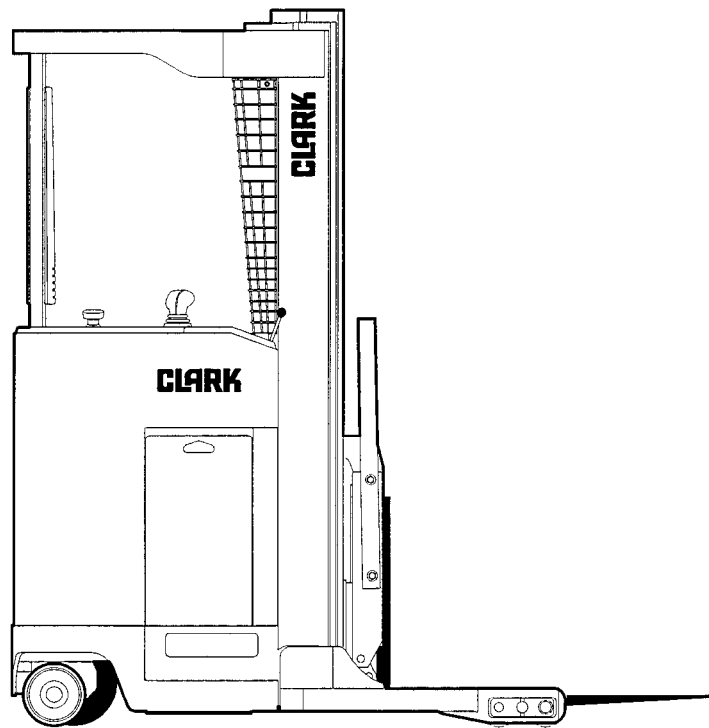


# SM-587 NPR 17/20



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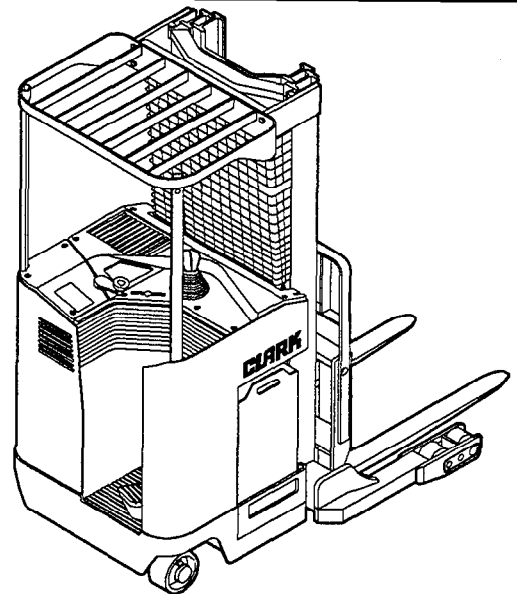
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# Service Manual SM -587

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**NPR-345**

**NPR-17  
NPR-20**

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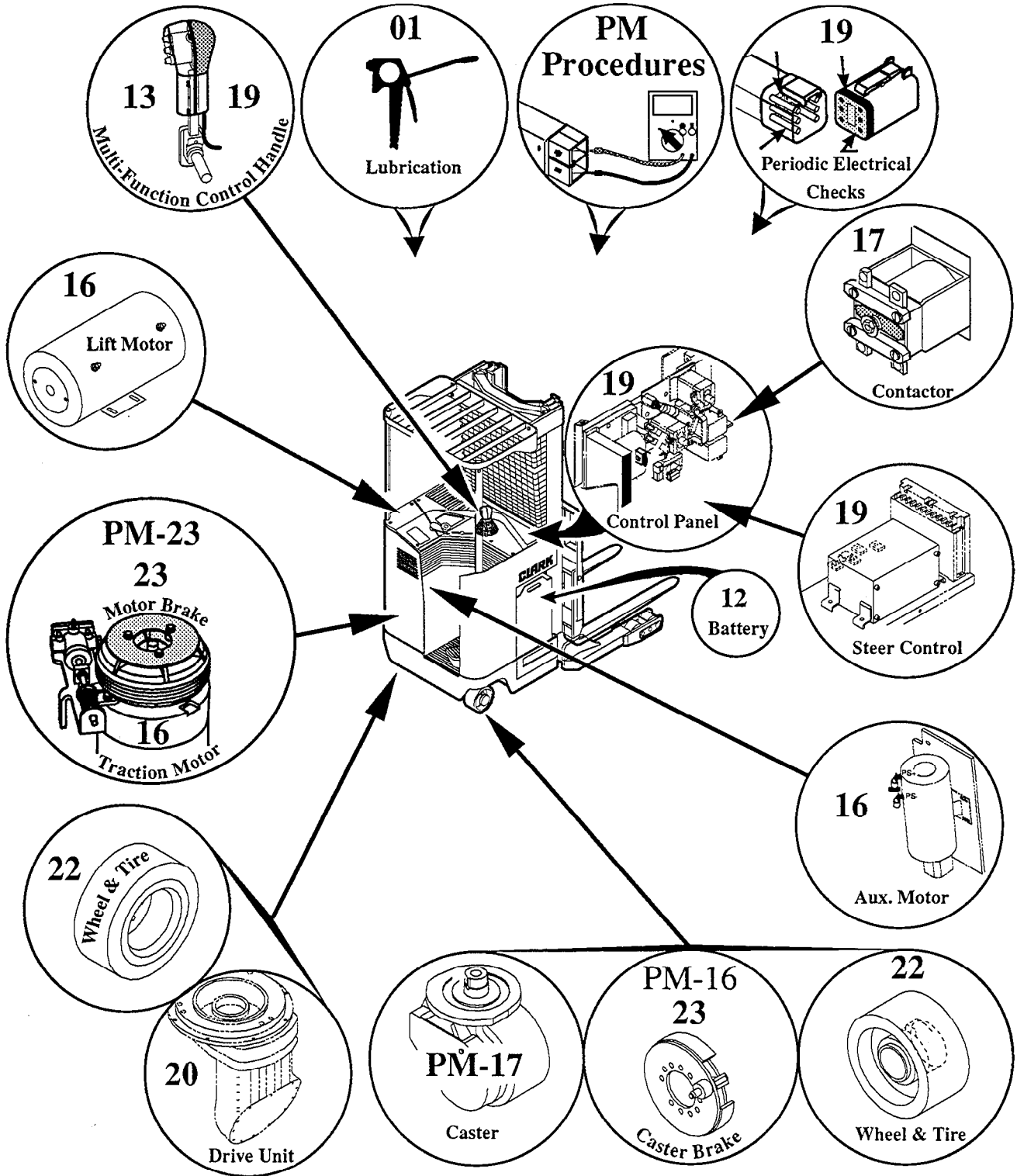
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## NPR-345



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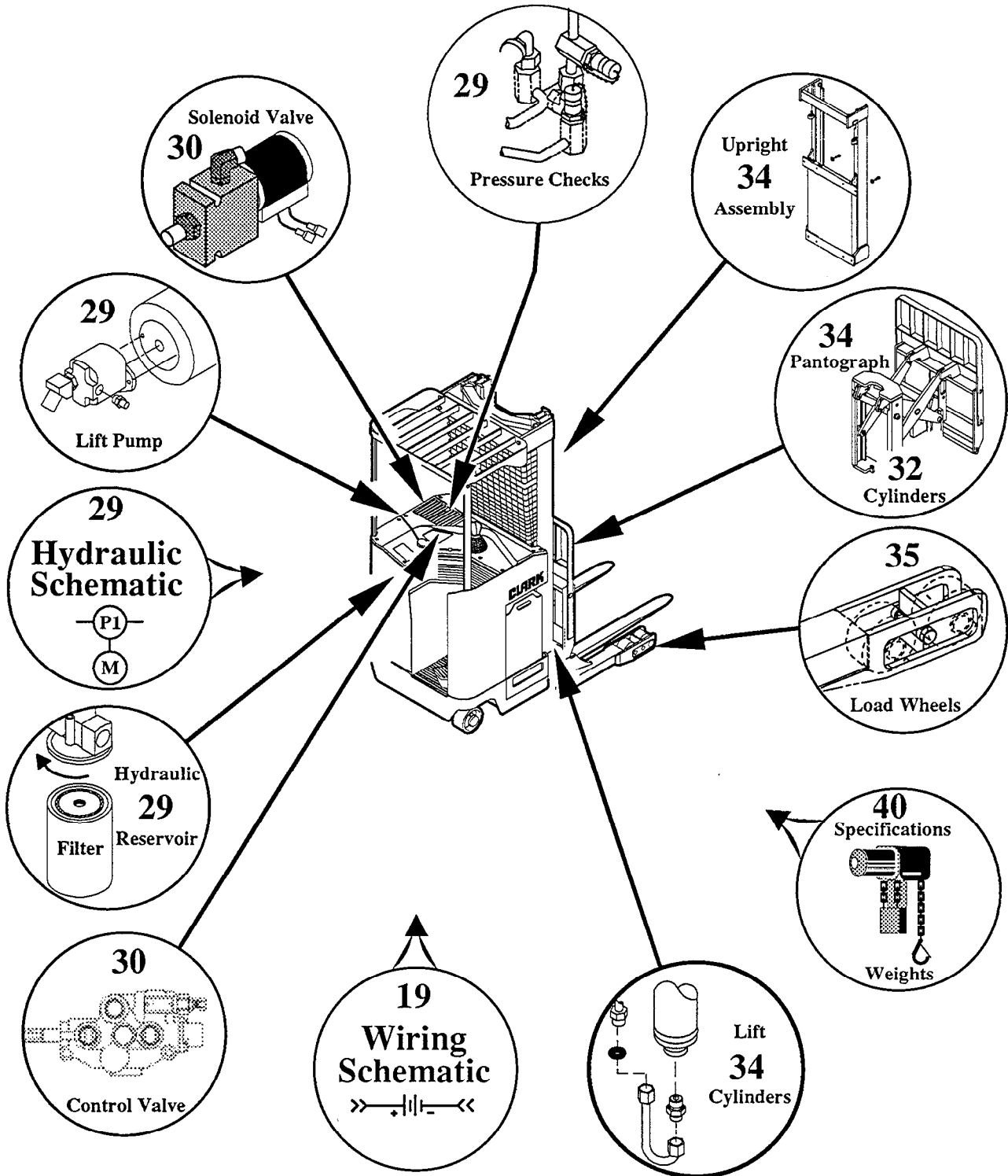
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The following is a list of "CAUTIONS" connected with the operation and maintenance of trucks equipped with Solid State Control Panels.


## Safety Signs and Safety Messages


SAFETY SIGNS and MESSAGES are placed in this manual and also on the truck to provide instructions and to identify specific areas where potential hazards exist and special precautions must be taken. Be sure you know and understand the meaning of these instructions, signs and messages. Damage to the truck or serious injury to you or other persons may result if these messages are not followed. If warning decals are damaged they must be replaced. Contact your Clark dealer for replacements.

**NOTICE** This message is used when special information, instructions or identification is required relating to procedures, equipment, tools, pressures, capacities and other special data.

**IMPORTANT** This message is used when special precautions should be taken to ensure a correct action or to avoid damage to or malfunction of the truck or a component.

 **CAUTION** This message is used as a reminder of safety practices which can result in personal injury if proper precautions are not taken.

 **WARNING** This message is used when a hazard exists which can result in serious personal injury or death, if proper precautions are not taken.

 **DANGER** This message is used when an extreme hazard exists.

## **WELDING ON TRUCKS**

1. Make sure the truck has no grounds.
2. Disconnect truck battery.
3. Protect electrical wiring and components from weld spatter with a shield.
4. Ventilate battery or remove battery from truck.

**If the above is not followed, damage can result to wiring and electrical components on a solid state control truck.**

# CAUTIONS

---

## DO NOT STEAM CLEAN

**Do not steam clean a solid state controlled truck as excessive moisture will interfere with proper operation of the solid state components.**

Solid State Controls should be cleaned at regular intervals. Blowing dirt off with an air hose (that is restricted to 30 psi [207 kPa]) periodically will, for the most part, eliminate any serious cleaning problems. Should the need arise for a more thorough cleaning, water may be hosed over the control and if necessary a mild detergent applied such as that used in washing dishes in our home. The detergent should be rinsed off and the controls must be thoroughly air dried before putting truck into service.

Periodic cleaning, such as those mentioned above, should preclude the need for using a degreaser. However, if a degreaser is used we recommend the following:

Only approved solvents should be used to clean Solid State Control Components. Use Clark #1801146 Degreaser, or the equivalent to MS-180 Freon TF Degreaser and Cleaner.

## CHECK POLARITY

Battery Polarity must be correct or the truck will not operate.

## USE TRUCK BATTERY ONLY

Do not use a motor generator unit such as "ready power" or a battery charger to move and/or check this truck as serious damage may occur

## IMPORTANT SAFETY NOTICE

**Read and understand all Safety Precautions and Warnings before performing repairs on lift trucks.**

Appropriate service methods and proper repair procedures are essential to the safe, reliable operation of industrial trucks as well as the personal safety of the individual doing the work. This Service Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure successful repair and reliable truck operation.

There are numerous variations in procedures, techniques, tools and parts for servicing industrial trucks, as well as in the skill of the individual doing the work.

This manual cannot possibly anticipate all such variations and provide advice or precautions as to each. Accordingly, anyone departing from the instructions provided in this manual through procedures used or choice of tools, materials, and parts may jeopardize his or her personal safety and/or the safety of the vehicle user.

Improper or careless techniques cause accidents. Don't take chances with incorrect or damaged equipment. Read and understand the procedures for safe operation and maintenance outlined in this manual.

**Drive and work safely and follow the safety signs and their messages displayed in the work area, on the truck and in this manual.**

## GENERAL PRECAUTIONS

The following list contains general precautions that should be followed when working on a lift truck.

- Service Electric Truck Batteries in a well-ventilated area to avoid the danger of lighting explosive gases, clear of pedestrians and with adequate overhead clearance and on a flat, level surface.
- Always wear safety glasses for eye protection.
- Remove rings, watches, loose jewelry and open clothing before working on a vehicle, to avoid serious injury.
- Do not smoke while working on a vehicle.
- Put power key switch in the OFF position, unless otherwise required by the procedure.
- Set the parking brake. Place chocks to the front and rear surfaces of the tires to provide further restraint from inadvertent vehicle movement.
- Use safety stands or blocks whenever a procedure requires you to be under the vehicle.
- Follow the Safety Instructions outlined in Group 12, "Handling Storage Batteries".
- Always Discharge the Capacitors prior to working on or around electrical components. Refer to the instructions outlined in Group 19, "Discharging Capacitors".



### CAUTION

**Avoid contact with Battery Acid. The battery contains corrosive acid which can cause injury. Follow the instructions outlined in Group 12 "Handling Storage Batteries" and those instructions received with your battery and charger.**

# Foreword

---

**This Service Publication** provides information covering normal service, maintenance and repair of the Clark industrial lift trucks noted on the cover. It has been specifically prepared to help owners and service personnel maintain these trucks in efficient and safe operating condition.

**This manual is intended** for use by persons who are trained and authorized to do lift truck maintenance. It is designed to provide essential information about the correct and safe service maintenance and repair of the truck by *trained mechanics or service technicians*.

**The information is organized by use of the Basic Group Numbering System** used in the Master Parts Book and the Customer Parts Manuals. The manual includes:

## **P.M.**

Planned Maintenance Procedures including precautions and safe maintenance recommendations.

## **01-40**

Service specifications, adjustments, maintenance and overhaul procedures including lubrication charts, recommended lubricants and service weights, etc.

**General and detailed service and repair procedures** are outlined (as required) for each component or subsystem. Some procedures include explanations that are common to several components or subsystems.

**The Pictorial Index** lists components or systems by Basic Group Number of Major Parts. Additional content listings are placed at the beginning of each Section in the manual.

**The Table of Contents** list the pages in this manual.

**Procedures have been made easier to use** by providing specific steps only when necessary and general instructions required to explain the activity, component, assembly, or process being worked on. The technician is expected to include obvious additional steps of standard procedure for removal, disassembly, cleaning, inspection, reassembly, installation, etc., as needed.

**To be better prepared** to do the necessary service work, take time to completely read the entire procedure, including any special instructions, before starting any work.

**The technician is cautioned and expected to...**

**... before beginning to work.**

- Take time to completely read (entire) procedures, including any special instructions.

## **ABOUT PLANNED MAINTENANCE**

**The Planned Maintenance Procedures** located in the front of this manual provide a basic step by step guide which should be followed in servicing the vehicle. Adjustment Procedures, Specifications, Lubrication Guides, Overhaul Procedures and other data are found in the rear of this manual listed under *Group and Section Numbers*. Refer to the index.

Regular, correct maintenance and care of industrial trucks is not only important for long and efficient truck life but it is essential for safe operation. The importance of proper maintenance through planned service, inspection and qualified repairs cannot be emphasized too strongly. Preventive maintenance instructions are provided for reference in setting-up and conducting a recommended periodic Planned Maintenance (PM) program.

## **NOTICE**

The descriptions and specifications included in this manual were in effect at the time of printing. Clark reserves the right to discontinue models at any time, or make improvements and changes in specifications or design without notice and without incurring obligation. Specifications, torques, pressures, measurements, adjustments, illustrations and other items may change at any time. Contact your authorized CLARK dealer for information on possible updates or revisions.

**An effective PM program** should incorporate two basic phases:

1. An inspection performed by the driver or maintenance man at the beginning of each shift. This is a quick visual check for obvious damage and leaks and a functional test... *a check of fluids and water levels, lights (if so equipped), instruments and warning devices.*
2. The Planned Maintenance routine is based on 50 to 250 operating hours ... *with the interval being determined by operating conditions.*

### **Records will tell you how often PM should be done.**

- If an operation is clean and not strenuous, a PM interval can be extended.
- If an operation is extremely dirty and strenuous, the PM interval may have to be reduced.

**If the PM is faithfully followed**, needs for repair, major adjustment and component replacement will be discovered and such work can be scheduled eliminating unnecessary downtime and cost. For instance, brake checks which are part of the PM will uncover the need for adjustments and/or repairs which may be required periodically.

### **The objectives of PM are:**

1. To reduce costly unscheduled downtime.
2. Reduce maintenance costs.
3. Increase vehicle productivity.
4. Increase personal safety of drivers and other personnel.

### **Inspection Forms**

To insure that the daily inspection and PM are properly performed, we recommended the use of inspection forms. Such forms not only provide a guide for the inspections and maintenance requirements for each vehicle, they will assist you in determining when to schedule a vehicle for major repairs. Consequently these repairs can be done without the disruptive effect of unscheduled down time.

#### **NOTE**

Refer to the Operator's Manual, located on the truck, for additional information on the operation, care and maintenance of your truck.

*Contact your authorized Clark dealer for more information on maintenance and repair of these trucks.*

## The Planned Maintenance Procedures

Outlined on the following pages are organized in five basic categories. They are:

1. Walk Around Visual Inspection.
2. Operational Tests.
3. Cleaning.
4. Checks and Minor Adjustments.
5. Lubrication.

Each category is preceded with a summary of the inspections, checks, tests, etc., that should be performed in each category.

The nature of problems found during a P.M. should be noted in the "comments" portion of the check sheet. Whenever a system or component is faulty or unsafe, it must be noted on the check sheet and reported to the designated authority at the conclusion of the P.M.

## P.M. Check Sheet Example

### P.M. CHECK SHEET

A special coding system on the P.M. Check sheet allows truck condition to be reported with a minimum number of words. As the P.M. is performed, a mark should be made in the appropriate box of the component being checked.

- (✓) indicates the particular truck component or system has been checked.
- (x) indicates the component or system is in need of a minor adjustment or service (not part of the normal P.M.) that should be taken care of in the near future.
- (r) indicates there is a potential problem that could result in damage to a component or system and requires attention.
- (s) indicates the need for urgent repair or replacement of a component or system and the truck should be shut down as possible property damage or personnel injury may result.

1. Visual Inspection			
A. Oil Leaks	✓		
B. Switches	✓		
C. Drive Tire	✓		
D. Load Wheels	✓		
E. Caster Wheels	✓		
F. Control Linkage	✓		
2. Operational Tests			
A. Brakes			S
B. Brake Switch		r	
C. Horn	✓		
D. Steering	✓		
E. Speed Control	X		
F. Lift & Lower Control	✓		

### Code

	✓ = O.K.
O.K.	X = Adjust (Not P.M.)
Potential	r = Repair or Replace
Urgent	S = Requires Shop Repair

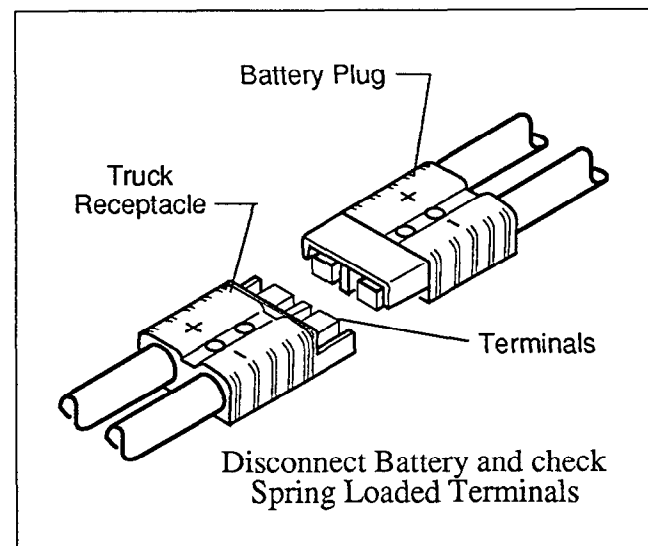
### Walk Around Visual Inspection Summary

- Visible frame damage.
- Tire Wear and/or lodged foreign objects in tire tread and/or badly damaged side walls.
- Overhead Guard for security of mounting (loose or missing fasteners) and damage.
- Visible fluid leaks.
- Presence and condition of covers, pads, floor mat, decals and truck data plate.
- Safety Screen and/or Glass for security of mounting and damage.
- Visible signs of wear and/or damage to upright.
- Load Back Rest for security of mounting and damage.
- Check that "ground chain link" is touching the floor.

### Visual Inspection

#### 1. Inspect Battery Plug & Truck Receptacle

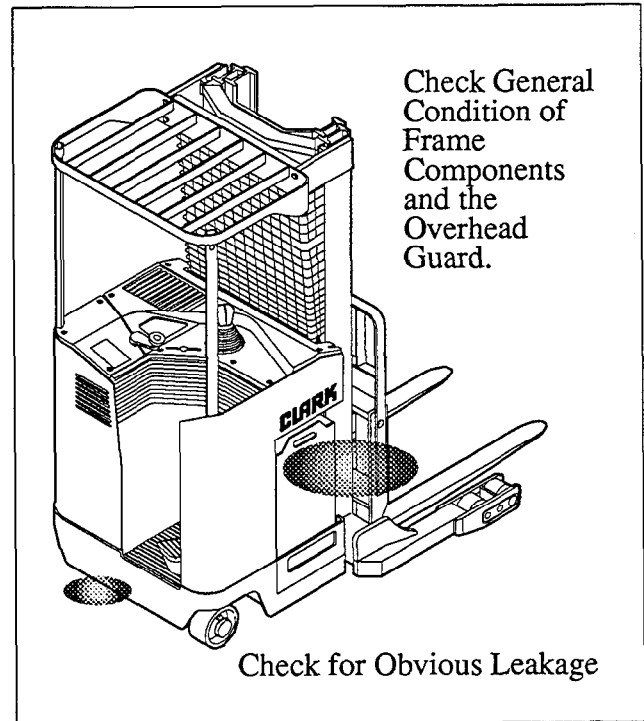
- Disconnect battery from truck. Pull back on the battery disconnect lever located at the right front corner of the console.
- Inspect the spring loaded terminals in the truck battery receptacle and check the battery plug terminals. Burned or pitted terminals should be noted on the P.M. check sheet.





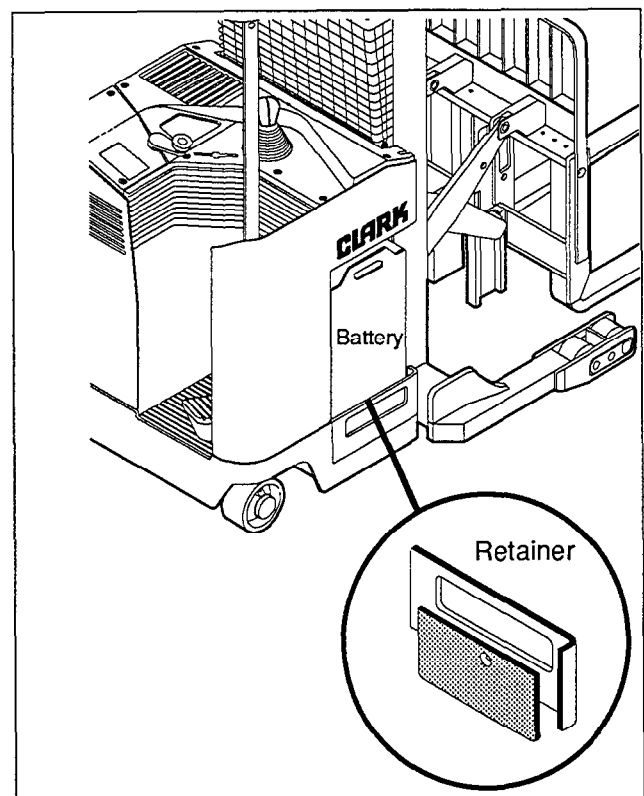
### 2. Check for Obvious Oil Leaks and general condition of Frame & Overhead Guard

- Make a quick overall inspection for oil leaks. If oil leaks are found, at this time, or later in the P.M., fix the minor leaks and report on the check sheet any leaks which will require major repair.
- 3. Check condition of covers, pads and floor mat.
  - Inspect name plates, warning decals and truck date plate for damage and to be sure none are missing. Be sure warning and instructional decals are readable.
- 4. Check safety screen and/or glass for security of mounting and damage.
  - Check overhead guard for damage and security of mounting. Be sure the legs of the overhead guard are mounted securely and are not damaged, cracked or bent.



### 5. Battery Retainers

- Check battery retainers for damage. Make certain retainers are locked in position at each end of the battery compartment.

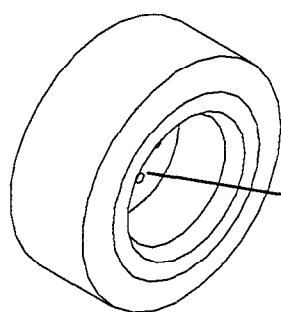
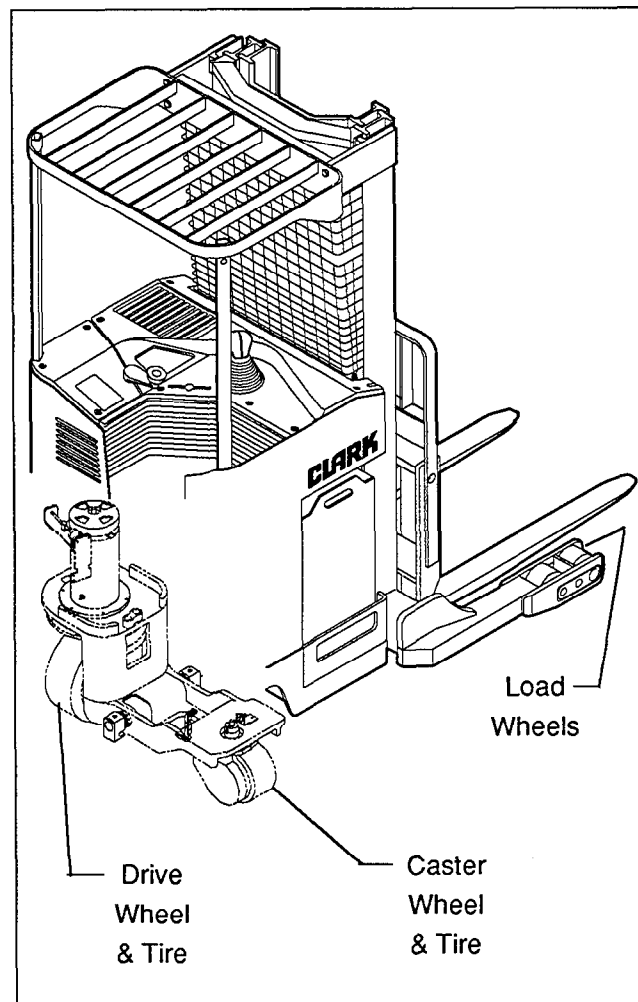


## Planned Maintenance Procedures

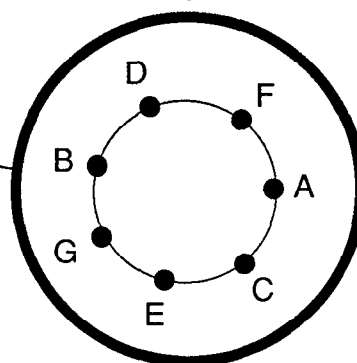
### 6. Inspect Wheels & Tires

- Check for obvious damage to tires on the load, caster and drive wheels.
- Look for excessive tire wear, cuts, breaks, "chunking" or bond failure between the tires and wheels.
- Remove objects that are embedded in the tire.
- Make sure grease fittings are not damaged and none are missing.
- Be sure drive wheel fasteners are secure and none are missing. If they are loose, torque them to specifications. Fasteners must be tightened using a diagonal sequence as shown below (lettered A through G).

Retorque drive wheel fasteners after the first 200 hours of operation.



Fastener Tightening Sequence



TORQUE FASTENERS  
TO:  
124 - 139 LB. FT.  
(168 - 188 N•M)

## Operational Test Summary

- Check Multi-Function control for freedom of operation.
- Check battery connection.
- Check horn.
- Check key switch and dash display.
- Check upright operation.
- Check speed limit switch operation.
- Check brakes.
- Check hour meter.
- Check steering.
- Check control plugging.
- Check acceleration.

## Operational Tests

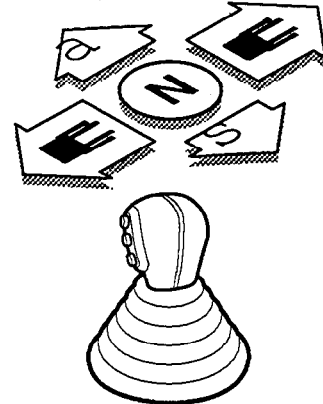
### a. Check Controls

#### NOTE

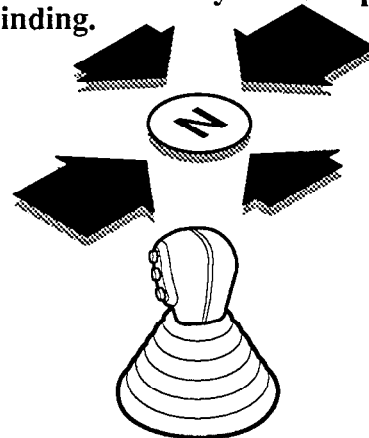
Battery connector should be disconnected and key switch turned OFF before making these checks.

- Inspect multi-function control handle for freedom of operation. Move control to the full forward and rearward positions. Then move it into the full left and full right positions. The control must operate freely without binding and spring return to neutral.
- Connect battery.

Move control through all functions checking for freedom of movement.



Check the Multi-Function Control for Freedom of movement. Control should spring return to neutral from any actuated position without binding.



## Planned Maintenance Procedures

- b. Check horn to be sure it operates.
- c. Turn key switch ON.

### Check the Diagnostic Display & Key Switch

- *Digital readout* should display "8888" for about one second after you turn the key switch ON. This indicates that the digital readout is okay. then, either the battery symbol or the wrench symbol light should come ON.
  - *Battery Symbol*: When the battery symbol light comes on, the digital readout shows the percentage of usable remaining battery charge. If the readout registers 19 or less, the readout will flash.
  - *Wrench Symbol*: If this light comes on, a status code will appear on the digital readout. The status code may indicate an easily correctable "operator fault" or it may indicate that the truck should be serviced.
  - *Fault Codes*: Codes -01 through -03, -06 and -08 are usually operator fault codes, and can be corrected by the operator as explained in Group 19, Section 3. A momentary display of status code -99 indicates that the truck hours exceed the preprogrammed maintenance reminder hours and the functions must be reset after completing the P.M.
- d. Check the hour meter. Turn the key switch to the OFF position. The hourglass symbol light should come on. The hours registered on the truck should appear on the digital readout for about four seconds. Record this hour meter reading on the PM check sheet.

