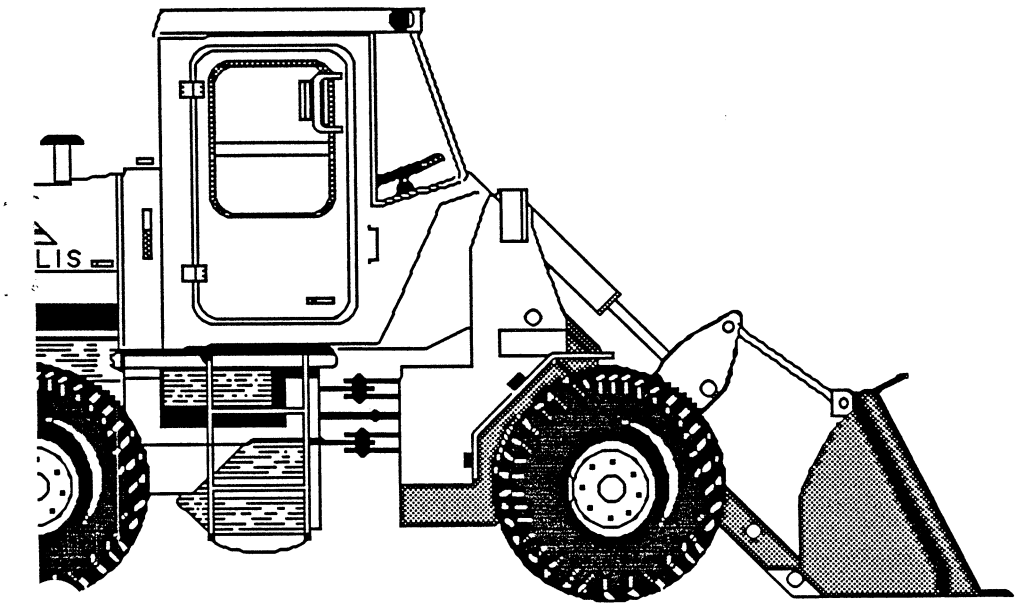
FIATALLIS®

# 345-B

## wheel loader

service manual

# ELECTRICAL SYSTEMS



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# TOPIC 1 ELECTRICAL SYSTEM DESCRIPTION

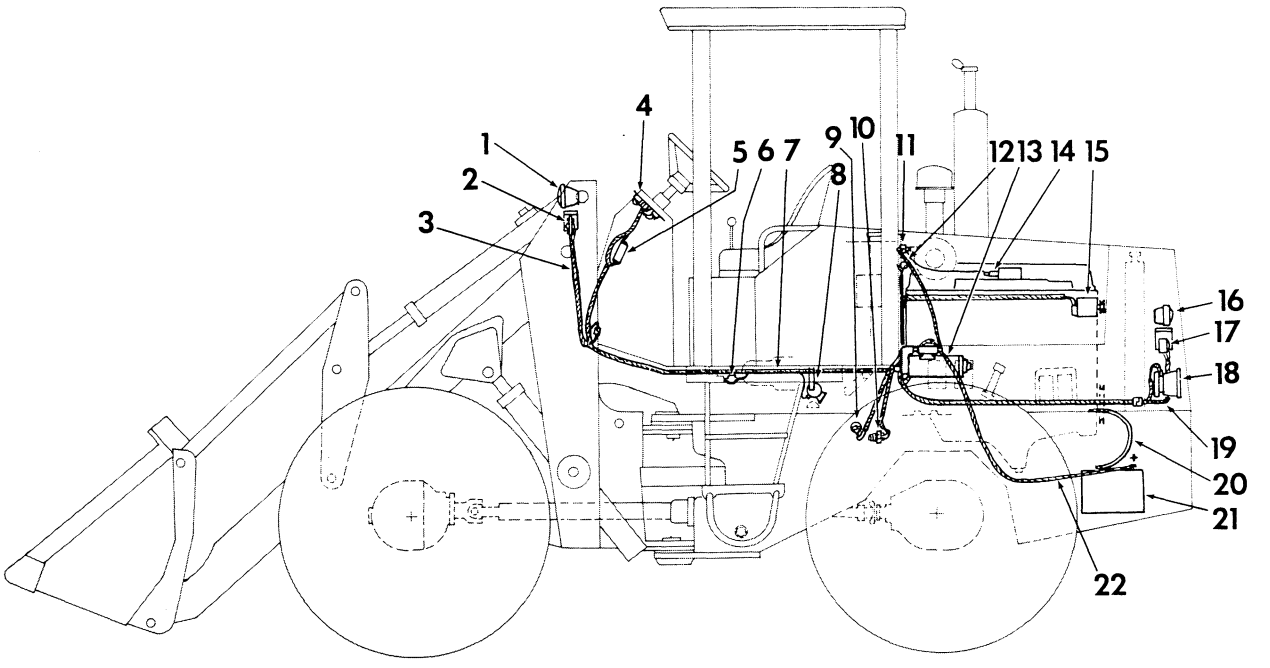


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FIG. 1 ELECTRICAL SYSTEM

1. Roadlight
2. Directional-Warning light
3. Harness
4. Instrument panel
5. Junction box
6. Stoplight switch
7. Harness
8. Horn
9. Back-up alarm switch
10. Neutral switch
11. Air heater solenoid
12. Hourmeter
13. Starter motor
14. Air heater element
15. Alternator and Regulator
16. Floodlight
17. Tail light
18. Back-up alarm
19. Harness
20. Cable
21. Battery
22. Cable

## 1.1 GENERAL INFORMATION

1.1.1
The loader electric system consists of the following three circuits as shown in FIG. 1 above:

A. Charging Circuit (See page 22 for more detailed descrription)
B. Cranking Circuit (See page 41 for more detailed description)
C. Accessory Circuit (See page 50 for more detailed description)

## 1.2 HOW DO THE CIRCUITS OPERATE

1.2.1
CHARGING CIRCUIT — FIG. 2, produces energy for the electrical system.

1.2.2
When the batteries are fully charged and the electrical load is normal, the regulator calls on the alternator alone to power the system. Refer to FIG. 2.

*Study SAFETY RULES, pages I thru III, thoroughly for the protection of personal and machine safety.*

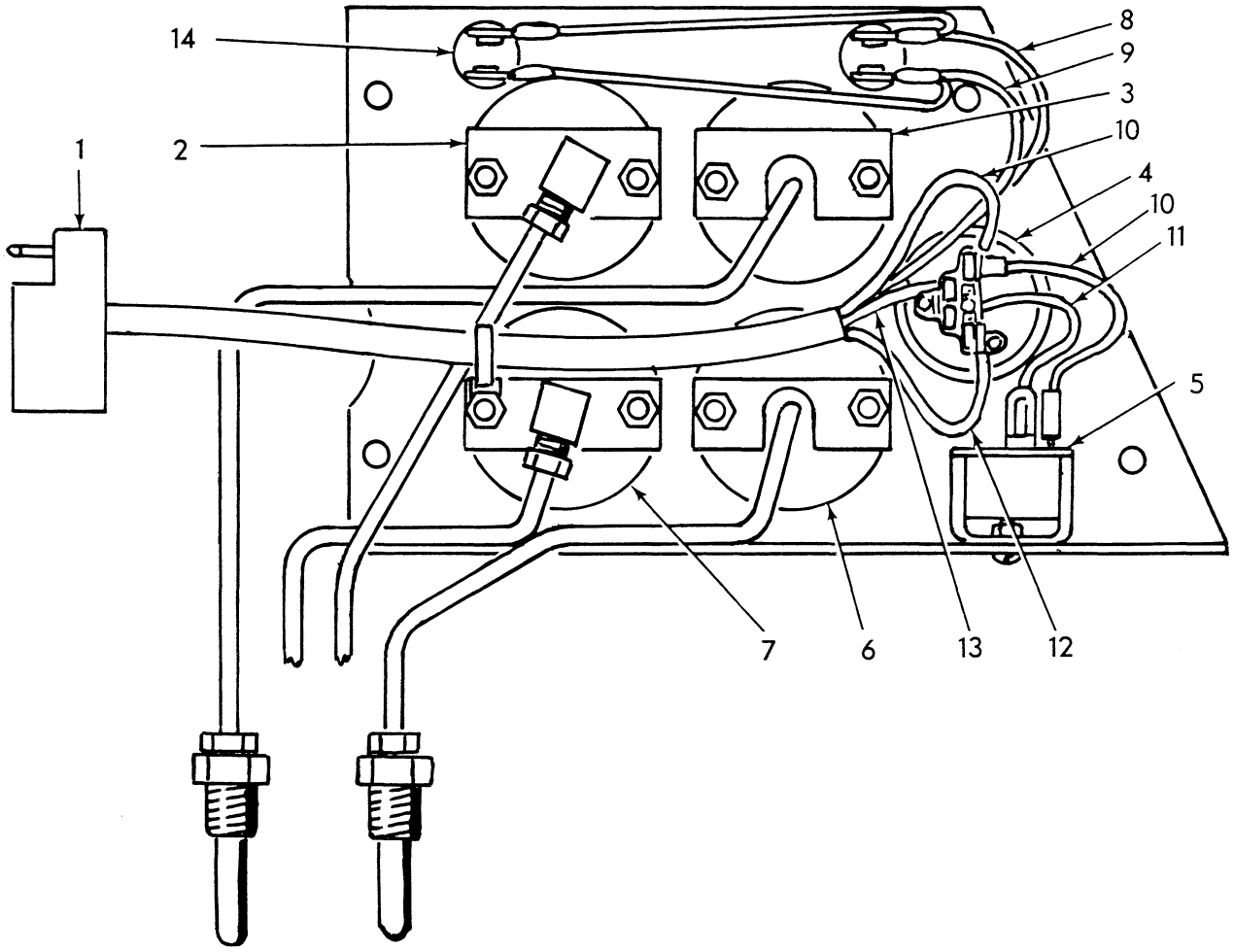


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FIG. 11-A REAR VIEW – LEFT HAND INSTRUMENT PANEL

1. Harness
2. Engine oil pressure gauge
3. Engine water temperature gauge
4. Turn signal switch
5. Turn signal flasher
6. Converter oil temperature gauge
7. Converter oil pressure gauge
8. Wire, black
9. Wire, grey
10. Wire, red w/white tracer
11. Wire, tan
12. Wire, green
13. Wire, yellow
14. Panel light

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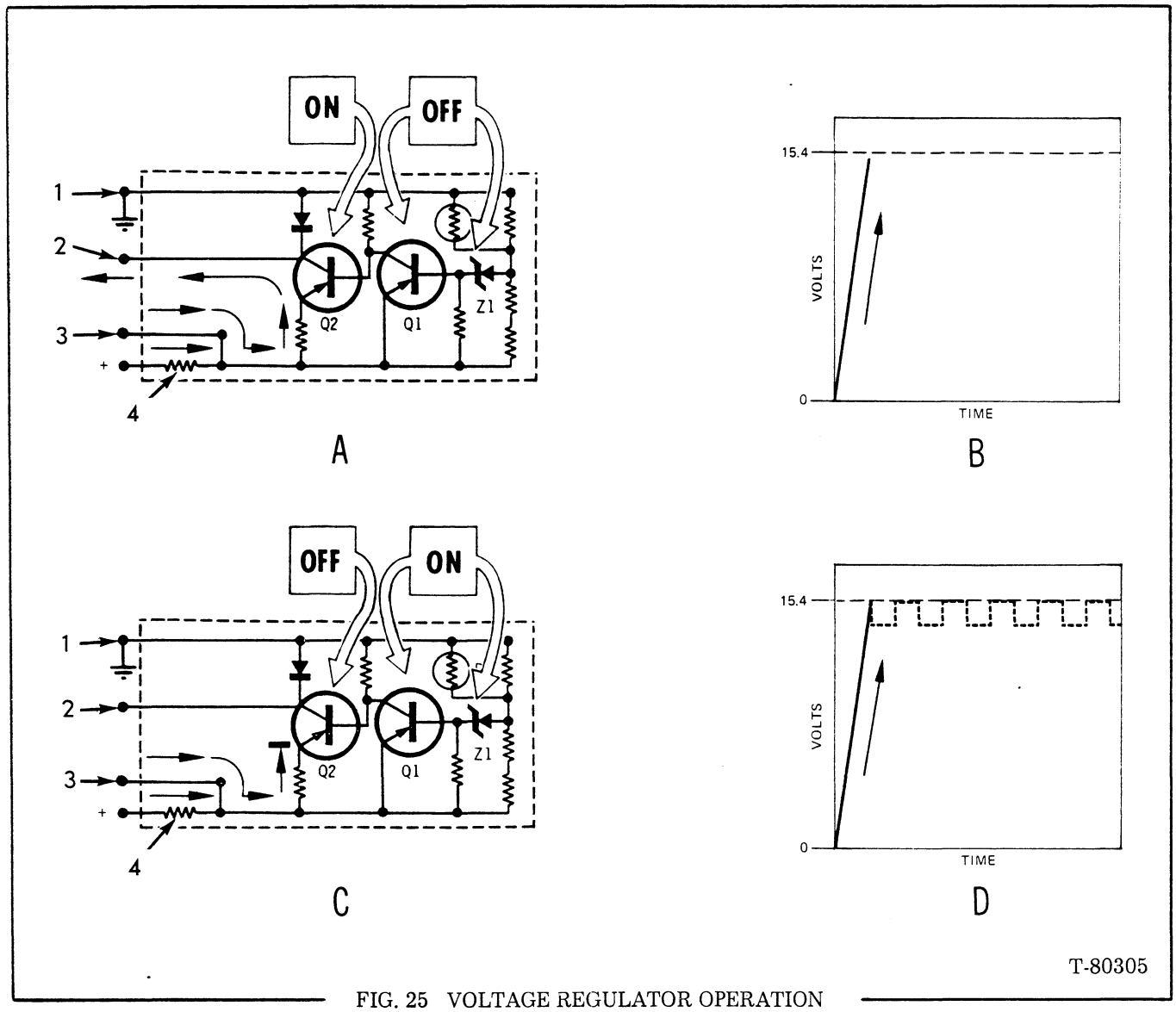



FIG. 25 VOLTAGE REGULATOR OPERATION

1. Negative terminal
2. Field terminal
3. Auxiliary terminal
4. Excitiation resistor

## 5.2 VOLTAGE REGULATOR

### 5.2.1 DESCRIPTION

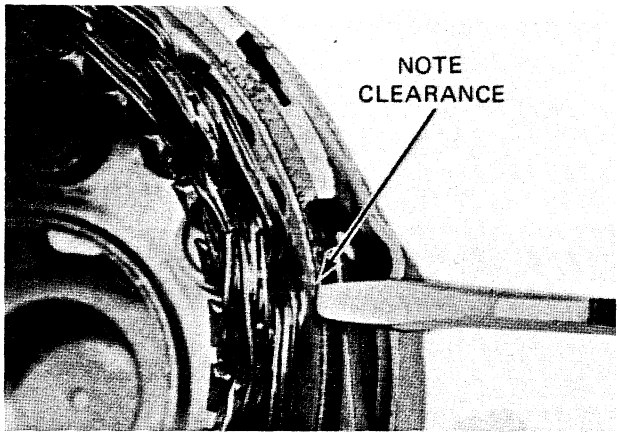
5.2.1.1
The voltage regulator is an electronic switching device. It senses voltage appearing at the alternator auxiliary terminal and supplies the necessary field current to maintain system voltage at the alternator output terminals.

5.2.1.2
A Zener Diode and Thermistor are incorporated in the voltage regulator circuit, along with calibrating resistors and two switching transistors. The Zener Diode is the voltage sensitive component, while the Thermistor serves to adjust the Zener action to suit regulator ambient temperature.

5.5.6 STATOR REMOVAL

5.5.6.1
Remove through bolts holding front and rear housings (see FIG. 19).

5.5.6.2
Insert two small screwdrivers in the stator slots between stator and front housing. Do not insert blade deeper than 1/16" to avoid damaging stator windings (FIG. 40).




T-80313D
FIG. 40 PROPER TOOL REPLACEMENT

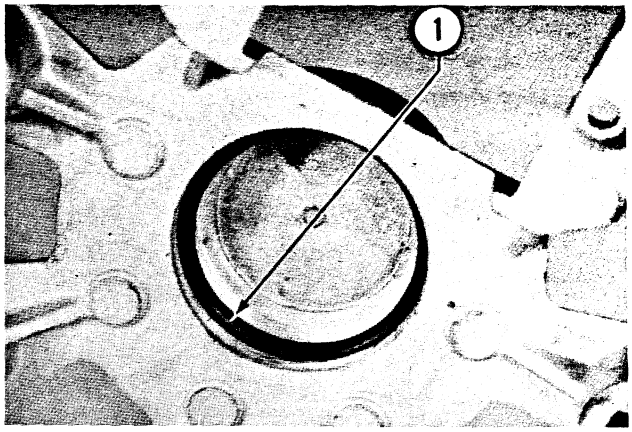
5.5.6.3
Apply prying pressure at several points around the stator to extract and front housing as an assembly. Do not burr the stator core which may make reassembly difficult. At this point, the rotor and front housing are one assembly and the stator and rear housing are one assembly.

5.5.6.4
Place the stator and rear housing assembly on a clean smooth working surface, free of metal chips that could damage windings.

5.5.6.5
Remove balance of locknuts and insulating washers from the rectifying diode terminal studs. Carefully slip the diode plate studs out of the rear housing. Do not exert unnecessary pressure on the diode terminals or on the stator leads.

5.5.6.6
Check the rear housing for cracks around drilled openings. If the rear bearing bore has been scuffed from the bearing turning in the casting the housing must be replaced. Refer to Parts Catalog for proper replacement.

5.5.6.7
Clean rear housing and install new rear bearing retainer in bore recess (FIG. 41).




T-80314A
FIG. 41 REAR BEARING RETAINER LOCATION

1. Rear Bearing Retainer

5.5.6.8
Before the stator may be tested for continuity the rectifying diodes must be removed. Refer to Sub-Topic 5.4.7 for stator testing.

5.5.7 TESTING RECTIFIER DIODES

The rectifying diodes must be separated from the stator before testing. Use a low voltage soldering iron and needle nose pliers to separate from stator. Avoid bending or twisting diode terminal.

5.5.7.1
Test each diode with equipment discussed in Sub-Topic 5.5.2. Connect one test lead to the heat sink and the other to the diode terminals. Do not connect test leads to the studs (FIG. 42).

5.5.7.2
All diodes in the same heat sink must test alike. Diodes with RED printed part number are positive polarity and those with BLACK are negative polarity.

5.5.7.3
Replace complete assembly if one or more diodes are defective.

6.6.3.2
If the lamp lights, the insulation between the brushboxes and the brushgear plate is unsatisfactory and the brushgear assembly must be replaced. Refer to Parts Catalog for proper replacement.

## 6.6.4 CHECKING FIELD COIL INSULATION

Ensure that both insulated brushes are clear of the yoke and connect a 110 volt A.C. 15 watt test lamp between the eyelet of the flexible link and a clean part of the yoke. If the lamp lights, there is a short circuit between the field coils and the yoke. The field coil assembly must therefore be renewed (see Sub-Topic 6.6.5.1).

## 6.6.5 FIELD COIL CONTINUITY AND INSULATION

6.6.5.1
Due to the very low resistance of the field coils and the method of interconnecting the conductors, the continuity of the field coils and the presence of a short-circuit between windings can only be determined by using special equipment. The field coils should be visually inspected for signs of obvious faults. Check the various joints of the field coil assembly. Look for discoloration (due to burning) of the winding insulation tape which could indicate short-circuited windings. If in doubt, the field coil assembly should be replaced. Refer to Parts Catalog for proper kit.

## 6.6.6 BUSHINGS

The commutator-end cover, intermediate bracket and drive-end fixing bracket are fitted with self-lubricating porous bronze bushings. New bushings should be allowed to stand for 24 hours at room temperature completely immersed in clean light engine oil. Alternatively the bushing may be immersed in the above lubricant at 212° F. (100° C.) for two hours and allowed to cool before removal. Bushings must not be reamed after fitting otherwise the self-lubricating qualities will be impaired.

6.6.6.1
Bushings must be replaced when there is excessive sideplay of the armature shaft. Fouling of the pole-shoes by the armature, or inefficient operation of the starter, is likely to occur when the inner diameter of the bushings exceeds the following dimensions:

| | |
|---|---|
| commutator end-cover bushing | 0.505"(12.82mm) |
| intermediate bracket bushing | 1.127"(28.62mm) |
| drive-end fixing bracket bushing | 0.675"(17.14mm) |

6.6.6.2
The bushings in the commutator end cover can be removed by inserting a 0.563" (14.30 mm) thread tap and then withdrawing the tap complete with the bushing.

**⚠ WARNING**

Use proper tools to bring holes into alignment.
DO NOT USE FINGERS OR HANDS.

6.6.6.3
The bushings in the intermediate bracket and drive-end fixing bracket can be removed by using a press, or by supporting the bracket and carefully tapping the bushing out with a mandrel. New bushings should be pressed or carefully driven squarely into position using a shouldered polished mandrel.

## 6.6.7 ROLLER CLUTCH AND DRIVE OPERATING MECHANISM

The roller clutch is an over-running device which prevents the armature from rotating at excessive speed if the drive is held in engagement after the engine has started. A roller clutch drive assembly in good condition provides instantaneous take-up of the drive in one direction while it is free to rotate in the other. The assembly should move freely along the armature shaft splines without roughness or tendency to bind. All moving parts should be smeared liberally with light grease.

## 6.6.8 REASSEMBLY OF STARTER MOTOR AND SOLENOID

The following method of reassembly is recommended:

6.6.8.1
Fit intermediate bracket and drive assembly to the armature. Check that the shims have been included between armature core and intermediate bracket.

6.6.8.2
Assemble the armature sub-assembly to fixing bracket, locating intermediate bracket with dowel peg in fixing bracket.

6.6.8.3
Slide yoke assembly over armature and locate yoke with dowel peg protruding through edge of intermediate bracket.