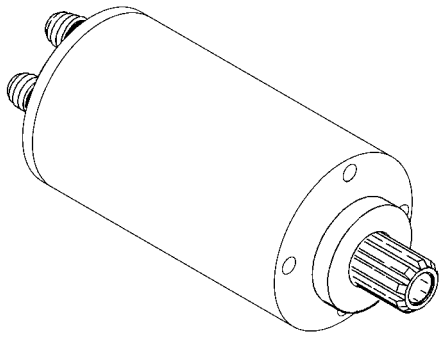
STEERING HOUSING AND CONTROL UNIT

ERC20-30AGF (ERC040-065RG/ZG) [E108];
ERC/P16-20AAF (ERC030-040AG/BG) [A814];
ERP20-30ALF [B216];
GC/GLC030-040AF [B809];
GLP/GDP16-20AF
(GP/GLP/GDP030-040AF) [B810];
GP/GLP/GDP2.00-3.00RF/TF
(GP/GLP/GDP040-060RG/TG/ZG) [A875];
GC/GLC040-065RG/TG/ZG [E187];
ERP20-30ALF (ERP040-060DH) [D216];
ERP20-32ALF (ERP040-065DH) [E216];
ERC/P16-20AAF (ERC030-040AH) [B814];
ERC20-32AGF (ERC040-065GH) [A908];
ERC35-55HG (ERC70-120HH) [B839/C839]



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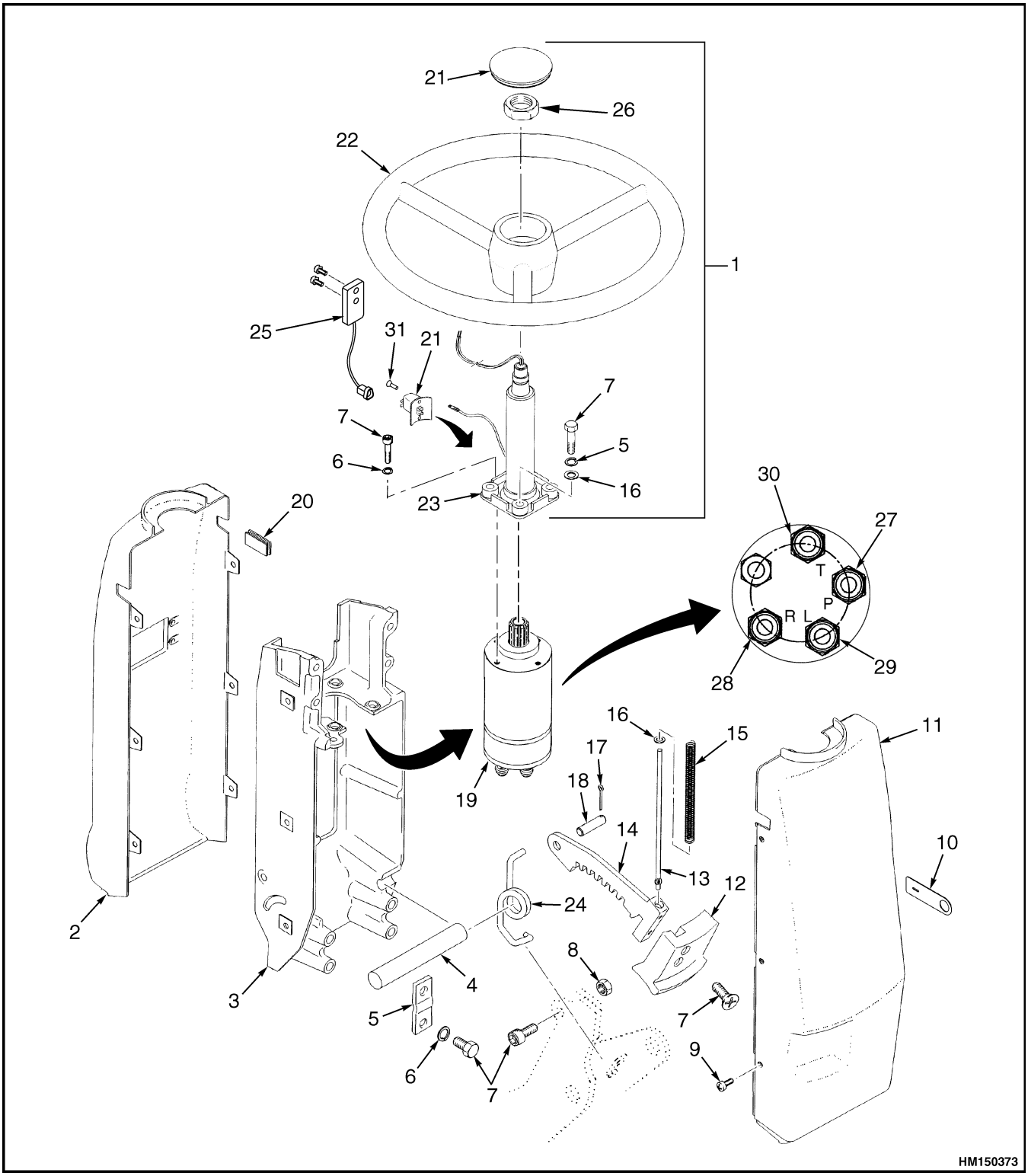
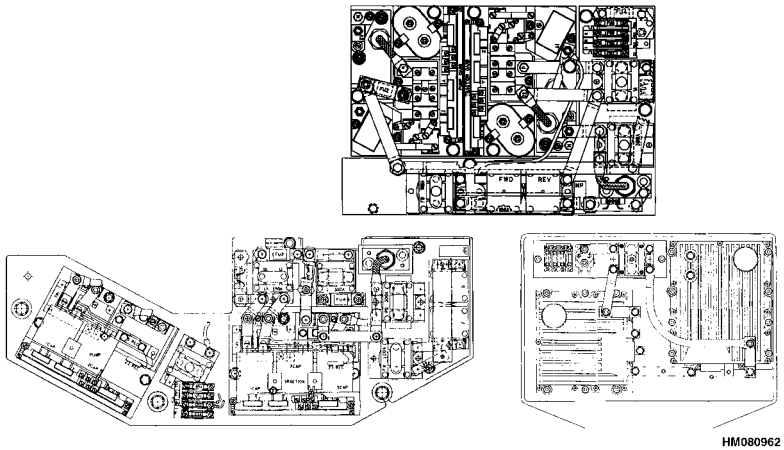


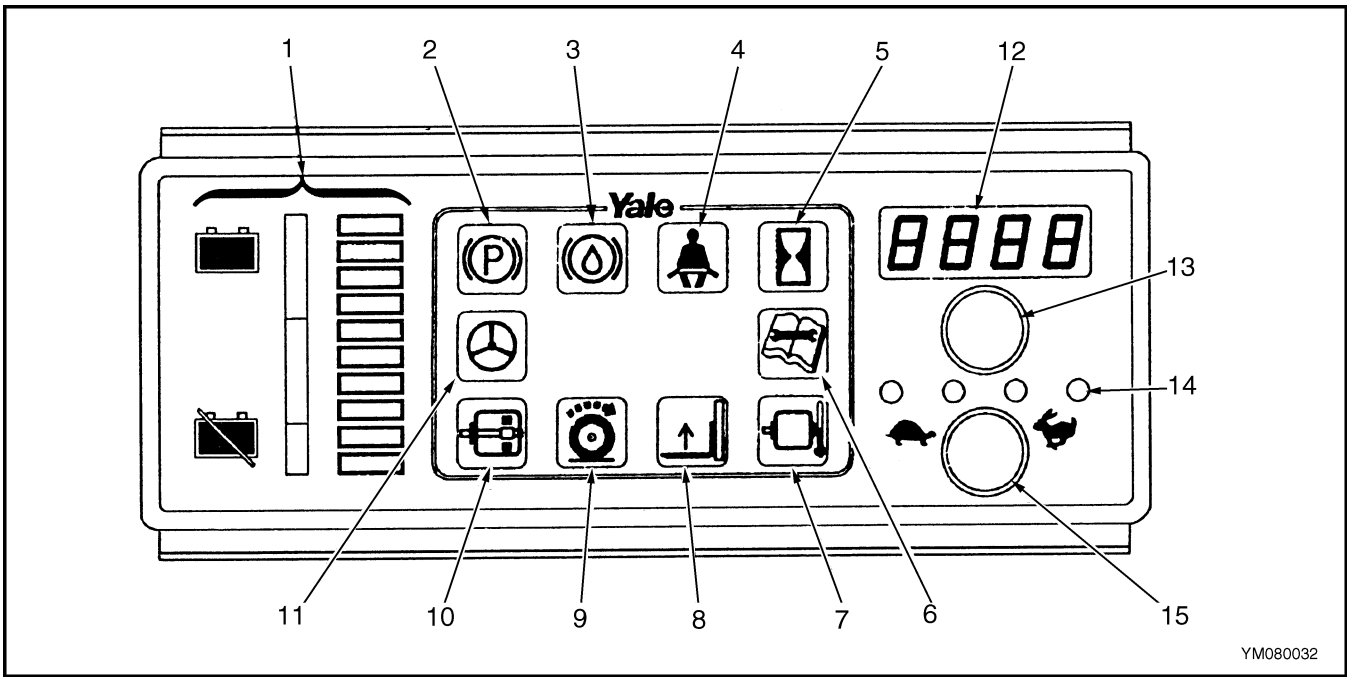
Figure 6. Steering Column Assembly, Models ERP20-30ALF [ERP040-060DH] (D216), ERP20-32ALF [ERP040-065DH] (E216), ERC/P16-20AAF [ERC030-040AH] (B814/C814), ERC35-55HG (ERC70-120HH) (B839/C839), and ERC20-32AGF [ERC040-065GH] (A908)

ELECTRICAL SYSTEM

REPLACEMENT, CHECKS, AND ADJUSTMENTS
TRUCKS WITH EV-100/200ZX OR SR (SEM) AND SP MOTOR CONTROLLERS

ERC/P16-20AAF
(ERC030-040AF, AG/BG) [A814];
ERC35-55HG
(ERC70-120HD, ERC70-120HG) [A839];
ERP20-30ALF [B216];
ERC20-30AGF
(ERC040-65RF/ZF, RG/ZG) [E108]





1. BATTERY INDICATOR
2. PARKING BRAKE INDICATOR
3. BRAKE FLUID LOW INDICATOR
4. FASTEN SEAT BELT INDICATOR
5. HOURMETER FUNCTION INDICATOR
6. STATUS CODE FUNCTION INDICATOR
7. MOTOR TEMPERATURE INDICATOR
8. LIFT PUMP MOTOR INDICATOR
9. TRACTION MOTOR INDICATOR
10. BRUSH WEAR INDICATOR
11. STEERING PUMP MOTOR INDICATOR
12. DIGITAL DISPLAY
13. STATUS CODES PUSH BUTTON
14. PERFORMANCE LEVEL INDICATORS
15. PERFORMANCE LEVEL PUSH BUTTON

Figure 3. Premium Display Panel

Description of Features on the Premium Display Panel

Battery Indicator

The battery indicator is a scale with a series of 10 Light Emitting Diodes (LEDs) in three colors (green, orange, and red). As the battery voltage decreases during operation, different LEDs illuminate to indicate a discharged battery. No more than two LEDs are illuminated at one time. When the battery is fully charged, the two green LEDs at the end of the scale are illuminated. When the battery discharges during operation, the LEDs illuminate from top to bottom (green to red). See Figure 3.

All lift trucks with this type of warning indicator display have a lift interrupt. When the battery is discharged to the red section of the battery discharge indicator, the last two LEDs begin to flash just before the lift interrupt is enabled. When the last two LEDs are illuminated continuously, the controller for the battery discharge indicator stops the power to the hydraulic pump motor. This action prevents the lift truck from lifting. Enough battery power is normally available to move the lift truck to a battery charger or to a place where a charged battery can be installed.

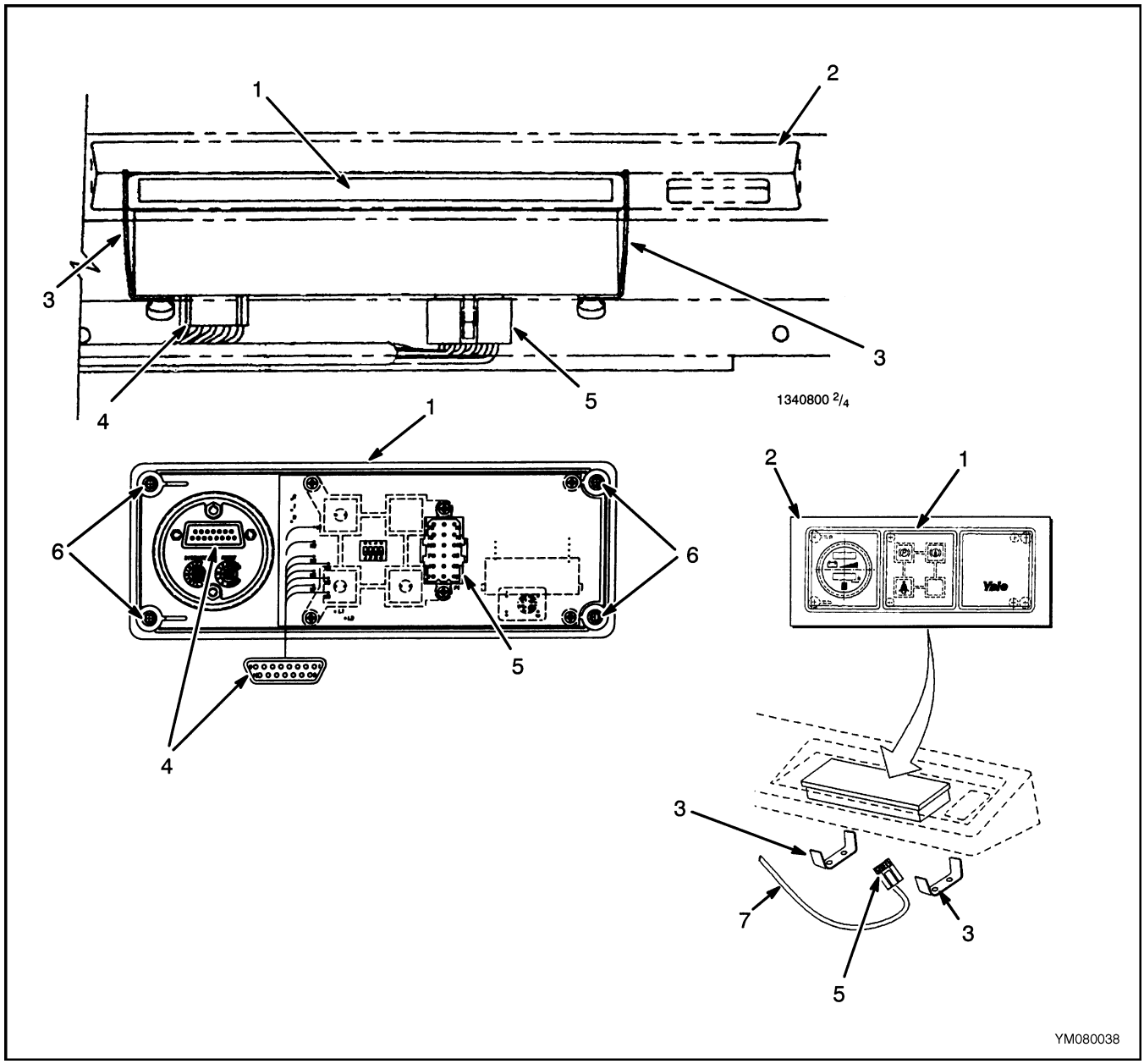
Parking Brake Indicator

This red indicator is **ON** for 1 second after the key is moved to the **ON** position. This on-time checks that the indicator is operating. The indicator will also be **ON** when the parking brake is applied and the seat switch is closed. The indicator will go **OFF** when the parking brake is released.

If the parking brake is NOT applied and the operator leaves the seat or turns the key to the **OFF** position, a warning buzzer will make a noise for approximately 10 seconds.

Brake Fluid Low Indicator

This red indicator is **ON** for 1 second after the key is moved to the **ON** position. This on-time checks that the indicator is operating. If the indicator is **ON** during operation, the fluid level in the brake fluid reservoir is low and must be filled. See Figure 3.



NOTE: STANDARD DISPLAY PANEL SHOWN

1. DISPLAY PANEL
2. RIGHT INSTRUMENT PANEL
3. CLAMP TO FASTEN DISPLAY PANEL
4. PLUG CONNECTOR ON BACK OF METER (STANDARD DISPLAY PANEL ONLY)
5. 18-PIN PLUG CONNECTOR ON BACK OF DISPLAY PANEL
6. STUDS FOR CLAMP
7. WIRING HARNESS

Figure 7. ZX Display Panel Replacement

Legend for Figure 16

1. SEAT
2. PLATE
3. SWITCH BARREL
4. JAM NUTS
5. SWITCH

3. Adjust the jam nuts to move the switch. Adjust the switch so that there is 1.52 mm (0.06 in.) clearance between the switch barrel and the plate as shown in Figure 16.

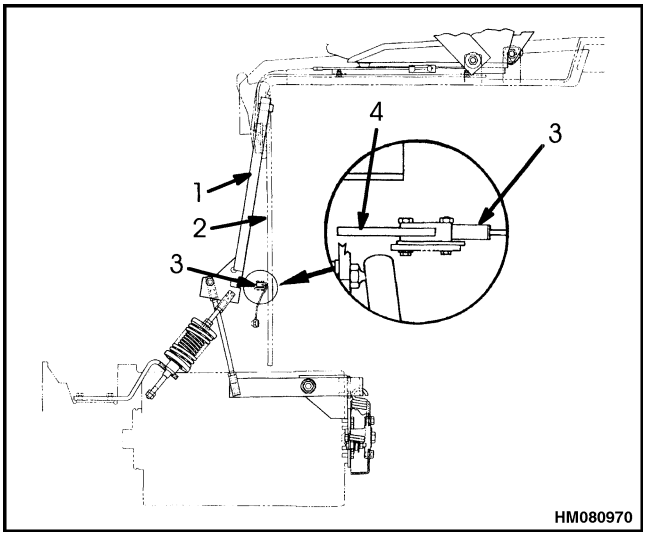
SWITCH FOR OPTIONAL SEAT BRAKE, REPLACE

NOTE: The seat brake is a factory option on the ERC/P16-20AAF (ERC030-040AF, AG/BG) and ERC20-30AGF (ERC040-65RF/ZF, RG/ZG) models only.

This switch has the same function as the seat switch and is located near the bottom of the linkage that operates the seat brake. See Figure 17 or Figure 18. Replace this switch as follows:

1. Disconnect the battery and remove the key.

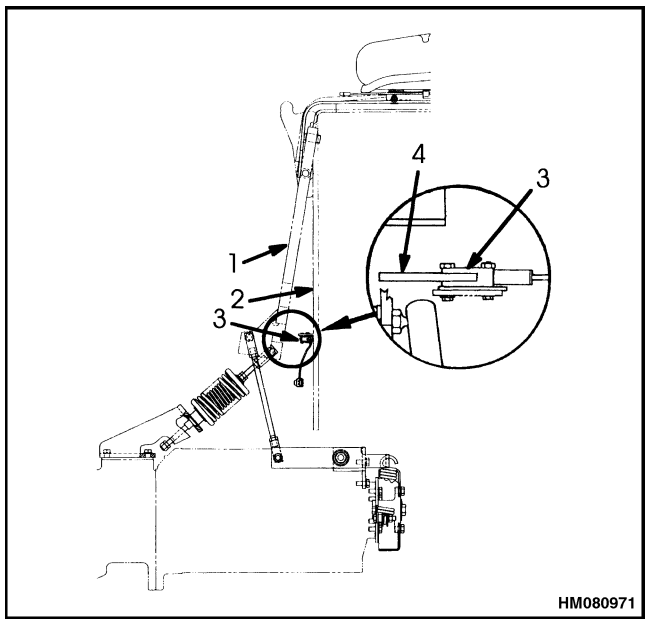
2. Remove the cover over the linkage under the seat. Remove the mount screws for the switch.



1. LINKAGE LEVER
2. FRONT PLATE OF BATTERY COMPARTMENT
3. SWITCH
4. SWITCH ACTUATOR

Figure 17. Seat Brake Assembly (ERC20-30AGF [ERC040-65RF/ZF, RG/ZG] Only)

3. Make a note of which wires are connected to which terminals for correct connection during installation. Remove the wires and install them on the replacement switch.



1. LINKAGE LEVER
2. FRONT PLATE OF BATTERY COMPARTMENT
3. SWITCH
4. SWITCH ACTUATOR

Figure 18. Seat Brake Assembly (ERC/P16-20AAF [ERC030-040AF, AG/BG] Only)

4. Install the switch using the same screws and nuts.

5. Adjust the switch as described in Optional Seat Brake Switch Adjustment. Install the cover over the linkage.

PARKING BRAKE SWITCH, REPLACE

The parking brake switch is fastened near the linkage for applying the parking brake. This switch operates the indicator in the display panel and the alarm through the control card for the display panel. See Figure 19 or Figure 20.

The park brake alarm will operate for 10 seconds when the operator gets off the seat, or the key is moved to the **OFF** position if the park brake is not applied. The alarm is operated by the display panel from the switch signal and is located within the display panel housing. The alarm will not operate if the parking brake switch is damaged or not adjusted correctly. An alarm that does not operate cannot be repaired and must be replaced as part of the display panel.

1. Disconnect the battery and remove the key.

Legend for Figure 26

NOTE: SPOT LIGHTS ARE NOT INSTALLED IN THE UNITED STATES OR CANADA. INCANDESCENT BRAKE, TAIL, AND REVERSE LIGHTS SHOWN.

NOTE: ERC/P16-20AAF (ERC030-040AF, AG/BG) AND ERC20-30AGF (ERC040-65RF/ZF, RG/ZG) MODELS SHOWN. ERP20-30ALF MODELS ARE SIMILAR.

NOTE: SEE THE **DIAGRAMS** SECTION FOR YOUR LIFT TRUCK MODEL, FOR THE CORRECT CONNECTIONS.

A. FRONT LIGHTS

1. SPOT LIGHT (REPLACES RIGHT DRIVING LIGHT WHEN INSTALLED)
2. DRIVING LIGHT
3. OPERATOR'S COMPARTMENT LIGHT
4. FLASHING LIGHT
5. REVERSE ALARM
6. BRAKE, TAIL, AND REVERSE LIGHT ASSEMBLY
7. LIGHT SWITCH CONNECTOR

B. REAR LIGHTS

8. CONTROL CIRCUIT CONNECTOR
9. 12-VOLT CONVERTER
10. RELAY
11. BLK
12. BRN/WHT
13. BRN/PUR
14. BLK/PUR

7. Assemble the base and lens of the light assembly and install the two screws. Align the assembly in the brackets and tighten the screws.

LED Brake, Tail, and Reverse Light Assembly, Replace

Remove

NOTE: Newer models of lift trucks are equipped with LED (Light Emitting Diode) backup and brake tail lights. These light assemblies are non-repairable and must be replaced as a complete unit. See the **Parts Manual** for replacement LED lights.

1. Disconnect negative terminal of battery and remove the key.

2. Disconnect the LED light from the chassis light harness. See Figure 27.

3. Remove LED light assembly and harness from mounting bracket.

4. If the LED mounting bracket must be removed from the overhead guard leg, remove the plug, screw and bracket from the overhead guard leg.

Install

1. If the mounting bracket was removed, install it onto the overhead guard leg. Insert the plug and screw to attach mounting bracket to overhead guard leg.

2. Install the LED light assembly and harness on the mounting bracket.

3. Connect the LED light to the chassis light harness. See Figure 27.

4. Connect the negative terminal of battery and close the hood.

Flashing Light Assembly, Replace

1. Disconnect the battery and remove the key.

2. Remove the two screws, nuts, and washers that fasten the flashing light.

3. Remove the wire guard.

4. To replace a bulb *only*, remove the lens from the base. Carefully remove the bulb. Go to Step 8 if the assembly will not be replaced.

5. Carefully pull the wires away from the lift truck for as much length as possible. It can be necessary to loosen the wire clamp (top mounted units only). If the complete light assembly is being replaced, cut each of the wires as close to the splice connectors (lift truck end) as possible.

6. Carefully remove 6 mm (0.25 in.) of insulation from the ends of both the lift truck and flashing light wires. Install a 50 mm (2.00 in.) length of heat-shrink tubing on each wire of the pair. Connect the red and red/green wires using a butt splice (Yale Part No. 504231210). Connect the black and black/tan wires using another butt splice. Slide the tubing over each butt splice so that they are centered. Use a hot air-device to heat and "shrink" the tubing onto each splice.

SEM CONTROLLER FIELD DIAGNOSTIC PROCEDURE

If a problem is suspected with a SEM controller, follow the below test procedure for diagnosing field and armature transistor (FET) failures in SEM controllers.

Armature FET Test

1. Remove all cables and wiring harnesses from the controller.
2. Set the digital meter to the diode test function.
3. Attach the red lead to the NEG terminal and the black lead to the A2 terminal.
4. If the reading is higher or lower than 0.4 to 0.5 volts, replace the controller.
5. Attach the red lead to the A2 terminal and the black to the POS terminal.
6. If the reading is higher or lower than 0.4 to 0.5 volts, replace the controller.

Field FET Test

1. Attach the red lead to the NEG terminal and the black to the F1 terminal.
2. If the reading is higher or lower than 0.4 to 0.5 volts, replace the controller.
3. Attach the black lead to the F2 terminal.
4. If the reading is higher or lower than 0.4 to 0.5 volts, replace the controller.
5. Attach the black lead to the POS terminal and the red lead to the F1 terminal.
6. If the reading is higher or lower than 0.4 to 0.5 volts, replace the controller.
7. Attach the red lead to the F2 terminal.
8. If the reading is higher or lower than 0.4 to 0.5 volts, replace the controller.

Seat Switch Check

WARNING

Some checks and adjustments in this section must be done with the battery connected and power applied to the controller. Lift truck movement during checks or adjustments can cause personal injury. Raise the drive wheels to prevent lift truck movement. See the Operating Manual or the section Periodic Maintenance of the Service Manual for your lift truck to raise the drive wheels.

Never have any metal on your fingers, arms, or neck. These metal items can accidentally make an electrical connection and cause an injury.

ALWAYS disconnect the battery before making checks or adjustments that do not need power applied.

CAUTION

The SEM Display Panel must be adjusted using a computer to allow lift truck operation. Refer to the section Display Panel for SEM Controls, (Windows Version) 2200 YRM 942 for the adjustment procedure.

CAUTION

Correct meter polarity is necessary for some checks. Meter correct positive is indicated as (+). Meter correct negative is indicated as (−).

Use a meter with a minimum rating of 20,000 ohms per volt to make measurements. Most digital volt meters are good.

NOTE: There is no adjustment for the seat switch located in the cushion of the operator seat. Check that the seat switch is good.

Check as follows:

1. Sit on the seat.
2. Turn the key to the **START** and **ON** positions.
3. Depress the Foot Directional Control pedal or accelerator pedal. If the seat switch is bad, the lift truck will not operate. Replace the seat switch. See Seat Switch, Replace of this section.

Optional Seat Brake Switch Adjustment

WARNING

Some checks and adjustments in this section must be done with the battery connected and power applied to the controller. Lift truck movement during checks or adjustments can cause personal injury. Raise the drive wheels to prevent lift truck movement. See the Operating Manual or the section Periodic Maintenance of the Service Manual for your lift truck to raise the drive wheels.

Never have any metal on your fingers, arms, or neck. These metal items can accidentally make an electrical connection and cause an injury.

ALWAYS disconnect the battery before making checks or adjustments that do not need power applied.

CAUTION

The SEM Display Panel must be adjusted using a computer to allow lift truck operation. Refer to section Display Panel for SEM Controls, (Windows Version) 2200 YRM 942 for the adjustment procedure.

CAUTION

Correct meter polarity is necessary for some checks. Meter correct positive is indicated as (+). Meter correct negative is indicated as (−).

Use a meter with a minimum rating of 20,000 ohms per volt to make measurements. Most digital volt meters are good.

Check the operation of the switch for the optional seat brake by leaving the parking brake off, moving the key to the **ON** position, and getting off the seat. If alarm makes a noise, the switch is operating correctly.

This switch is located near the bottom of the linkage that operates the seat brake. See Figure 18. Make sure the seat brake linkage is correctly adjusted as described in the **Frame** section for your unit. Remove the cover over the linkage under the seat. Loosen the mount screws for the switch. Adjust the switch so the switch leaf is actuated each time the linkage lever contacts the battery compartment. Tighten the mount screws without moving the switch. Check that the switch operates correctly after the screws are tight. Install cover over the linkage.

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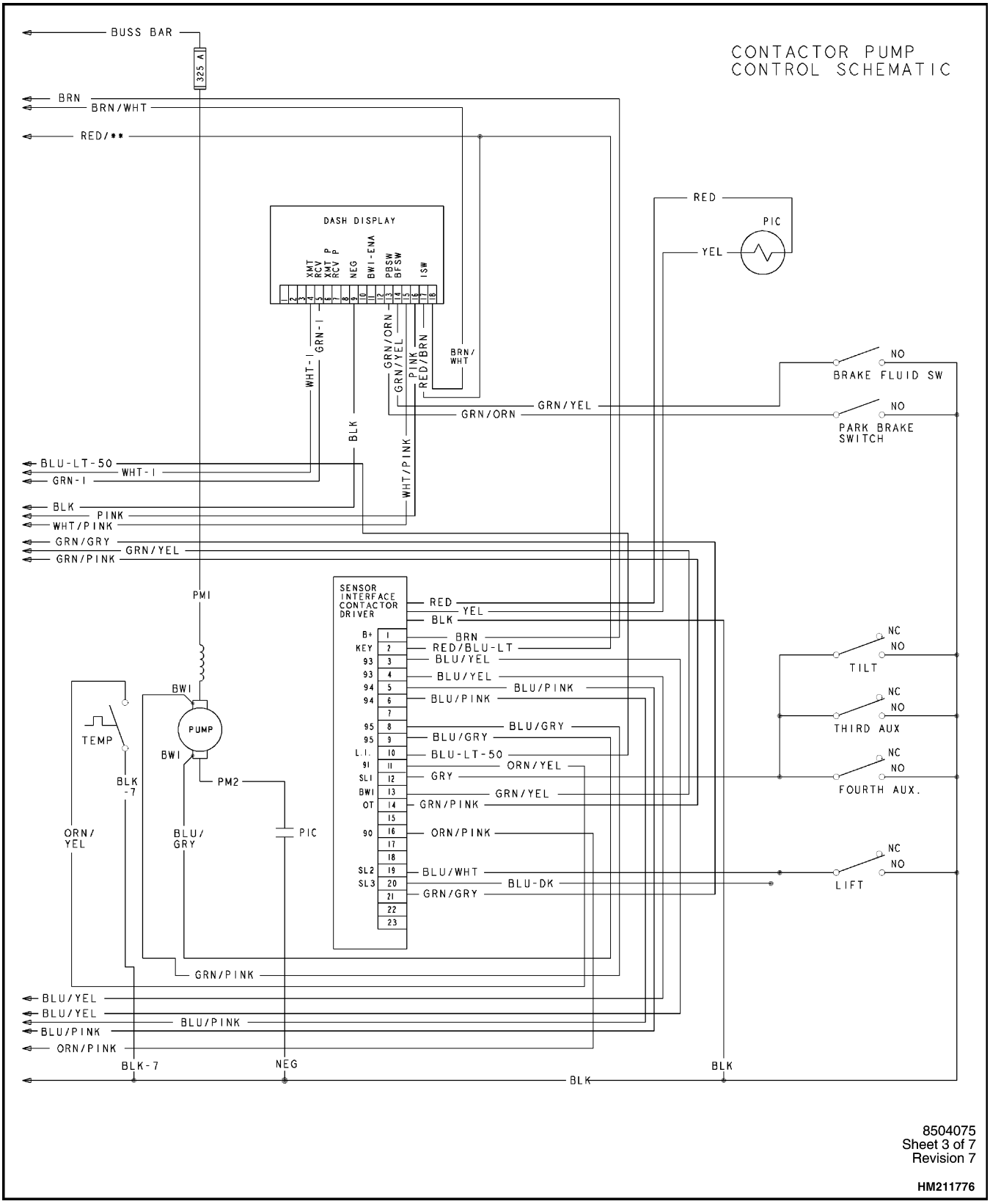

Figure 9. Contactor Control for Pump Motor ERC/P16-20AAF (ERC030-040AG/BG), ERC20-30AGF (ERC040-065RG/ZG) Schematic Diagram (Later Models)

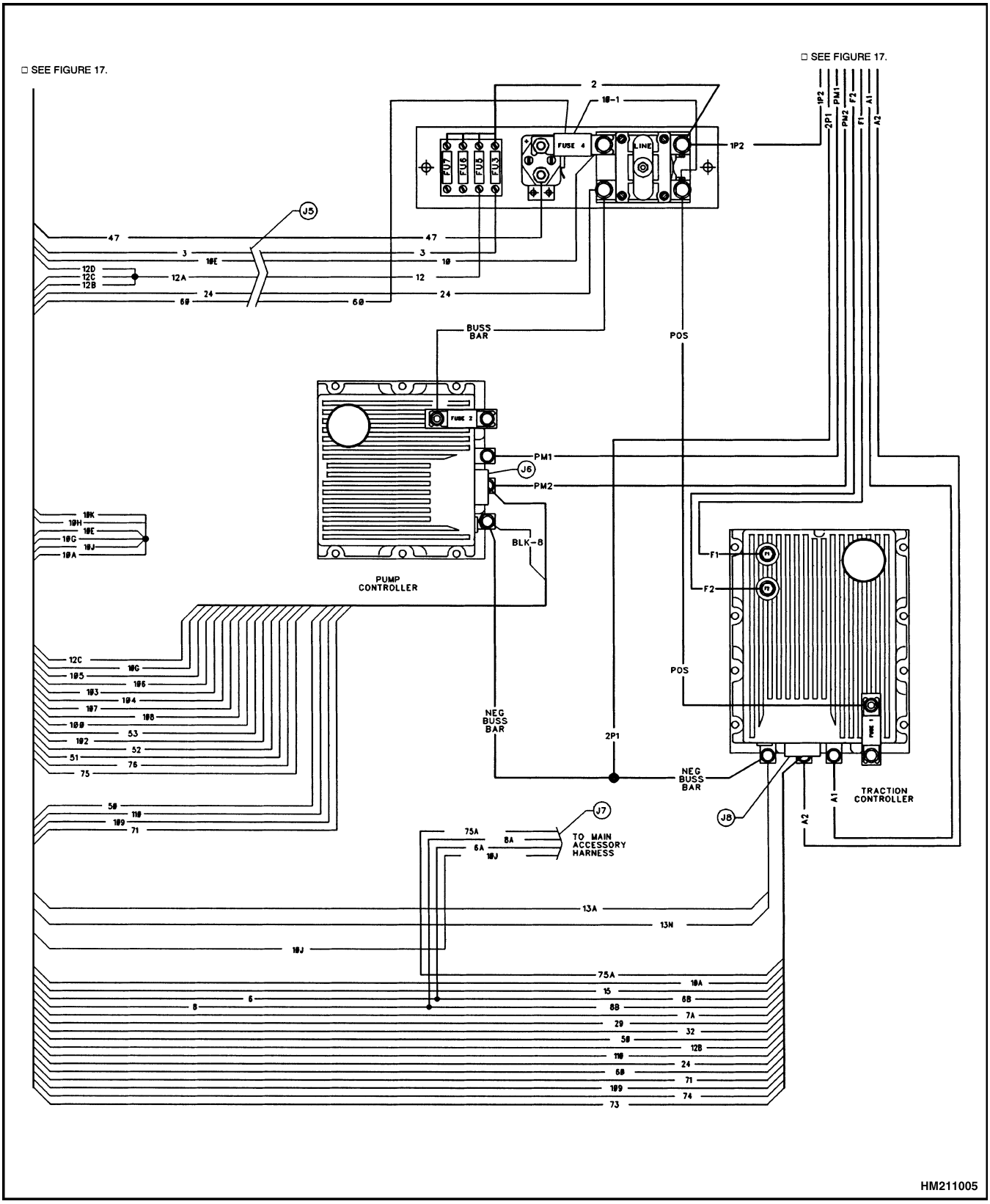

Figure 19. SR (SEM) and SP Motor Controllers ERP20-30ALF Wiring Diagram

Legend for Figure 25

1. BATTERY CONNECTOR
2. POWER CABLE PM1
3. POWER CABLE PM2
4. POWER CABLE POS
5. LIFT PUMP MOTOR
6. POWER CABLE A2
7. POWER CABLE F1
8. TRACTION MOTOR
9. POWER CABLE NEG
10. POWER CABLE A1
11. POWER CABLE F2

Legend for Figure 30

1. TO LIGHTS
2. COIL WIRES 10 AND 60
3. POWER STEERING CONTACTOR
4. POWER CABLE (TAN OR 47)
5. LINE CONTACTOR
6. POS (POSITIVE) POWER CABLE
7. POWER CABLE F1
8. POWER CABLE F2
9. TRACTION MOTOR CONTROLLER (SR)
10. PUMP MOTOR CONTROLLER (SP)
11. LIGHTS FUSE (15 AMP)
12. POWER CABLE PM1
13. POWER CABLE PM2
14. NEG (NEGATIVE) POWER CABLE
15. MAIN WIRE HARNESS, TRUCK
16. POWER CABLE A2
17. POWER CABLE A1

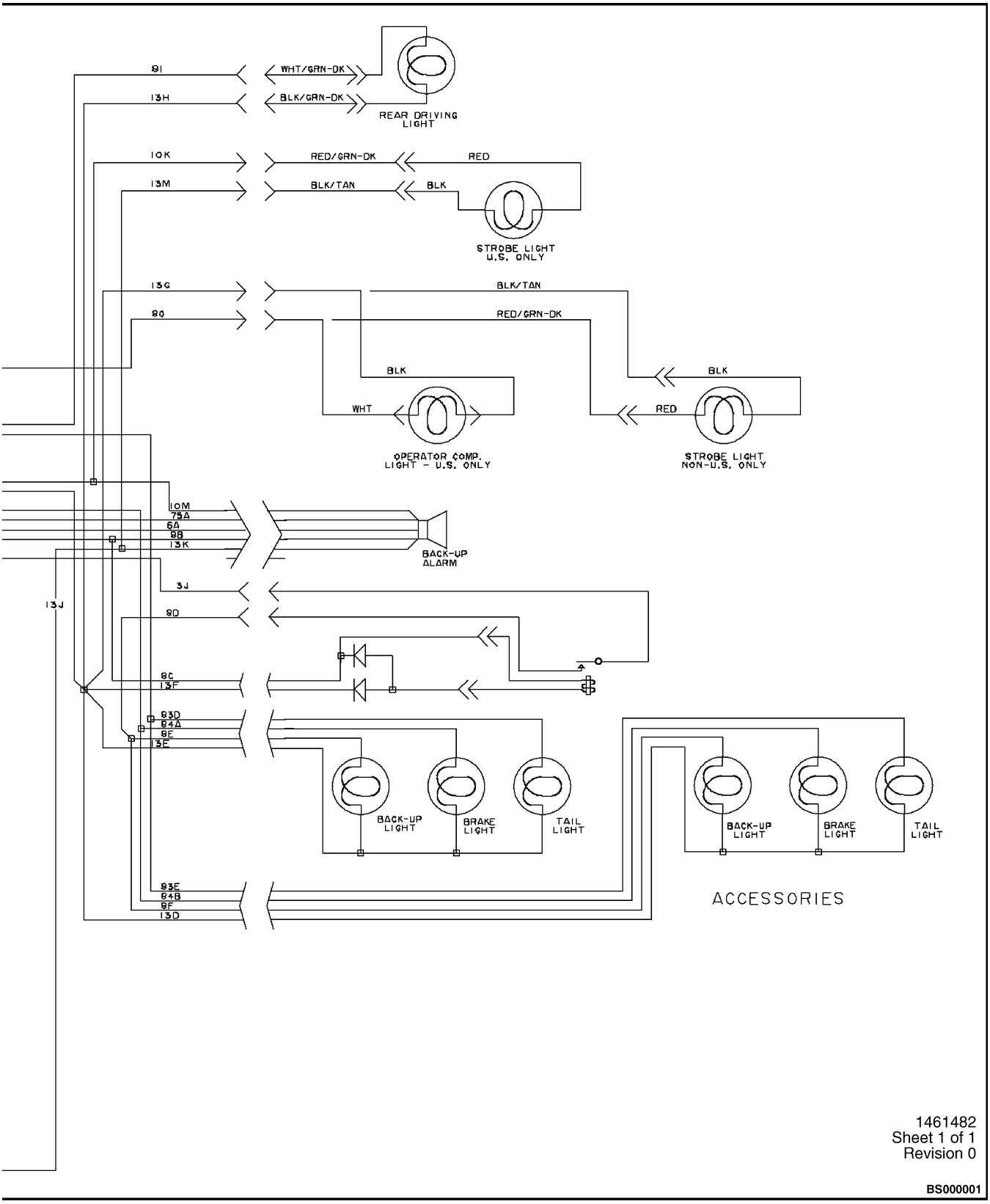

Figure 36. Lighting Schematic Diagram ERP20-30ALF