SM 646
EC 90/120
Service Manual



CLARK Technical Publications
Lexington, KY
40508

MidWestTech | Clark EC 90, 120 Forklift Service Manual | Publication SM-646

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CLARK Material Handling Company

Alphabetical Listing of Topics

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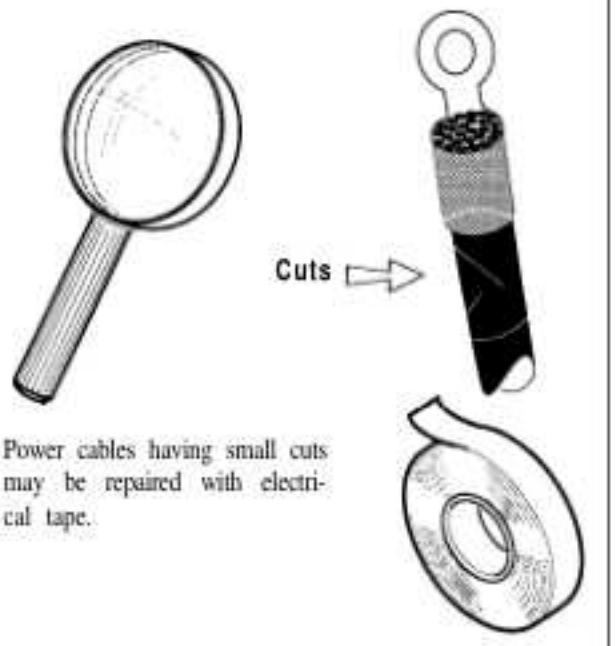
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Checking Power Cables

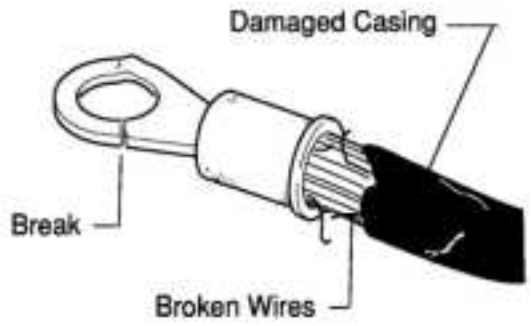
Every cable and wiring harness on this truck is manufactured to an exact specification. A shorter cable or harness will not fit. If either a harness or cable is routed improperly, it will not fit. Subsequently, electrical shorts and damaged components may result if the replacement part is the wrong one, or if it is routed incorrectly.



Power cables having small cuts may be repaired with electrical tape.

Repairable Damage

Cables having damage as shown in illustration below should be removed immediately and replaced with new. Be certain the replacement cable is the exact same length, size and has the proper connector. Make absolutely certain the cable end is properly crimped and its connection properly torqued upon installation

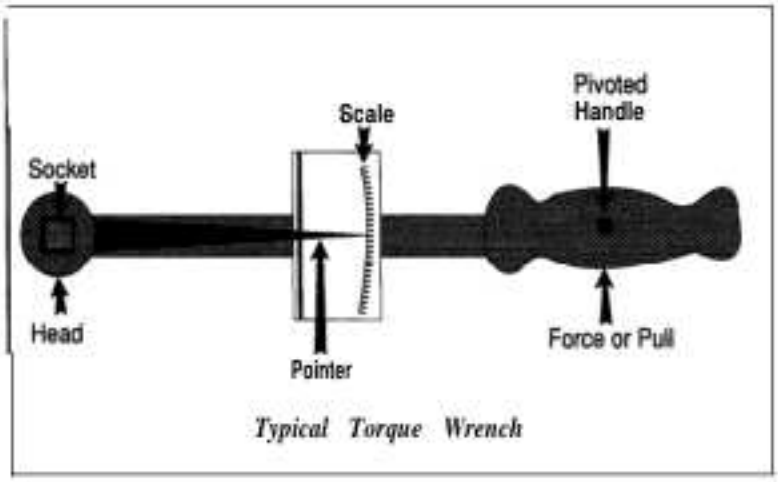


*Cable **Unfit** for Further Service*

Torquing Fasteners

Improperly torqued fasteners can cause damage

Use an appropriate wrench and tighten all fasteners to the torque specified in the following inspection procedures.



Typical Torque Wrench

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Control Panel Maintenance

The SCR control, like all electrical apparatus, has thermal losses. The semiconductor junctions have finite temperature limits, above which they can be damaged.

For these reasons, during normal maintenance, do not expose components to excessive heat (such as steam cleaning).

Observe the following DO'S and DON'TS:

- Any trucks that will be used in ambients of 50°C (120°F) or over should be brought to attention of CLARK Material Handling Co.
- All external components having inductive coils must be filtered.

IMPORTANT

Do not clean electrical components with steam. Use only approved solvents to clean solid state components.

- **Not all degreasers are acceptable.** We recommend Clark #1801146 degreaser, or the equivalent to MS-180 Freon TF degreaser and cleaner.
- **Do not HIPOT (or MEGGER) control.**
- Use a lead-acid battery with voltage and ampere hour ratings specified for the vehicle. Follow normal battery maintenance procedures, recharging before 80 percent discharged and with periodic equalizing charges.
- DO NOT plug the truck when it is jacked up and drive wheels are in a free-wheeling position. The high motor speeds can create excessive voltages that can be harmful to the control.

Normal Cleaning

- Blowing dirt off with an air hose periodically will, for the most part, eliminate any serious cleaning problems.

  For more thorough cleaning, hose water over the control, and use a mild detergent such as that used for washing dishes. Rinse. Dry the control with an air hose.
- The Control Panel Assembly must be **thoroughly dry** before putting the truck back into service or components may be damaged.
- Keep terminal boards and other exposed SCR control parts free from dirt and paint; they could change effective resistance between points.

Control Panel Troubleshooting

A digital VOM (Simpson Digital Multimeter model 461, or equivalent) is recommended for all electrical and control setting checks.

When diagnosing trouble with an SCR control, DO NOT begin by disassembling components.

Start by analyzing symptoms of complaint. Make a preliminary investigation, then systematically determine probable cause.

Troubleshooting SCR System

- **Get the facts.** Never start troubleshooting until you get facts. Talk with truck operator and review work order.
- **Determine where to start.** Operate truck to observe fault. Determine what checks should be made.
- **Perform basic checks.** Check battery. Test for grounds and shorts. Do not assume these checks do not have to be made.
- **Take time to investigate.** Unnecessary work can be avoided by diagnosing trouble accurately on basis of preliminary investigation, and correct use of information in troubleshooting guide.
- **Use symptoms indicated by the trouble** to locate the proper diagnosis chart in Troubleshooting section. Use the Sequence of Operation manual as a diagnostic tool.
- **Use flow chart.** To find root cause, use the flow chart in the troubleshooting guide. It defines symptoms, possible causes and solutions.
- **Locate trouble by process of elimination. The** cause is usually simple, rather than mysterious and complicated.
- **MOST IMPORTANT: Use the Electrical Schematic Diagram for the truck you are working on. You** must be able to trace the:
  - **POWER CIRCUITS** which consist of heavy cables and main power components of truck.
  - **CONTROL CIRCUITS** which control speed, time delay, and controlled plugging.
  - **DIRECTIONAL CIRCUITS** which control forward and reverse contactors.
  - **ACCESSORY CIRCUITS** which control components, including horn, battery indicator and hour meter.

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Section 1.

Counterweight Removal and Installation

Counterweight Removal 2
Counterweight Installation 3

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