

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD AND DEPOT MAINTENANCE MANUAL
PUMP, CENTRIFUGAL
FRESH WATER; GASOLINE
DRIVEN 2 WHEEL MOUNTED
4 IN 500 GPM, 30 FT HEAD
(CARVER MODEL K400S)
FSN 4320-810-7311 (LESS ENGINE)



SAFETY PRECAUTIONS

Before Operation

When the unit is operated in an inclosed area, exhaust gases must be piped to the out- side. Continued breathing of exhaust gases is dangerous and may be fatal.

Do not smoke or use an open flame when servicing the batteries. Batteries generate hydrogen, a highly explosive gas.

Exercise extreme caution when using a bromochloromethane fire extinguisher in an in- closed area. A deadly gas is generated by the contact of bromochloromethane with a heated metallic surface. Provide adequate ventilation before entering an inclosed area where bromochloromethane has been used.

During Operation

When the unit is operated in an inclosed area, exhaust gases must be piped to the out- side. Continued breathing of exhaust fumes is dangerous and may be fatal.

Use extreme caution when using a bromochloromethane fire extinguisher in an inclosed area. A deadly gas is generated by the contact of bromochloromethane and a heated metallic surface. Provide adequate ventilation before entering an inclosed area where bromochloromethane has been used.

After Operation

Do not smoke or use an open flame when servicing the batteries. Batteries generate hydrogen, a highly explosive gas.

Exercise extreme caution when using a bromochloromethane fire extinguisher in an inclosed area. A deadly gas is generated by the contact of bromochloromethane with a heated metallic surface. Provide adequate ventilation before entering an inclosed area where bromochloromethane has been used.

When making repairs on the fuel tank, make sure the tank is completely filled with clean water to eliminate all fumes which may cause an explosion.

TECHNICAL MANUAL

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 27 February 1961

No. 5-4320-215-35

FIELD AND DEPOT MAINTENANCE MANUAL**PUMP, CENTRIFUGAL: FRESH WATER; GASOLINE DRIVEN; 2 WHEEL MOUNTED; 4 IN., 500
GPM, 30 FT. HEAD (CARVER MODEL K400S) FSN 4320-810-7311 (LESS ENGINE)**

| | | Paragraphs | Page |
|-------------------|---|------------|------|
| CHAPTER 1. | INTRODUCTION | | |
| Section I. | General | | |
| | Scope | | |
| | Record and report forms | 2 | 2 |
| Section II. | Description and data | | |
| | Description..... | 3 | 2 |
| | Tabulated data | 4 | 2 |
| CHAPTER 2. | GENERAL MAINTENANCE INSTRUCTIONS AND TROUBLESHOOTING | | |
| | General | 5 | 5 |
| | Engine and pump..... | 6 | 5 |
| | Battery-charging generator fails to charge..... | 7 | 5 |
| CHAPTER 3. | BATTERY-CHARGING GENERATOR REPAIR INSTRUCTIONS | | |
| | General..... | 8 | 6 |
| | Battery-charging generator..... | 9 | 6 |
| 4. | FUEL TANK, AXLE, AND CART BASE REPAIR INSTRUCTIONS | | |
| | General | 10 | 8 |
| | Fuel tank..... | 11 | 8 |
| | Axle | 12 | 8-9 |
| | Cart base | 13 | 9 |
| APPENDIX INDEX | REFERENCES | | |

Chapter 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions cover the Carver Pump Company, Model K400S Centrifugal Pump, less engine. They provide information on the maintenance of the equipment which is beyond the scope of the tools, equipment, personnel, or supplies normally available to using organizations. Refer to TM 5-2805-209-12 and TM 5-2805-209-35 for information and instructions on the engine.

b. The appendix contains a list of all publications referenced in the text. Appendix II of TM 5-4320-215-12 contains the Maintenance Allocation Chart. The list of repair parts required by field and depot maintenance facilities for support of this equipment is contained in TM

5-4320-215-35P.

c. Report all deficiencies as specified in AR 700-38. Submit recommendations for changes, additions, or deletions to The Commanding General, U. S. Army Engineer Maintenance Center, Corps of Engineers, ATTN: EMCDM. P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

2. Record and Report Forms

For record and report forms applicable to third, fourth, and fifth echelons of maintenance, refer to TM 5-505, Maintenance of Engineer Equipment.

Section II. DESCRIPTION AND DATA

3. Description

For a complete description of the centrifugal pump, refer to TM 5-4320-215-12.

4. Tabulated Data

a. *Engine Repair and Replacement Standards.* For engine repair and replacement standards, refer to TM 5-2805-209-35.

b. *Time Standards.* Table I lists the number of man-hours required under normal conditions for various operations in the maintenance and repair of the Carver Pump Company, Model K400S Centrifugal Pump. The man-hours listed are not intended to be rigid standards. Under adverse conditions, the operations will take considerably longer; whereas under ideal -conditions with highly skilled mechanics, most of the operations can be accomplished in considerably less time.

Table I. Time Standards

Hours

(1) Lubrication and service:

| | |
|--|-----|
| 01 ENGINE | |
| 0100 Engine Assembly | |
| Engine, gasoline | |
| (Drain, flush, and refill crankcase, replace filter element) | 0.7 |
| 03 FUEL SYSTEM | |
| 0306 Tanks, Lines, Fittings | |
| Tanks, gasoline | |
| (Remove; clean and replace screen; drain and flush tank; replenish with fuel)..... | 0.7 |
| 06 ELECTRICAL SYSTEM (ENGINE AND VEHICULAR) | |
| 0601 Generator | |
| Generator, engine accessory, electrical | |
| (Fill oil cup)..... | 0.1 |

Table I. Time Standards-Continued

| | Hours |
|---|-------|
| Battery, storage (Fill with water to proper level, clean terminals) | 0.2 |
| 13 WHEELS AND TRACKS | |
| 1311 Wheel Assembly | |
| Cone and rollers, tapered roller bearing (Clean and repack with lubricant) | 0.5 |
| 1313 Tires, Tubes | |
| Inner tube, pneumatic (Check pressure and inflate) | 0.1 |
| 55 PUMPS (EXCLUDE ENGINE PUMPS) | |
| 5500 Pump Assembly | |
| Pump assembly (priming and draining) | 0.1 |
| 5505 Lubricators | |
| Cup, grease (Fill grease cup) | 0.1 |
| (2) Remove and replace. | |
| 01 ENGINE | |
| 0100 Engine Assembly | |
| Engine, gasoline (Includes removal and installation of pump and lifting bail) | 2.5 |
| 0111.1 Hand-Cranking Devices | |
| Clamp, hand crank | 0.1 |
| 03 FUEL SYSTEM | |
| 0306 Tanks, Lines, Fittings | |
| Tank, gasoline | 0.5 |
| 06 ELECTRICAL SYSTEM (ENGINE AND VEHICULAR) | |
| 0601 Generator | |
| Generator, engine accessory, electrical | 0.4 |
| Belt, V (includes adjustment) | 0.4 |
| 0602 Generator Regulator | |
| Regulator, engine generator (includes adjustment) | 1.5 |
| 0607 Instrument or Engine Control Panel | |
| Ammeter | 0.3 |
| 0612 Batteries | |
| Battery, storage | 0.2 |
| 0615 Radio Suppression | |
| Capacitor | 0.3 |
| 11 REAR AXLE | |
| 1100 Rear Axle Assembly | |
| Axle assembly (Includes removal and installation of wheels and hubs as an assembly) | 1.5 |
| 13 WHEELS AND TRACKS | |
| 1311 Wheel Assembly | |
| Cone and rollers, tapered roller bearing | 0.5 |
| 1313 Tires, Tubes | |
| Inner tube, pneumatic | 1.0 |

Table I. Time Standards-Continued

Hours

| | |
|--|-----|
| 15 FRAME | |
| 1501 Frame Assembly | |
| Base, cart | 5.0 |
| 1503 Pintles and Towing Attachments | |
| Tongue | 0.4 |
| 1507 Landing Gear; Leveling Jacks | |
| Foot, cart | 0.1 |
| 22 MISCELLANEOUS BODY, CHASSIS OR HULL, AND ACCESSORY ITEMS | |
| 2202.1 Mirrors, Reflectors, Personnel Heaters, Defrosters, Wipers, Air Horns | |
| Reflectors, indicator, clearance | 0.1 |
| 2210 Data Plates and Instruction Holders | |
| Plate, identification | 0.1 |
| 26 ACCESSORIES, PUBLICATIONS, TEST EQUIPMENT AND TOOLS | |
| 2602.1 Accessories | |
| Chock assembly | 0.1 |
| 47 GAGES (NON-ELECTRICAL); WEIGHING AND MEASURING DEVICES | |
| 4705 Fuel Gages (Quantity) | |
| Gage, fuel | 0.1 |
| 55 PUMPS (EXCLUDE ENGINE PUMPS) | |
| 5500 Pump Assembly | |
| Pump assembly (Replacement consists of complete disassembly and reassembly of the pump) | 1.0 |
| 5501 Volute, Housing | |
| Chamber, pump (Replacement consists of complete disassembly and reassembly of the pump) | 1.0 |
| 5502 Impeller; Rotor, Diaphragm | |
| Impeller (Includes removal and installation of suction head and flange as an assembly) | 0.3 |
| 5504 Discharge Assembly | |
| Elbow, street | 0.1 |
| 5504.2 Suction Valve, Suction Heads | |
| Suction, Head (includes adjustment) | 0.8 |
| 5505 Lubricators | |
| Cup, grease | 0.1 |
| 5508.2 Pump Drive Assembly | |
| Seal, bellows, shaft (includes removal and installation of the pump chamber) | 1.0 |
| 76 FIRE FIGHTING EQUIPMENT | |
| 7603 Fire Extinguishers | |
| Extinguishers, fire | 0.1 |

c. *Nut and Bolt Torque Data.* For nut and bolt torque data, refer to TM 5-2805-209-35.

Chapter 2

GENERAL MAINTENANCE INSTRUCTIONS AND TROUBLESHOOTING

Note: No special tools or equipment are needed to perform field and depot maintenance on this centrifugal pump.

5. General

2805-209-35 and TM 5-X320-215-12.

This chapter provides information useful in diagnosing and correcting unsatisfactory operation of the centrifugal pump or any of its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause.

6. Engine and Pump

For engine and pump troubleshooting, refer to TM 5-

7. Battery-Charging Generator Fails to Charge

| <i>Probable cause</i> | <i>Possible remedy</i> |
|--|--|
| Armature defective | Replace the armature (par. 9). |
| Field coils defective | Replace the field coils (par. 9). |
| Brush holders and/or brush tension springs defective | Replace brush holders and/or brush tension springs (par. 9). |

AGO 4615A

BATTERY-CHARGING GENERATOR REPAIR INSTRUCTIONS

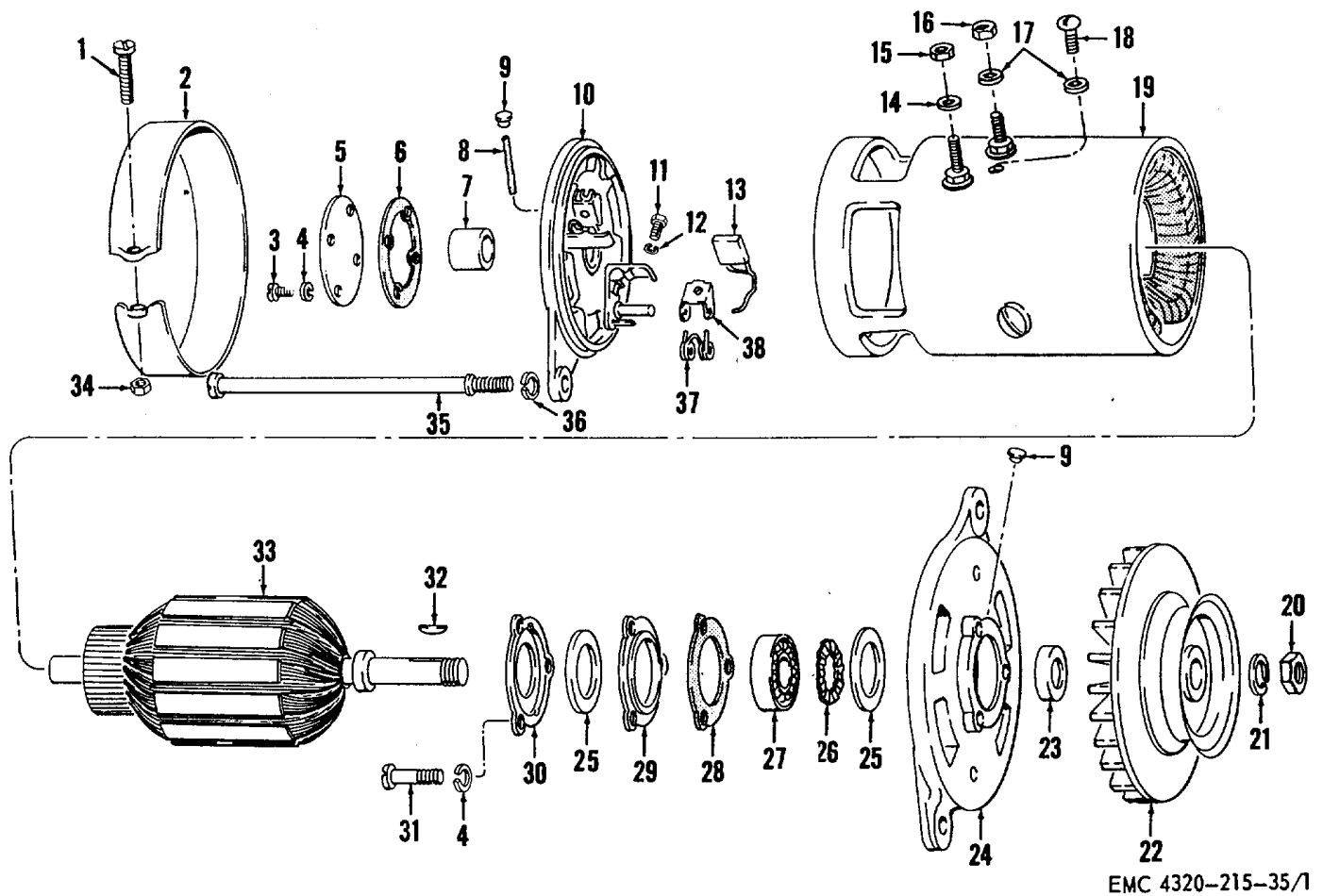
8. General

The battery-charging generator is a beltdriven, air-cooled, externally controlled unit of the two-brush type. One brush is grounded so that the generator stator frame serves as conductor in the ground return portion of the electrical circuit. The other brush, mounted in an insulated brush holder, is connected to the armature terminal of the generator. One field lead connects to the insulated brush holder. The other field lead connects to the field terminal of the generator.

9. Battery-Charging Generator

- a. Remove and install the battery-charging generator (TM 5-4320-215-12).
- b. Disassemble and reassemble the battery-charging generator as shown by figure 1.
- c. Clean, inspect, and repair.
- d. Test the brush holder, armature, and field coils as described in TM 5-764.

AGO 4615A



EMC 4320-215-35/1

- | | |
|---|--|
| 1 Screw, machine, No. 10-32 x 1 1/2 in. | 20 Nut (spec) |
| 2 Cover band | 21 Washer, lock, 5/8 in. |
| 3 Screw, machine, brass, No. 10-32 x 5/16 in. (3 rqr) | 22 Pulley |
| 4 Washer, lock, No. 10 (3 rqr) | 23 Spacer |
| 5 Cover | 24 Head |
| 6 Gasket | 25 Packing (2 rqr) |
| 7 Bearing | 26 Retainer |
| 8 Wick | 27 Bearing |
| 9 Oiler (2 rqr) | 28 Retainer |
| 10 Head | 29 Retainer |
| 11 Screw, machine, No. 8-32 x 1/4 in. (2 rqr) | 30 Retainer |
| 12 Washer, lock, No. 8 (2 rqr) | 31 Screw, machine, No. 10-32 x 1/2 in. (3 rqr) |
| 13 Brush | 32 Key, woodruff, No. 505 |
| 14 Washer, lock, 1/4 in. | 33 Armature |
| 15 Nut, plain, hex, 1/4-28 | 34 Nut, plain, hex, No. 10-32 |
| 16 Nut, plain, hex, No. 10-32 | 35 Through-bolt |
| 17 Washer, lock, IT. No. 10 (2 rqr) | 36 Washer, lock, 5/16 in. |
| 18 Screw, machine, No. 10-32 x 5/16 in. | 37 Spring |
| 19 Stator and field | 38 Arm |

Figure 1. Battery-charging generator, disassembly and reassembly.

Chapter 4

FUEL TANK, AXLE, AND CART BASE REPAIR INSTRUCTIONS

10. General

This chapter includes repair instructions for the fuel tank as well as the cart base and axle. The cart base is a welded-steel structure specially designed and drilled for securing the engine and pump in alignment. The axle is of one piece construction and secured to the underside of the frame by means of U-shaped brackets welded to the axle.

11. Fuel Tank

- a. Remove and install the fuel tank (TM 5-4320-

215-12).

- b. Clean, inspect, and repair.

Warning: Do not attempt to repair an empty tank near an open flame. Be sure the tank is full of water before soldering or brazing.

12. Axle

- a. Remove and install the wheel, tire, and tube (TM 5-4230-215-12).

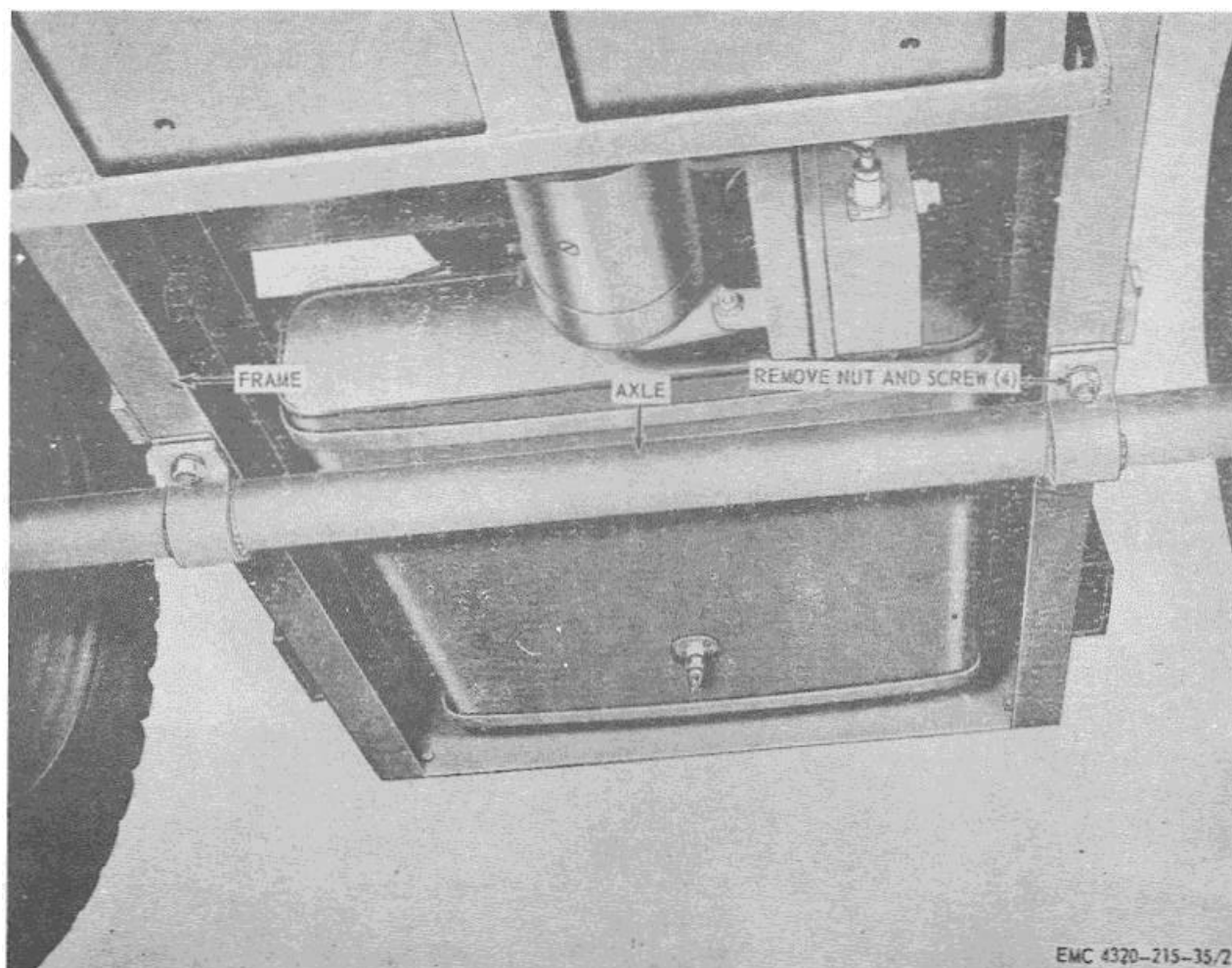


Figure 2. Axle, removal and installation.

- d. Remove and install the engine and centrifugal pump (TM 5-4320-215-12).
- e. Remove and install the lunette, tongue, lifting bail, cart foot, reflector, wheel chock, crank holddown bracket, and fire extinguisher bracket (8M 5-4320-215-12).
- f. Remove and install the axle (par. 12).
- g. Clean, inspect, and repair.

- 12).
 - f. Remove and install the axle (par. 12).
 - g. Clean, inspect, and repair.

- a. Remove and install the battery box and cables (TM 5-4320-215-12).
- b. Remove and install the fuel tank and fuel line (TM 5-4320-215-12).
- c. Remove and install the generator and voltage

9

APPENDIX

REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320-5 Dictionary of United States Army Terms.
AR 320-50 Authorized Abbreviations and Brevity Codes.

2. Field and Depot Maintenance

TM 5-764 Electric Motor and Generator Repair.
TM 5-2805-209-35 Field and Depot Maintenance Manual Engine, Gasoline (Wisconsin Model MVF4D).

3. Fire Protection

TM 5-687 Repairs and Utilities: Fire Protection Equipment and Appliances; Inspections, Operations, and Preventive Maintenance.
TM 9-1799 Ordnance Maintenance: Fire Extinguishers.

4. Lubrication

LO 5-4320-215-12 Pump Centrifugal: Fresh Water; Gasoline Driven; 2 Wheel Mounted; 4 In., 500 Gpm, 30 Ft Head (Carver Model K400S) W/Wisconsin Engine Model MVF4D.

5. Operator and Organizational Maintenance

TM 5-2805-209-12 Operator and Organizational Maintenance Manual Engine, Gasoline (Wisconsin Model MVF4D).
TM 5-4320-215-12 Operator and Organizational Maintenance Manual Pump, Centrifugal: Fresh Water; Gasoline Driven; 2 Wheel Mounted; 4 In., 500 Gpm, 30 Ft Hd (Carver Model K400S) (Less Engine).

6. Painting

TM 9-2851 Painting Instructions for Field Use.

7. Preventive Maintenance

AR 700-38 Unsatisfactory Equipment Report.
AR 750-5 Maintenance Responsibilities and Shop Operation.
TM 5-505 Maintenance of Engineer Equipment.

8. Publication Indexes

DA Pam 108-1 Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310-1 Index of Administrative Publications.
DA Pam 310-2 Index of Blank Forms.
DA Pam 310-3 Index of Training Publications.
DA Pam 310-4 Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-5 Index of Graphic Training Aids and Devices.
DA Pam 310-25 Index of Supply Manuals-Corps of Engineers.

AGO 4615A

9. Radio Interference Suppression

TM 11-483 Radio Interference Suppression.

10. Supply Publications

TM 5-2805-209-35P Field and Depot Maintenance Repair Parts and Special Tool Lists Engine, Gasoline (Wisconsin Model MVF4D).

TM 5-2805-209-20P Organizational Maintenance Repair Parts and Special Tool Lists Engine, Gasoline (Wisconsin Model MVF4D).

TM 5-4320-21L5-20P Organizational Maintenance Repair Parts and Special Tool Lists Pump, Centrifugal: Fresh Water; Gasoline Driven; 2 Wheel Mounted; 4 In., 500 Gpm, 30 Ft Head (Carver Model K400S) FSN 4320-810-7311 (Less Engine).

TM 5-4320-215-35P Field and Depot Maintenance Repair Parts and Special Tool Lists Pump Centrifugal: Fresh Water; Gasoline Driven; 2 Wheel Mounted; 4 In., 500 Gpm, 30 Ft Head (Carver Model K400S) FSN 4320-810-7311 (Less Engine).

11. Training Aids

FM 5-25 Explosives and Demolition.

FM 21-5 Military Training.

FM 21-6 Techniques of Military Instruction.

FH 21-30 Military Symbols.

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For explanation of abbreviations used, see AR 320-50.

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