

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR'S MANUAL

CRANE, TRUCK, WAREHOUSE, SLEWING  
BOOM, GASOLINE, FRONT WHEEL DRIVE,  
PNEUMATIC TIRES, 10,000 LB. CAPACITY  
PETTIBONE-MULLIKEN MODEL 10F  
ARMY MODEL MHE 195, FSN 3950-723-3295

This copy is a reprint which  
includes current pages from  
Change 2.

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HEADQUARTERS, DEPARTMENT OF THE ARMY  
APRIL 1965

## **SAFETY PRECAUTIONS**

### **BEFORE: OPERATION**

When servicing battery, do not smoke or use flame in the vicinity. Batteries generate hydrogen, a highly explosive gas.

Check to be sure there is sufficient engine coolant and engine lubricant before starting engine.

Do not fill fuel tank while engine is running. Provide metallic contact between fuel container and fuel tank to prevent a static spark from igniting fuel.

Do not remove radiator cap from an overheated radiator; stop engine and allow radiator to cool before removing cap to avoid injury by scalding. Allow engine to cool before filling radiator, otherwise there is danger of cracking cylinder head or block.

Check equipment logbook for record of proper servicing and maintenance.

### **DURING OPERATION**

Do not shift directional shift lever while crane is in motion.

Be alert for other workers to be sure they are not in the way of the load of moving crane.

Be sure there is sufficient clearance overhead and on each side of crane.

Avoid sudden starting and stopping of crane. Reduce speed when making a turn.

Face in direction of travel.

Know rated capacity of crane and do not overload it. Never pick up a load until certain it can be carried safely.

Report any evidence of faulty crane operation.

### **AFTER OPERATION**

Make sure boom is lowered and in front of machine whenever possible.

Raise hook block high enough so no one will walk into it.

Make sure hand brake is engaged firmly.

If engine cooling system or any lubricating oil sump is drained, make certain appropriate warning tags are attached to steering handwheel.

If crane is parked on an incline, block at least two wheels in the event of handbrake failure.

CHANGE }  
No. 2 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 29 April 1974

**Operator's Manual  
CRANE, TRUCK, WAREHOUSE; SLEWING BOOM;  
GASOLINE; FRONT WHEEL DRIVE, PNEUMATIC  
TIRES; 10,000 LB. CAPACITY; PETTIBONE;  
MULLIKEN MODEL 10F, ARMY MODEL MHE-195;  
FSN 3950-723-3295**

TM 10.3950-204-10, 21 April 1965, is changed as follows:

*Inside Front Cover.* Add the following two warnings to the list of safety precautions:

**WARNING**

**Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.**

**WARNING**

**Drycleaning solvent, P-D-80, used to clean parts, is potentially dangerous to personnel and property. Do not use it near an open flame or excessive heat. The flash point of solvent is 100° F. to 138° F.**

Page 2. The appendix II title is changed to read:

Basic Issue items List and Items Troop Installed or Authorized List.

Page 3. Paragraph 1 is superseded as follows:

\*This change supersedes C1, 13 April 1973.

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**1. Scope**

This manual is for use in operating and maintaining the warehouse crane; Pettibone-Mulliken Model 10F, Army Model MHE-195.

Paragraph 3 is added as follows:

**3. Recommendation for Maintenance Publications Improvements**

You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to: Commander, US Army Troop Support Command, ATRN: AMSTS-MPP, 4300 Goodfellow blvd., St. Louis, MO 63120. A reply will be furnished directly to you.

Paragraph 4 is added as follows:

**4. Forms and Record.** Maintenance forms and records that are required are explained in TM 38-750.

Page 6. Paragraph 6.1 is added as follows:

**6.1. Maintenance and Operating Supplies.**

Maintenance and operating supplies required for the initial 8 hours of operation are listed in table 2-1.

Page 6. Table 2-1 is added as follows:



Page 9. Immediately after the section III title, add the following warning:

**WARNING**

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

the following warning:

**WARNING**

Drycleaning solvent, P-D-680, used to clean parts, is potentially dangerous to personnel and property. Do not use it near an open flame or excessive heat. The flash point of solvent is 100° F. to 138° F.

Page 18. Appendix I is superseded as follows:

Page 12. Immediately after the chapter 3 title, add

**APPENDIX I  
REFERENCES**

1. Fire Protection. TB 54200-200-10	Hand Portable Fire Extinguishers Approved for Army Users.
2. Lubrication. C9100IL LO 10-3950-204-20	Fuels, Lubricants, Oils, and Waxes Crane, truck, warehouse, slewing boom, gasoline, front wheel drive, pneumatic tires; 10,000 lb. capacity (Pettibone-Mulliken Model 10F, Army Model MHE-195) FSN 3950-723-3295.
3. Painting. AR 746-1	Color, Marking, and Preparation of Equipment for Shipment.
4. Maintenance TB MED 251 TB 750-651 TM 96140-200-14	Noise and Conservation of Hearing Use of Antifreeze Solutions, and Cleaning Compounds in Engine Cooling Systems. Operator's, Organizational, DS, and GS Maintenance Manual: Storage Batteries, Lead-Acid Type.
TM 5-331B	Utilization of Engineer Construction Equipment, Volume-Lifting, Loading, and Hauling Equipment.
TM 38-750-1 TM 92610-200-20	Maintenance Management Field Command Procedures (CS3 Test). Organizational Care, Maintenance and Repair of Pneumatic Tires and Inner Tubes
5. Demolition TM 750-2443	Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Commands)

Page 20. Appendix II is superseded as follows:

**APPENDIX II  
BASIC ISSUE ITEMS LIST AND ITEMS  
TROOP INSTALLED OR AUTHORIZED LIST**

**Section I. INTRODUCTION**

1. Scope. This appendix lists items required by the operator for operation of the warehouse crane.

2. General This list is divided into the following sections:

a. *Basic Issue Items List-Section II.* Not applicable.

b. *Items Troop Installed or Authorized List-Section III.* A list of items in alphabetical sequence, which at the discretion of the unit commander, may accompany the warehouse crane. These items are not subject to turn-in with the warehouse crane when it is evacuated.

3. Explanation of Columns The following provides an explanation of columns in the tabular list of items troop installed or authorized, section III.

a. Source, Maintenance and Recoverability Code(s) (SMR). Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item which will be used for requisitioning purposes.

c. Description This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft, ea, pr, etc.

e. Quantity Authorized This column indicates the quantity of the item authorized to be used with the equipment.

### Section II. Items Troop Installed or Authorized List

<i>Federal stock number</i>	<i>Description</i>	<i>U/M</i>	<i>Qty auth</i>
7520-559-9618	CASE: Maintenance and operation manuals	EA	1
4210-889-2221	EXTINGUISHER, FIRE	EA	1

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS  
*Major General, United States Army*  
*The Adjutant General*

CREIGHTON W. ABRAMS  
*General, United States Army*  
*Chief of Staff*

Distribution:

To be distributed in accordance with DA Form 12-25A, (qty rgr block No. 893) Operator Maintenance requirements for Warehouse Equipment.

No. 103950-204-10 )  
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 TECHNICAL MANUAL )

HEADQUARTERS  
 DEPARTMENT OF THE ARMY  
 WASHINGTON, D.C., 21 April 1965

**OPERATOR'S MANUAL  
 CRANE, TRUCK, WAREHOUSE, SLEWING  
 BOOM, GASOLINE, FRONT WHEEL DRIVE,  
 PNEUMATIC TIRES, 10,000 LB. CAPACITY,  
 PETTIBONE-MULLIKEN MODEL 10F, ARMY  
 MODEL MH: 195, FSN 3950-723-3295**

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# CHAPTER 1 INTRODUCTION

## Section I. GENERAL

### 1. Scope

This manual is published for use of personnel responsible for the operation and operator maintenance of the Crane, Truck, Warehouse, Slewing Boom, Gasoline, Front Wheel Drive, Pneumatic Tires, 10,000 Lb. Capacity, Pettibone Mulliken Model 10F, Army Model MHE 195, Federal Stock Number 3950-723-3295.

### 2. Orientation

Throughout this manual the use of the terms right, left, front, and rear indicate directions from the viewpoint of the operator sitting in the seat of the crane.

## Section II. DESCRIPTION AND DATA

### 3. Description

The Pettibone Mulliken Model 10 F Crane (fig. 1 and 2) is a front wheel drive, materials handling vehicle. It is powered by a six-cylinder gasoline engine. The crane has a power shift transmission with a torque converter which provides a means of shifting gears without the use of a foot clutch. It is capable of lifting and transporting loads up to 10,000 pounds at a 36-inch load center front of bumper.

### 4. Tabulated Data

#### a. Performance.

Load capacity.....	10,000 lb.
Towing capacity (on level).....	9,000 lb.
Maximum gradability (with rated load on dry surface).....	15%
Speed (maximum)	
Forward .....	12 mph
Reverse .....	12 mph
Slewing .....	180°
Minimum radius (from front of bumper) .....	1 ft. 1 in.
Maximum radius (from front of bumper) .....	17 ft. 3 in.
Boom lift .....	70°
Boom extended.....	8 ft.
Maximum hook height.....	24 ft.

Turning radius (outside) .....	11 ft. 2 in.
Turning radius (inside) .....	4 ft. 8 in.

#### b. Capacities.

Cooling system .....	16 qt.
Fuel tank .....	40 gal.
Hydraulic tank .....	62 gal.
Transmission.....	4.5 gal.
Differential .....	12 qt.
Air cleaner .....	1 qt.
Crankcase (with oil filter change).....	6 qt.
Oil filter .....	1/2 qt.
Hydrovac .....	2 oz.

#### c. Tire Pressure.

Drive wheels .....	90 psi
Steering wheels.....	86 psi

#### d. Dimensions and Weight.

Height .....	9 ft. 10 in.
Length.....	24 ft.
Width .....	8 ft
Weight (approx.) .....	20,360 lb.
Under clearance.....	8 1/2 in.
Wheel base.....	10 ft. 4 in.

#### e. Wheel Loading ,(Unloaded).

Front wheel .....	14,540 lb.
Rear wheel.....	5,460 lb.

#### f. Service Weight .....

.....	20,000 lb.
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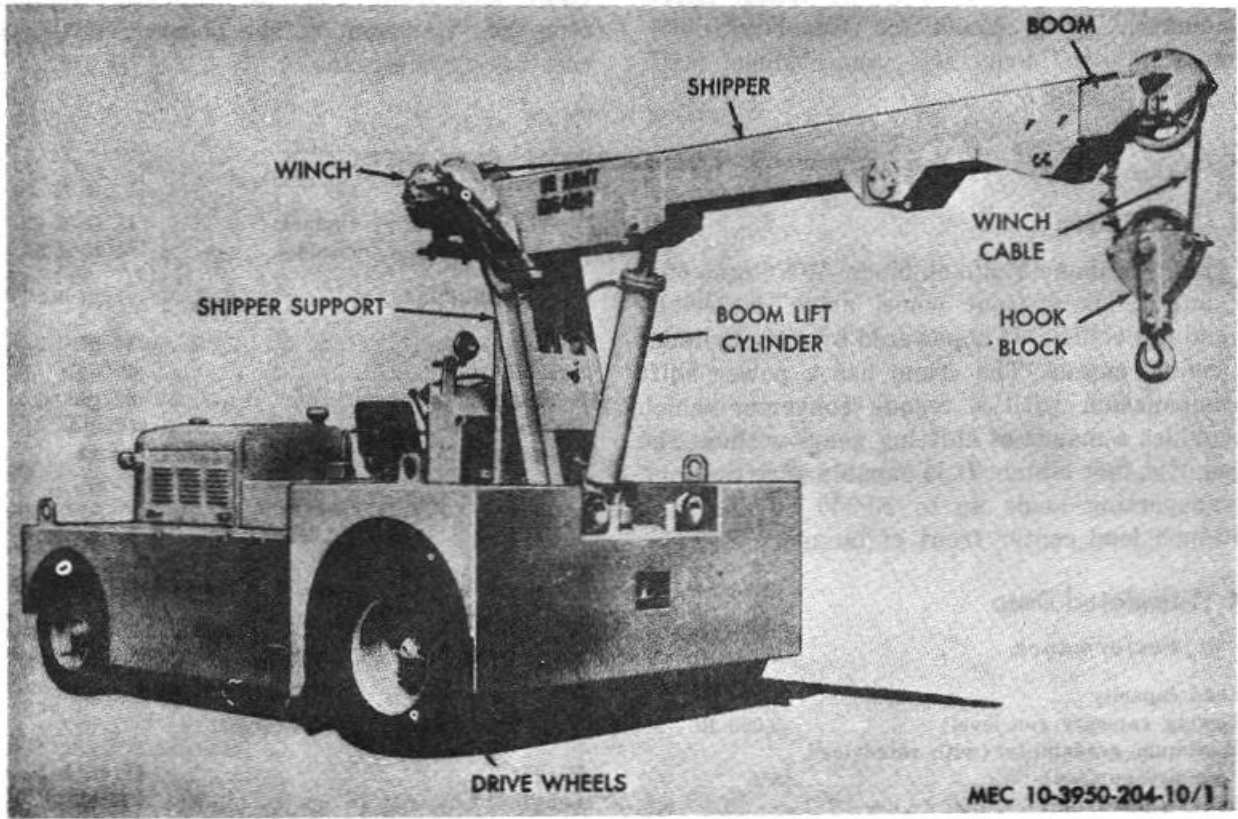


Figure 1. Crane, three-quarter front view.

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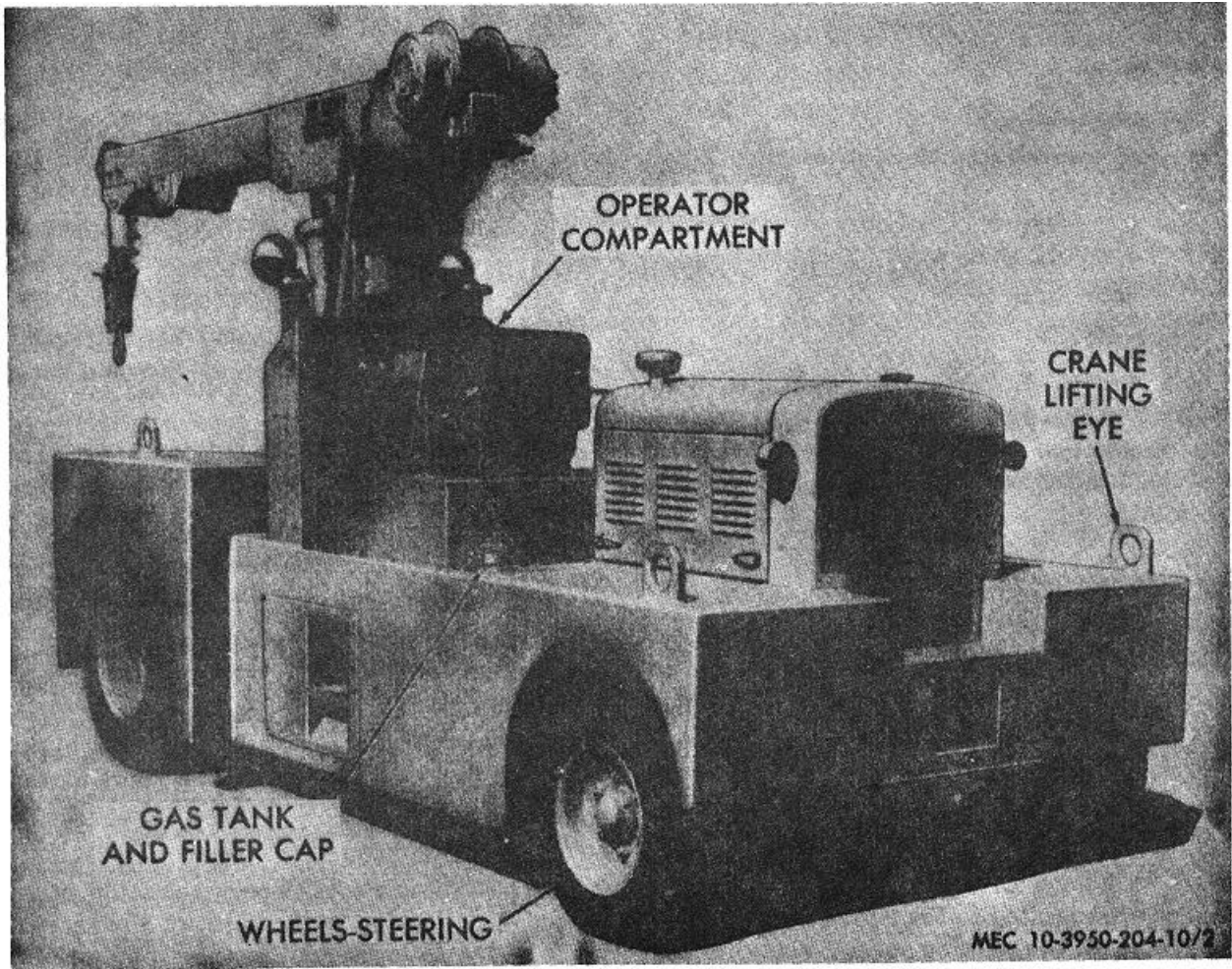


Figure 2. Crane, three-quarter rear view.

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## CHAPTER 2

### OPERATING INSTRUCTIONS

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#### Section I. SERVICE UPON RECEIPT OF CRANE

##### 5. General

When a new or used crane is received by an organization it must be serviced to prepare it for operation.

crane are the responsibility of the using organization and will be performed by organizational maintenance personnel. The operator will assist in these services when directed to do so by the commanding officer.

##### 6. Responsibilities

The services performed upon receipt of the

#### Section II. CONTROLS AND INSTRUMENTS

##### 7. General

This section furnishes the operator with illustrations and sufficient information concerning the location and the use of the various controls and instruments to properly operate the crane.

*e. Horn Button.* The horn button (1, fig. 4) is located in the center of the steering wheel. Depress button to sound horn.

*f. Steering Wheel.* The steering wheel (2, fig.4) controls direction of travel of crane. Turn clockwise to move crane in a right direction. Turn counterclockwise to move crane in a left direction.

*g. Service Brake Pedal.* The service brake pedal (3, fig. 4) is located to the right of the steering column on floor plate. Release pedal before putting crane in motion.

*h. Accelerator Pedal.* The accelerator pedal (4, fig. 4) is located to the right of the service brake pedal. It is used to increase or decrease engine speed. Depress pedal to increase engine speed and release the pressure on pedal to decrease engine speed.

*i. Parking Brake Hand Lever.* The parking brake (5, fig. 4) is located to the right front of the driver's seat on the floor plate. Pull up on lever to apply brake and hold crane in a stationary position. To release brake, push lever down.

*j. Shifting Lever.* The shifting lever (6, fig. 4) is located to the right of driver's seat. This

##### 8. Controls

The controls, located in the operator's compartment, are as follows:

*a. Slewing Lever.* The slewing level (21, fig.3) is located to the left of the steering wheel, below instrument panel. Push lever forward to swing boom to the right, pull lever backward to swing boom to the left.

*b. Lift Cylinder Lever.* The lift cylinder lever (20, fig. 3) is located to the left of the steering wheel next to the slewing lever, below instrument panel. Push lever forward to lower boom, pull backward to raise boom.

*c. Winch Cable Lever.* The winch cable lever (15, fig. 3) is located to the right of the steering wheel below instrument panel. Push lever forward to let cable down. Pull lever backward to raise cable up.

*d. Crowd Lever.* The crowd lever (14, fig. 3) is located to the right side of the steering wheel next to the winch lever. Push forward to extend boom, pull lever back to retract boom. Make sure winch cable is down when retracting boom because winch cable goes up when boom is being retracted.

lever controls forward and reverse movement of crane. It also controls low forward, high forward and low reverse, and high reverse. Neutral is midway between forward and reverse position. Push lever half-way forward for low forward. Push lever all the way forward for high forward movement of crane. Pull lever half-way back for low reverse. Pull lever all the way back for high reverse movement of crane.

## 9. Instruments

The instruments, located on instrument panel in operator's compartment, are as follows:

*a. Hour Meter.* The hour meter (1, fig. 3) is located on top left side of instrument panel. It indicates total number of hours engine has been in operation. The meter is equipped with a scale that reads from tenths of hours to thousands of hours. Always check to be sure hour meter is operating properly when engine is in operation.

*b. Ammeter.* The ammeter (2, fig. 3) is located on top left side of instrument panel. The ammeter indicates amount of current being put into or withdrawn from battery. The dial reads from -30 amperes to +30 amperes. When engine is running at full governed speed and battery is fully charged, the needle should move slightly to the positive side of the 0 mark on the dial. When needle indicates a constant discharge, stop engine and do not operate again until the malfunction has been corrected.

*c. Dash Light Switch.* The dash light switch (3, fig. 3) is located on top left side of panel above ammeter.

*d. Engine Oil Pressure Gauge.* The engine oil pressure gauge (4, fig. 3) is located top left side of panel, to the right of ammeter. The oil pressure gage indicates pressure of the oil in the engine lubricating system and has a dial reading from 0 to 80 pounds per square inch. At normal operating temperature and governed speed, gage should show pressure between 25 and 35 pounds per square inch. If the gage fails to show proper pressure reading, stop engine immediately and do not operate crane again until cause of the malfunction has been corrected.

*e. Engine Temperature Gauge.* The engine temperature gauge (6, fig. 3) is located on top left side of panel, to the right of engine oil pressure gauge. The temperature indicates temperature of engine cooling fluid on a dial reading from 100° F. to 240° F. Under normal conditions, this temperature should be approximately 180° F. When gauge indicates temperatures excessively higher or lower than 180° F., stop engine and do not operate crane until cause has been determined and corrected.

*f. Fuel Gauge.* The fuel indicator (8, fig. 3) is located on top left side of panel, to the right of engine temperature gauge. The fuel indicator indicates amount of fuel in tank. The dial reads from empty to full in one-quarter increments.

*g. Light Switch.* The light switch (11, fig. 3) is located on top right side of instrument panel. This controls both head lights and tail lights. To turn the lights on, pull switch out from instrument panel. To turn lights off, push switch in toward instrument panel.

*h. Spot Light Switch No. 1.* The spot light switch No. 1 (12, fig. 3) is located to the right of head light switch. Pull out to turn spot light on. Push in to turn light off.

*i. Spot Light Switch No. 2.* The spot light switch No. 2 is located to the right of 1st spot light switch. Pull out to turn light on. Push in to turn light off.

*j. Slewing Cylinder Plate.* The slewing cylinder plate (19, fig. 3) is located on bottom left side of panel.

*k. Lift Cylinder Plate.* The lift cylinder plate (18, fig. 3) is located on bottom left side of panel, to the right of slewing plate.

*l. Choke.* The choke (17, fig. 3) is located on bottom left side of panel, to the right of lift cylinder plate. The choke is used to enrich air fuel mixture. The normal operating position for the control is pushed in toward the front hood support as far as it will go. To enrich mixture when starting a cold engine, pull control out. Push control in as engine warms up.

*m. Oil Pressure Gauge. (Transmission)* The oil pressure gauge (5, fig. 3) (0-200 lbs.) is

located on right side of choke on panel. This indicates pressure of oil in transmission.

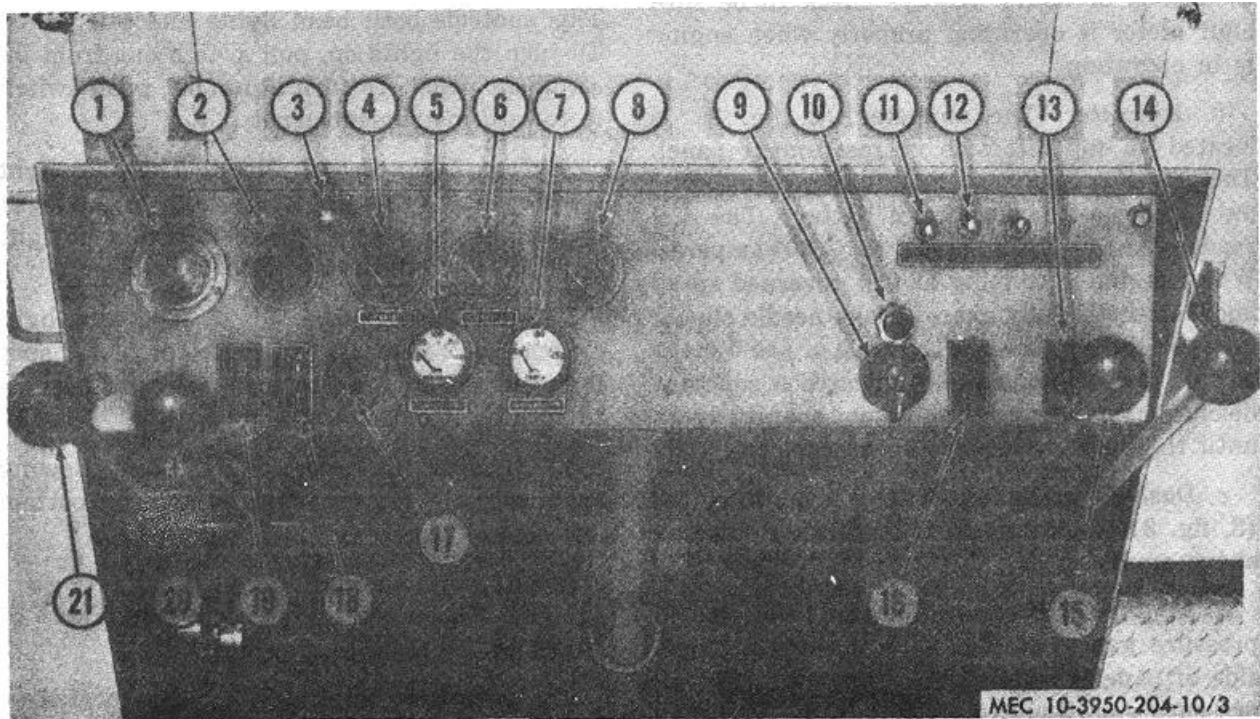
*n. Temperature Gauge.* (Transmission) The temperature gauge (7, fig. 3) (100° 250° F.) is located on right side of transmission pressure gauge. This indicates temperature of oil circulating in transmission.

*o. Starter Button.* The starter button (10, fig. 3) is located on bottom right side of panel, above ignition switch. The starter button activates the starter to crank engine. To start crane, turn ignition switch on (p below) and depress starter button. When engine starts, release starter button.

*p. Ignition Switch.* The ignition switch (9, fig. 3) is located on bottom right side of panel. The ignition switch activates the electrical system. Turn switch clockwise to ON position when starting crane and counterclockwise to OFF position when crane is not in operation.

*q. Winch Plate.* The winch instruction plate (16, fig. 3) is located on bottom right side of panel, to right of ignition switch.

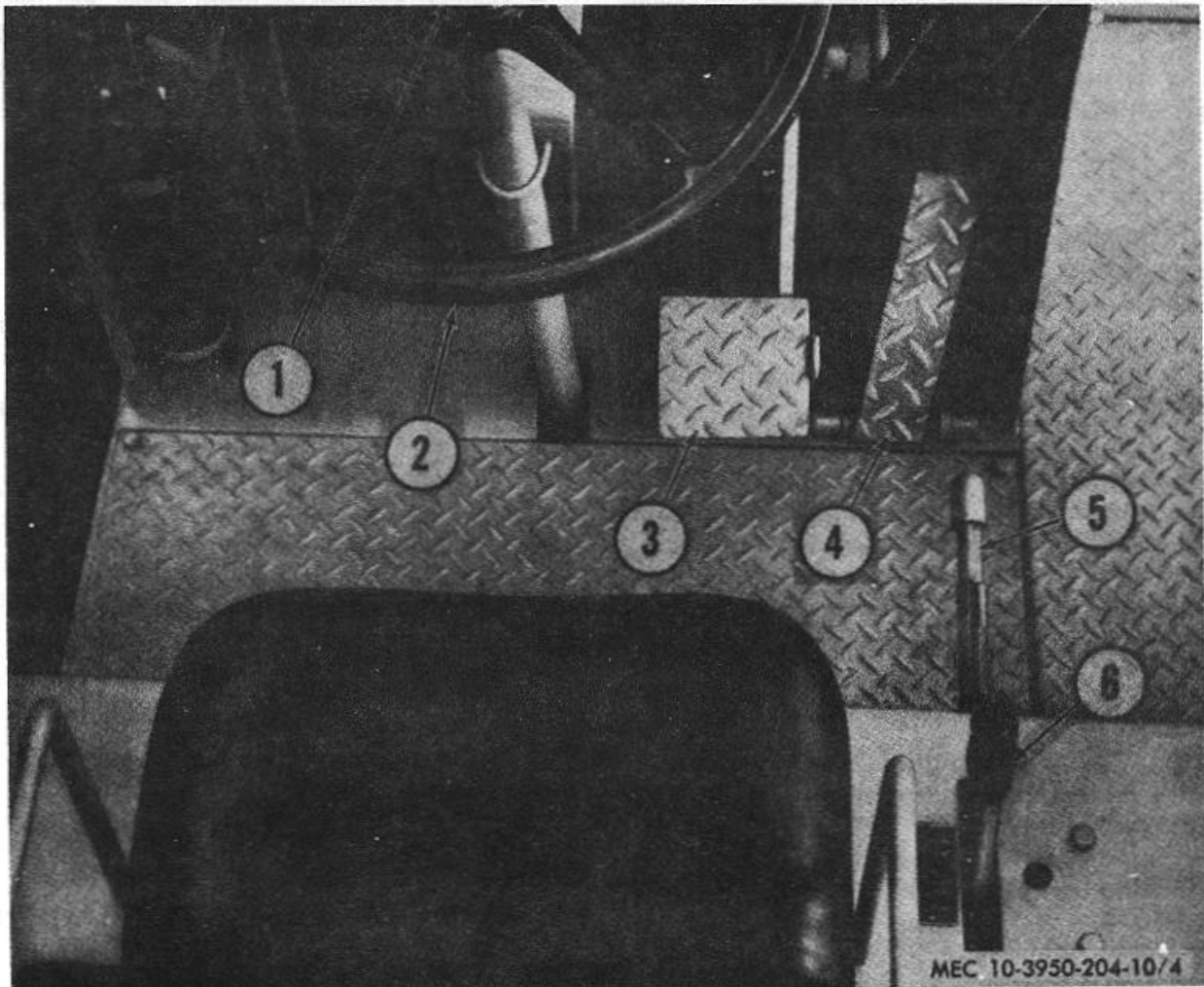
*r. Boom Extension Plate.* The boom extension instruction plate (13, fig. 3) is located on bottom right side of panel, to right of winch plate.



- |    |                                    |    |                            |
|----|------------------------------------|----|----------------------------|
| 1  | Hour meter                         | 12 | Spot light switch          |
| 2  | Ammeter                            | 13 | Boom extension instruction |
| 3  | Dash light switch                  | 14 | Crowd lever                |
| 4  | Engine oil pressure gauge          | 15 | Winch cable lever          |
| 5  | Transmission oil pressure gauge    | 16 | Winch plate                |
| 6  | Engine temperature gauge           | 17 | Choke control              |
| 7  | Transmission oil temperature gauge | 18 | Lift plate                 |
| 8  | Fuel gauge                         | 19 | Slewing instruction plate  |
| 9  | Ignition switch                    | 20 | Lift lever                 |
| 10 | Starter button                     | 21 | Slewing lever              |
| 11 | Head light switch                  |    |                            |

**Figure 3. Instrument panel.**

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- |   |                |   |                          |
|---|----------------|---|--------------------------|
| 1 | Horn button    | 4 | Accelerator pedal        |
| 2 | Steering wheel | 5 | Parking brake hand lever |
| 3 | Brake pedal    | 6 | Shift lever              |

**Figure 4. Operator's compartment.**

### **Section III. OPERATING UNDER USUAL CONDITIONS**

#### **10. General**

A person selected to operate this crane must be an experienced operator of materials handling equipment or heavy-duty equipment. In addition, each operator must undergo a thorough training program to acquaint him with the specific operating characteristics of this crane. This section gives instructions on starting, driving, and stopping crane. It also gives instructions for loading, lifting, and transporting items of equipment.

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#### **11. Starting Instructions**

a. Perform before-operation services listed in paragraph 22.

b. Make certain that forward-reverse levers are in neutral position.

c. Make certain that parking brake hand lever (para. 8i) is pulled up in parking position.

d. If engine is cold, pull choke control (para.9l) all the way out.

e. Turn ignition switch (para. 9p) to ON position.

f. Depress starter button (para. 9o) and release it as soon as engine starts. Do not depress starter button longer than eight seconds. If engine fails to start on the first try, allow engine and starter to come to a complete stop before making a second attempt.

g. Hold accelerator pedal steady and allow engine to warm up at a fast idling speed. Immediately observe engine oil pressure gage (para. 9d) and ammeter (para. 9b) for normal readings. Also observe transmission oil temperature gage (para. 9n) for indications of trouble. As engine begins to warm up, gradually push in on choke control; as soon as engine is warm, push choke control all the way in.

h. Warm engine until it will idle smoothly with choke control pushed all the way in. Check for proper readings on ammeter (para. 9b), engine oil pressure gage (para. 9d), engine temperature gage (para. 9e) and fuel gage (para. 9f). Be sure hour meter (para. 9a) is operating properly.

i. Remove foot pressure from accelerator pedal. Report any malfunctions to the proper authority.

## 12. Driving Instructions

To drive crane, follow the instructions below:

a. Perform during operation services listed in paragraph 22.

b. Move directional shift lever to desired position (para. 8j).

c. Release parking brake hand lever (para.8i).

d. Depress accelerator pedal (para. 8h) until

desired driving speed is attained. If crane fails to move, shut off engine and report this to proper authority.

## 13. Loading Instructions

When loading items of equipment, follow the instructions below:

a. Approach load squarely.

b. Stop machine by depressing brake pedal (3, fig. 4).

c. Place the transmission shift lever (6, fig. 4) in neutral position.

d. Position boom with lift (20, fig. 3), crowd (14, fig. 3), and slewing (21, fig. 3), controls.

e. Lower hook block (fig. 1) to load with winch (15, fig. 3) control.

f. When raising load, accelerate engine by depressing accelerator pedal (4, fig. 4).

g. If load has to be moved, place load against front bumper.

h. To lower load, position load by driving crane to desired spot, whenever possible.

i. Lower load by moving winch lever (15, fig. 3) forward.

**Note. Do not raise or lower boom with lift cylinders or extend or retract the boom with crowd cylinders with load on boom.**

## 14. Stopping instructions

When stopping crane, follow the instructions below:

a. Remove foot from accelerator pedal and depress service brake pedal slowly and bring crane to gradual stop.

b. Move shift levers into neutral position.

c. Apply parking brake.

d. Turn ignition switch to OFF position.



#### Section IV. OPERATION OF EQUIPMENT USED IN CONJUNCTION WITH CRANE

##### 15. General

This section contains instructions for operating the portable fire extinguisher (fig. 5) that is supplied with crane.

##### 16. Operating the Extinguisher

a. Disconnect clamp that secures extinguisher to its mounting bracket, swing clamp open, and remove extinguisher.

b. Hold extinguisher upright and raise large locking handle to break seal.

c. Aim nozzle at base of fire and depress small operating lever with thumb.

d. Direct discharge at base of fire with a side-to-side sweeping motion.

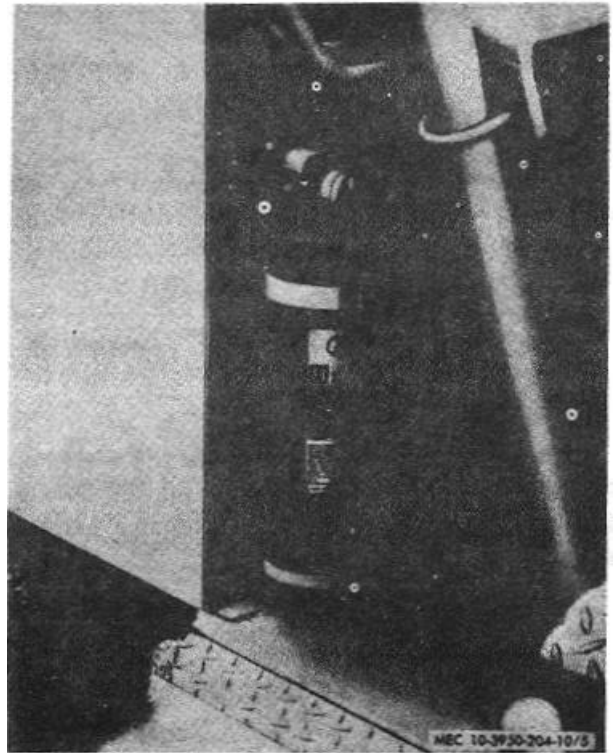


Figure 5. Fire extinguisher.

## CHAPTER 3

### MAINTENANCE INSTRUCTIONS

---

#### Section I. SPECIAL TOOLS AND EQUIPMENT

##### 17. Special Tools

There are no special tools necessary for the operation or operator maintenance of this crane.

##### 18. Equipment

The items of equipment supplied with this crane are listed in the basic issue item list.

#### Section II. LUBRICATION

##### 19. General

The lubrication of this crane is the responsibility of the using organization and will be performed by organizational maintenance personnel.

##### 20. Operator Responsibilities

The operator will be alert to detect signs of vehicle malfunctioning from lack of lubrication. He will report these conditions immediately to the proper authority.

#### Section III. PREVENTIVE MAINTENANCE SERVICES UNDER USUAL CONDITIONS

##### 21. General

To insure that the crane is ready for operation at all times, it must be inspected systematically, so that defects will be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraph 22. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the crane will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a malfunction is noted during operation  
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which would damage the equipment if operation were continued. All malfunctions will be recorded with the corrective action taken on DA Form 2404 at the earliest opportunity.

##### 22. Daily Preventive Maintenance Service

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. Refer to figure 6 for the daily preventive maintenance services.



ITEM		PAR. REF.
17.	<b>LIGHTS.</b> Check for defective lamps or lamp units.	
18.	<b>DRIVE AXLE.</b> Check for leaks. (weekly)	
19.	<b>SLEWING CYLINDER.</b> Check for leaks. (weekly)	
21.	<b>HAND BRAKE.</b> Check operation.	8i
22.	<b>BATTERIES.</b> Tighten loose cables and mountings. Remove corrosion. Inspect for cracks and leaks. Fill to 1/2 inch above plates. Clean vent holes in filler caps before installing. In freezing weather, run engine a minimum of 2 hours after adding water. (weekly.)	24b 25c
24.	<b>OIL LEVEL GAUGE.</b> Add oil as indicated by level gauge. Reference current L.O.	
26.	<b>RADIATOR.</b> Check coolant level. Proper coolant level is 1 inch below filler neck.	

**NOTE 1. OPERATION.** During operation observe for unusual noise or vibration.

MEC 10-3950-204-10/6 (2)

**Figure 6. Continued Daily Preventative Maintenance Service**

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## Section IV. PREVENTIVE MAINTENANCE SERVICES UNDER UNUSUAL CONDITIONS

### 23. General

When crane is operated under unusual conditions, extra care must be taken to maintain crane in good operating condition. Certain additional services must be performed, and some of the regular preventive maintenance services must be performed more often.

### 24. Extremely Hot, Dry Climates

The following precautions should be taken whenever crane is operated in extremely hot climates.

#### a. Cooling System.

- (1) Check fan belt frequently to be certain that it maintains its proper tension. Have adjustment made as necessary.
- (2) Check radiator coolant frequently to be certain it is at required level. Be sure radiator cap is on securely.
- (3) Keep external parts of radiator clean.
- (4) Check hoses, clamps, and gaskets frequently.

b. *Electrical System.* Check level of water in battery, maintaining it 1/2-inch above plates. Have specific gravity of electrolyte checked frequently.

c. *Fuel System.* Keep fuel tank as full as possible to reduce condensation.

d. *Tires.* Inspect tires frequently to be certain they are wearing evenly and maintaining proper air pressure.

### 25. Extremely Cold Climate

The following precautions should be taken whenever crane is operated in extremely cold climates:

a. *Shelter.* The crane should be stored in a heated shelter if possible. If a shelter is not available, cover crane with a tarpaulin or similar material.

#### b. Cooling System.

- (1) Have proper amount of antifreeze compound added to cooling system.
- (2) When antifreeze is not available and crane is not to be used, have radiator and

cylinder block drained whenever temperature is expected to be 32° F or lower. Attach a tag to the steering wheel to warn personnel that cooling system has been drained.

(3) When adding water to a radiator that contains antifreeze, allow engine to run long enough for water to mix well with the antifreeze. Have mixture checked with a hydrometer.

(4) Keep fuel tank as full as possible to reduce condensation.

#### c. Electrical System.

(1) Have specific gravity of battery electrolyte checked frequently.

(2) Operate engine for a minimum of one hour after water has been added to battery. This will allow the solution to mix and will reduce the danger of its freezing.

(3) Whenever shelter for crane is not available, remove battery from crane and store in a warm place.

(4) Check all electrical wires, connections, and cables to see that they are clean, dry, and secure.

### 26. Sandy Terrain

The following precautions should be taken when crane is operated in sandy terrain:

a. Take precautions to prevent sand and dust from entering fuel system.

b. Tie a single-layer cloth bag over air cleaner.

c. Clean dust and sand from axles, wheels, radiator, brake, and steering assemblies.

d. In sandstorms, cover exposed parts of lift and tilt cylinder rods.

e. Be certain crankcase breather tube is fastened securely in its place. Clean tube by dipping

it several times in SD (solvent, drycleaning).

**27. Tropical Climates**

The following precautions should be taken when crane is operated in tropical climates:

a. Keep radiator, controls, and instruments free of insects, webbing, and other items that may impair their functioning.

- b. Lubricate battery terminals frequently.
- c. Have parts fungus proofed if necessary.
- d. Check level of the electrolyte in battery frequently.
- e. Check all painted surfaces frequently. In tropical areas, when paint is chipped or scratched from crane, corrosive action takes place almost immediately. Report all abrasions, scratches, and chips to the proper authority.

**Section V. TROUBLESHOOTING**

**28. Definition**

Troubleshooting is the process of locating and correcting malfunctions that may occur under normal operating conditions, and it is the responsibility of the using organization.

**29. Operator Responsibilities**

The operator will report to the proper authority any deficiencies noted before, during or after operation. Report any strange noises or subnormal operation immediately and as accurately as possible.

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**CHAPTER 4  
DEMOLITION OF CRANE**

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**30. Authority**

The crane will be destroyed only if there is danger of capture and use by the aggressor, and only after the order is given by the unit commander. Destroy the same parts on all similar equipment to prevent salvage by the aggressor.

**31. Methods**

*a. Destruction by Hand.*

- (1) Smash the items listed below with a sledge, a hammer, or an ax.
  - (a) Controls
  - (b) Valves
  - (c) Hydraulic cylinders
  - (d) Hydraulic pump
  - (e) Carburetor
  - (f) Manifold
  - (g) Generator
  - (h) Distributor
  - (i) Ignition coil
  - (j) Spark plugs
  - (k) Battery
- (2) Smash the items listed below by using a heavy hammer to drive a pointed steel bar into the parts.

- (a) Engine
- (b) Drive axle and differential
- (c) Gear housing
- (d) Steering gear housing
- (e) Radiator
- (f) Oil and fuel tanks

- (3) Destroy the items listed below by cutting them or ripping them out.

- (a) Wires
- (b) Cables
- (c) Lines

*b. Destruction by Misuse.*

- (1) Drain crankcase and radiator, disconnect radiator fan, and run engine at full throttle.
- (2) Place sand, gravel, nuts, bolts, screws, or broken glass in the fuel tank.
- (3) Pack cloths saturated with gasoline around engine and inside crane, and set the cloths afire.
- (4) Remove carburetor, generator, and distributor and bury them in the ground or throw them into a body of water.

## APPENDIX I REFERENCES

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### 1. Dictionaries of Terms and Abbreviations

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

### 2. Fire Protection

SB 5-111 Supply of DA Approved Fire Extinguishers to Army Troop Users.  
TM 5-687 Repair and Utilities: Fire Protection Equipment and Appliances:  
Inspections, Operations, and Preventive Maintenance.

### 3. Lubrication

LO 10-3950-204-20

### 4. Operating Instructions

TM 10-3950-204-10 Crane, Truck, Warehouse, Slewing Boom, Gasoline, Front Wheel  
Drive, Pneumatic Tires, 10,000 Lb. Capacity, Pettibone-Mulliken  
Model 10F, Army Model MHE, 195, FSN 3950-723-3295.

### 5. Painting

TM 9-213 Painting Instruction for Field Use.

### 6. Preventive Maintenance

AR 750-5 Organization, Policies and Responsibilities for Maintenance Operation.  
TB ENG 347 Winterization Techniques for Engineer Equipment.  
TM 5-764 Electric Motor and Generator Repair.  
TM 9-207 Operation and Maintenance of Army Materiel in Extreme Cold  
Weather (0° to 65° F.)  
TM 9-6140-200-15 Operation and Organizational, Field and Depot Maintenance: Storage  
Batteries, Lead-Acid Type.  
TM 38-750 Army Equipment Record Procedures.

### 7. Publications Indexes

DA Pam 108-1 Index of Army Motion Pictures, Filmstrips, Slides, Tapes, 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 Doctrinal, Training, and Organizational Publications.  
DA Pam 310-4 Index of Technical Manuals, Technical Bulletins, Supply Manuals  
(Types 4, 6, 7, 8 and 9), Supply Bulletins, Lubrication Orders, and  
Modification Work Orders.  
DA Pam 310-5 Index of Graphic Training Aids and Devices.

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**8. Radio Interference Suppression**

TM 11-483 Radio Interference Suppression.

**9. Shipment and Limited Storage**

AR 743-505 Limited Storage of Engineers Mechanical Equipment.

TM 38-230 Preservation, Packaging, and Packing of Military Supplies and Equipment.

**10. Supply Publications**

C-9100-series Petroleum, Petroleum-Base Products and Related Materials.

**11. Training Aids**

FM 21-5 Military Training Management.

FM 21-6 Techniques of Military Instruction.

FM 21-30 Military Symbols.

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**APPENDIX II  
BASIC ISSUE ITEMS LIST AND MAINTENANCE  
AND OPERATING SUPPLIES**

---

**Section I. INTRODUCTION**

**1. General**

Section II lists the accessories, tools, and publications required in operator maintenance and operation, initially issued with, or authorized for Army Model MHE 195 Crane, Truck, Warehouse. Section III lists the maintenance and operating supplies required for initial operation.

**2. Explanation of Columns Contained in Section II**

*a. Source Codes.* The information provided in each column is as follows:

- (1) *Materiel.* This column lists the basic materiel code number of the supply service assigned responsibility for the part. Blank spaces denote supply responsibility of the preparing agency. General Engineer Supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other basic materiel code numbers are

3 - Chemical Materiel  
5 - Engineer Materiel  
10 - Quartermaster Materiel  
11 - Signal Materiel  
12 - Adjutant General

- (2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

- (a) P1-applied to repair parts which are low-mortality parts, stocked in or supplied from supply service depots, and authorized for installation at indicated maintenance levels.
- (b) X2-applied to repair parts which are not stocked. The indicated maintenance level requiring such repair parts will attempt to obtain

them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

- (3) *Maintenance.* The lowest maintenance level authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O--Organizational Maintenance

*b. Federal Stock Numbers.* When a Federal stock number is available for a part, it will be shown in this column, and will be used for requisitioning purposes.

*c. Description.*

- (1) The item name and a brief description of the part are shown.
- (2) A five-digit Federal supply code for manufacturers and/or other supply services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.

Example: (08645) 86453

*d. Unit of Issue.* If no abbreviation is shown in this column, the unit of issue is "each".

*e. Quantity Issued with Equipment.* This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

*f. Illustrations.* This column is subdivided into two columns which provide the following information:

- (1) *Figure number.* Provides tire identifying number of the illustration.
- (2) *Item number.* Provides the referenced number for the parts shown in the illustration.

**3. Federal Supply Code for Manufacturers 78977**  
Unity Mfg. Co.

**4. Explanation of Columns Contained in Section III**

*a. Item.* This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

*b. Component Application.* This column identifies the component application of each maintenance or operating supply item.

*c. Source of Supply.* This column lists the basic materiel code number of the supply service assigned responsibility of the preparing agency. Other basic materiel code numbers are

- 3 Chemical Materiel
- 9 Ordnance Materiel
- 10 Quartermaster Materiel

*d. Federal Stock Number.* The Federal stock number will be shown in this column and will be used for requisitioning purposes.

*e. Description.* The item and a brief description are shown.

*f. Quantity Required for Initial Operation.* This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

*g. Quantity Required for 8 Hours Operation.* Quantities listed represent the estimated requirements for an average 8 hours of operation.

*h. Notes.* This column contains informative notes keyed to data appearing in the preceding column.

**Section II. BASIC ISSUE ITEMS LIST**  
**BASIC ISSUE ITEMS LIST**

M A T E R I E L	S o u r c e	M a i n t e n a n c e	R e c o v e r a b l e	Federal Stock No.	Description	U n i t  o f  I s s u e	Q u a n t i t y  r e q u i r e d	Q u a n t i t y  r e q u i r e d	Illustration	
									Fig.	Item
11	P1	0	....	6140-538-9986	BATTERY, storage, 12 volt	ea	.....	2		
3	P1	0	....	6810-249-9364	ACID, sulfuric, electrolyte dilute, specific gravity 1.280 1-gallon container	ea	.....	2		
5	X2	0	....	4210-893-1092	EXTINGUISHER fire.....	ea	.....	1		
10	P1	0	....	7520-559-9618	CASE, maintenance and operational manuals.	ea	.....	1		
10	X2	0	...	.....	SOTLIGHT ASSEMBLY (78977) S6 PUBLICATIONS	ea	.....	2		
12					TM 10-3950-204-10 (operator's manual).	ea	.....	1		
					REPAIR PARTS None authorized for operator maintenance.					
					SPECIAL TOOLS None required for operator maintenance.					
				7510-889-3494	RECORDS Equipment Log Book c/o the following: DA Forms 2408, 2408-1, 2408-2, 2408-3, 2408-4, 2408-5, 2408-6, 2087,2408-10, and 2408-11					

**Section III. MAINTENANCE AND OPERATING SUPPLIES**

Item	Component Application	Source of Supply	Federal Stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	CRANKCASE (1).....	..... 10 10 10 10 10	..... 9150-265-9434  9150-265-9429 9150-242-7604	OIL LUBRICATING: 55 gal. drum as follows: Grade OE 30..... OE-30..... Grade OE 10..... OE-10..... OES.....			(1) Includes quantity of oil to fill engine oil systems as follows: 5 Qt.-Crankcase 1/2 Qt.-Oil Filter 1 Qt. Air Cleaner
2	AIR CLEANER.....			OIL LUBRICATING.....	1 Pt.		
3	TRANSMISSION..... DIFFERENTIAL.....	10 10	 9150-577-5844	GRADE OE 10..... MOBILE LUBE GO90 (5 gal. pail).	6.5 Gal.		
4	HYDRAULIC TANK.....	10 10 10	9150-257-5440 9150-265-9429 9150-242-7604	GOS (5 gal. Pail) OE-10 55 gal. Drum OES 55 gal. Drum	62 Gal.		
5	HYDRAULIC BRAKE SYSTEM.....			OIL, HYDRAULIC, 1 gal. Can as follows: HB-Nonpetroleum Base, Automotive .....	1 Pt.		
		10	9150-231-9071	HBA nonpetroleum.....	1 Pt.		
		10	9150-252-6375	Base Automotive Arctic-Type	1 Pt.		
6	FUEL TANK.....	10	9130-264-6218	GASOLINE: Bulk as follows: Regular Grade 90 Octane Rating.....	40 Gal.		
7	RADIATOR.....	..... 9 9	..... 6850-243-1992 6850-243-1990	WATER .....	16 Qts.		
		9	6850-243-1990	ANTIFREEZE: Ethylene-glycol, 1 gal can	.....	.....	
8	GENERAL APPLICATION	10 10	9150-231-9064 9150-231-9065	ANTIFREEZE Ethylene-glycol, 55 gal drum PL-LIGHT, LUBRICATING OIL, preservative, 1 qt. Can. PL-LIGHT LUBRICATING OIL, preservative, 1 gal can.			
9	GENERAL APPLICATION	10 10	9150-190-0905 9150-190-0907	GAA, GREASE, AUTOMOTIVE and Artillery, 5 lb. Can. GAA, GREASE, AUTOMOTIVE and Artillery, 35 lb. Can.			

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NG: State AG (3).

USAR: None.

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

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# The Metric System and Equivalents

## Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

## Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 dekagram = 10 grams = .35 ounce  
 1 hectogram = 10 dekagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

## Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

## Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

## Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

## Temperature (Exact)

°F Fahrenheit temperature      5/9 (after subtracting 32)      Celsius temperature      °C

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