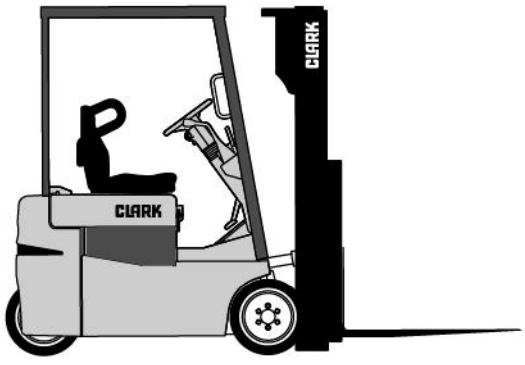
TMX 12-25
EPX 16-20s

SERVICE MANUAL

RATED CAPACITY : 1250~2270kg



Part No. 8037870
Book No. SM-715
Jun. 2005

CLARK
THE FORKLIFT

**#40-1,Ungnam-Dong,
changwon-city, Kyungnam,
Korea**

Introduction to Planned Maintenance

A program of regular, routine inspections, lubrication, and other service tasks is important for the long life and troublefree operation of the lift truck.

The Clark service organization offers customers a formalized program.called Planned Maintenance, or PM.for

performing these tasks.

PM Intervals

The PM inspections, adjustments, and lubrications are typically performed on each covered truck at 50-250 hour intervals. (See Section 1, in this Group about defining service intervals.)

The PM Form

As an aid to service technicians performing and documenting PM inspections, Clark has prepared a "Planned Maintenance Report" form. A copy of this form is inserted in Section 3 of this Group.

We recommend that you use this form as a checklist and to make a record of your inspection and truck condition. This record can be used to inform the owner of needed repairs and help establish the optimal PM intervals.

When you have finished the PM inspections, be sure to give a copy of the report to the person responsible for lift truck maintenance.

The Basic PM Procedures

The basic PM procedure is to perform checks first, repairs and adjustments last. As you go through each step of the PM, you should note all your findings on the PM report form.

The PM report form serves as a record of what you did in the PM and what further service needs to be performed. "Further service" consists of any repair, adjustment, inspection, or lubrication that you discovered during the PM or any periodic service procedure that is due but not covered by the PM agreement).

You should consult the previous PM report forms, periodic service chart, and truck hour meter to determine what periodic service is due. List the service due on the new PM form.

The PM procedure, in outline form, is as follows:

1. **External visual checks.** Perform these as you walk around the truck with it turned off.
2. **Operational checks.** Perform these while operating the truck.
3. **Internal visual checks.** Perform these after removing the floor board and cowl cover.
4. **Air cleaning internal components.** Do this while performing the previous step.
5. **Critical fastener torque checks.**
6. **Minor adjustments and repairs** you found in your inspection.
7. **Fluid level checks and fill.**
8. **Chassis lubrication.**
9. **Final clean up.**
10. **Minor adjustments** to the responsible party.

Each of these steps is explained in detail beginning on the next page.

⚠ CAUTION

- **Do not make repairs or adjustments unless authorized to do so.**
- **Disconnect the battery before you work on electrical components.**
- **Always wear safety glasses.**
- **Wear a safety (hard) hat in industrial plants and in special areas where protection is necessary or required.**
- **Remove all jewelry (watch, rings, bracelets, etc.) before working on the truck.**

Truck Location and Parking

Before starting the external inspection, make sure the truck is parked on a clean, level surface. Fully lower upright, turn truck off, and engage the parking brake.

If it is necessary to drive the truck to a suitable inspection location, perform the initial braking and steering checks, given later in this Section, as you begin to move the truck.

To perform the operational checks, the truck must be where there is sufficient clearance to raise the upright and room to maneuver the truck at full speed without endangering personnel, equipment, or materials.

External Inspection

Walk around the truck and take note of any obvious damage and maintenance problems, as follows:

Decals

Check to be sure all capacity, safety, and warning plates and decals are attached and legible.

NOTE

Do not operate a lift truck with damaged or missing decals and nameplates. Replace them immediately. They contain important information. See Group 40 for decal locations.

Fittings and Fasteners

Make sure that fittings and fasteners are present, in usable condition and fully fastened. Critical fastener torque checks should be performed later--when making minor adjustments and repairs.

Overhead Guard and Chassis

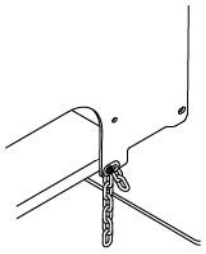
Be sure that the overhead guard and any other safety devices are in place, undamaged, and attached securely. Inspect welds and structural members for cracks or other damage.

Lights and Safety Devices

Check safety devices, such as lights, horn, and audible alarms, to make sure they are securely attached and have on visible damage.

Static Chain

Look under the truck to make sure the static chain contacts the floor and is not excessively worn or loose. See Group 13 for more information.



Leaks

Look under the truck and on the chassis, uprights, and exposed hoses for any signs of external leakage: brake fluid, drive axle oil, and hydraulic fluid, and battery fluid.

When you suspect hydraulic oil leaks and loose fittings,

DO NOT USE BARE HANDS TO CHECK.

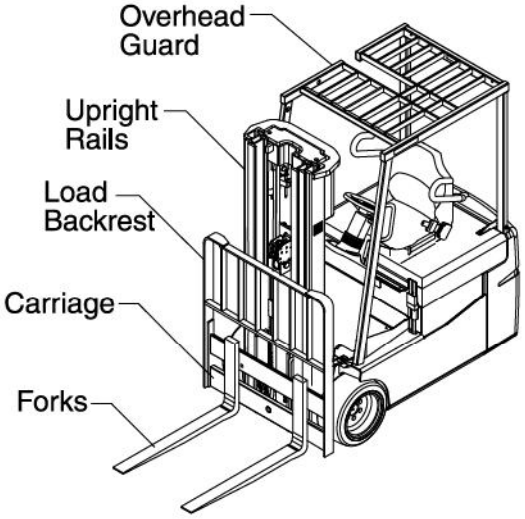
⚠ CAUTION

HYDRAULIC FLUID PRESSURE. Do not use your hands to check for hydraulic leakage. Oil may be hot or under pressure. Fluid under pressure can penetrate your skin and cause serious injury.

Carriage, Load Backrest, and Upright

(See Group 34 for more detailed inspection procedure.)

Inspect the welds on the carriage, load backrest, and upright for cracks. Be sure that the mounting fasteners are in place and tight.



Inspect the upright assembly: rails, carriage rollers, load backrest, lift chains, and lift and tilt cylinders. Look for obvious wear and maintenance problems and damaged or missing parts. Check for any loose parts or fittings. Check for leaks, any damaged or loose rollers and rail wear (metal flaking).

Carefully check the lift chains for wear, rust and corrosion, cracked or broken links, and stretching. Check that the lift and carriage chains are correctly adjusted to have equal tension and that the tops of the rails are within 4 mm (1/8 in) of each other.

Check that the lift chain anchor fasteners and locking means are in place and tight. Be sure all safety guards and chain retainers are in place and not damaged.

Inspect the carriage stops and cylinder retainer bolts. Check all welded connections.

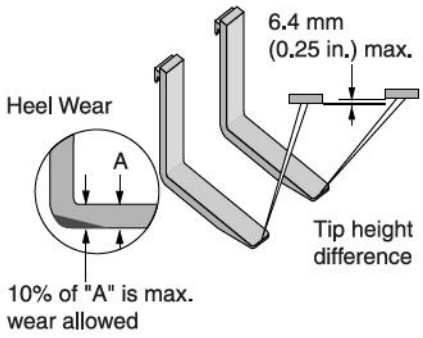
Inspect all lift line hydraulic connections for leaks. Check the lift cylinder rods for wear marks, grooves and scratches. Check the cylinder seals for leaks.

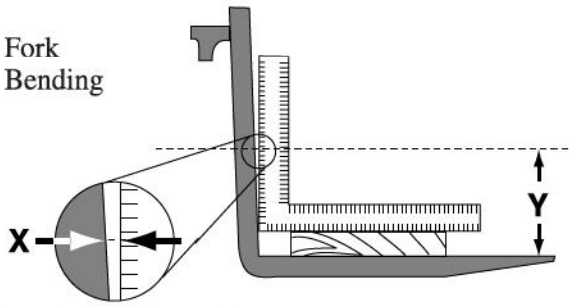
Forks

Inspect the load forks for cracks, breaks, bending, and wear.

WARNING

HEEL WEAR. If the fork blade at the heel is worn down by more than 10 percent, the load capacity is reduced and the fork must be replaced.





X must be less than 25.4 mm (1 in) when measured at **Y** height of 46 cm (18 in).

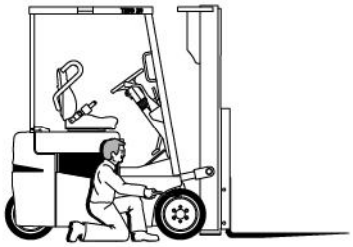
Measure fork bending with a T-square and wood bock as shown above.

Inspect the fork latches to ensure that they are in good condition, operate freely, and lock correctly. See Group 34 for more details on inspection procedures, including use of fork wear gage.

Wheels and Tires

Check the condition of the drive and steer wheels and tires. Remove objects that are embedded in the tread. Inspect the tires for excessive wear or breaks or "chunking out."

Check all wheel lug nuts or bolts to be sure none are loose or missing. Have missing bolts or lug nuts replaced and tightened to correct torque as explained in Group 22.



WARNING

Check tire pressure from a position facing the tread of the tire, not the side. Use a long-handled gauge to keep your body away. If tires are low, the tire may require removal and repair. Incorrect (low) tire pressure can reduce truck stability. See "Specifications" in Group 22 for proper inflation pressure.

Operational Checks

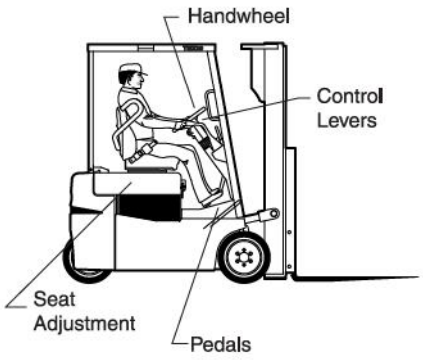
Be sure that:

- Truck is parked on a level surface.
- Key switch is off.
- Parking brake is applied.
- Directional control is in "N" (neutral).
- Battery is connected.

Operator's Environment

Sit in the operator's seat and make sure the seat is secure and that the seat adjustment mechanism operates properly.

With the key switch off, check that travel and load handling capability, dash display, lights, and alarms are all disabled.



Check that the steering wheel is tight and rotates smoothly and adjusts for tilt properly. Check the control levers and foot pedals to make sure they are securely mounted, operate freely, and return to neutral when released. Perform an additional visual inspection of the upright and overhead guard from the seated position

Service and Parking Brake (Initial Check)

Push the brake pedal down fully and hold. The brakes should apply before the pedal reaches the floorplate. If the pedal continues to creep downward, report the failure immediately. Do not operate the truck until the brakes are repaired.

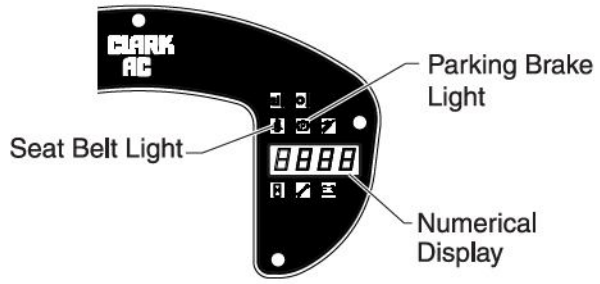
Operate the parking brake to make sure that it is securely mounted and that it applies, catches, and releases properly.

Apply the parking brake. Turn the key switch on.

Dash Display and Safety Lock-Outs

As you turn the key switch on, check the instrument display. All indicator lights should come on for a 2-second lamp check. The seat belt prompt light should remain on for 4 seconds, accompanied by the high-pitched seat-belt alarm. The parking brake light should remain on (if the brake is set) and the numerical display should read -255 to indicate that the parking brake is set.

(If any other error codes display or indicator lights identify a problem, note the condition for further service action.)



With the parking brake set, the drive motor should not function. Test this feature by depressing the accelerator pedal after selecting a direction.

Place the direction control in forward and then release the parking brake. The numerical display should now read "-79" to indicate that you have not consciously selected a direction after parking. The drive motor and the The drive motor should not function during this error condition.

Continue this test by selecting reverse before releasing the parking brake. The error code -79 should display and The drive motor should be locked out.

Place the direction control in neutral and release the parking brake. The numerical display should now show the battery status (normal condition). The battery must be recharged if the reading is less than 20 (percent). The truck hydraulics will not function if the reading is less than 15%.

Apply the parking brake

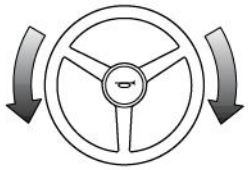
See Groups 13 and 19 for detailed descriptions of all display light functions and status error codes.

Steering (Initial Check)

Key switch is still on. Put the truck in neutral and release the parking brake. Put the direction control in forward then turn the steering handwheel clockwise until the steering hits its stop. Then turn the handwheel counterclockwise and count the revolutions before the steering hits its stop. There should be 5 revolutions from stop to stop. Return the steer wheels to the straight-ahead position.

The steering system components should operate smoothly when the steering handwheel is turned.

Hard steering, excessive play (looseness), or unusual sounds when turning indicates a need for detailed inspection and service as described in Group 25/26.



If the truck has a steering system fault, take the truck out of service until it is repaired.

Hydraulic System

Next you will test the hydraulic control levers and load handling mechanism.

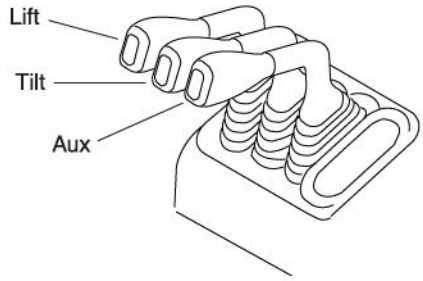
CAUTION

Check for sufficient clearance above and in front of the upright before operating the control levers.

Control Levers

With the parking brake still on, check each control lever in both directions to see that it works as follows:

- Lever has freeplay: You can move the lever slightly without having an effect. The hydraulic pump motor does not start and the load handling mechanism does not move; for instance, the carriage does not lower or lift.
- Lever has lag: You can move the lever slightly more and the pump motor starts without causing lift, tilt, or sideshift to occur. (Lowering occurs without the pump motor starting.)
- Lever actuates load handling function: You can move the lever slightly more and lift, lower, tilt, or sideshift occur slowly in the appropriate direction
- Lever accelerates load handling function: You can move the lever further to increase the speed at which lift, lower, tilt, or sideshift occur.



Carriage, Upright, and Sideshifter

With the parking brake still on, make sure load handling mechanism performs all functions smoothly, fully, and responsively:

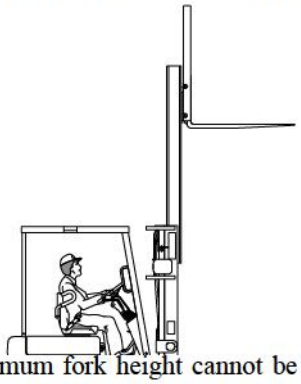
1. Pull back on the tilt control lever and hold until the upright reaches the full back tilt position. Push forward on the lever to tilt it forward. Return the upright to the vertical position and release the lever. Repeat these actions as you observe.
   - If there is excessive play between rails and channels, upright adjustment is required.
   - If there is racking, adjustment of the cylinder rod yokes or shims is required. ("Racking"is when the extension of the two tilt cylinder rods is unequal.)

   The basic adjustment procedure is described later in this Section. Detailed upright checks and adjustments are described in Group 34.

   CAUTION

   Be sure that there is adequate overhead clearance before raising the upright.

2. Pull back on the lift control lever and raise the carriage to full height. Watch the upright assembly as it rises. All movements of the upright, fork carriage, and lift chains must be even and smooth, without binding or jerking or making "clunking" noises.
   Watch for chain wobble or looseness; the chains should have equal tension and move smoothly without noticeable wobble.
   Release the lever.
   The basic chain adjustment procedure is described later in this Section. Detailed chain inspection and adjustment procedures are in Group 34.



   If the maximum fork height cannot be reached, this indicates there is low oil level in the hydraulic sump or severe binding within the upright.
3. Push forward on the lift control lever. Watch the upright as it lowers. If you suspect a problem with lifting or lowering speeds, refer to Group 34 to diagnose the problem.
4. Check sideshifter action by pushing forward and backward.

Horn, Lights, and Alarms

Test the horn and headlights and other safety devices before moving the truck. Check backup alarms and lights and all other safety equipment as you drive the truck in the following steps.

CAUTION

If the service brake, parking brake, or interlock is not operating properly, take the truck out of service until it is repaired.

Traction and Braking System

Next, drive the truck to test the braking, accelerating, turning and reversing.

WARNING

Fasten your seat belt before driving the truck.

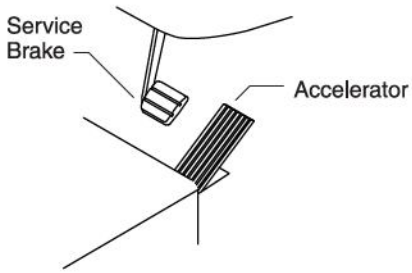
NOTE

After you move the truck, you can check where the truck was parked to see if there are any leaks.

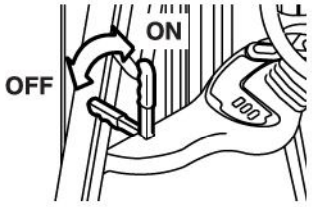
Brakes

Make sure that the truck is on a level surface, the travel area is clear in front of and behind the truck, the parking brake is released, the direction control is in neutral, and the key switch is on. The numerical display should show battery condition with the parking brake off.

1. Move the direction control lever from neutral to forward.
2. Check brakes at creep speed: Release the brake pedal and depress the accelerator pedal to obtain slow forward speed. Apply the brake pedal to ensure that the brakes are sufficient to stop the truck. Pedal should feel firm and drive motor should cut off before brakes apply.



3. Check brake pedal freeplay: Travel again and gently depress the brake the brake pedal. The pedal should drop a very slight distance before the brakes begin to apply.
4. Check brakes at full travel speed: Depress and release the brake pedal several times while driving the truck. The brakes should bring the truck to a smooth stop without pulling, squealing, or shuddering. Drive motor should cut off before brakes apply.
5. Check brake holding capability and adjustment: Park the truck on a grade and depress brake pedal. The brake should hold a lift truck with rated load on a 15% grade.
6. Check the function of the parking brake: Park the truck on a grade and apply the parking brake. The parking brake should hold a lift truck with rated load on a 15% grade. Also, when travelling at full speed, application of the parking or service brake should stop the truck in one truck-length.



Release Braking

Release Braking is the automatic slowing of the truck, using the drive motor as a generator, when you lift your foot from the accelerator.

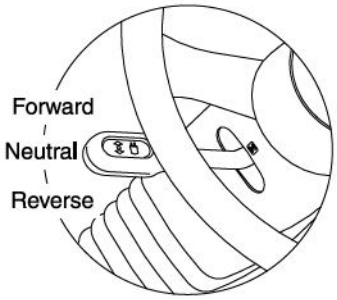
Accelerate to a Medium speed. Take your foot off the accelerator, truck should smoothly brake to a stop (distance depends on the RELEASE BRAKING setting).

When the truck is on a ramp and the accelerator pedal is released, the truck should brake to a stop and then continue the creep down the ramp at approx. 1 MPH.

See Section 19 for adjustment procedures for the Release Braking function.

Controlled Reversal

Accelerate to a slow speed and reverse the direction control without applying the foot brake. Truck should slow to a smooth stop then accelerate normally in the opposite direction.



Repeat in both directions at various speeds.

Acceleration

After checking to see that you have a clear path, check acceleration from a stand still condition. Drive the truck in a straight line at a high rate of speed. Acceleration should be smooth and without hesitation. Listen for unusual drive train noise. Repeat in opposite direction.

The accelerator pedal must move easily and smoothly throughout the acceleration stroke and return without

binding. There should be no restriction to movement on acceleration or deceleration.

Turning

1. Drive the truck in a straight line. The truck must travel without drifting to either side.
2. Drive slowly (creep speed) through a series of full right and left turns. Check steering response and smoothness of operation.
   - The turning effort must be the same in either direction. You should hear the power steering pump operate over relief when in a full turn.
   - The drive motor control system employs a speed differential between the left and right motors to facilitate turning. If this system is malfunctioning steering can be difficult and wheels can make scrubbing noises.

Refer to Group 26 for steer system troubleshooting information.

Internal Inspection

The internal inspection involves accessing the truck's inner compartments, inspecting the various electrical and hydraulic components, and checking fluid levels.

You can perform much of the inspection as you air clean the truck, which is described later in this Section.

CAUTION

Remove all jewelry (watch, rings, bracelet, neck chains, etc.) before working on electric trucks. Severe burns can result from contact with electrical circuits.

Proceed as follows:

1. Park the truck on a level surface.

IMPORTANT

Fully lower carriage and place upright in vertical position.

Discharging Controller Capacitors

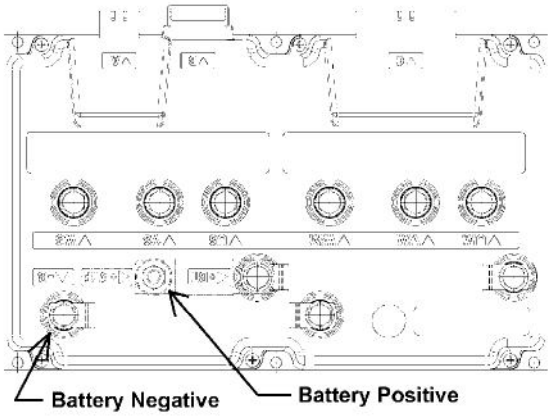
a. Turn off the key, put the direction control in neutral, and set the parking brake.
b. Disconnect the battery connector.
c. Turn the key switch on.

It is necessary to discharge the capacitors before you work on the controller.

NOTE

Make sure that the battery has first been disconnected at the battery receptacle.

To discharge the capacitors connect a 200 ohm 10 watt resistor between the positive and negative input post of the controller for 10 seconds.



General Checks

Look for:

- Pinched wires
- Frayed or broken cables
- Dirty or loose electrical connections
- Loose or bent linkage pins
- Signs of excessive wear or damage to linkages, hinges, hoses, lines, clamps, and fittings
- Leaks, (often indicated by dust or dirt built up) from pumps, steering gear, and reservoirs and plumbing
- Loose or damaged fasteners and motor mounts.

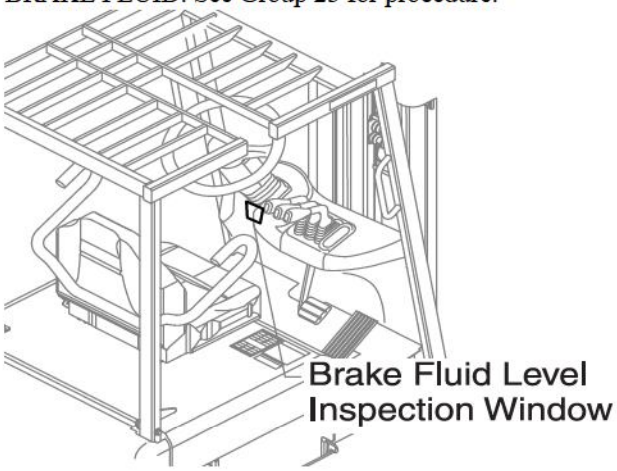
Fluid and Filters

IMPORTANT

Carriage must be fully lowered and upright in vertical position before you check hydraulic fluid.

Brake Fluid

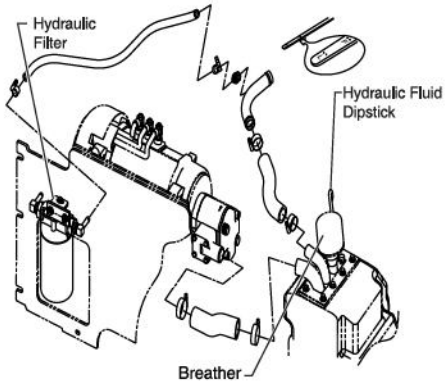
Using a flshlight, check **brake fluid** reservoir through inspection window. Fill to full mark, if low, with DOT 3 BRAKE FLUID. See Group 23 for procedure.



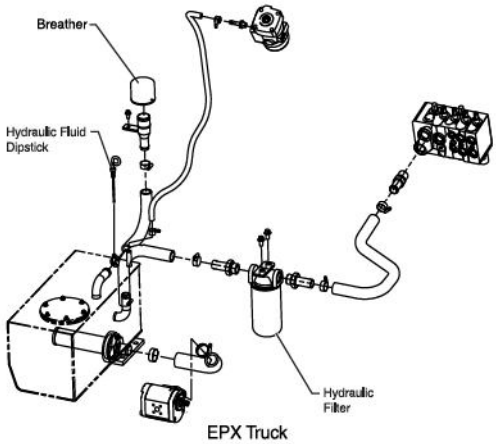
Hydraulic Fuid and Filters

Remove dipstick and check **hydraulic fluid level**. Top off if below full mark as described in Group 29.

Consult the periodic service chart (or service decal) to determine if it is time to replace the **sump cap filter** and/ or spin-on **hydraulic filter.** If they are due, their replacement is considered part of the **PM**.



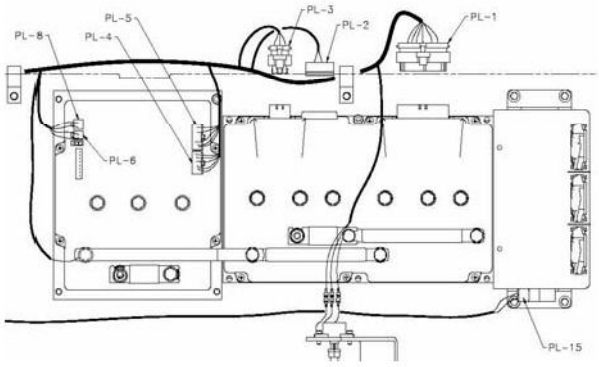
TMX Truck



EPX Truck

Controller Connectors

Pull connectors PL-1 through PL-8 and lubricate terminals with Clark Electrical Connector Grease, part # 2819910.



Make sure all connections are tight.

Battery

Inspect the battery for any damage, cracks, leaking condition, etc. If the terminals are corroded, clean and protect them with CLARK Battery Saver (available from your Clark dealer).

Check six cells with your hydrometer as desribed in Group 12. A consistent reading among the six cells indicates the battery is probably in good condition.

Perform the battery load test described in Group 12.

Air Cleaning the Truck

You must air clean the truck as you perform the internal inspection described earlier in this Section.

CAUTION

Wear suitable eye protection and protective clothing.

CAUTION

Battery must be disconnected and capacitors discharged before inserting air wand into truck compartments.

Use an air hose with special adapter or extension that has a control valve and nozzle to direct the air properly. Use clean, dry, low-pressure compressed air. Restrict air pressure to 30 psi (207 kPa), maximum. (OSHA requirement).

Use air pressure to:

- Blow air into all motor openings from various angles to remove dust.
- Blow off all switches, contactors, motor controls, and all compartment walls.
- Air-clean the upright assembly, drive axle, steering axle, steering cylinder.

If air pressure does not remove heavy deposits of grease, oil, etc., it may be necessary to use steam or liquid spray cleaner. DO NOT clean electrical components with steam.

Minor Adjustments Covered by PM

As you performed your inspections, you noted all needed adjustments and repairs on the PM report form. Some of these items may be outside the scope of the PM and should be reported for additional service. At this point in the PM, however, you should perform certain adjustment and repairs, if needed. These include:

Switch Adjustments

If any action that is triggered or indicated by a switch does not occur at the right instant, check the switch adjustment. To adjust the switch, slightly loosen the mounting screws and slide the switch to appropriately advance or retard the point at which the switch trips. Retighten the screws. If switch or circuitry is defective, report this on the PM form as a further needed repair.

Parking Brake Adjustment

Adjust the parking brake at the caliper end. Loosen the jamb nut and turn the adjusting nut to increase (or decrease) the slack in the cable. Tighten the jamb nut.

The brake caliper should be fully released when the parking brake handle is in the off position and should be fully applied when the handle is fully back.

See Group 23 for detailed procedure.

Racking Adjustments

Racking adjustments are part of the PM. To eliminate racking on back tilt, add or remove shims as explained in Group 34. For forward racking adjustment, adjust rod end mounting yokes as described in Group 34.

Chain Adjustments

With the upright fully lowered, the tops of the upright rails should be flush with each other within 4 mm (1/8 in). Paired chains should have equal tension. Fork heels should rest 13 to 38 mm (0.5 to 1.5 in) off ground.

Check for chain stretch with chain ruler as described in Group 34.

Basic chain adjustment procedure: With upright and carriage fully lowered, loosen jamb nut on chain anchor, loosen adjusting nut, and turn adjusting nut to obtain correct length/tension. Tighten jamb nut.

See Group 34 for detailed procedure.

Missing or Loose Fasteners

Replace/tighten missing or loose fasteners during the PM. This incudes bolts, cotter pins, cable ties, and so on.