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IS 13064 (1991): Power tillers - Installation and preventive maintenance - Guidelines [FAD 11: Agricultural Tractors and Power Tillers]



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भारतीय मानक

पावर टिलर — स्थापना एवं एहतियाती  
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*Indian Standard*

**POWER TILLERS — INSTALLATION AND  
PREVENTIVE MAINTENANCE — GUIDELINES**

UDC 631.313.72

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**BUREAU OF INDIAN STANDARDS**  
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NEW DELHI 110002

## **FOREWORD**

**This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Agricultural Tractors and Power Tillers Sectional Committee had been approved by the Food and Agriculture Division Council.**

**Power tiller is a sophisticated prime mover and involves heavy initial investment as compared to the animal power. Therefore, it should be utilized for reasonably long working hours to minimized cost of operation. Though basic design of the power tiller and quality of the materials used for fabrication of its various components are important, proper installation and preventive maintenance is equally important for trouble free use. This standard provides guidelines for installation and preventive maintenance of the power tiller for the benefit of farmers.**

## *Indian Standard*

# POWER TILLERS — INSTALLATION AND PREVENTIVE MAINTENANCE — GUIDELINES

### 1 SCOPE

This standard covers detailed procedure for installation and preventive maintenance of the power tillers.

### 2 TERMINOLOGY

**2.0** For the purpose of this standard, the following definitions shall apply.

#### 2.1 Power Tiller

A prime mover in which direction of travel and its control for field operation is performed by the operator walking behind it. It is also known as hand or walking type tractor.

NOTE — Power tiller if provided with riding attachment should be safe and stable for riding.

#### 2.2 Installation

Operation performed to make the power tiller worthy to give trouble free service for maximum working hours in the field.

#### 2.3 Preventive Maintenance

Systematic series of inspections and operations performed periodically to maintain or improve the efficiency and performance of the power tiller.

#### 2.4 Manufacturer

Any person or organization who actually manufactures power tiller fully or partially and assembles the power tillers.

#### 2.5 Supplier

Any person or organization appointed or recognized by the manufacturer for sale of the power tiller of his make. The manufacturer may or may not be a supplier.

#### 2.6 User

Any person or organization who purchases and uses the power tiller.

#### 2.7 Operator

A person who actually operates the power tiller. An operator may or may not be the user.

### 3 INSTALLATION

#### 3.1 Pre-delivery Checks and Service

**3.1.1** Pre-delivery checks and service of the power tiller should be done to the satisfaction of the user.

**3.1.2** The complete service of the power tiller including lubrication should be done in accordance with the manufacturer's recommendations. Checks and operations recommended to be performed before delivery are listed in Annex A.

**3.1.3** The functioning of the power tiller and its attached components should be checked and shown to the user.

#### 3.2 Matching Implements

As the power tiller is only a prime mover, it can be handled efficiently when right type of implements are used with it. It is, therefore, essential that the supplier should recommend the matching implements and should give adequate information regarding the type of the implements along with the specification and the addresses of the manufacturer and the suppliers.

#### 3.3 Delivery

**3.3.1** At the time of delivery, the supplier should provide all the documents and service manuals to the user. A list of the documents and service manuals recommended to be supplied is given in Annex B.

**3.3.2** The supplier should also provide the necessary tools and accessories to the user.

**3.3.3** The supplier should give a list of fast wearing components of the power tiller for the guidance of the user. If required by the user a set of the fast-wearing components should be supplied along with the power tiller on payment of its cost.

#### 3.4 Running-in

**3.4.1** The new power tiller needs to be run-in to make all its parts to move freely and smoothly. During this period, the pistons, piston rings, cylinders, valves, valve seats, bearings, etc, get proper seat and settle down through lubrication.

#### 3.5 Training and Familiarization

**3.5.1** Generally the users are not conversant with driving and its control procedure. It is, therefore, essential for the supplier to impart training to the user in order to familiarize him in different aspects of maintenance, servicing, checking and utilization of the power tiller.

**3.5.2** The power tiller has to perform its function in the user's field on different soils and climates. Every field operation needs a special adjustment and setting of the equipment with the power tiller. If is, therefore, necessary that the supplier demonstrates to the user the setting

of different equipments with the power tiller and their functioning. The user should also be informed regarding its periodical maintenance.

### **3.6 Warranty Services**

**3.6.1** It is recommended that at least three services should be done by the supplier free of labour charges. The user shall be informed well in advance regarding the dates and place of the free services. The user should not attempt to service the power tiller himself as defects generally are observed only by the trained mechanic. Some of the operations recommended to be performed during the warranty services are given in Annex C for guidance.

## **4 PREVENTIVE MAINTENANCE**

### **4.1 General**

**4.1.1** User should maintain record of consumption of fuel/oil with reference to operation and soil condition. Maintenance of records of fuel consumption will help identify problems and prevent major engine break downs.

**4.1.2** The machine should be kept cleaned. Regular notes for leakage of oil, fuel and abnormal sound should be kept after performing the work each day.

**4.1.3** Operational settings of the power tiller like engine speed, brake and clutch plates and oil pressure should be checked and recorded in the log book periodically.

**4.1.4** All repairs should be carried out by trained mechanics with using genuine spare parts.

**4.1.5** User should operate power tiller within operational limits of the machine. Any abuse or overload will cause reduced life or breakdown of machine.

### **4.2 Lubrication**

**4.2.1** Lubrication of different assemblies reduces friction between the moving parts, assists in cooling the engine, seals gases within the combustion chamber and helps in keeping the inner assemblies clean. It is, therefore, essential to lubricate the power tiller regularly.

**4.2.2** The lubrication schedule for different assemblies as specified by the manufacturer in the manual shall be followed. The grades of the grease and oil as recommended by the manufacturer shall be used in recommended quantities and intervals.

### **4.3 Maintenance Procedure**

**4.3.1** The daily servicing and maintenance shall be done by the user in accordance with the procedure given in the operator's manual. For the guidance some of the operations to be performed are given in Annex D.

**4.3.2** The periodic maintenance should be carried out as indicated in the service manual. Some of the details are given in Annex D and Fig. 1.

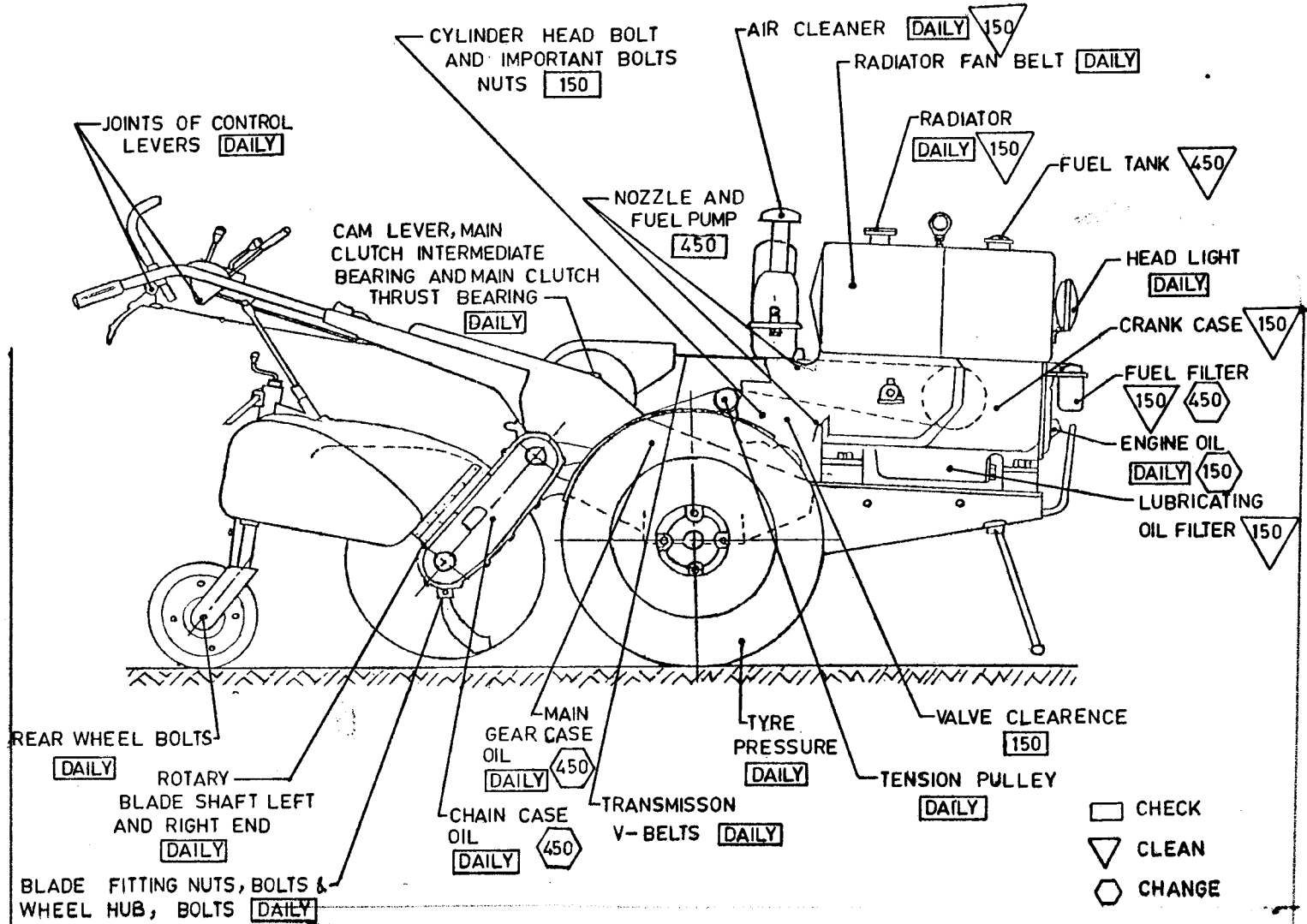


FIG. 1 PERIODICAL MAINTENANCE SCHEDULE



**ANNEX A**  
( Clause 3.1.2 )

**PRE-DELIVERY INSPECTION OF POWER TILLERS**

The following points shall be checked during pre-delivery inspection of power tillers:

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1 Check engine oil and fill up to recommended level.</li> <li>2 Check water level ( water cooled, engine ) and fill up.</li> <li>3 Check fuel tank and leakage.</li> <li>4 Check air cleaner oil and fill up to the level mark.</li> <li>5 Check fan belt tension and adjust, if necessary ( for water cooled engines ).</li> <li>6 Check transmission belts tension and adjust, if necessary.</li> <li>7 Check gear box oil and fill up to level.</li> <li>8 Check chain case oil and fill up to level.</li> <li>9 Fill oil in both ends of rotavator shaft.</li> <li>10 Oil all moving parts and joints of levers.</li> <li>11 Check tyre pressure.</li> <li>12 Check all bolts and nuts and tight, if necessary.</li> </ol> | <ol style="list-style-type: none"> <li>13 Tight tyre bolts, wheel hub nuts and axle bolts.</li> <li>14 Check engine foundation bolts and tight, if necessary.</li> <li>15 Grease rear wheel shaft and tension pulley.</li> <li>16 Check main clutch adjustment, brake adjustment and side clutch adjustment.</li> <li>17 Crank the engine several times.</li> <li>18 Check oil pressure indicator mark.</li> <li>19 Check exhaust condition.</li> <li>20 Check abnormal sound.</li> <li>21 Check vibration.</li> <li>22 Check engine speed and hunting.</li> <li>23 Check head light.</li> <li>24 Check functions of main clutch, brake, side clutch and engagements of gears and rotary shaft.</li> <li>25 Check for oil and water leakage.</li> </ol> |
|---|---|

NOTE — Power tiller should be on a level ground and engine in horizontal position for checks at points 1 to 9.

**ANNEX B**  
( Clause 3.3.1 )

**LIST OF DOCUMENTS AND SERVICE MANUALS**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1 Sale letter.</li> <li>2 Warranty card.</li> <li>3 Service manual.</li> <li>4 Temporary registration number certificate.</li> <li>5 List of tools and accessories supplied with the power tiller.</li> </ol> | <ol style="list-style-type: none"> <li>6 List of spare parts supplied with the power tiller.</li> <li>7 Lubrication chart and owner's maintenance manual.</li> <li>8 Spare parts catalogue ( optional ).</li> </ol> |
|--|---|

**ANNEX C**  
( Clause 3.6.1 )

**OPERATIONS TO BE PERFORMED IN WARRANTY SERVICES**

**C-1 FIRST FREE SERVICE**

**C-1.1** Clean tiller thoroughly.

**C-1.2** Warm up water in radiator by running the engine. Stop the engine, drain water completely. If dirty, clean radiator with fresh water, refill radiator with clean, soft water. Add radiator inhibitor ( for water cooled engine ).

**C-1.3** Clean crank case after running the engine 5-10 minutes and change engine oil, clean oil screen assembly.

**C-1.4** Clean lubricating oil filter or replace if disposable type.

**C-1.5** Clean air cleaner and filter. Change oil.

**C-1.6** Change chain case oil, if necessary.

**C-1.7** Fill oil at both ends of the rotavator shaft.

**C-1.8** Change gear case oil, if necessary.

**C-1.9** Grease rear wheel shaft and tension pulley.

**C-1.10** Lubricate all moving parts.

**C-1.11** Oil main clutch thrust bearing, intermediate bearing, main clutch lever, cam lever, etc.

**C-1.12** Oil steering clutch lever joints, arm shafts and shift fork arm shaft.

**C-1.13** Check cylinder head nuts. Tighten the nut to the recommended torque.

**C-1.14** Check and tighten all nuts and bolts to the recommended torque.

**C-1.15** Adjust clutch, accelerator, brake, etc, if necessary.

**C-1.16** Check and tighten rotavator blade nuts.

**C-1.17** Adjust radiator fan belt to the recommended deflection ( for water cooled engines ).

**C-1.18** Adjust power transmission 'V' belts to recommended deflection.

**C-1.19** Change fuel filter, if necessary.

**C-1.20** Clean oil pressure indicator, if necessary.

**C-1.21** Adjust valve clearance as recommended.

**C-1.22** Inspect electrical system.

**C-1.23** Check tyre pressure.

**C-1.24** Start engine and follow.

## **C-2 SECOND FREE SERVICE**

**C-2.1** Clean tiller thoroughly.

**C-2.2** Warm up water in radiator ( for water cooled engine only ) by running the engine. Stop the engine, drain water completely. If dirty, clean radiator with fresh water, refill radiator with clean, soft water. Add radiator inhibitor. ( for water cooled engine ).

**C-2.3** Clean crank case after running the engine 5-10 minutes and change engine oil, clean oil screen assembly.

**C-2.4** Clean lubricating oil filter or replace if disposable type.

**C-2.5** Clean air cleaner and filter. Change oil.

**C-2.6** Change chain case oil, if necessary.

**C-2.7** Fill oil at both ends of the rotavator shaft.

**C-2.8** Change gear case oil, if necessary.

**C-2.9** Grease rear wheel shaft and tension pulley.

**C-2.10** Oil main clutch thrust bearing, intermediate bearing, main clutch lever, cam lever, etc.

**C-2.11** Oil steering clutch lever joints, arm shafts and shift fork arm shaft.

**C-2.12** Check cylinder head nuts. Tighten the nuts to the recommended torque.

**C-2.13** Check and tighten all nuts and bolts to the recommended torque.

**C-2.14** Adjust clutch, accelerator, brake, etc, if necessary.

**C-2.15** Lubricate all moving parts.

**C-2.16** Check and tighten rotavator blade nuts.

**C-2.17** Adjust radiator fan belt to the recommended deflection ( for water cooled engines ).

**C-2.18** Adjust power transmission 'V' belts to recommended deflection.

**C-2.19** Change fuel filter, if necessary.

**C-2.20** Clean oil pressure indicator, if necessary.

**C-2.21** Adjust valve clearance as recommended.

**C-2.22** Set engine speed at no load.

**C-2.23** Check tyre pressure.

**C-2.24** Inspect electrical system.

**C-2.25** Start engine and follow.

**C-2.26** Check engine nozzle pressure and fuel injection timing.

## **C-3 THIRD FREE SERVICE**

**C-3.1** Clean tiller thoroughly.

**C-3.2** Warm up water in radiator ( for water cooled engine only ) by running the engine. Stop the engine, drain water completely. If dirty, clean radiator with fresh water, refill radiator with clean, soft water. Add radiator inhibitor ( for water cooled engine ).

**C-3.3** Clean crank case after running the engine 5-10 minutes and change engine oil, clean oil screen assembly.

**C-3.4** Clean lubricating oil filter or replace if disposable type.

**C-3.5** Clean air cleaner and filter. Change oil.

**C-3.6** Change chain case oil, if necessary.

**C-3.7** Fill oil at both ends of the rotavator shaft.

**C-3.8** Change gear case oil, if necessary.

**C-3.9** Grease rear wheel shaft and tension pulley.

**C-3.10** Oil main clutch, thrust bearing, intermediate bearing, main clutch lever, cam lever, etc.

**C-3.11** Oil steering clutch lever joints, arm shafts and shift fork arm shaft.

**C-3.12** Check cylinder head nuts. Tighten the nuts to the recommended torque.

**C-3.13** Check and tighten all nuts and bolts to the recommended torque.

**C-3.14** Adjust clutch, accelerator, brake, etc, if necessary.

**C-3.15** Lubricate all moving parts.

**C-3.16** Check and tighten rotavator blade nuts.

**C-3.17** Adjust radiator fan belt to the recommended deflection ( for water cooled engines ).

**C-3.18** Adjust power transmission 'V' belts to recommended deflection.

**C-3.19** Change fuel filter, if necessary.

**C-3.20** Clean oil pressure indicator, if necessary.

**C-3.21** Adjust valve clearance as recommended.

**C-3.22** Set engine speed at no load.

**C-3.23** Clean fuel tank thoroughly.

**C-3.24** Check and adjust injector pressure to the recommended pressure.

**C-3.25** Check and tighten engine foundation, if necessary.

**C-3.26** Check tyre pressure.

**C-3.27** Inspect electrical system.

**C-3.28** Start engine and follow.

**C-3.29** Check engine nozzle pressure and fuel injection timing.

**ANNEX D**  
( Clauses 4.3.1 and 4.3.2 )

**CHECK LIST FOR PERIODICAL MAINTENANCE**

|        |  | <input type="checkbox"/> CHECK |                          |                          | <input type="checkbox"/> CLEAN |                          |                          | <input type="checkbox"/> CHANGE |  |  |
|--------|--|--------------------------------|--------------------------|--------------------------|--------------------------------|--------------------------|--------------------------|---------------------------------|--|--|
| Sl No. | Item   | During Warranty Service Period |                          |                          | Frequency                      |                          |                          |                                 |  |  |
|        |  | 1st Service                    | 2nd Service              | 3rd Service              | Daily                          | Every 150 hours          | Every 450 hours          |                                 |  |  |
| 1.     | Crank Case   | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> |                                | <input type="checkbox"/> |                          |                                 |  |  |
| 2.     | Engine Oil   | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>       | <input type="checkbox"/> |                          |                                 |  |  |
| 3.     | Nozzle & Fuel Pump   |                                |                          | <input type="checkbox"/> |                                |                          | <input type="checkbox"/> |                                 |  |  |
| 4.     | Lubricating oil Filter   | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> |                                | <input type="checkbox"/> |                          |                                 |  |  |
| 5.     | Fuel Filter  | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> |                                | <input type="checkbox"/> | <input type="checkbox"/> |                                 |  |  |
| 6.     | Fuel Tank  |                                |                          | <input type="checkbox"/> |                                |                          | <input type="checkbox"/> |                                 |  |  |
| 7.     | Air Cleaner  | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>       | <input type="checkbox"/> |                          |                                 |  |  |
| 8.     | Valve Clearance  | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> |                                | <input type="checkbox"/> |                          |                                 |  |  |
| 9.     | Cylinder Head Bolt and all other important bolts and nuts        | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> |                                | <input type="checkbox"/> |                          |                                 |  |  |
| 10.    | Main Gear Case Oil   |                                |                          | <input type="checkbox"/> | <input type="checkbox"/>       |                          | <input type="checkbox"/> |                                 |  |  |
| 11.    | Chain Case Oil   | <input type="checkbox"/>       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>       |                          | <input type="checkbox"/> |                                 |  |  |
| 12.    | Rotary Blade Shaft left and right end                            |                                |                          |                          | <input type="checkbox"/>       |                          |                          |                                 |  |  |
| 13.    | Rear Wheel Bolts   |                                |                          |                          | <input type="checkbox"/>       |                          |                          |                                 |  |  |
| 14.    | Cam Lever  |                                |                          |                          | <input type="checkbox"/>       |                          |                          |                                 |  |  |
| 15.    | Tension Pulley   |                                |                          |                          | <input type="checkbox"/>       |                          |                          |                                 |  |  |
| 16.    | Main Clutch, Intermediate Bearing and Main Clutch Thrust Bearing |                                |                          |                          | <input type="checkbox"/>       |                          |                          |                                 |  |  |
| 17.    | Joints of all Control Levers                                     |                                |                          |                          | <input type="checkbox"/>       |                          |                          |                                 |  |  |

|     |  |                          |                          |                          |                          |                          |                          |
|-----|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 18. | Blade Fitting Nuts, Bolts and Wheel Hub bolt |                          |                          |                          | <input type="checkbox"/> |                          |                          |
| 19. | Transmission 'V' Belts                       |                          |                          |                          | <input type="checkbox"/> |                          |                          |
| 20. | Tyre Pressure                                |                          |                          |                          | <input type="checkbox"/> |                          |                          |
| 21. | Head Light                                   |                          |                          |                          | <input type="checkbox"/> |                          |                          |
| 22. | Radiator *                                   | ▽                        | ▽                        | ▽                        | <input type="checkbox"/> | ▽                        |                          |
| 23. | Radiator Fan Belt *                          |                          |                          |                          | <input type="checkbox"/> |                          |                          |
| 24. | Injector Pressure and Timing                 |                          | <input type="checkbox"/> | <input type="checkbox"/> |                          | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. | Oil Pressure Indicator                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                          |                          |
| 26. | Air Breather Valve                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                          | <input type="checkbox"/> |                          |

For Water Cooled Engine

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### Amendments Issued Since Publication

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