OPERATORS MANUAL

International
Hopper Cooled
1½ to 2½ and 3 to 5 H.P.
Model "LB" Engines
(Gasoline or Kerosene)

This manual contains information which will be valuable to you during the entire life of your engine. It includes operation and maintenance information, and a parts list. Rely on your manual for operating and maintenance information... and rely on your International Harvester dealer when in need of skilled mechanical service or genuine IH service parts.

INTERNATIONAL HARVESTER COMPANY
180 NORTH MICHIGAN AVE.  CHICAGO 1, ILLINOIS, U.S.A.
TO THE ENGINE OWNER

Please accept our congratulations on your investment in an International Harvester engine. We feel sure you will obtain from this machine the economical and superior performance it is designed to give. It is certain that you will derive a large measure of personal satisfaction from operating it.

Years of engine manufacturing experience and actual contact with problems in the field have been combined with advancements in engineering and metallurgical science to produce all the features and refinements built into your engine. Properly adjusted, operated, and maintained, this engine will respond to every reasonable demand you make upon it and give you reliable service for years to come.

The purpose of this Operator's Manual is to explain maintenance requirements and routine adjustments which are necessary for the most efficient operation of your engine. To protect your engine investment, study your Manual before starting or operating your engine.

If you should need information not given in this Manual, or require the services of a trained mechanic, we urge you to use the extensive facilities offered by the International Harvester dealer in your locality. Dealers are kept informed on the best methods of servicing and are equipped to provide prompt, high-class service in the field or in an up-to-date service station.

Dealers carry ample stocks of essential genuine IH parts. These dealers are backed in every case by the full facilities of a conveniently located International Harvester branch.

When in need of parts, always give the International Harvester dealer your engine serial number. We suggest that you write this serial number in the space provided below, for ready reference when parts are required.

Engine Serial No. (Stamped on plate above cylinder head)

* * *

It is the policy of International Harvester Company to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to make such changes on machines sold previously.
IMPORTANT

This engine has been designed to be one of the safest engines for operation inside of a building. The fuel tank is below the carburetor to eliminate any possibility of fuel leakage from fuel lines or carburetor. We suggest, however, that you obtain a permit from the insurance company whenever engine is installed in an insured building.

BEFORE STARTING THE ENGINE

All oil is drained from the crankcase, and the water is drained from the hopper when the engine is shipped.

Fill the crankcase to the top of filler boss (see ref. no. 2, Illust. 3) with the proper grade of oil for the prevailing temperature (see table on page 7.)

See that the crankcase water drain plug (see ref. no. 11, Illust. 1) is in place and tight, then fill hopper to within 3/4" of the top with clean water. Use soft or rain water, if possible, and keep hopper well filled at all times. In cold weather engine can be started easier if hot water is used.

The hopper capacity for the 1-1/8 to 2-1/2 H.P. engine is approximately 2-1/4 U.S. gallons and for the 3 to 5 H.P. engine it is approximately 4 U.S. gallons.

On gasoline engines fill the fuel tank with clean gasoline. On kerosene engines fill the fuel tank with clean kerosene and fill the gasoline (starting) chamber in the mixer with clean gasoline. Caution: Never fill fuel tank while engine is running.

Because the fuel consumption of this engine is very small, a high test gasoline is a good investment especially in cold weather. Trouble can be avoided if the fuel is kept free from water and dirt. Keep your supply of gasoline in a closed container so the more volatile portion does not evaporate. The fuel tank should be removed and cleaned out at least once a year.
STARTING GASOLINE ENGINE

Open the gasoline needle valve 1/3 to 1/2 of a turn.

Grip the crank about 1" from the flywheel and when cranking keep tension on hand away from the flywheel.

Press down on choke valve and crank engine two complete revolutions, then release choke. Crank till it is on the compression stroke, then give the crank a quick upward flip. If engine does not start after a few cranks, choke again. Do not choke the engine too much or you may flood it and cause hard starting. As soon as engine starts to run, adjust needle valve to give the smoothest operation. After engine is hot readjust needle valve. Excessive fuel will cause the engine to run uneven and smoke, not enough fuel will cause the engine to run uneven and backfire.

If engine becomes flooded, spark plug should be removed, cleaned and reinstalled, then crank engine with the fuel completely shut off, until it starts to run. Adjust the gasoline needle valve to best operating position.

If the engine has been flooded it is a good policy to pour about one tablespoonful of oil into the cylinder through the spark plug opening before replacing the spark plug.

When starting a hot engine, do not use the choke, but close the needle valve one-fourth of a turn from the regular operating position.

![Illustration of a Gasoline Engine]

Index to reference nos. on illustration.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water hopper cover (Special)</td>
</tr>
<tr>
<td>2</td>
<td>Gasoline needle valve.</td>
</tr>
<tr>
<td>3</td>
<td>Fuel pipe.</td>
</tr>
<tr>
<td>4</td>
<td>Fuel tank filler cap.</td>
</tr>
<tr>
<td>5</td>
<td>Serial number.</td>
</tr>
<tr>
<td>6</td>
<td>Timing notch (in side plate)</td>
</tr>
<tr>
<td>7</td>
<td>Speed control lever.</td>
</tr>
<tr>
<td>8</td>
<td>Timing (D.C.) notch.</td>
</tr>
<tr>
<td>9</td>
<td>Starting crank handle.</td>
</tr>
<tr>
<td>10</td>
<td>Choke valve.</td>
</tr>
<tr>
<td>11</td>
<td>Crankcase water drain plug.</td>
</tr>
</tbody>
</table>
STARTING KEROSENE ENGINE

This engine is started on gasoline and must be run on gasoline until it is
hot enough to run on kerosene.

To start on gasoline, close the kerosene needle valve and open the gasoline
needle valve 1/3 to 1/2 of a turn. See that heat regulating valve at the
exhaust outlet is in the correct position. (See "Heat Regulating Valve on
Kerosene Engines" on page 5.) It is not necessary to change this valve once
it has been correctly set, except for extreme differences in temperature,
load or fuel. Press down on the choke valve and crank the engine two com-
plete revolutions, then release the choke valve. When cranking the engine
grip the crank about 1" away from the flywheel and keep tension on hand away
from flywheel. Now, crank the engine until it is on the compression stroke
and then give the crank a quick upward flip. If the engine does not start
after a few cranks choke again. Do not choke the engine too much or you
may flood it and make it hard to start.

Index to reference numbers
on illustration.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heat control valve retainer plate.</td>
</tr>
<tr>
<td>2</td>
<td>Fuel tank filler cap.</td>
</tr>
<tr>
<td>3</td>
<td>Fuel pipe.</td>
</tr>
<tr>
<td>4</td>
<td>Kerosene needle valve.</td>
</tr>
<tr>
<td>5</td>
<td>Gasoline (starting) needle valve.</td>
</tr>
<tr>
<td>6</td>
<td>Choke valve.</td>
</tr>
<tr>
<td>7</td>
<td>Gasoline chamber filler cap.</td>
</tr>
<tr>
<td>8</td>
<td>Crankcase water drain plug.</td>
</tr>
</tbody>
</table>

Illustr. 2 - Kerosene Engine

As soon as engine starts to run, adjust gasoline needle valve to give the
smoothest operation and allow the engine to operate on gasoline until the
gasoline chamber is nearly empty, then open the kerosene needle valve and
close the gasoline needle valve. Adjust the kerosene needle valve to give
the smoothest operation. Excessive fuel will cause the engine to run uneven
and smoke and not enough fuel will cause it to run uneven and backfire.

The warming-up time can be shortened by putting only enough water in the
hopper to cover the cylinder. After the engine is changed over to operate
on Kerosene, fill the water hopper.

Gasoline must always be used for starting this engine, regardless whether
the engine is hot or cold. When starting a hot engine, do not use the choke,
but open the gasoline needle valve about 1/3 of a turn.

If engine becomes flooded the spark plug should be removed, cleaned and rein-
stalled and the engine cranked, with the fuel completely shut off, until the
engine starts to run; then adjust the gasoline needle valve to best operating
position.

If the engine has been flooded it is a good policy to pour about one table-
spoonful of oil into the cylinder through the spark plug opening before
replacing the spark plug.
Model LA Stationary Engines

Illustr. 1. Flywheel side of Model LA 1½ to 2½ h.p. engine with air cleaner attachment supplied as special equipment.

Two Sizes, 1½ to 2½ h.p. and 3 to 5 h.p.

Model LA engines are built in two sizes, with variable power ratings. They are almost identical in design and have practically the same features. The power rating of the smaller size ranges from 1½ to 2½ h.p. and the larger size from 3 to 5 h.p. Both models are easy to start, simple in operation and construction, and fully enclosed so that all working parts are protected from the weather and from dust, dirt, and grit. Their compact size and light weight make them easy to install in out-of-the-way corners, and they can be transported quickly from place to place.

Handy for Many Jobs

These engines will save time, money, and labor. At only a few cents an hour, they will pump water, saw wood, run feed grinders, small corn shellers, elevators, or cream separators. There are many other odd power jobs they can do.

Variable Speed Control

Both engines have a simple hand lever speed control. This economy feature enables the owner to operate his engine at a speed in keeping with the work being done and the horsepower required to do it.

Light Weight

The 1½ to 2½ h.p. engine weighs approximately 168 pounds and the 3 to 5 h.p. weighs approximately 270 pounds.

Easy Starting

A high-tension, rotary-type Wico magneto with impulse coupling is supplied as regular equipment and provides quick and easy starting under all conditions.

Reinforced Steel Fuel Tank

The fuel tank is made of reinforced steel. It is regularly equipped as suction fuel feed. Steel skids, with large-size handholes at each end, make it easy to transport the engine from place to place.

Regular Equipment

Both models are skidded and come equipped with a Wico type “AH” magneto. Regular pulley and fuel equipment are shown in the table below.

Special Equipment

Plain pulleys, 3 to 14-in. diameter. V-belt pulleys, 10, 13, and 15-in. diameter. Friction clutch pulley, 12-in. diameter, 6-in. face. Friction clutch sprocket. Friction clutch attachment less pulley. Friction clutch pulleys, 8½, 10, or 12-in. diameter, with 6-in. face in place of regular. Twenty-tooth friction clutch sprocket in place of regular. Attachments include auxiliary water hoppers, air cleaners, direct-connected gear-drive pump jacks (with or without clutch for 1½ to 2½ h.p. engine, and with clutch for 3 to 5 h.p. engine), and two-wheel hand trucks for either engine. Either engine can also be supplied less pulley, Natural gas attachment. Fuel tank with splash plates. Spark arrester for 3 to 5 h.p. engine.

Specifications

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½ to 2½ h.p.</td>
<td>Gasoline engine with 6-in. pulley</td>
<td>177 lb.</td>
</tr>
<tr>
<td>1½ to 2½ h.p.</td>
<td>Kerosene engine with 6-in. pulley</td>
<td>192 lb.</td>
</tr>
<tr>
<td>1½ to 2½ h.p.</td>
<td>Engine with 3 to 5 h.p. skids and fuel tank, extra-high (large-capacity) water hopper, 15-in. V pulley (special for milk cooler)</td>
<td>222 lb.</td>
</tr>
<tr>
<td>3 to 5 h.p.</td>
<td>Gasoline engine with 8-in. pulley</td>
<td>285 lb.</td>
</tr>
<tr>
<td>3 to 5 h.p.</td>
<td>Kerosene engine with 8-in. pulley</td>
<td>299 lb.</td>
</tr>
</tbody>
</table>

All weights and measurements are approximate.
Model LA Stationary Engines

Illust. 2. A natural gas attachment is supplied on special order for either the 1½-2½ or the 3-5 h.p. engine.

All Working Parts Completely Enclosed

The completely enclosed one-piece crankcase protects the working parts against dirt, dust, and climatic conditions. The removable rain and dust shield fits tightly over the cylinder head and protects the valves, valve rocker arms, and valve push rods. The cylinder is water-cooled by a complete circulation of water around the cylinder head. This feature assures a smooth-running engine during long periods of continuous operation.

Illust. 4. Pulley side of the 3 to 5 h.p. Engine. Note the convenient hand lever speed control.

<table>
<thead>
<tr>
<th>Data</th>
<th>1 ½ to 2 ½ h.p.</th>
<th>3 to 5 h.p.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horsepower at engine speed 600 r.p.m.</td>
<td>1 ½</td>
<td>3</td>
</tr>
<tr>
<td>Horsepower at engine speed 1000 r.p.m.</td>
<td>2 ½</td>
<td>5</td>
</tr>
<tr>
<td>Bore</td>
<td>3 ½”</td>
<td>4”</td>
</tr>
<tr>
<td>Stroke</td>
<td>3 ½”</td>
<td>4 ¼”</td>
</tr>
<tr>
<td>Engine speed r.p.m.</td>
<td>600 to 1000</td>
<td>600 to 1000</td>
</tr>
<tr>
<td>Flywheel size</td>
<td>14” dia.</td>
<td>17 ½” dia.</td>
</tr>
<tr>
<td>Magneto, rotary type</td>
<td>Wico</td>
<td>Wico</td>
</tr>
<tr>
<td>Pulley (regular) takes 4” belt</td>
<td>6” dia. 5” face</td>
<td>8” dia. 5” face</td>
</tr>
<tr>
<td>Pulley speed r.p.m.</td>
<td>300 to 500</td>
<td>300 to 500</td>
</tr>
<tr>
<td>Water hopper—Capacity</td>
<td>2 ¼ gallons</td>
<td>4 gallons</td>
</tr>
<tr>
<td>Fuel tank—Capacity</td>
<td>1 ½ gallons</td>
<td>2 gallons</td>
</tr>
<tr>
<td>Lubricating oil</td>
<td>Special</td>
<td>Special</td>
</tr>
<tr>
<td>Capacity</td>
<td>Special</td>
<td>Special</td>
</tr>
<tr>
<td>Auxiliary water hopper</td>
<td>Special</td>
<td>Special</td>
</tr>
<tr>
<td>Air cleaner attachment</td>
<td>Special</td>
<td>Special</td>
</tr>
<tr>
<td>Two-wheel truck</td>
<td>Gasoline, Kerosene or Natural Gas</td>
<td></td>
</tr>
<tr>
<td>Length, overall</td>
<td>28”</td>
<td>33 ½”</td>
</tr>
<tr>
<td>Width, overall</td>
<td>16 ½”</td>
<td>19 ½”</td>
</tr>
<tr>
<td>Height, overall</td>
<td>18”</td>
<td>20 ½”</td>
</tr>
</tbody>
</table>

Illust. 3. One-piece, fully enclosed engine crankcase protects the inside mechanism from dust, dirt, and water.
Model LA Stationary Engines

Automatic Lubrication

Dependable, long-life engine performance depends largely upon the efficiency of the lubricating system. One quart of oil fills the reservoir in the 1 ½ to 2 ½ h.p. size, and three pints of oil are needed in the 3 to 5 h.p. size. No more can be added, as the oil filler acts as a gauge and shows plainly when the reservoir is full. At every turn of the governor gear, which revolves in a bath of oil, all moving parts, including the governor gear, crankshaft, crankshaft pinion, camshaft, and cam gear are automatically oiled. On the inside of the crankcase, oil holes are provided for the lubrication of the crankshaft, camshaft, and governor gear bearings. An oil pocket over each bearing assures positive lubrication. The connecting-rod crankpin bearing is lubricated from an oil groove in the crankshaft and the piston pin bearing is thoroughly oiled by splash lubrication.

Illustr. 6. Semi-front view of the 1 ½ to 2 ½ h.p. Kerosene Engine with cylinder head cover (A) and wing nut (B) removed. The air cleaner attachment is supplied as special equipment.

Illustr. 7. Auxiliary water hopper supplied on special order provides a convenient supply of hot water at all times.

Illustr. 5. Flywheel side of Engine with side plate removed. (A) governor speed lever assembly; (B) oil level; (C) crankshaft; (D) counterbalanced weights; (E) crankshaft pinion; (F) camshaft; (G) cam gear.
ENGINE SPEED CONTROL LEVER

Your engine is equipped with a governor which maintains constant engine speed under variable loads. Speeds of from 600 to 1000 RPM can be obtained by retarding or advancing the speed control lever. The engine develops its maximum horsepower at the higher speed.

The governor has been correctly set at the factory and should not be changed.

To get satisfactory service, do not overload the engine.

HEAT REGULATING VALVE ON KEROSENE ENGINES

Hot exhaust gases are circulated around the intake passage in the cylinder head of the kerosene engines, to bring the kerosene mixture up to the proper temperature for efficient combustion. The amount of heat circulated is controlled by the heat regulating valve at the exhaust muffler (see reference 1, Illust. 2).

The heat regulating valve should be set as hot as possible without causing excessive detonation (pinging or knocking). If excessive detonation occurs under heavy loads or high temperatures, loosen two capscrews and turn muffler counter-clockwise to a slightly colder position. After turning heat valve to a new position, engine will have to run for about 15 minutes before the effect of the new setting can be noticed. After correct adjustment has been made, tighten capscrews.

If the engine is running too cold it can be detected by uneven running, excess fuel consumption and crankcase oil dilution.

OPERATING A KEROSENE ENGINE ON GASOLINE

This kerosene engine is designed to operate with maximum efficiency on kerosene. It can be operated on gasoline, but not as efficiently as the gasoline engine.

When operating this kerosene engine on gasoline set the heat regulating valve in the extreme "Cold" position. Close the gasoline valve in the mixer and use the kerosene valve.
TO STOP GASOLINE ENGINE (see Illustr. 3)

Close fuel needle valve, or short-circuit the magneto by placing a screw driver or other metal object between the magneto short-circuiting terminal and magneto frame. A wire can be attached to this terminal for a remote cut-out switch, if desired.

TO STOP KEROSENE ENGINE

Close the kerosene needle valve and open the gasoline needle valve. Operate the engine two or three minutes with the speed control lever one-half open to empty mixer of kerosene and fill with gasoline.

This will assure having gasoline in mixer for starting again. Then shut off gasoline needle valve, or ground magneto terminal to frame.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crankcase oil drain plug.</td>
</tr>
<tr>
<td>2</td>
<td>Crankcase oil filler plug.</td>
</tr>
<tr>
<td>3</td>
<td>Hand hole cover plate.</td>
</tr>
<tr>
<td>4</td>
<td>Speed control lever.</td>
</tr>
<tr>
<td>5</td>
<td>Magneto.</td>
</tr>
<tr>
<td>6</td>
<td>Short-circuiting terminal.</td>
</tr>
<tr>
<td>7</td>
<td>Magneto breaker cover.</td>
</tr>
<tr>
<td>8</td>
<td>Pulley.</td>
</tr>
<tr>
<td>9</td>
<td>Exhaust muffler.</td>
</tr>
</tbody>
</table>

ILLUST. 3

VALVE CLEARANCE

The intake valve clearance is .006" to .008" and the exhaust valve clearance is .008" to .010" when the engine is hot.

EXHAUST PIPE

In case the exhaust is to be carried to the outside of the building, a drain should always be provided close to the cylinder head and slightly below the exhaust outlet from the head. Use 45 degree bends or long radius elbows to make the turns. The pipe should be increased one size, starting at the cylinder head, and increased one size for every 10 feet of length.

FLYWHEEL

If the flywheel is to be removed, loosen clamp bolt at hub and tap flywheel as close to hub as possible. Caution: Never strike flywheel rim to remove flywheel.
BELT PULLEY

If belt pulley has been removed and is being reassembled, or if a new pulley is being installed, assemble the pulley with felt washer in place.

The 6" pulley is standard equipment for the 1-1/2 to 2-1/2 H.P. engine, but pulleys varying in size from 3" to 14" are available as special equipment. For the 3 to 5 H.P. engine the 8" pulley is standard equipment and the same special pulleys as used for the 1-1/2 and 2-1/2 H.P. engine are available.

LUBRICATION

The entire engine, including the governor, valve mechanism, and magneto impulse coupling, is lubricated by the oil in the engine crankcase. Keep oil up to top of filler boss (see ref. 2, Illust. 3).

ENGINE LUBRICATING OIL

Engine lubricating oil shall be of well-refined petroleum oils, free from water, sediment, and without admixtures of fatty oils, acids, soaps, resins or any other substances not derived from petroleum. Oil shall not corrode any metal used in engine construction. Also, engine lubricating oil containing additive products not necessarily derived from petroleum but being of non-corrosive type, is satisfactory for use in our engines.

<table>
<thead>
<tr>
<th>VISCOSITY OF RECOMMENDED LUBRICATION OILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air temperature</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Above 32° F.</td>
</tr>
<tr>
<td>32° F. to 10° F.</td>
</tr>
<tr>
<td>Below 10° F.</td>
</tr>
</tbody>
</table>

Refer to special instructions for "Cold Weather Operation" on page 9.

Never test the oil level while the engine is running.

Drain the oil completely after every 120 hours of operation and refill with new oil. Change oil after every 50 hours when operating under very dusty conditions.

Always wipe off surface around oil filler plug before removing plug, so that no dirt will fall into opening.
VALVE OILER ADJUSTING SCREW

ILLUST. 4

View shows (1) valve oiler adjusting screw, and (2) crankcase water drain plug.

The amount of oil delivered to the valve levers and valve guides is controlled by the valve oiler adjusting screw. This screw is set at the factory to give approximately three drops of oil per minute when the oil is hot.

Whenever the valve housing is removed, inspect the valve oiler and if it is not supplying approximately three drops of oil per minute when engine is running (oil hot), adjust it as follows:

Loosen the jam nut, and turn the screw in (clockwise) slightly to decrease the supply, or out slightly to increase it. Then tighten the jam nut and check oil feed.

After an air cleaner attachment is applied in the field, be sure to check oil feed and readjust if necessary. See instructions on page 36.
COLD WEATHER OPERATION

If the engine is to be operated in temperatures of 32° F. or lower, observe the following precautions:

Fuel System

Use only a high-test winter-grade gasoline for starting, and keep your supply in a closed container so the more volatile portion does not evaporate.

Fill the fuel tank at the end of the day’s run to prevent moisture from collecting in the tank.

Lubrication

Be sure to use the correct grade of lubricating oil in the engine crankcase as specified on page 7.

Cooling System

When the temperature is likely to be 32° F. or lower, there is danger of the water freezing in the hopper. To overcome this, drain the water at the end of each run.

Filling the hopper with hot water will facilitate starting.

SPARK PLUGS

The recommended standard service spark plugs for this engine are the Champion No. 1 Commercial or the AC-77.

The spark plug gap should be .028 to .032 inches.

Note: To remedy fouling or sooting, use a hotter (light service) spark plug. To remedy pre-ignition and burning of electrodes, use a colder (severe service) spark plug (see list of Spark Plugs on page 25)
**MAGNETO**

Your engine is equipped with a high-tension magneto, with automatic impulse coupling, which is designed and built in accordance with the latest ignition practices. A magneto of this type is used by International Harvester because our engineers have proved that it is superior from the standpoint of performance, long life, and trouble-free operation.

**GREASING BREAKER MECHANISM AND CHECKING POINTS**

Your magneto requires very little attention. It is important, however, to keep the breaker arm chamber clean, as oil on the breaker points will cause rapid point wear. After every 250 hours of operation the breaker point chamber should be inspected to assure that it is clean. See that the points are in good condition and have the proper clearance. If the chamber is clean, no attention is necessary other than checking the clearance of the points. But if the chamber is dirty, all parts must be thoroughly cleaned. After cleaning, the points should be dressed, the point clearance checked, and the breaker arm regreased as outlined below.

To get at the breaker mechanism, remove the breaker cover. Pry the breaker arm and anchor from the chamber and clean all parts. Inspect the breaker points and, if necessary, dress them with a sharp fine file. If the points are worn excessively, replace both points. Fill the recess in breaker post with grease and pack a small quantity of grease in back of the breaker arm rubbing block (see Illustration 5). See your International Harvester dealer for proper grease to use.

![Diagram of magneto](image)

**Illustration 5**

Assemble the breaker arm, leaving the spring anchor projecting \(\frac{1}{8}\)" to \(\frac{3}{16}\)" out from end of slot so it is pushed into place by breaker cover. Be sure the points line up when breaker arm is pushed into place. Check the gap between the breaker points with the gauge furnished (see Illustration 5). The point opening should be \(0.018\)" when the rubbing block is on the high part of the cam. If gap is not correct, adjust it by loosening the screw holding the adjustable point (see Illustration 5) and moving the point up or down until gauge slips snugly into opening. After proper adjustment has been made, tighten the screw.
MAGNETO - Continued

TIMING MAGNETO TO ENGINE

Magneto may be timed to engine by placing "D.C." mark on flywheel in line with timing notch on side plate and inserting magneto into place, with marked tooth of magneto gear held in line with punch mark on magneto flange.

However, necessity of holding the magneto gear while assembling may be eliminated by the following procedure:

Place flywheel in position shown in Illustr. 6A, then turn magneto gear marked tooth to stable position shown in Illustr. 6 and insert magneto in its mounting hole so gears mesh. Then tighten the magneto screws lightly so magneto can be rocked.

By tipping the magneto forward or backward, the magneto impulse coupling can be made to trip exactly at the time the "D.C." timing mark on flywheel is in line with timing notch on side plate. Then tighten the magneto screws.

CAUTION: When checking tripping point of coupling, take a firm hold on flywheel and move slowly to avoid passing point of actual trip. Never allow magneto impulse coupling to trip before "D.C." because there is a possibility of engine kicking back when starting it.

[Diagrams showing distance measurements and views of components]
SUGGESTIONS FOR CHECKING TROUBLE

Study the Problem Before Making Any Changes

If any adjustments are to be disturbed, the original setting should be noted, so that this same setting may be restored in case the new adjustment does not remedy the trouble.

Failure to Start:
- No gasoline in mixer.
- Fuel valve closed.
- Mixer choked too much.
- Magneto grounded.
- Kerosene instead of gasoline in mixer for starting.

Irregular Speed:
- Governor sticking, out of adjustment, or worn.
- Throttle shaft bent or out of alignment.

Lack of Power:
- Governor out of adjustment.
- Exhaust pipe clogged.
- Engine speed control lever not advanced.
- Air cleaner pipe clogged (when used).

Overheating:
- Insufficient amount of water.
- Excess load.
- Inside of cylinder head limed up or clogged with dirt.
- Excess carbon in the cylinder.

Missing and Backfiring:
- Water in the fuel.
- Air leaks around the mixer.
- Engine not warmed up.
- Red-hot carbon deposits in cylinder.

Knocking:
- Excess carbon in the cylinder.
- Sticky valve or improperly adjusted valves.
- Loose piston pin, connecting rod, camshaft, or crankshaft bearings.
- Broken piston rings or loose piston.

Lack of Compression:
- Sticky, dirty, pitted or improperly adjusted valves.
- Stuck, worn or broken piston rings.
- Worn piston.
- Leaky cylinder head gasket.

Excess Fuel Consumption:
- Choke closed.
- Air intake cap or air cleaner clogged (when used).
- Mixer adjustment too rich.

Lack of Fuel:
- Fuel low in the tank.
- Air vent hole in fuel tank filler cap plugged.
- Fuel valve closed or only partially opened.
- Clogged fuel strainer screen, or fuel line.

Defective Ignition:
- Wrong kind, old, cracked, dirty, or poorly set spark plug.
- Broken, loose or improperly connected wiring.
- Dirty, pitted, or improperly set breaker points.
- Breaker arm not free on its bearing or the breaker arm spring weak or broken.
- Magneto not timed correctly with the engine.

Explosions in exhaust pipe often occur just after starting, due to first charges not firing in cylinder and passing through into exhaust pipe, where burning gases from first few explosions will ignite them.
STORING AND HOUSING ENGINES

When your engine is not to be used for a period of time, it should be stored in a dry and protected place. To leave equipment outdoors, exposed to the elements, will result in materially shortening the life of the machine.

The following procedure should be followed when your engine is placed in storage and the lubrication precautions should be repeated every six months thereafter. We also recommend caution to be practiced in starting an engine that has been in storage (see instructions on the bottom of the page).

1. Drain water from the cooling system.

2. After the engine has become cold, remove the spark plug and pour one tablespoonful of SAE-50 lubricating oil of a good grade into the cylinder. Crank engine 2 or 3 times to distribute oil over the cylinder wall. Replace spark plug.

3. Turn the engine with the crank until it is on the compression stroke and leave it in this position. Both intake and exhaust valves are now closed, which prevents the entrance of any dust into the cylinder.

4. Plug up the ends of breather pipe and exhaust pipe.

5. Drain the fuel tank and clean out the mixer.

CAUTION: A gummy substance will form in the tank fuel lines, and mixer if gasoline is allowed to stand in them for a period of time. These gum deposits can be completely dissolved with acetone or a mixture of equal parts of alcohol and benzol.

STARTING ENGINES THAT HAVE BEEN IN STORAGE

1. Remove spark plug and pour a mixture of one-half gasoline and one-half light lubricating oil into the cylinder (two tablespoonfuls is enough).

2. Remove valve housing cover and flush valve and valve operating mechanism with the same mixture.

3. Crank engine rapidly until excess oil has been blown out of spark plug hole. This operation will loosen any tight piston rings and wash out gummy oil from valves and piston.

4. Flush out crankcase with kerosene and fill with specified lubricating oil.

5. Remove crankcase breather pipe plug, and exhaust pipe plug.

6. Install spark plug.

7. Fill water cooling system.

8. Fill fuel tank.

9. Start engine and let it run slowly; observe if any valves are sticking. If so, pour small quantity of kerosene on valve stem until loose.

10. Assemble valve housing cover.

CAUTION! Do not operate at high speed immediately after starting.
KEROSENE BURNING ATTACHMENTS

Attachment 63140 D - For 1½ to 2½ HP Type "LB" Engines
Attachment 63410 D - For 3 to 5 HP Type "LB" Engines

INSTALLATION

Drain water from hopper, remove fuel pipe, and remove cylinder head, complete. Remove valve oiler tube with regulator and remove valve push rods.

Screw new valve oiler tube with regulator into place. Remove air intake with choke and compensating valve from old cylinder head. Move cotter pin in compensating valve pin from top hole to bottom hole. Bolt air intake with new kerosene mixer to cylinder head. Secure cylinder head to crankcase with new longer bolts, using new gasket, old valve levers and bracket and spark plug.

Put new valve push rods in place and temporarily adjust valves so that they have plenty of clearance. Install new fuel pipe assembly with gasket, connect spark plug cable and put new valve housing and gasket in place.

Fill hopper with water, fill fuel tank with clean kerosene and fill gasoline starting chamber in mixer with clean gasoline. Start engine, as instructed under "Starting a Kerosene Engine" on page 4.

After engine is hot, stop it, retighten cylinder head bolts and adjust valves to clearance of .006" to .008" for the intake, and .008" to .010" for the exhaust.
ENSIGN GAS BURNING ATTACHMENT

Attachment 38727 D - For 1 1/2 to 2 1/2 HP Engines
Attachment 38728 D - For 3 to 5 HP Engines

![Diagram of gas burning attachment]

1/2" for 1 1/2 to 2 1/2 engines
1 15/16" for 3 to 5 engines

Drill a 25/64" hole

Illustr. 7

Gas Regulator Mounted on Engine
ENSIGN GAS BURNING ATTACHMENTS - Continued

Attachment 38727 D - For 1½ to 2½ HP Engines
Attachment 38728 D - For 3 to 5 HP Engines

INSTALLATION

Drain water from hopper, remove fuel pipe, cylinder head and crankcase hand hole cover. Remove connecting rod cap, then remove piston and connecting rod through head end of cylinder.

Remove old piston from connecting rod and assemble new piston with rings on rod. Insert connecting rod and piston assembly into cylinder and connect to crankshaft so that the two punch marks on rod and cap are on the same side and the countersunk oil hole in the small end of the rod is on top. Replace hand hole cover using new gasket.

Remove mixer and air intake from cylinder head. Assemble new mixer with street elbows on cylinder head, using old air intake. Bolt cylinder head with valve assembly and new gasket to crankcase. Temporarily adjust valves so that they have plenty of clearance. Fill hopper with water and replace gasoline fuel pipe and valve housing.

Drill hole in skid runner and assemble regulator and connections, as shown in Illust. 7. Connect regulator to gas line with a convenient shut-off valve.

Start engine as instructed below under "Operating Engine on Natural Gas" and run until hot, then stop it, retighten cylinder head bolts and readjust valves to clearance of .006" to .008" for the intake, and .008" to .010" for the exhaust.

ADJUSTMENT

The gas fuel adjusting screw (see Illust. 7) turns in for lean and out for rich mixture. If adjustment is necessary, turn screw in until engine misses under load, then turn screw out until even running is obtained. Excessive fuel will cause the engine to run uneven and smoke; not enough fuel will cause the engine to run uneven and backfire.

OPERATING ENGINE ON GAS

Start engine on gasoline as instructed on page 3. As soon as engine starts, close gasoline needle valve, on mixer, and at the same time open valve on gas line. If engine starts to miss just after switching to gas, depress choke on air intake of mixer momentarily.

The gas regulator is set at the factory and should require no further adjustment.

Pressure of gas at inlet of regulator must be maintained at from 7 to 10 inches of water, or 4 to 5 ounces of gauge pressure.

To stop the engine, close valve on gas line, or short-circuit the magneto. Always close valve on gas line if engine is to be stopped for any length of time.
AIR CLEANER ATTACHMENTS

Attachment 28730 DA-For 1½ to 2½ HP Gasoline or Kerosene Engines
Attachment 33584 DB-For 3 to 5 HP Gasoline Engines
Attachment 33585 D-For 3 to 5 HP Kerosene Engines

If the engine is to be operated under dusty conditions we recommend these "Oil Bath Type" Air Cleaner Attachments.

INSTALLATION

Drain oil from crankcase.

Remove flywheel and crankcase side cover. Remove breather pipe from crankcase side cover and replace it with the new one provided. Replace side cover and flywheel and refill crankcase with new oil. (see Oil Specifications on page 7).

Disconnect fuel pipe and remove fuel tank to get at air intake bolts. Remove air intake and replace it with new air intake and gasket. Compensating valve cotter pin should be in top hole for gasoline engines, and in lower hole for kerosene engines.

Bolt air cleaner with gasket to air intake and fasten hose connection to breather pipe.

Fasten fuel tank and fuel pipe back in place. Fill air cleaner oil cup to "OIL LEVEL" mark with SAE-20 or lighter oil.

After starting engine check oil feed of valve oiler (see "Valve Oilier adjusting Screw" on page 8).

MAINTENANCE

All oil is drained from air cleaner when it is shipped. Fill oil cup to "oil level" mark with SAE-20 or lighter oil.

Clean and refill the oil cup every day, or every 10 hours of operation. Cleaning period may be extended to 30 hours when operating under very light dust conditions. At no time should dirt be allowed to accumulate in bottom of oil cup to a depth greater than 3/4".

The complete air cleaner must be removed and the inside washed thoroughly in kerosene at intervals frequent enough to insure clean screens in the cleaner. This may be necessary every sixty (60) hours of operation if operating in an atmosphere heavily laden with dust.

Illustration 8
Showing Air Cleaner Assembled on 1½ to 2½ HP Gasoline Engine.
CLUTCH SPROCKETS AND PULLEYS

INSTALLATION

Remove regular pulley from engine.

Remove hand wheel and clutch cover from clutch pulley or sprocket a assembly; then back out clutch yoke lock screw until clutch yoke can be unscrewed from assembly.

Slide assembly on engine pulley shaft back to the shoulder on shaft and drive pulley key in place.

The clutch yoke should then be screwed on to such a position that it will require a definite effort to pull the hand wheel out and overcenter. (Put wheel on temporarily to check this).

After correct adjustment of yoke has been obtained, align clutch lock screw with nearest hole in pressure plate, then screw it down.

Remove wheel, replace cover, then replace wheel.

LUBRICATION

Daily or every 10 hours of operation, lubricate clutch sprocket through lubricator fitting. Use pressure gun grease (chassis lubricant) and apply 3 or 4 strokes of hand lubricator.

Daily or every 10 hours of operation, fill grease cup on clutch pulley with pressure gun grease (chassis lubricant) and turn it down.
PUMP JACK ATTACHMENTS

Attachment 30732 DB - For 1$\frac{1}{2}$ to 2$\frac{1}{2}$ HP Engines (less Clutch)
Attachment 36110 D - For 1$\frac{1}{4}$ to 2$\frac{1}{2}$ HP Engines (with Clutch)
Attachment 35460 D - For 3 to 5 HP Engines (with Clutch)

INSTALLATION

Remove engine crankcase oil drain plug and allow oil to drain. Replace plug with elbow, pipe and cap provided. Refill crankcase with new oil (see Engine Oil Specifications on page 7).

Remove engine pulley. Attach skid brace "C" with bolts "E" to the rear of skid runners (see Illust. 9). Loosen the engine hold-down bolts and fuel tank bolts. Loosening these bolts is necessary to get good alignment.

Remove crankcase hand hole cover. Bolt pump jack housing (with gasket "A" in place) to crankcase with capscrews "B" (see Illust. 9). Attach body brace "G" to pump jack, fastening lower end to skid brace and upper end to engine with hand hole cover capscrews (See Illust. 9).

Slip drive pinion on engine pulley shaft and adjust pump jack housing so that the clearance around drive pinion flange is uniform. Then tighten the two capscrews "B" (See Illust. 9) and the bolts fastening pump jack to skid brace. Tighten engine hold-down bolts and fuel tank bolts.
Gear-Driven Pump Jacks for LA Engines

These gear-drive pump jacks for both the 1 1/2 to 2 1/2 h.p. and 3 to 5 h.p. type LA engines are designed to give the utmost in performance and do it economically over a long period of years. As shown in the illustration on this page, the gear-drive pump jack is directly connected to the engine. This feature makes it possible to operate the complete outfit in a small space and eliminates entirely the use of belts. The pump jack is fully enclosed and the gears run in a constant bath of oil, thus providing smooth and quiet operation.

The jack is driven from the camshaft on the engine which runs at one-half the engine speed. The two crank arms are provided with three holes each, which serve to vary the length of the pump stroke. By attaching

Illustr. 8. Any 1 1/2 to 2 1/2 h.p. and 3 to 5 h.p. type LA Engine now in use can be equipped easily and quickly with one of these direct-connected, gear-drive pump jacks.

the pitman rods in the first hole next to the center, a 5-inch stroke is provided; the second hole permits a 7 1/2-inch stroke; the third hole, a 10-inch stroke. The pitman rods, when in operation and carrying the maximum load, are practically on a vertical plane and parallel with the pump rod. This feature eliminates the excessive bending of the pitman rods and cuts the side thrust on the pump guides to a minimum.

The crank gear shaft that carries the maximum load is equipped with replaceable bronze bearings which are constantly lubricated from the inside of the pump jack housing. There are two revolving 11-inch diameter safety ring type crank arms on which the pitman rods are attached. The use of two "U" bolts instead of one assures positive alignment and a rigid connection between the jack and the pump barrel. Slotted holes are provided in the jack which make it possible to attach the jack to any size pump.
# Gear-Driven Pump Jacks for LA Engines

## Specifications for Gear-Driven Pump Jacks

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 to 2 1/2 h.p.</td>
<td>Gear-driven pump jack less clutch (attachment No. 30732DB)</td>
<td>90 lb.</td>
</tr>
<tr>
<td>1 1/2 to 2 1/2 h.p.</td>
<td>Gear driven pump jack with clutch (attachment No. 36110D)</td>
<td>112 lb.</td>
</tr>
<tr>
<td>3 to 5 h.p.</td>
<td>Gear-driven pump jack with clutch (attachment No. 35460D)</td>
<td>219 lb.</td>
</tr>
</tbody>
</table>

All weights and measurements are approximate.

## Belt-Driven Pump Jacks

These belt-driven pump jacks are ideally suited for Model LA engines; however, they can be used with any small engine having suitable power. The gear ratio is 5 to 1, and they are made in both single and double gear types, having a lifting capacity ranging from 150 to 350 feet when pumping with a 2-inch cylinder.

**Illustration 9.** The double-gear pump jack is supplied in either the clamp or sub-base style.

**Illustration 10.** The center-drive pump jack may be attached to pump base, post, floor, wall, or ceiling.

## Specifications for Belt-Driven Pump Jacks

<table>
<thead>
<tr>
<th>Kind of Jack</th>
<th>Lifting Capacity 24 in. Cylinder</th>
<th>Stroke</th>
<th>Pulley Diam.</th>
<th>Shaft</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Gear</td>
<td>200-250 ft.</td>
<td>5-7 1/2-10 in.</td>
<td>13 in.</td>
<td>1 1/2 in.</td>
<td>60 lb.</td>
</tr>
<tr>
<td>Double Gear</td>
<td>250-350 ft.</td>
<td>5-7 1/2-10 in.</td>
<td>13 in.</td>
<td>1 1/2 in.</td>
<td>85 lb.</td>
</tr>
</tbody>
</table>

All weights are approximate. **NOTE:** Guards are available as special equipment for single or double-gear pump jacks.

## Capacity and Horsepower Required to Operate a Tubular-Well Cylinder 40 Upstrokes per Minute on a 10-inch Stroke

<p>| Total Elevation in Feet | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
|-------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|</p>
<table>
<thead>
<tr>
<th>Diameter Cylinder</th>
<th>Gallons Per Min.</th>
<th>Horsepower Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/4 in.</td>
<td>154</td>
<td>.27 .32 .37 .45 .55</td>
</tr>
<tr>
<td>1 1/2 in.</td>
<td>250</td>
<td>.31 .41 .51 .62 .72</td>
</tr>
<tr>
<td>2 in.</td>
<td>326</td>
<td>.35 .46 .69 .92 1.15</td>
</tr>
<tr>
<td>2 1/2 in.</td>
<td>510</td>
<td>.23 .32 .48 .64 .80</td>
</tr>
<tr>
<td>3 in.</td>
<td>730</td>
<td>.35 .46 .69 .92 1.15</td>
</tr>
<tr>
<td>3 1/2 in.</td>
<td>1000</td>
<td>.51 .63 .94 1.25 1.55</td>
</tr>
<tr>
<td>4 in.</td>
<td>1300</td>
<td>.66 .82 1.30 1.65 2.05</td>
</tr>
<tr>
<td>4 1/2 in.</td>
<td>1650</td>
<td>.80 1.00 1.50 2.05 2.60</td>
</tr>
<tr>
<td>5 in.</td>
<td>2000</td>
<td>1.00 1.25 1.90 2.50</td>
</tr>
<tr>
<td>5 1/4 in.</td>
<td>2500</td>
<td>1.25 1.75 2.63</td>
</tr>
<tr>
<td>6 in.</td>
<td>2900</td>
<td>1.40 1.75 2.63</td>
</tr>
<tr>
<td>6 1/2 in.</td>
<td>3200</td>
<td>1.60 2.05 2.90</td>
</tr>
<tr>
<td>7 in.</td>
<td>3500</td>
<td>1.80 2.30 3.20</td>
</tr>
<tr>
<td>7 1/4 in.</td>
<td>3800</td>
<td>2.00 2.50 3.40</td>
</tr>
<tr>
<td>8 in.</td>
<td>4200</td>
<td>2.20 2.75 3.65</td>
</tr>
</tbody>
</table>

**NOTE:** For every inch decrease of stroke, deduct 10 percent of table reading.
PUMP JACK ATTACHMENTS - Continued

Attachment 30732 DB - For 1 1/2 to 2 1/2 HP Engines (less Clutch)
Attachment 36110 D - For 1 1/2 to 2 1/2 HP Engines (with Clutch)
Attachment 35460 D - For 3 to 5 HP Engines (with Clutch)

INSTALLATION - Continued

Put pulley felt washer in pump jack cover, insert drive pinion key and
fasten the new pulley to drive pinion with the three cap screws.

Place two 1/16" thick spacers (not furnished) opposite each other
between pulley hub and pump jack cover to maintain 1/16" gap. With
spacers in place, drive home the key, then remove the spacers.

Attach pitman rods to crank arms and fasten pitman cross bar securely
to pitman rods. Then fasten pump jack to pump barrel with the two "U"
bolts and connect pitman cross bar to pump rod with bolt furnished.

LUBRICATION

Remove filler plug "F" and level plug "L" (see Illust. 9). Pour trans-
mission lubricant through filler "F" until it reaches level "L", then
replace plugs.

Check oil level once a week, or after every 60 hours of operation, and
keep up to level "L".

Use SAE-90 transmission lubricant in the gear housing for all tempera-
tures above Zero F. For temperatures below Zero F. use SAE-90 diluted
with 1/6 part of kerosene.

Remove drain plug "D" and drain all lubricant from housing at least once
a year, and refill with fresh lubricant. If lubricant has been thinned
for use in temperature below Zero F., change it before operating in hot
weather.

Occasionally lubricate pitman pins with a few drops of engine oil.

OPERATION

When starting a cold engine having an attachment without a clutch, first
crank engine over with fuel shut off until pitman pins are nearly at top
of stroke. Then turn on fuel and start engine. This saves cranking
against the load of the pump while starting the engine.

Disengage the clutch by turning clutch handle toward flywheel, before
starting the engine on attachments equipped with a clutch. After start-
ing engine in cold weather, let it run for a minute or two before
engaging clutch. When engaging clutch, give handle a quick positive
turn.
## SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>1½ to 2½ H.P.</th>
<th>3 to 5 H.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horsepower</strong></td>
<td>1½</td>
<td>3</td>
</tr>
<tr>
<td>(at engine speed of 600 R.P.M.)</td>
<td>2½</td>
<td>5</td>
</tr>
<tr>
<td>(at engine speed of 1000 R.P.M.)</td>
<td>3½&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td><strong>Bore</strong></td>
<td>3½&quot;</td>
<td>4½&quot;</td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>3½&quot;</td>
<td>4½&quot;</td>
</tr>
<tr>
<td><strong>No. of cylinders</strong></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Engine speed</strong></td>
<td>600 to 1000 R.P.M.</td>
<td>600 to 1000 R.P.M.</td>
</tr>
<tr>
<td><strong>Flywheel size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(14½&quot; dia., 1½&quot; face)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Magneto—high tension, rotary type</strong></td>
<td>IHC Type “H-1”</td>
<td>IHC Type “H-1”</td>
</tr>
<tr>
<td><strong>Spark plug (optional)</strong></td>
<td>Champion No. 1 Commercial or A.C. 77</td>
<td>Champion No. 1 Commercial or A.C. 77</td>
</tr>
<tr>
<td><strong>Pulley (standard)</strong></td>
<td>6&quot; dia., 5&quot; face</td>
<td>8&quot; dia., 5&quot; face</td>
</tr>
<tr>
<td><strong>Pulley sizes (furnished as ordered)</strong></td>
<td>3&quot; to 14&quot; dia.</td>
<td>3&quot; to 14&quot; dia.</td>
</tr>
<tr>
<td><strong>Pulley speed</strong></td>
<td>300 to 500 R.P.M.</td>
<td>300 to 500 R.P.M.</td>
</tr>
<tr>
<td><strong>Water hopper—capacity</strong></td>
<td>2½ U.S. gallons</td>
<td>4 U.S. gallons</td>
</tr>
<tr>
<td><strong>Fuel tank—capacity</strong></td>
<td>1½ U.S. gallons</td>
<td>2 U.S. gallons</td>
</tr>
<tr>
<td><strong>Lubricating oil—capacity</strong></td>
<td>2 U.S. pints</td>
<td>3 U.S. pints</td>
</tr>
<tr>
<td><strong>Length overall</strong></td>
<td>28&quot;</td>
<td>33½&quot;</td>
</tr>
<tr>
<td><strong>Width overall</strong></td>
<td>16½&quot;</td>
<td>19½&quot;</td>
</tr>
<tr>
<td><strong>Height overall</strong></td>
<td>17½&quot;</td>
<td>20½&quot;</td>
</tr>
</tbody>
</table>
Always Use IH Parts

The finest engineering skill and the most advanced manufacturing methods go into all International Harvester products. Each part is built to our own high manufacturing standards. These are important things to remember when wear and tear make new parts necessary.

IH parts retain and continue the original performance you get when you choose International Harvester quality products. When replacing parts, don't handicap your equipment. For your protection, be sure to use IH SERVICE PARTS.

International Harvester dealers' bins are well stocked with IH parts. These parts departments are well-equipped service stations staffed by factory-trained servicemen. Dealers are backed in every case by the full facilities of a nearby International Harvester District Office.

When selecting new farm operating equipment, keep in mind the protective service rendered by the International Harvester dealer in your community.