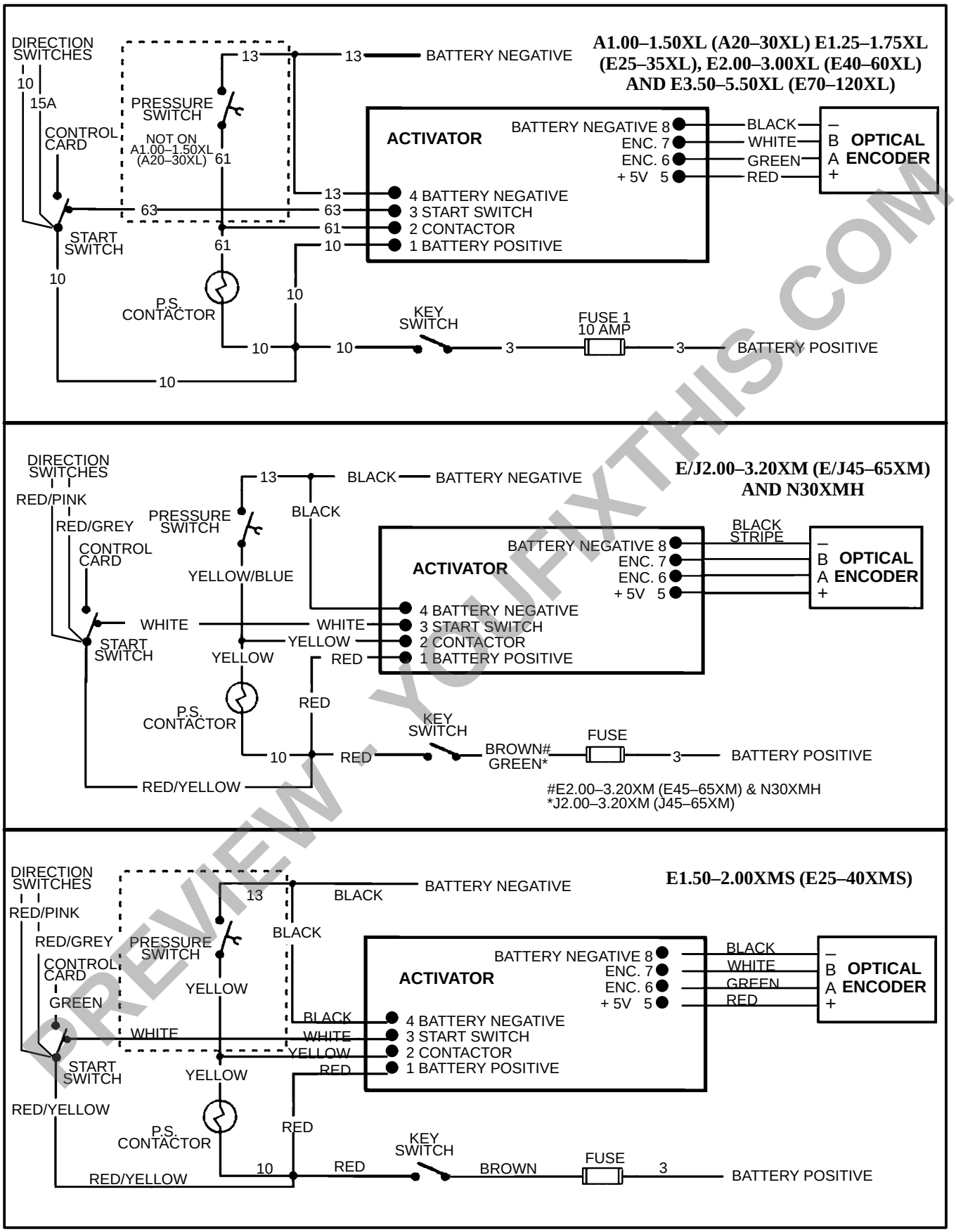
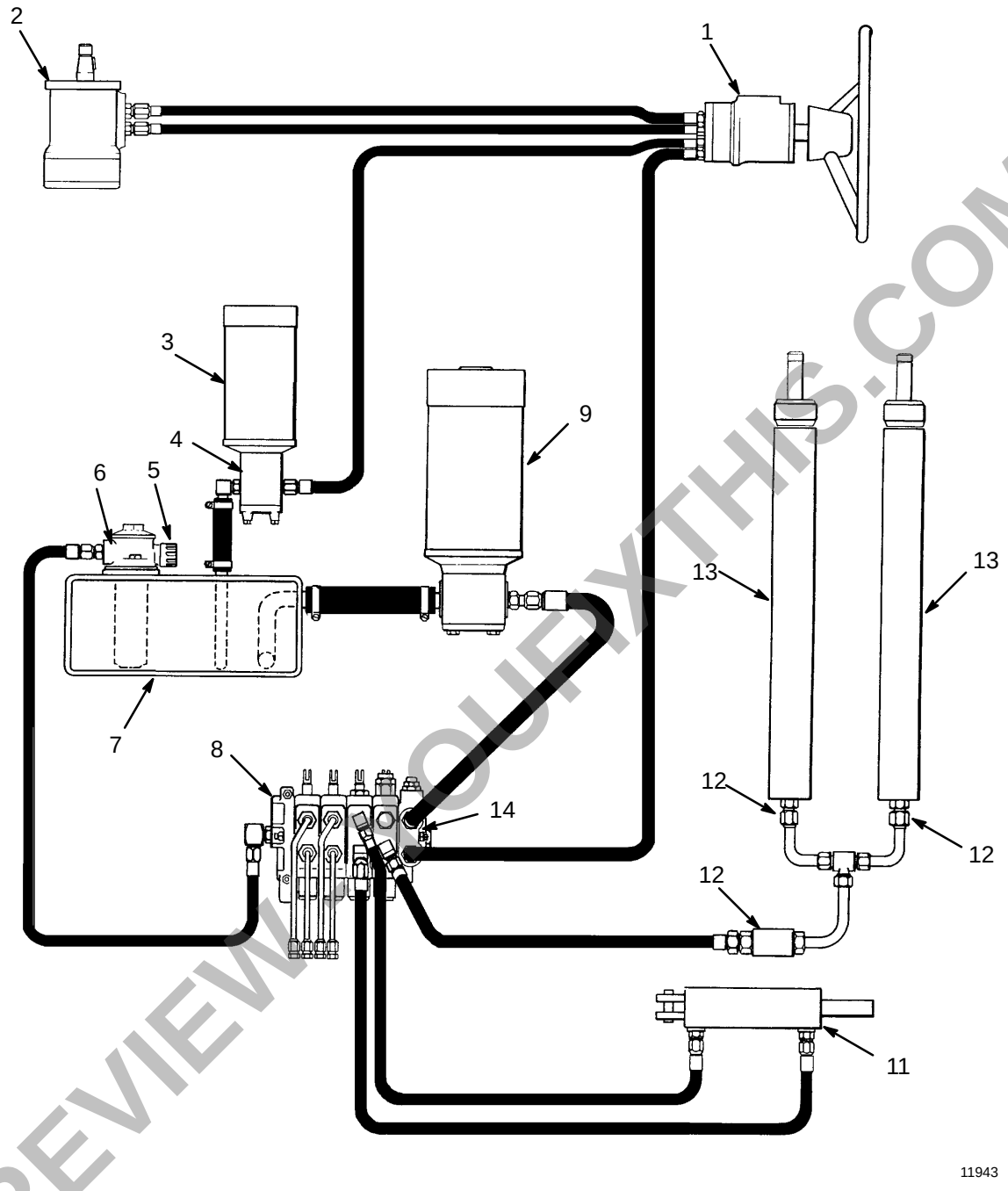


FIGURE 16. OPTICAL ENCODER AND ACTIVATOR CIRCUITS

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1. STEERING CONTROL UNIT
2. MOTOR, HYDRAULIC STEERING
3. MOTOR, STEERING PUMP
4. STEERING PUMP
5. BREATHER
6. FILTER
7. HYDRAULIC TANK
8. CONTROL VALVE
9. HYDRAULIC MOTOR
10. HYDRAULIC PUMP
11. TILT CYLINDER
12. LOWERING CONTROL VALVE
13. LIFT CYLINDER
14. TEST PORT

FIGURE 1. HYDRAULIC SYSTEM DIAGRAM

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TABLE 5. TORQUE VALUES FOR INCH FASTENERS*

SIZE AND PITCH		GRADE 2[1]		GRADE 5[2]		GRADE 8[3]	
		lb_f ft	Nm	lb_f ft	Nm	lb_f ft	Nm
1/4	20 UNC	4	6	6	9	9	12
1/4	28 UNF	5	6	7	10	10	14
5/16	18 UNC	8	11	13	18	18	25
5/16	24 UNF	9	13	14	20	20	28
3/8	16 UNC	15	20	23	31	33	44
3/8	24 UNF	17	23	26	36	37	50
7/16	14 UNC	24	33	37	50	52	71
7/16	20 UNF	27	36	41	56	58	79
1/2	13 UNC	37	50	57	77	80	110
1/2	20 UNF	41	56	64	86	90	120
9/16	12 UNC	53	72	82	110	115	155
9/16	18 UNC	59	80	91	125	130	175
5/8	11 UNC	73	99	115	155	160	215
5/8	18 UNF	83	110	130	175	180	245
3/4	10 UNC	130	175	200	270	280	380
3/4	16 UNF	145	195	225	300	315	425
7/8	9 UNC	125	170	320	435	455	615
7/8	14 UNF	140	185	355	480	500	680
1	8 UNC	185	255	485	655	680	925
1	14 UNF	210	285	540	735	765	1.040
1–1/8	7 UNC	265	360	595	805	965	1,310
1–1/8	12 UNF	300	405	670	905	1,080	1,470
1–1/4	7 UNC	375	510	840	1,140	1,360	1,850
1–1/4	12 UNF	415	565	930	1,260	1,500	2,050
1–3/8	6 UNC	490	665	1,100	1,490	1,780	2,420
1–3/8	12 UNF	560	760	1,250	1,700	2,040	2,760
1–1/2	6 UNC	650	885	1,460	1,980	2,370	3,210
1–1/2	12 UNF	735	995	1,650	2,230	2,670	3,620

* Unless otherwise specified

[1] Approximately equal to metric Property Class 5.8

[2] Approximately equal to metric Property Class 8.8

[3] Approximately equal to metric Property Class 10.9

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OVERHEAD GUARD

⚠ WARNING

The overhead guard is part of the operator protection system. Do not operate the lift truck without the overhead guard correctly fastened to the lift truck.

Removal

1. Remove the battery as described in the section **PERIODIC MAINTENANCE, 8000 SRM 370.**

2. Remove the two capscrews that hold the rear supports of the overhead guard to the counterweight. Slots on either side of the counterweight permit access to the nuts and washers.

3. Remove the two capscrews that hold the two front supports of the overhead guard to the cowl.

4. Use a lifting device or have another person give assistance to lift the overhead guard from the lift truck.

Installation

1. Use a lifting device or have another person give assistance to lift the overhead guard on the lift truck.

2. Install and tighten the four capscrews, washers and nuts that hold the overhead guard to the lift truck. Tighten the capscrews to 66 N.m (48 lbf ft).

3. Install the battery as described in the section **PERIODIC MAINTENANCE, 8000 SRM 370.**

HOOD AND SEAT ASSEMBLY (See FIGURE 3.)

The hood is a cover for the battery, electronic controller, traction motor, and is a battery restraint. The function of the battery restraint, when the hood is correctly locked to the frame, is to hold the battery in the battery compartment if an accident causes the lift truck to tip over. A sliding latch mechanism on the front of the hood locks the hood to the frame for lift truck operation. (See FIGURE 2.) The sliding latch unlocks the hood from the frame so that the hood can be raised to the open position for access to the battery.

The latch mechanism must operate correctly before the lift truck can be operated. The latch must not be worn and must fully engage the frame. The hood must be locked in the closed position when the lift truck is operated. If the latch mechanism does not lock the hood in the closed position, do not operate the lift truck.

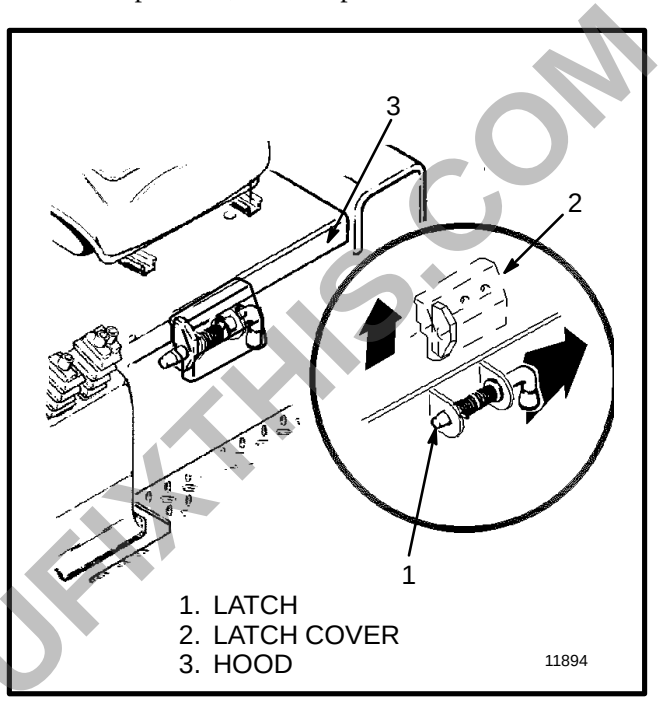


FIGURE 2. LATCH, BATTERY RESTRAINT

The latch at the front of the hood fastens the hood to the frame and two hinges at the back of the hood fasten the hood to the counterweight. A gas controlled spring holds the hood in the open position. A handle to disconnect the battery is fastened to the hood at the right side of the seat assembly. This handle is an emergency disconnect that permits the operator to quickly disconnect the battery while on the seat of the lift truck. The hood must be opened to connect the battery again.

The hood, seat belt, hip restraint brackets, seat and seat mount are all parts of the operator restraint system. Checks and adjustments for the operator restraint system are described in the **OPERATING MANUAL, Part No. 897206,** and the section **PERIODIC MAINTENANCE, 8000 SRM 370.**

NOTE: An Operator Restraint System is available for installation on all models of this series of lift trucks. If your lift truck does not have Operator Restraint a kit is available at **NO CHARGE**. Contact your dealer for Hyster lift trucks for information. Hyster Company strongly recommends that all trucks be equipped with an Operator Restraint System.

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springs are pushing on each brush. Install and tighten the screws for the brush wires and bus connectors.

8. Carefully install the brush covers so that sparks are kept inside the motor housing. Install the battery as described in the **OPERATING MANUAL** or the SRM section PERIODIC MAINTENANCE for your lift truck.

Steering Pump Motor

1. Disconnect the battery connector. Remove the floorplate from the lift truck for access to the steering pump motor. Open the hood for access to the motor on J2.00–3.20XM (J40–65XM) trucks. Remove the screws that hold the two brush cover plates to the motor housing.

2. Inspect the brushes and commutator as described in the previous paragraphs for the traction and hydraulic pump motors. The brush replacement procedure is also the same, although there are only two brushes for the steering pump motor.

3. Install the brush covers and screws. Install the floorplate or close the hood and connect the battery connector.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	PROCEDURE OR ACTION
Heavy streaks and fine grooves (See FIGURE 6.)	Operation in a dirty or abrasive environment Continuous operation of motor with a light load Brush pressure is too low Worn brushes	Clean commutator more frequently Increase load on motor from time to time Increase brush pressure Replace brushes
Grooves and lines following heavy streaks. The armature must be replaced or the brushes will wear rapidly. (See FIGURE 7.)	Operation in a dirty or abrasive environment Continuous operation of motor with a light load Brush pressure is too low Worn brushes	Clean commutator more frequently Increase load on motor from time to time Increase brush pressure Replace brushes
Grooves the width of the brushes (See FIGURE 8.)	Operation in a dirty or abrasive environment Wrong type of brushes for this motor and operation Brush pressure is too high	Clean commutator more frequently Replace brushes with correct type Adjust brush pressure
Copper drag occurs when copper from the commutator is pulled into the slot between the commutator bars. This problem will cause a short circuit between the commutator bars. (See FIGURE 9.)	Operation in a dirty or abrasive environment Brush holder is not correctly adjusted electrically for the motor Wrong type of brushes for this motor and operation Brush pressure is incorrect (too high or too low)	Clean commutator more frequently Adjust brush holder Replace brushes with correct type Adjust brush pressure
Electrical burns on commutator bars on opposite sides of the commutator. (See FIGURE 10.)	Open armature winding Motor has been stalled	Replace armature Use correct operating techniques

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TABLE 1. MAINTENANCE SCHEDULE (Item No. Reference FIGURE 2.)

ITEM NO.	ITEM	8 Hr./ 2 mo.	350 Hr./ 2 mo.	2000 Hr./ 1 yr.	PROCEDURE or QUANTITY	SPECIFICATION
1	HYDRAULIC OIL (TANK) (TOTAL SYSTEM) OIL LEAKS	X X		C	11.0 litre (11.6 qt) 13.0 litre (13.7 qt) Check for Leaks	SAE 10W(–18°C–38°C) (10°F–100°F) API CC or CC/SE
2	BATTERY RESTRAINT LATCH	X[1] X			Check Electrolyte Level Check Operation	
3	WHEELS AND TIRES AIR PRESSURE	X X			Check Condition Check Pressure	See Nameplate
4	FORKS	X			Check Condition	
5	LIFT CHAINS	X			Check Condition	
6	MAST	X			Check Operation	
	GAUGES, HORN, LIGHTS, AND ALARMS	X			Check Operation	
8	SEAT BELT AND RAILS	X			Check Condition	
	OPERATION OF ELEC-TRONIC CONTROLLER	X			Check Operation	
	STEERING	X			Check Operation	
7	SERVICE BRAKES	X		X	Check Operation Check Brake Lining	See Parts Manual
15	PARKING BRAKE ADJUSTMENT	X	L X		Check Operation Check Adjustment	Silicone Lubricant on Linkage
	BRAKE FLUID		X		0.25 litre (0.26 qt)	SAE J–1703 Brake Fluid
9	HYDRAULIC TANK BREATHER		X		Clean 1	See Parts Manual
10	M.D.U. (SPETH) UPPER GEAR CASE LOWER GEAR CASE M.D.U. (HURTH)		X	C	 1.25 litre (1.3qt) 0.45 litre (0.48 qt) 4.2 litre (4.4 qt)	SAE 80W–90 MIL–L–2105B, AGL–5
11 6 5	MAST SLIDING SURFACES LIFT CHAINS		 L L			 Multi–Purpose Grease[2] Engine Oil, 20W–20
12	CONTACTORS		X		Check Condition	
13	MOTOR BRUSHES		X		Check Condition	
	HOOD HINGES AND LATCHES		L		As Necessary	Multi–Purpose Grease[2] Silicone Lubricant on Linkage
3	WHEEL NUT TORQUE		X			155 N.m (115 lbf ft) (Speth MDU) 140 N.m (103 lbf ft) (Hurth MDU)
	SAFETY LABELS		X		Replace as Necessary	See Parts Manual
1	HYDRAULIC FILTER			C	1	See Parts Manual
14	STEERING CHAIN[3]			L	As Necessary	Multi–Purpose Grease[2]
8	SEAT RAILS			L	As Necessary	Multi–Purpose Grease[2]

X = Check L = Lubricate C = Change

NOTES:
1. Equalization charge approximately each month but not more than each week.
2. Multi–Purpose grease with 4% Molybdenum Disulphide.
3. Check the steering chain adjustment on new lift trucks after the first 100 hours.
Change the filters on new lift trucks after the first 100 hours. Never use steam to clean the parts of the electrical system. See the SERVICE MANUAL for detailed information.

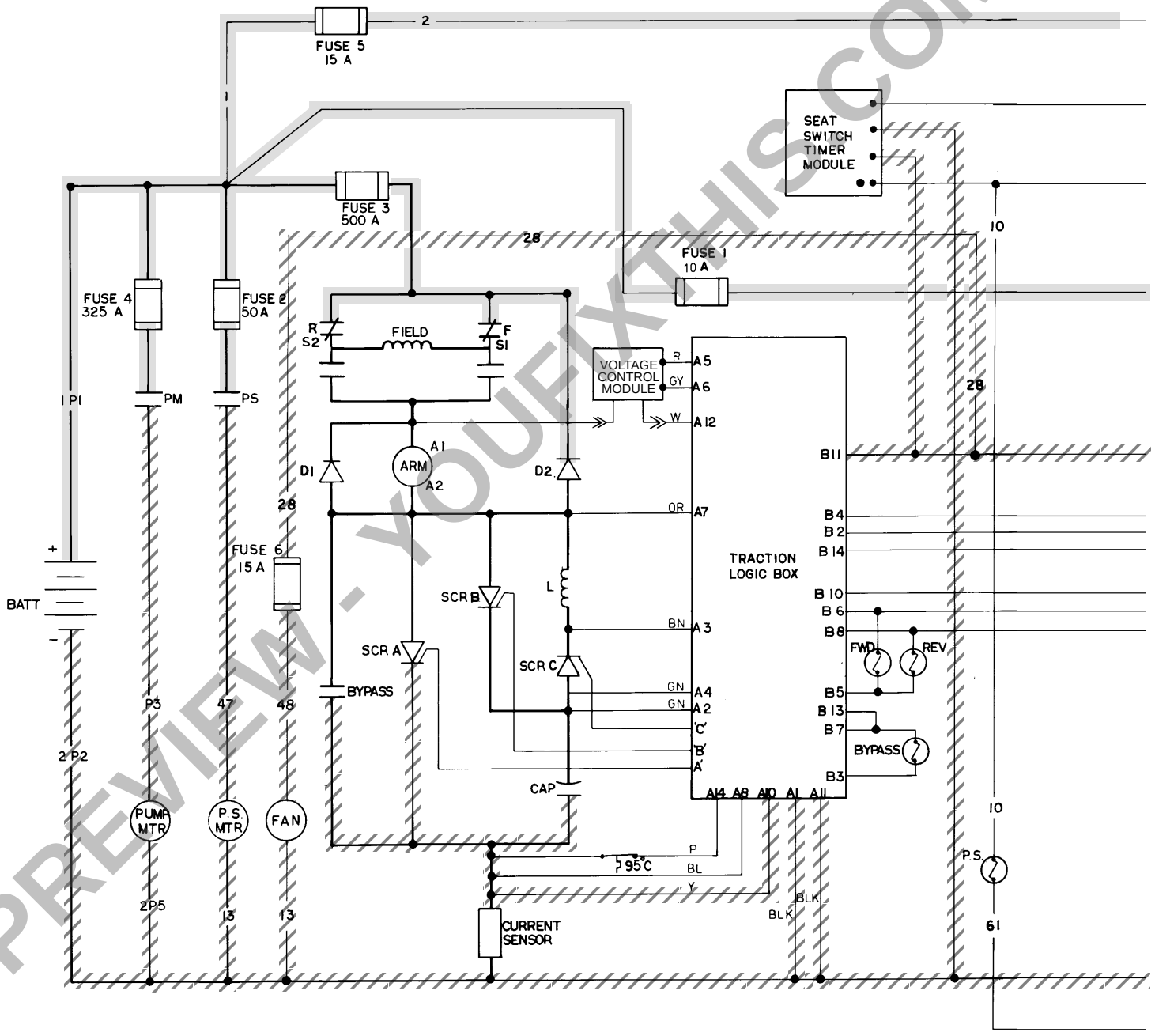
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SEQUENCE OF OPERATION

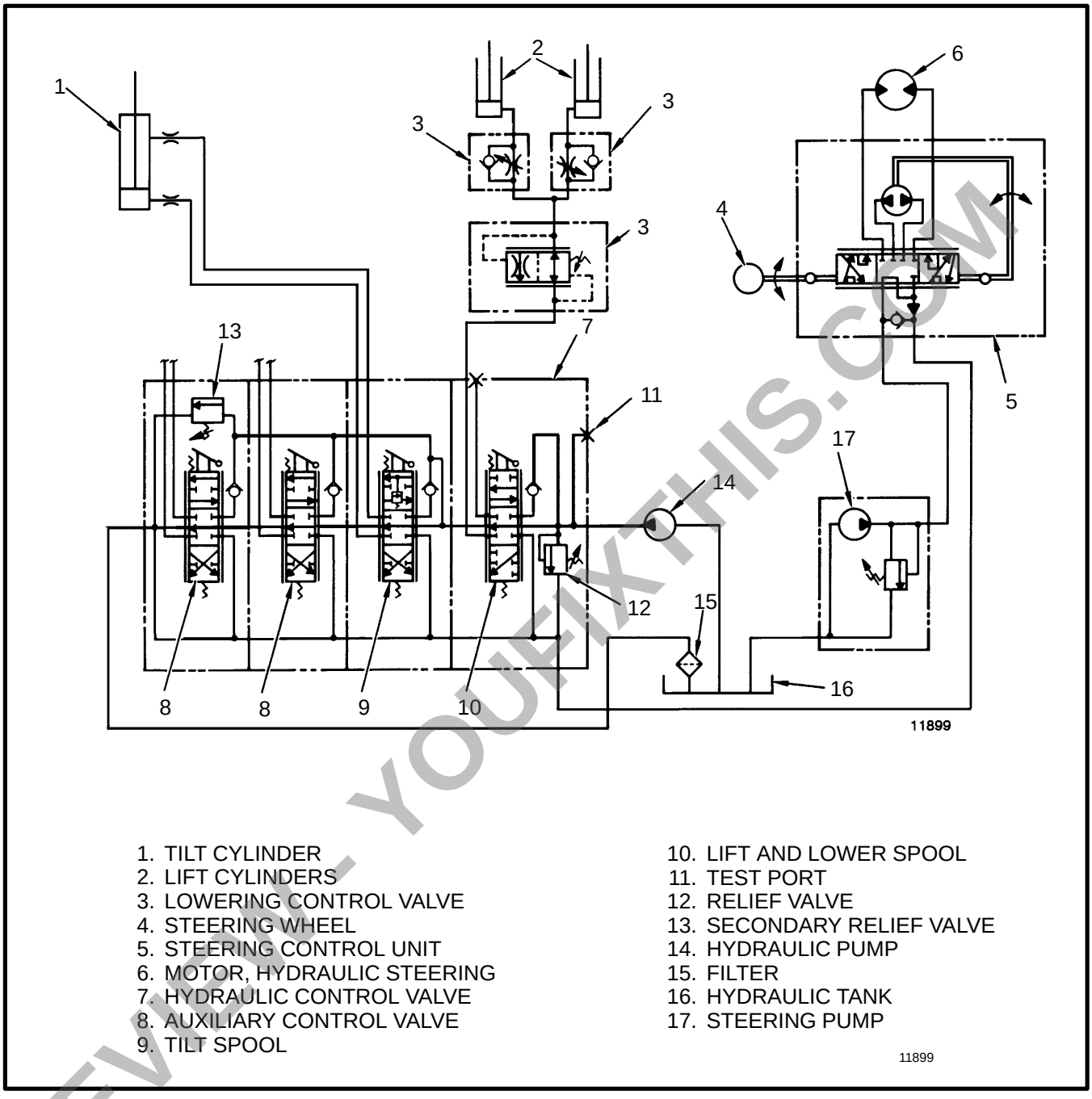
The following schematics describe the electrical sequence of operation for the lift truck to begin moving in the Forward direction. Some parts of the energized circuit are not indicated as active if they are not being described.

NOTE: In the following schematics,
indicates positive voltage.
indicates battery negative.



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1. TILT CYLINDER
2. LIFT CYLINDERS
3. LOWERING CONTROL VALVE
4. STEERING WHEEL
5. STEERING CONTROL UNIT
6. MOTOR, HYDRAULIC STEERING
7. HYDRAULIC CONTROL VALVE
8. AUXILIARY CONTROL VALVE
9. TILT SPOOL
10. LIFT AND LOWER SPOOL
11. TEST PORT
12. RELIEF VALVE
13. SECONDARY RELIEF VALVE
14. HYDRAULIC PUMP
15. FILTER
16. HYDRAULIC TANK
17. STEERING PUMP

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FIGURE 2. HYDRAULIC SYSTEM, SCHEMATIC

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TABLE 6. TORQUE VALUES FOR METRIC FASTENERS*

SIZE AND PITCH	PROPERTY CLASS 5.8[1]		GRADE 8.8[2]		GRADE 10.9[3]	
	Nm	lb_f ft	Nm	lb_f ft	Nm	lb_f ft
M3 x 0.5	0.62	0.5	0.99	0.7	1.34	1.0
M3.5 x 0.6	0.97	0.7	1.55	1.1	2.11	1.6
M4 x 0.7	1.44	1.1	2.30	2.1	3.13	2.3
M5 x 0.8	2.91	2.1	4.65	3.6	6.33	4.7
M6 x 1	4.94	3.6	7.90	6	10.8	8
M8 x 1.25	12.0	9	19.2	14	26.1	19
M8 x 1	12.8	9	20.5	15	27.9	21
M10 x 1.5	23.8	18	38.0	28	52	38
M10 x 1.25	25.1	19	40.1	30	55	41
M12 x 1.75	41.4	31	66	49	90	66
M12 x 1.25	45.3	33	72	53	98	72
M14 x 2	66	49	105	77	145	105
M14 x 1.5	72	53	115	85	155	115
M16 x 2	105	77	165	122	225	165
M16 x 1.5	110	81	175	130	240	175
M20 x 2.5	200	150	320	235	435	320
M20 x 1.5	225	165	355	260	485	360
M24 x 3	345	255	555	410	755	560
M24 x 2	375	275	605	445	820	605
M27 x 3	505	370	810	600	1,100	810
M27 x 2	550	405	875	645	1,190	880
M30 x 3.5	690	510	1,100	810	1,500	1,100
M30 x 3	715	530	1,140	840	1,550	1,140
M30 x 2	765	565	1.220	900	1,660	1,230
M33 x 3.5	940	695	1,500	1,100	2,040	1,510
M33 x 2	1,030	760	1,640	1,210	2,240	1,660
M36 x 4	1,200	885	1,930	1,430	2,620	1,940
M36 x 3	1,280	945	2,040	1,510	2,780	2,050
M39 x 4	1,560	1,150	2,490	1,840	3,390	2,500
M39 x 3	1,640	1,210	2,630	1,940	3,570	2,640
M42 x 4.5	1,930	1,430	3,080	2,280	4,200	3,100
M42 x 3	2,070	1,530	3,320	2,450	4,510	3,330
M45 x 4.5	2,410	1,780	3,850	2,840	5,240	3,870
M45 x 3	2,580	1,910	4,120	3,040	5,610	4,140
M48 x 5	2,900	2,140	4,630	3,420	6,300	4,650
M48 x 3	3,160	2,330	5,040	3,720	6,860	5,060

* Unless otherwise specified

[1] Approximately equal to Grade 2

[2] Approximately equal to Grade 5

[3] Approximately equal to Grade 8

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The seat assembly slides on seat rails that are fastened to the hood by four capscrews. A lever at the left front side of the base controls the adjustment of the seat to the forward and backward positions.

An optional seat can be installed that has a back cushion which tilts backward 5 to 20 degrees. A handle on the right side of the seat back controls the angle of tilt.

All seats have a seat switch installed in the bottom cushion that senses pressure. When the operator is not on the seat, the seat switch opens and stops the operation of the lift truck.

Removal

1. Disconnect the battery connector.

2. Disconnect the electrical connector to the seat switch. Remove the four capscrews that fasten the seat base to the hood. Lift the seat assembly from the hood.

3. Disconnect the gas controlled spring from the hood. Remove the capscrews that fasten the hinges to the counterweight. Lift the hood from the lift truck.

COUNTERWEIGHT

⚠ WARNING

Do not operate the lift truck if the capscrews for the counterweight are not installed. When the capscrew is removed, the counterweight can fall from the lift truck.

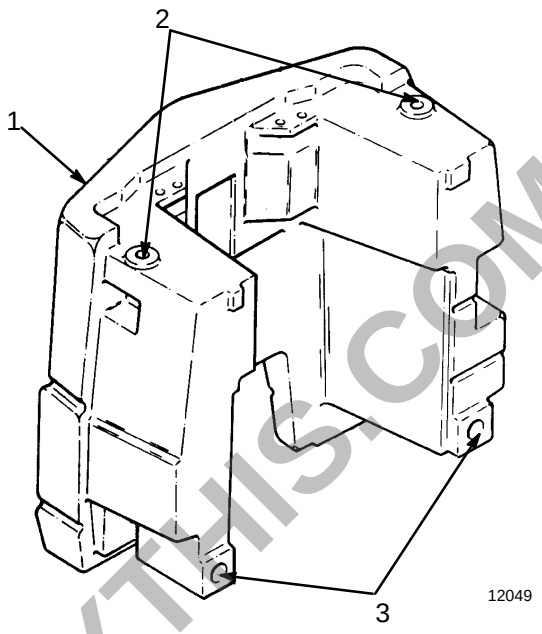
Removal (See FIGURE 4.)

1. Remove the battery. See the section, **PERIODIC MAINTENANCE, 8000 SRM 370** for removal of the battery.

2. Remove the overhead guard as described in the Overhead Guard.

⚠ WARNING

The counterweight is very heavy. Make sure the sling, chain, eyebolts, and crane or lifting device has the capacity to lift the counterweight. See Table 1.



1. COUNTERWEIGHT
2. INSTALL EYE BOLTS HERE TO LIFT COUNTERWEIGHT
3. MOUNT HOLES

FIGURE 4. COUNTERWEIGHT

3. Install eyebolts in the holes where the overhead guard fastens to the counterweight. Attach a chain or sling to the eyebolts. Use a crane or other lifting device to hold the weight of the counterweight. Make sure the sling, chain, eyebolts, and crane or lifting device has the capacity to lift the counterweight. See Table 1.

TABLE 1. WEIGHT OF COUNTERWEIGHTS

A1.00XL (A20XL)	504–554 kg (1111–1222 lb)
A1.25XL (A25XL)	677–727 kg (1493–1603 lb)
A1.50XL (A30XL)	815–865 kg (1797–1907 lb)

4. Access to the two capscrews that hold the counterweight to the frame is at the bottom inside of the battery compartment. Access to the nuts is from under the counterweight. Remove the two M20 x 2.5 x 200 capscrews, flat washers, lockwashers, and nuts that hold the counterweight to the frame. Use the crane to lift the counterweight away from the frame.

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TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROCEDURE OR ACTION
The steering wheels do not move when the steering wheel is turned.	The oil level is low or there is no oil in the tank.	Fill tank to the correct level. Check for leaks.
	The steering control unit is damaged.	Repair or install new control unit.
	No oil flow from the steering control unit to the steering cylinder.	Repair or install new components. Check for leaks.
	The sleeve and spool in the control unit will not move.	Install new components.
	Hydraulic hoses not connected or have damage.	Check for leaks. Tighten connections. Install new components as necessary.
Slow or difficult steering.	Relief valve for the steering system is damaged or not adjusted correctly.	Adjust or install new relief valve.
	Low oil pressure from the hydraulic pump.	Check for restrictions. See Troubleshooting Chart, ”Hydraulic System”.
	Seal in the steering cylinder has a leak.	Repair cylinder. Install new seal or new cylinder.
	Hydraulic lines are too small or have restrictions.	Remove restrictions. Install larger or new hydraulic lines.
	Steering control unit is worn, not assembled correctly or has damage.	Repair or install new control unit.
Steering wheel turns the tires in the wrong direction.	The hydraulic lines are not connected correctly at the steering cylinder or at the steering control unit.	Connect lines correctly. Remove air from the system.
Steering function continues after the steering wheel stops.	The steering control unit is assembled wrong or has damage.	Repair or install new control unit.
The steering operation is not smooth.	The oil level in the tank is low.	Fill tank. Check for leaks.
	Air was not removed after repair to the hydraulic system.	Remove air from the system.
	The steering control unit is assembled wrong or has damage.	Repair or install new control unit.
	The hydraulic pump has a leak at the inlet.	Fix leaks. Remove air from the system.

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MAINTENANCE PROCEDURES
EVERY 8 HOURS OR DAILY

Inspect the lift truck every eight hours or daily before use. Put the lift truck on a level surface. Lower the carriage and forks, and turn the key switch to "OFF." If repair is required, put a tag in the operator's area that indicates the lift truck cannot be operated. DO NOT operate a lift truck until the problems are corrected.

CHECKS BEFORE OPERATION

Make the following checks:

- Oil level in the hydraulic tank.
- Electrolyte and specific gravity of the battery.
- Make sure the battery is clean and the correct size and weight for the lift truck.
- Operation of the battery restraint and latch mechanism.
- Condition of the wheels and tires.
- Condition of the forks, carriage, mast, and overhead guard.
- Leaks in the hydraulic system.

Hydraulic System (See FIGURE 3.)

⚠ WARNING

At operating temperature the hydraulic oil is HOT. Do not permit the oil to contact the skin and cause a burn.

⚠ CAUTION

Do not permit dirt to enter the hydraulic system when the oil level is checked or the filter is changed.

Never operate the pump without oil in the hydraulic system. The operation of the hydraulic pump without oil will damage the pump.

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered and the key switch is "OFF." Add hydraulic oil only as needed. If more hydraulic oil is added than the "FULL" level, hydraulic oil will leak from the breather during operation.

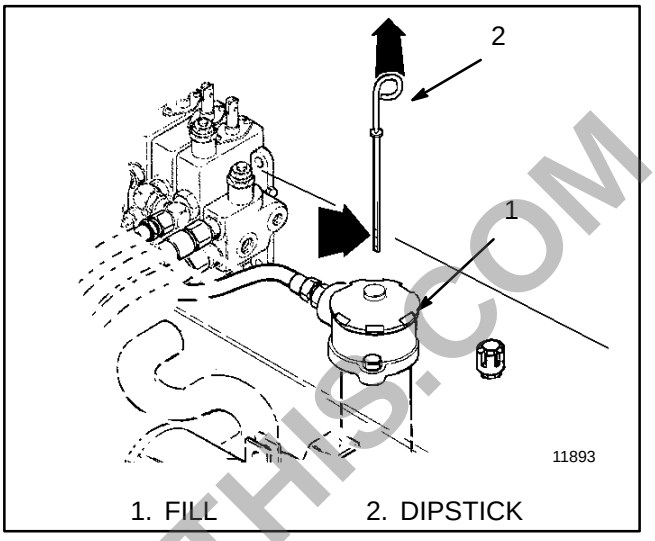


FIGURE 3. CHECK THE HYDRAULIC OIL

Battery

Make sure the battery weight is within the maximum and minimum weight shown on the nameplate.

Keep the battery case, top cover and the area for the battery clean and painted. Leakage and corrosion from the battery can cause a malfunction in the electric controls of the lift truck. Use a water and sodium bicarbonate solution (soda) to clean the battery and the battery area. Keep the top of the battery clean, dry and free of corrosion.

Make sure the battery is charged and has the correct voltage and ampere hour rating for the lift truck (see the nameplate).

Inspect the battery case, connector and cables for damage, cracks or breaks. See the battery dealer in the area to repair any damage. Check the level of the electrolyte daily on a minimum of one cell. The correct level is half–way between the top of the plates and the bottom of the fill hole. Add only distilled water.

⚠ WARNING

Make sure the key switch is "OFF" and the park brake is set before connecting the battery.

If the lift truck was operated with a discharged battery, check all contactors for welded tips before a charged battery is connected.

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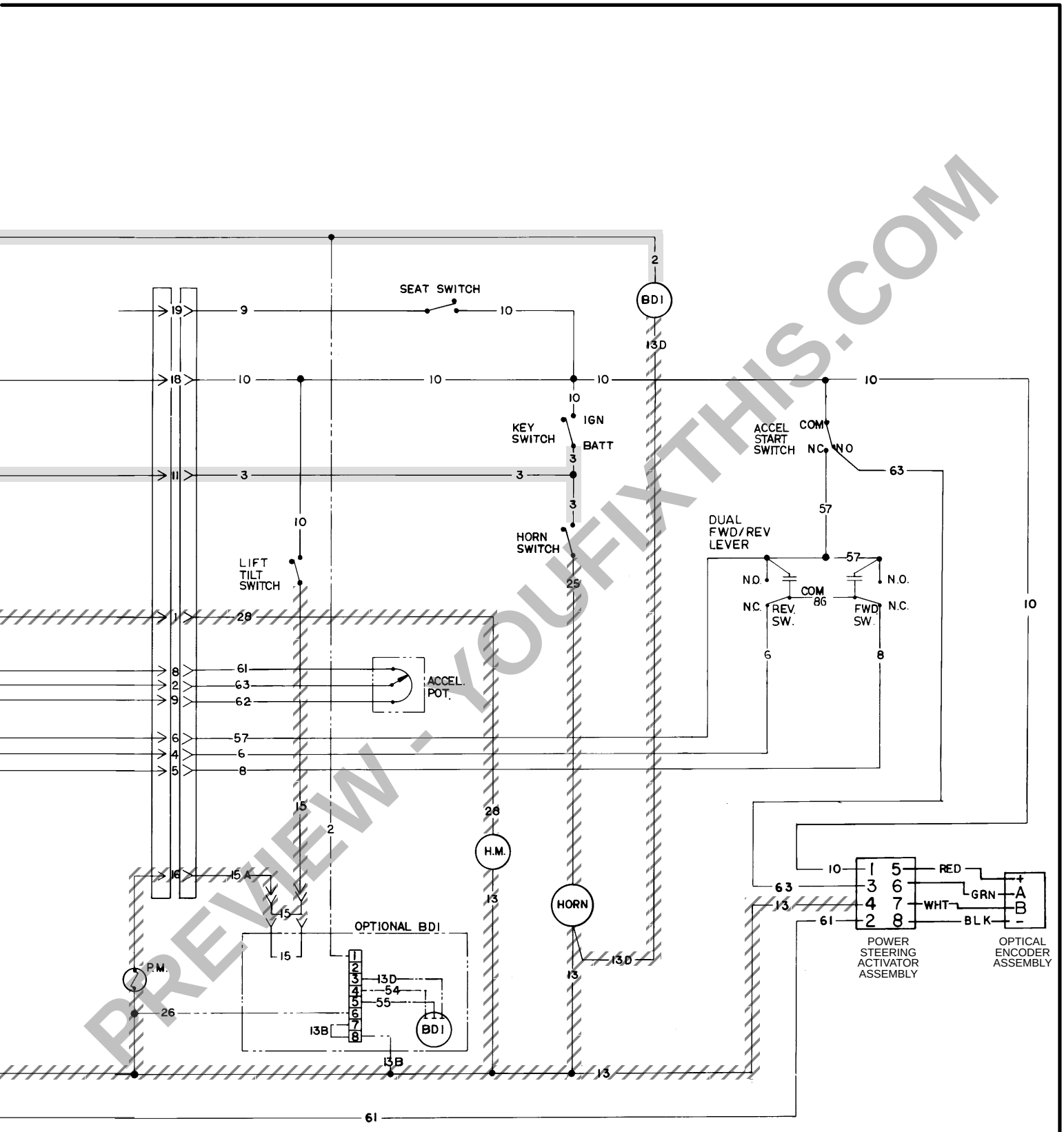
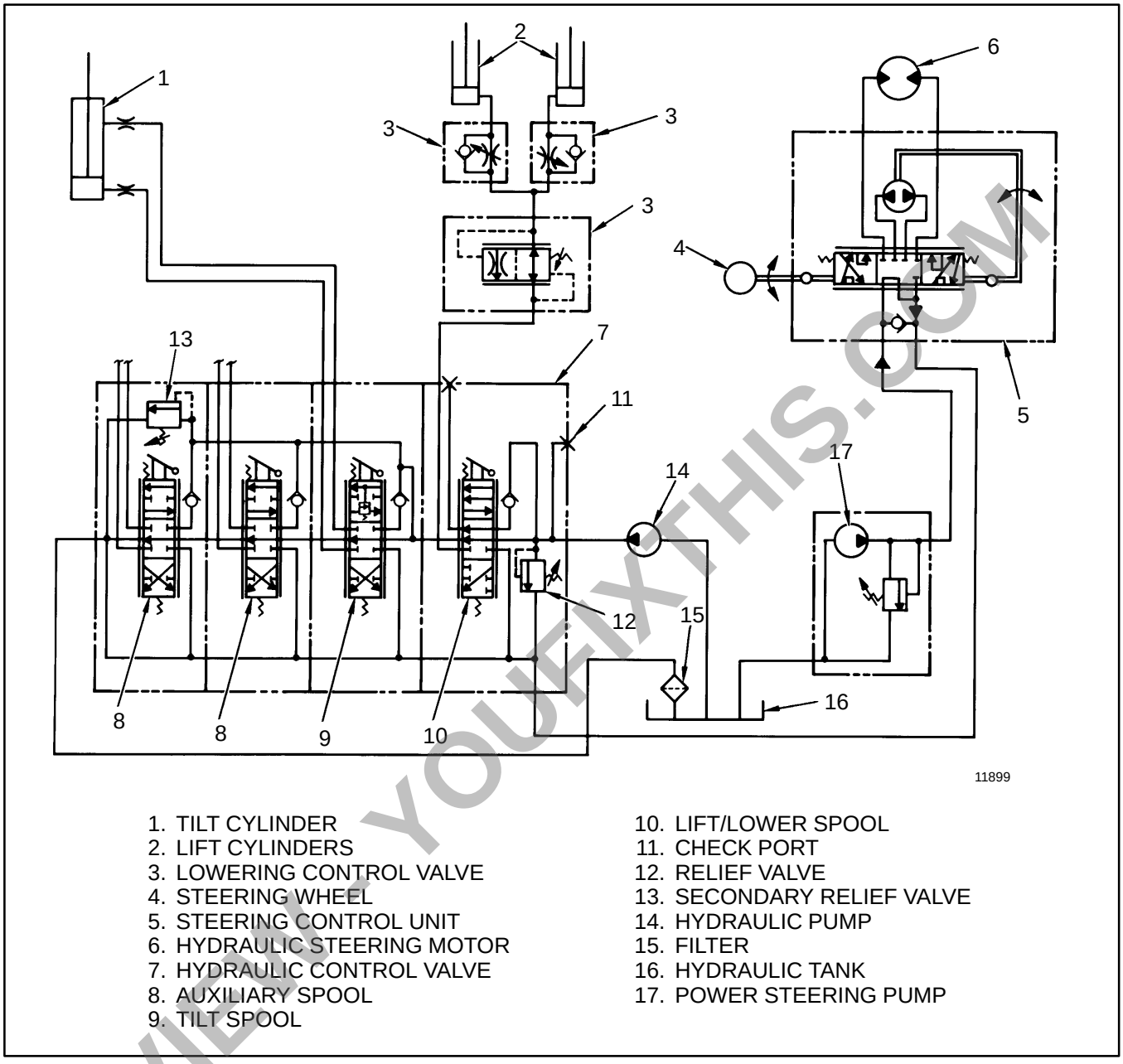


FIGURE 15. SEQUENCE OF OPERATION, BATTERY CONNECTED

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1. TILT CYLINDER
2. LIFT CYLINDERS
3. LOWERING CONTROL VALVE
4. STEERING WHEEL
5. STEERING CONTROL UNIT
6. HYDRAULIC STEERING MOTOR
7. HYDRAULIC CONTROL VALVE
8. AUXILIARY SPOOL
9. TILT SPOOL
10. LIFT/LOWER SPOOL
11. CHECK PORT
12. RELIEF VALVE
13. SECONDARY RELIEF VALVE
14. HYDRAULIC PUMP
15. FILTER
16. HYDRAULIC TANK
17. POWER STEERING PUMP

FIGURE 4. HYDRAULIC SCHEMATIC

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TORQUE SPECIFICATIONS

ITEM	SPECIFICATION
FRAME	
Counterweight, Capscrews	320 N.m (236 lbf ft)
Overhead Guard Capscrews	66 N.m (50 lbf ft)
MASTER DRIVE UNIT (MDU) (SPETH)	
Capscrews on Traction Motor (6)	45 N.m (33 lbf ft)
Capscrews in Top of Main Case (8)	69 N.m (51 lbf ft)
Capscrews for Large Bearing Cap at Top of MDU (6)	45 N.m (33 lbf ft)
Capscews for Lower Case	
Large Capscrews (2)	295 N.m (218 lbf ft)
Small Capscrews (2)	120 N.m (88 lbf ft)
Nut on Large Gear at top of MDU	280 N.m (207 lbf ft)
Castle Nut on Axle Shaft	450 N.m (332 lbf ft)
Pinion Nut	55 N.m (41 lbf ft)
Drain Plug	22 N.m (16 lbf ft)
MASTER DRIVE UNIT (MDU) (HURTH)	
Capscrews – Motor to Adaptor Ring (6)	20 N.m (15 lbf ft)
Capscrews – Adaptor Ring to Top Case (6)	25 N.m (18 lbf ft) Initial 68 N.m (50 lbf ft) Final
Special Nut	60 N.m (44 lbf ft)
Capscrews – Top Case Assembly	
8 mm Capscrews	23 N.m (17 lbf ft)
10 mm Capscrews	46 N.m (34 lbf ft)
Capscrew – Axle/Spiral Bevel Gear Assembly	110 N.m (81 .bf ft)
Capscrews – Spiral Gear Cover	9.5 N.m (7 lbf ft)
Drain Plug	22 N.m (16 lbf ft)
STEERING SYSTEM	
Capscrews to Fasten Body of Power Steering Pump	34 to 40 N.m (25 to 30 lbf ft)
Capscrews for Hydraulic Steering Motor	
Capscrews for Flange Cover (6)	5 to 8 N.m (45 to 70 lbf in)
Capscrews for End Cover (6)	30 to 36 N.m (22 to 25 lbf ft)
Capscrews to Fasten Steering Control Unit to Steering Column	19 N.m (14 lbf ft)
THE TORQUE SPECIFICATONS ARE CONTINUED ON THE NEXT PAGE.	

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Installation

WARNING

The counterweight is very heavy. Make sure the sling, chain, eyebolts, and crane or lifting device has the capacity to lift the counterweight. See Table 1.

1. Use a crane to lift the counterweight into position. The lift points for the counterweight are not at the center of gravity of the counterweight. Some assistance will be required to engage the attachment points on the frame. The counterweight engages two vertical plates on the frame. These plates hold the counterweight in position on the lift truck.

2. Install the two M20 x 2.5 x 200 capscrews, flat washers, lockwashers, and nuts that hold the counterweight to the frame. Tighten the capscrews to 320 N.m (236 lbf ft).

3. Disconnect the sling or chain. Remove the eyebolts from the counterweight.

4. Install the overhead guard as described in the Overhead Guard. Install the hood and seat assembly

5. Install the battery.

HYDRAULIC TANK

Inspection

Make a visual inspection of all sides of the tank. Inspect the welds for cracks and leakage. Check for wet areas, accumulation of dirt, and loose or missing paint caused by leakage. Areas of the tank that are not easily seen can be checked with an inspection mirror and a light that is approved for locations with flammable vapors.

Repairs, Small Leaks

Use the following procedure to repair small leaks:

1. Use steam to clean the area around the leak. Remove all paint and dirt around the leak.

WARNING

Do not use tools that can make sparks, heat or static electricity. The vapors in the tank can cause an explosion.

2. Apply Loctite® 290 to the leak. Follow the instructions of the manufacturer.

Repairs, Large Leaks

1. Use one of the procedures described under **Cleaning** to clean and prepare the tank for repairs.

2. Use acceptable welding practices to repair the tank. See the American National Standard *Safety In Welding And Cutting* ANSI Z 49.1 – 1973.

Cleaning

WARNING

Special procedures must be followed when large leaks or other repairs need welding or cutting. All work must be done by authorized personnel. If the tank is cleaned inside of a building, make sure there is enough ventilation. See the following manuals for additional information:

- **"Safe Practices For Welding And Cutting Containers That Have Held Combustibles" by the American Welding Society, A6.0–65.**
- **"Safety In Welding And Cutting", American National Standard, ANSI Z 49.1 – 1973.**

When cleaning the tank, do not use solutions that make dangerous gases at normal temperatures or when heated. Wear eye and face protection. Protect the body from burns.

When cleaning with steam, use a hose with a minimum diameter of 19 mm (0.75 inch). Control the pressure of the steam by a valve installed at the nozzle of the hose. If a metal nozzle is used, it must be made of a material that does not make sparks. Make an electrical connection between the nozzle and the tank. Connect a ground wire to the tank to prevent static electricity.

Steam Method Of Cleaning

Use the following procedure to clean the tank with steam:

a. Remove all the parts from the tank. Install the drain plug.

b. Fill the tank 1/4 full with a solution of water and sodium bicarbonate or sodium carbonate. Mix 0.5 kg (1 lb) per 4 litres (1 gallon) of water.

c. Mix the solution in the tank using air pressure. Make sure all the surfaces on the inside of the tank are flushed with the solution. Drain the tank.

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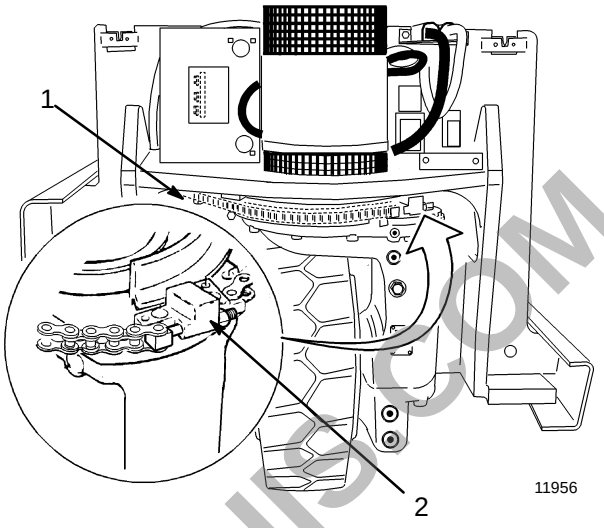
2. Operate the power steering pump and steering for a complete turn. Check that the maximum pressure is 10.7 to 11.0 MPa (155 0 to 1,600 psi).

3. If the pressure is greater than 11.0 MPa (1,600 psi), replace the relief valve. If the pressure is less than 10.7 MPa (1,550 psi), check that the power steering pump is not worn or damaged.

4. When the pressure checks are complete, return the steering system to normal operation.

Check the Operation and Alignment of the Steering System (See FIGURE 11.)

Raise the lift truck to remove the weight of the lift truck from the MDU. Loosen or tighten the hex nut that holds one end of the steering chain on the master drive unit. Push on the chain between the sprocket and the end of the chain. The tension is correct when the chain moves 7.35 to 11.00 mm (0.29 to 0.43 in).



1 CHECK CHAIN ADJUSTMENT HERE
2. MAKE ADJUSTMENT HERE

FIGURE 11. ADJUSTMENT OF THE STEERING CHAIN

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE
Steering is slow or more difficult than normal.	The power steering pump is worn. Check the hydraulic pressure.
	The spring for the relief valve is weak or damaged.
	The steering control unit has a defect. See the section **THE STEERING CONTROL UNIT, 1600 SRM 54.**
The MDU does not turn when the steering wheel is turned.	Air in the steering hydraulic system.
	Steering pump does not send oil to the steering system.
	The relief valve for the steering system is open (damaged).
	See the section, **THE STEERING CONTROL UNIT, 1600 SRM 54.**
The master drive unit rotates in the wrong direction from the direction of the steering wheel.	The hydraulic lines are wrong at the hydraulic steering motor.
	The hydraulic lines are wrong at the steering control unit.
	If the steering control unit was disassembled, check the rotor for correct alignment.
The master drive unit continues to turn after the steering wheel has stopped turning.	A centering spring is broken in the steering control unit.
	There is damage to the sleeve or the spool of the steering control unit.
	Check for dirt in the hydraulic system and the steering control unit.
The power steering motor makes noise that is not normal.	There is air entering the power steering pump. Check for air entering the pump through the inlet port or the seals between the pump and the motor.

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INTRODUCTION

GENERAL

This section has a description and the service procedures for the parts of the frame. These parts include the counterweight assembly, overhead guard, hydraulic tank, access panels, and positions for decals.

DESCRIPTION

The frame is a single weldment with mounts for the counterweight, overhead guard, mast and load wheels, and the master drive unit. The hydraulic tank is part of the frame. The hood panel opens on hinges to give access to the battery compartment, the electronic controller and the traction motor on the master drive unit. Access panels on each side of the lift truck are removed by lifting them from the frame. These panels give further access and protection to the battery.

The weight of the battery is the main part of the counterweight system on an electric lift truck. Each model of lift truck has a cast–iron counterweight with a weight necessary for the indicated capacity. A slot in the overhead guard permits removal of the battery without removing the overhead guard.

The hydraulic pump motor, steering pump motor and the hydraulic tank are under the floor plate in the operator compartment. This floor plate is held in position by tabs and can be removed to give access to hydraulic components. The control valve is fastened to the front of the battery compartment. A cover protects the control valve and control linkage. The cover is fastened in position by machine screws.

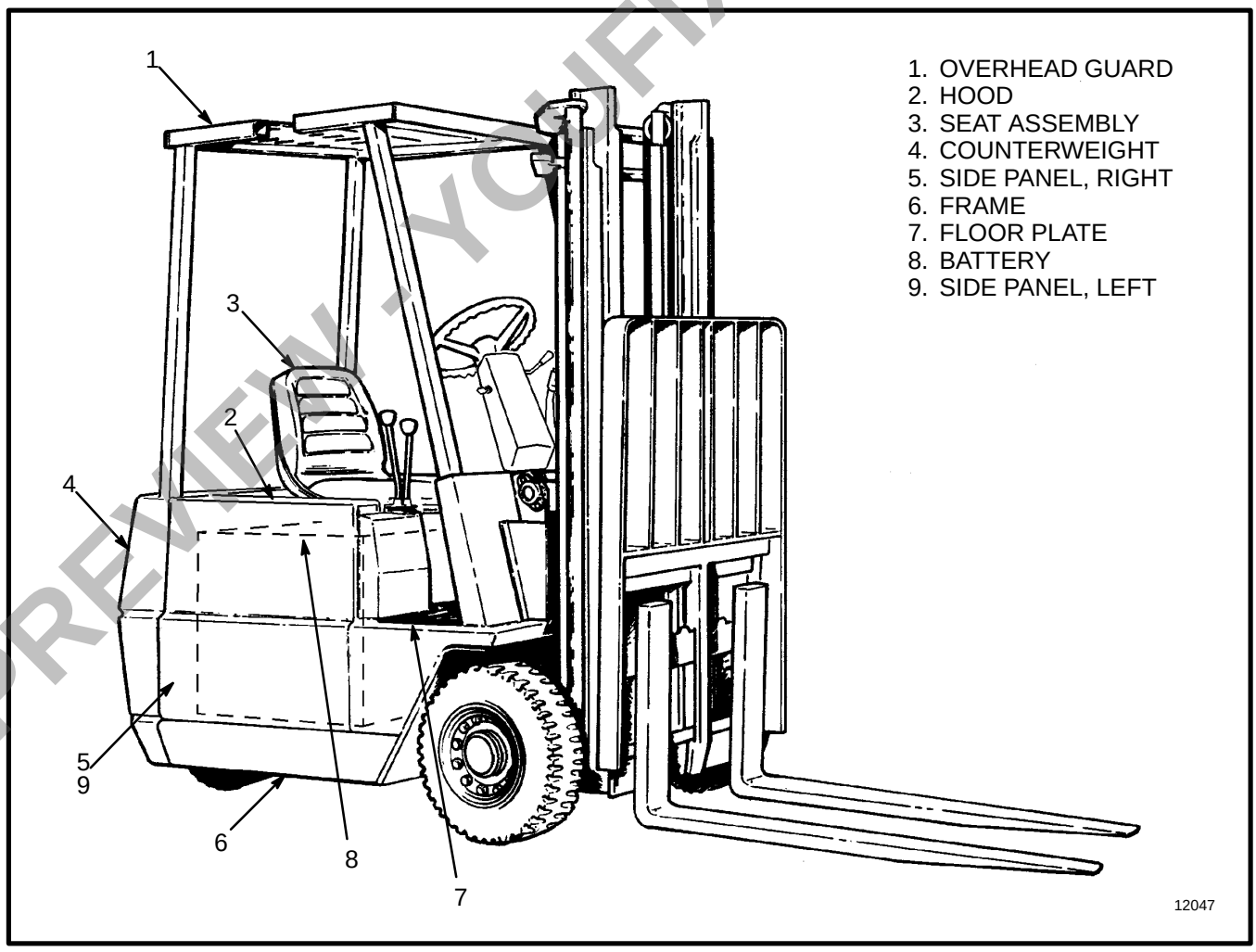


FIGURE 1. PARTS OF THE FRAME

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