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SERVICE BULLETIN

MAINTENANCE OF WAY EQUIPMENT

DATE: 8-2014

BULLETIN NO: 14-008

TITLE: 5044573 Kit, Solid State Relay

RATING:

| | | | |
|--------------------------|--|-------------------------------------|---|
| <input type="checkbox"/> | DIRECTIVE (Action Is Required) | <input type="checkbox"/> | ALERT (Potential Problem) |
| <input type="checkbox"/> | INFORMATION (Action Is Optional) | <input checked="" type="checkbox"/> | PRODUCT IMPROVEMENT (Enhance Product) |

PRODUCT SERIES / MODEL: W96 Series E3 - 44 / 45 Spike Driver

SERIAL NO: N/A

SUMMARY: Reports from the field have suggested that the mechanical relays that control the propel functions on W96 Series E3 - 44 / 45 Spike Driver have been failing. Under normal operating conditions, cases have been reported where these relays have malfunctioned due to auxiliary contact failure.

When the relays are cycled at a high frequency, heat tends to build up from current loads as the auxiliary device is cycled on and off. Over time, wear on the auxiliary contact points causes them to degrade. Most failures are due to contacts being welding closed due to heat build-up despite operational function of the relay coil.

In operation, the solid state relay uses a cycle controlling device that will provide longer service life. The solid state relay has no moving parts and is not easily affected by contact wear.

OPERATIONAL IMPACT: Failure of the propel function mechanical relay will result in propel function failure.

ACTION: Solid State Relay Kit #5044573 is available from HarSCO Rail. Order one kit for each spike driver. Follow the instructions in this Service Bulletin and on the attached 5044573 Kit, Solid State Relay drawing to install the kit on your W96 Series E3 - 44 / 45 Spike Driver.

CONTACT: HarSCO Rail Service Department
Columbia, SC Facility
(803) 822-7546

SAFETY INFORMATION



■ **FOLLOW APPLICABLE RAILROAD LOCKOUT - TAGOUT PROCEDURES TO DISABLE ENERGY SOURCES WHEN PERFORMING MAINTENANCE, MAKING ADJUSTMENTS OR REPAIRS TO THE EQUIPMENT. FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.**

Solid State Relay Kit Instructions

1. Make sure the machine's engine is stopped. Rotate the battery disconnect switch (S1100) to the OFF position.
2. Using a voltage meter, verify that power has been disconnected: 0 Volts from (S1100 - 1) to (000) ground.
3. Apply lockout / tagout devices to prevent accidental energizing of the electrical system.
4. Locate Forward Propel (K3220) and Reverse Propel (K3260) mechanical relays in the CPU enclosure. Removed existing wiring from both relays. Remove mechanical relays (K3260 and K3220).
5. Refer to the attached 5044573 Kit, Solid State Relay drawing. Use the wiring chart and the instructions on the drawing to install and wire the solid state relays.



■ **VERIFY ALL NON ESSENTIAL PERSONNEL ARE CLEAR OF MACHINE BEFORE BATTERY DISCONNECT SWITCH IS TURNED BACK ON. INCORRECT WIRING COULD CAUSE THE MACHINE TO PROPEL IN A UNEXPECTED MANNER. FAILURE TO HEED THIS WARNINGS COULD RESULT IN SEVERE BODILY INJURY.**

6. Remove all lockout / tagout devices.
7. Rotate the battery disconnect switch to the ON position.
8. Start machine's engine and verify travel functions properly.

5044573 Kit, Solid State Relay

| ITEM | PART NO | DESCRIPTION | QTY |
|------|---------|------------------------------|-----|
| 1 | 5044231 | Relay, Socket | 2 |
| 2 | 5044218 | Relay, Solid State | 2 |

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415 North Main Street
 Fairmont, MN
 56031-1837
 Tel: (507) 235-3361
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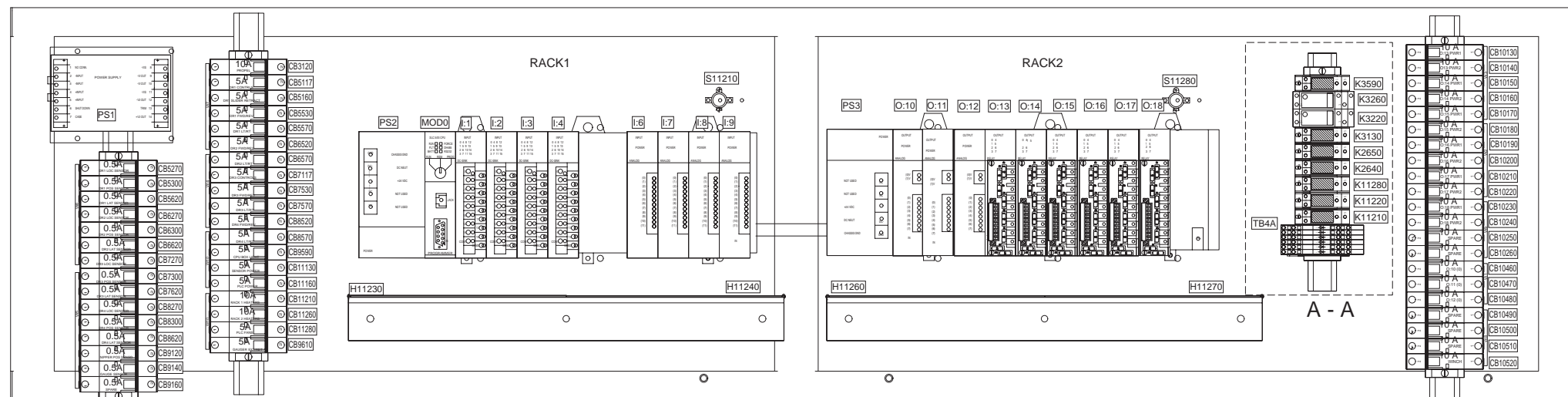
401 Edmund Road, Box 20
 Cayce-West Columbia, SC
 29171-0020
 Tel: (803) 822-9160
 Fax: (803) 822-7471

200 South Jackson Road
 Ludington, MI
 49431
 Tel: (231) 843-3431
 Fax: (231) 843-1644

Printed In USA

| BILL OF MATERIAL | | | |
|------------------|---------|-----|--|
| ITEM | PART # | QTY | PART DESCRIPTION |
| 1 | 5044231 | 2 | RELAY, SOCKET : DIN RAIL RELAY SOCKET, USE WITH 5044218 |
| 2 | 5044218 | 2 | RELAY, SOLID STATE : INPUT 18-32VDC OUTPUT 1-48VDC @ 5AMPS |

| WIRING CHART | | | | | | | | |
|--------------|------|--------|-------|----------|----------|----------|----------|----------|
| RUN | WIRE | SIZE | COLOR | FROM | TERM NO. | TO | TERM NO. | PART NO |
| 1 | 000 | 16 AWG | Black | K3260:1 | NONE | K3220:1 | NONE | EXISTING |
| 2 | 000 | 16 AWG | Black | K3590:13 | NONE | K3260:1 | NONE | EXISTING |
| 3 | 000 | 16 AWG | Black | K3130:13 | NONE | K3220:1 | NONE | EXISTING |
| 4 | 3122 | 16 AWG | White | K3260:3 | NONE | K3220:3 | NONE | EXISTING |
| 5 | 3124 | 16 AWG | White | K3220:4 | NONE | TB4A-1:+ | NONE | EXISTING |
| 6 | 3140 | 16 AWG | White | K3260:4 | NONE | TB4A-2:+ | NONE | EXISTING |
| 7 | 3222 | 16 AWG | White | K3220:5 | NONE | TB4A-3:- | NONE | EXISTING |
| 8 | 3262 | 16 AWG | White | K3260:5 | NONE | TB4A-5:- | NONE | EXISTING |

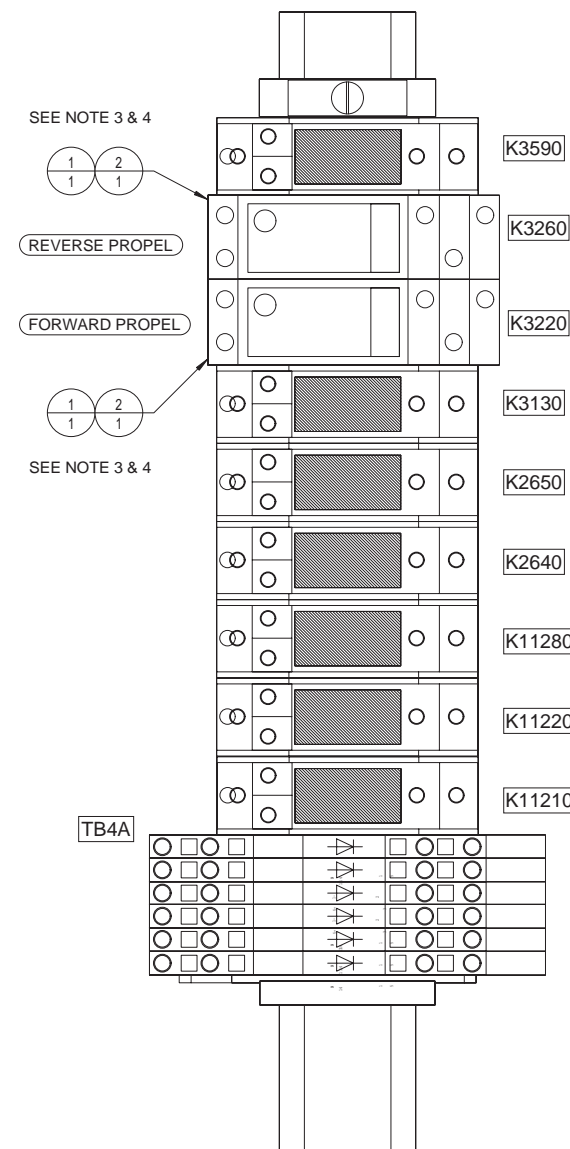


CPU ENCLOSURE

NOTES:

- ALL WIRES & CONDUCTORS SHALL BE LABELED (WIRE MARKERS) USING A SLEEVE TYPE NUMBERING SYSTEM.
WIRES ARE TO BE LABELED ON BOTH ENDS EXCEPT WHERE:
- OVERALL WIRE LENGTH IS LESS THAN 4"
- WIRES ARE TERMINATED IN A CONNECTOR (VEAM, CANNON, DIN, ECT.)
- ROUTE WIRES PER WIRE CHART. MAKE ALL CORNERS AS SQUARE AS POSSIBLE.
- REMOVE AND DISCARD ORIGINAL MECHANICAL RELAY.
- INSTALL SOLID STATE RELAY PER PRINT LAYOUT.

| REFERENCE DRAWINGS | | | |
|--------------------|---------------------|-------------------|---------------------|
| W96E3 - 45 GAUGER | | W96E3 - 44 NIPPER | |
| 3424837 | SCHEMATIC | 3422204 | SCHEMATIC |
| 3427586 | ENCLOSURE ASSY, CPU | 3416561 | ENCLOSURE ASSY, CPU |



SECTION A - A

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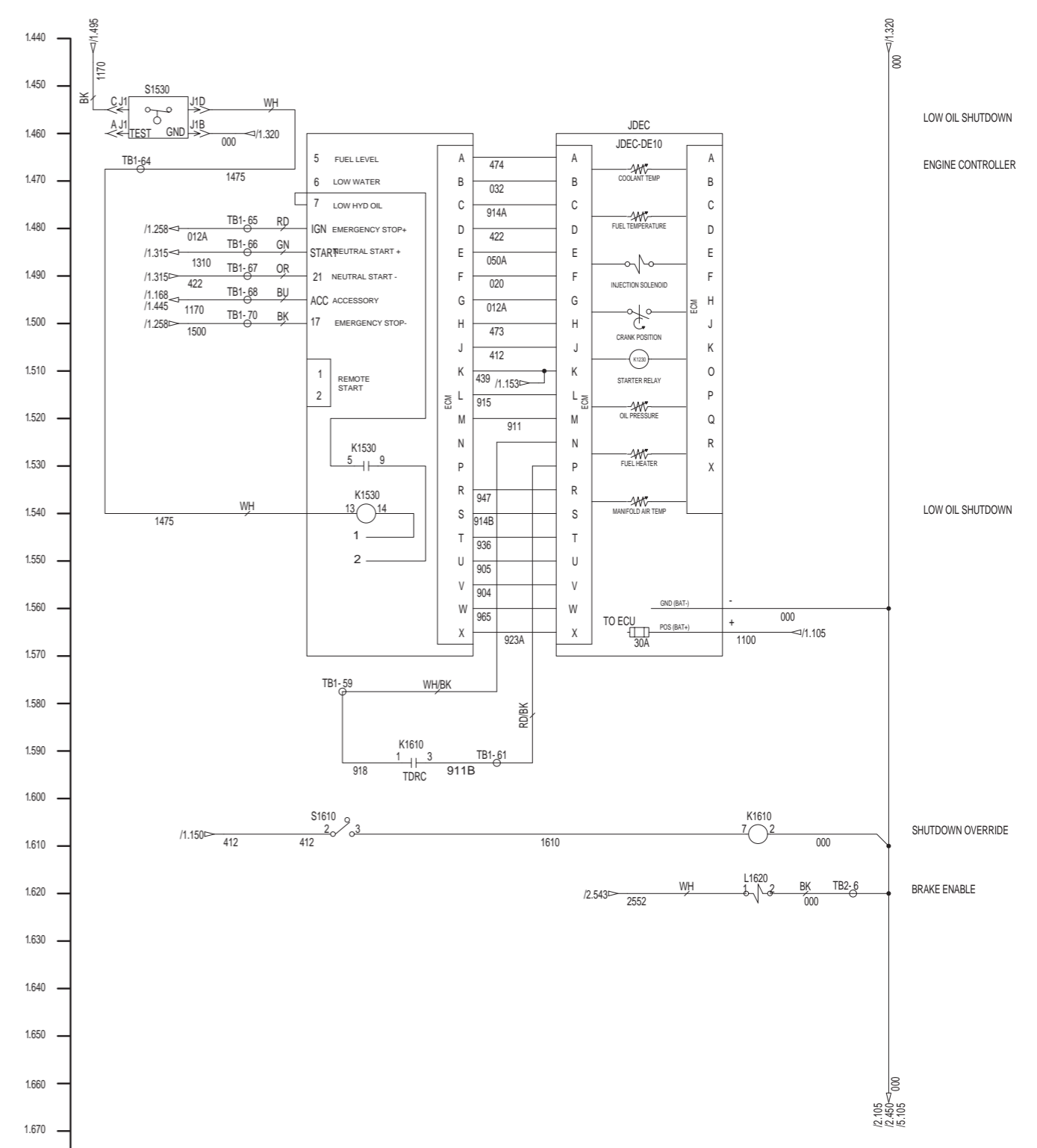
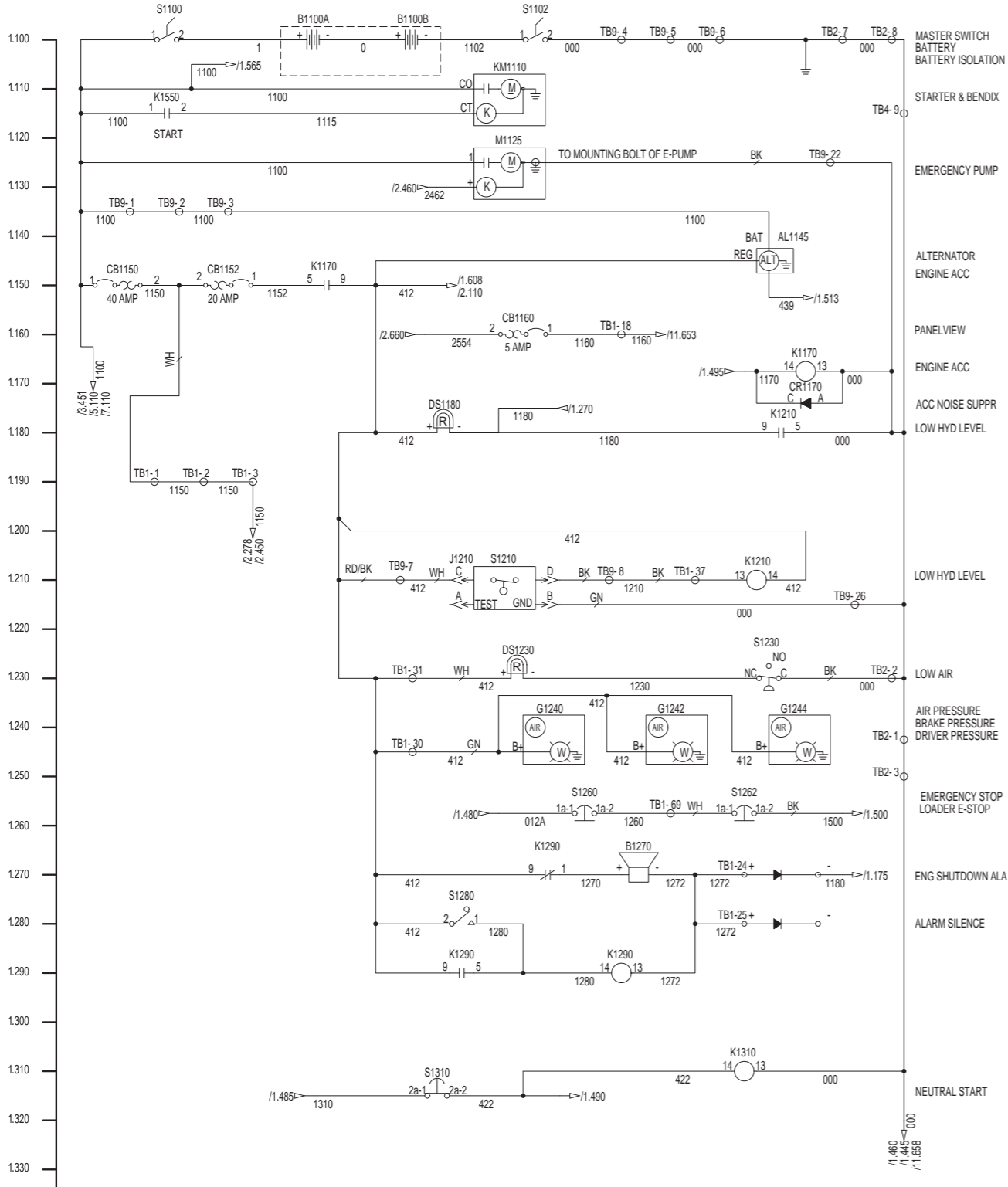
| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|-------------|-----|----------|
| EC510036 | A | NEW RELEASE | JES | 05-05-14 |

DRAWING TITLE/DESCRIPTION:
KIT, SOLID STATE RELAY
W96E3 - 44/45
 MACHINE TYPE-MODEL:
W96 SPIKER
 E3 PROJECT FILE NAME:
W96E3_KIT_0

| | |
|-------------------------------|------------------------|
| SHEET NUMBER 1 | DRAWN BY: JES |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 05-05-14 |
| TOTAL NUMBER OF SHEETS 1 | SIZE: D |
| | SCALE: |

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E3 DRAWING
 DRAWING NUMBER:
5044573



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| CHANGE # | R/L | REVISION | DR | DATE |
|-----------|-----|--|-----|----------|
| EC506060 | G | CHANGE TO PANELVIEW DISPLAY 502528 | KMS | 02-04-13 |
| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
| EC507653 | J | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 06-24-13 |
| EC508026 | K | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 08-02-13 |
| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-44

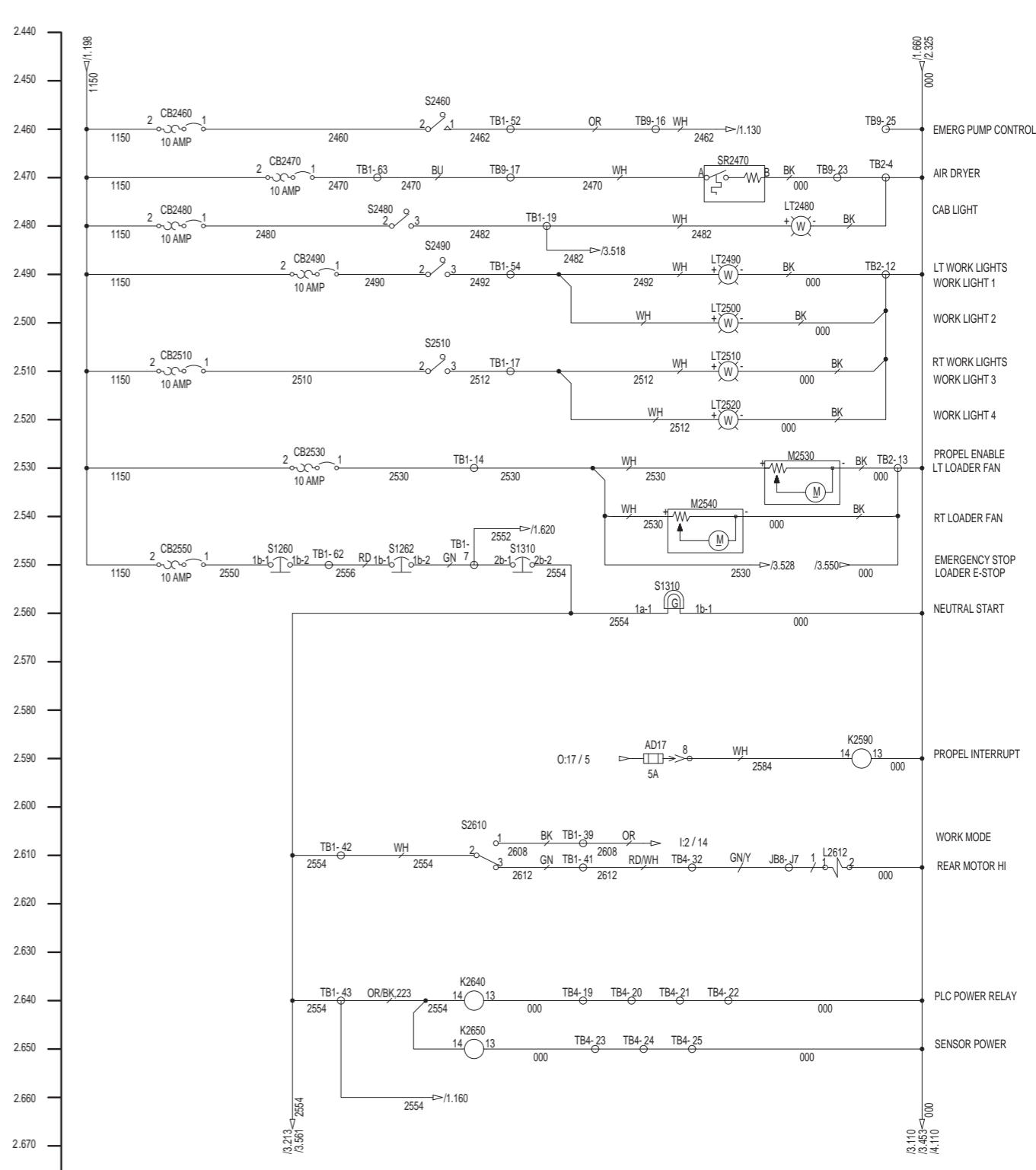
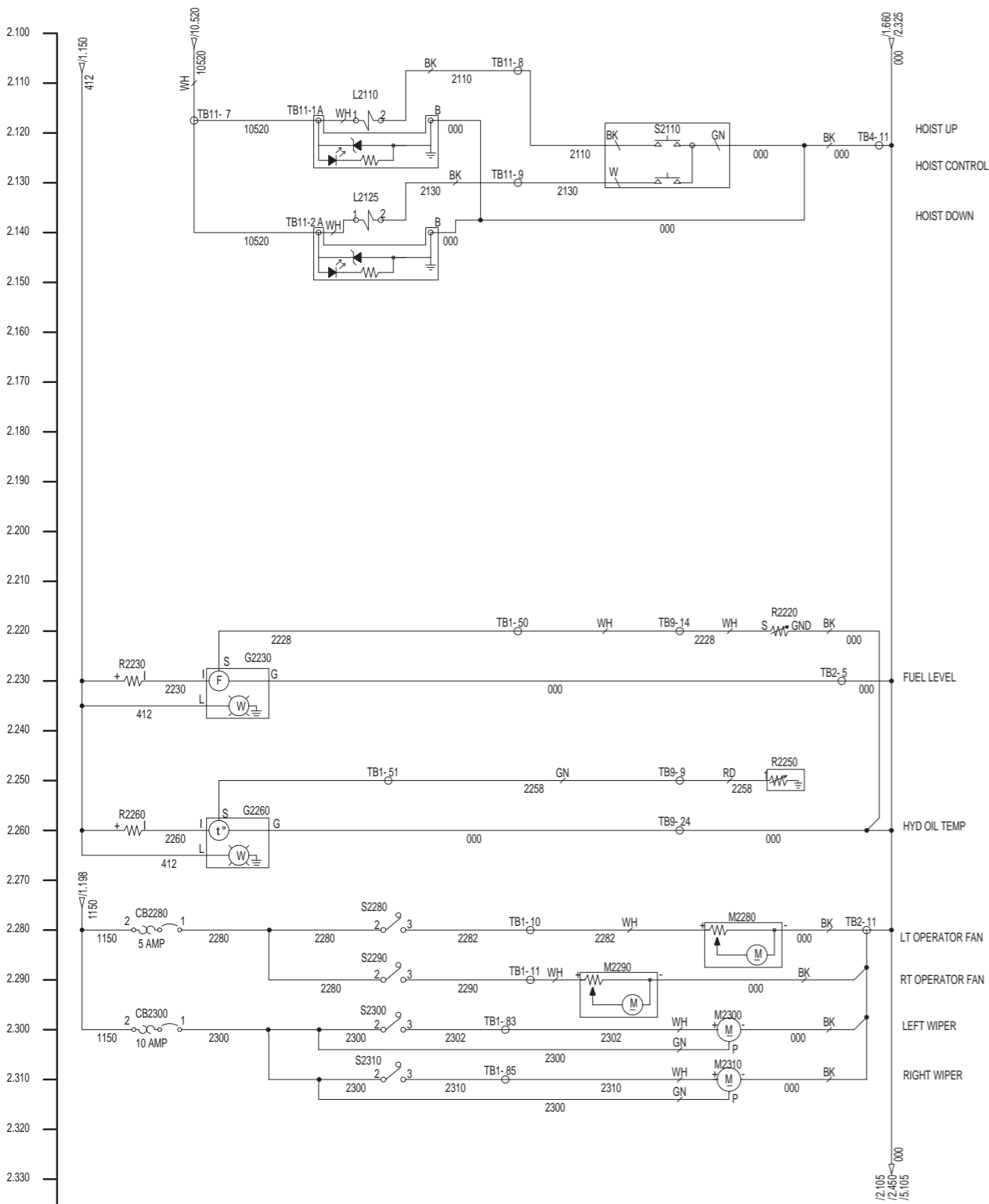
E3 PROJECT FILE NAME:
W96E3-44_16

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| SHEET NUMBER 1 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

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E3 DRAWING

DRAWING NUMBER:
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ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-44

E3 PROJECT FILE NAME:
W96E3-44_16

SHEET NUMBER
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NUMBER OF JUPITER SHEETS
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TOTAL NUMBER OF SHEETS
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DRAWN BY:
WGL

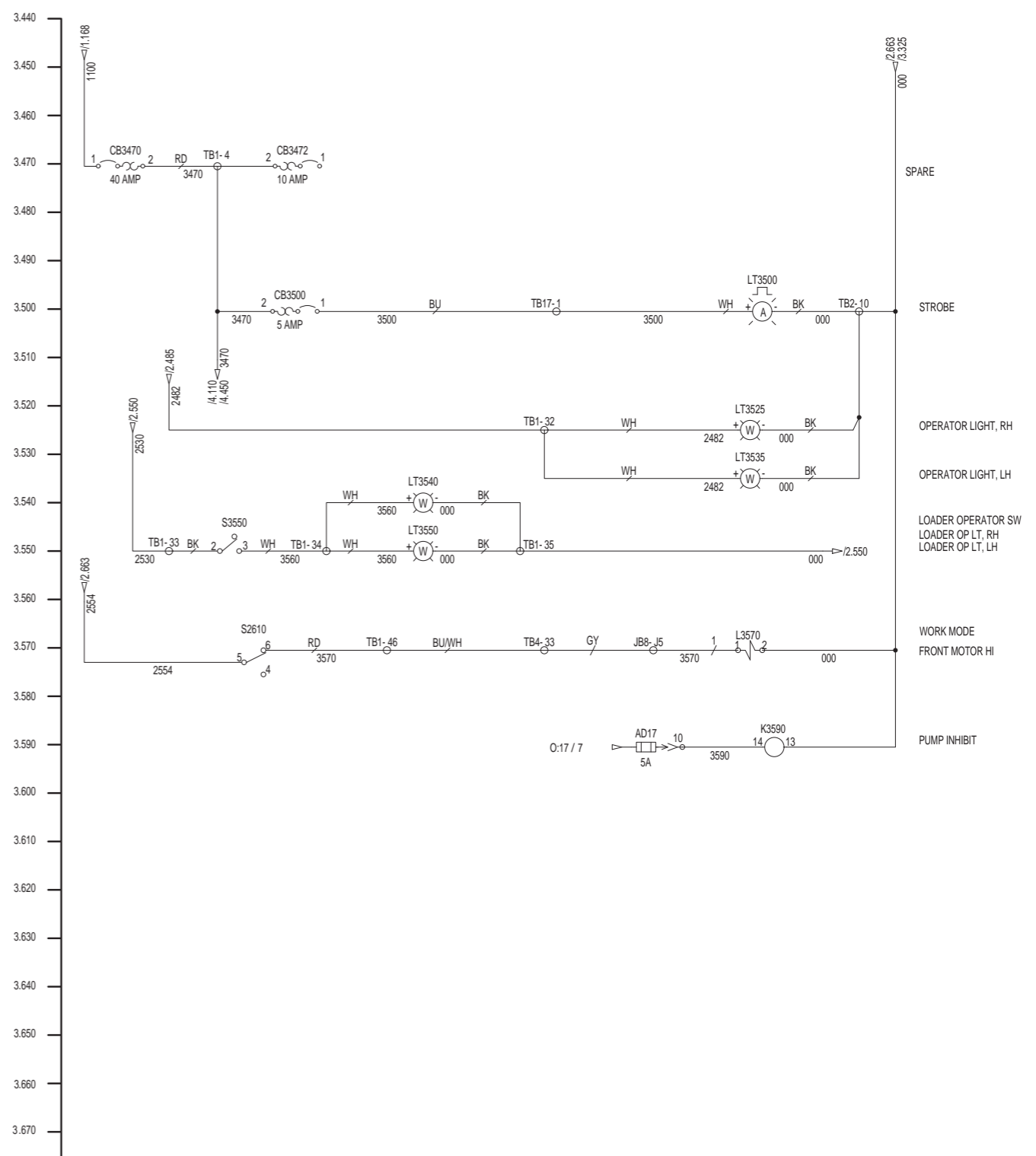
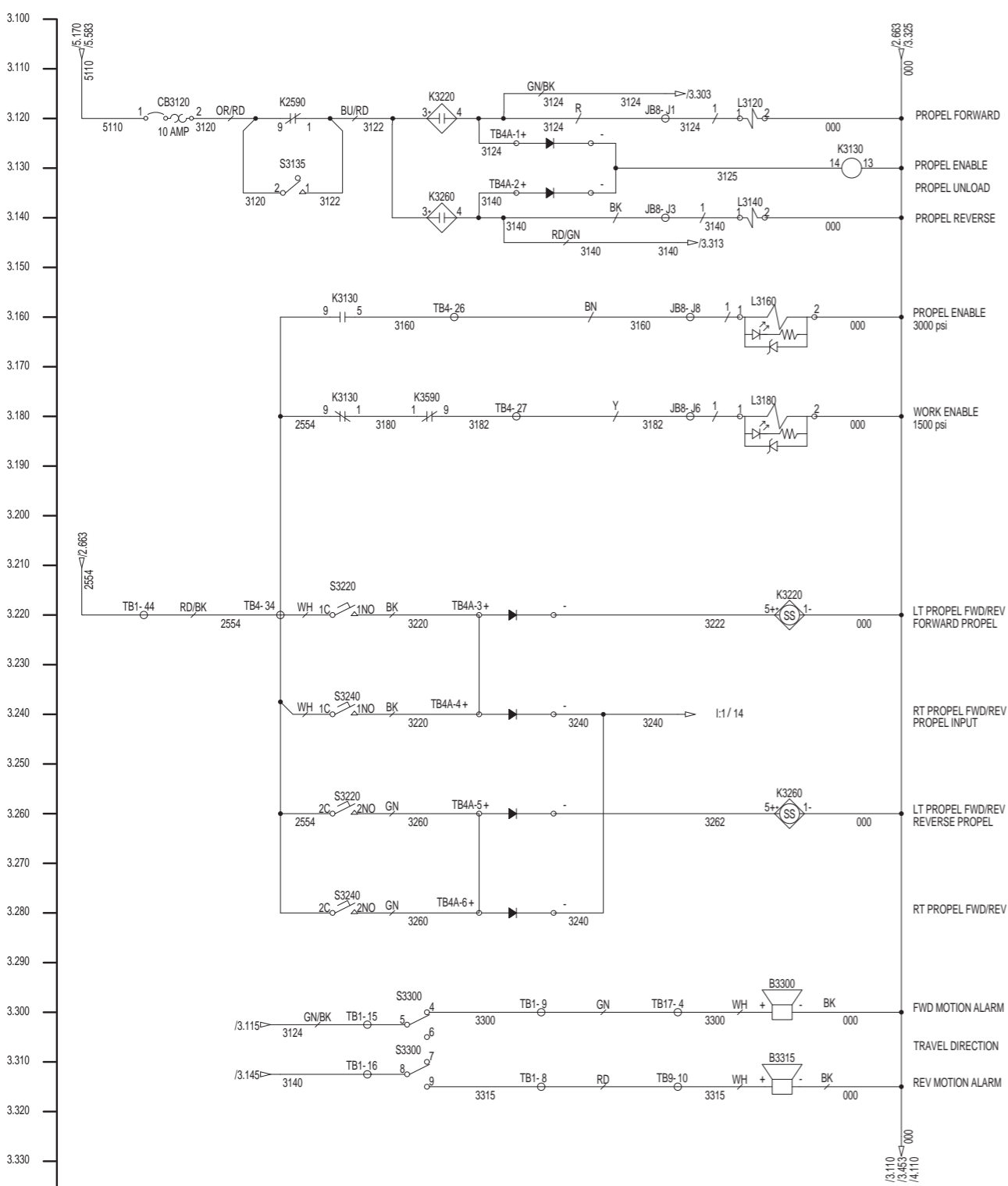
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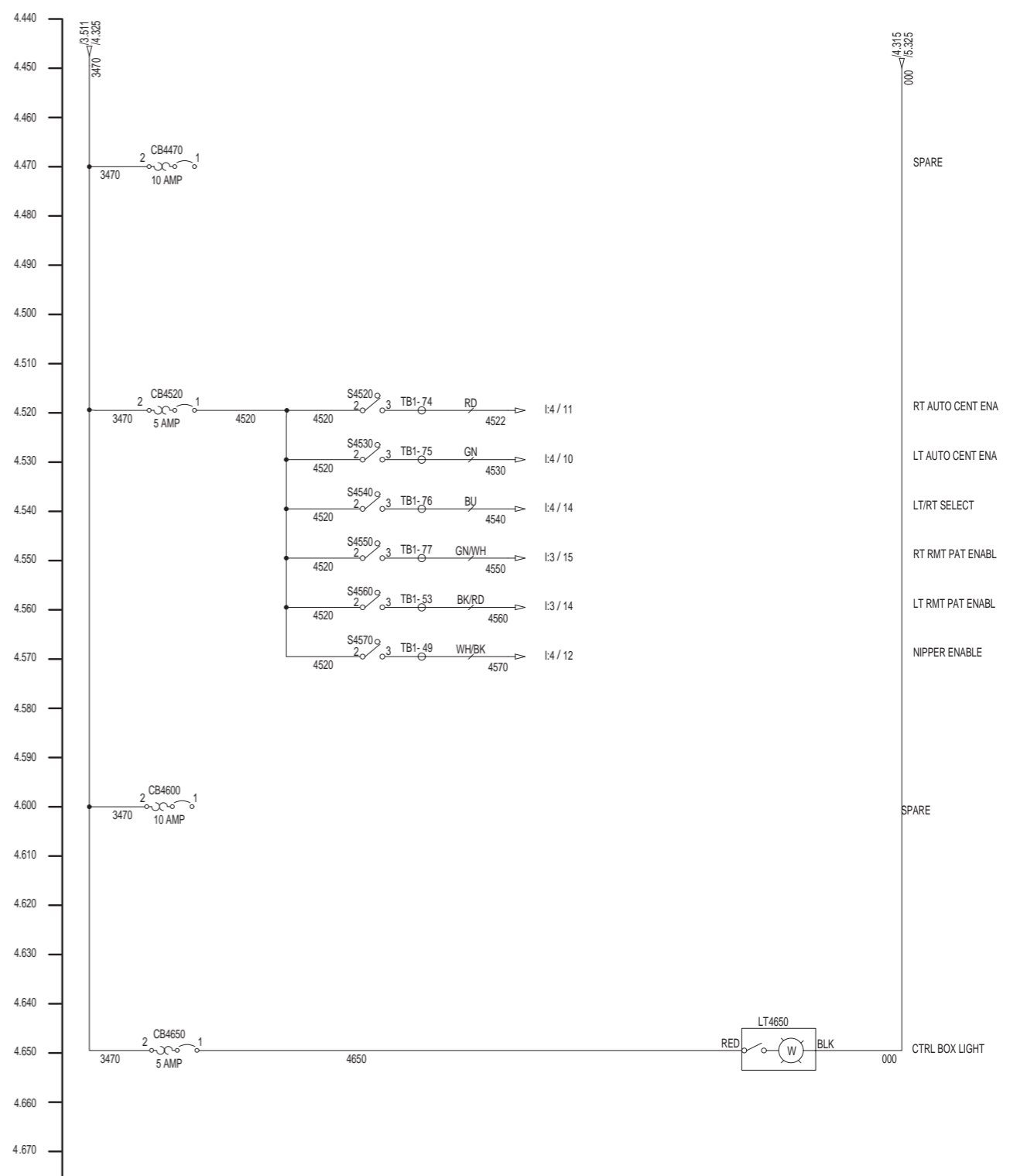
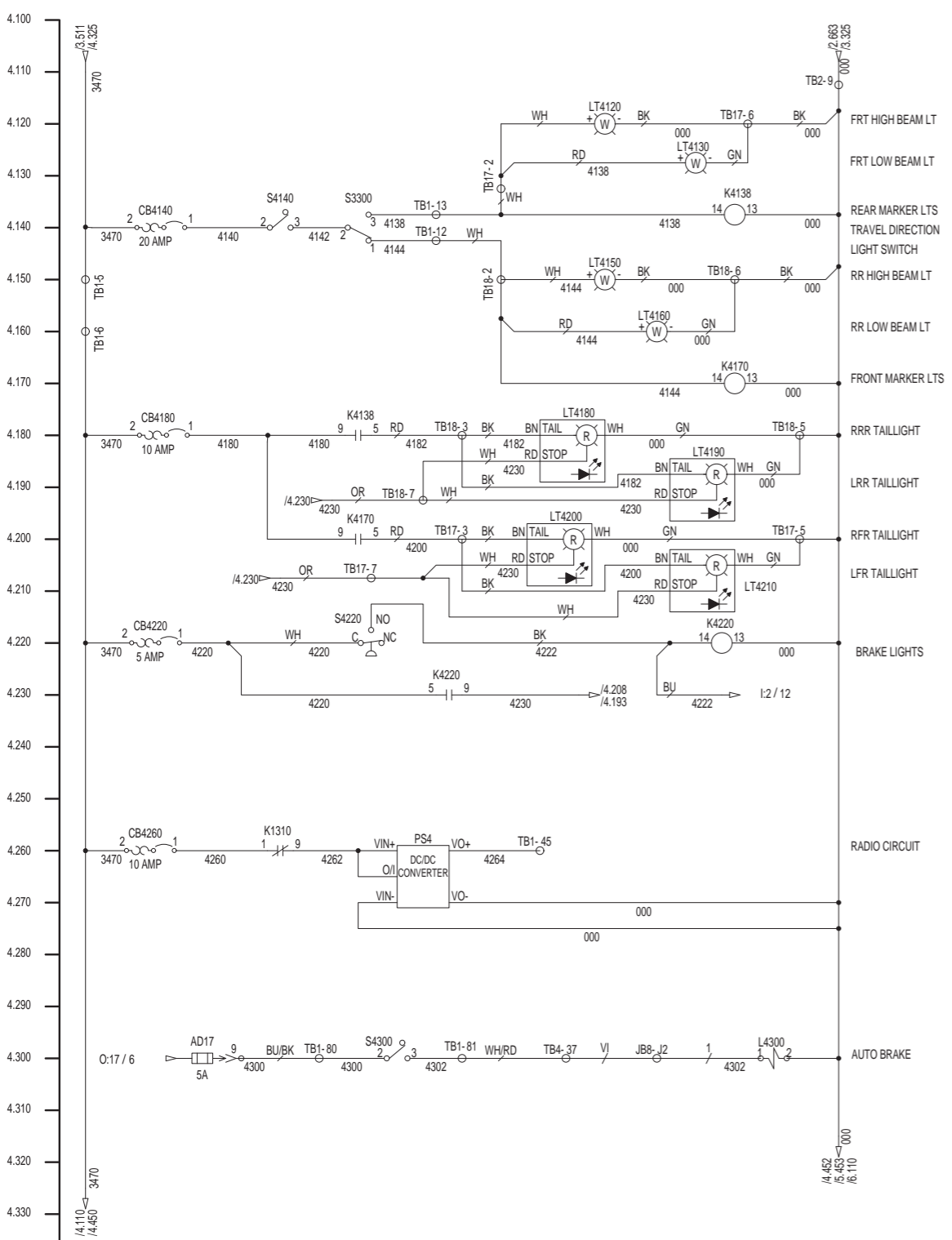
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| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

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|---|---|
| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: W96E3-44 | E3 PROJECT FILE NAME: W96E3-44_16 |

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| SHEET NUMBER 3 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

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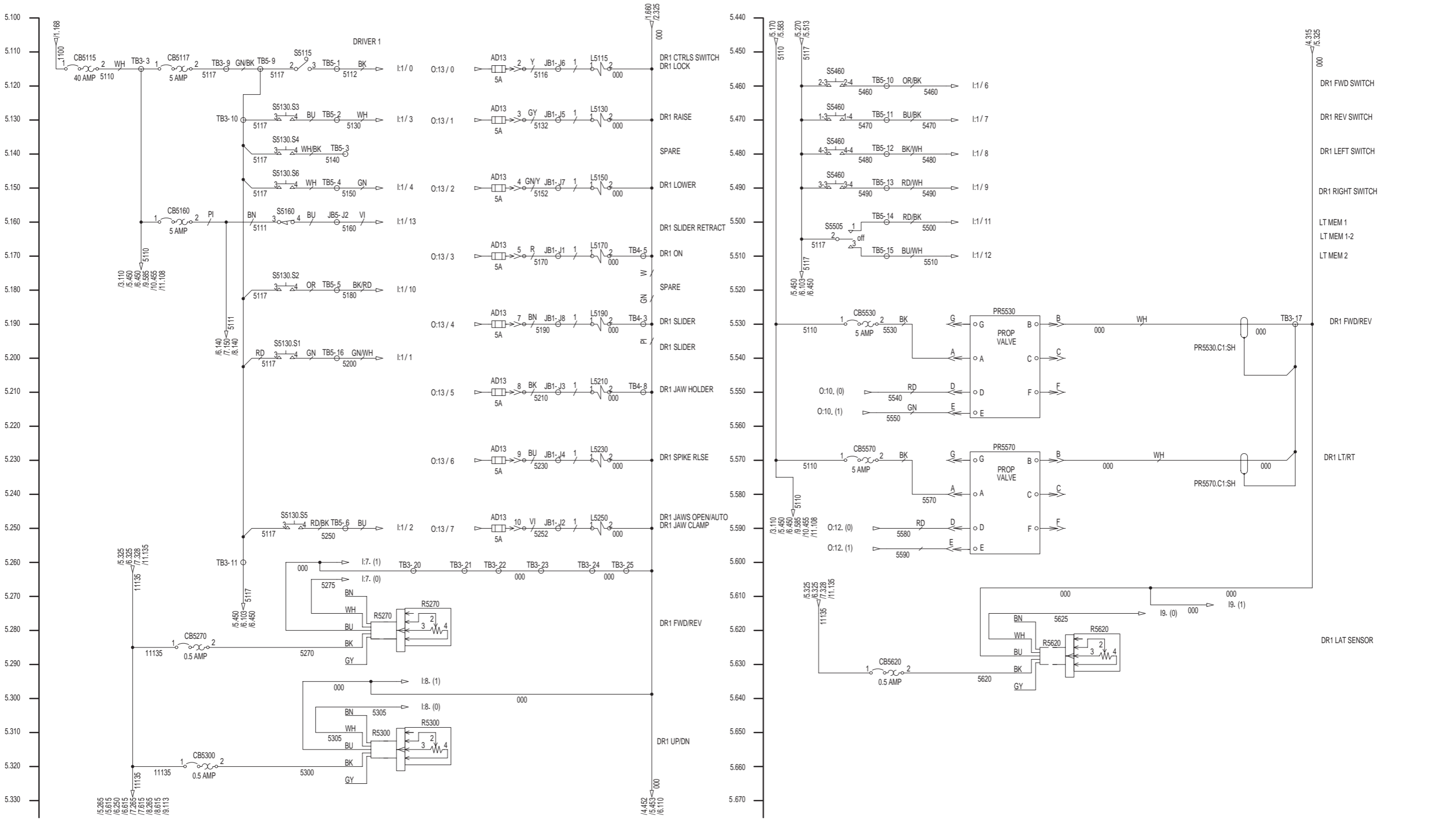
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| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
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| EC507653 | J | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 06-24-13 |
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| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

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| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: W96E3-44 | E3 PROJECT FILE NAME: W96E3-44_16 |

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| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
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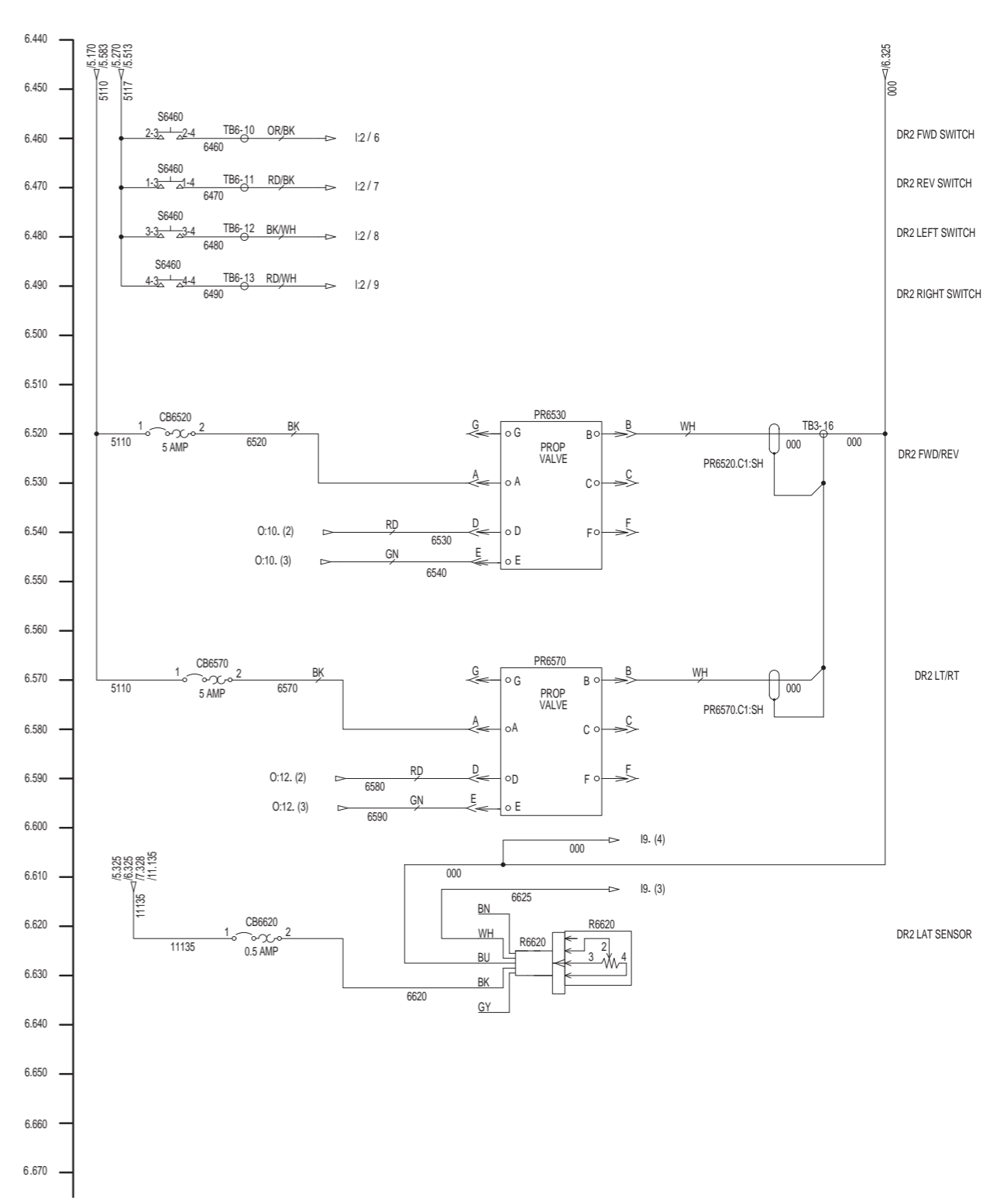
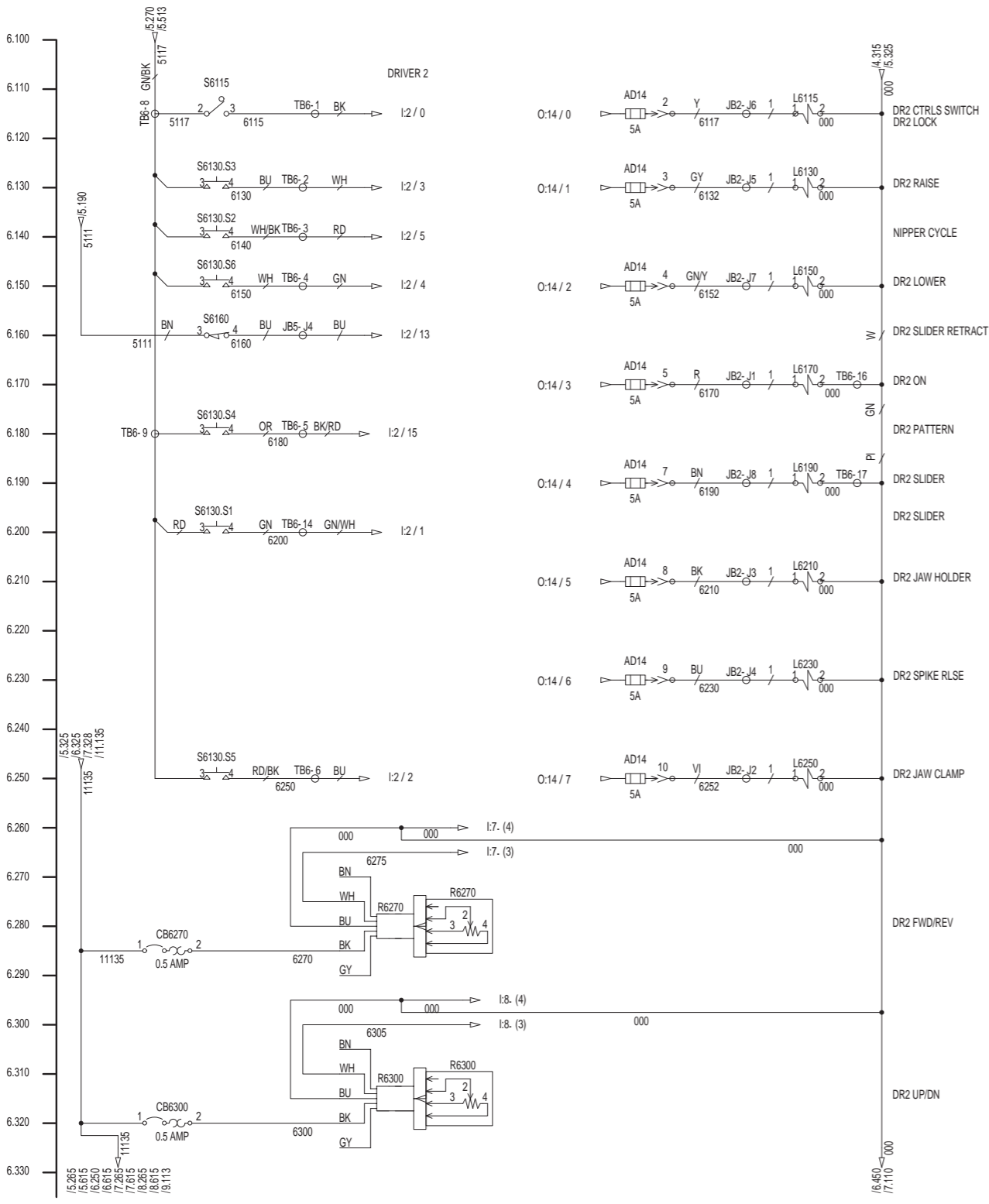
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| EC506060 | G | CHANGE TO PANELVIEW DISPLAY 502528 | KMS | 02-04-13 |
| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
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| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: W96E3-44 | |
| E3 PROJECT FILE NAME: W96E3-44_16 | |

| | |
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| SHEET NUMBER 5 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
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| EC508026 | K | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 08-02-13 |
| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

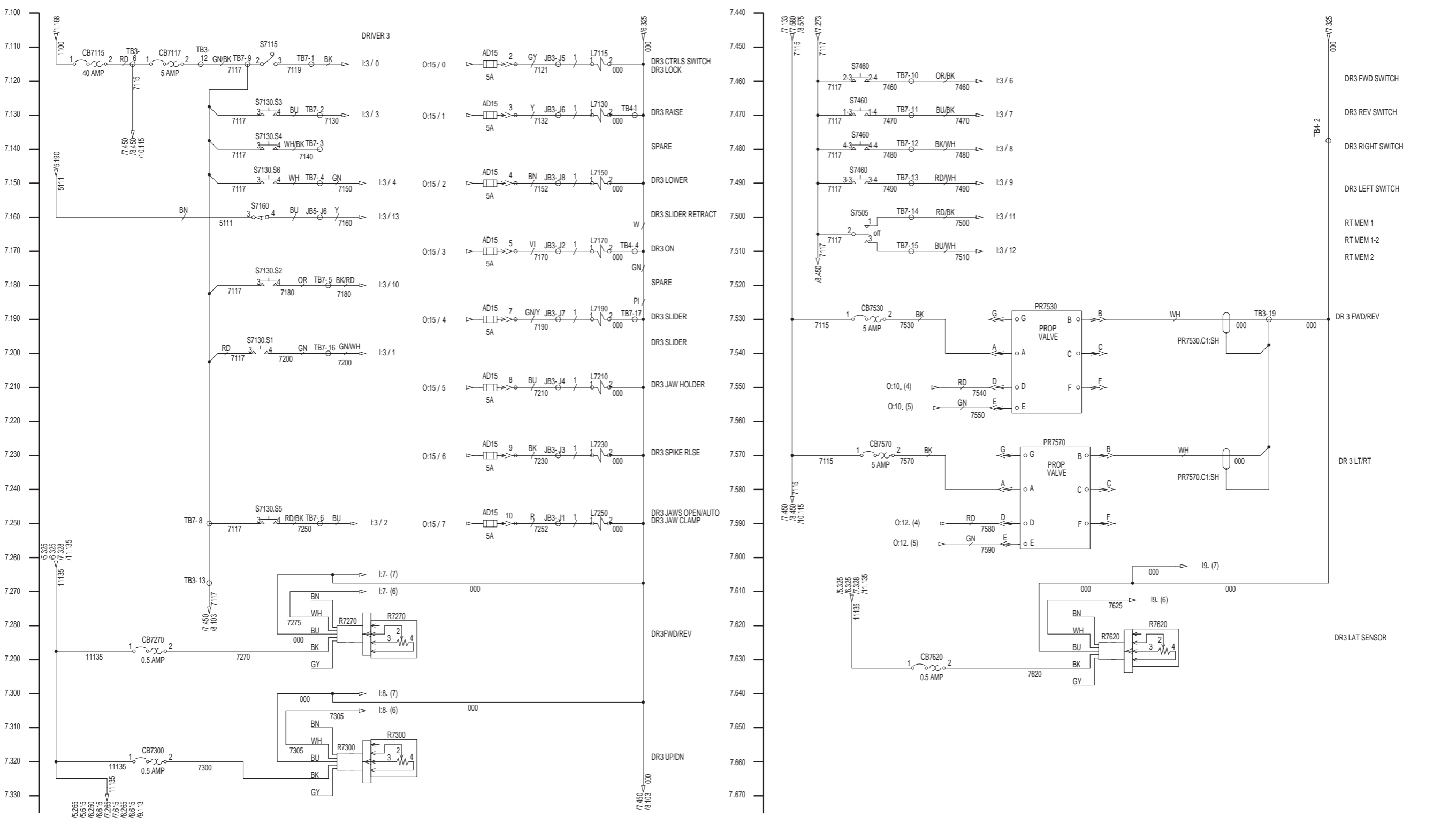
MACHINE TYPE-MODEL:
W96E3-44

E3 PROJECT FILE NAME:
W96E3-44_16

| | |
|--------------------------------------|-------------------------------|
| SHEET NUMBER 6 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

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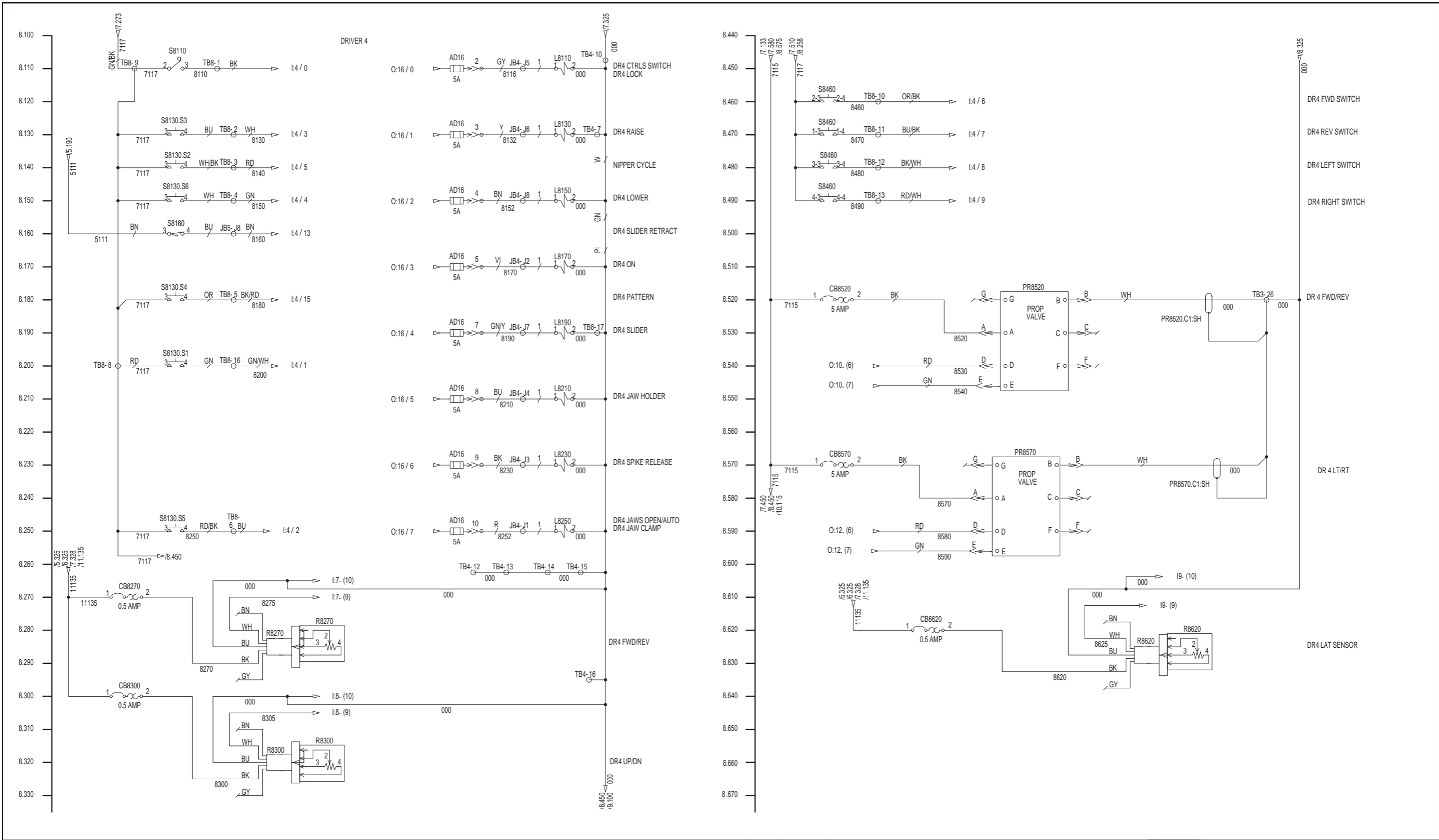
| CHANGE # | R/L | REVISION | DR | DATE |
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| EC506060 | G | CHANGE TO PANELVIEW DISPLAY 502528 | KMS | 02-04-13 |
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| | |
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| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: W96E3-44 | |
| E3 PROJECT FILE NAME: W96E3-44_16 | |

| | |
|--------------------------------------|-------------------------------|
| SHEET NUMBER 7 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
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| CHANGE # | R/L | REVISION | DR | DATE |
|-----------|-----|--|-----|----------|
| EC506060 | G | CHANGE TO PANELVIEW DISPLAY 502528 | KMS | 02-04-13 |
| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
| EC507653 | J | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 06-24-13 |
| EC508026 | K | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 08-02-13 |
| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

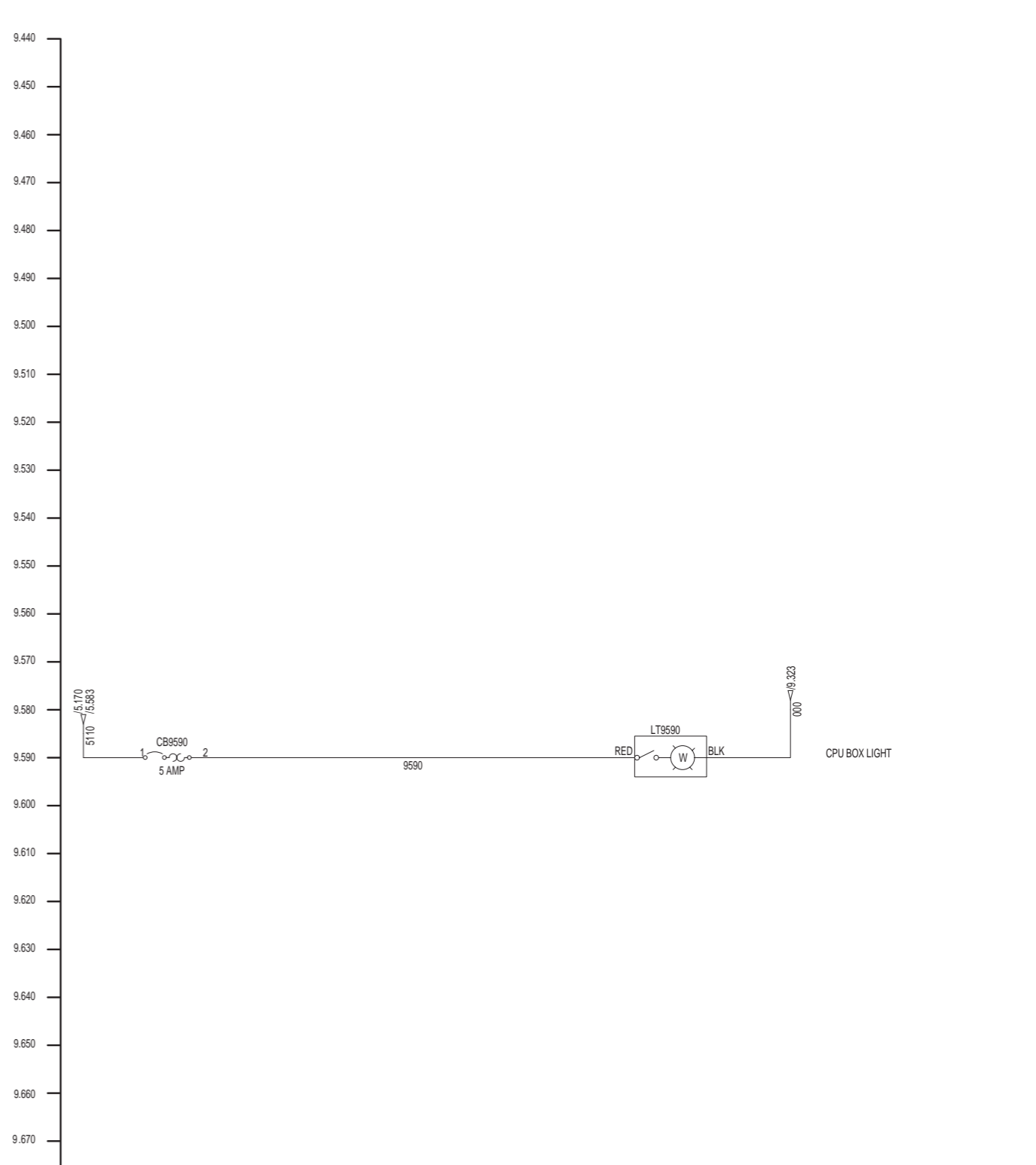
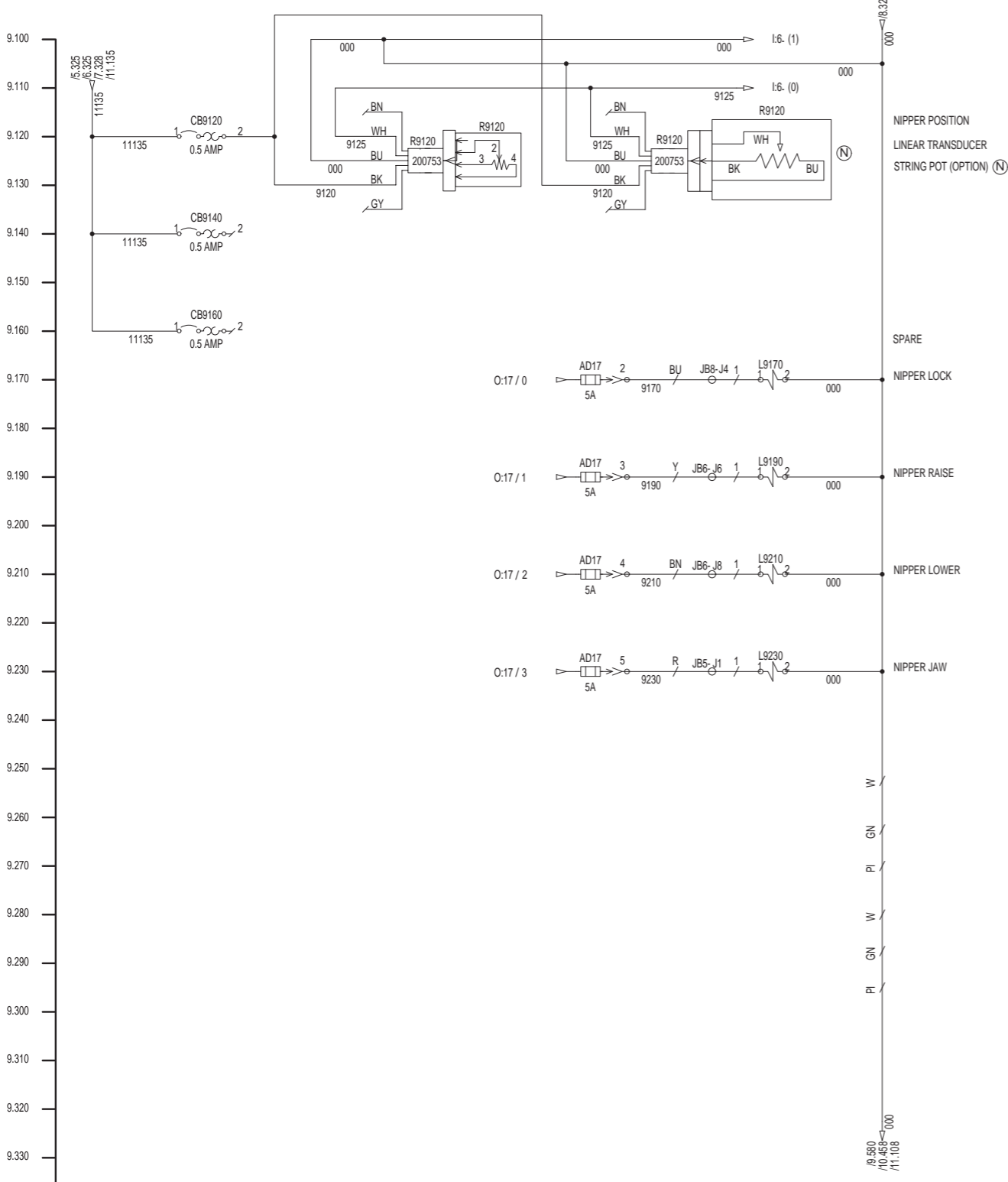
MACHINE TYPE-MODEL:
W96E3-44

E3 PROJECT FILE NAME:
W96E3-44_16

| | |
|--------------------------------------|-------------------------------|
| SHEET NUMBER 8 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

HARSCO
RAIL

E3 DRAWING
 DRAWING NUMBER:
3422204



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| CHANGE # | R/L | REVISION | DR | DATE |
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| EC506060 | G | CHANGE TO PANELVIEW DISPLAY 502528 | KMS | 02-04-13 |
| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
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| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

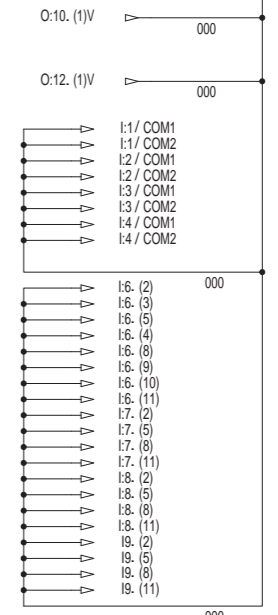
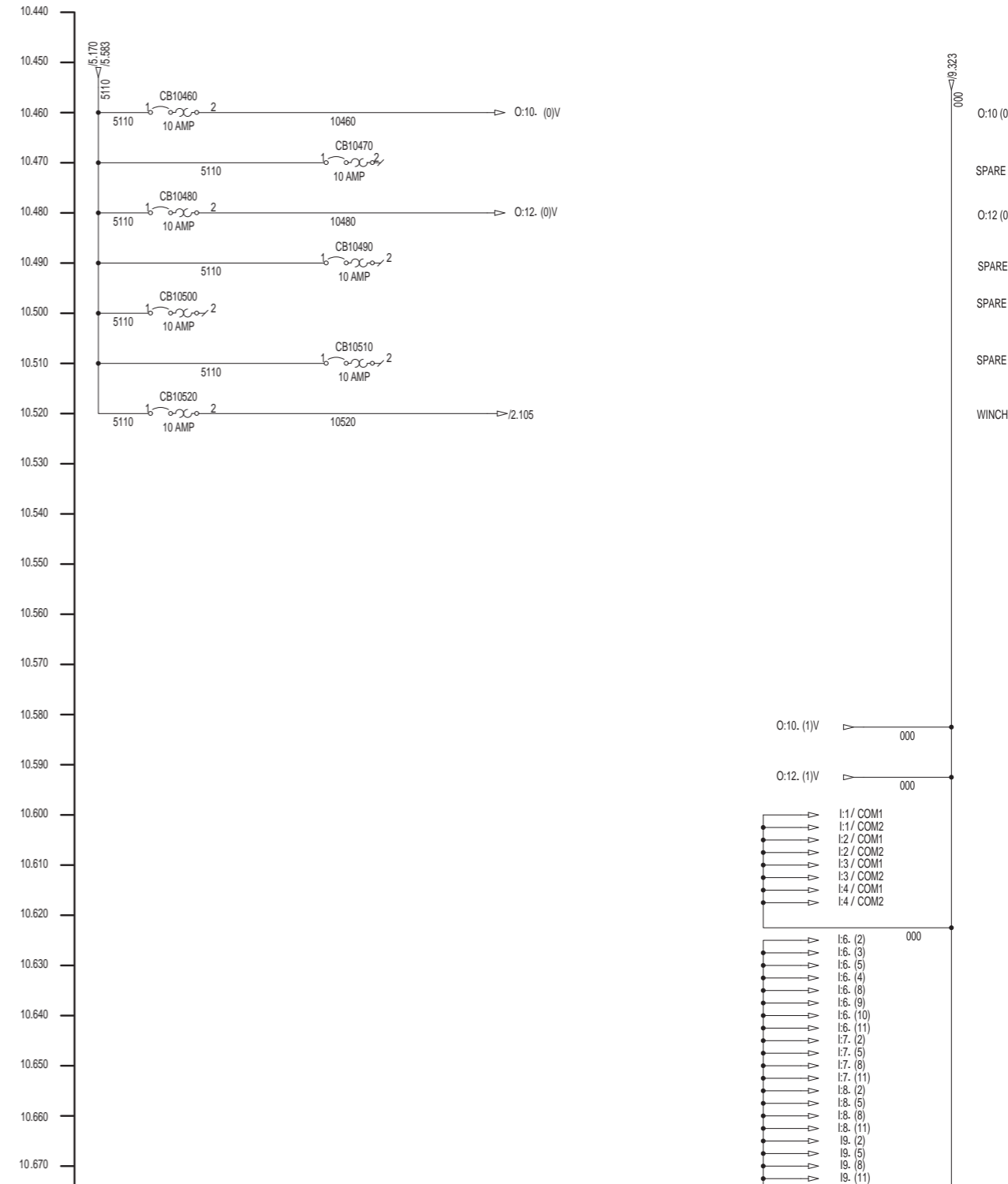
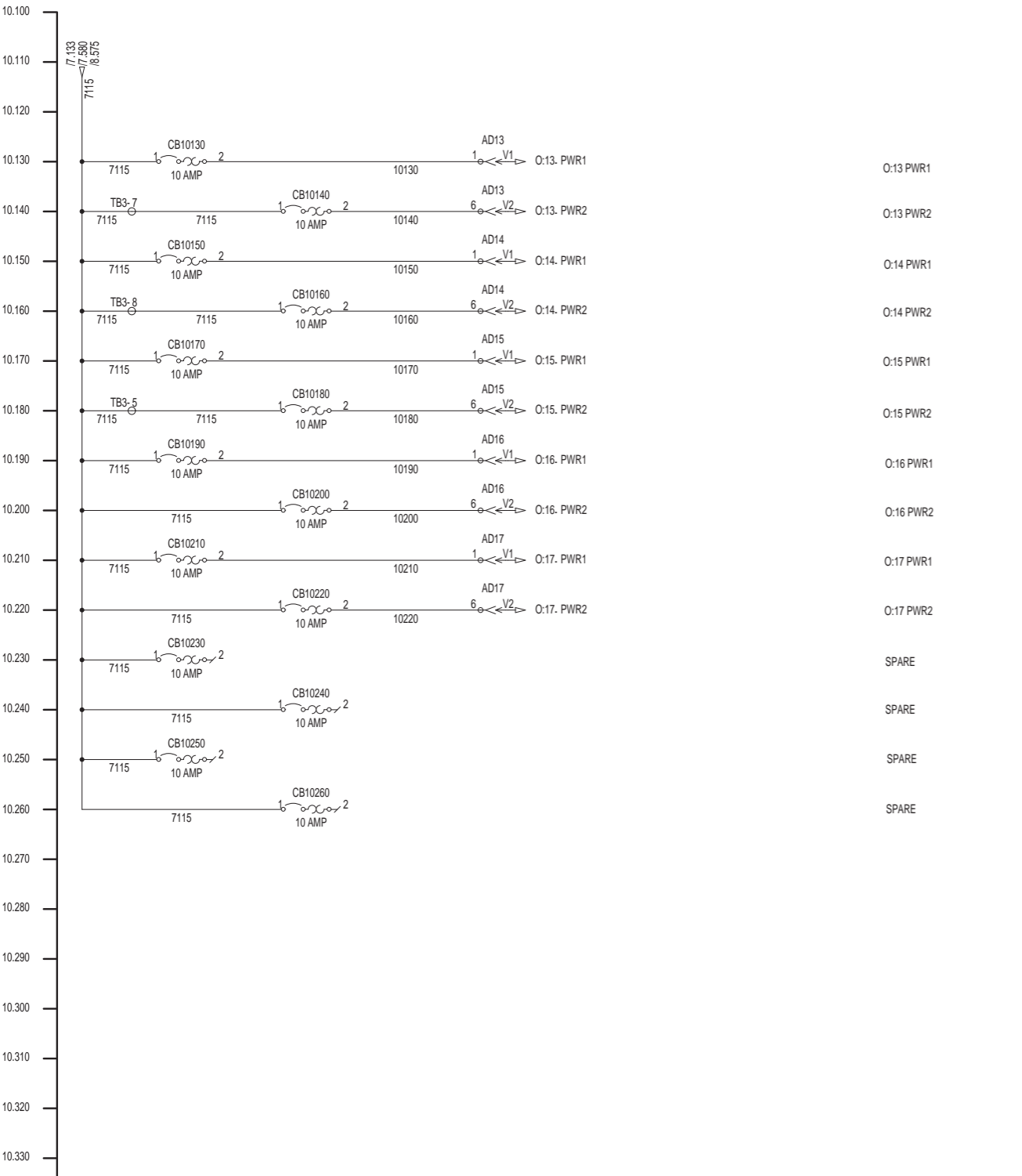
MACHINE TYPE-MODEL:
W96E3-44

E3 PROJECT FILE NAME:
W96E3-44_16

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| SHEET NUMBER 9 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

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E3 DRAWING
 DRAWING NUMBER:
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| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
| EC507653 | J | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 06-24-13 |
| EC508026 | K | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 08-02-13 |
| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

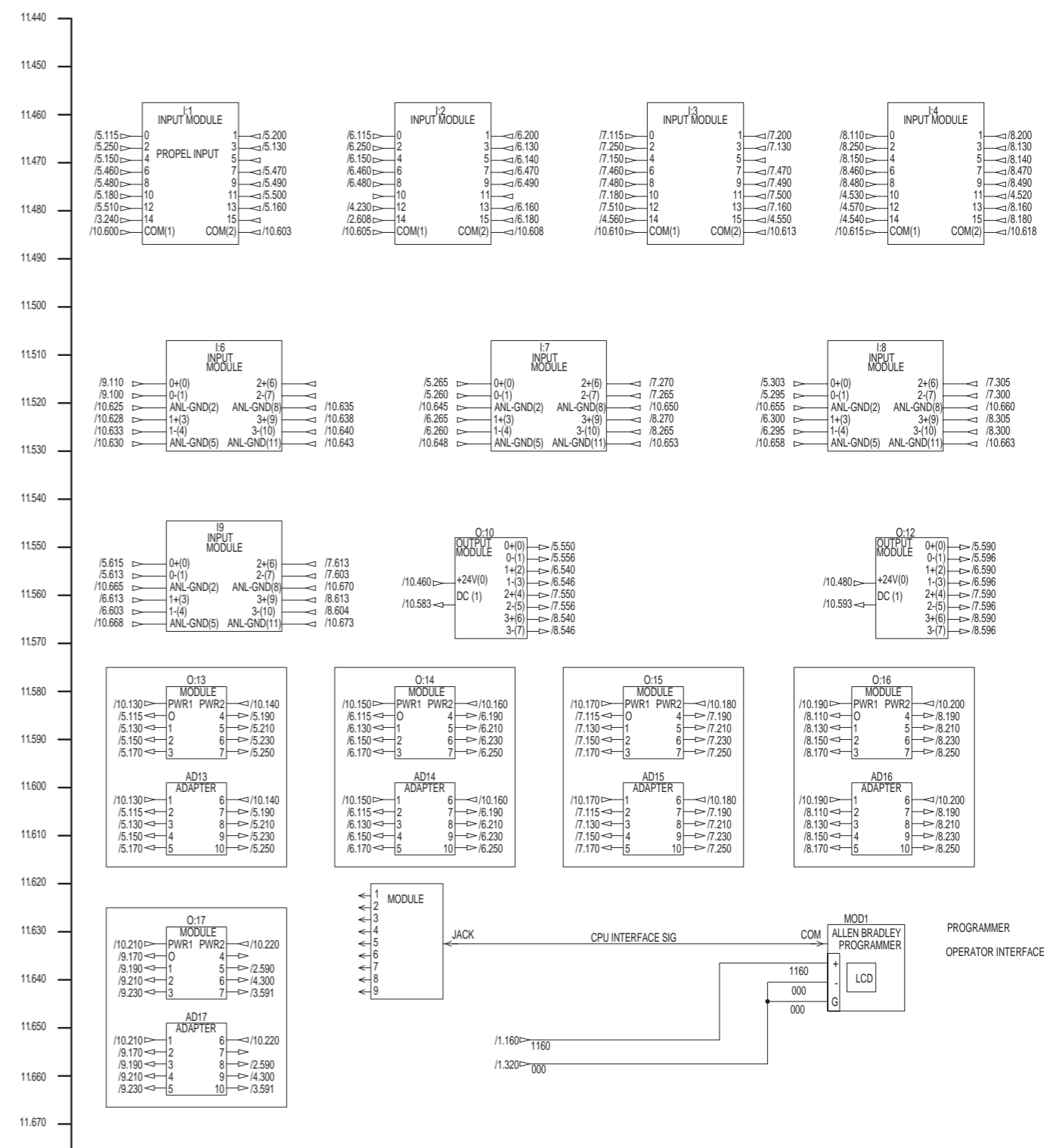
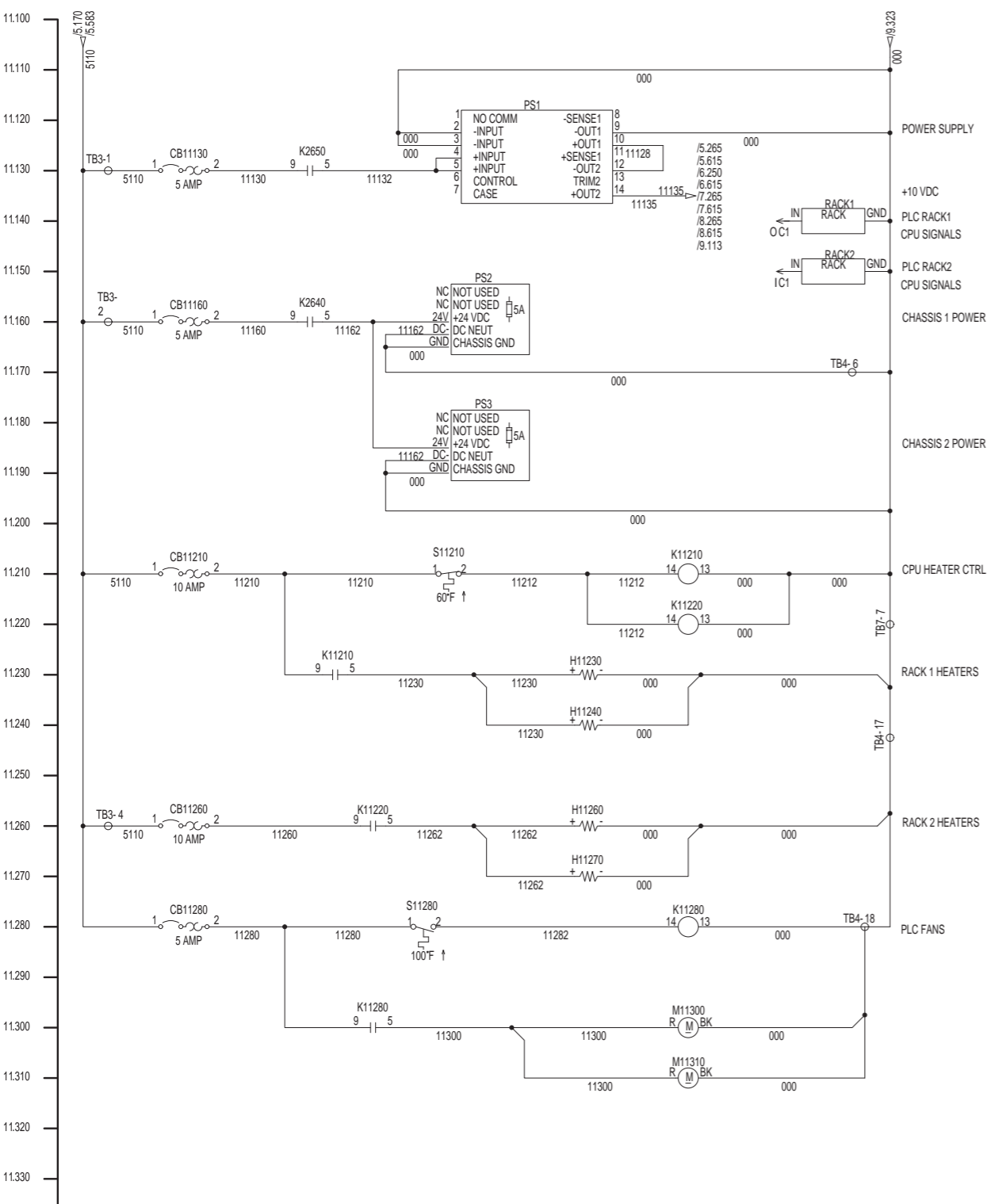
MACHINE TYPE-MODEL:
W96E3-44

E3 PROJECT FILE NAME:
W96E3-44_16

| | |
|-------------------------------|------------------------|
| SHEET NUMBER 10 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

HARSCO RAIL

E3 DRAWING
 DRAWING NUMBER:
3422204



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| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
| EC507653 | J | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 06-24-13 |
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| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
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DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-44

E3 PROJECT FILE NAME:
W96E3-44_16

SHEET NUMBER
11

NUMBER OF JUPITER SHEETS
-

TOTAL NUMBER OF SHEETS
15

DRAWN BY:
WGL

REL. DATE:
07/10/09

SIZE:
D

SCALE:

HARSCO RAIL

E3 DRAWING
 DRAWING NUMBER:
3422204



| SWITCHES | | | | | | |
|----------|----------|----------------|----------------------|--------------------|----------|-------------|
| NO | DEVICE | SHEET LOCATION | | DESCRIPTION | LOCATION | PART NUMBER |
| 1 | S1100 | /1.100 | | MASTER SWITCH | EJB | F014685 |
| 2 | S1102 | /1.100 | | BATTERY ISOLATION | EJB | F014685 |
| 3 | S1210 | /1.210 | | LOW OIL WARNING | MISC | 416078 |
| 4 | S1230 | /1.230 | | LOW AIR | MISC | F025303 |
| 5 | S1260 | /1.258 | /2.550 | EMERGENCY STOP | CTRL | ASSEMBLY |
| 6 | S1262 | /1.258 | /2.550 | LOADER E-STOP | MISC | ASSEMBLY |
| 7 | S1280 | /1.280 | | ALARM SILENCE | CTRL | F017149 |
| 8 | S1310 | /2.560 | /1.315 /2.550 | NEUTRAL START | CTRL | ASSEMBLY |
| 9 | S1530 | /1.455 | | LOW OIL SHUTDOWN | MISC | 416078 |
| 10 | S1610 | /1.608 | | SHUTDOWN OVERRIDE | CTRL | F014868 |
| 11 | S2110 | /2.123 | | HOIST CONTROL | MISC | 106746500 |
| 12 | S2280 | /2.280 | | LT OPERATOR FAN | CTRL | F014868 |
| 13 | S2290 | /2.290 | | RT OPERATOR FAN | CTRL | F014868 |
| 14 | S2300 | /2.300 | | LEFT WIPER | CTRL | F014868 |
| 15 | S2310 | /2.310 | | RIGHT WIPER | CTRL | F014868 |
| 16 | S2460 | /2.460 | | EMERGENCY PUMP | CTRL | F017149 |
| 17 | S2480 | /2.480 | | CAB LIGHT | CTRL | F014868 |
| 18 | S2490 | /2.490 | | LT CARRIAGE LTS | CTRL | F014868 |
| 19 | S2510 | /2.510 | | RT CARRIAGE LTS | CTRL | F014868 |
| 20 | S2610 | /2.610 | /3.573 | WORK MODE | MISC | F023824 |
| 21 | S3135 | /3.135 | | PROPEL UNLOAD | CTRL | F017149 |
| 22 | S3220 | /3.220 | /3.260 | LT PROPEL FWD/REV | MISC | 177773 |
| 23 | S3240 | /3.240 | /3.280 | RT PROPEL FWD/REV | MISC | 177773 |
| 24 | S3300 | /4.140 | /3.303 /3.313 | TRAVEL DIRECTION | CTRL | F022927 |
| 25 | S3550 | /3.550 | | LOADER OPERATOR SW | MISC | F014868 |
| 26 | S4140 | /4.140 | | LIGHT SWITCH | CTRL | F014868 |
| 27 | S4220 | /4.220 | | BRAKE LIGHTS | MISC | 171893 |
| 28 | S4300 | /4.300 | | AUTO BRAKE | CTRL | F014868 |
| 29 | S4520 | /4.520 | | RT AUTO CENT ENA | CTRL | F014868 |
| 30 | S4530 | /4.530 | | LT AUTO CENT ENA | CTRL | F014868 |
| 31 | S4540 | /4.540 | | LT/RT SELECT | CTRL | F014868 |
| 32 | S4550 | /4.550 | | RT RMT PAT ENABL | CTRL | F014868 |
| 33 | S4560 | /4.560 | | LT RMT PAT ENABL | CTRL | F014868 |
| 34 | S4570 | /4.570 | | NIPPER ENABLE | CTRL | F014868 |
| 35 | S5115 | /5.115 | | DR1 CTRLS SWITCH | MISC | F040195 |
| 36 | S5130.S1 | /5.200 | | DR1 SLIDER | ASSEMBLY | 200201 |
| 37 | S5130.S2 | /5.180 | | SPARE | ASSEMBLY | 200201 |
| 38 | S5130.S3 | /5.130 | | DR1 RAISE | ASSEMBLY | 200201 |
| 39 | S5130.S4 | /5.140 | | SPARE | ASSEMBLY | 200201 |
| 40 | S5130.S5 | /5.250 | | DR1 JAWS | ASSEMBLY | 200201 |
| 41 | S5130.S6 | /5.150 | | DR1 LOWER | ASSEMBLY | 200201 |
| 42 | S5160 | /5.160 | | DR1 SLIDER RETRA | MISC | 035009000 |
| 43 | S5460 | /5.470 | /5.460 /5.490 /5.480 | DR1 DIRECTION | MISC | ASSEMBLY |
| 44 | S5505 | /5.505 | | LT MEM 1-2 | MISC | F018845 |
| 45 | S6115 | /6.115 | | DR2 CTRLS SWITCH | MISC | F040195 |
| 46 | S6130.S1 | /6.200 | | DR2 SLIDER | ASSEMBLY | 200201 |
| 47 | S6130.S2 | /6.140 | | NIPPER CYCLE | ASSEMBLY | 200201 |
| 48 | S6130.S3 | /6.130 | | DR2 UP | ASSEMBLY | 200201 |
| 49 | S6130.S4 | /6.180 | | DR2 PATTERN | ASSEMBLY | 200201 |
| 50 | S6130.S5 | /6.250 | | DR2 JAWS | ASSEMBLY | 200201 |
| 51 | S6130.S6 | /6.150 | | DR2 LOWER | ASSEMBLY | 200201 |
| 52 | S6160 | /6.160 | | DR2 SLIDER RETRACT | MISC | 035009000 |
| 53 | S6460 | /6.470 | /6.460 /6.480 /6.490 | DR2 DIRECTION | MISC | ASSEMBLY |
| 54 | S7115 | /7.115 | | DR3 CTRLS SWITCH | MISC | F040195 |
| 55 | S7130.S1 | /7.200 | | DR3 SLIDER | ASSEMBLY | 200201 |
| 56 | S7130.S2 | /7.180 | | SPARE | ASSEMBLY | 200201 |
| 57 | S7130.S3 | /7.130 | | DR3 UP | ASSEMBLY | 200201 |

| SWITCHES | | | | | | |
|----------|----------|----------------|----------------------|--------------------|----------|-------------|
| NO | DEVICE | SHEET LOCATION | | DESCRIPTION | LOCATION | PART NUMBER |
| 57 | S7130.S4 | /7.140 | | SPARE | ASSEMBLY | 200201 |
| 58 | S7130.S5 | /7.250 | | DR3 JAWS | ASSEMBLY | 200201 |
| 59 | S7130.S6 | /7.150 | | DR3 LOWER | ASSEMBLY | 200201 |
| 60 | S7160 | /7.160 | | DR3 SLIDER RETRACT | MISC | 035009000 |
| 61 | S7460 | /7.470 | /7.460 /7.490 /7.480 | DR3 DIRECTION | MISC | ASSEMBLY |
| 62 | S7505 | /7.505 | | RT MEM 1-2 | MISC | F018845 |
| 63 | S8110 | /8.110 | | DR4 CTRLS SWITCH | MISC | F040195 |
| 64 | S8130.S1 | /8.200 | | DR4 SLIDER | ASSEMBLY | 200201 |
| 65 | S8130.S2 | /8.140 | | NIPPER CYCLE | ASSEMBLY | 200201 |
| 66 | S8130.S3 | /8.130 | | DR4 UP | ASSEMBLY | 200201 |
| 67 | S8130.S4 | /8.180 | | DR4 PATTERN | ASSEMBLY | 200201 |
| 68 | S8130.S5 | /8.250 | | DR4 JAWS | ASSEMBLY | 200201 |
| 69 | S8130.S6 | /8.150 | | DR4 LOWER | ASSEMBLY | 200201 |
| 70 | S8160 | /8.160 | | DR4 SLIDER RETRACT | MISC | 035009000 |
| 71 | S8460 | /8.470 | /8.460 /8.480 /8.490 | DR4 DIRECTION | MISC | ASSEMBLY |
| 72 | S11210 | /11.210 | | CPU HEATER CTRL | CPU | F023786 |
| 73 | S11280 | /11.280 | | CPU COOLING FANS | CPU | F023823 |

| MISC COMPONENTS | | | | | |
|-----------------|--------|---------|--------------------|----------|-------------|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER |
| 1 | | | | | |
| 2 | AL1145 | /1.145 | ALTERNATOR | E | |
| 3 | B1100A | /1.100 | BATTERY | MISC | 179351 |
| 4 | B1100B | /1.100 | BATTERY | MISC | 179351 |
| 5 | B1270 | /1.270 | ENG SHUTDOWN ALA | CTRL | F040126 |
| 6 | B3300 | /3.300 | FWD MOTION ALARM | MISC | F040795 |
| 7 | B3315 | /3.315 | REV MOTION ALARM | MISC | F040795 |
| 8 | H11230 | /11.230 | RACK 1 HEATERS | CPU | 171962 |
| 9 | H11240 | /11.240 | RACK 1 HEATERS | CPU | 171962 |
| 10 | H11260 | /11.260 | PLC HEATER | CPU | 171962 |
| 11 | H11270 | /11.270 | PLC HEATER | CPU | 171962 |
| 12 | JDEC | /1.465 | ENGINE CONTROLLER | E | |
| 13 | KM1110 | /1.110 | STARTER & BENDIX | E | |
| 14 | M2280 | /2.280 | LT OPERATOR FAN | MISC | 171967 |
| 15 | M2290 | /2.290 | RT OPERATOR FAN | MISC | 171967 |
| 16 | M2300 | /2.300 | LEFT WIPER | MISC | 171965 |
| 17 | M2310 | /2.310 | RIGHT WIPER | MISC | 171965 |
| 18 | M2540 | /2.540 | RT LOADER FAN | MISC | 171967 |
| 19 | M2530 | /2.530 | LT LOADER FAN | MISC | 171967 |
| 20 | M11300 | /11.300 | CPU COOLING FANS | CPU | 171961 |
| 21 | M11310 | /11.310 | CPU COOLING FANS | CPU | 171961 |
| 22 | MOD0 | /11.633 | PROGRAMMER | CPU | F026078 |
| 23 | MOD1 | /11.633 | OPERATOR INTERFACE | CTRL | 5025283 |
| 24 | PS1 | /11.120 | POWER SUPPLY | CPU | 171814 |
| 25 | PS2 | /11.155 | CHASSIS 1 POWER | CPU | F025843 |
| 26 | PS3 | /11.180 | CHASSIS 2 POWER | CPU | F025843 |
| 27 | PS4 | /4.260 | RADIO CIRCUIT | CTRL | 196035 |
| 28 | RACK1 | /11.140 | PLC RACK1 | CPU | 171898 |
| 29 | RACK2 | /11.150 | PLC RACK2 | CPU | 171898 |
| 30 | SR2470 | /2.470 | AIR DRYER | AIR | 189349 |

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| EC508026 | K | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 08-02-13 |
| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

| | |
|---|--|
| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: W96E3-44 | |
| E3 PROJECT FILE NAME: W96E3-44_16 | |

| | |
|--------------------------------------|-------------------------------|
| SHEET NUMBER 12 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS - | REL. DATE: 07/10/09 |
| TOTAL NUMBER OF SHEETS 15 | SCALE: D |

| | |
|-----------------------|-----------------------------------|
| HARSCO RAIL | E3 DRAWING |
| | DRAWING NUMBER: 3422204 |

| LIGHTS & INDICATORS | | | | | | |
|---------------------|--------|---------|--------------------|----------|-------------|---------------|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | BULB PART NO. |
| 1 | DS1180 | /1.180 | LOW HYD OIL | CTRL | 181375 | |
| 2 | DS1230 | /1.230 | LOW AIR | MISC | 171957 | 171959 |
| 3 | LT2480 | /2.480 | CAB LIGHT | MISC | 201136 | 174479 |
| 4 | LT2490 | /2.490 | WORK LIGHT 1 | MISC | 174288 | 174290 |
| 5 | LT2500 | /2.500 | WORK LIGHT 2 | MISC | 174288 | 174290 |
| 6 | LT2510 | /2.510 | WORK LIGHT 3 | MISC | 174288 | 174290 |
| 7 | LT2520 | /2.520 | WORK LIGHT 4 | MISC | 174288 | 174290 |
| 8 | LT3500 | /3.501 | STROBE | MISC | 3000871 | |
| 9 | LT3525 | /3.525 | OPERATOR LIGHT, RH | MISC | 201136 | |
| 10 | LT3535 | /3.535 | OPERATOR LIGHT, LH | MISC | 201136 | |
| 11 | LT3540 | /3.540 | LOADER OP LT, RH | MISC | 201136 | |
| 12 | LT3550 | /3.550 | LOADER OP LT, LH | MISC | 201136 | |
| 13 | LT4120 | /4.120 | FRT HIGH BEAM LT | MISC | 200644 | 174289 |
| 14 | LT4130 | /4.128 | FRT LOW BEAM LT | MISC | 174287 | 174289 |
| 15 | LT4150 | /4.150 | RR HIGH BEAM LT | MISC | 200644 | 174289 |
| 16 | LT4160 | /4.160 | RR LOW BEAM LT | MISC | 174287 | 174289 |
| 17 | LT4180 | /4.180 | RFR TAILLIGHT | MISC | 199960 | |
| 18 | LT4190 | /4.188 | LRR TAILLIGHT | MISC | 199960 | |
| 19 | LT4200 | /4.200 | RFR TAILLIGHT | MISC | 199960 | |
| 20 | LT4210 | /4.205 | LFR TAILLIGHT | MISC | 199960 | |
| 21 | LT4650 | /4.650 | CTRL BOX LIGHT | CTRL | F040972 | 174771 |
| 22 | LT9590 | /9.590 | CPU BOX LIGHT | CPU | F040972 | 174771 |

| RELAYS | | | | | | | |
|--------|--------|----------------|----------|--------|-------------------|----------|-------------|
| NO | DEVICE | SHEET LOCATION | | | DESCRIPTION | LOCATION | PART NUMBER |
| | | COIL | CONTACTS | | | | |
| 1 | M1125 | /1.125 | | | EMERGENCY PUMP | REAR | 171634 |
| 3 | K1170 | /1.168 | /1.150 | | ENGINE ACC | CTRL | 171956 |
| 4 | K1210 | /1.210 | /1.180 | | LOW HYD LEVEL | CTRL | 171956 |
| 5 | K1290 | /1.290 | /1.290 | /1.270 | ALARM SILENCE | CTRL | 171956 |
| 6 | K1310 | /1.310 | | /4.260 | RADIO CIRCUIT | CTRL | 171956 |
| 7 | K2590 | /2.590 | | /3.120 | PROPEL INTERRUPT | CTRL | 171956 |
| 8 | K2640 | /2.640 | /11.160 | | PLC POWER RELAY | CPU | 171956 |
| 9 | K2650 | /2.650 | /11.130 | | SENSOR POWER | CPU | 171956 |
| 10 | K3130 | /3.130 | /3.160 | /3.180 | PROPEL ENABLE | CPU | 171956 |
| 11 | K3220 | /3.220 | /3.120 | | FORWARD PROPEL | CPU | 5044218 |
| 12 | K3260 | /3.260 | /3.140 | | REVERSE PROPEL | CPU | 5044218 |
| 13 | K3590 | /3.591 | | /3.180 | PUMP INHIBIT | CPU | 171956 |
| 14 | K1610 | /1.608 | /1.593 | | SHUTDOWN OVERRIDE | CTRL | 2005190 |
| 15 | K4138 | /4.138 | /4.180 | | REAR MARKER LTS | CTRL | 171956 |
| 16 | K4170 | /4.170 | /4.200 | | FRONT MARKER LTS | CTRL | 171956 |
| 17 | K4220 | /4.220 | /4.230 | | BRAKE LIGHTS | CTRL | 171956 |
| 18 | K11210 | /11.210 | /11.230 | | HEATER CTRL RELAY | CPU | 171956 |
| 19 | K11220 | /11.220 | /11.260 | | PLC HEATER | CPU | 171956 |
| 20 | K11280 | /11.280 | /11.300 | | CPU COOLING FANS | CPU | 171956 |
| 21 | K1530 | /1.540 | /1.530 | | LOW OIL SHUTDOWN | MISC | 171956 |

| GAUGES | | | | | | |
|--------|--------|---------|-----------------|----------|-------------|----------------|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | BULB PART NO. |
| 1 | G1240 | /1.245 | AIR PRESSURE | MISC | A0154Y05 | 0-3101019-0-25 |
| 2 | G1242 | /1.245 | BRAKE PRESSURE | MISC | A0154Y05 | 0-3101019-0-25 |
| 3 | G1244 | /1.245 | DRIVER PRESSURE | MISC | A0154Y05 | 0-3101019-0-25 |
| 4 | G2230 | /2.230 | FUEL LEVEL | CTRL | F017241 | 171972 |
| 5 | G2260 | /2.260 | HYD OIL TEMP | CTRL | 185995 | 171972 |

| RESISTORS & SENDERS | | | | | | |
|---------------------|--------|---------|-------------------|----------|-------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | R2220 | /2.220 | FUEL LEV SENDER | MISC | F024335 | |
| 2 | R2230 | /2.230 | FUEL LEVEL | CTRL | 171970 | |
| 3 | R2250 | /2.250 | HYD OIL TEMP SEN | MISC | F015000 | |
| 4 | R2260 | /2.260 | HYD OIL TEMP | CTRL | 171970 | |
| 5 | R5270 | /5.275 | DR1 FWD/REV | MISC | 199943 | |
| 6 | R5300 | /5.310 | DR1 UP/DN | MISC | 199943 | |
| 7 | R5620 | /5.623 | DR1 LAT SENSOR | MISC | 199946 | |
| 8 | R6270 | /6.276 | DR2 FWD/REV | MISC | 199943 | |
| 9 | R6300 | /6.311 | DR2 UP/DN | MISC | 199943 | |
| 10 | R6620 | /6.623 | DR2 LAT SENSOR | MISC | 199946 | |
| 11 | R7270 | /7.280 | DR3FWD/REV | MISC | 199943 | |
| 12 | R7300 | /7.315 | DR3 UP/DN | MISC | 199943 | |
| 13 | R7620 | /7.623 | DR3 LAT SENSOR | MISC | 199946 | |
| 14 | R8270 | /8.280 | DR4 FWD/REV | MISC | 199943 | |
| 15 | R8300 | /8.317 | DR4 UP/DN | MISC | 199943 | |
| 16 | R8620 | /8.623 | DR4 LAT SENSOR | MISC | 199946 | |
| 17 | R9120 | /9.121 | LINEAR TRANSDUCER | MISC | 199944 | |

(N)

NIPPER STRING POT KIT OPTION

| RESISTORS | | | | | | |
|-----------|--------|---------|---------------------|----------|----------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | R9120 | /9.125 | STRING POT (OPTION) | 5045088 | 0-3137013-0-14 | |

| PROPORTIONAL VALVES | | | | | | |
|---------------------|--------|---------|--------------|----------|-------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | PR5530 | /5.530 | DR1 FWD/REV | HYD | 180600 | |
| 3 | PR5570 | /5.570 | DR1 LT/RT | HYD | 180600 | |
| 4 | PR6530 | /6.520 | DR2 FWD/REV | HYD | 180600 | |
| 5 | PR6570 | /6.570 | DR2 LT/RT | HYD | 180600 | |
| 6 | PR7530 | /7.530 | DR 3 FWD/REV | HYD | 180600 | |
| 7 | PR7570 | /7.570 | DR 3 LT/RT | HYD | 180600 | |
| 8 | PR8520 | /8.520 | DR 4 FWD/REV | HYD | 180600 | |
| | PR8570 | /8.570 | DR 4 LT/RT | HYD | 180600 | |

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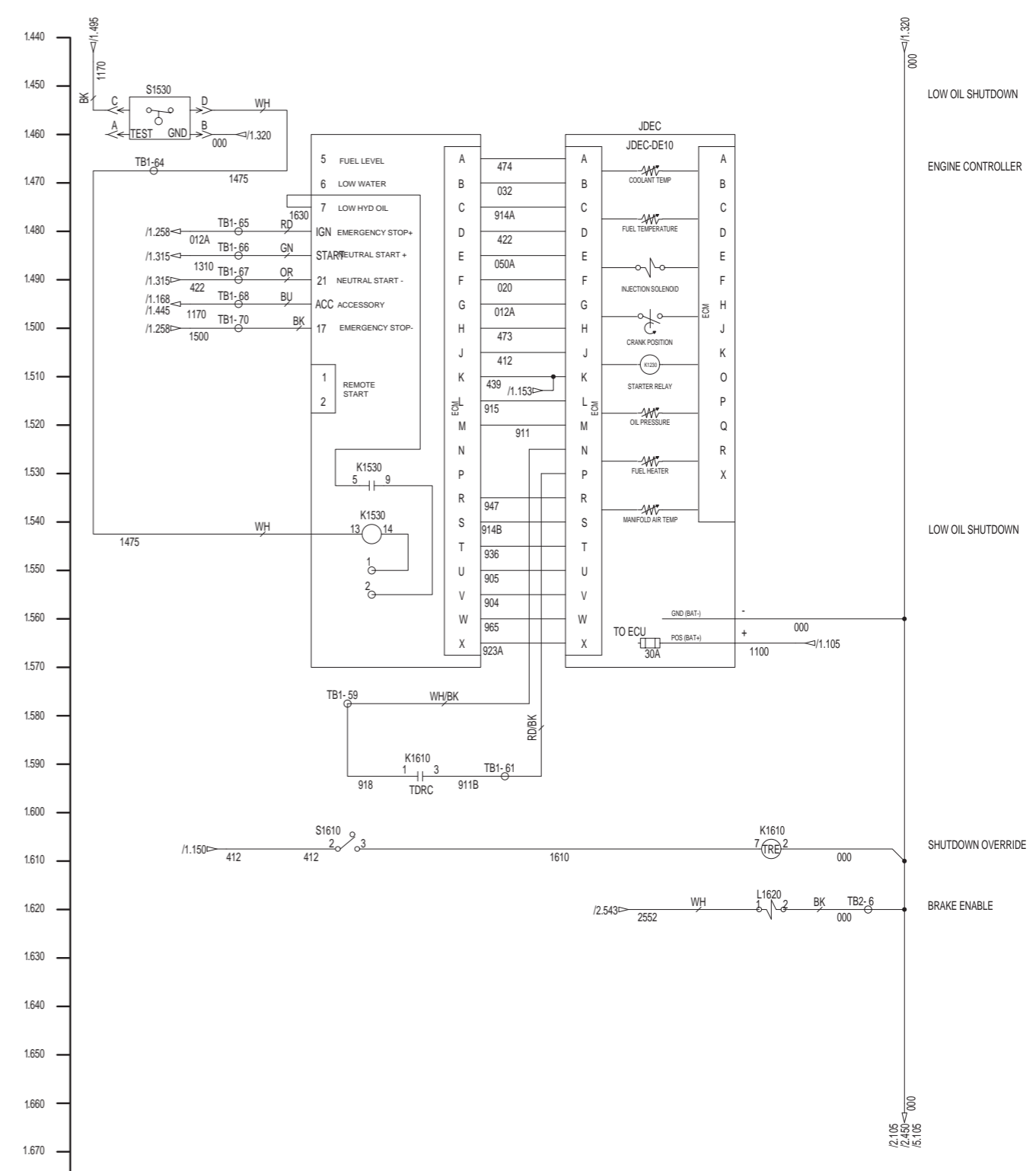
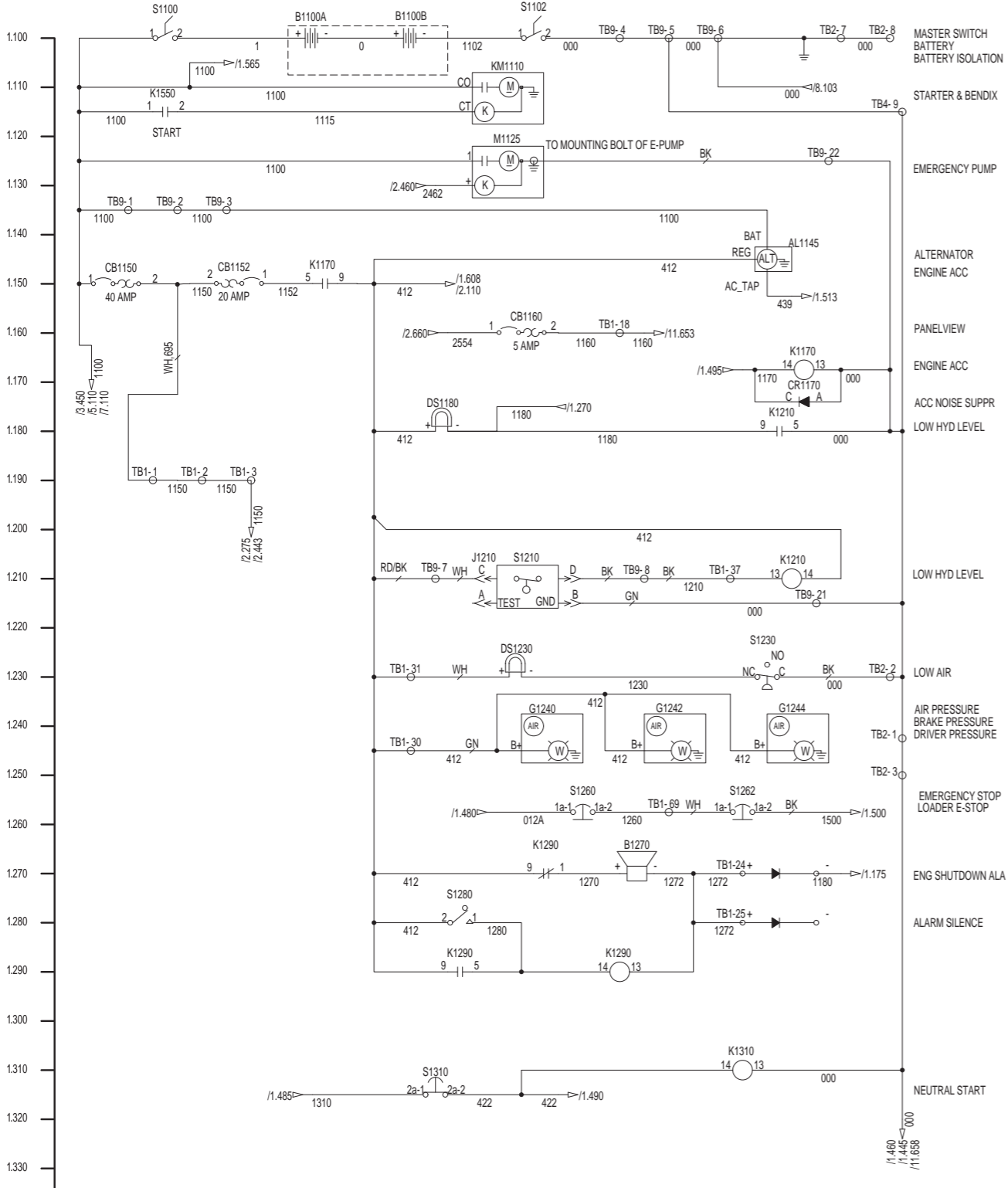
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| EC506060 | G | CHANGE TO PANELVIEW DISPLAY 502528 | KMS | 02-04-13 |
| EC507027 | H | DOCUMENTATION UPDATED, SEE EC FOR DETAILS | JES | 05-06-13 |
| EC507396 | I | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 06-04-13 |
| EC507653 | J | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 06-24-13 |
| EC508026 | K | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 08-02-13 |
| ECN000300 | L | BUILD UPDATES, SEE EC CHANGE DETAIL | JES | 12-10-13 |
| EC509962 | M | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-30-14 |
| EC510424 | N | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

| DRAWING TITLE/DESCRIPTION: | |
|----------------------------|--|
| ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: | |
| W96E3-44 | |
| E3 PROJECT FILE NAME: | |
| W96E3-44_16 | |

| | |
|--------------------------|----------|
| SHEET NUMBER | 13 |
| NUMBER OF JUPITER SHEETS | - |
| TOTAL NUMBER OF SHEETS | 15 |
| DRAWN BY: | WGL |
| REL. DATE: | 07/10/09 |
| SIZE: | D |
| SCALE: | |

HARSCO
RAIL

E3 DRAWING
DRAWING NUMBER:
3422204



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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

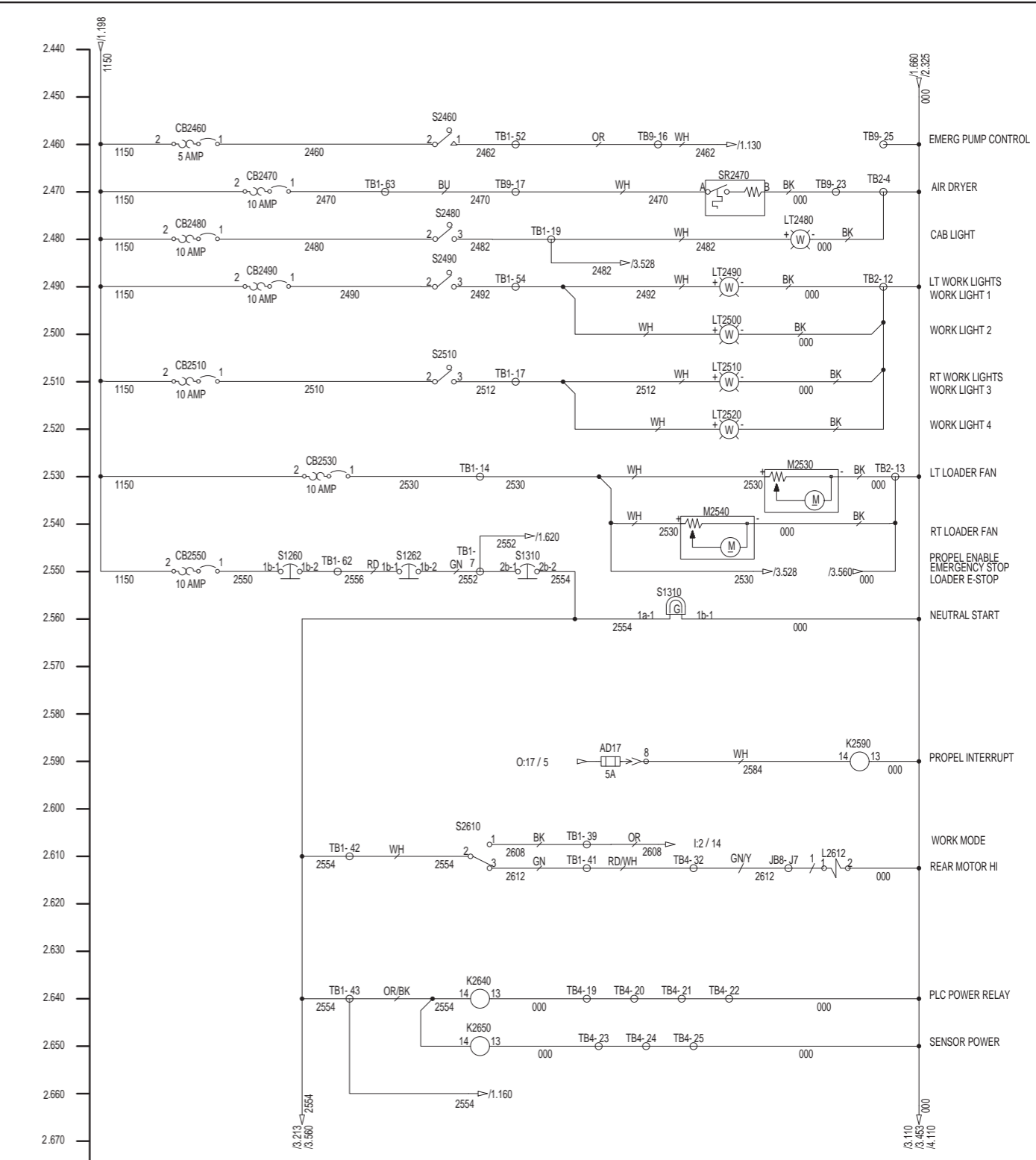
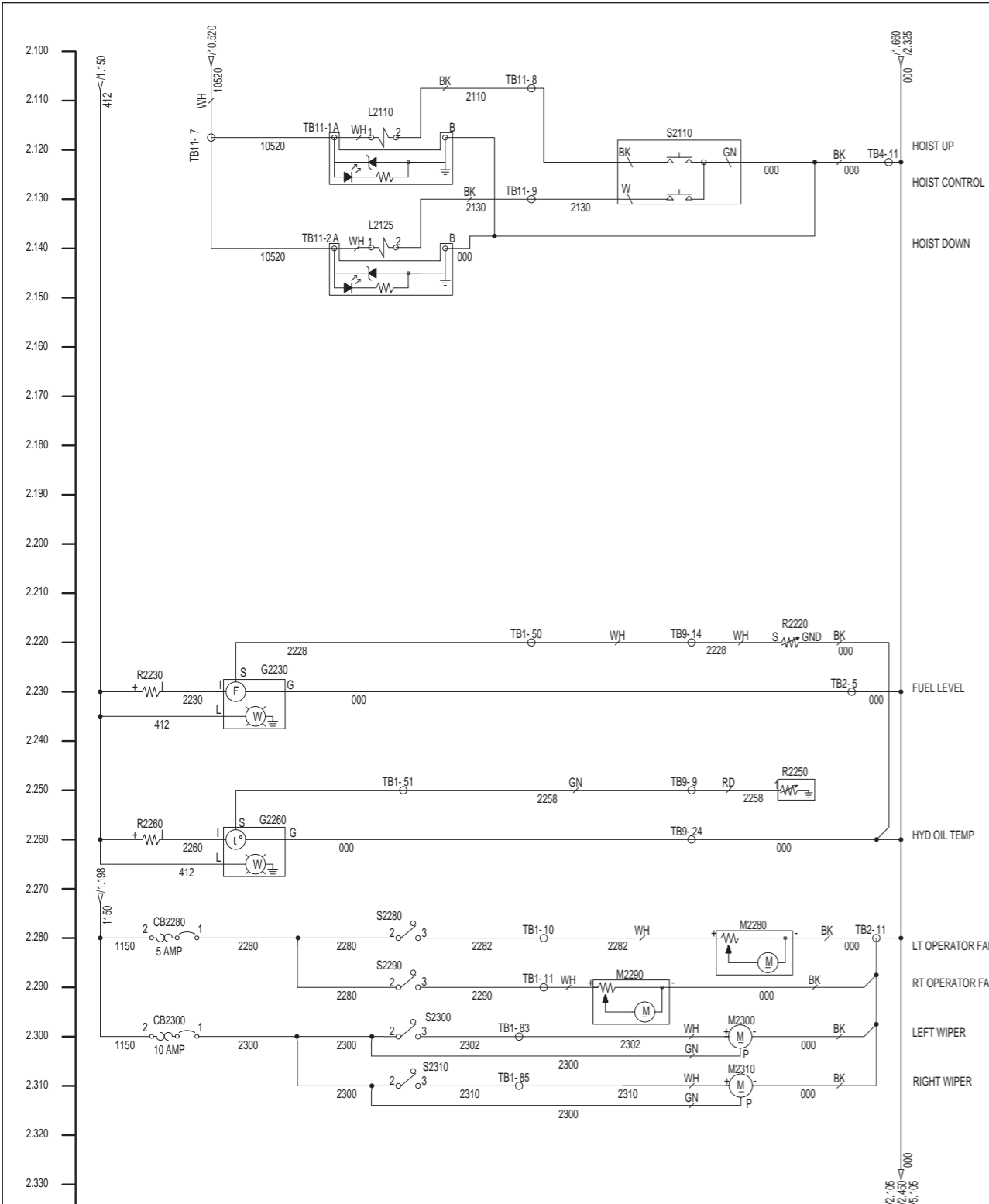
MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

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| SHEET NUMBER 1 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

HARSCO RAIL

E3 DRAWING
DRAWING NUMBER:
3424837



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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE. SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING. SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS. SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES. SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

SHEET NUMBER
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NUMBER OF JUPITER SHEETS

TOTAL NUMBER OF SHEETS
16

DRAWN BY:
WGL

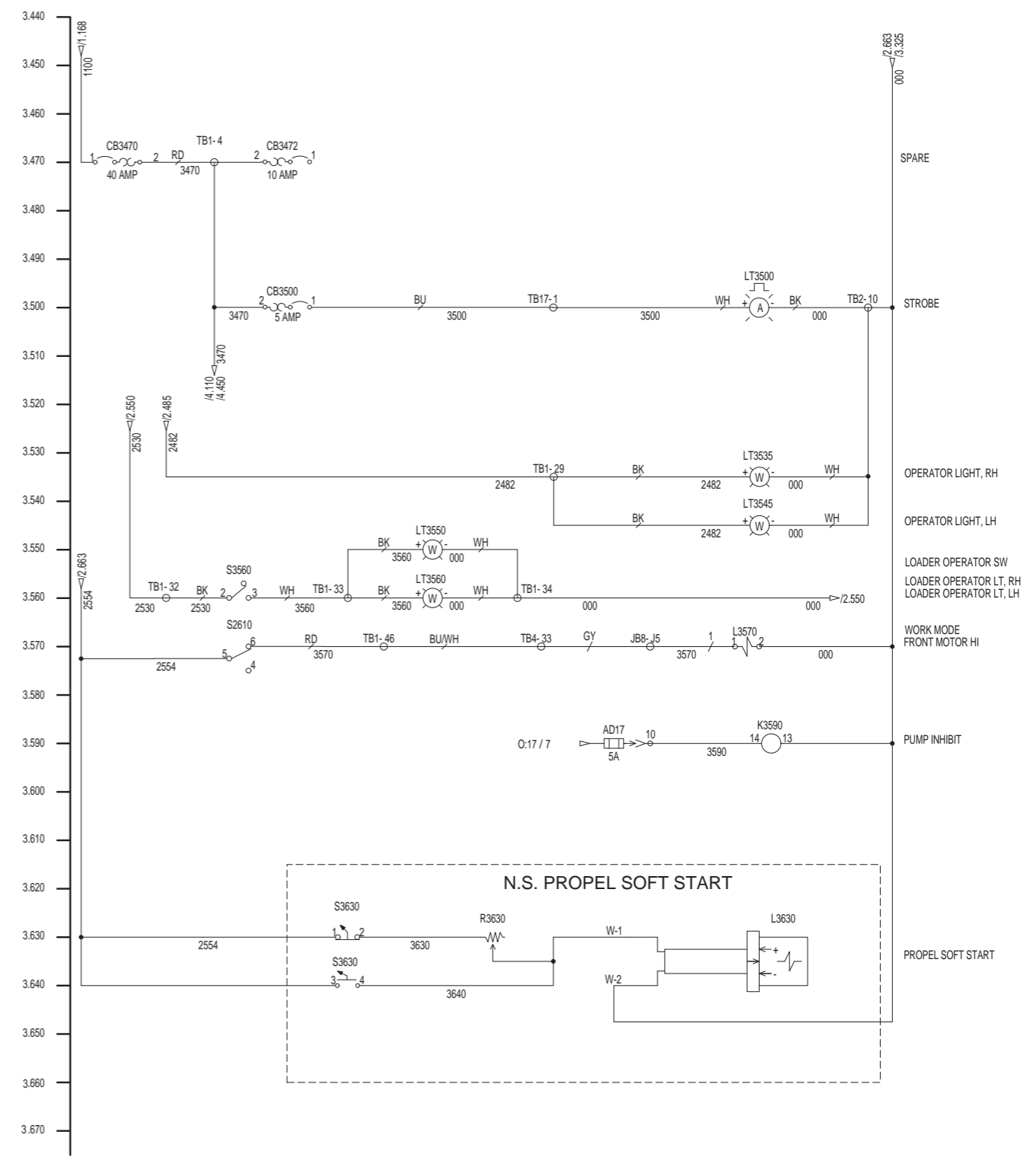
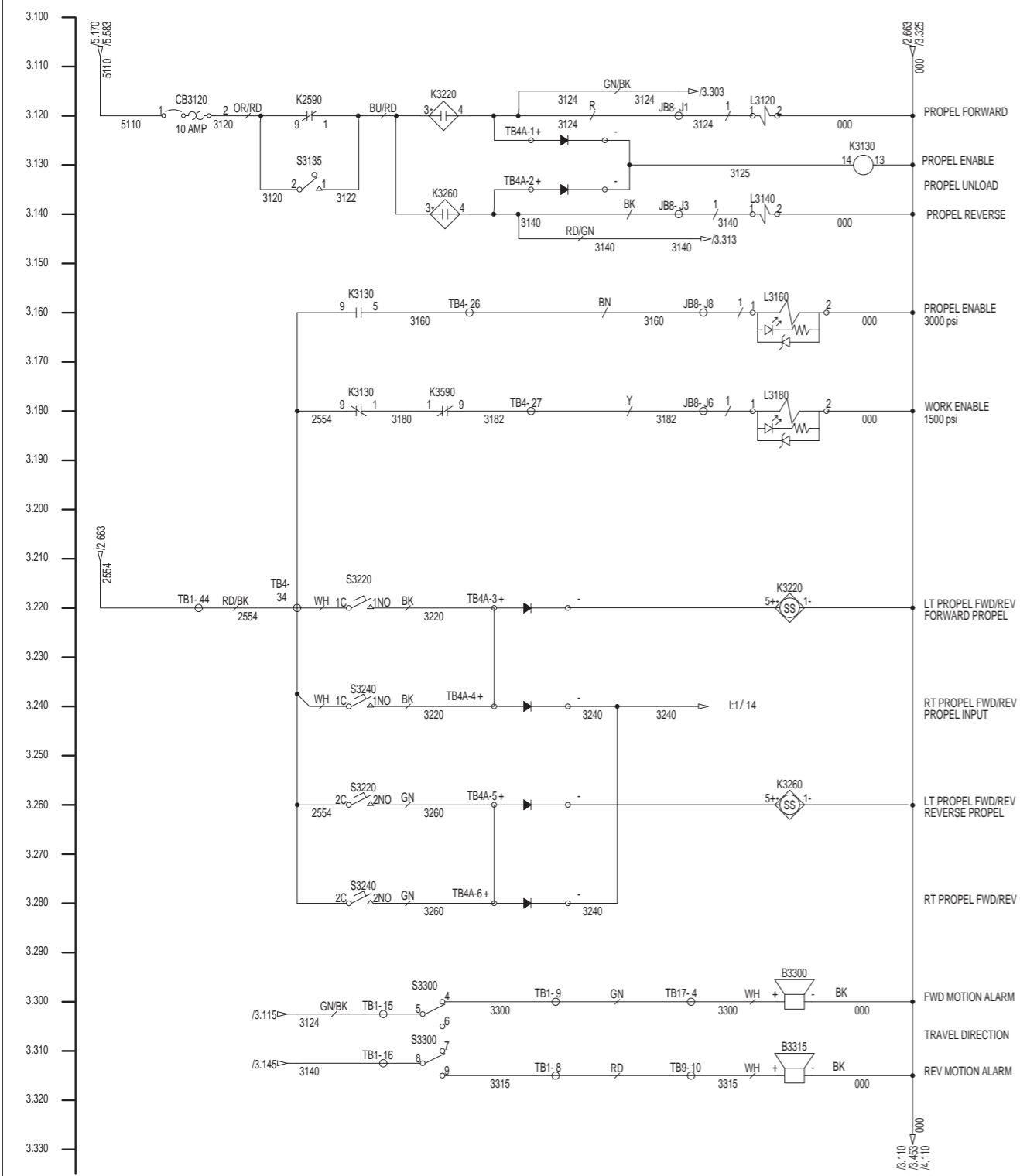
REL. DATE:
7/10/09

SIZE:
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SCALE:

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E3 DRAWING
DRAWING NUMBER:
3424837



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| CHANGE # | R/L | REVISION | DR | DATE |
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| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE. SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING. SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS. SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES. SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

SHEET NUMBER
3

NUMBER OF JUPITER SHEETS

TOTAL NUMBER OF SHEETS
16

DRAWN BY:
WGL

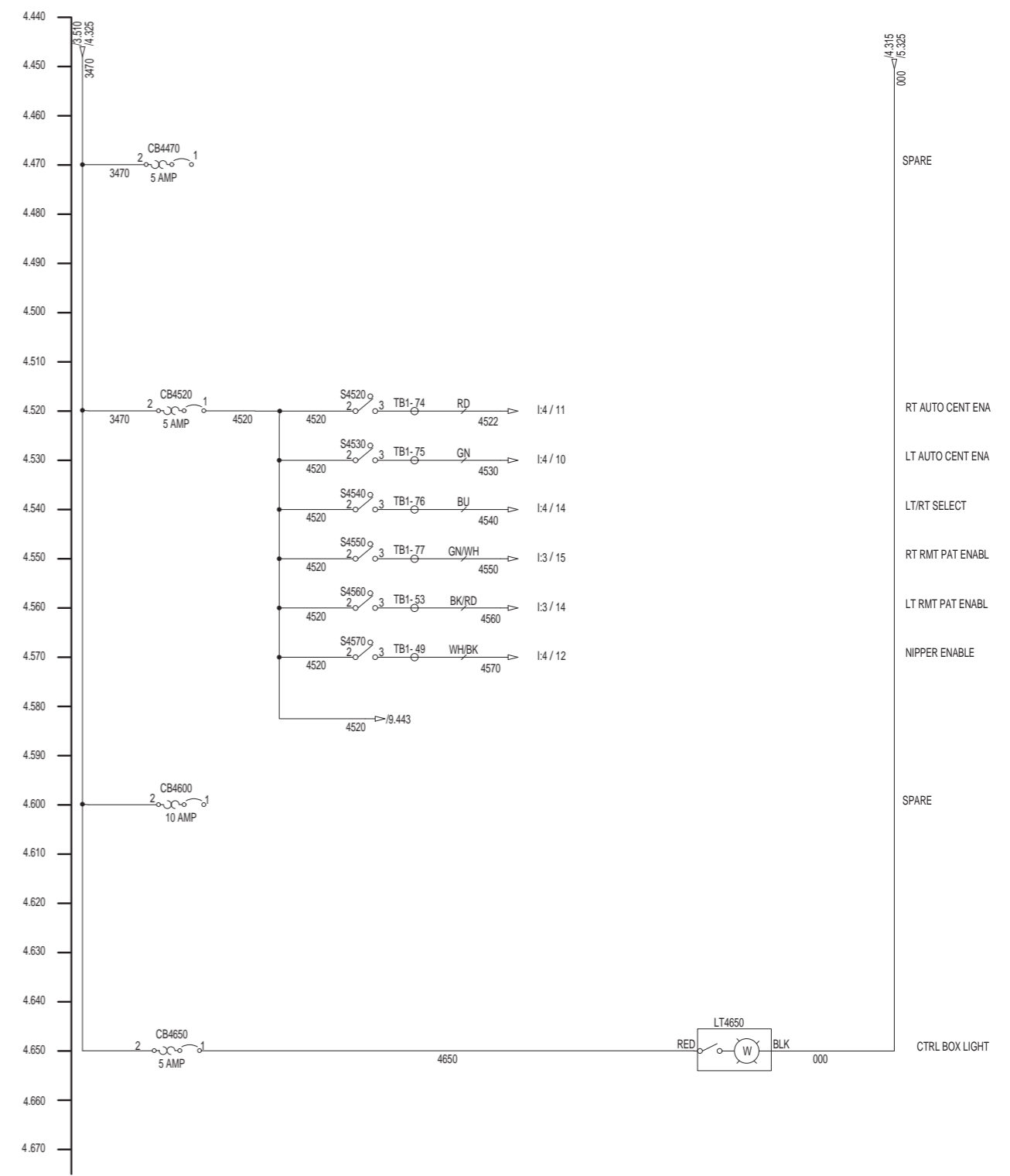
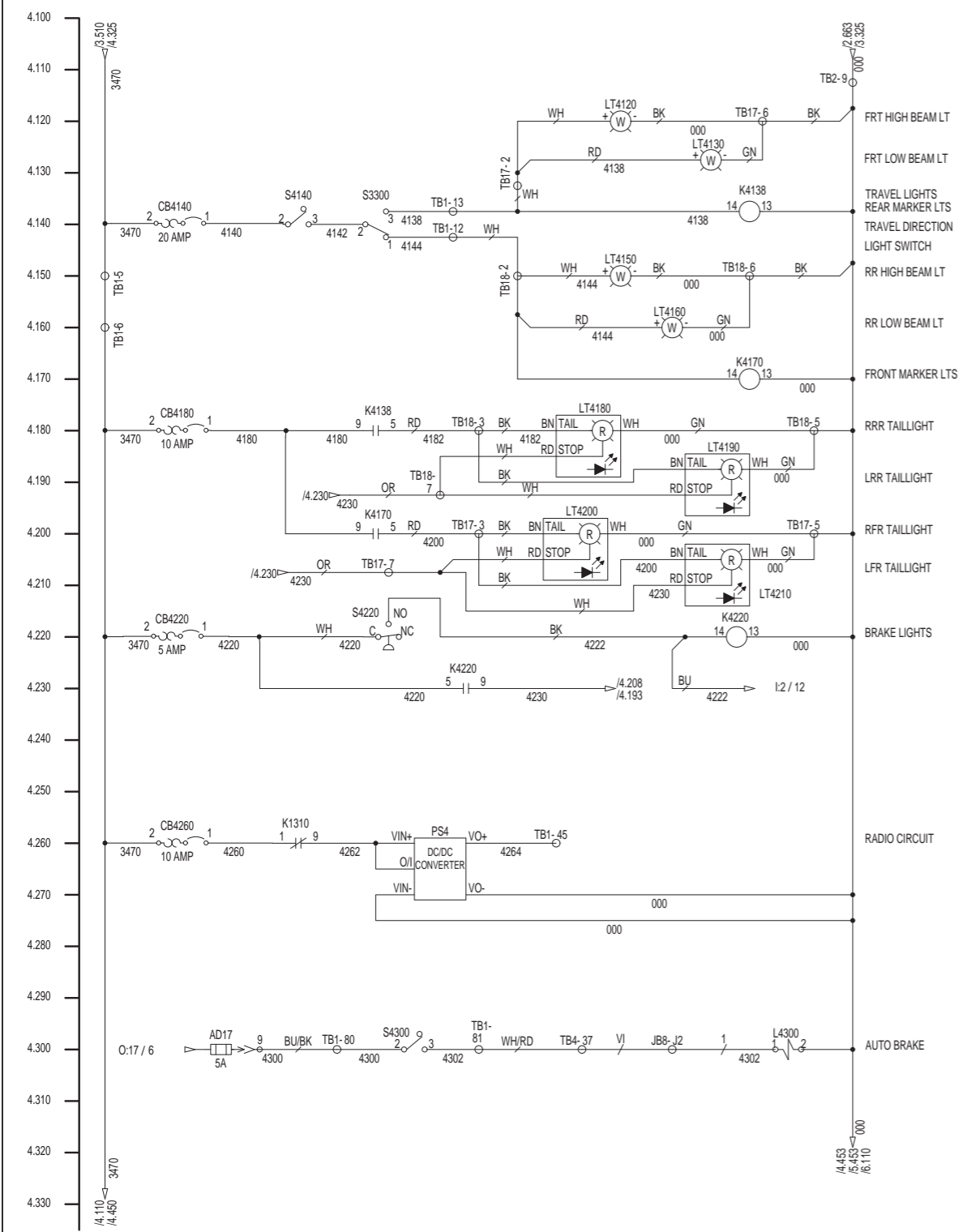
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7/10/09

SIZE:
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SCALE:

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E3 DRAWING
 DRAWING NUMBER:
3424837



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| CHANGE # | R/L | REVISION | DR | DATE |
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| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

SHEET NUMBER
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NUMBER OF JUPITER SHEETS

TOTAL NUMBER OF SHEETS
16

DRAWN BY:
WGL

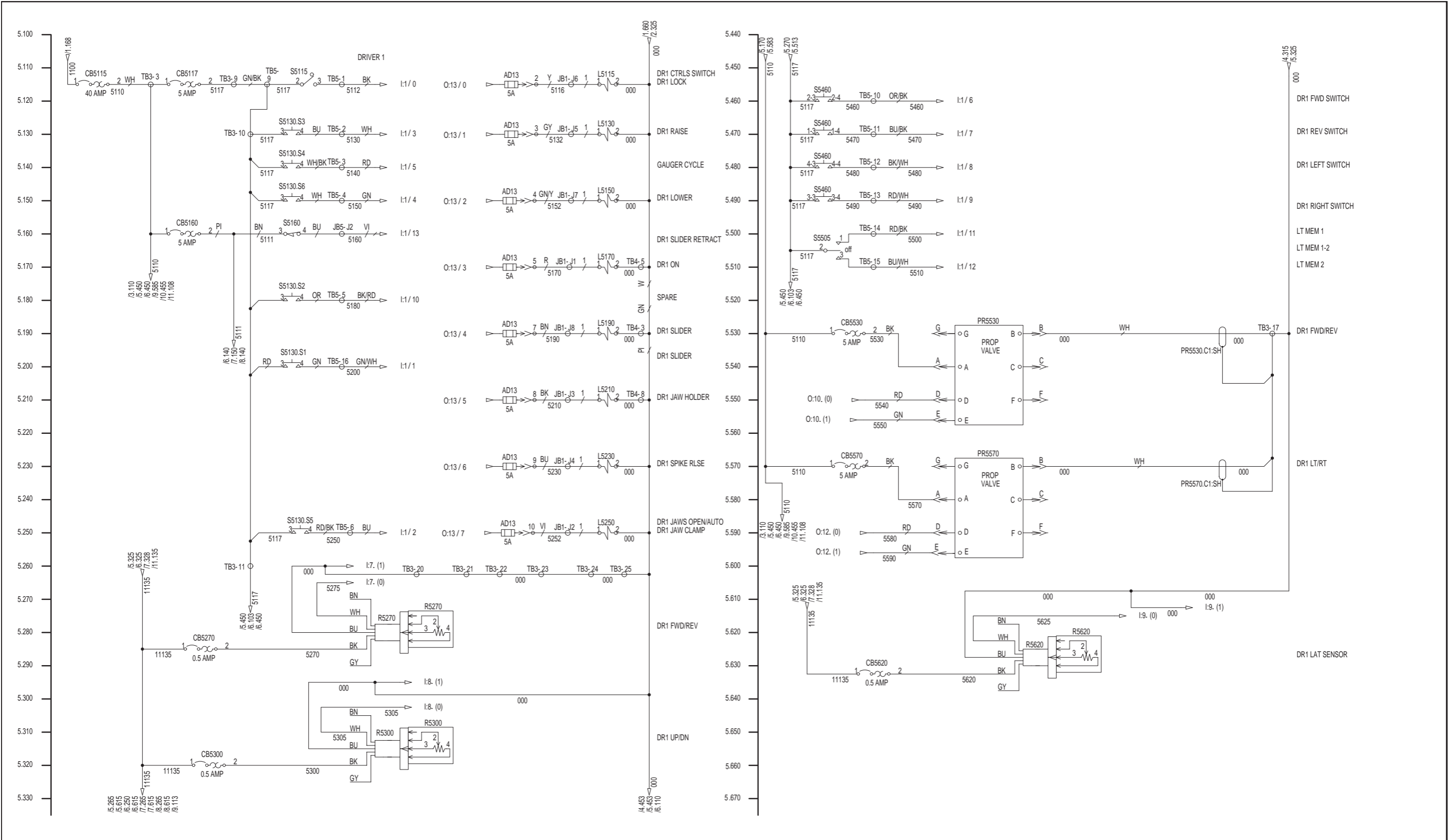
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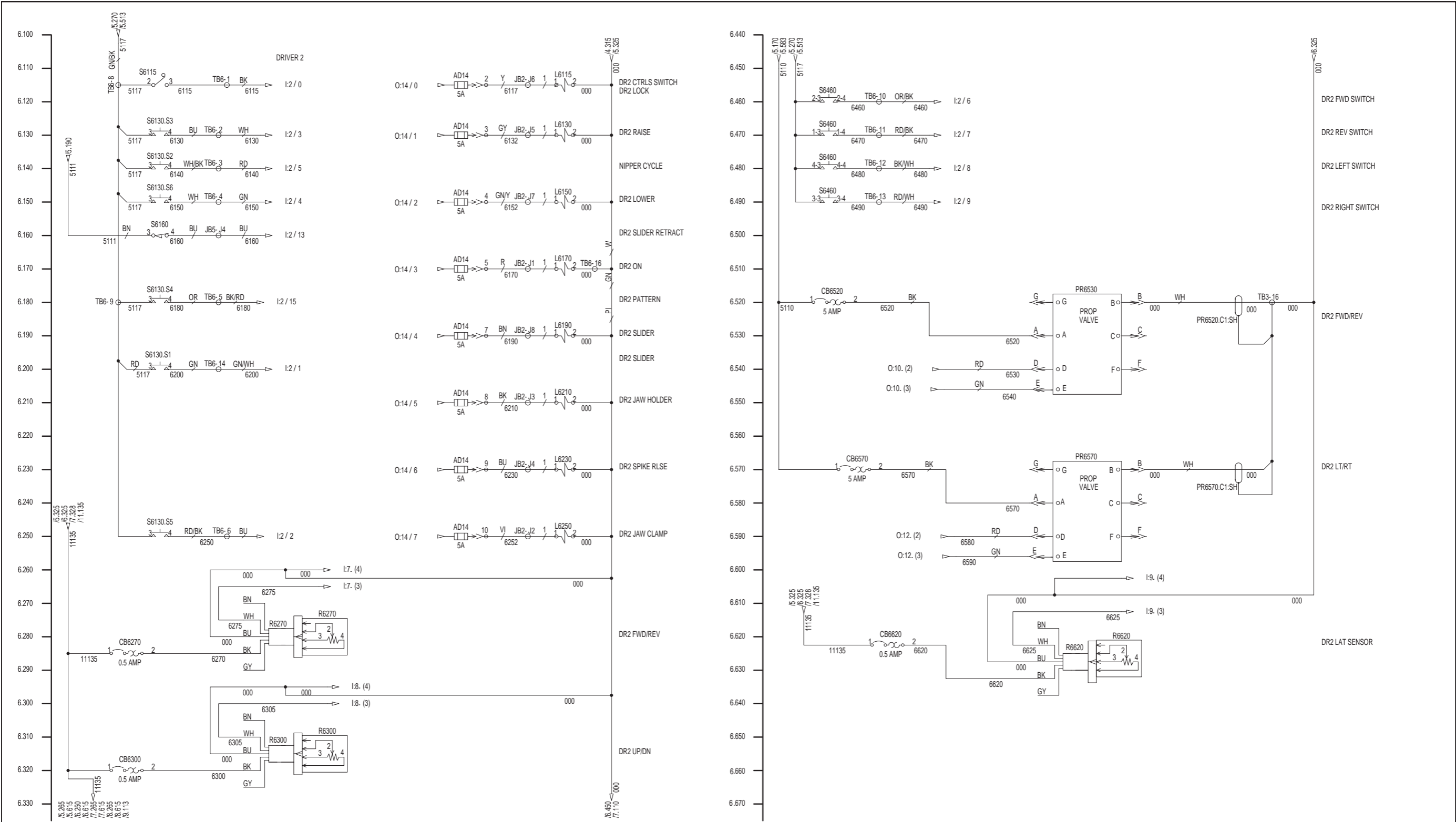
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HARSCO RAIL

E3 DRAWING
DRAWING NUMBER:
3424837



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| | | EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 | | MACHINE TYPE-MODEL: W96E3-45 | NUMBER OF JUPITER SHEETS | |
| | | EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 | E3 PROJECT FILE NAME: W96E3-45_11 | TOTAL NUMBER OF SHEETS 16 | SCALE: D | DRAWING NUMBER: 3424837 |
| | | EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 | | | | |
| | | EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 | | | | |
| | | EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 | | | | |
| | | EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 | | | | |
| | | EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 | | | | |



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| CHANGE # | R/L | REVISION | DR | DATE |
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| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

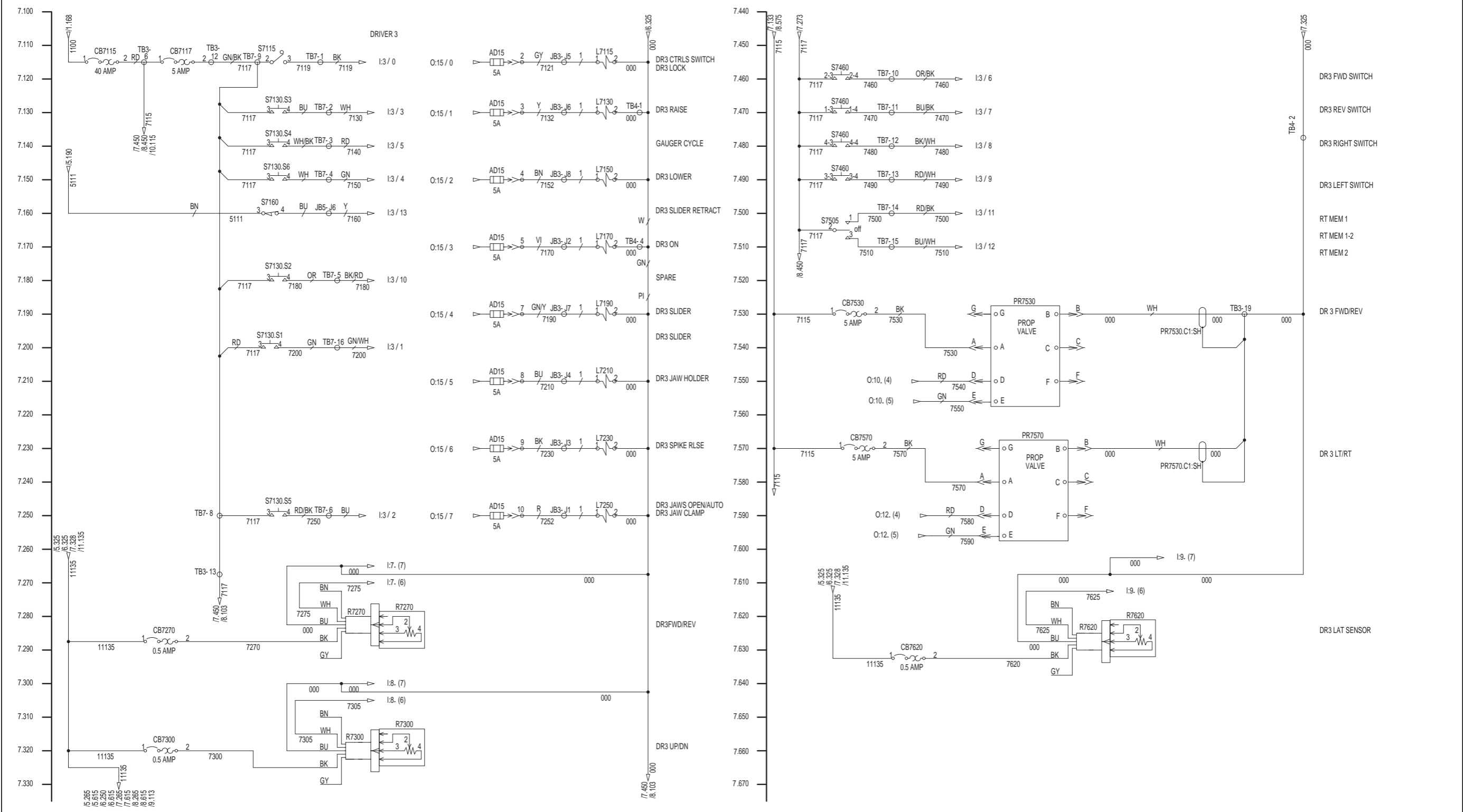
MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

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| SHEET NUMBER 6 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

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E3 DRAWING
DRAWING NUMBER:
3424837



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| CHANGE # | R/L | REVISION | DR | DATE |
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| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE. SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING. SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS. SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES. SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

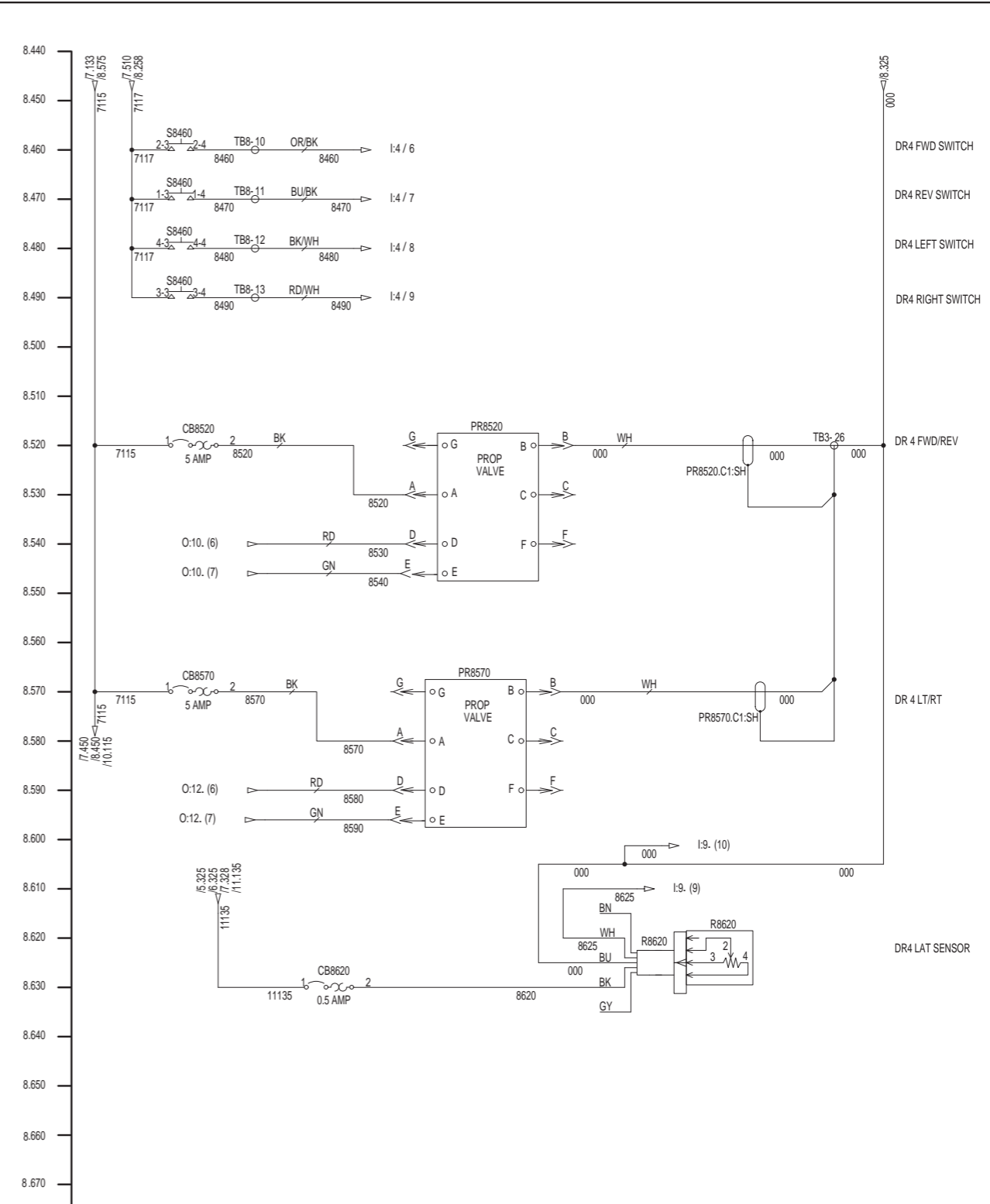
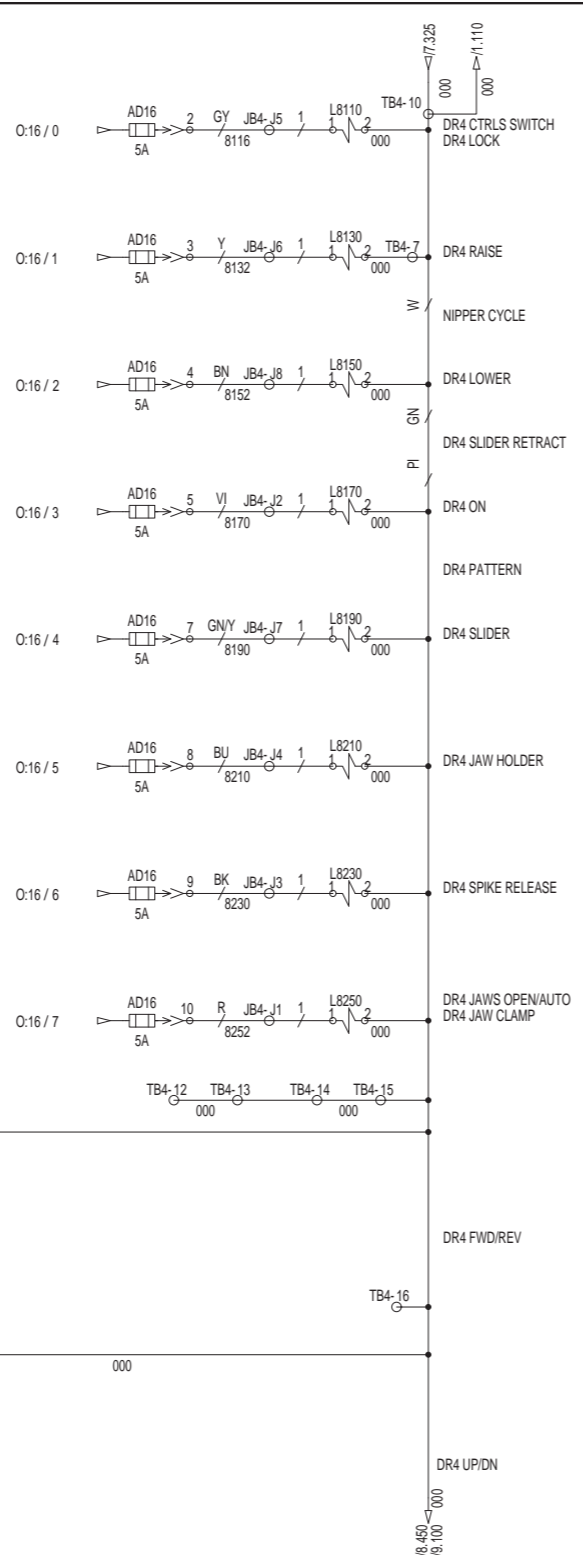
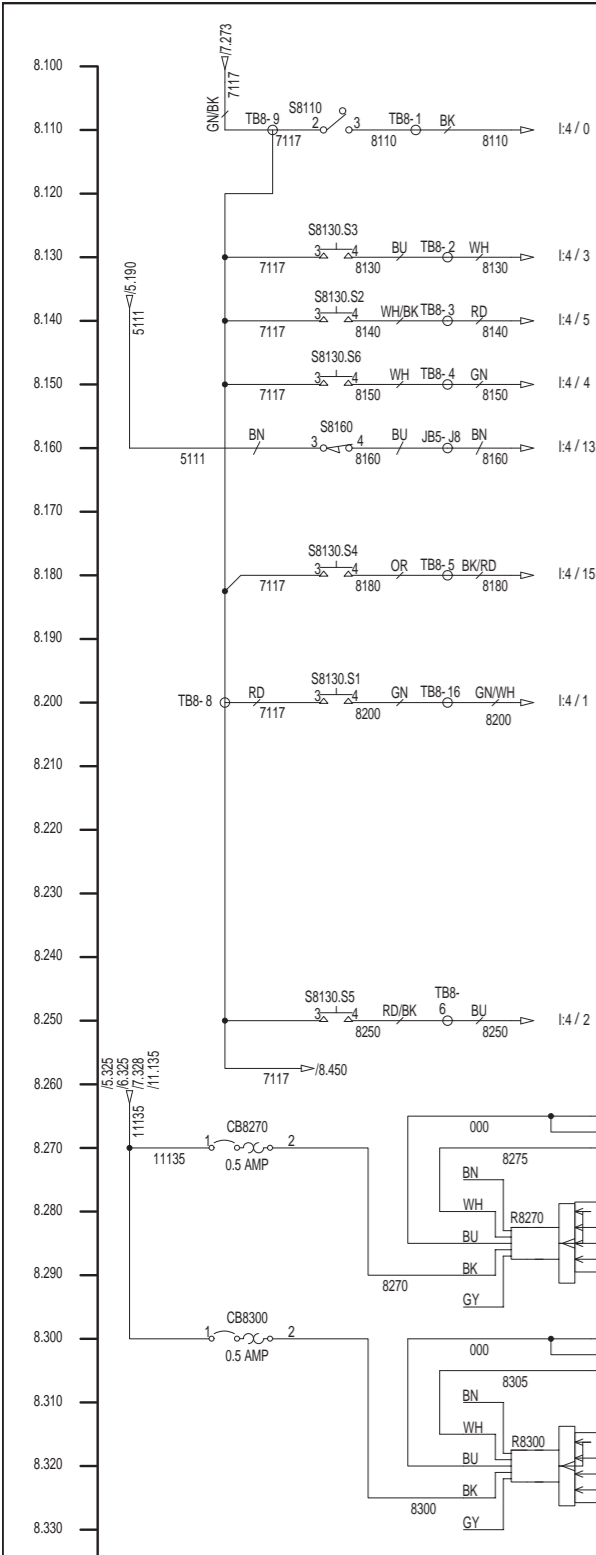
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E3 PROJECT FILE NAME:
W96E3-45_11

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| SHEET NUMBER 7 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

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E3 DRAWING
DRAWING NUMBER:
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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

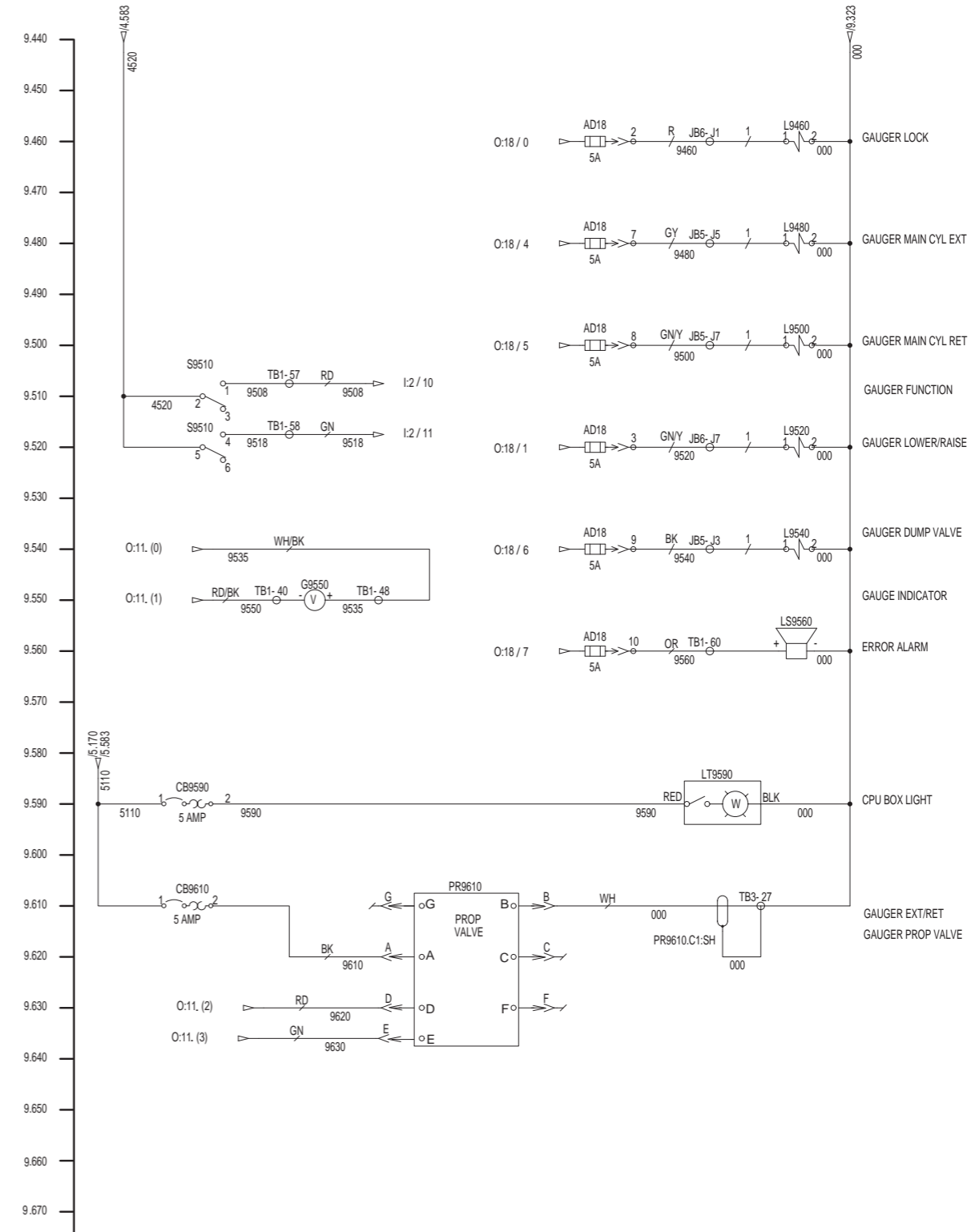
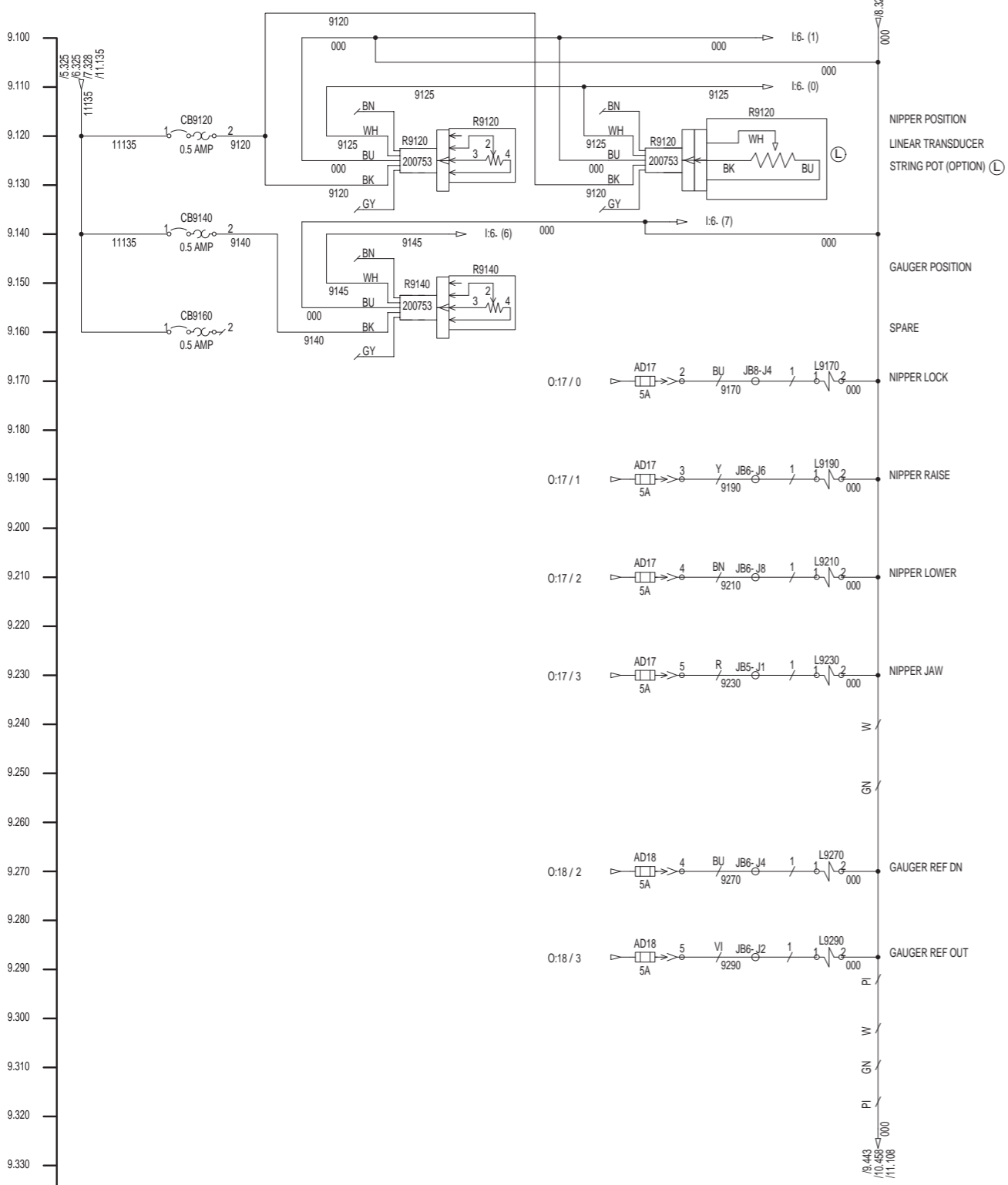
MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

| | |
|-------------------------------------|------------------------------|
| SHEET NUMBER 8 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

HARSCO RAIL

E3 DRAWING
DRAWING NUMBER:
3424837



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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE. SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING. SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS. SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES. SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

SHEET NUMBER
9

NUMBER OF JUPITER SHEETS

TOTAL NUMBER OF SHEETS
16

DRAWN BY:
WGL

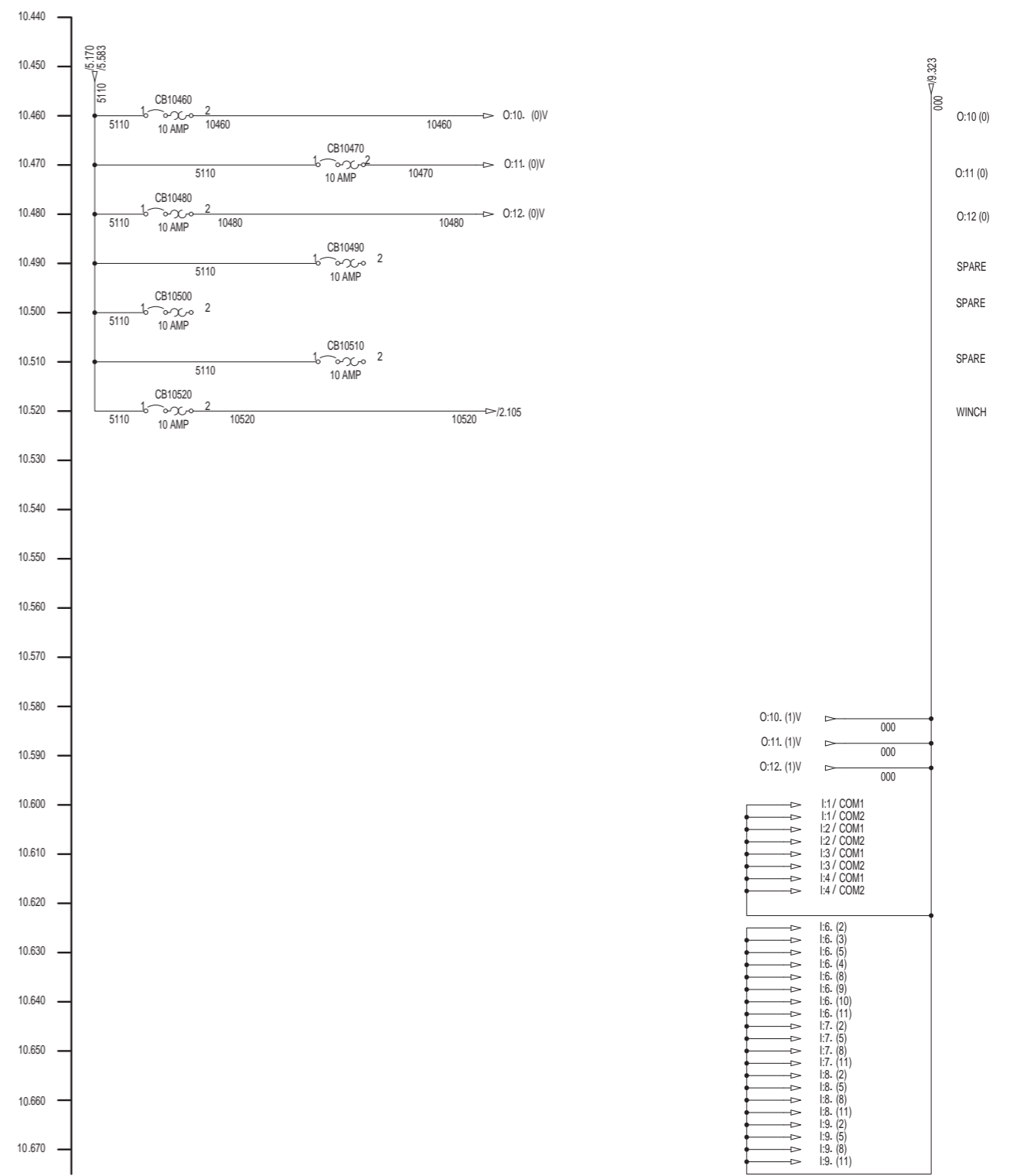
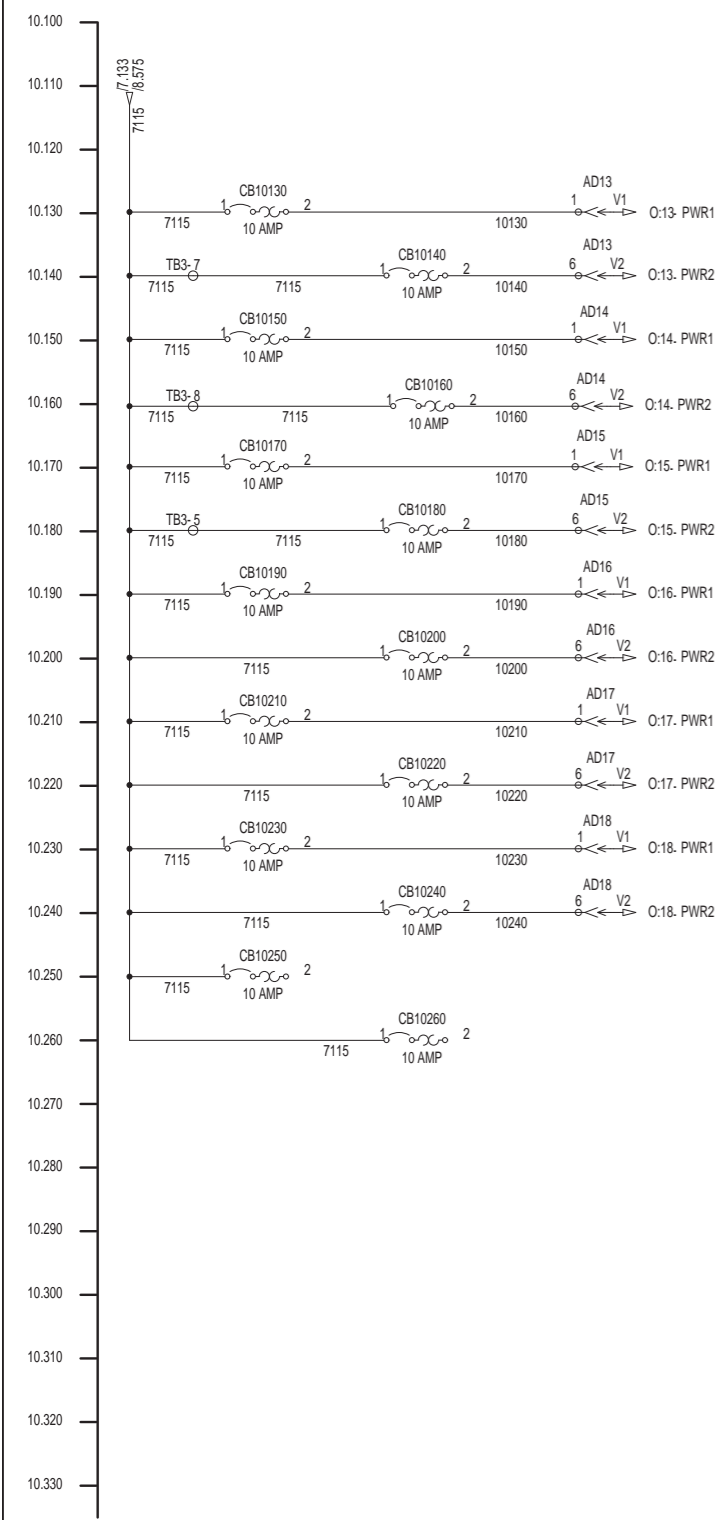
REL. DATE:
7/10/09

SIZE:
D

SCALE:

HARSCO RAIL

E3 DRAWING
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| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

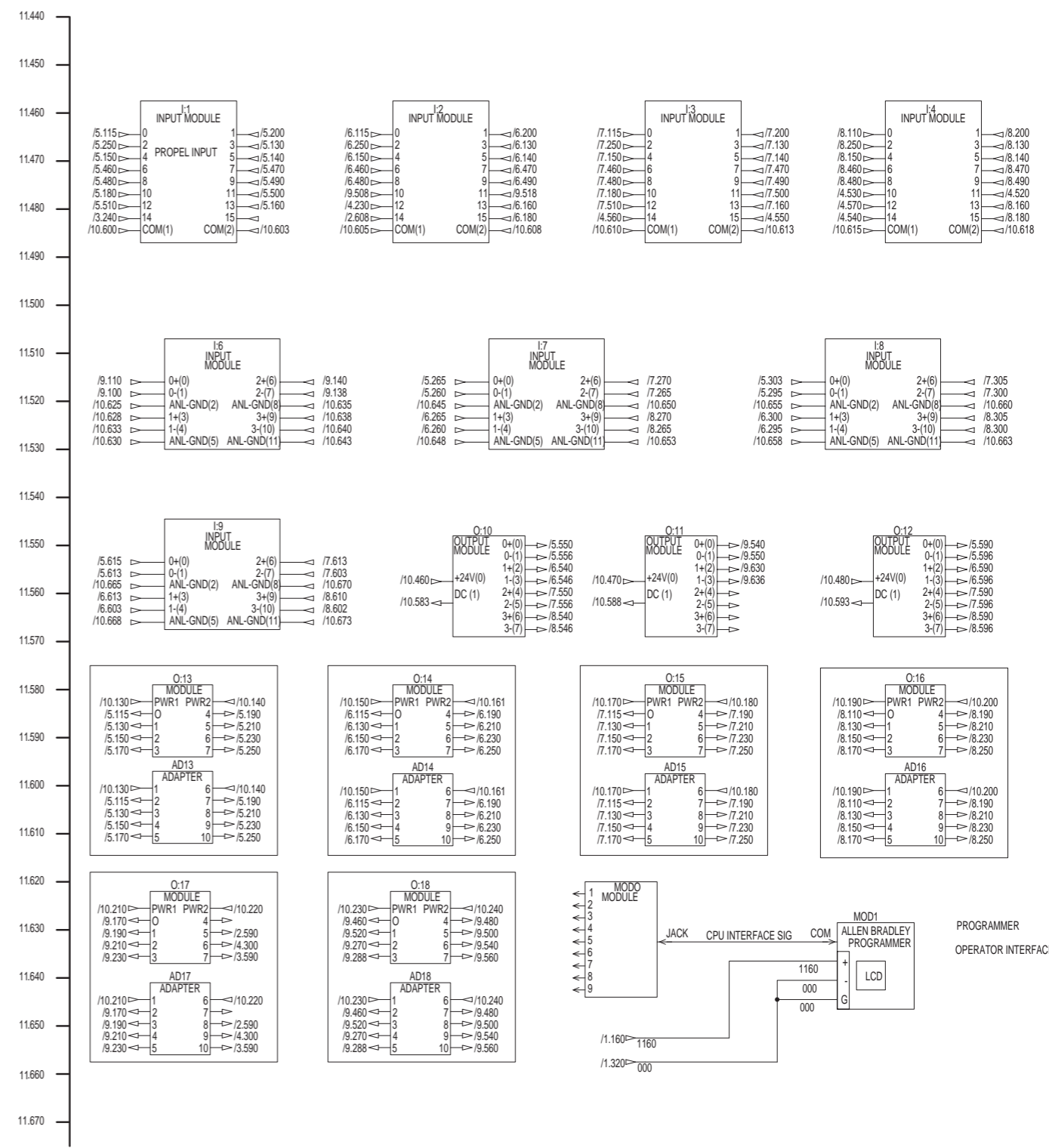
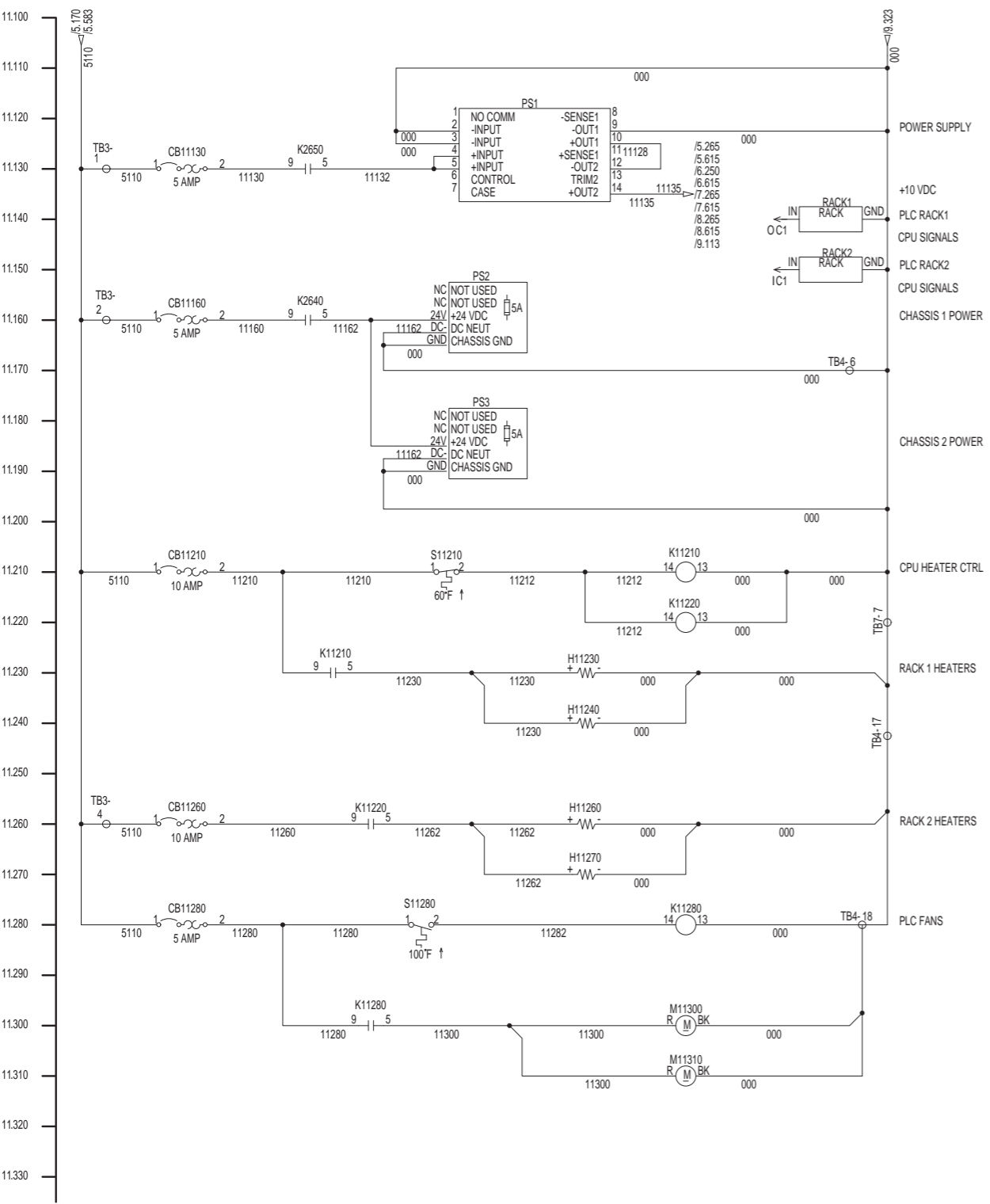
MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

| | |
|-------------------------------------|------------------------------|
| SHEET NUMBER 10 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

HARSCO
RAIL

E3 DRAWING
DRAWING NUMBER:
3424837



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| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
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DRAWING TITLE/DESCRIPTION:
ELECTRICAL SCHEMATIC

MACHINE TYPE-MODEL:
W96E3-45

E3 PROJECT FILE NAME:
W96E3-45_11

SHEET NUMBER
11

NUMBER OF JUPITER SHEETS

TOTAL NUMBER OF SHEETS
16

DRAWN BY:
WGL

REL. DATE:
7/10/09

SIZE:
D

SCALE:

HARSCO RAIL

E3 DRAWING
 DRAWING NUMBER:
3424837

| SWITCHES | | | | | | |
|----------|----------|----------------|---------------|--------------------|----------|-------------|
| NO | DEVICE | SHEET LOCATION | | DESCRIPTION | LOCATION | PART NUMBER |
| 1 | S1100 | /1.100 | | MASTER SWITCH | EJB | F014685 |
| 2 | S1102 | /1.100 | | BATTERY ISOLATION | EJB | F014685 |
| 3 | S1210 | /1.210 | | LOW OIL WARNING | MISC | 416078 |
| 4 | S1230 | /1.230 | | LOW AIR | MISC | F025303 |
| 5 | S1260 | /1.258 | /2.550 | EMERGENCY STOP | CTRL | ASSEMBLY |
| 6 | S1262 | /1.258 | /2.550 | LOADER E-STOP | MISC | ASSEMBLY |
| 7 | S1280 | /1.280 | | ALARM SILENCE | CTRL | F017149 |
| 8 | S1310 | /2.560 | /1.315 /2.550 | NEUTRAL START | CTRL | ASSEMBLY |
| 9 | S1530 | /1.455 | | LOW OIL SHUTDOWN | MISC | 416078 |
| 10 | S1610 | /1.608 | | SHUTDOWN OVERRIDE | CTRL | F014868 |
| 11 | S2110 | /2.123 | | HOIST CONTROL | MISC | 106746500 |
| 12 | S2280 | /2.280 | | LT OPERATOR FAN | CTRL | F014868 |
| 13 | S2290 | /2.290 | | RT OPERATOR FAN | CTRL | F014868 |
| 14 | S2300 | /2.300 | | LEFT WIPER | CTRL | F014868 |
| 15 | S2310 | /2.310 | | RIGHT WIPER | CTRL | F014868 |
| 16 | S2460 | /2.460 | | EMERGENCY PUMP | CTRL | F017149 |
| 17 | S2480 | /2.480 | | CAB LIGHT | CTRL | F014868 |
| 18 | S2490 | /2.490 | | LT CARRIAGE LTS | CTRL | F014868 |
| 19 | S2510 | /2.510 | | RT CARRIAGE LTS | CTRL | F014868 |
| 20 | S2610 | /2.610 | /3.573 | WORK MODE | MISC | F023824 |
| 21 | S3135 | /3.135 | | PROPEL UNLOAD | CTRL | F017149 |
| 22 | S3220 | | /3.220 /3.260 | LT PROPEL FWD/REV | MISC | 177773 |
| 23 | S3240 | | /3.240 /3.280 | RT PROPEL FWD/REV | MISC | 177773 |
| 24 | S3300 | /4.140 | /3.303 /3.313 | TRAVEL DIRECTION | CTRL | F022927 |
| 25 | S3560 | /3.560 | | LOADER OPERATOR SW | MISC | F014868 |
| 26 | S4140 | /4.140 | | LIGHT SWITCH | CTRL | F014868 |
| 27 | S4220 | /4.220 | | BRAKE LIGHTS | MISC | 171893 |
| 28 | S4300 | /4.300 | | AUTO BRAKE | CTRL | F014868 |
| 29 | S4520 | /4.520 | | RT AUTO CENT ENA | CTRL | F014868 |
| 30 | S4530 | /4.530 | | LT AUTO CENT ENA | CTRL | F014868 |
| 31 | S4540 | /4.540 | | LT/RT SELECT | CTRL | F014868 |
| 32 | S4550 | /4.550 | | RT RMT PAT ENABL | CTRL | F014868 |
| 33 | S4560 | /4.560 | | LT RMT PAT ENABL | CTRL | F014868 |
| 34 | S4570 | /4.570 | | NIPPER ENABLE | CTRL | F014868 |
| 35 | S5115 | /5.115 | | DR1 CTRLS SWITCH | MISC | F040195 |
| 36 | S5130.S1 | | /5.200 | DR1 SLIDER | ASSEMBLY | 200201 |
| 37 | S5130.S2 | | /5.180 | SPARE | ASSEMBLY | 200201 |
| 38 | S5130.S3 | | /5.130 | DR1 RAISE | ASSEMBLY | 200201 |
| 39 | S5130.S4 | | /5.140 | GAUGER CYCLE | ASSEMBLY | 200201 |
| 40 | S5130.S5 | | /5.250 | DR1 JAWS | ASSEMBLY | 200201 |
| 41 | S5130.S6 | | /5.150 | DR1 LOWER | ASSEMBLY | 200201 |
| 42 | S5160 | /5.160 | | DR1 SLIDER RETRA | MISC | 035009000 |
| 43 | S5460 | /5.470 /5.460 | /5.490 /5.480 | DR1 DIRECTION | MISC | ASSEMBLY |
| 44 | S5505 | /5.505 | | LT MEM 1-2 | MISC | F018845 |
| 45 | S6115 | /6.115 | | DR2 CTRLS SWITCH | MISC | F040195 |
| 46 | S6130.S1 | | /6.200 | DR2 SLIDER | ASSEMBLY | 200201 |
| 47 | S6130.S2 | | /6.140 | NIPPER CYCLE | ASSEMBLY | 200201 |
| 48 | S6130.S3 | | /6.130 | DR2 UP | ASSEMBLY | 200201 |
| 49 | S6130.S4 | | /6.180 | DR2 PATTERN | ASSEMBLY | 200201 |
| 50 | S6130.S5 | | /6.250 | DR2 JAWS | ASSEMBLY | 200201 |
| 51 | S6130.S6 | | /6.150 | DR2 LOWER | ASSEMBLY | 200201 |
| 52 | S6160 | /6.160 | | DR2 SLIDER RETRACT | MISC | 035009000 |
| 53 | S6460 | /6.470 /6.460 | /6.490 /6.480 | DR2 DIRECTION | MISC | ASSEMBLY |
| 54 | S7115 | /7.115 | | DR3 CTRLS SWITCH | MISC | F040195 |
| 55 | S7130.S1 | | /7.200 | DR3 SLIDER | ASSEMBLY | 200201 |
| 56 | S7130.S2 | | /7.180 | SPARE | ASSEMBLY | 200201 |
| 57 | S7130.S3 | | /7.130 | DR3 UP | ASSEMBLY | 200201 |

| SWITCHES | | | | | | |
|----------|----------|----------------|---------------|--------------------|----------|-------------|
| NO | DEVICE | SHEET LOCATION | | DESCRIPTION | LOCATION | PART NUMBER |
| 57 | S7130.S4 | | /7.140 | GAUGER CYCLE | ASSEMBLY | 200201 |
| 58 | S7130.S5 | | /7.250 | DR3 JAWS | ASSEMBLY | 200201 |
| 59 | S7130.S6 | | /7.150 | DR3 LOWER | ASSEMBLY | 200201 |
| 60 | S7160 | /7.160 | | DR3 SLIDER RETRACT | MISC | 035009000 |
| 61 | S7460 | /7.470 /7.460 | /7.490 /7.480 | DR3 DIRECTION | MISC | ASSEMBLY |
| 62 | S7505 | /7.505 | | RT MEM 1-2 | MISC | F018845 |
| 63 | S8110 | /8.110 | | DR4 CTRLS SWITCH | MISC | F040195 |
| 64 | S8130.S1 | | /8.200 | DR4 SLIDER | ASSEMBLY | 200201 |
| 65 | S8130.S2 | | /8.140 | NIPPER CYCLE | ASSEMBLY | 200201 |
| 66 | S8130.S3 | | /8.130 | DR4 UP | ASSEMBLY | 200201 |
| 67 | S8130.S4 | | /8.180 | DR4 PATTERN | ASSEMBLY | 200201 |
| 68 | S8130.S5 | | /8.250 | DR4 JAWS | ASSEMBLY | 200201 |
| 69 | S8130.S6 | | /8.150 | DR4 LOWER | ASSEMBLY | 200201 |
| 70 | S8160 | /8.160 | | DR4 SLIDER RETRACT | MISC | 035009000 |
| 71 | S8460 | /8.470 /8.460 | /8.490 /8.480 | DR4 DIRECTION | MISC | ASSEMBLY |
| 72 | S9510 | /9.510 /9.520 | | GAUGER FUNCTION | CTRL | F023824 |
| 73 | S11210 | /11.210 | | CPU HEATER CTRL | CPU | F023786 |
| 74 | S11280 | /11.280 | | CPU COOLING FANS | CPU | F023823 |
| 75 | S3630 | /3.640 /3.630 | | PROPEL SOFT START | ASSEMBLY | |

| MISC COMPONENTS | | | | | |
|-----------------|--------|---------|--------------------|----------|-------------|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER |
| 1 | | | | | |
| 2 | AL1145 | /1.145 | ALTERNATOR | E | |
| 3 | B1100A | /1.100 | BATTERY | MISC | 179351 |
| 4 | B1100B | /1.100 | BATTERY | MISC | 179351 |
| 5 | B1270 | /1.270 | ENG SHUTDOWN ALA | CTRL | F040126 |
| 6 | B3300 | /3.300 | FWD MOTION ALARM | MISC | F040795 |
| 7 | B3315 | /3.315 | REV MOTION ALARM | MISC | F040795 |
| 8 | LS9560 | /9.560 | ERROR ALARM | CTRL | 187068 |
| 9 | CR1170 | /1.174 | ACC NOISE SUPPR | CTRL | F023788 |
| 10 | H11230 | /11.230 | RACK 1 HEATERS | CPU | 171962 |
| 11 | H11240 | /11.240 | RACK 1 HEATERS | CPU | 171962 |
| 12 | H11260 | /11.260 | PLC HEATER | CPU | 171962 |
| 13 | H11270 | /11.270 | PLC HEATER | CPU | 171962 |
| 14 | JDEC | /1.465 | ENGINE CONTROLLER | E | |
| 15 | KM1110 | /1.110 | STARTER & BENDIX | E | |
| 16 | M2280 | /2.280 | LT OPERATOR FAN | MISC | 171967 |
| 17 | M2290 | /2.290 | RT OPERATOR FAN | MISC | 171967 |
| 18 | M2300 | /2.300 | LEFT WIPER | MISC | 171965 |
| 19 | M2310 | /2.310 | RIGHT WIPER | MISC | 171965 |
| 20 | M2540 | /2.540 | RT LOADER FAN | MISC | 171967 |
| 21 | M2530 | /2.530 | LT LOADER FAN | MISC | 171967 |
| 22 | M11300 | /11.300 | CPU COOLING FANS | CPU | 171961 |
| 23 | M11310 | /11.310 | CPU COOLING FANS | CPU | 171961 |
| 24 | MOD0 | /11.633 | PROGRAMMER | CPU | F026078 |
| 25 | MOD1 | /11.633 | OPERATOR INTERFACE | CTRL | 5025283 |
| 26 | PS1 | /11.120 | POWER SUPPLY | CPU | 171814 |
| 27 | PS2 | /11.155 | CHASSIS 1 POWER | CPU | F025843 |
| 28 | PS3 | /11.180 | CHASSIS 2 POWER | CPU | F025843 |
| 29 | PS4 | /4.260 | RADIO CIRCUIT | CTRL | 196035 |
| 30 | RACK1 | /11.140 | PLC RACK1 | CPU | 171898 |
| 31 | RACK2 | /11.150 | PLC RACK2 | CPU | 171898 |
| 32 | SR2470 | /2.470 | AIR DRYER | AIR | 189349 |

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| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

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E3 PROJECT FILE NAME:
W96E3-45_11

SHEET NUMBER
12

NUMBER OF JUPITER SHEETS

TOTAL NUMBER OF SHEETS
16

DRAWN BY:
WGL

REL. DATE:
7/10/09

SIZE:
D

SCALE:

HARSCO RAIL

E3 DRAWING
 DRAWING NUMBER:
3424837

| LIGHTS & INDICATORS | | | | | | |
|---------------------|--------|---------|------------------------|----------|-------------|---------------|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | BULB PART NO. |
| 1 | DS1180 | /1.180 | LOW HYD OIL | CTRL | 181375 | |
| 2 | DS1230 | /1.230 | LOW AIR | MISC | 171957 | 171959 |
| 3 | LT2480 | /2.480 | CAB LIGHT | MISC | 201136 | 174479 |
| 4 | LT2490 | /2.490 | WORK LIGHT 1 | MISC | 174288 | 174290 |
| 5 | LT2500 | /2.500 | WORK LIGHT 2 | MISC | 174288 | 174290 |
| 6 | LT2510 | /2.510 | WORK LIGHT 3 | MISC | 174288 | 174290 |
| 7 | LT2520 | /2.520 | WORK LIGHT 4 | MISC | 174288 | 174290 |
| 8 | LT3500 | /3.500 | STROBE | MISC | 3000871 | |
| 9 | LT3535 | /3.535 | OPERATOR LIGHT, RH | MISC | 201136 | 174479 |
| 10 | LT3545 | /3.545 | OPERATOR LIGHT, LH | MISC | 201136 | 174479 |
| 11 | LT3550 | /3.550 | LOADER OPERATOR LT, RH | MISC | 201136 | 174479 |
| 12 | LT3560 | /3.560 | LOADER OPERATOR LT, LH | MISC | 201136 | 174479 |
| 13 | LT4120 | /4.120 | FRT HIGH BEAM LT | MISC | 200644 | 174289 |
| 14 | LT4130 | /4.128 | FRT LOW BEAM LT | MISC | 174287 | 174289 |
| 15 | LT4150 | /4.150 | RR HIGH BEAM LT | MISC | 200644 | 174289 |
| 16 | LT4160 | /4.160 | RR LOW BEAM LT | MISC | 174287 | 174289 |
| 17 | LT4180 | /4.180 | RRR TAILLIGHT | MISC | 199960 | |
| 18 | LT4190 | /4.188 | LRR TAILLIGHT | MISC | 199960 | |
| 19 | LT4200 | /4.200 | RFR TAILLIGHT | MISC | 199960 | |
| 20 | LT4210 | /4.205 | LFR TAILLIGHT | MISC | 199960 | |
| 21 | LT4650 | /4.650 | CTRL BOX LIGHT | CTRL | F040972 | 174771 |
| 22 | LT9590 | /9.590 | CPU BOX LIGHT | CPU | F040972 | 174771 |

| GAUGES | | | | | | |
|--------|--------|---------|-----------------|----------|-------------|----------------|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | BULB PART NO. |
| 1 | G1240 | /1.245 | AIR PRESSURE | MISC | A0154Y05 | 0-3101019-0-25 |
| 2 | G1242 | /1.245 | BRAKE PRESSURE | MISC | A0154Y05 | 0-3101019-0-25 |
| 3 | G1244 | /1.245 | DRIVER PRESSURE | MISC | A0154Y05 | 0-3101019-0-25 |
| 4 | G2230 | /2.230 | FUEL LEVEL | CTRL | F017241 | 171972 |
| 5 | G2260 | /2.260 | HYD OIL TEMP | CTRL | 185995 | 171972 |
| 6 | G9550 | /9.550 | GAUGE INDICATOR | CTRL | F022130 | |

| RESISTORS & SENDERS | | | | | | |
|---------------------|--------|---------|-------------------|----------|-------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | R2220 | /2.220 | FUEL LEV SENDER | MISC | F024335 | |
| 2 | R2230 | /2.230 | FUEL LEVEL | CTRL | 171970 | |
| 3 | R2250 | /2.250 | HYD OIL TEMP SEN | MISC | F015000 | |
| 4 | R2260 | /2.260 | HYD OIL TEMP | CTRL | 171970 | |
| 5 | R5270 | /5.275 | DR1 FWD/REV | MISC | 199943 | |
| 6 | R5300 | /5.310 | DR1 UP/DN | MISC | 199943 | |
| 7 | R5620 | /5.623 | DR1 LAT SENSOR | MISC | 199946 | |
| 8 | R6270 | /6.276 | DR2 FWD/REV | MISC | 199943 | |
| 9 | R6300 | /6.311 | DR2 UP/DN | MISC | 199943 | |
| 10 | R6620 | /6.623 | DR2 LAT SENSOR | MISC | 199946 | |
| 11 | R7270 | /7.280 | DR3FWD/REV | MISC | 199943 | |
| 12 | R7300 | /7.315 | DR3 UP/DN | MISC | 199943 | |
| 13 | R7620 | /7.623 | DR3 LAT SENSOR | MISC | 199946 | |
| 14 | R8270 | /8.280 | DR4 FWD/REV | MISC | 199943 | |
| 15 | R8300 | /8.317 | DR4 UP/DN | MISC | 199943 | |
| 16 | R8620 | /8.620 | DR4 LAT SENSOR | MISC | 199946 | |
| 17 | R9120 | /9.120 | LINEAR TRANSDUCER | MISC | 199944 | |
| 18 | R9140 | /9.150 | GAUGER POSITION | MISC | 199945 | |

Ⓛ

NIPPER STRING POT KIT OPTION

| RESISTORS | | | | | | |
|-----------|--------|---------|---------------------|----------|----------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | R9120 | /9.125 | STRING POT (OPTION) | 5045088 | 0-3137013-0-14 | |

| PROPORTIONAL VALVES | | | | | | |
|---------------------|--------|---------|-------------------|----------|-------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | PR5530 | /5.530 | DR1 FWD/REV | HYD | 180600 | |
| 2 | PR5570 | /5.570 | DR1 LT/RT | HYD | 180600 | |
| 3 | PR6530 | /6.520 | DR2 FWD/REV | HYD | 180600 | |
| 4 | PR6570 | /6.570 | DR2 LT/RT | HYD | 180600 | |
| 5 | PR7530 | /7.530 | DR 3 FWD/REV | HYD | 180600 | |
| 6 | PR7570 | /7.570 | DR 3 LT/RT | HYD | 180600 | |
| 7 | PR8520 | /8.520 | DR 4 FWD/REV | HYD | 180600 | |
| 8 | PR8570 | /8.570 | DR 4 LT/RT | HYD | 180600 | |
| 9 | PR9610 | /9.610 | GAUGER EXT/RET | HYD | 180600 | |
| 10 | L3630 | /3.638 | PROPEL SOFT START | | D8305Y01 | |

| RELAYS | | | | | | |
|--------|--------|----------------|---------------|-------------------|----------|-------------|
| NO | DEVICE | SHEET LOCATION | | DESCRIPTION | LOCATION | PART NUMBER |
| | | COIL | CONTACTS | | | |
| 1 | M1125 | /1.125 | | EMERGENCY PUMP | REAR | 171634 |
| 2 | K1170 | /1.168 | /1.150 | ENGINE ACC | CTRL | 171956 |
| 3 | K1210 | /1.210 | /1.180 | LOW HYD LEVEL | CTRL | 171956 |
| 4 | K1290 | /1.290 | /1.290 /1.270 | ALARM SILENCE | CTRL | 171956 |
| 5 | K1310 | /1.310 | /4.260 | RADIO CIRCUIT | CTRL | 171956 |
| 6 | K1530 | /1.543 | /1.533 | LOW OIL SHUTDOWN | MISC | 171956 |
| 7 | K1550 | | /1.115 | START | MISC | 172164 |
| 8 | K2590 | /2.590 | /3.120 | PROPEL INTERRUPT | CTRL | 171956 |
| 9 | K2640 | /2.640 | /11.160 | PLC POWER RELAY | CPU | 171956 |
| 10 | K2650 | /2.650 | /11.130 | SENSOR POWER | CPU | 171956 |
| 11 | K3130 | /3.130 | /3.160 /3.180 | PROPEL ENABLE | CPU | 171956 |
| 12 | K3220 | /3.220 | /3.121 | FORWARD PROPEL | CPU | 5044218 |
| 13 | K3260 | /3.260 | /3.140 | REVERSE PROPEL | CPU | 5044218 |
| 14 | K3590 | /3.590 | /3.180 | PUMP INHIBIT | CPU | 171956 |
| 15 | K1610 | /1.608 | /1.593 | SHUTDOWN OVERRIDE | CTRL | 2005190 |
| 16 | K4138 | /4.138 | /4.180 | REAR MARKER LTS | CTRL | 171956 |
| 17 | K4170 | /4.170 | /4.200 | FRONT MARKER LTS | CTRL | 171956 |
| 18 | K4220 | /4.220 | /4.230 | BRAKE LIGHTS | CTRL | 171956 |
| 19 | K11210 | /11.210 | /11.230 | HEATER CTRL RELAY | CPU | 171956 |
| 20 | K11220 | /11.220 | /11.260 | PLC HEATER | CPU | 171956 |
| 21 | K11280 | /11.280 | /11.300 | CPU COOLING FANS | CPU | 171956 |

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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

| DRAWING TITLE/DESCRIPTION: | |
|----------------------------|--|
| ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: | |
| W96E3-45 | |
| E3 PROJECT FILE NAME: | |
| W96E3-45_11 | |

| SHEET NUMBER | DRAWN BY: |
|--------------------------|------------|
| 13 | WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: |
| | 7/10/09 |
| TOTAL NUMBER OF SHEETS | SCALE: |
| 16 | D |

HARSCO
RAIL

E3 DRAWING
DRAWING NUMBER:
3424837

| CIRCUIT BREAKERS | | | | | | |
|------------------|--------|---------|---------|--------------------|----------|-------------|
| NO | DEVICE | SHT LOC | AMP | DESCRIPTION | LOCATION | PART NUMBER |
| 1 | CB1150 | /1.150 | 40 AMP | ENG CTRLS/GAUGE | EJB | 5022146 |
| 2 | CB3470 | /3.470 | 40 AMP | CONTROLS POWER | EJB | 5022146 |
| 3 | CB1152 | /1.150 | 20 AMP | IGNITION, GAUGES | CTRL | 5022144 |
| 4 | CB1160 | /1.160 | 5 AMP | INST. PROTECTION | CTRL | 5022139 |
| 5 | CB2280 | /2.280 | 5 AMP | OPERATOR FANS | CTRL | 5022139 |
| 6 | CB2300 | /2.300 | 10 AMP | WIPERS | CTRL | 5022142 |
| 7 | CB2460 | /2.460 | 5 AMP | EMERG PUMP CONTROL | CTRL | 5022139 |
| 8 | CB2470 | /2.470 | 10 AMP | AIR DRYER | CTRL | 5022142 |
| 9 | CB2480 | /2.480 | 10 AMP | CAB LIGHT | CTRL | 5022142 |
| 10 | CB2490 | /2.490 | 10 AMP | LT WORK LIGHTS | CTRL | 5022142 |
| 11 | CB2510 | /2.510 | 10 AMP | RT WORK LIGHTS | CTRL | 5022142 |
| 12 | CB2530 | /2.530 | 10 AMP | LOADER FANS | CTRL | 5022142 |
| 13 | CB2550 | /2.550 | 10 AMP | PROPEL ENABLE | CTRL | 5022142 |
| 14 | CB3120 | /3.120 | 10 AMP | PROPEL | CPU | 5022142 |
| 15 | CB3472 | /3.470 | 10 AMP | SPARE | CTRL | 5022142 |
| 16 | CB3500 | /3.500 | 5 AMP | STROBE | CTRL | 5022139 |
| 17 | CB4140 | /4.140 | 20 AMP | TRAVEL LIGHTS | CTRL | 5022144 |
| 18 | CB4180 | /4.180 | 10 AMP | MARKER LIGHTS | CTRL | 5022142 |
| 19 | CB4220 | /4.220 | 5 AMP | BRAKE LIGHTS | CTRL | 5022139 |
| 20 | CB4260 | /4.260 | 10 AMP | RADIO CIRCUIT | CTRL | 5022142 |
| 21 | CB4470 | /4.470 | 5 AMP | SPARE | CTRL | 5022139 |
| 22 | CB4520 | /4.520 | 5 AMP | PLC SWITCH INPUTS | CTRL | 5022139 |
| 23 | CB4600 | /4.600 | 10 AMP | SPARE | CTRL | 5022142 |
| 24 | CB4650 | /4.650 | 5 AMP | CTRL BOX LIGHT | CTRL | 5022139 |
| 25 | CB5115 | /5.115 | 40 AMP | DR1, DR2 CTRLS | EJB | 5022146 |
| 26 | CB5117 | /5.115 | 5 AMP | DR1 CONTROLS | CPU | 5022139 |
| 27 | CB5160 | /5.160 | 5 AMP | DR1 SLIDER RETRACT | CPU | 5022139 |
| 28 | CB5270 | /5.285 | 0.5 AMP | DR1 LOC SENSOR | CPU | 5025319 |
| 29 | CB5300 | /5.320 | 0.5 AMP | DR1 POS SENSOR | CPU | 5025319 |
| 30 | CB5530 | /5.530 | 5 AMP | DR1 FWD/REV | CPU | 5022139 |
| 31 | CB5570 | /5.570 | 5 AMP | DR1 LT/RT | CPU | 5022139 |
| 32 | CB5620 | /5.633 | 0.5 AMP | DR1 LAT SENSOR | CPU | 5025319 |
| 33 | CB6270 | /6.285 | 0.5 AMP | DR1 LOC SENSOR | CPU | 5025319 |
| 34 | CB6300 | /6.320 | 0.5 AMP | DR2 POS SENSOR | CPU | 5025319 |
| 35 | CB6520 | /6.520 | 5 AMP | DR2 FWD/REV | CPU | 5022139 |
| 36 | CB6570 | /6.570 | 5 AMP | DR2 LT/RT | CPU | 5022139 |
| 37 | CB6620 | /6.623 | 0.5 AMP | DR2 LAT SENSOR | CPU | 5025319 |
| 38 | CB7115 | /7.115 | 40 AMP | DR3 & DR4 CTRLS | EJB | 5022146 |
| 39 | CB7117 | /7.115 | 5 AMP | DR3 CONTROLS | CPU | 5022139 |
| 40 | CB7270 | /7.288 | 0.5 AMP | DR3 LOC SENSOR | CPU | 5025319 |
| 41 | CB7300 | /7.320 | 0.5 AMP | DR3 POS SENSOR | CPU | 5025319 |
| 42 | CB7530 | /7.530 | 5 AMP | DR3 FWD/REV | CPU | 5022139 |
| 43 | CB7570 | /7.570 | 5 AMP | DR3 LT/RT | CPU | 5022139 |
| 44 | CB7620 | /7.633 | 0.5 AMP | DR3 LAT SENSOR | CPU | 5025319 |
| 45 | CB8270 | /8.270 | 0.5 AMP | DR4 LOC SENSOR | CPU | 5025319 |
| 46 | CB8300 | /8.300 | 0.5 AMP | DR4 POS SENSOR | CPU | 5025319 |
| 47 | CB8520 | /8.520 | 5 AMP | DR4 FWD/REV | CPU | 5022139 |
| 48 | CB8570 | /8.570 | 5 AMP | DR4 LT/RT | CPU | 5022139 |
| 49 | CB8620 | /8.630 | 0.5 AMP | DR4 LAT SENSOR | CPU | 5025319 |

| CIRCUIT BREAKERS | | | | | | |
|------------------|---------|---------|---------|-------------------|----------|-------------|
| NO | DEVICE | SHT LOC | AMP | DESCRIPTION | LOCATION | PART NUMBER |
| 50 | CB9120 | /9.120 | 0.5 AMP | NIPPER POS SENSO | CPU | 5025319 |
| 51 | CB9140 | /9.140 | 0.5 AMP | SPARE | CPU | 5025319 |
| 52 | CB9160 | /9.160 | 0.5 AMP | SPARE | CPU | 5025319 |
| 53 | CB9590 | /9.590 | 5 AMP | CPU BOX LIGHT | CPU | 5022139 |
| 54 | CB9610 | /9.610 | 5 AMP | GAUGER PROP VALVE | CPU | 5022139 |
| 55 | CB10130 | /10.130 | 10 AMP | O:13 PWR1 | CPU | 5022142 |
| 56 | CB10140 | /10.140 | 10 AMP | O:13 PWR2 | CPU | 5022142 |
| 57 | CB10150 | /10.150 | 10 AMP | O:14 PWR1 | CPU | 5022142 |
| 58 | CB10160 | /10.161 | 10 AMP | O:14 PWR2 | CPU | 5022142 |
| 59 | CB10170 | /10.170 | 10 AMP | O:15 PWR1 | CPU | 5022142 |
| 60 | CB10180 | /10.180 | 10 AMP | O:15 PWR2 | CPU | 5022142 |
| 61 | CB10190 | /10.190 | 10 AMP | O:16 PWR1 | CPU | 5022142 |
| 62 | CB10200 | /10.200 | 10 AMP | O:16 PWR2 | CPU | 5022142 |
| 63 | CB10210 | /10.210 | 10 AMP | O:17 PWR1 | CPU | 5022142 |
| 64 | CB10220 | /10.220 | 10 AMP | O:17 PWR2 | CPU | 5022142 |
| 65 | CB10230 | /10.230 | 10 AMP | O:18 PWR1 | CPU | 5022142 |
| 66 | CB10240 | /10.240 | 10 AMP | O:18 PWR2 | CPU | 5022142 |
| 67 | CB10250 | /10.250 | 10 AMP | SPARE | CPU | 5022142 |
| 68 | CB10260 | /10.260 | 10 AMP | SPARE | CPU | 5022142 |
| 69 | CB10460 | /10.460 | 10 AMP | O:10 (0) | CPU | 5022142 |
| 70 | CB10470 | /10.470 | 10 AMP | O:11 (0) | CPU | 5022142 |
| 71 | CB10480 | /10.480 | 10 AMP | O:12 (0) | CPU | 5022142 |
| 72 | CB10490 | /10.490 | 10 AMP | SPARE | CPU | 5022142 |
| 73 | CB10500 | /10.500 | 10 AMP | SPARE | CPU | 5022142 |
| 74 | CB10510 | /10.510 | 10 AMP | SPARE | CPU | 5022142 |
| 75 | CB10520 | /10.520 | 10 AMP | WINCH | CPU | 5022142 |
| 76 | CB11130 | /11.130 | 5 AMP | SENSOR POWER | CPU | 5022139 |
| 77 | CB11160 | /11.160 | 5 AMP | PLC POWER | CPU | 5022139 |
| 78 | CB11210 | /11.210 | 10 AMP | RACK 1 HEATERS | CPU | 5022142 |
| 79 | CB11260 | /11.260 | 10 AMP | RACK 2 HEATERS | CPU | 5022142 |
| 80 | CB11280 | /11.280 | 5 AMP | PLC FANS | CPU | 5022139 |

| SOLENOIDS | | | | | | |
|-----------|--------|---------|---------------------|----------|-------------|--|
| NO | DEVICE | SHT LOC | DESCRIPTION | LOCATION | PART NUMBER | |
| 1 | L1620 | /1.620 | BRAKE ENABLE | AIR | 185440 | |
| 2 | L2110 | /2.118 | HOIST UP | HYD | F025600 | |
| 3 | L2125 | /2.140 | HOIST DOWN | HYD | F025600 | |
| 4 | L2612 | /2.613 | REAR MOTOR HI | HYD | 190296 | |
| 5 | L3120 | /3.120 | PROPEL FORWARD | HYD | F025600 | |
| 6 | L3140 | /3.140 | PROPEL REVERSE | HYD | F025600 | |
| 7 | L3160 | /3.160 | PROPEL ENABLE | HYD | | |
| 8 | L3180 | /3.180 | WORK ENABLE | HYD | | |
| 9 | L3570 | /3.570 | FRONT MOTOR HI | HYD | 190296 | |
| 10 | L4300 | /4.300 | AUTO BRAKE | AIR | 190032 | |
| 11 | L5115 | /5.115 | DR1 LOCK | AIR | 190032 | |
| 12 | L5130 | /5.130 | DR1 RAISE | HYD | F026061 | |
| 13 | L5150 | /5.150 | DR1 LOWER | HYD | F026061 | |
| 14 | L5170 | /5.170 | DR1 ON | HYD | 199115 | |
| 15 | L5190 | /5.190 | DR1 SLIDER | AIR | 190032 | |
| 16 | L5210 | /5.210 | DR1 JAW HOLDER | HYD | F025600 | |
| 17 | L5230 | /5.230 | DR1 SPIKE RLSE | AIR | 190032 | |
| 18 | L5250 | /5.250 | DR1 JAW CLAMP | HYD | F025600 | |
| 19 | L6115 | /6.115 | DR2 LOCK | AIR | 190032 | |
| 20 | L6130 | /6.130 | DR2 RAISE | HYD | F026061 | |
| 21 | L6150 | /6.150 | DR2 LOWER | HYD | F026061 | |
| 22 | L6170 | /6.170 | DR2 ON | HYD | 199115 | |
| 23 | L6190 | /6.190 | DR2 SLIDER | AIR | 190032 | |
| 24 | L6210 | /6.210 | DR2 JAW HOLDER | HYD | F025600 | |
| 25 | L6230 | /6.230 | DR2 SPIKE RLSE | AIR | 190032 | |
| 26 | L6250 | /6.250 | DR2 JAW CLAMP | HYD | F025600 | |
| 27 | L7115 | /7.115 | DR3 LOCK | AIR | 190032 | |
| 28 | L7130 | /7.130 | DR3 RAISE | HYD | F026061 | |
| 29 | L7150 | /7.150 | DR3 LOWER | HYD | F026061 | |
| 30 | L7170 | /7.170 | DR3 ON | HYD | 199115 | |
| 31 | L7190 | /7.190 | DR3 SLIDER | AIR | 190032 | |
| 32 | L7210 | /7.210 | DR3 JAW HOLDER | HYD | F025600 | |
| 33 | L7230 | /7.230 | DR3 SPIKE RLSE | AIR | 190032 | |
| 34 | L7250 | /7.250 | DR3 JAW CLAMP | HYD | F025600 | |
| 35 | L8110 | /8.110 | DR4 LOCK | AIR | 190032 | |
| 36 | L8130 | /8.130 | DR4 RAISE | HYD | F026061 | |
| 37 | L8150 | /8.150 | DR4 LOWER | HYD | F026061 | |
| 38 | L8170 | /8.170 | DR4 ON | HYD | 199115 | |
| 39 | L8190 | /8.190 | DR4 SLIDER | AIR | 190032 | |
| 40 | L8210 | /8.210 | DR4 JAW HOLDER | HYD | F025600 | |
| 41 | L8230 | /8.230 | DR4 SPIKE RELEASE | AIR | 190032 | |
| 42 | L8250 | /8.250 | DR4 JAW CLAMP | HYD | F025600 | |
| 43 | L9170 | /9.170 | NIPPER LOCK | AIR | 190032 | |
| 44 | L9190 | /9.190 | NIPPER RAISE | HYD | F025600 | |
| 45 | L9210 | /9.210 | NIPPER LOWER | HYD | F025600 | |
| 46 | L9230 | /9.230 | NIPPER JAW | HYD | 199115 | |
| 47 | L9270 | /9.270 | GAUGER REF DN | AIR | 190032 | |
| 48 | L9290 | /9.288 | GAUGER REF OUT | AIR | 190032 | |
| 49 | L9460 | /9.460 | GAUGER LOCK | AIR | 190032 | |
| 50 | L9480 | /9.480 | GAUGER MAIN CYL EXT | HYD | F025600 | |
| 51 | L9500 | /9.500 | GAUGER MAIN CYL RET | HYD | F025600 | |
| 52 | L9520 | /9.520 | GAUGER LOWER/RAISE | HYD | F025600 | |
| 53 | L9540 | /9.540 | GAUGER DUMP VALVE | HYD | 199115 | |

| TERMINAL BLOCKS | |
|-----------------|----------|
| COMPONENT | LOCATION |
| TB1- | CTRL |
| TB2- | CTRL |
| TB3- | CPU |
| TB4- | CPU |
| TB5- | DR1JS |
| TB6- | DR2JS |
| TB7- | DR3JS |
| TB8- | DR4JS |
| TB9- | EJB |
| TB11- | HOIST |
| TB16- | CTRL |
| TB17- | FRT LTS |
| TB18- | REAR LTS |
| TB19- | CPU |
| TBE- | ENGINE |

| KEY | |
|-------|---------------------------------------|
| CPU | = COMPUTER BOX |
| CTRL | = CONTROL BOX |
| E | = ENGINE |
| EJB | = ENGINE JUNCTION BOX |
| RT | = RIGHT |
| LT | = LEFT |
| FS | = FOOT SWITCH |
| FWD | = FORWARD |
| REV | = REVERSE |
| PSW | = PRESSURE SWITCH |
| DR1JS | = DRIVER 1 JOYSTICK |
| DR2JS | = DRIVER 2 JOYSTICK |
| DR3JS | = DRIVER 3 JOYSTICK |
| DR4JS | = DRIVER 4 JOYSTICK |
| GAUGE | = GAUGE ENCLOSURE |
| MISC | = OTHER AREAS OF MACHINE |
| TTBOX | = TURNABLE BOX |
| ONT | = CENTER |
| FRT | = FRONT |
| LTS | = LIGHTS |
| LOC | = LOCATION |
| EXT | = EXTEND |
| RET | = RETRACT |
| POS | = POSITION |
| ** | = SEE ENCLOSURE ASSY FOR PART NUMBERS |

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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

| DRAWING TITLE/DESCRIPTION: |
|----------------------------|
| ELECTRICAL SCHEMATIC |
| MACHINE TYPE-MODEL: |
| W96E3-45 |
| E3 PROJECT FILE NAME: |
| W96E3-45_11 |

| SHEET NUMBER | DRAWN BY: |
|--------------------------|------------|
| 14 | WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: |
| | 7/10/09 |
| TOTAL NUMBER OF SHEETS | SIZE: |
| 16 | D |
| | SCALE: |
| | |

HARSCO RAIL

E3 DRAWING
 DRAWING NUMBER:
3424837

| MODULE I:1 | | PART NUMBER F025845 | |
|---------------|--------|------------------------|--------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:1-0 | 5114 | 5115 | DR1 CONTROL SWITCH |
| I:1-1 | 5200 | 5200 | DR1 SLIDER EXT/RET |
| I:1-2 | 5250 | 5250 | DR1 JAWS OPEN/AUTO |
| I:1-3 | 5130 | 5130 | DR1 RAISE |
| I:1-4 | 5150 | 5150 | DR1 LOWER |
| I:1-5 | 5140 | 5140 | GAUGER CYCLE |
| I:1-6 | 5460 | 5460 | DR1 FORWARD |
| I:1-7 | 5470 | 5470 | DR1 REVERSE |
| I:1-8 | 5480 | 5480 | DR1 LEFT |
| I:1-9 | 5490 | 5490 | DR1 RIGHT |
| I:1-10 | **NC** | **NC** | SPARE |
| I:1-11 | **NC** | **NC** | SPARE |
| I:1-12 | **NC** | **NC** | SPARE |
| I:1-13 | 5160 | 5160 | DR1 SLIDER RETRACT |
| I:1-14 | 3240 | 3240 | FWD/REV PROPEL |
| I:1-15 | **NC** | **NC** | SPARE |
| I:1-COM1 | 000 | 10600 | MODULE GND 1 |
| I:1-COM2 | 000 | 10603 | MODULE GND 2 |

| MODULE I:4 | | PART NUMBER F025845 | |
|---------------|--------|------------------------|---------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:4-0 | 8110 | 8110 | DR4 CONTROLS SW |
| I:4-1 | 8200 | 8200 | DR4 SLIDER EXT/RET |
| I:4-2 | 8250 | 8250 | DR4 JAWS OPEN/AUTO |
| I:4-3 | 8130 | 8130 | DR4 RAISE |
| I:4-4 | 8150 | 8150 | DR4 LOWER |
| I:4-5 | 8140 | 8140 | NIPPER CYCLE |
| I:4-6 | 8460 | 8460 | DR4 FORWARD |
| I:4-7 | 8470 | 8470 | DR4 REVERSE |
| I:4-8 | 8480 | 8480 | DR4 LEFT |
| I:4-9 | 8490 | 8490 | DR4 RIGHT |
| I:4-10 | 4530 | 4530 | LT AUTO CENT ENABLE |
| I:4-11 | 4522 | 4520 | RT AUTO CENT ENABLE |
| I:4-12 | 4570 | 4570 | NIPPER ENABLE |
| I:4-13 | 8160 | 8160 | DR4 SLIDER RETRACT |
| I:4-14 | 4540 | 4540 | LT/RT SELECT SWITCH |
| I:4-15 | **NC** | **NC** | SPARE |
| I:4-COM1 | 000 | 10615 | MODULE GND 1 |
| I:4-COM2 | 000 | 10618 | MODULE GND 2 |

| MODULE I:2 | | PART NUMBER F025845 | |
|---------------|--------|------------------------|--------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:2-0 | 6115 | 6115 | DR2 CONTROLS SW |
| I:2-1 | 6200 | 6200 | DR2 SLIDER EXT/RET |
| I:2-2 | 6250 | 6250 | DR2 JAWS OPEN/AUTO |
| I:2-3 | 6130 | 6130 | DR2 RAISE |
| I:2-4 | 6150 | 6150 | DR2 LOWER |
| I:2-5 | 6140 | 6140 | NIPPER CYCLE |
| I:2-6 | 6460 | 6460 | DR2 FORWARD |
| I:2-7 | 6470 | 6470 | DR2 REVERSE |
| I:2-8 | 6480 | 6480 | DR2 LEFT |
| I:2-9 | 6490 | 6490 | DR2 RIGHT |
| I:2-10 | 9508 | 9508 | GAUGER FUNCTION SW |
| I:2-11 | 9518 | 9518 | GAUGER FUNCTION SW |
| I:2-12 | 4222 | 4230 | BRAKES ON |
| I:2-13 | 6160 | 6160 | DR2 SLIDER RETRACT |
| I:2-14 | 2608 | 2608 | WORK MODE |
| I:2-15 | **NC** | **NC** | SPARE |
| I:2-COM1 | 000 | 10605 | MODULE GND 1 |
| I:2-COM2 | 000 | 10608 | MODULE GND 2 |

| MODULE I:6 | | PART NUMBER F025846 | |
|---------------|--------|------------------------|----------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:6-0 | 9125 | 9125 | NIPPER POSITION |
| I:6-1 | 000 | 9120 | NIPPER POSITION |
| I:6-2 | 000 | 10628 | CHANNEL 0 ANALOG GND |
| I:6-3 | 000 | 9570 | CHANNEL DISABLE |
| I:6-4 | 000 | 9575 | CHANNEL DISABLE |
| I:6-5 | 000 | 10630 | CHANNEL 1 ANALOG GND |
| I:6-6 | 9145 | 9145 | GAUGER POSITION |
| I:6-7 | 000 | 9140 | GAUGER POSITION |
| I:6-8 | 000 | 10634 | CHANNEL 2 ANALOG GND |
| I:6-9 | 000 | 10636 | CHANNEL DISABLE |
| I:6-10 | 000 | 10638 | CHANNEL DISABLE |
| I:6-11 | 000 | 10640 | CHANNEL 3 ANALOG GND |

| MODULE I:7 | | PART NUMBER F025846 | |
|---------------|--------|------------------------|----------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:7-0 | 5275 | 5275 | DR1 FWD/REV SENSOR |
| I:7-1 | 000 | 5270 | DR1 FWD/REV SENSOR |
| I:7-2 | 000 | 10643 | CHANNEL 0 ANALOG GND |
| I:7-3 | 6275 | 6275 | DR2 FWD/REV SENSOR |
| I:7-4 | 000 | 6270 | DR2 FWD/REV SENSOR |
| I:7-5 | 000 | 10645 | CHANNEL 1 ANALOG GND |
| I:7-6 | 7275 | 7275 | DR3 FWD/REV SENSOR |
| I:7-7 | 000 | 7270 | DR3 FWD/REV SENSOR |
| I:7-8 | 000 | 10648 | CHANNEL 2 ANALOG GND |
| I:7-9 | 8275 | 8275 | DR4 FWD/REV SENSOR |
| I:7-10 | 000 | 8270 | DR4 FWD/REV SENSOR |
| I:7-11 | 000 | 10650 | CHANNEL 3 ANALOG GND |

| MODULE I:3 | | PART NUMBER F025845 | |
|---------------|--------|------------------------|--------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:3-0 | 7119 | 7115 | DR3 CONTROLS SW |
| I:3-1 | 7200 | 7200 | DR3 SLIDER EXT/RET |
| I:3-2 | 7250 | 7250 | DR3 JAWS OPEN/AUTO |
| I:3-3 | 7130 | 7130 | DR3 RAISE |
| I:3-4 | 7150 | 7150 | DR3 LOWER |
| I:3-5 | 7140 | 7140 | GAUGER CYCLE |
| I:3-6 | 7460 | 7460 | DR3 FORWARD |
| I:3-7 | 7470 | 7470 | DR3 REVERSE |
| I:3-8 | 7480 | 7480 | DR3 LEFT |
| I:3-9 | 7490 | 7490 | DR3 RIGHT |
| I:3-10 | **NC** | **NC** | SPARE |
| I:3-11 | **NC** | **NC** | SPARE |
| I:3-12 | **NC** | **NC** | SPARE |
| I:3-13 | 7160 | 7160 | DR3 SLIDER RETRACT |
| I:3-14 | 4560 | 4560 | LT RMT PAT ENABLE |
| I:3-15 | 4550 | 4550 | RT RMT PAT ENABLE |
| I:3-COM1 | 000 | 10610 | MODULE GND 1 |
| I:3-COM2 | 000 | 10613 | MODULE GND 2 |

| MODULE I:8 | | PART NUMBER F025846 | |
|---------------|--------|------------------------|----------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| I:8-0 | 5305 | 5305 | DR1 UP/DN SENSOR |
| I:8-1 | 000 | 5300 | DR1 UP/DN SENSOR |
| I:8-2 | 000 | 10653 | CHANNEL 0 ANALOG GND |
| I:8-3 | 6305 | 6305 | DR2 UP/DN SENSOR |
| I:8-4 | 000 | 6300 | DR2 UP/DN SENSOR |
| I:8-5 | 000 | 10655 | CHANNEL 1 ANALOG GND |
| I:8-6 | 7305 | 7305 | DR3 UP/DN SENSOR |
| I:8-7 | 000 | 7300 | DR3 UP/DN SENSOR |
| I:8-8 | 000 | 10658 | CHANNEL 2 ANALOG GND |
| I:8-9 | 8305 | 8305 | DR4 UP/DN SENSOR |
| I:8-10 | 000 | 8300 | DR4 UP/DN SENSOR |
| I:8-11 | 000 | 10660 | CHANNEL 3 ANALOG GND |

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| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
|--|--------------------------------------|
| MACHINE TYPE-MODEL: W96E3-45 | E3 PROJECT FILE NAME: W96E3-45_11 |

| | |
|---------------------------------|-----------------------|
| SHEET NUMBER 15 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

HARSCO
RAIL

E3 DRAWING
DRAWING NUMBER:
3424837

| MODULE O:10 | | PART NUMBER F025848 | |
|----------------|--------|------------------------|-------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:10-(0) | 5540 | 5540 | DR1 FWD/REV VALVE |
| O:10-(1) | 5550 | 5550 | DR1 FWD/REV VALVE |
| O:10-(2) | 6530 | 6530 | DR2 FWD/REV VALVE |
| O:10-(3) | 6540 | 6540 | DR2 FWD/REV VALVE |
| O:10-(4) | 7540 | 7540 | DR3 FWD/REV VALVE |
| O:10-(5) | 7550 | 7550 | DR3 FWD/REV VALVE |
| O:10-(6) | 8530 | 8530 | DR4 FWD/REV VALVE |
| O:10-(7) | 8540 | 8540 | DR4 FWD/REV VALVE |
| O:10-(0)V | 10460 | 10460 | MODULE POWER |
| O:10-(1)V | 000 | 10583 | MODULE GROUND |

| MODULE O:15 | | PART NUMBER 5031123 | |
|----------------|--------|------------------------|-------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:15-0 | 7121 | 7115 | DR3 LOCK |
| O:15-1 | 7132 | 7130 | DR3 RAISE |
| O:15-2 | 7152 | 7150 | DR3 LOWER |
| O:15-3 | 7170 | 7170 | DR3 ON |
| O:15-4 | 7190 | 7190 | DR3 SLIDER |
| O:15-5 | 7210 | 7210 | DR3 JAW HOLDER |
| O:15-6 | 7230 | 7230 | DR3 SPIKE RELEASE |
| O:15-7 | 7252 | 7250 | DR3 JAW CLAMP |
| O:15-PWR1 | 10170 | 10170 | MODULE PWR1 |
| O:15-PWR2 | 10180 | 10180 | MODULE PWR2 |

| MODULE O:11 | | PART NUMBER F025848 | |
|----------------|--------|------------------------|----------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:11-(0) | 9535 | 9535 | GAUGE METER + |
| O:11-(1) | 9550 | 9550 | GAUGE METER - |
| O:11-(2) | 9620 | 9620 | GAUGER EXT/RET VALVE |
| O:11-(3) | 9630 | 9630 | GAUGER EXT/RET VALVE |
| O:11-(4) | **NC** | **NC** | SPARE |
| O:11-(5) | **NC** | **NC** | SPARE |
| O:11-(6) | **NC** | **NC** | SPARE |
| O:11-(7) | **NC** | **NC** | SPARE |
| O:11-(0)V | 10460 | 10460 | MODULE POWER |
| O:11-(1)V | 000 | 10583 | MODULE GROUND |

| MODULE O:16 | | PART NUMBER 5031123 | |
|----------------|--------|------------------------|-------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:16-0 | 8116 | 8110 | DR4 LOCK |
| O:16-1 | 8132 | 8130 | DR4 RAISE |
| O:16-2 | 8152 | 8150 | DR4 LOWER |
| O:16-3 | 8170 | 8170 | DR4 ON |
| O:16-4 | 8190 | 8190 | DR4 SLIDER |
| O:16-5 | 8210 | 8210 | DR4 JAW HOLDER |
| O:16-6 | 8230 | 8230 | DR4 SPIKE RELEASE |
| O:16-7 | 8252 | 8250 | DR4 JAW CLAMP |
| O:16-PWR1 | 10190 | 10190 | MODULE PWR1 |
| O:16-PWR2 | 10200 | 10200 | MODULE PWR2 |

| MODULE O:12 | | PART NUMBER F025848 | |
|----------------|--------|------------------------|---------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:12-(0) | 5580 | 5580 | DR1 LEFT |
| O:12-(1) | 5590 | 5590 | DR1 RIGHT |
| O:12-(2) | 6580 | 6580 | DR2 LEFT |
| O:12-(3) | 6590 | 6590 | DR2 RIGHT |
| O:12-(4) | 7580 | 7580 | DR3 LEFT |
| O:12-(5) | 7590 | 7590 | DR3 RIGHT |
| O:12-(6) | 8580 | 8580 | DR4 LEFT |
| O:12-(7) | 8590 | 8590 | DR4 RIGHT |
| O:12-(0)V | 10480 | 10480 | MODULE POWER |
| O:12-(1)V | 000 | 10583 | MODULE GROUND |

| MODULE O:17 | | PART NUMBER 5031123 | |
|----------------|--------|------------------------|------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:17-0 | 9170 | 9170 | NIPPER LOCK |
| O:17-1 | 9190 | 9190 | NIPPER RAISE |
| O:17-2 | 9210 | 9210 | NIPPER LOWER |
| O:17-3 | 9230 | 9230 | NIPPER JAW |
| O:17-4 | **NC** | **NC** | SPARE |
| O:17-5 | 2584 | 2590 | PROPEL INTERRUPT |
| O:17-6 | **NC** | **NC** | SPARE |
| O:17-7 | 3590 | 3590 | PUMP INHIBIT |
| O:17-PWR1 | 10210 | 10210 | MODULE PWR1 |
| O:17-PWR2 | 10220 | 10220 | MODULE PWR2 |

| MODULE O:13 | | PART NUMBER 5031123 | |
|----------------|--------|------------------------|-------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:13-0 | 5116 | 5115 | DR1 LOCK |
| O:13-1 | 5132 | 5130 | DR1 RAISE |
| O:13-2 | 5152 | 5150 | DR1 LOWER |
| O:13-3 | 5170 | 5170 | DR1 ON |
| O:13-4 | 5190 | 5190 | DR1 SLIDER |
| O:13-5 | 5210 | 5210 | DR1 JAW HOLDER |
| O:13-6 | 5230 | 5230 | DR1 SPIKE RELEASE |
| O:13-7 | 5252 | 5250 | DR1 JAW CLAMP |
| O:13-PWR1 | 10130 | 10130 | MODULE PWR1 |
| O:13-PWR2 | 10140 | 10140 | MODULE PWR2 |

| MODULE O:18 | | PART NUMBER 5031123 | |
|----------------|--------|------------------------|---------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:18-0 | 9460 | 9460 | GAUGER LOCK |
| O:18-1 | 9520 | 9520 | GAUGER LOWER/RAISE |
| O:18-2 | 9270 | 9270 | GAUGE REF DOWN |
| O:18-3 | 9290 | 9290 | GAUGE REF OUT |
| O:18-4 | 9480 | 9480 | GAUGER MAIN CYL EXT |
| O:18-5 | 9500 | 9500 | GAUGER MAIN CYL RET |
| O:18-6 | 9540 | 9540 | GAUGER DUMP VALVE |
| O:18-7 | 9560 | 9560 | GAUGER ERROR ALARM |
| O:18-PWR1 | 10230 | 10230 | MODULE PWR1 |
| O:18-PWR2 | 10240 | 10240 | MODULE PWR2 |

| MODULE O:14 | | PART NUMBER 5031123 | |
|----------------|--------|------------------------|-------------------|
| TERMINAL | WIRE # | LOCATION | FUNCTION |
| O:14-0 | 6117 | 6115 | DR2 LOCK |
| O:14-1 | 6132 | 6130 | DR2 RAISE |
| O:14-2 | 6152 | 6150 | DR2 LOWER |
| O:14-3 | 6170 | 6170 | DR2 ON |
| O:14-4 | 6190 | 6190 | DR2 SLIDER |
| O:14-5 | 6210 | 6210 | DR2 JAW HOLDER |
| O:14-6 | 6230 | 6230 | DR2 SPIKE RELEASE |
| O:14-7 | 6252 | 6250 | DR2 JAW CLAMP |
| O:14-PWR1 | 10150 | 10150 | MODULE PWR1 |
| O:14-PWR2 | 10160 | 10160 | MODULE PWR2 |

| CHANGE # | R/L | REVISION | DR | DATE |
|----------|-----|---|-----|----------|
| EC506060 | F | CHANGE TO PANELVIEW DISPLAY 5025283 | KMS | 02-04-13 |
| EC507027 | G | DOCUMENTATION UPDATE, SEE EC FOR DETAILS | JES | 05-02-13 |
| EC507318 | H | UPDATED LIGHTING, SEE EC FOR DETAILS | JES | 05-28-13 |
| EC507653 | I | SHT 2-3 UPDATE WIRE NUMBERS, SHT 16 UPDATE PART NUMBERS | JES | 06-24-13 |
| EC507948 | J | BUILD UPDATES, SEE EC FOR DETAILS | JES | 07-25-13 |
| EC509962 | K | UPDATED K3220 & K3260 TO SOLID STATE RELAY'S | JES | 04-29-14 |
| EC510424 | L | ADDED NIPPER STRING POT OPTION, SHT 9 & 13 | JES | 06-16-14 |

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|---|---|
| DRAWING TITLE/DESCRIPTION: ELECTRICAL SCHEMATIC | |
| MACHINE TYPE-MODEL: W96E3-45 | E3 PROJECT FILE NAME: W96E3-45_11 |

| | |
|--|------------------------------|
| SHEET NUMBER 16 | DRAWN BY: WGL |
| NUMBER OF JUPITER SHEETS | REL. DATE: 7/10/09 |
| TOTAL NUMBER OF SHEETS 16 | SCALE: D |

| | |
|-----------------------|-----------------------------------|
| HARSCO RAIL | E3 DRAWING |
| | DRAWING NUMBER: 3424837 |

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