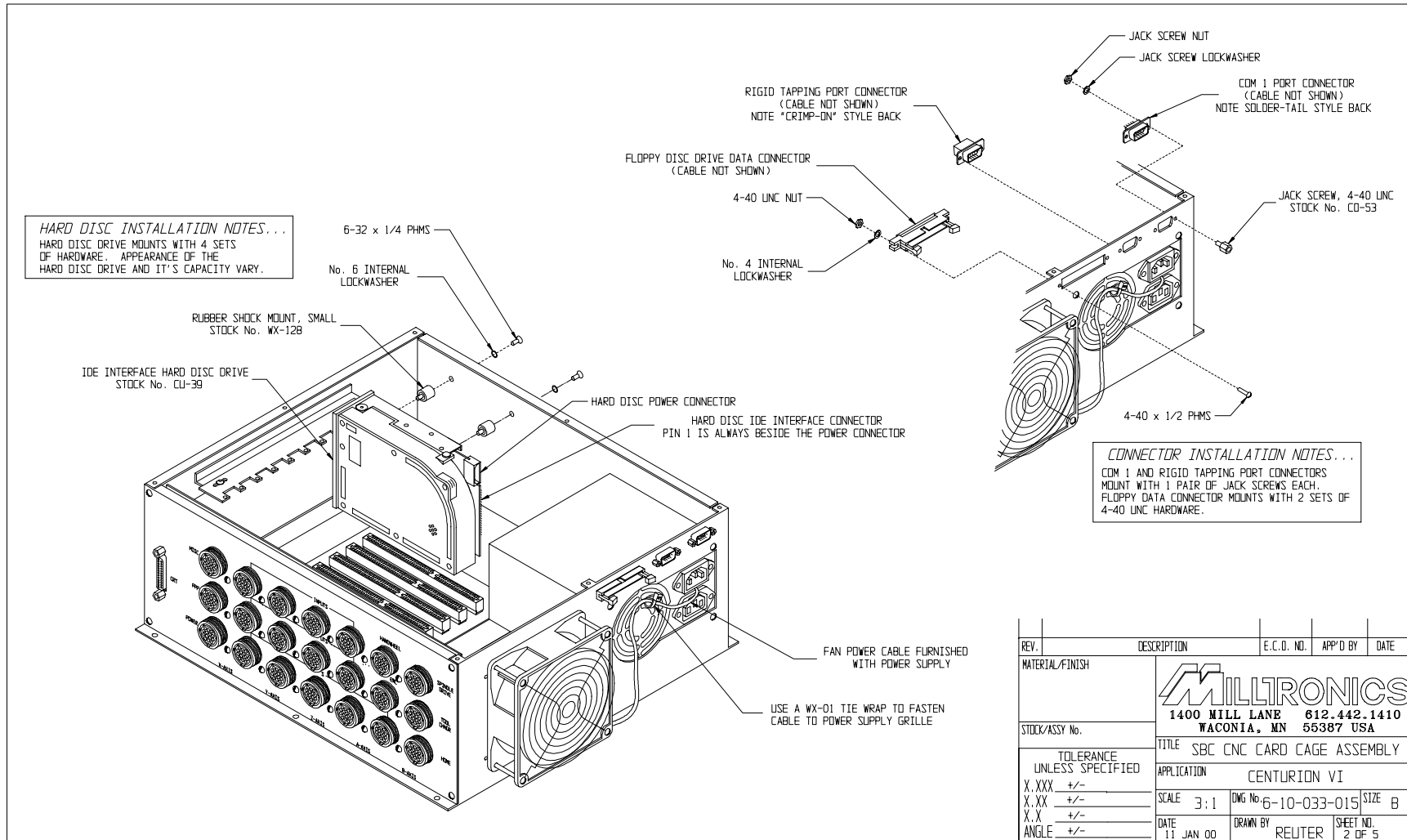
Connector COM1 (on Mag Panel)

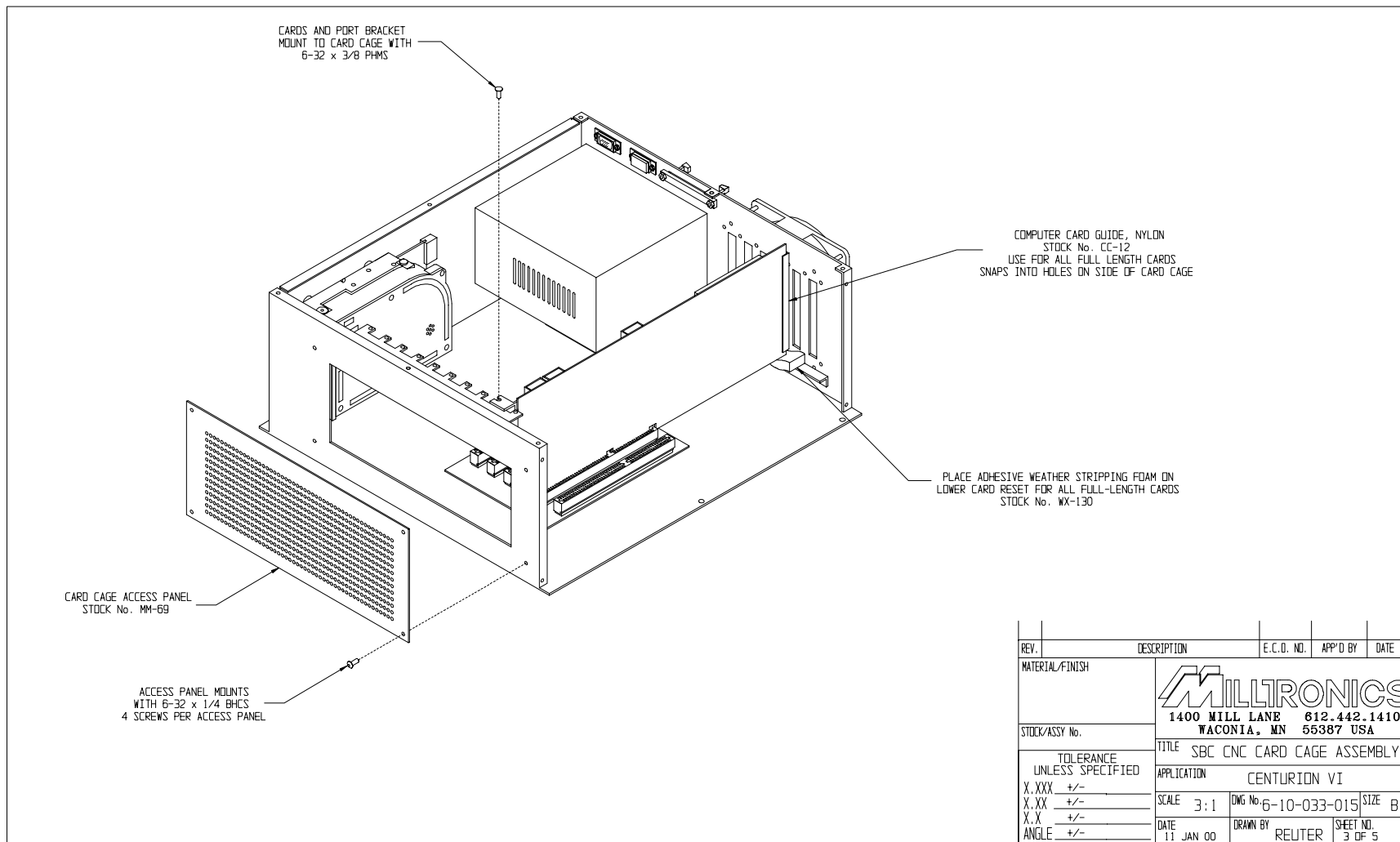
- Pin 2 - RXD
Pin 3 - TXD
Pin 7 - Ground
All other pins no connect

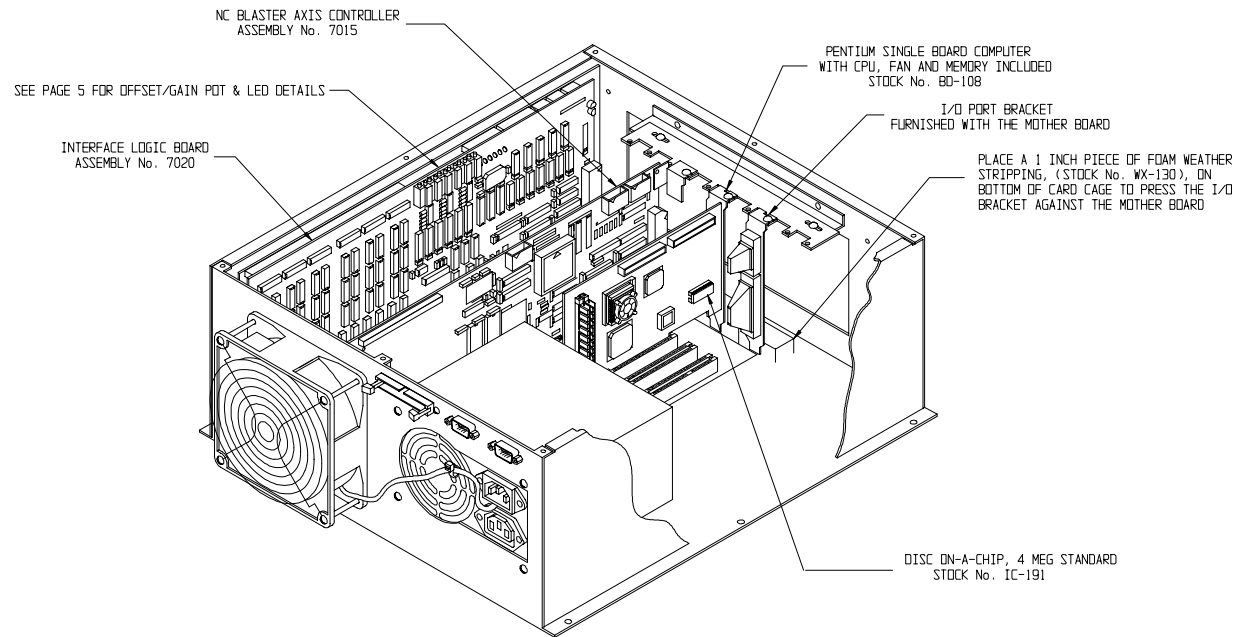
Card Cage Assembly



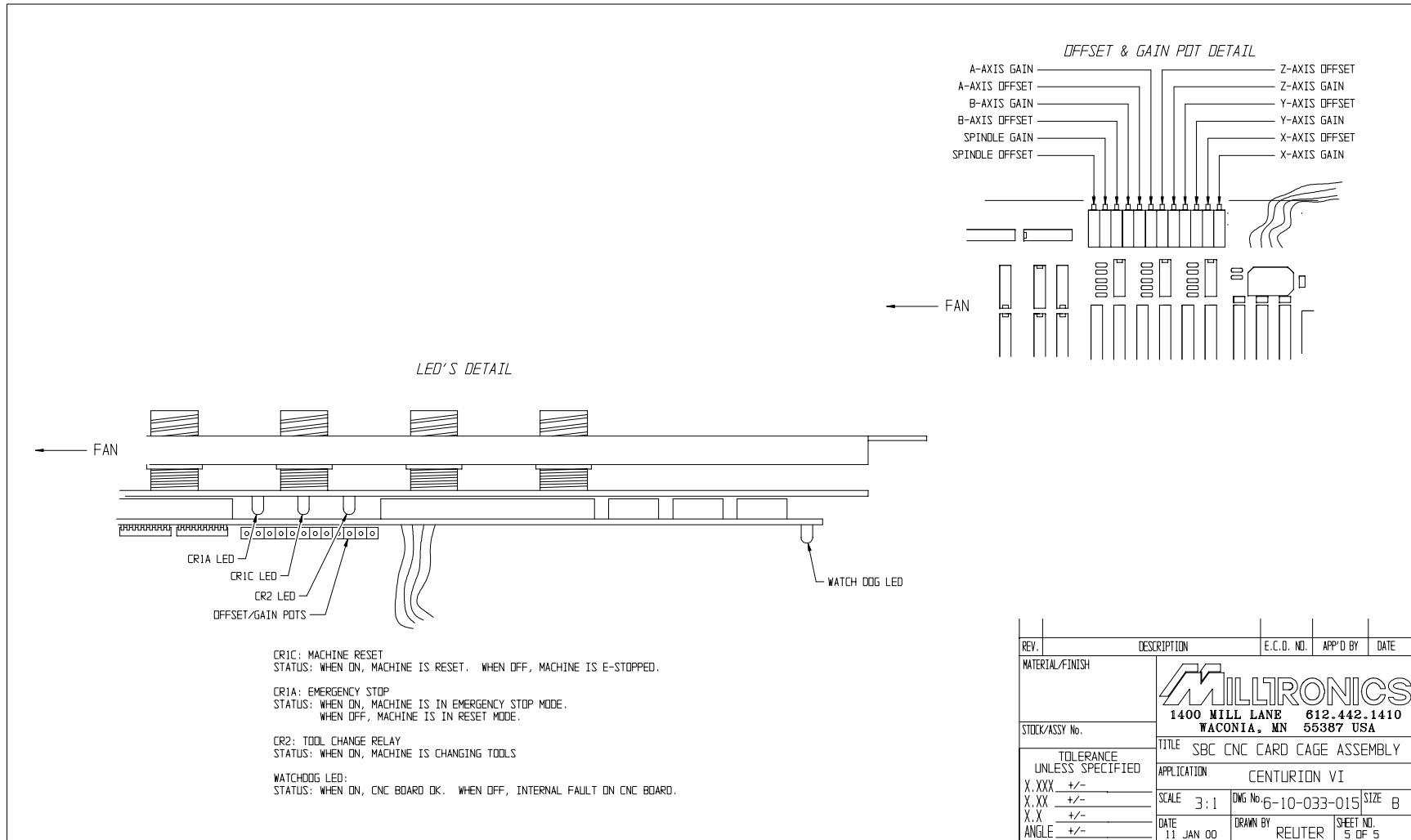
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH	 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA			
STOCK/ASSY No.	TITLE	SBC CNC CARD CAGE ASSEMBLY		
TOLERANCE UNLESS SPECIFIED	APPLICATION	CENTURION VI		
X.XXX +/-	SCALE	4:1	DWG No. 6-10-033-015	SIZE B
X.XX +/-	DATE	11 JAN 00	DRAWN BY	REUTER
X.X +/-				SHEET NO. 1 OF 5
ANGLE +/-				







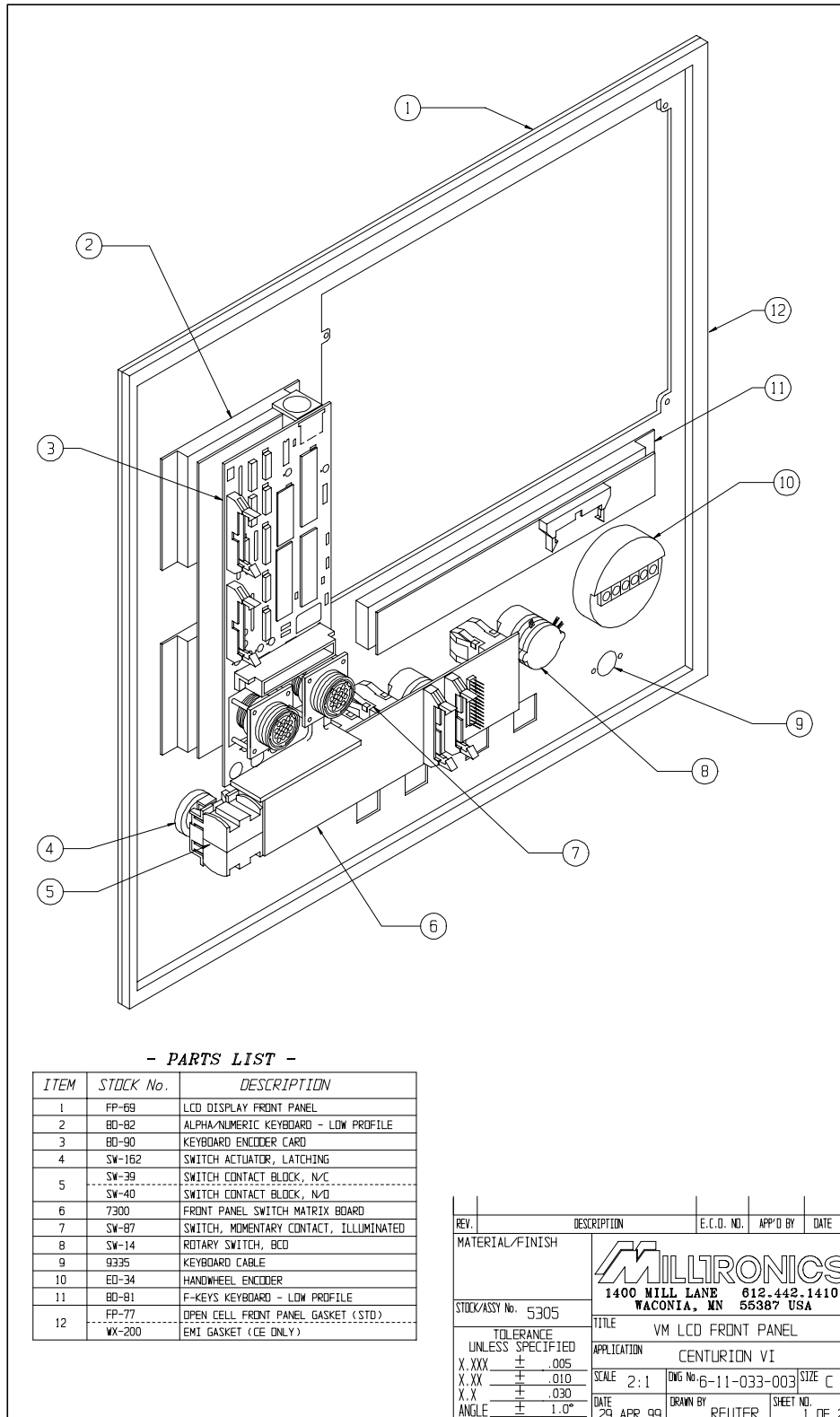
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE SBC CNC CARD CAGE ASSEMBLY		
X.XXX +/-		APPLICATION CENTURION VI		
X.XX +/-		SCALE 3:1 DWG No. 6-10-033-015 SIZE B		
X.X +/-		DATE 11 JAN 00 DRAWN BY REUTER SHEET NO. 4 OF 5		
ANGLE +/-				

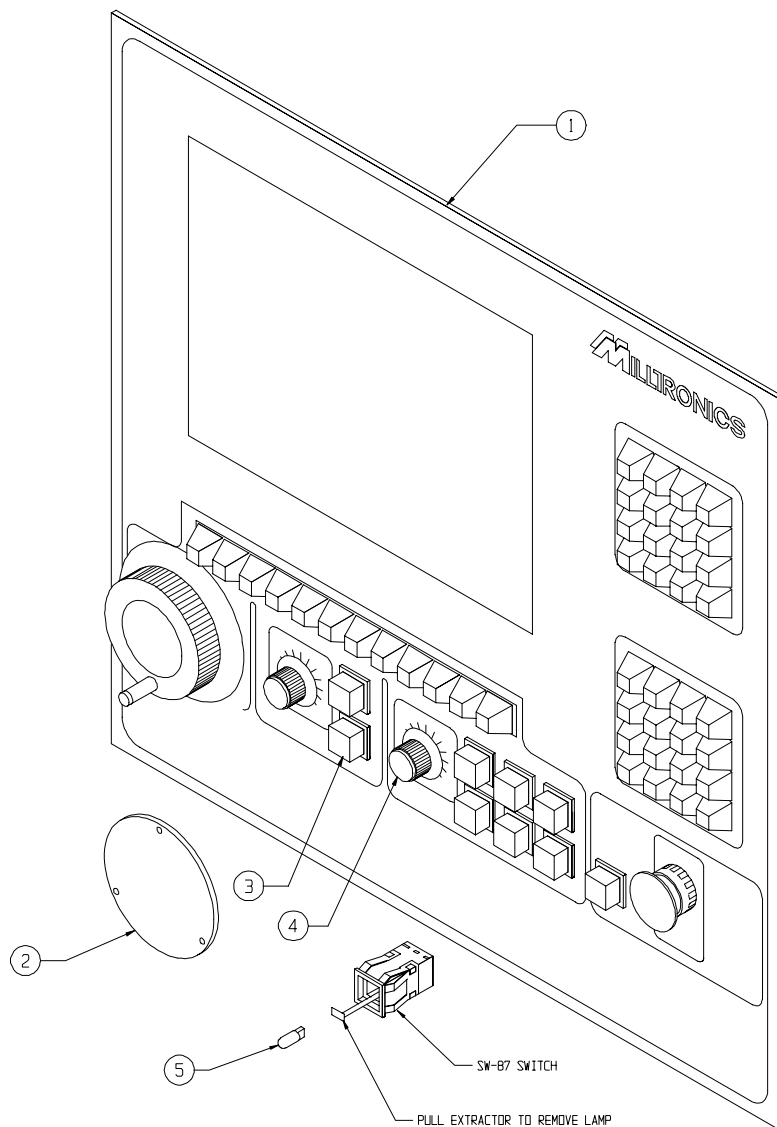


REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		MILLIRONICS 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE SBC CNC CARD CAGE ASSEMBLY		
X.XXX +/-		APPLICATION CENTURION VI		
X.XX +/-		SCALE 3:1		
X.X +/-		DWG NO. 6-10-033-015		
ANGLE +/-		DATE 11 JAN 00		
		DRAWN BY REUTER		
		SHEET NO. 5 OF 5		

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LCD Front Panel Assembly



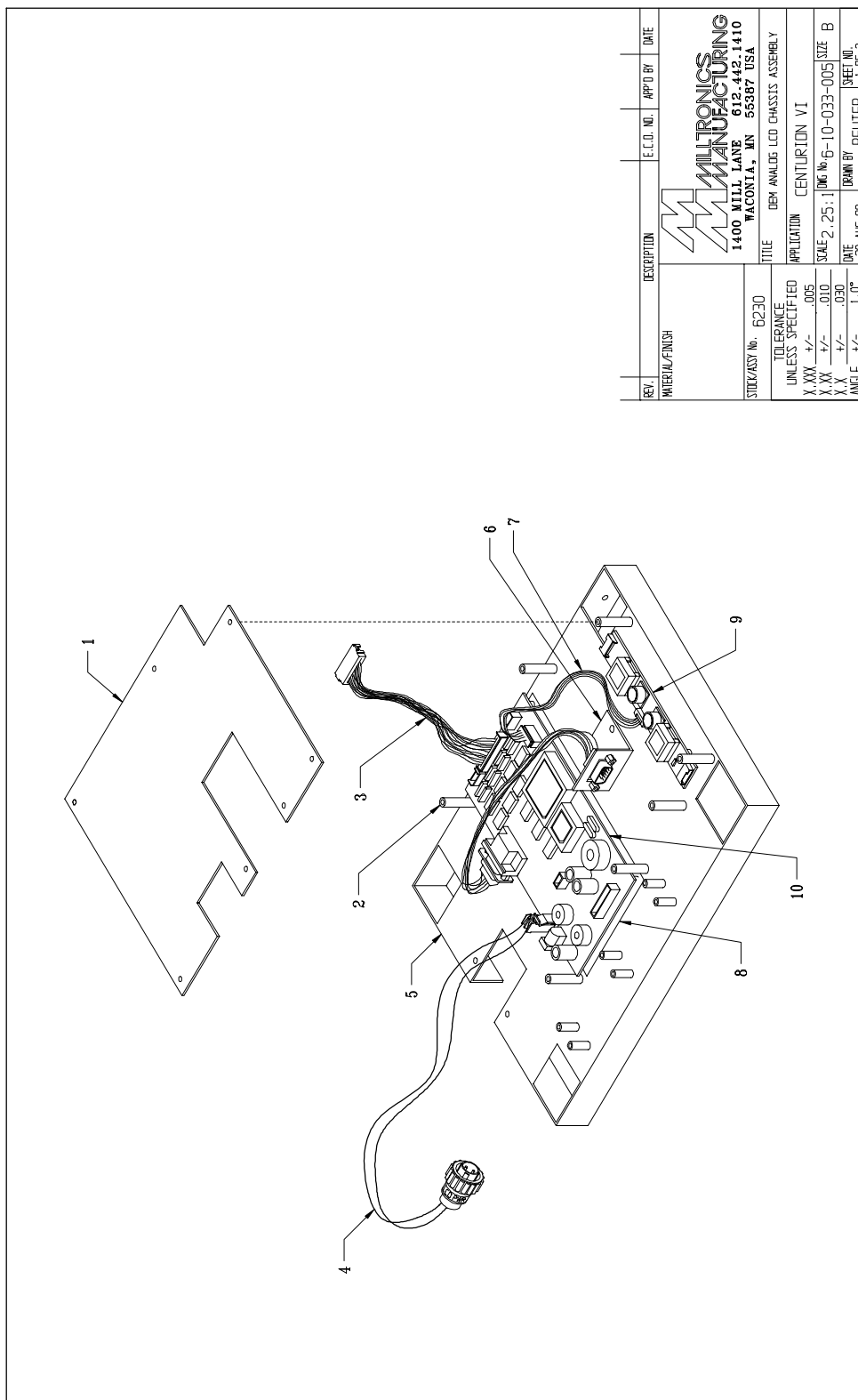


- PARTS LIST -

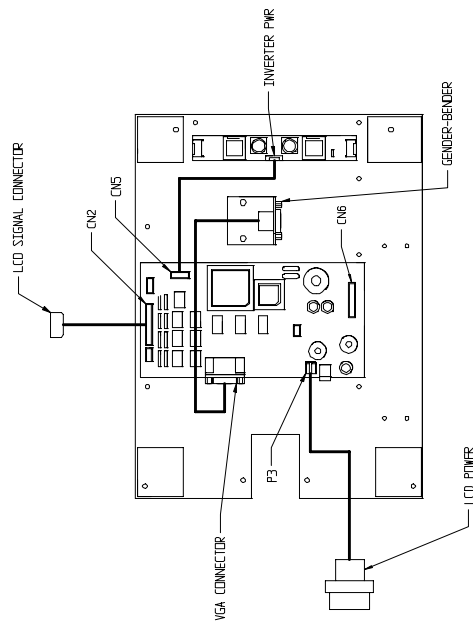
ITEM	STOCK No.	DESCRIPTION
1	FP-74	VM FRONT PANEL OVERLAY
2	MP-70	ENCODER HOLE COVER (WHEN USED)
3	SW-89	SQUARE KEYTOP, RED
	SW-88	SQUARE KEYTOP, GREEN
	SW-90	SQUARE KEYTOP, WHITE
5	SW-35	SWITCH KNOB
5	SW-92	SWITCH LAMP, 24 VOLT

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA				
STOCK/ASSY No. 5305				
TITLE VM LCD FRONT PANEL				
APPLICATION CENTURION VI				
SCALE 2:1 DWG No 6-11-033-003 SIZE C				
DATE 29 APR 99 DRAWN BY REUTER SHEET NO. 2 OF 2				
TOLERANCE UNLESS SPECIFIED X.XXX ± .005 X.XX ± .010 X.X ± .030 ANGLE ± 1.0°				

LCD Chassis Assembly



REV.	DESCRIPTION	E.C.D. NO.	APPRO. BY	DATE
	MATERIAL/FINISH			
	STOCK/CAST No. 6230			
	TOLERANCE UNLESS SPECIFIED			
	X.XX +/- .005			
	X.XX +/- .010			
	X.X +/- .030			
	ANGLE +/- 1.0°			
	TITLE DEM ANALOG LCD CHASSIS ASSEMBLY			
	APPLICATION CENTURION VI			
	SCALE 2.25:1 DWG No. 6-10-033-005 SIZE B			
	DATE 20 AUG 98			
	DRAWN BY REUTER			
	SHEET NO. 1 OF 2			



-INSTRUCTIONS-

1. MOUNT THE VGA FENDER-BENDER TO THE CHASSIS WITH 6-32 x 1/2 RHMS AND No. 8 LOCKWASHERS.
2. PLACE THE WX-242 INSULATOR SO IT LIES UNDER THE DIGITAL VIEW BOARD. INDEX THE INSULATOR WITH THE MOUNTING STANDOFFS FOR THE PC BOARD.
3. INSTALL THE ANALOG-TO-DIGITAL CONVERSION BOARD. THE WIRES FROM THE VGA FENDER-BENDER MUST LIE UNDER THE CONVERSION BOARD. USE THE 1/4 RHMS AND NO. 8 LOCKWASHERS TO SECURE IT. ATTACH THE OTHER END OF THE VGA FENDER-BENDER TO THE VGA CONNECTOR ON THE CONVERSION BOARD AND SECURE WITH THE CONNECTOR SCREWS.
4. MOUNT THE ICCT INVERTER BOARD TO THE CHASSIS WITH 4-40 x 1/4 RHMS AND LOCKWASHERS. CONNECT THE INVERTER POWER CABLE TO THE INVERTER BOARD. (SMALLER PLUG). CONNECT THE OTHER END TO THE CONVERSION BOARD CONNECTOR "CNS". THESE PLUGS ARE KEVED TO FIT ONLY ONE WAY ON EITHER BOARD'S CONNECTORS.
5. PLUG THE ANALOG LCD POWER CABLE. (2-PIN END), INTO THE "P3" CONNECTOR ON THE CONVERSION BOARD.
6. CONNECT THE CUAL IN-LINE END OF THE LCD SIGNAL CABLE INTO "CNS" CONNECTOR ON THE CONVERSION BOARD. THIS CONNECTOR IS KEVED AND WILL FIT ONLY ONE WAY. CONTAIN THE LOOSE WIRES OF THE CABLE WITH WK-01 TIE WRAPS.
7. PLACE NO. 8 INTERNAL LOCKWASHERS ON THE 6-32 STUDS. THESE ARE THE ONLY STUDS ON THE CHASSIS. THEN SCREW ON THE SP-58 SPACERS.
8. PLACE THE LCD CHASSIS COVER ON THE COMPLETED ASSEMBLY AND USE 6-32 x 1/4 RHMS AND LOCKWASHERS TO SECURE IT IN PLACE.

- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	PL-63	LCD CHASSIS BACK COVER DNG No. 6-01-033-042
2	SP-98	6-32 x 1-1/4 FEMALE/FEMALE HEX SPACER
3	CB-42	DIV/SHARP LCD SIGNAL CABLE DIGITAL VIEW No. 234-30
4	9496	ANALOG LCD POWER CABLE DNG. No. 6-04-033-079
5	BR-95	12 TN. LCD DISPLAY CARRIER DNG No. 6-01-033-023
6	9497	ANALOG VGA GENDER-BENDER ASSEMBLY DNG No. 6-04-033-080
7	CB-41	HDI/4034/5520 POWER CABLE DIGITAL VIEW No. 420680170
8	WK-242	DIGITAL VIEW PCB INSULATOR DNG No. 6-01-033-047
9	PS-44	CERT BOARD/RIGHT INVERTER XENON No. 13320
10	BO-80	ANALOG LCD DISPLAY CONVERSION BOARD

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/CAST NO. 6230		TITLE DEM ANALOG LCO CHASSIS ASSEMBLY		
TOLERANCE UNLESS SPECIFIED		APPLICATION CENTURION VI		
X .XXX	+/- .005	SCALE 2.25:1 Dwg No 6-10-033-005 SIZE B		
X .XX	+/- .010	DATE 10/10/03 DRAWN BY DECATED SHEET NO.		
X .X	+/- .030			
X .XX	+/- 1.0"			