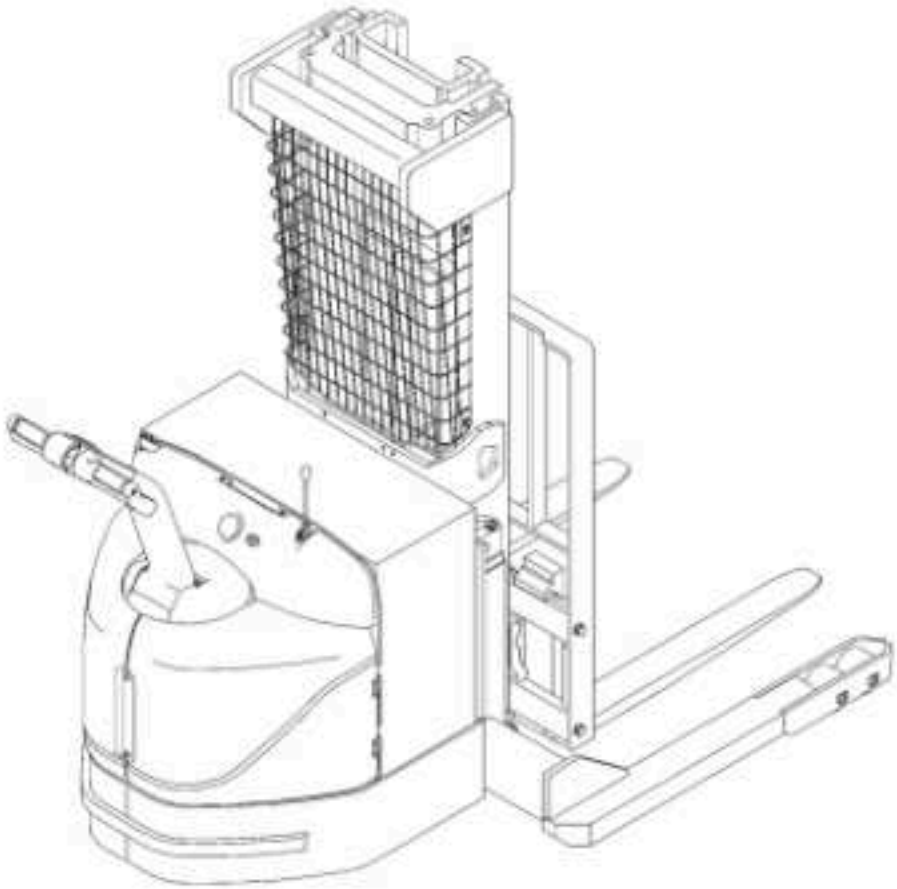
LINDE LIFT TRUCK CORP.
A MEMBER OF THE LINDE GROUP



EWS Service Manual

Electric Walkie Straddle Truck

160875

Contract 2803 September 2002

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ABBREVIATIONS

cc	cubic centimeter
cm	centimeter
cu in	cubic inches
fl oz	fluid ounces
ft	foot, feet
ft-lbs	foot-pounds
gal	gallon, gallons
in	inch, inches
in-lbs	inch-pounds
kg	kilogram, kilograms
kg/cm²	kilograms per square centimeter
kg-m	kilogram-meter
km	kilometer (100 meters)
kph	kilometer per hour
lb, lbs	pound, pounds
lbs/sq in	pounds per square inch
l	liter
m	meter, meters
mi	mile, miles
mm	millimeter (1/1000 of a meter)
mph	miles per hour
N-m	newton meters
oz	ounce, ounces
psi	pounds per square inch
qt	quart, quarts

CONVERSION TABLE

bar x 14.5	**psi**
cc x 0.0610	**cu in**
cc x 0.03519	**fl oz (imp)**
cc x 0.03381	**fl oz (US)**
cu in x 16.39	**cc**
fl oz (imp) x 28.41	**cc**
fl oz (US) x 29.57	**cc**
ft-lbs x 12	**in-lbs**
ft-lbs x 1.383	**kg-m**
ft-lbs x 1.355	**N-m**

CONVERSION TABLE *(continued)*

gal (imp) x 4.546	**liters**
gal (imp) x 1.201	**gallon (US)**
gal (US) x 3.7853	**liters**
gal (US) x 0.8326	**gallon (imp)**
grams x 0.03527	**oz**
in x 0.2540	**mm**
in x 2.54	**cm**
in-lbs x 0.0833	**ft-lb**
in-lbs x 0.1153	**kg-m**
kg x 2.2046	**lb**
kg x 35.274	**oz**
kg-m x 7.233	**ft-lb**
kg-m x 86.796	**in-lbs**
kg/cm 2 x 14.22	**psi**
km x 0.6214	**miles**
kPa x 6.8948	**psi**
lb x 0.4536	**kg**
lb x 4.445	**N**
lb/sq in x 0.1450	**kPa**
liter x 35.19	**fl oz (imp)**
liter x 33.81	**fl oz (US)**
liter x 2.113	**pint (US)**
liter x 0.8799	**quart (imp)**
liter x 1.0567	**quart (US)**
meter x 3.281	**feet**
meter x 1.094	**yards**
mile x 1.6093	**km**
mm x 0.03937	**inches**
N x 0.225	**lb**
N-m x 0.738	**ft-lb**
oz x 28.35	**gram**
psi x 0.1450	**kPa**
qt (imp) x 1.1365	**liters**
qt (imp) x 1.201	**quart (US)**
qt (US) x 0.9463	**liters**
qt (US) x 0.8326	**quart (imp)**
fl oz (US) x 1.04	**fl oz (imp)**

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UNIT EQUIVALENTS

LENGTH

mm	0.03937 in
cm	0.3937 in
meter	3.28 ft
kilometer	0.621 mile
inch	2.54 cm
foot	0.3048 meter
yard	0.9144 meter
mile	1.61 km

CAPACITY

liter	0.0353 cu ft
liter	0.2642 gallons (US)
liter	61.023 cu in
liter	2.202 lb of fresh water at 62°
liter	1000 cc
liter	35.19 fl oz (Imp)
liter	33-82 fl oz (US)
gal (US)	3.785 liters
gal (Imp)	4.546 liters
cu ft	28.32 liters
cu in	0.0164 liter
fl oz (US)	29.57 cc
fl oz (Imp)	28.41 cc

WEIGHT/FORCE

gram	15.432 grains
gram	0.0353 oz
kilogram	2.2046 lbs
kilogram	0.0011 ton (sht)
metric ton	1.1025 ton (sht)
grain	0.0648 gram
lb	0.454 kg
N	0.225 lb
oz	28.35 gram
ton (sht)	907.18 kg
ton (sht)	0.907 metric ton
ton (sht)	2000 lb

AREA

sq cm	0.1 550 sq in
sq m	10.76 sq ft
sq in	6.45 sq cm
sq ft	0.0929 sq m

VOLUME

cu cm	0.061 cu in
cu m	35.315 cu ft
cu in	16.38 cu cm
cu ft	0.028 cu m

PRESSURE

1 bar	14.5 psi
kilo pascal	0.1450377 lbs per sq in
lb per sq in	6.894757 kilo pascal
kg per sq cm	0.96784 standard atmosphere
standard atmosphere	1.033228 kg per sq cm
standard atmosphere	4.6959 lbs per sq in

TEMPERATURE

°C x 1.8 + 32	**°F**
°F - 32 x 0.555	**°C**

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Drive Motor Controller Maintenance (24-volt)

The drive motor controller is generally maintenance free. It is recommended, however, that the following items be checked as required during the normal preventive maintenance of the truck:

⚠ WARNING:

BEFORE DOING ANY WORK ON THE VEHICLE, DISCONNECT THE BATTERY. THE CAPACITORS IN THE CONTROLLER WILL CONTINUE TO POWER THE ELECTRICAL SYSTEM FOR A FEW MINUTES AFTER THE BATTERY IS DISCONNECTED. CAPACITORS SHOULD BE DISCHARGED BY CONNECTING A 200OHM, 2 WATT RESISTOR ACROSS THE B+ AND B- CONTROLLER TERMINAL BARS. THE CONTROLLER SHOULD NOT BE SERVICED UNTIL ITS CAPACITORS ARE COMPLETELY DISCHARGED OR ARCING AND POSSIBLE INJURY OR DAMAGE COULD RESULT.

- The controller unit and its connections should be free of dirt, grease, paint or liquids. Clean, dry, low pressure air should be used to remove any build up of dust on the controller. If the controller requires more thorough cleaning, to remove grease or oil for example, it may be cleaned with a mild solution of detergent or denatured alcohol.

⚠ CAUTION:

NEVER STEAM CLEAN THE CONTROLLER OR WIRING.

If these liquids are used for cleaning, dry the controller with clean, dry, low pressure air.

⚠ CAUTION:

DO NOT ATTEMPT TO OPERATE THE CONTROLLER UNLESS IT AND ALL CONNECTIONS ARE THOROUGHLY DRY.

- The line contactor should be inspected every 160 hours for proper operation and tip condition.
- Ensure that the electrical connections to the controller (as well as those to the motor, switches, etc.) are tight.

⚠ CAUTION:

ALWAYS USE INSULATED WRENCHES. WHEN CHECKING THE CONTROLLER BUS BAR CONNECTIONS FOR TIGHTNESS, BE SURE TO USE THE DOUBLE WRENCH TECHNIQUE (ONE WRENCH ON THE BOLT HEAD AND THE OTHER ON THE HEX NUT) TO AVOID PUTTING STRESS ON THE BUS BARS. TOO MUCH STRESS COULD CRACK THE SEAL AROUND THE BUS BAR.

- Ensure correct operation of the potentiometer in the accelerator switch assembly. Inspect the linkage between the hand grip and the accelerator switch assembly. Clean as necessary and verify proper actuation with no binding.

⚠ CAUTION:

ALWAYS REMOVE THE CONTROLLER IF ANY WELDING MUST BE PERFORMED ON THE TRUCK.

Drive Motor Controller Replacement

If a new controller is being installed, it should not require adjustment of any parameters as all new controllers are supplied with correct settings.

- Disconnect the battery.
- Discharge the internal drive motor controller capacitors by connecting a 200 ohm, 2 watt resistor across the B+ and B- bars.
- Disconnect the dash display wiring connector (PY) (if equipped with dash display) and the wiring harness connector (PL2) at the controller.
- Disconnect the motor and supply cables at the controller terminal bars.
- Remove the mounting screws and the controller.
- Reinstall the controller in the reverse order of removal after applying a thin layer of heat transfer compound (Dow Corning 340 or equivalent) between the controller and the truck chassis. Apply anti-fretting compound to the display and wiring harness connectors as per page 06-28.
- If the truck is equipped with an optional anticorrosion, washdown, or cold storage package, spray the controller faces and cable connections with conformal coating (Techspray Fine-L-Kote® or equivalent).

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Drive Motor Controller Troubleshooting (24-Volt) *(Continued)*

Fault Code Storage and Retrieval

When a fault occurs, the status code that it generates is stored in the controller program. The program will store 16 fault codes. The 17th fault code will be written over the first fault code. This process will continue to occur so that any subsequent fault code will be rewritten over the oldest fault code in the 16 position loop.

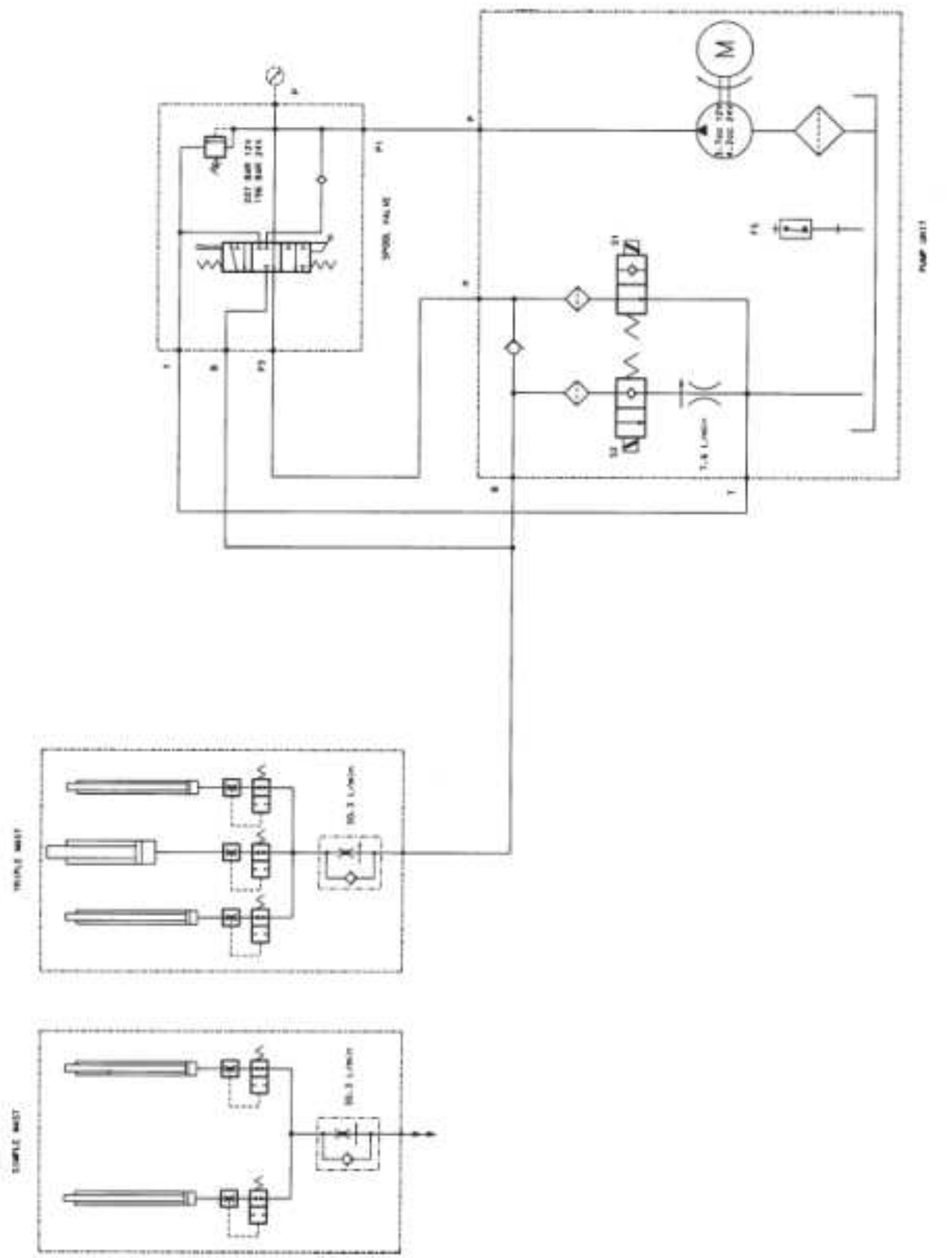
When using the handset to access fault codes, the code in the first position of the program will be displayed first. This code will not necessarily be the most recent fault code to have occurred. The handset can be used to scroll through all 16 fault code positions to get to the most recent one. The scrolling procedure below includes the display of the battery charge state and hourmeter reading at the time of each fault. This information can be used to scroll to the most recent fault code (or another desired fault code).

Alternately, the handset can be used to access function 28 from the setup mode before trying to access any fault codes. Function 28 displays a number corresponding to the position of the most recent fault code in the 16 position loop. The numbers that get displayed in function 28 can range from 18 to 48 (even numbers only). The number 18 corresponds to position 1, 20 to position 2, 22 to position 3, etc. See Drive Motor Controller Program for information on entering the setup mode of the handset. Once you know which position the most recent fault code is in, you can rapidly scroll to it by keeping count of the codes as you scroll through them without reading the hourmeter display for each code.

Follow the procedure below to use the handset to scroll through the fault codes stored in the program. Handset keys need to be pressed and held for about one second to ensure proper input.

- Turn the key switch off.
- Disconnect the dash display cable (if equipped) from the PY socket on the controller face and plug the handset cable into socket PY.
- Press the ESC and CONT keys at the same time. The two digit fault code stored in position 1 will appear in the display.
- Press the CONT key. The battery state of charge (in percent) at the time of the fault will appear in the display.
- Press the CONT key again. The hourmeter reading at the time of the fault will appear in the display.
- Press the CONT key again to display the next fault code. Use the CONT key as in the previous two steps to access the battery charge state and hourmeter reading at the time of fault occurrence. (Any of these values may be erased by pressing the ESC key.) Every third press of the CONT key will display the next fault code. After the sixteenth fault code, the screen will be blank. To scroll through the loop again, press ESC and CONT simultaneously. It is not possible to back up in the loop. To see a fault code again, one must scroll to the sixteenth position and start over.

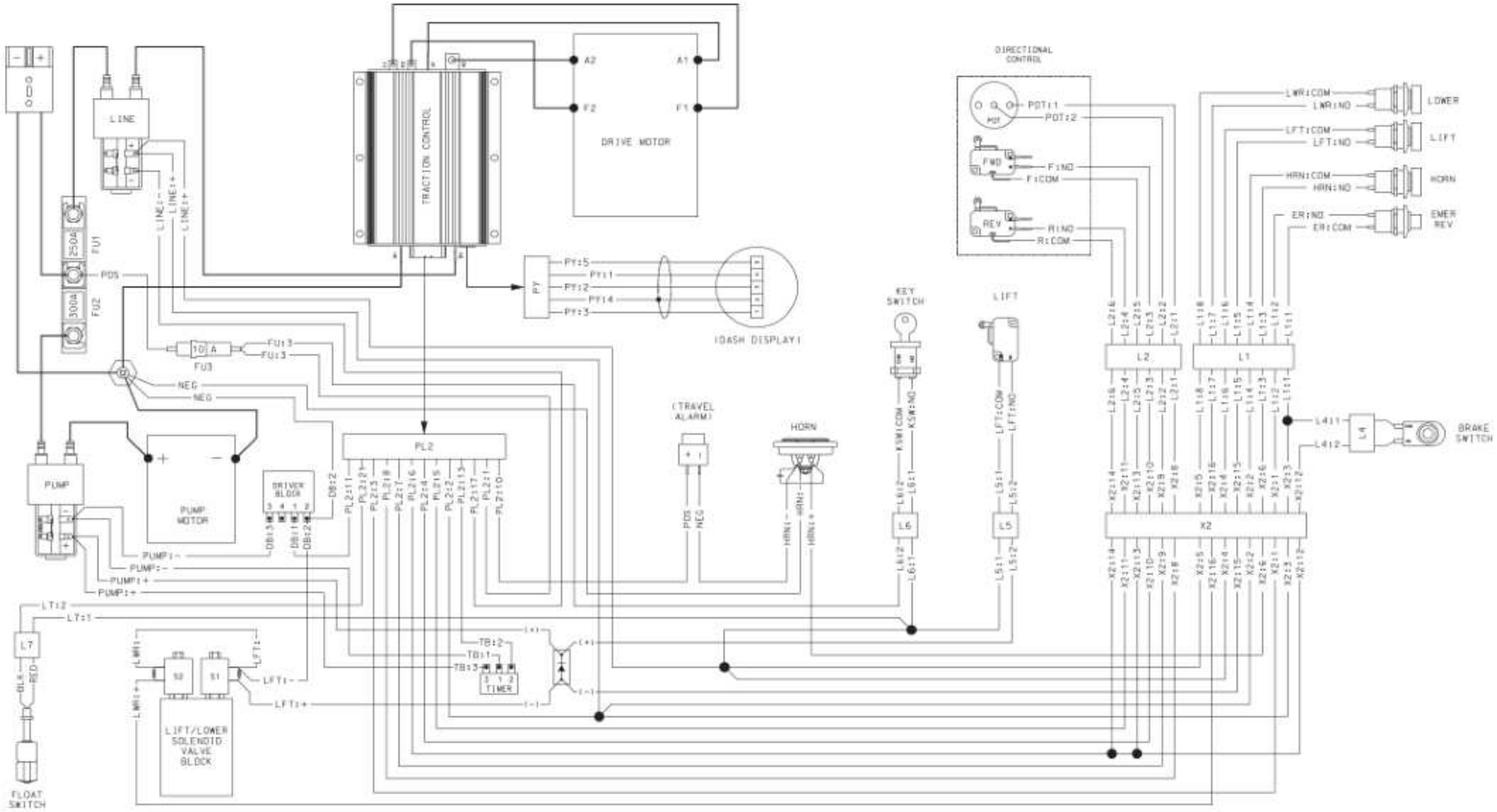
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Hydraulic Schematic

07

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24-VOLT EWS WIRING DIAGRAM

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Optional equipment is shown in parentheses

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