

Electrical Operations Manual

Partner 8 & 9

Milltronics Manufacturing Company

1400 Mill Lane
Waconia, MN 55387

Phone (952) 442-1401
Fax (952) 442-1407

Belt driven head bearings:

Lower spindle thrust (7014TBT) x 3

Upper spindle radial (6013) x 2

Gear driven spindle bearings:

Lower spindle thrust (7014TBT)x 3

Upper spindle radial (6212) x 2

Upper motor shaft (6210)

Lower motor shaft (6209) BG-20

Upper , lower idler (6206) BG-14 x4

All axis thrust bearings (Fafnir
MM30BS62H)

All axis radial bearings (6206) BG-14 x
2

CENTURION V MILL INTERFACE PLUGS DESIGNATION
PC-INTF-01 29-Jan-91

14 PIN AMP PLUGS

| Pin No. | MISC. | FRONT PANEL | POWER PLUG | ENCODER PLUG |
|---------|----------|-------------|------------|--------------|
| 1 | N.C. | +5VDC | +5VDC | +CH. A |
| 2 | N.C. | GND | +5VDC | -CH. A |
| 3 | N.C. | KEY | +5VDC | +CH. B |
| 4 | N.C. | +24VDC | +24VDC | -CH. B |
| 5 | KEY | +12VDC | N.C. | +MARK |
| 6 | GND | -12VDC | +12VDC | -MARK |
| 7 | RESET 1 | RESET 1 | -12VDC | GND |
| 8 | RESET 2 | RESET 2 | N.C. | +5VDC |
| 9 | TCHNG 1 | TCHNG 1 | KEY | GND |
| 10 | TCHNG 2 | TCHNG 2 | GND | GRID |
| 11 | ESTOP 1A | ESTOP 1B | GND | SIGNAL |
| 12 | ESTOP 2 | ESTOP 2 | GND | GND |
| 13 | SP. ANA. | SP. ANA. | GND | GND |
| 14 | GND | GND | GND | KEY |

| PIN | X INPUTS | DESCRIPTION | X OUTPUTS | DESCRIPTION |
|-----|-------------|------------------------|---------------------------|----------------|
| 1 | IN. 1 | E-STOP | OUT. 1 | EXCESS ERROR |
| 2 | IN. 2 | SPINDLE CW | OUT. 2 | SPRAY MIST |
| 3 | IN. 3 | SPINDLE CCW | OUT. 3 | FLOOD |
| 4 | IN. 4 | UP TO SPEED | OUT. 4 | SPINDLE CW |
| 5 | IN. 5 | IN TOOL CHANGE | OUT. 5 | SPINDLE CCW |
| 6 | IN. 6 | LUBE FAULT | OUT. 6 | SPINDLE STOP |
| 7 | IN. 7 | WAIT CHANNEL | OUT. 7 | SPINDLE ENB. |
| 8 | IN. 8 | ZERO SPEED | OUT. 8 | TCH RESET |
| 9 | IN. 9 | SPARE | OUT. 9 | ALLOW RESET |
| 10 | IN. 10 | SPINDLE REVERSE | OUT. 10 | M-10 (PULSE) |
| 11 | IN. 11 | DIGITIZING | OUT. 11 | M-11 (PULSE) |
| 12 | KEY | | OUT. 12 | 4TH AXIS BRAKE |
| | | (Set M-10, Clear M-11) | | |
| 13 | N/O CONTACT | ACROLOOP (P2) | KEY | |
| 14 | N/C CONTACT | ACROLOOP (P2) | CONTACT COM.ACROLOOP (P2) | |

PROCEDURE TO CHANGE MITSUBISHI PARAMETERS
Partner 8

1. LED display should read "R.....0".
2. Depress mode switch until LED display reads "01.....".
3. Depress set switch. Data on LED display will flicker.
4. Depress up or down switch to change data.
5. Depress set switch to store data.
6. Depress up switch to go to next parameter.
7. Go to step 3 and repeat until parameter 01 reappears.
8. Depress mode switch to go to next set of parameters and repeat steps 3 thru 7.
9. After setting all parameters, depress switch PB1 to set all new parameters.

PARTNER 8
Mitsubishi Spindle Parameters

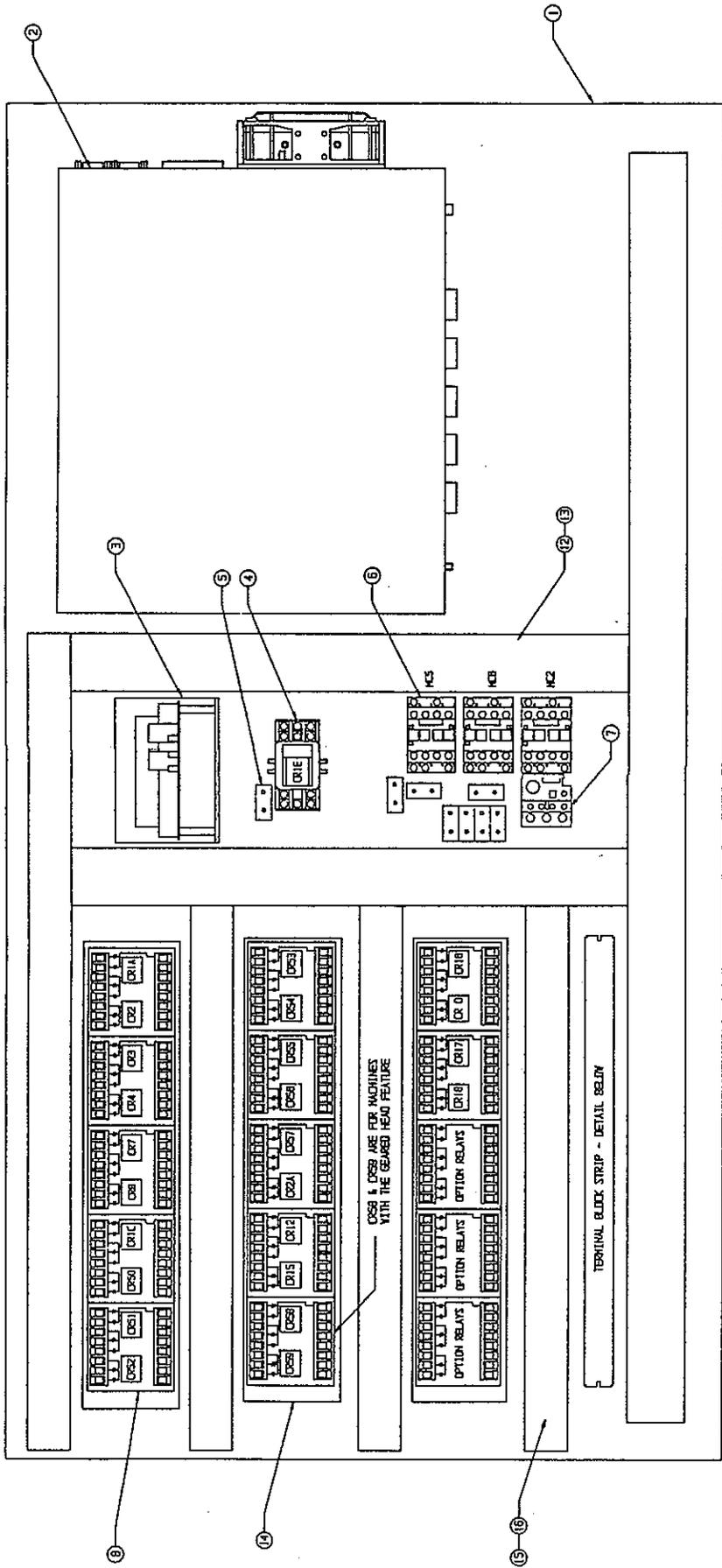
| <u>Par. #</u> | <u>Symbol</u> | <u>Description</u> | <u>Data</u> | <u>Unit Setting</u> |
|---------------|---------------|--|-------------|---------------------|
| 01 | NOX | Motor Type | 2 | DEC |
| 02 | MLS | Motor Selection | 5 | DEC |
| 03 | PLG | Position Loop Encoder Pulses | 0 | DEC |
| 04 | MOD | Interface Mode Remote/Bus | 0 | DEC |
| 05 | DSR | Speed Reference Signal | 0 | DEC |
| 06 | MON | Output Monitor Selection | 0 | DEC |
| 07 | O1SL | Not Used | 0 | |
| 08 | O2SL | Not Used | 0 | |
| 09 | I1SL | Auxiliary Input Selection | 0 | DEC |
| 0A | I2SL | Not Used | 0 | |
| 0B | VOP | Analog Speed Reference Offset | 0 | DEC |
| 0C | VON | Not Used | 0 | |
| 0D | VGP | Analog Speed Reference Gain | 1000 | DEC |
| 0E thru 20 | | Not Used | 0 | |
| 21 | PG1 | Spindle Orientation, First Decel Point | 133 | MS |
| 22 | PG2 | Spindle Orientation, Second Decel Point | 20 | DEG |
| 23 | PGL | Sync Tap C Axis Control Position Gain | 60 | RAD |
| 24 | ZRZ | Spindle Orientation In Position Range | 48 | DEG |
| 25 | OSP | Spindle Orientation Speed | 220 | RPM |
| 26 | CSP | Creep Speed | 30 | RPM |
| 27 | PST | Oriented Spindle Stop Position | 2048 | DEG |
| 28 thru 2E | | Not Used | 0 | |
| 2F | ORS1 | Oriented Spindle Stop Control | 7701 | HEX |
| 30 | ORS2 | Oriented Spindle Stop Control | 600 | HEX |
| 31 | TSP | Maximum Motor Speed | 600 | RPM |
| 32 | ZSP | Zero Speed Output Speed | 50 | RPM |
| 33 | CSN | Acceleration Time Constant | 50 | MS |
| 34 | SDT | Speed Detection | 10 | PER |
| 35 | TLM | Torque Limit | 10 | PER |
| 36 | YKP | Speed Loop Proportional Gain | 63 | RAD/S |
| 37 | VKI | Speed Loop Integral Gain | 60 | RAD/S |
| 38 | TYP | Transition To Position Loop | 1 | DEC |
| 39 | GRA1 | # Gear Teeth Spindle Side 00 | 7 | HEX |
| 3A | GRA2 | # Gear Teeth Spindle Side 01 | 1 | HEX |
| 3B | GRA3 | # Gear Teeth Spindle Side 10 | 1 | HEX |
| 3C | GRA4 | # Gear Teeth Spindle Side 11 | 1 | HEX |
| 3D | GRB1 | # Gear Teeth Motor Side 00 | 2 | HEX |
| 3E | GRB2 | # Gear Teeth Motor Side 01 | 1 | HEX |
| 3F | GRB3 | # Gear Teeth Motor Side 10 | 1 | HEX |
| 40 | GRB4 | # Gear Teeth Motor Side 11 | 1 | HEX |
| 41 | OSL | Type of Spindle Orientation | 2 | HEX |
| 42 | BSK | Bit Assignment for Spindle Orient | 0 | HEX |
| 43 | | Not Used | 0 | |

| <u>Par. #</u> | <u>Symbol</u> | <u>Description</u> | <u>Data</u> | <u>Unit Setting</u> |
|---------------|---------------|------------------------------------|-------------|---------------------|
| 44 | CPI | Position Control Loop | 0 | HEX |
| 45 | CWT | Setting for Position Loop Control | 0 | HEX |
| 46 thru 48 | | Not Used | 0 | |
| 49 | GAH1 | Aux. # Gear Teeth Spindle Side 00 | 0 | HEX |
| 4A | GAH2 | Aux. # Gear Teeth Spindle Side 01 | 0 | HEX |
| 4B | GAH3 | Aux. # Gear Teeth Spindle Side 10 | 0 | HEX |
| 4C | GAH4 | Aux. # Gear Teeth Spindle Side 11 | 0 | HEX |
| 4D | GBH1 | Aux. # Gear Teeth Motor Side 00 | 0 | HEX |
| 4E | GBH2 | Aux. # Gear Teeth Motor Side 01 | 0 | HEX |
| 4F | GBH3 | Aux. # Gear Teeth Motor Side 10 | 0 | HEX |
| 50 | GBH4 | Aux. # Gear Teeth Motor Side 11 | 0 | HEX |
| 51 | SERR | | 50 | DEC |
| 52 | SETM | | 12 | DEC |
| 53 | ZSTM | | 200 | DEC |
| 54 | UTTM | | 1000 | DEC |
| 55 | SDEF | | 25 | DEC |
| 56 | SADN | | 4 | DEC |
| 57 | PEKO | | FF30 | HEX |
| 58 | CVHS | | 0 | DEC |
| 59 | SVSP | Servo Shift Speed | 40 | DEC |
| 5A | PDT | Deceleration Point Home Return | 88 | DEC |
| 5B | POS | In Position Range Output | 10 | HEX |
| 5C | PZSFL | Zero Return Shift Low Byte | 0 | HEX |
| 5D | DZSPH | Zero Return Shift High Byte | 0 | HEX |
| 5E | DCSN | Cushion to Suppress Gear Sound | 1 | DEC |
| 5F | PYX | Excitation for Gear, Load Response | 0 | DEC |
| 60 thru 7F | | Not Used | 0 | |
| 80 | TOUT | | 1000 | HEX |
| 81 | SMAX | | 2710 | HEX |
| 82 | TOPR | | 369D | HEX |
| 83 | BUNH | | A | HEX |
| 84 | FBCX | | 170A | HEX |
| 85 | KWP | | 3DE | HEX |
| 86 | KWI | | 548 | HEX |
| 87 | KWF | | 285 | HEX |
| 88 | TMST | | 17F5 | HEX |
| 89 | TMLD | | 2D2C | HEX |
| 8A | TMLS | | 3878 | HEX |
| 8B | ERLT | | CCC | HEX |
| 8C | WRP | | 1893 | HEX |
| 8D | WRB | | 831 | HEX |
| 8E | FLXC | | 674 | HEX |
| 8F | MMAX | | 2AE1 | HEX |
| 90 | MMIN | | 2000 | HEX |
| 91 | MB | | 195 | HEX |
| 92 | MA | | BF | HEX |
| 93 | KM | | 8A6 | HEX |
| 94 | KFP | | 4A3 | HEX |
| 95 | KFI | | A8E | HEX |
| 96 | PYMX | | C68 | HEX |
| 97 | K1P | | 8D | HEX |

| <u>Par. #</u> | <u>Symbol</u> | <u>Description</u> | <u>Data</u> | <u>Unit Setting</u> |
|---------------|---------------|-------------------------------|-------------|---------------------|
| 98 | KWSO | | 10 | HEX |
| 99 | KWS | | 22B | HEX |
| 9A | GCD | | 1657 | HEX |
| 9B | GCQ | | 1781 | HEX |
| 9C | KUV | | 5C1 | HEX |
| 9D | KDI | | 247 | HEX |
| 9E | KQI | | 247 | HEX |
| 9F | DILT | | 41E | HEX |
| A0 | QILT | | 41E | HEX |
| A1 | KI1 | | 101 | HEX |
| A2 | I1LD | | 2DDF | HEX |
| A3 | I1LS | | 3957 | HEX |
| A4 | X1.X2 | | 1A0D | HEX |
| A5 | X3.X4 | | FF26 | HEX |
| A6 | Y0.Y1 | | BFFF | HEX |
| A7 | Y2.Y3 | | 8099 | HEX |
| A8 | Y4PLX | | 40 | HEX |
| A9 | SPO | | 0 | HEX |
| AA | SBS | | 0 | HEX |
| AB | SIQ | | 0 | HEX |
| AC | DPO | | 0 | HEX |
| AD | DBS | | 0 | HEX |
| AE | DIQ | | 0 | HEX |
| AF | BSD | | 0 | HEX |
| B0 | IGF | Not Used | 0 | HEX |
| B1 | CSMAX | | 0 | HEX |
| B2 | CTOPR | | 0 | HEX |
| B3 | CBUNH | | 0 | HEX |
| B4 | CF8CX | | 0 | HEX |
| B5 | CKWP | | 0 | HEX |
| B6 | CKWI | | 0 | HEX |
| B7 | CKWF | | 0 | HEX |
| B8 | CKWSO | | 0 | HEX |
| B9 | CKWS | | 0 | HEX |
| BA | CKI1 | | 0 | HEX |
| BB | CSFT | | 0 | HEX |
| BC thru | C0 | Not Used | 0 | |
| C1 | OM1 | PG1 Decel Point For Each Gear | 0 | HEX |
| C2 | OM1 | PG1 Decel Point for Each Gear | 0 | HEX |
| C3 | OM2 | PG2 Decel Point for Each Gear | 0 | HEX |
| C4 | OM2 | PG2 Decel Point for Each Gear | 0 | HEX |
| C5 thru | F6 | Not Used | | |
| F7 | OLS | | 100 | DEC |
| F8 | OLL | | 8C | HEX |
| F9 | OIT | | 600 | DEC |
| FA | HSS | | 0 | HEX |
| FB thru | FF | Not Used | | |

MITSUBISHI SPINDLE ALARM LIST

| <u>No.</u> | <u>Content</u> | <u>Fix*</u> | <u>*Key to Fixes</u> |
|------------|-------------------------------------|-------------|--|
| 10 | Voltage down | PR | PR: Reset by turning off power supply of NC |
| 11 | | | |
| 12 | Memory fault 1 | AR | AR: Reset by turning off power supply of spindle amp |
| 13 | External clock fault | | |
| 14 | | | NC: NC reset |
| 15 | Memory fault 2 | PR | |
| 16 | | | §: E-Stop does not occur |
| 17 | Card fault | PR | |
| 20 | No signal 1 (PLG) | PR | |
| 21 | No signal 2 (Spindle ENC) | PR | |
| 22 | IC MAC012 fault | PR | |
| 23 | Speed control error excess | PR | |
| 24 | Breaker trip/main circuit fault | PR | |
| 25 | Converter overcurrent/brake fault | PR | |
| 26 | Power phase failure | PR | |
| 27 | CPU fault | | |
| 30 | | | |
| 31 | Overspeed | PR | |
| 32 | Inverter overcurrent/overcurrent | PR | |
| 33 | Overvoltage | PR | |
| 34 | Data parity check error | PR | |
| 35 | Data fault | PR | |
| 36 | Data transfer fault | PR | |
| 37 | Parameter error | PR | |
| 40 | TR-TK unit switching failure | NR | |
| 41 | FR-TK unit communication failure | NR | |
| 42 | | NR | |
| 43 | | NR | |
| 44 | | NR | |
| 45 | Controller overheat | NR | |
| 46 | Motor overheat | NR | |
| 47 | | NR | |
| 50 | | NR | |
| 51 | | NR | |
| 52 | Error excess | NR | |
| 53 | | NR | |
| 54 | | NR | |
| 55 | | NR | |
| 56 | Other axis fault | NR | |
| 57 | Option card error | NR | |
| E0 | Instantaneous power failure warning | § | |
| E1 | | § | |
| E2 | | | |
| E3 | | | |
| E4 | Parameter error warning | § | |
| E5 | | | |
| E6 | | | |
| E7 | NC emergency stop | | |

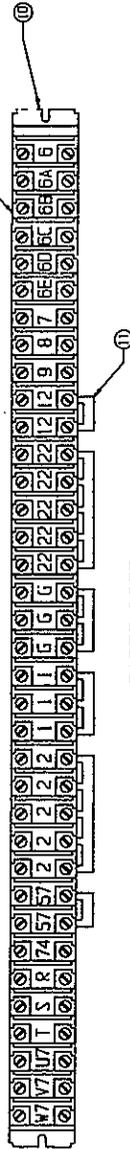


CS8 & CS9 ARE FOR MACHINES WITH THE GEARED HEAD FEATURE

TERMINAL BLOCK STRIP - DETAIL RELAY

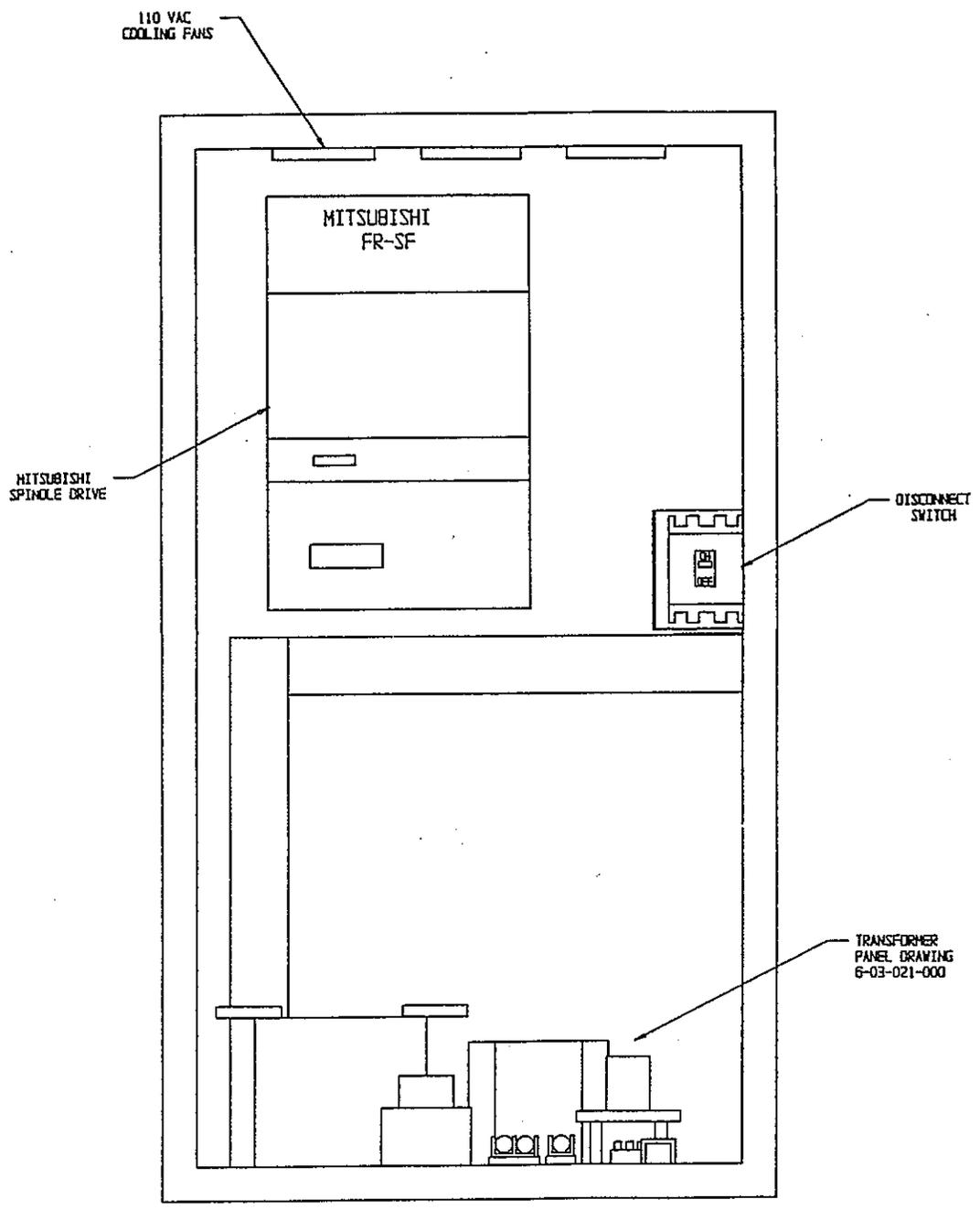
- PARTS LIST -

| ITEM | STOCK No. | DESCRIPTION | REMARKS |
|------|-----------|----------------------------|-------------------|
| 1 | None | CONTROL MAG PANEL | PRE-EXISTING |
| 2 | 0100 | CONTROL MAG PANEL | |
| 3 | 0177 | POWER SUPPLY 47-15-224 VDC | |
| 4 | R-05 | CENTRAL RELAY, 1P01 | |
| 5 | R-05 | CENTRAL RELAY SOCKET BASE | |
| 6 | RI-09 | NOISE SUPPRESSOR, 220V | QTY. 8 EACH |
| 7 | R-55 | CONTACTOR RELAY, 3 HP | QTY. 3 EACH |
| 8 | R-55 | CONTACTOR OVERLOAD, 1 AMP | |
| 9 | RI-01 | DIODE RELAY COIL, PC-88-01 | STD. QTY. 11 EACH |
| 10 | RI-02 | TERMINAL BLOCKS, 2 POST | STD. QTY. 36 EACH |
| 11 | RI-16 | TERMINAL BLOCKS, 60 PIGS | STD. QTY. 13 EACH |
| 12 | VC-65 | WIRE DUCT, 2 IN. | |
| 13 | VC-65 | WIRE DUCT COVER, 2 IN. | |
| 14 | VC-64 | SWAP-TRAK CARD CARRIER | STD. QTY. 12 EACH |
| 15 | VC-67 | WIRE DUCT, 1-1/2 IN. | |
| 16 | VC-68 | WIRE DUCT COVER, 1-1/2 IN. | |



| | | | | |
|---------------------------------|--------------------------|------------|----------|---------|
| C | ADD/DEL TB'S, ADD RELAYS | 1957 | DMR | 9/94 |
| B | FILE UPDATE/REGEN | 1739 | C.R. | 2/94 |
| REV. | DESCRIPTION | E.C.D. NO. | APP'D BY | DATE |
| MATERIAL/FINISH | | | | |
| STG/ASST No. | | | | |
| UNLESS SPECIFIED | | | | |
| X,XXX | +/- | .005 | | |
| X,XX | +/- | .010 | | |
| X,X | +/- | .030 | | |
| X | +/- | 1.0" | | |
| TITLE CONTROL MAG PANEL LAY OUT | | | | |
| APPLICATION PARTNER VIII | | | | |
| SCALE 3:1 | | | | |
| DATE 16-03-021-001 SIZE C | | | | |
| 18 FEB 94 | | | | |
| DRAWN BY | | | | RELETER |
| SHEET NO. | | | | 1 OF 1 |



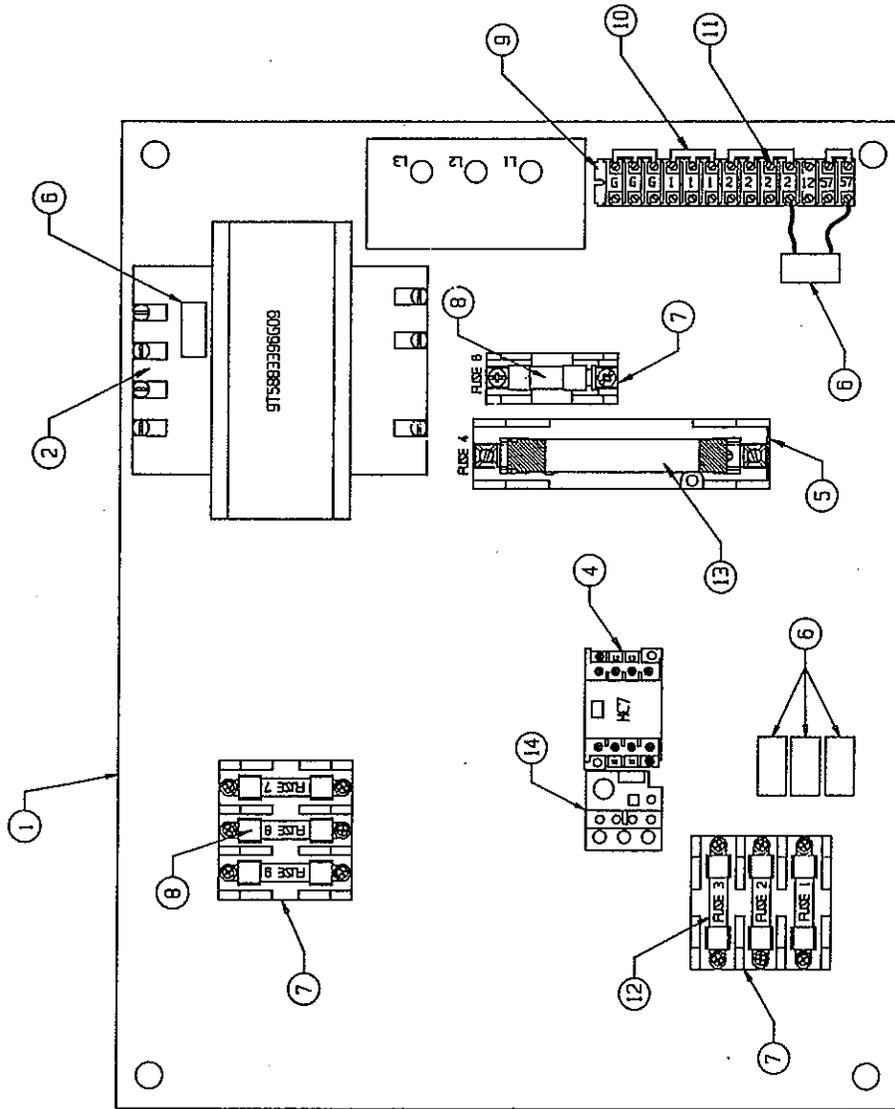


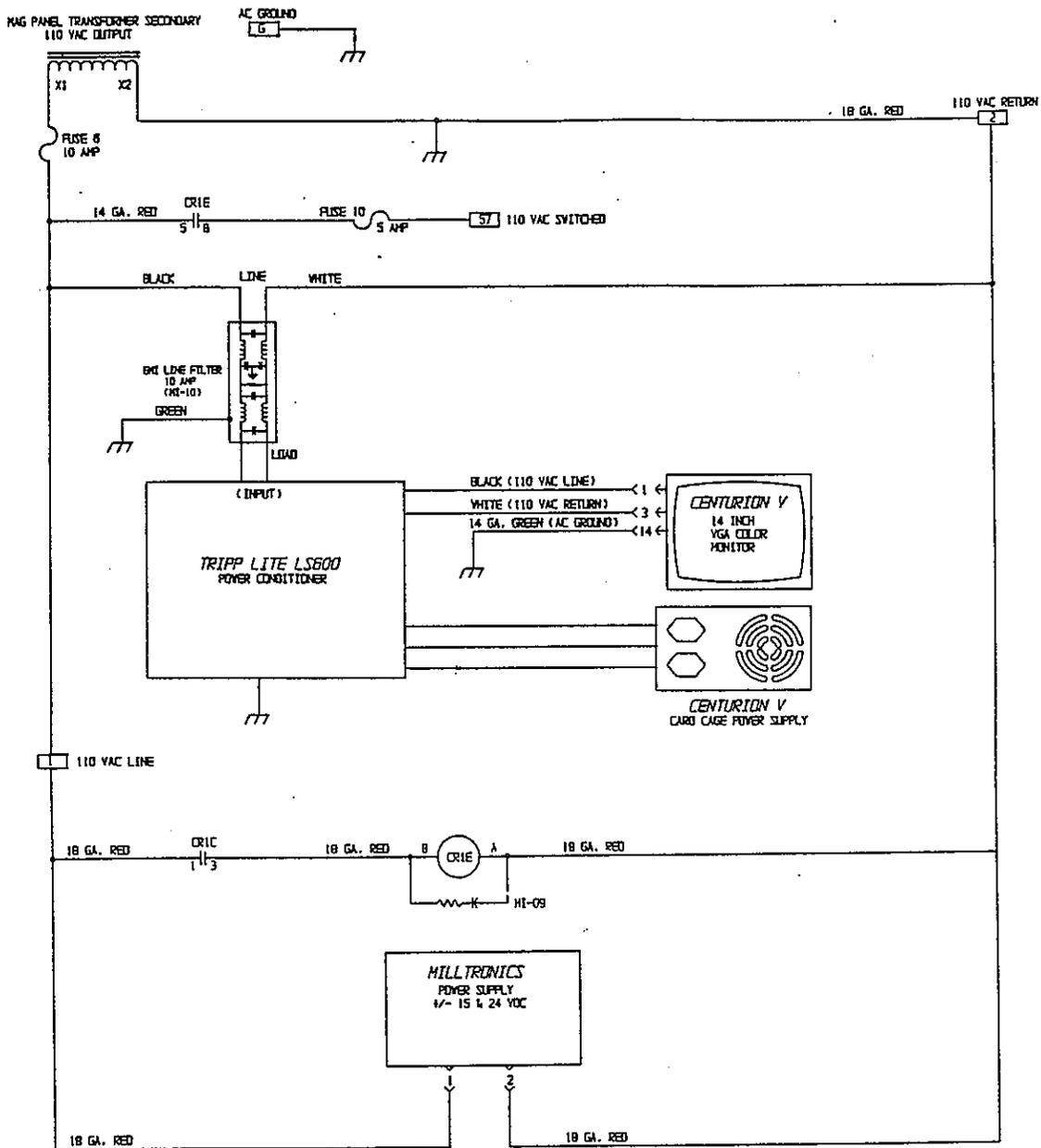
| | | | | |
|----------------------------|---------------------|---|----------------------|------------------|
| A | REFERENCE TO E.C.D. | 608 | M.F. | 9/91 |
| REV. | DESCRIPTION | E.C.D. NO. | APPRO BY | DATE |
| MATERIAL/FINISH | |  MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317 | | |
| STOCK/ASSY No. | | | | |
| TOLERANCE UNLESS SPECIFIED | | TITLE SPINDLE DRIVE MAG BOX | | |
| X.XXX | ± .005 | APPLICATION PARTNER VIII | | |
| X.XX | ± .010 | SCALE 3.5:1 | DWG No. 6-03-021-002 | SIZE C |
| X.X | ± .030 | DATE 30 JUL 91 | DRAWN BY THOMPSON | SHEET NO. 1 OF 1 |
| ANGLE | ± 1.0° | | | |

PARTS LIST

| No. | QTY | STOCK No. | DESCRIPTION |
|-----|-----|-----------|---|
| 1 | 1 | | MACHINE TRANSFORMER PANEL MPC No. 6-01-006-002 |
| 2 | 1 | TR-26 | TRANSFORMER, 1.5KVA 120/208/240/480 GENERAL ELECTRIC 9T588336609 |
| 4 | 1 | RL-49 | CONTACTOR RELAY, 230V/5 HP TELEMECANIQUE No. LCI-0181066 |
| 5 | 1 | FU-23 | FUSE HOLDER, SINGLE, H60030-1P |
| 6 | 5 | MI-09 | NOISE SUPPRESSOR, ELECTROLYTE MFG, .5 UF 600V - 220 OHM 1/2 W |
| 7 | 6 | FU-45 | FUSE HOLDER, SINGLE, F30A15P |
| 8 | 4 | FU-02 | FUSE, 10A SLD-BLD, TYPE FRN-R-10 |
| 9 | 1 | TB-02 | TERMINAL BLOCK END PIECE BUCHANAN No. 630 |
| 10 | 1 | TB-16 | TERMINAL BLOCK JUMPER 275A14 |
| 11 | 13 | TB-01 | TERMINAL BLOCK, 2 POST BUCHANAN No. 625 |
| 12 | 3 | FU-34 | FUSE, 5A SLD-BLD, TYPE FRN-R-5 |
| 13 | 1 | FU-47 | FUSE, 5A SLD-BLD, TYPE FRN-R-5 |
| 14 | 1 | RL-55 | CONTACTOR OVERLOAD, 1 AMP TELEMECANIQUE No. LR2-013 |

| | | | | | |
|--------------------|---|---|------------|----------|------|
| REV. | B | ADD & ERASE PARTS | 1665 | P.L. | L/94 |
| MATERIAL/FINISH | | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
| STOCK/ASY No. 5260 | |  MILLITRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317 | | | |
| TOLERANCE | | TITLE | | | |
| UNLESS SPECIFIED | | TRANSFORMER PANEL | | | |
| X.XXX +/- .005 | | APPLICATION | | | |
| X.XX +/- .010 | | PARTNER VIII | | | |
| X.X +/- .030 | | SCALE 3:1 | | | |
| ANGLE +/- 1.0° | | DATE 11 JAN 94 | | | |
| | | DRAWN BY REUTER | | | |
| | | SHEET NO. 1 OF 1 | | | |

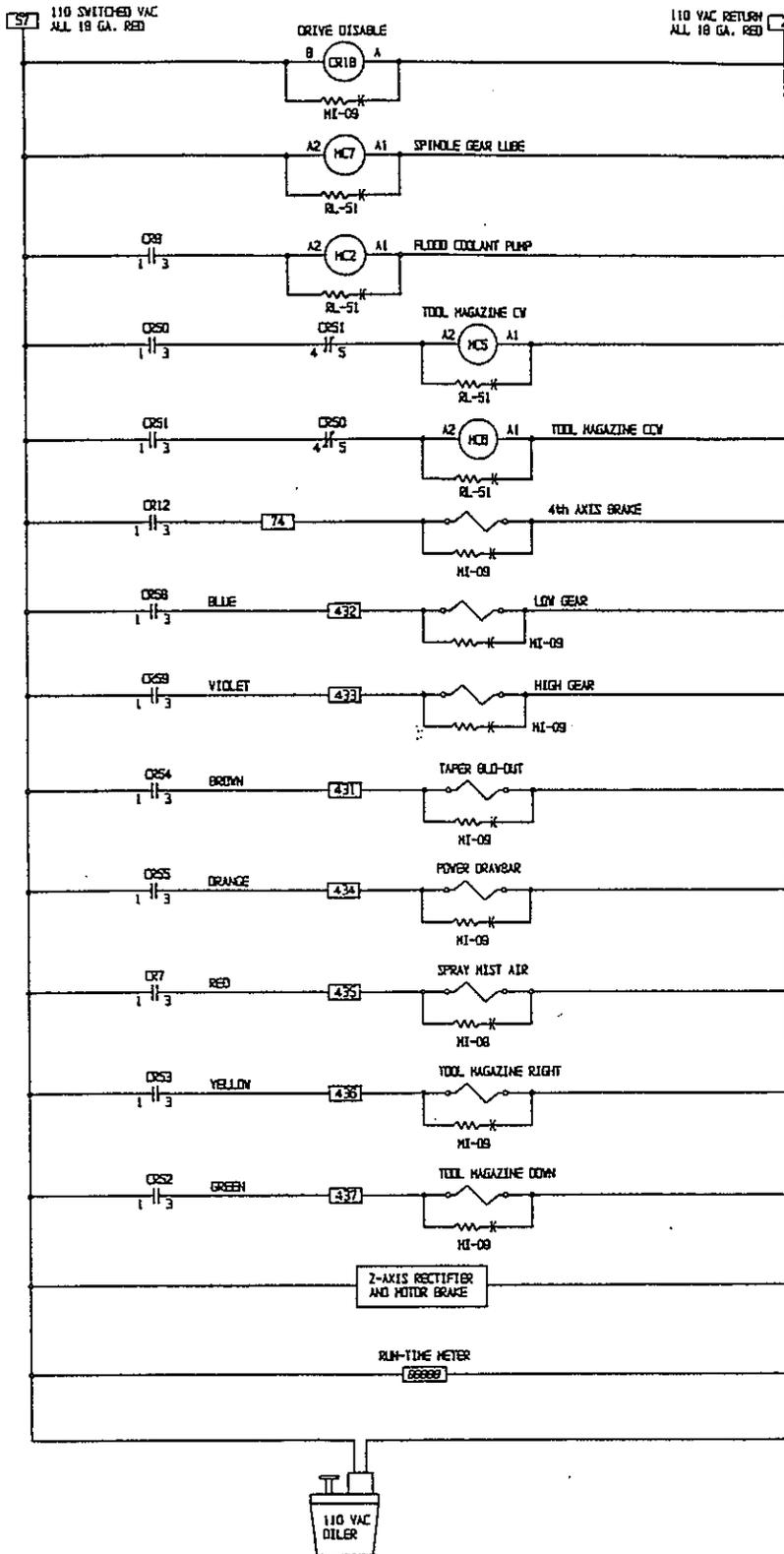




Notes...

1. SEE PAGE 2 FOR 220 VAC ELECTRICS
SEE PAGE 3 FOR 110 SWITCHED VAC ELECTRICS.

| | | | | |
|----------------------------|-----------------------|--|---------------------|------------------|
| H | REGENERATE TO 3 PAGES | 2023 | Dmr | 10/24 |
| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
| MATERIAL/FINISH | |  MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANBASSEN, MN 55317 | | |
| STOCK/ASST NO. | | | | |
| TOLERANCE UNLESS SPECIFIED | | TITLE AC SYSTEM WIRING - CENTURION V | | |
| X.XXX | ±.005 | APPLICATION PARTNER VIII | | |
| X.XX | ±.010 | SCALE 1:1 | PKG No 6-06-021-002 | SHEET C |
| X.X | ±.030 | DATE 24 OCT 94 | DRAWN BY CEJTEP | SHEET NO. 2 OF 3 |
| ANGLE | ±1.0° | | | |



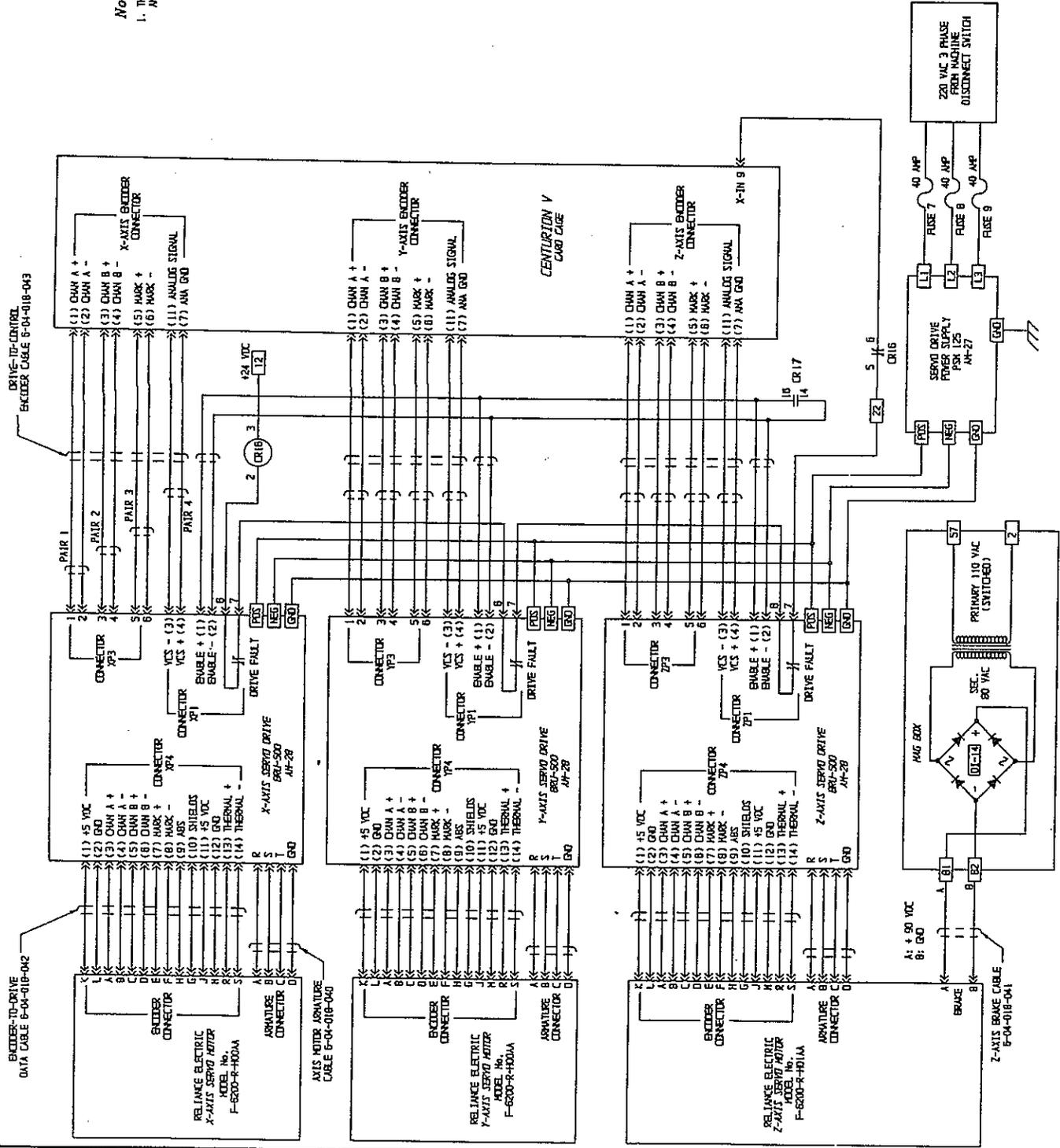
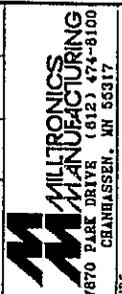
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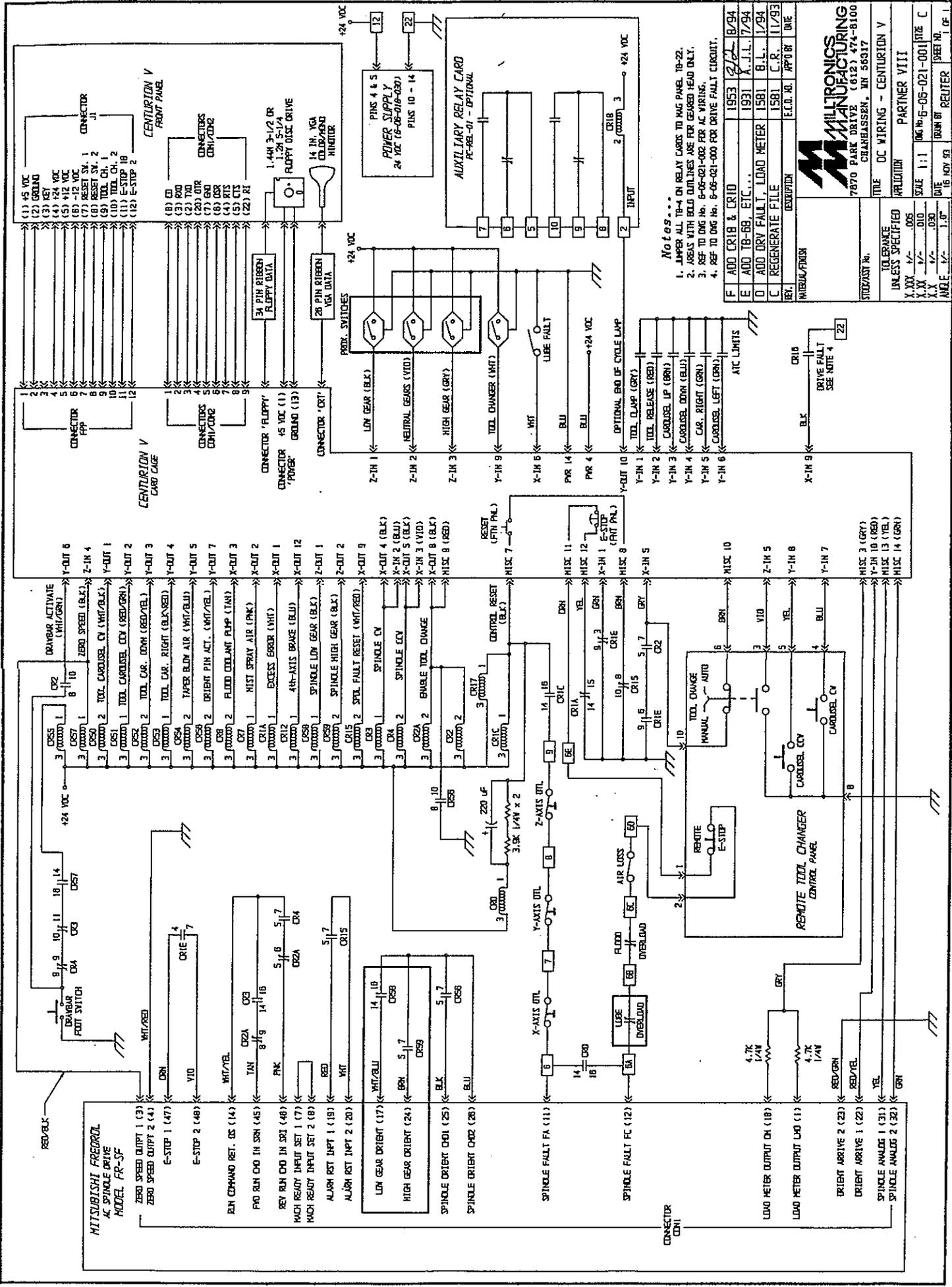
- SEE PAGE 1 FOR 220 VAC ELECTRICS
SEE PAGE 2 FOR 110 VAC ELECTRICS.
- THIS SCHEMATIC ALSO SERVES PARTNER IX.

| | | | | |
|----------------------------|-----------------------|--|----------|-------|
| A | REGENERATE TO 3 PAGES | 2023 | DMR | 10/94 |
| REV. | DESCRIPTION | E.C.D. NO. | APP'D BY | DATE |
| MATERIAL/FINISH | | <p>MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317</p> | | |
| STOCK/ASSY No. | | | | |
| TOLERANCE UNLESS SPECIFIED | | TITLE AC SYSTEM WIRING - CENTURION V | | |
| X.XXX | +/- .005 | APPLICATION PARTNER VIII | | |
| X.XX | +/- .010 | SCALE 1:1 | | |
| X.X | +/- .030 | DATE 24 OCT 94 | | |
| ANGLE | +/- 1.0° | DRAWN BY RELITER | | |
| | | SHEET NO. 3 OF 3 | | |

Notes...
 1. THIS SCHEMATIC SERIES PARTNER VIII
 AND PARTNER IX.

| | | | |
|---------------|--------------------------|-------------------------|-------------|
| D | CHANGE CR5B TO CR17 | 1873 | 7/84 |
| C | ADD BRU-500 FUSES 40 AMP | 1873 | D.H.R. 7/93 |
| B | ADD BRU-500 DRIVE FAULTS | 1569 | B.L. 11/93 |
| A | CHANGE TO BRU-500 | 1579 | B.L. 11/93 |
| REV. | | | |
| DRAWN/REVISED | | E.C.D. JR. | RPD/BT |
| TITLE | | MOTOR/ENCODER INTERFACE | |
| APPLICATION | | PARTNER VIII | |
| SCALE | | 1:1 | |
| DATE | | 06-06-021-000 | |
| SHEET NO. | | C | |
| DRAWN BY | | REUTER | |
| SHEET NO. | | 1 OF 1 | |





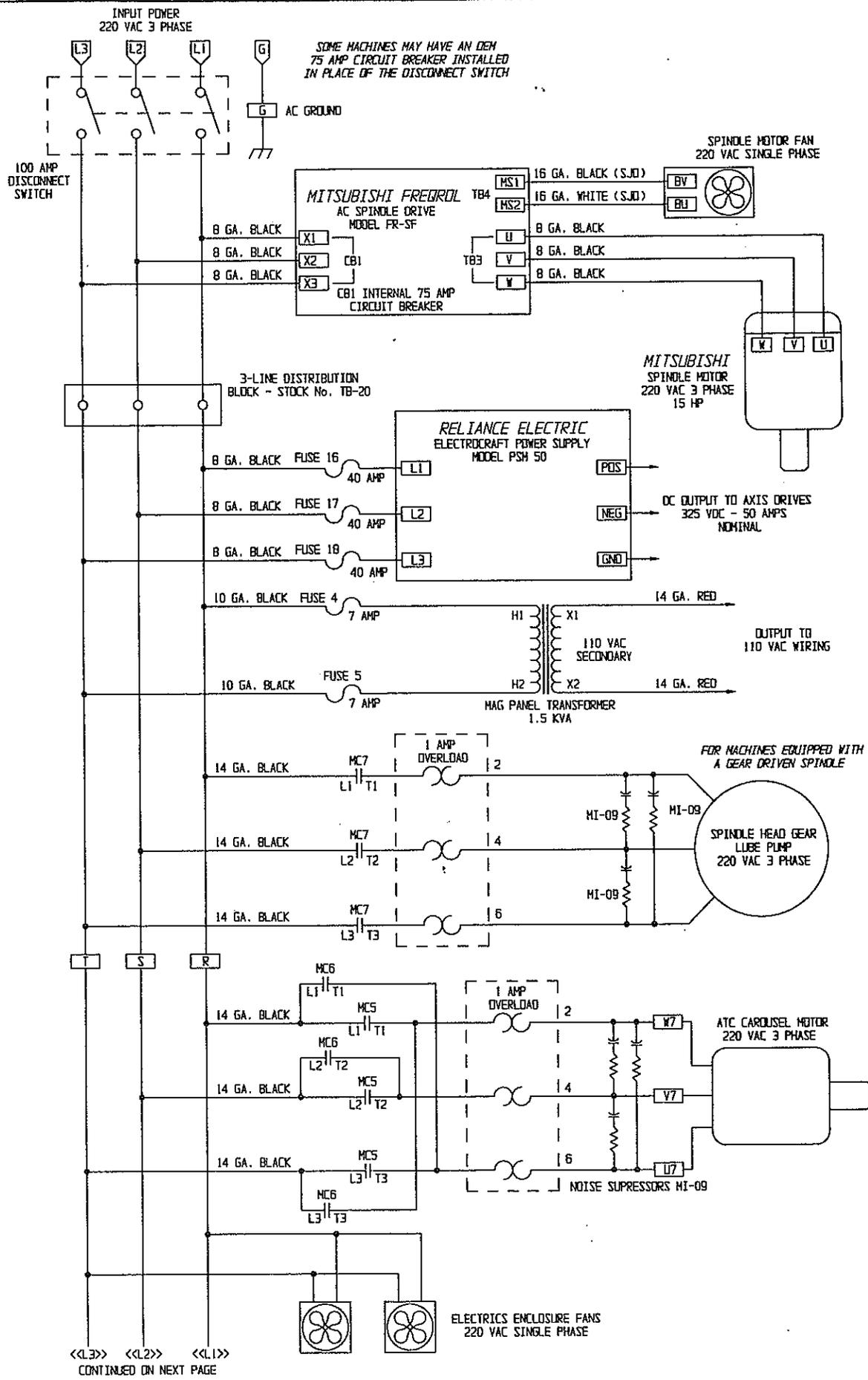
- Notes...
- JUMPER ALL TB-4 ON RELAY CARDS TO MAG PANEL TB-22.
 - AREAS WITH BOLD OUTLINES ARE FOR GEARED HEAD ONLY.
 - REF TO DWG No. 6-06-021-002 FOR AC WIRING.
 - REF TO DWG No. 6-06-021-000 FOR DRIVE FAULT CIRCUIT.

| REV. | DESCRIPTION | E.L.D. NO. | APPROB. | DATE |
|------|---------------------------|------------|---------|-------|
| F | ADD CR18 & CR10 | 1953 | 2/2 | 8/94 |
| E | ADD TB-68, ETC... | 1931 | A.L.L. | 7/94 |
| D | ADD DRY FAULT, LOAD METER | 1581 | B.L. | 1/94 |
| C | REGENERATE FILE | 1581 | C.R. | 11/93 |

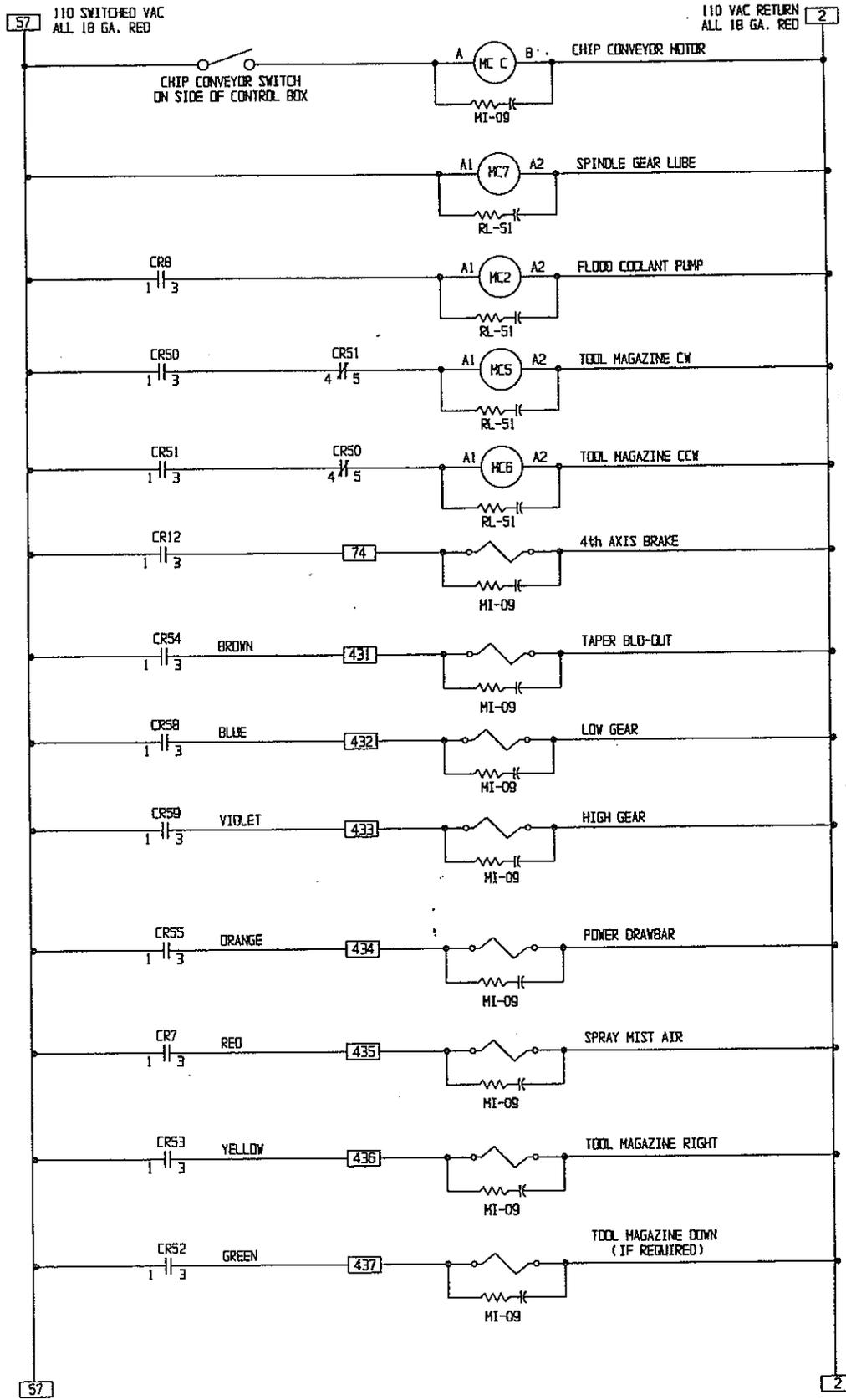
| TO BRANCH | UNLESS SPECIFIED |
|-----------|------------------|
| X-XX | 1/2" |
| X-XX | 1/4" |
| X-XX | 1/8" |
| X-XX | 1/16" |
| X-XX | 1/32" |
| X-XX | 1/64" |

| ITEM | DC WIRING - CENTURION V |
|------|-------------------------|
| 100 | PARTNER VIII |
| 101 | SCALE 1:1 |
| 102 | DATE 15 NOV 93 |
| 103 | DRAWN BY REUTER |
| 104 | SHEET NO. OF 1 |

MILITRONICS MANUFACTURING
 7870 PARK DRIVE (412) 474-8100
 CHAMBERLAIN, MN 55817



| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
|-------------|-------------------------|----------------------|-----------|--------|
| TITLE | COMPLETE MACHINE WIRING | SCALE 1:1 | DMR | DATE |
| APPLICATION | PARTNER VIII | ENG No. 6-06-021-005 | APP'D BY | DATE |
| | DATE 30 MAY 95 | DRAWN BY REUTER | SHEET NO. | 1 OF 9 |



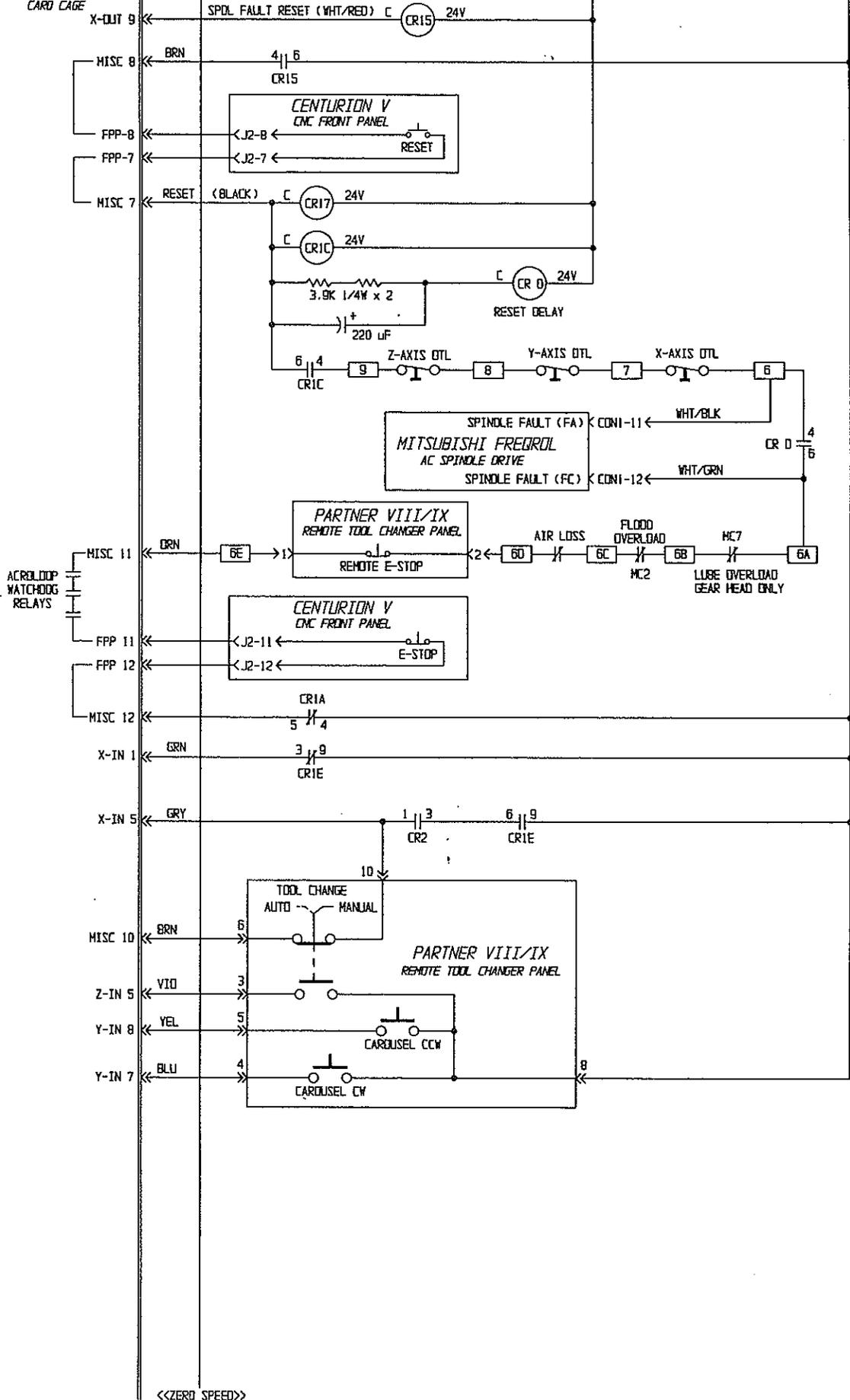
| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
|-------------|-------------------------|----------------------|------------------|------|
| TITLE | COMPLETE MACHINE WIRING | SCALE 1:1 | DMR | DATE |
| APPLICATION | PARTNER VIII | DATE 30 MAY 95 | APP'D BY | DATE |
| | | DWG No. 6-06-021-005 | SIZE B | |
| | | DRAWN BY REUTER | SHEET NO. 3 OF 9 | |

CENTURION V
CARD CAGE

<<ZERO SPEED>>

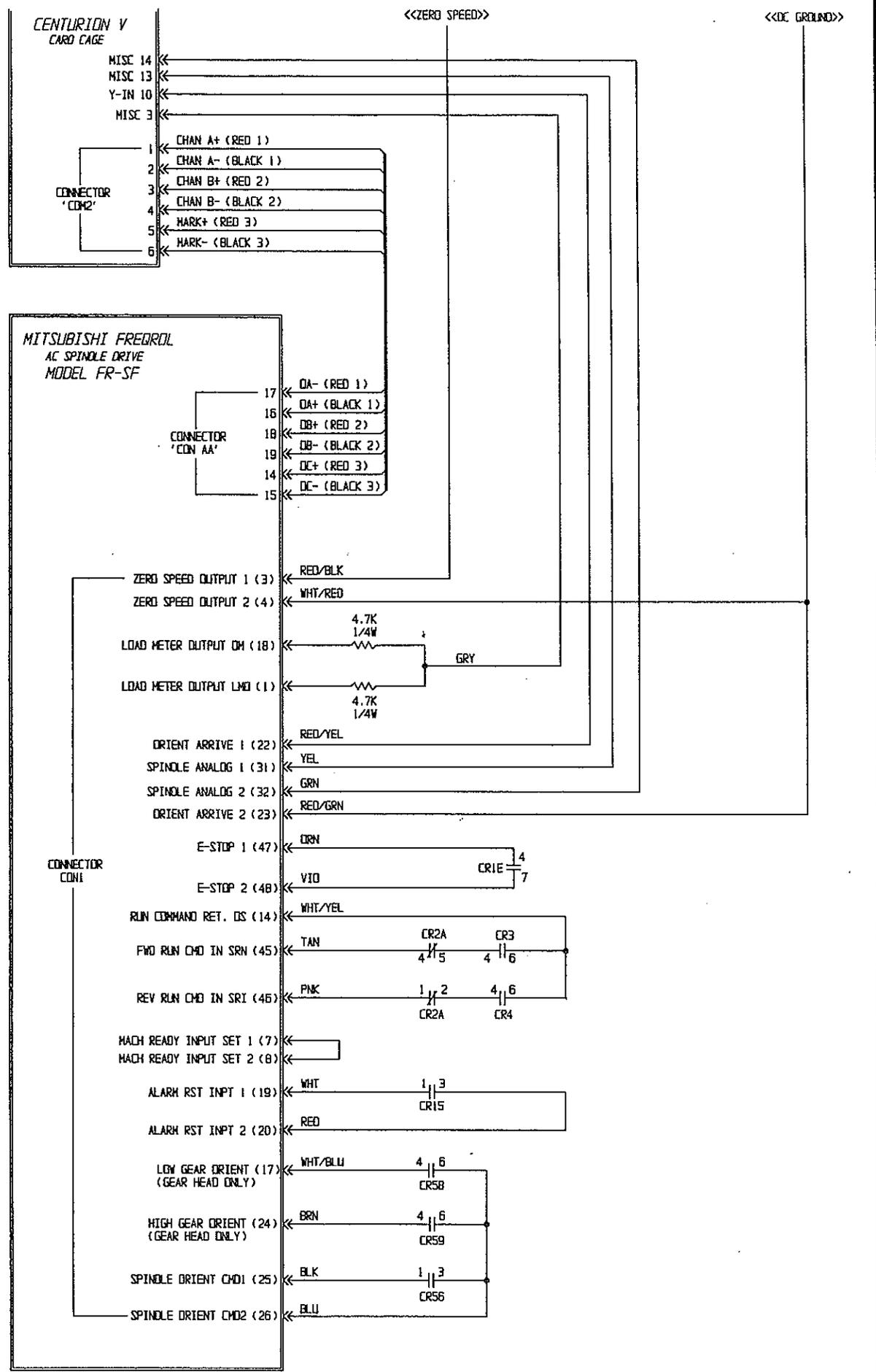
<<+24 VDC>>

<<DC GROUND>>

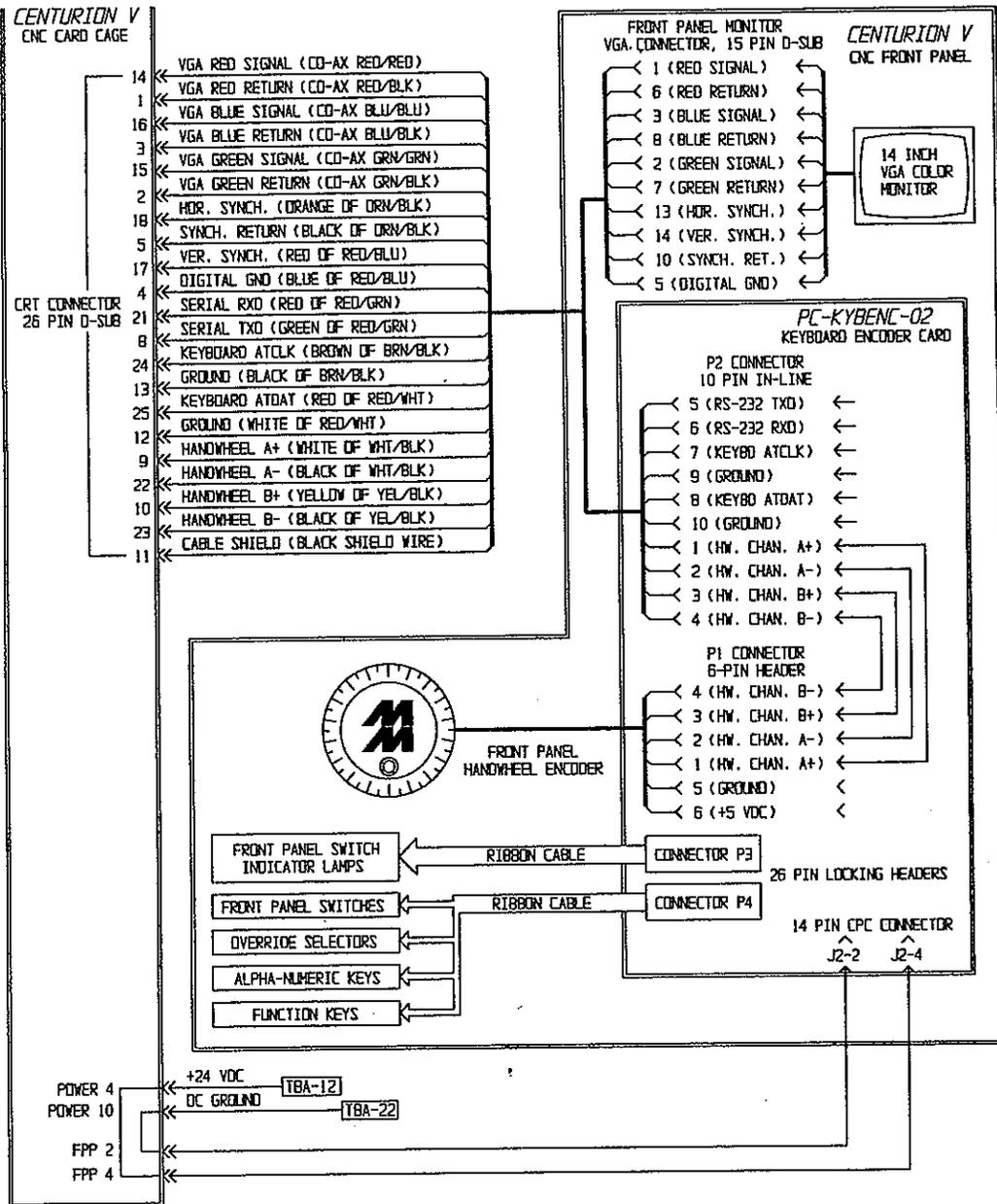


<<ZERO SPEED>>

| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
|--------------------------|-------------------------|----------------------|------------------|------|
| | COMPLETE MACHINE WIRING | | DMR | |
| TITLE | SCALE 1:1 | DWG No. 6-06-021-005 | SIZE B | |
| APPLICATION PARTNER VIII | DATE 30 MAY 95 | DRAWN BY REUTER | SHEET NO. 7 OF 9 | |

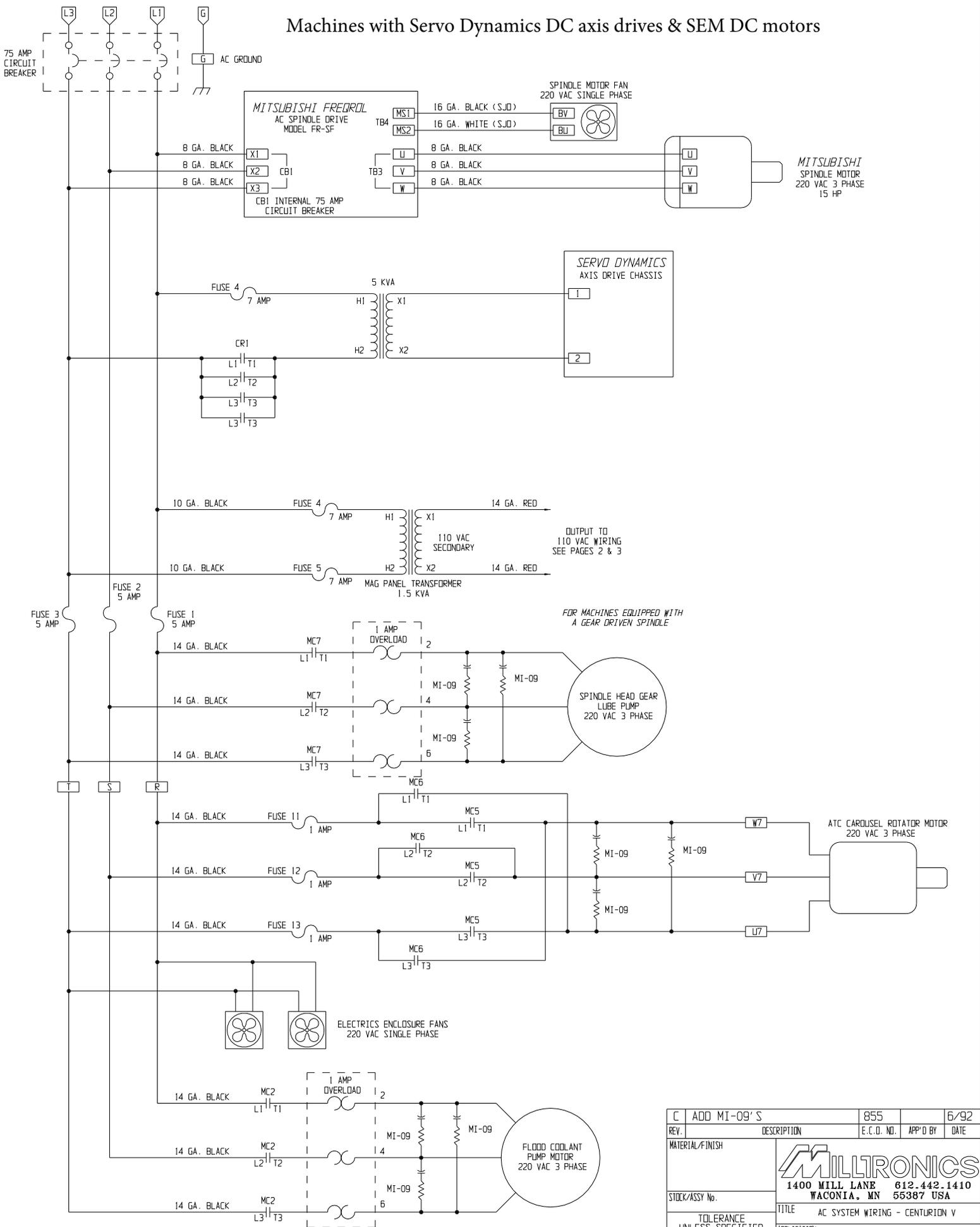


| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
|--------------------------------|-------------|-----------------|------------------------|-------------------|
| | | | <i>DMR</i> | |
| TITLE: COMPLETE MACHINE WIRING | | SCALE: 1:1 | ENG. NO.: 6-06-021-005 | SIZE: 8 |
| APPLICATION: PARTNER VIII | | DATE: 30 MAY 95 | DRAWN BY: REUTER | SHEET NO.: 8 OF 9 |

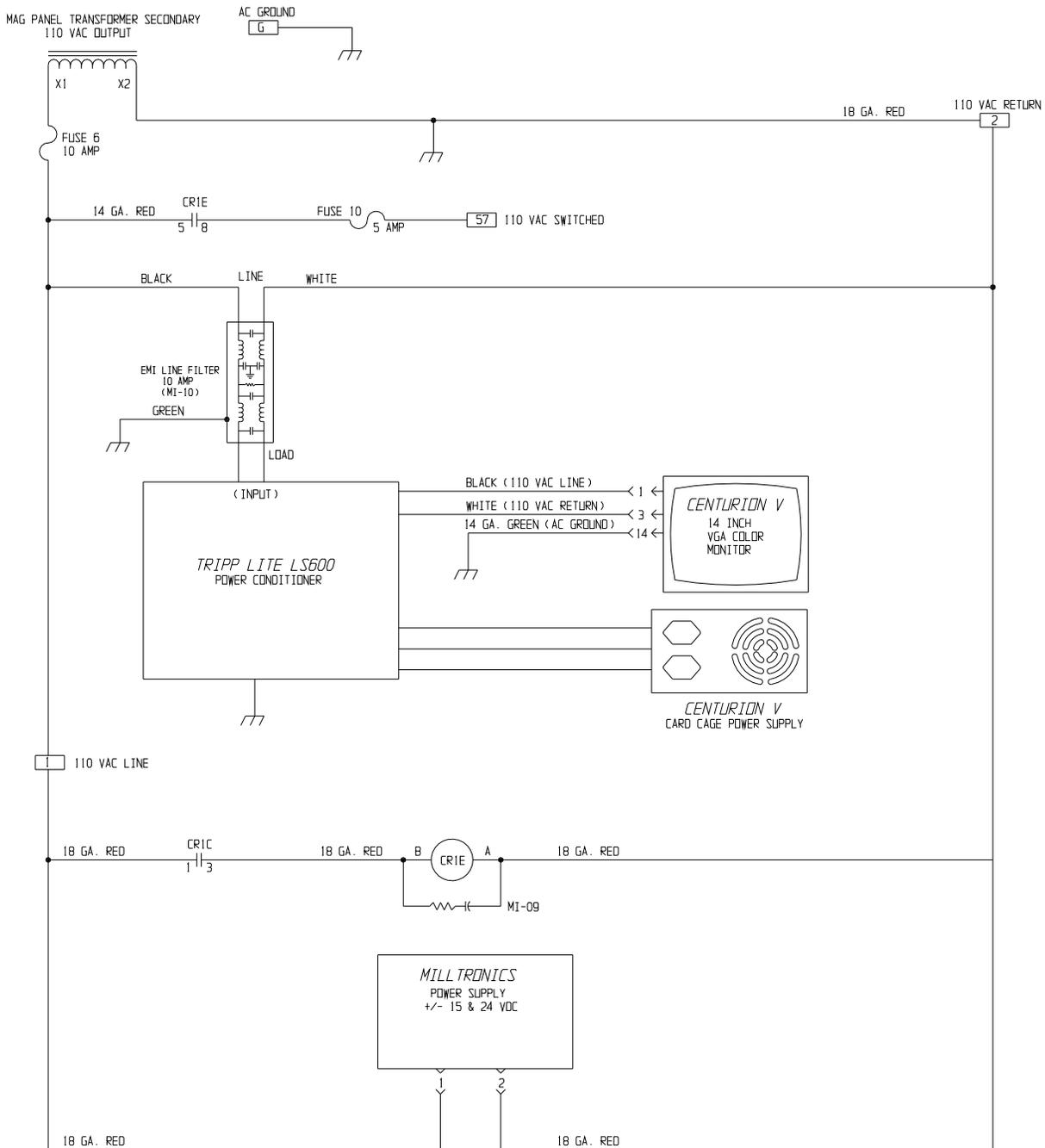


| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
|-------------|-------------------------|----------------------|-----------------|------------------|
| TITLE | COMPLETE MACHINE WIRING | SCALE 1:1 | DMR | 8 |
| APPLICATION | PARTNER VIII | DATE 30 MAY 95 | DRAWN BY REUTER | SHEET NO. 9 OF 9 |
| | | ORG No. 6-05-021-005 | | SIZE |

Machines with Servo Dynamics DC axis drives & SEM DC motors



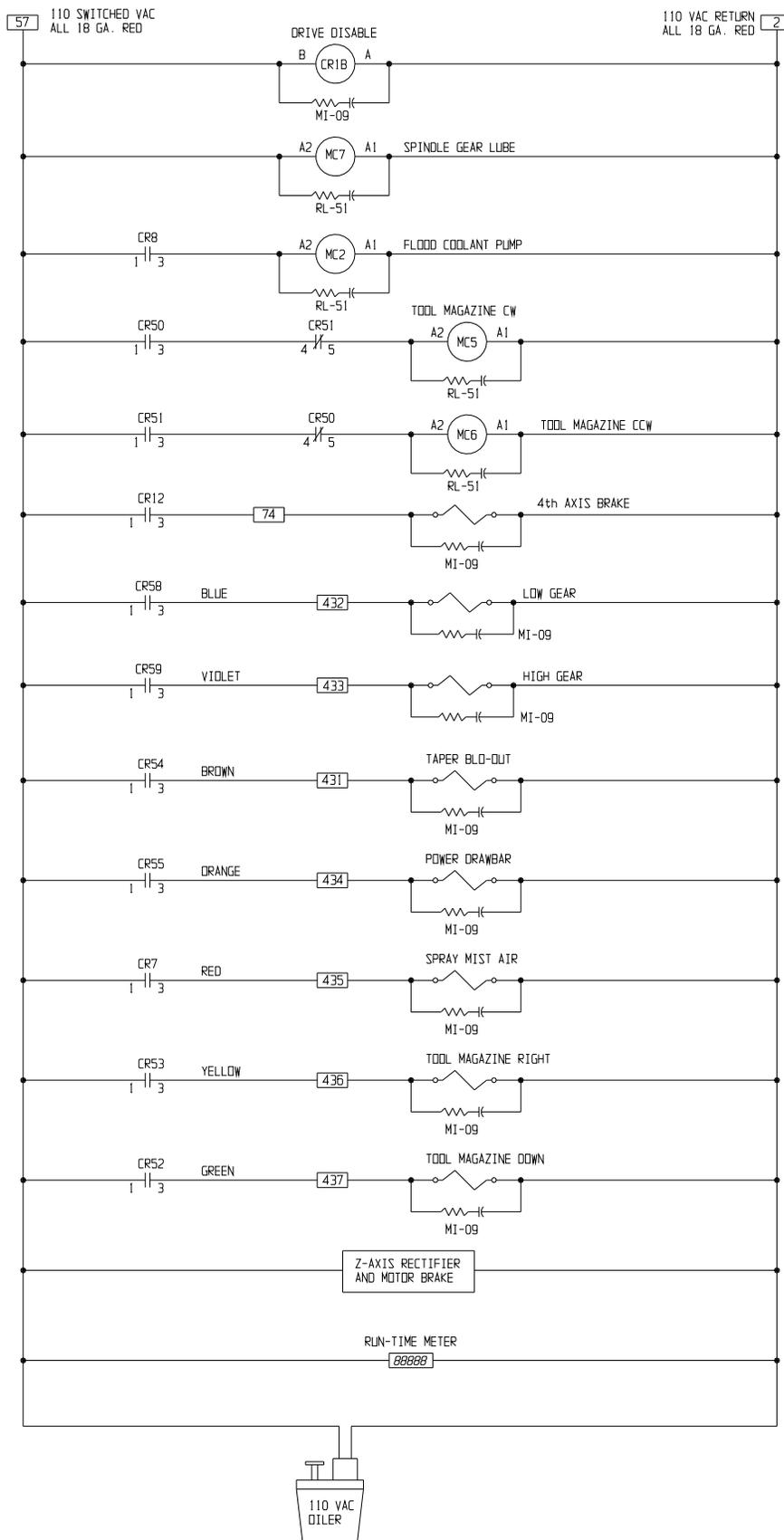
| | | | | |
|----------------------------|-------------|---|---------------------|------------------|
| C | ADD MI-09'S | 855 | | 6/92 |
| REV. | DESCRIPTION | E.C.D. NO. | APP'D BY | DATE |
| MATERIAL/FINISH | | MILLTRONICS 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA | | |
| STOCK/ASSY No. | | TITLE AC SYSTEM WIRING - CENTURION V | | |
| TOLERANCE UNLESS SPECIFIED | | APPLICATION PARTNER VIII | | |
| X.XXX | +/- .005 | SCALE 1:1 | DWG No 6-06-021-002 | SIZE C |
| X.XX | +/- .010 | DATE 21 OCT 94 | DRAWN BY REUTER | SHEET NO. 1 OF 3 |
| X.X | +/- .030 | | | |
| ANGLE | +/- 1.0° | | | |



Notes...

- SEE PAGE 2 FOR 220 VAC ELECTRICS
SEE PAGE 3 FOR 110 SWITCHED VAC ELECTRICS.

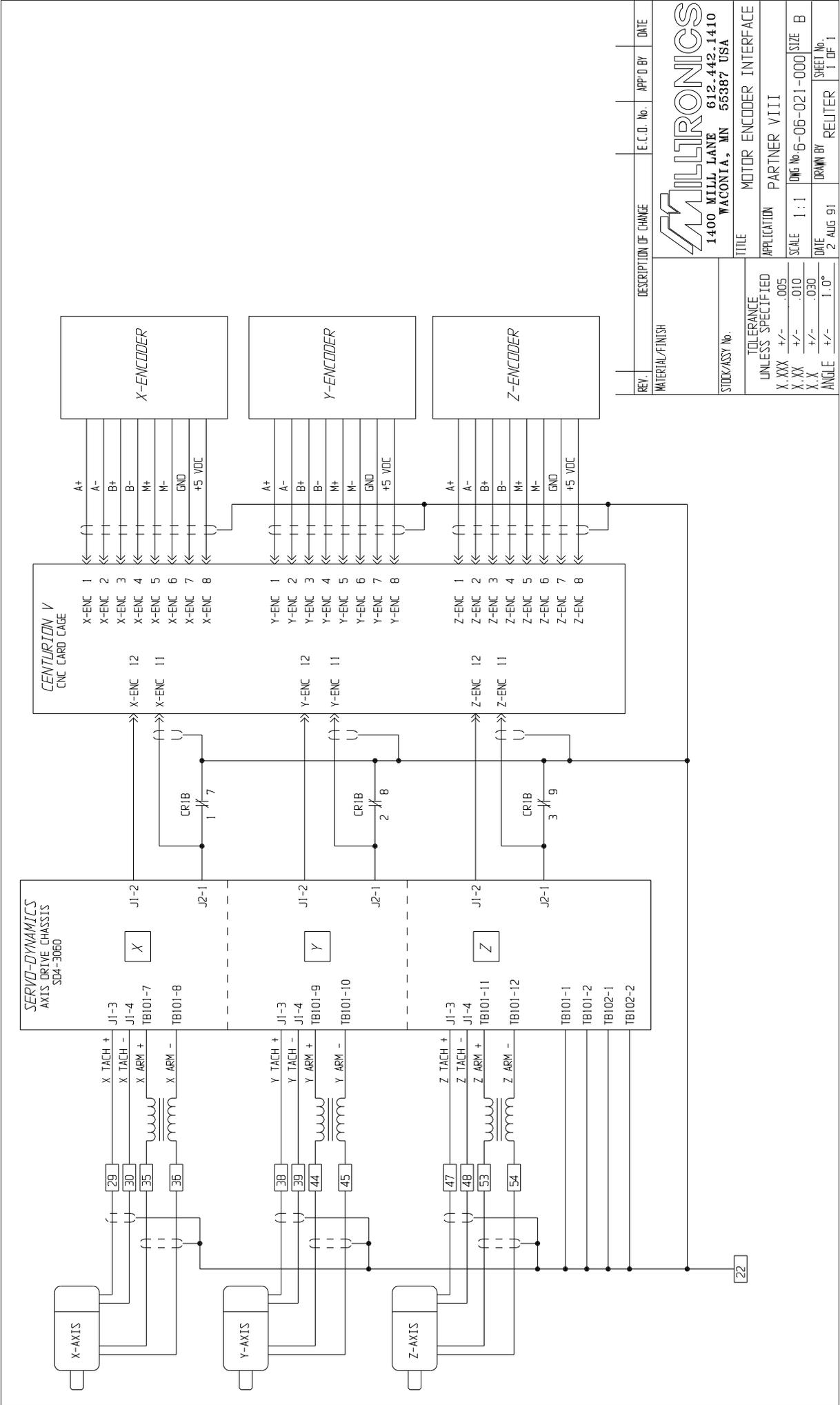
| | | | | |
|----------------------------|-------------|--|----------------------|------------------|
| C | ADD MI-09'S | 855 | | 6/92 |
| REV. | DESCRIPTION | E.C.D. NO. | APP'D BY | DATE |
| MATERIAL/FINISH | |  <p>1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA</p> | | |
| STOCK/ASSY No. | | | | |
| TOLERANCE UNLESS SPECIFIED | | TITLE AC SYSTEM WIRING - CENTURION V | | |
| X.XXX | +/- .005 | APPLICATION PARTNER VIII | | |
| X.XX | +/- .010 | SCALE 1:1 | DWG No: 6-06-021-002 | SIZE C |
| X.X | +/- .030 | DATE 24 OCT 94 | DRAWN BY REUTER | SHEET NO. 2 OF 3 |
| ANGLE | +/- 1.0° | | | |



Notes...

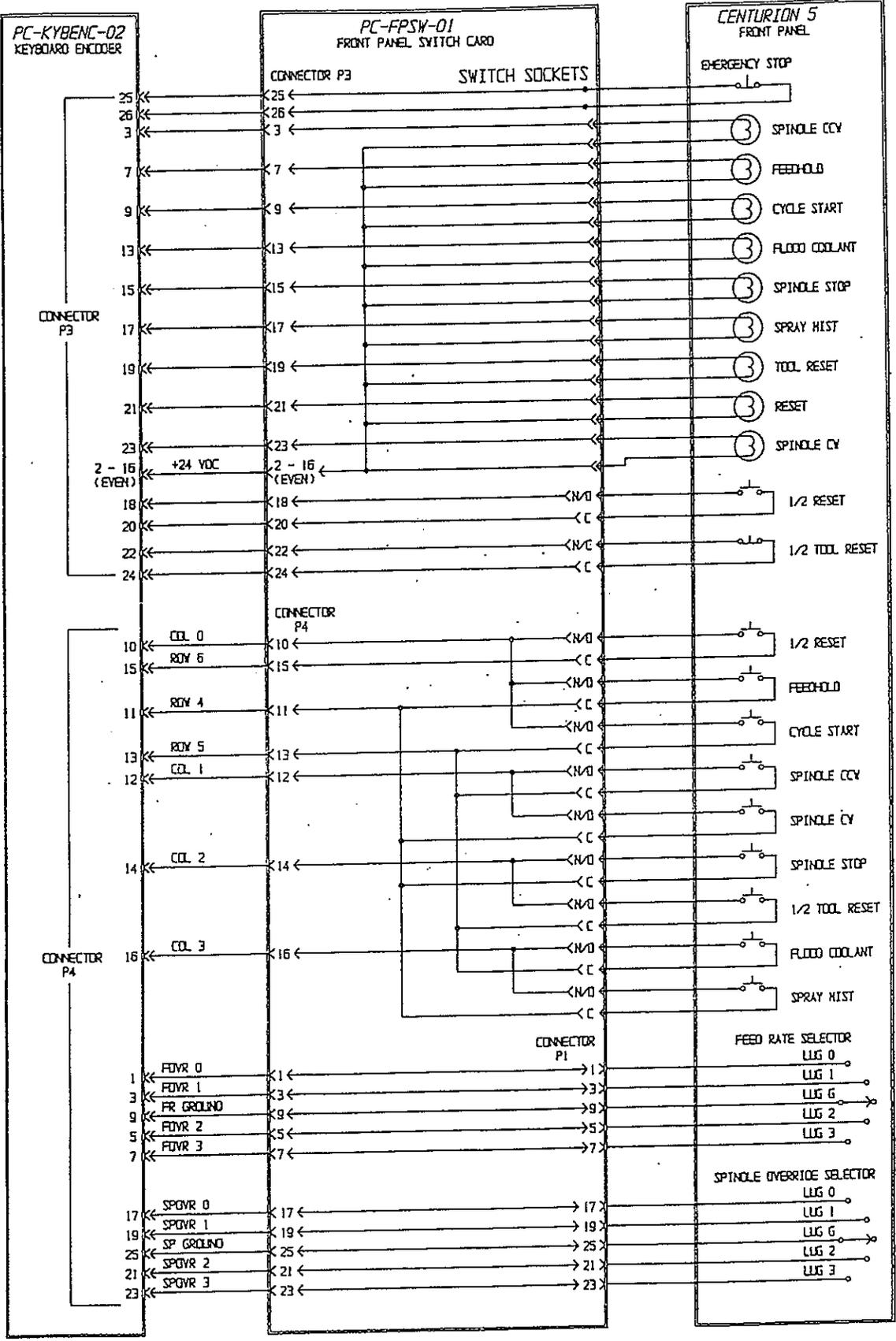
- SEE PAGE 1 FOR 220 VAC ELECTRICS
SEE PAGE 2 FOR 110 VAC ELECTRICS.
- THIS SCHEMATIC ALSO SERVES PARTNER IX.

| | | | | |
|----------------------------|-------------|--|--------------|----------------------------------|
| C | ADD MI-09'S | 855 | | 6/92 |
| REV. | DESCRIPTION | E.C.D. NO. | APP'D BY | DATE |
| MATERIAL/FINISH | | 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA | | |
| STOCK/ASSY No. | | | | |
| TOLERANCE UNLESS SPECIFIED | | TITLE AC SYSTEM WIRING - CENTURION V | | |
| X.XXX | +/- .005 | APPLICATION | PARTNER VIII | |
| X.XX | +/- .010 | SCALE | 1:1 | DWG No: 6-06-021-002 SIZE C |
| X.X | +/- .030 | DATE | 24 OCT 94 | DRAWN BY REUTER SHEET NO. 3 OF 3 |
| ANGLE | +/- 1.0° | | | |



| | | | | |
|-------------------------------|-----------------------|----------------------|----------|------------------|
| REV. | DESCRIPTION OF CHANGE | E.C.D. No. | APP'D BY | DATE |
| MATERIAL/FINISH | | | | |
| STOCK/ASSY No. | | | | |
| TOLERANCE UNLESS SPECIFIED | | | | |
| X, .XXX | +/- | .005 | | |
| X, .XX | +/- | .010 | | |
| X, X | +/- | .030 | | |
| ANGLE | +/- | 1.0° | | |
| TITLE MOTOR ENCODER INTERFACE | | | | |
| APPLICATION PARTNER VIII | | | | |
| SCALE | 1 : 1 | DMG No: 6-06-021-000 | SIZE | B |
| DATE | 2 AUG 91 | DRAWN BY | REUTER | SHEET No. 1 OF 1 |

MILTRONICS
 1400 MILL LANE
 WACONIA, MN 55387 USA

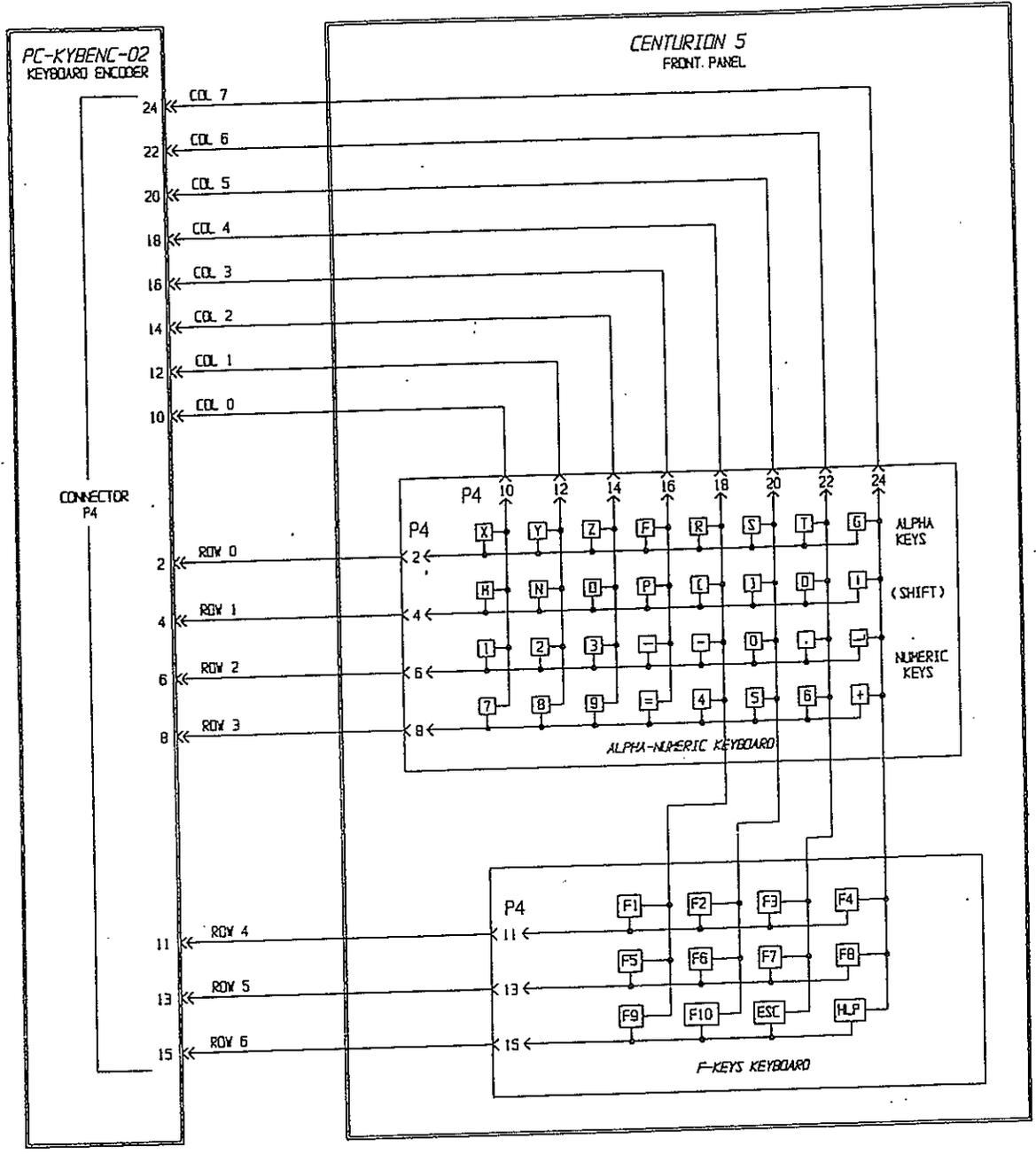


| | | | | |
|-------------|-------------|------------|-----------|------|
| REV. | DESCRIPTION | E.C.B. NO. | APP'D BY | DATE |
| TITLE | SCALE | DWG NO. | SIZE | |
| APPLICATION | DATE | DRAWN BY | SHEET NO. | |

DMR

FRONT PANEL INTERFACE SCHEMATIC SCALE 1:1 DWG NO. 6-06-004-013 SIZE 8

CENTURION V DATE 6 DEC 95 DRAWN BY REUTER SHEET NO. 1 OF 2



| REV. | DESCRIPTION | E.C.O. NO. | APP'D BY | DATE |
|-------------|---------------------------------|------------|----------|----------------------|
| | | | Dmr | |
| TITLE | FRONT PANEL INTERFACE SCHEMATIC | SCALE | 1:1 | DWG No. 6-06-004-013 |
| APPLICATION | CENTURION V | DATE | 6 DEC 95 | SIZE B |
| | | DRAWN BY | REUTER | SHEET NO. 2 OF 2 |

