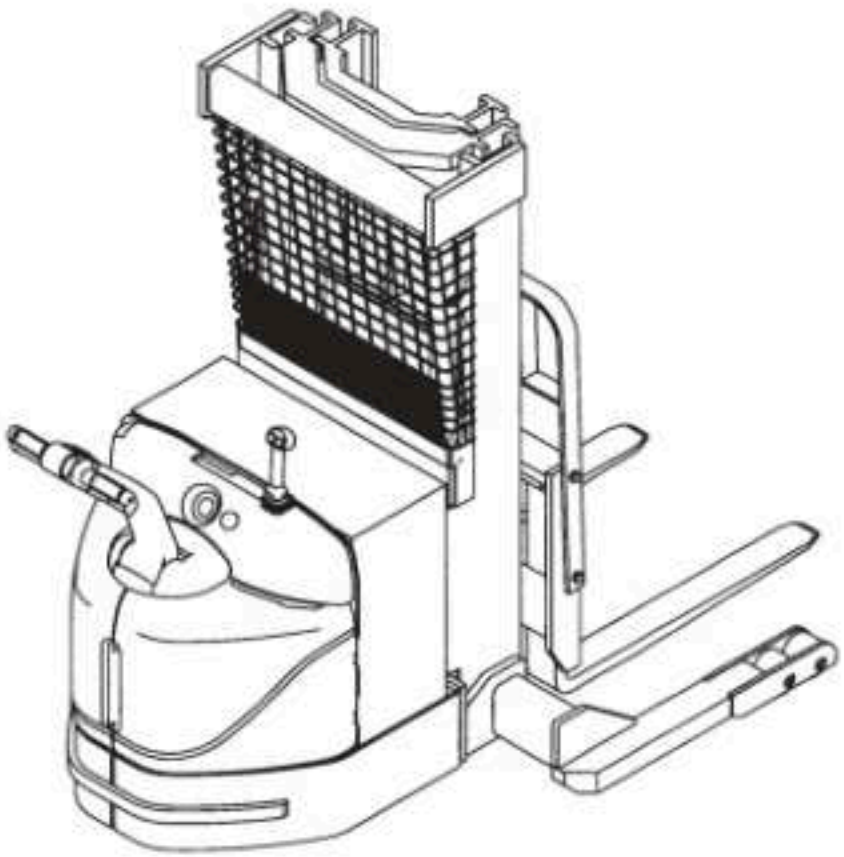
LINDE LIFT TRUCK CORP.
A MEMBER OF THE LINDE GROUP



EWX Service Manual

Electric Powered Walkie Reach Truck

160543

Contract 2737 July 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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Fault Code Descriptions *(Continued)*

51 Indicates incomplete precharge of controller internal capacitor during start-up sequence. This fault code is generated if capacitor voltage fails to exceed 85 percent of battery voltage when the key switch is turned on. The controller will not energize the line contactor when this condition is detected. Check for short circuit conditions between the armature and field circuits of the motor and between each of these circuits and the vehicle frame. Also check the fuse FU3 and the wiring in the circuit to PL2:1. Full battery voltage should be available at PL2:1. If these conditions are satisfactory and the fault persists, the controller is defective and must be replaced.

57 Indicates low armature current during operation. This could be caused by an open condition or abnormally high resistance in the armature circuit. It could also be caused by failure of internal controller transistors. Check armature cables for tightness at all connections. Disconnect the armature cables at the controller and check the armature circuit resistance across them. If an open circuit or high resistance is detected, trace and correct the problem. If the armature circuit is intact and conductive and the fault remains, then the controller is probably defective.

64 Indicates a problem with the line contactor circuit has been detected during the start-up sequence. This fault code will be generated if the voltage available at PL2:17 is less than 12 percent of battery voltage. This will occur if the line contactor or its circuit wiring contains an open condition. Disconnect the battery and PL2, reconnect the battery and check voltage at PL2:17 with the key switch on. Full battery voltage should be available. If not, the line contactor coil or its circuit wiring is open and must be repaired/replaced. If full battery voltage is available at PL2:17, and the fault persists, then the line contactor driver transistor in the controller is defective and the controller must be replaced.

65 Indicates a short in the line contactor circuit. This fault code is generated if the current in the line contactor circuit ever exceeds a built in limit. If this occurs, the contactor will drop out and the code will be displayed. Check the line contactor coil and circuit wiring to PL2:17 for short circuits. If the circuit resistance is correct and cycling the key switch does not clear the fault, then the controller is defective and must be replaced.

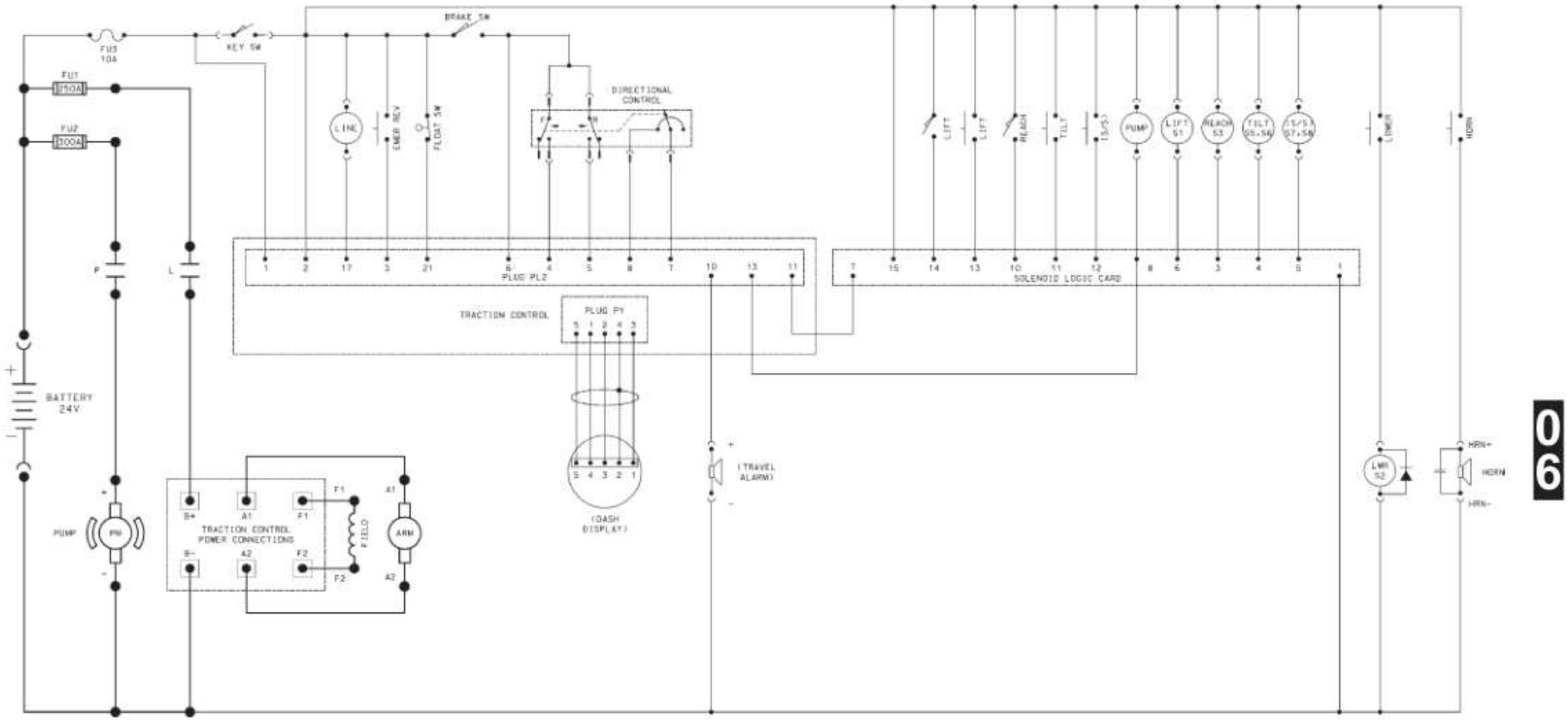
66 Indicates excessive field current. This fault code is displayed if the field current exceeds the current limit of the field transistors in the controller. Usually this is the result of field terminals or cables shorted to each other or battery positive or battery negative. Check the motor field circuit for proper isolation and correct any problems. If the field circuit is adequately isolated and the fault persists, the controller is defective and must be replaced.

76 Indicates overvoltage at internal capacitor during regenerative braking. This fault will cause the line contactor to drop out or chatter and trigger the fault code if the voltage at the capacitor (controller positive and negative terminals) reaches 50 volts during regenerative braking. The fault is usually intermittent and can be cleared by cycling the key switch. Abnormal resistance in the controller power supply circuit due to poor connections or a failing power fuse FU1 is usually the cause. Check the battery plug and main fuse FU1 connections. Ensure that line contactor tips are not bouncing open due to vehicle operation over a bumpy floor surface.

77 Indicates incorrect motor current polarity during regenerative braking. This fault code is displayed if the armature current sensor in the controller detects incorrect polarity during regenerative braking. When regenerative braking is occurring, the normal current direction should reverse. If this fails to happen, (due to a damaged semiconductor in the controller), the current sensor will detect current in the "motoring" direction (i.e. wrong polarity) and the line contactor will drop out. This fault usually indicates a defective controller.

99 Indicates that the time interval set for maintenance has expired. The time value to trigger this code is set at 9999 hours at the factory and so should not occur during the lifetime of the truck. If this does occur, values for functions 18 or 19 in the controller program have probably been altered. Check these functions and ensure that their values are set according to the table on pages 06-14 and 15.

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EWX WIRING SCHEMATIC

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Optional equipment is shown in parentheses

This schematic depicts truck in static position with forks fully lowered.

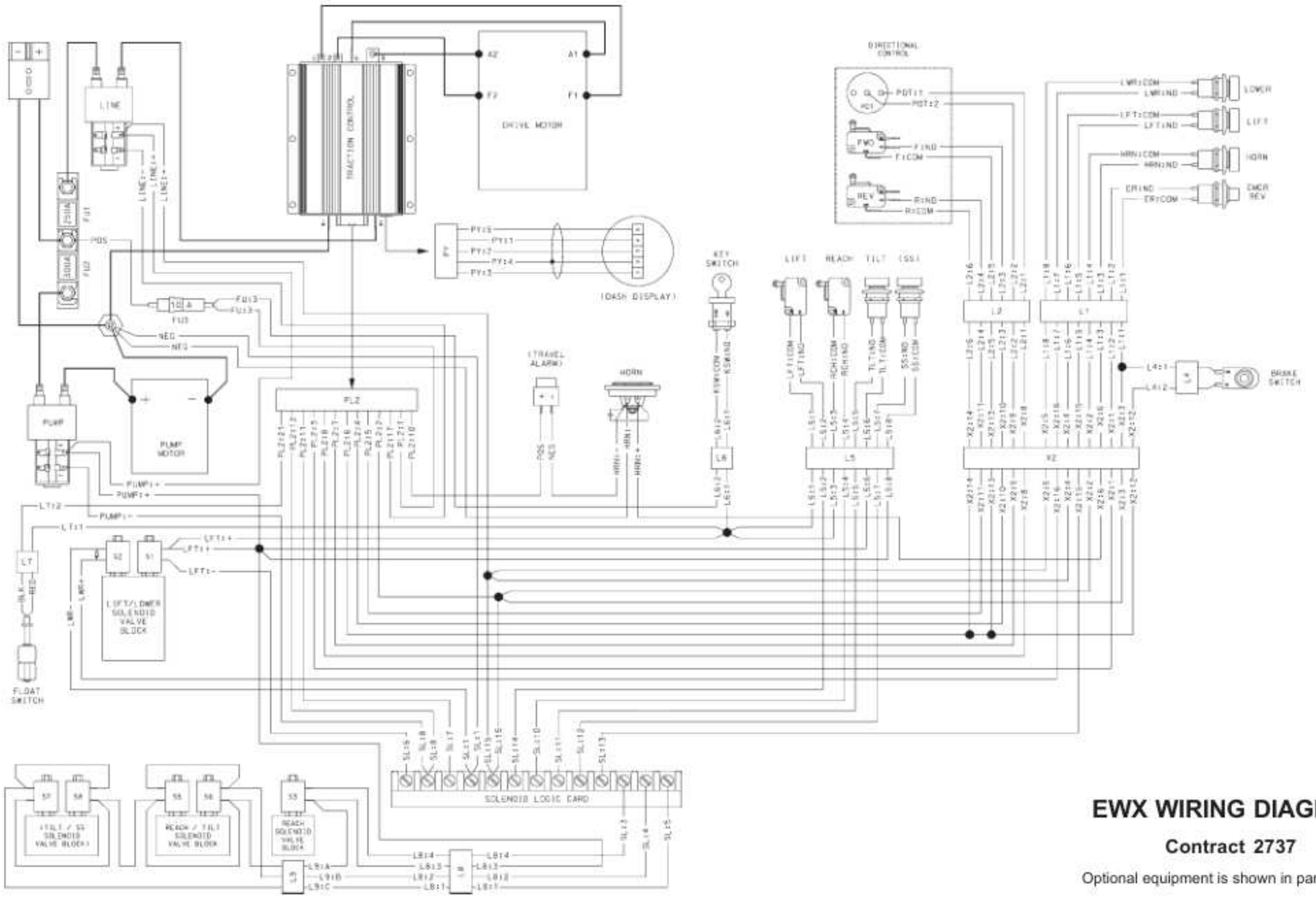
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SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Truck travels in reverse but not forward (see additional troubleshooting information in section 06)	Defective forward switch	Replace forward switch.
	Defective controller	Replace controller
	Misadjusted or broken hand grip mechanism	Repair or replace hand grip mechanism
Truck will not attain high speed when hand grip is fully rotated	Low battery charge	Recharge or replace battery.
	Loose or broken electrical connection between - - key switch and float switch - float switch and controller	Locate and repair loose or broken connection.
	Defective float switch	Repair or replace float switch.

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EWX WIRING DIAGRAM

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