



International Harvester

Operator's Manual

Power Unit

**UV401, UV461,
UV549**

JENSALES.COM

or Call 800-443-0625

JENSALES

Operator's Manual

THIS IS A MANUAL PRODUCED BY JENSALES INC. WITHOUT THE AUTHORIZATION OF
INTERNATIONAL HARVESTER OR IT'S SUCCESSORS. INTERNATIONAL HARVESTER AND IT'S SUCCESSORS
ARE NOT RESPONSIBLE FOR THE QUALITY OR ACCURACY OF THIS MANUAL.

TRADE MARKS AND TRADE NAMES CONTAINED AND USED HEREIN ARE THOSE OF OTHERS,
AND ARE USED HERE IN A DESCRIPTIVE SENSE TO REFER TO THE PRODUCTS OF OTHERS.

IH-O-UV401+

Operator's Manual



INTERNATIONAL®

**UV401, UV461 and UV549
Power Units**

JENSALES.COM

or Call 800-443-0625

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Ave.

Chicago 1, Illinois, U.S.A.

CONTENTS

INTRODUCTION	2, 3
Suggested power unit and fuel tank arrangement	3
Ventilation for power units installed inside of buildings	3
DESCRIPTION	4 to 6
Operating controls and instruments	5, 6
Specifications and capacities	5
OPERATION	7 to 14
Before starting your new power unit	7
Engines equipped for using liquefied petroleum gas or natural gas	10 to 12
Operating in cold weather	13, 14
Operating in hot weather	14
Operating precautions	8, 9
Operating the liquefied petroleum gas engine or natural gas engine	12, 13
Preparing for each day's work	9
PREVENTIVE MAINTENANCE	15 to 21
Checking mechanical problems	18 to 21
Lubrication	15
Lubrication guide	17
Periodic inspections	16
MAINTENANCE	22 to 38
Air cleaner	23, 24
Cooling system	22, 23
Distributor	27 to 33
Electrical system	33 to 36
Fan belt	25, 26
Fuel system	36 to 38
Hydraulic valve lifters	25
Ignition system	26, 27
Lubricating oil filter	24, 25
Oil cooler	25
Starting engines that have been in storage	38
Storing and housing your power unit	38
SPECIAL ATTACHMENTS	39 to 48
INDEX	49, 50

A Careful Operator

IS THE BEST INSURANCE

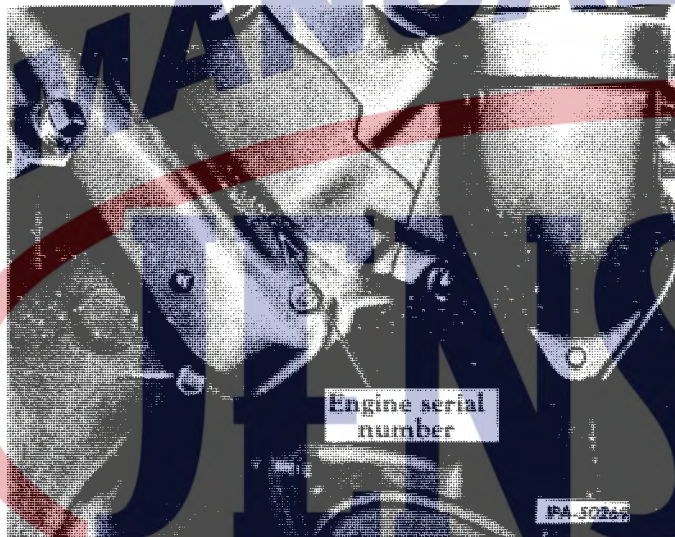
AGAINST AN ACCIDENT

—National Safety Council.

INTRODUCTION

For ready reference, we suggest that you write these serial numbers in the spaces provided below:

Power Unit Model	Engine Serial No.	Chassis or Power Unit Serial No.
UV-401	V-401 _____	UV-401 _____
UV-461	V-461 _____	UV-461 _____
UV-549	V-549 _____	UV-549 _____



Illust. 3
Location of engine serial number.



Illust. 3A
Location of power unit serial number.

VENTILATION FOR UNITS INSTALLED INSIDE OF BUILDINGS

The exhaust pipes should be arranged to provide the shortest possible length within the engine room. The parts of these exhaust pipes inside the building should be surrounded with a light steel tube sufficiently large to permit a two inch to four inch air space all around. This space should be ventilated to the outside. Another method of installation is to cover the exhaust pipe completely with at least two inches of air-cell asbestos.

Ventilate the engine room thoroughly and install the power unit so that air can flow freely through the radiator. An opening to the outside in front of the radiator is extremely desirable. Openings to the north or to a shaded side of the building are preferred. A blower fan attachment is available for use on some installations where it is desirable to force the air out of the building.

Where the door or window area is restricted, galvanized ducts extending from the ceiling above the engine to the top of the building are recommended to carry off the hot air. Not less than two ducts 24 inches x 24 inches, if cross sectioned, should be installed. At the same time, as many openings in the sides of the engine room as possible should be provided to let in cool outside air.

The exhaust manifold has one or more drain holes. Plugs are furnished to be used when the power unit is operated inside a building.

SUGGESTED POWER UNIT AND FUEL TANK ARRANGEMENT

1. Anchor the power unit securely to a level solid foundation, preferably concrete.
2. Mount the power unit or driven machine so that the belts may be removed or tightened.
3. Do not support a long exhaust pipe on the exhaust manifold. Instead, use a flexible pipe at the engine and support the rigid pipe from the ceiling or floor.
4. Use long-sweep elbows in exhaust pipes.
5. For every 12 feet of exhaust pipe, enlarge the diameter of the pipe one standard pipe size.
6. Install flexible fuel lines between the pipes to the fuel tank and the engine; also install the flexible exhaust piping so that the belting may be adjusted without disconnecting these pipes or lines.

DESCRIPTION

Power is supplied by an eight-cylinder V-type downdraft carbureted engine with mechanical governors using gasoline, natural gas or LPG as fuel. Features of these engines are: a five main bearing, Tocco-hardened, counter-balanced crankshaft; pressure fed single stage gear drive pump with combination type filter; oil intake floating screen; dry liner cylinders, aluminum-alloy pistons; oil cooler; dual exhaust manifold and a centrifugal type water pump.

SPECIFICATIONS AND CAPACITIES

Capacities (U.S. Measure)

Air cleaner oil cup	4-1/5 pts.
Crankcase	
(less oil filter and oil cooler)	10 qts.
(with oil filter)	12 qts.
(with oil filter and oil cooler)	13 qts.
Cooling system	
(UV-401 and UV-461)	30 qts.
(UV-549)	31 qts.

The capacities which appear throughout this manual are specifically for these engines and their attachments.

Engine	
Type	Overhead valve
Cylinders	8
Bore	
(UV-401 and UV-461)	4-1/8 in.
(UV-549)	4-1/2 in.
Stroke	
(UV-401)	3-3/4 in.
(UV-461 and UV-549)	4-5/16 in.
Distributor	
(Dwell angle)	
(Delco-Remy)	26° to 33°
(Holley)	26° to 29°
(Point gap)	.016 to .020 in.
Spark plug gap	
(gasoline)	.028 in.
(LPG or natural gas)	.015 in.
Air cleaner	10 in. E Type
Carburetor	
(gasoline)	
(UV-401 and UV-461)	Holly (2 Barrel)
(UV-549)	Holly (4 Barrel)
(UV-401, UV-461 and UV-549)	Zenith (2 Barrel)
(LPG or natural gas)	Ensign Type 2 in. XG

Engine Speeds

	Gasoline	LPG or natural gas
Full load governed		
(UV-401)	2800±10 rpm	2800±10 rpm
(UV-461 and UV-549)	2600±10 rpm	2600±10 rpm

Engine Speeds - Continued

	Gasoline	LPG or natural gas
High Idle		
UV-401	3080±25 rpm	3080±25 rpm
UV-461 and UV-549	2860±25 rpm	2860±25 rpm

Low idle (all units)	450±50 rpm	450±50 rpm
--------------------------------	------------	------------

Clutch

Type	Over-center, single plate
Size	11-1/2 in. drive ring

Dimensions of Power Unit

Length (overall)	
(UV-401)	67-7/8 in.
(UV-461 and UV-549)	68-1/4 in.
Width (overall)	41-7/8 in.
Height (overall)	48-5/8 in.

Specifications subject to change without notice.

OPERATING CONTROLS AND INSTRUMENTS

The operator should thoroughly familiarize himself with the instruments and controls provided for operation of his power unit. There are important differences between various engines; therefore, regardless of previous experience with other machines, the operator should fully understand what each control is for and how to use it before starting to operate the power unit.

Engine Throttle Control

This wire controls the speed of the engine and, when set in a given position, maintains a uniform engine speed when the engine load remains constant.

Clutch Lever

This lever is used to engage or disengage the engine from the load. If using the over-center type clutch: to engage the clutch, push the lever forward until a definite over-center action is felt. (Pushing the lever forward will disengage the spring-loaded type clutch.)

NOTE: Minimum governed speed is 1600 rpm for all units.

OPERATION

BEFORE STARTING YOUR NEW POWER UNIT

Inspect your power unit for any damage that may have occurred in transit. Check that all component parts are securely mounted to the engine.

A new power unit should be operated with a light load for the first 30 to 36 hours at the regular governed speed.

Lubrication

Lubricate the entire unit. Refer to "LUBRICATION" on page 17.

Check the oil levels of the engine crankcase and air cleaner oil cup to be sure that they are filled to the correct levels with the proper grades of oil for the prevailing temperature. Refer to specifications of lubricants on page 15.

Remove the spark plugs and put about one teaspoonful of engine oil into each cylinder. Install the spark plugs and crank the engine to distribute the oil over the cylinder walls. This assures positive lubrication of the cylinders and pistons immediately after starting and also eliminates the possibility of scoring.

The lubrication procedure above is necessary only when starting a new power unit or one that has been idle for a long time. For procedure in starting a power unit that has been removed from storage, refer to page 38.

Power Units shipped to destinations in the United States of America, Canada and Mexico have the crankcase and air cleaner filled with a 5W-20 rust inhibited engine oil. This oil, which is primarily a preservative oil, may be used on light and medium loads at temperatures below +80° F for the first 25 hours of operation. If temperatures are above +80° F or the unit is to be used on heavy loads, drain the oil from the crankcase and air cleaner and replace it with the required amount of oil having the physical properties and proper viscosity grade suitable for the prevailing temperature and type of service.

For further information, refer to the "LUBRICATION GUIDE" on page 17.

Cooling System

Check that the drain valve on the lower left side of the radiator is closed and that the drain plugs on both sides of the crankcase are closed.

Pour or run clean water (soft or rain water if possible) into the radiator slowly until the water has reached a point approximately 1 or 1-1/2 inches below the filler neck.

Let it stand for a few minutes to allow any air to escape. Then add water if necessary.

Water level should again be checked after the engine has been started and brought up to operating temperature.

For further information, refer to "COOLING SYSTEM" on page 22. If the power unit is to be operated in freezing temperatures, refer to "OPERATING IN COLD WEATHER" on pages 13 and 14.

Fuel System

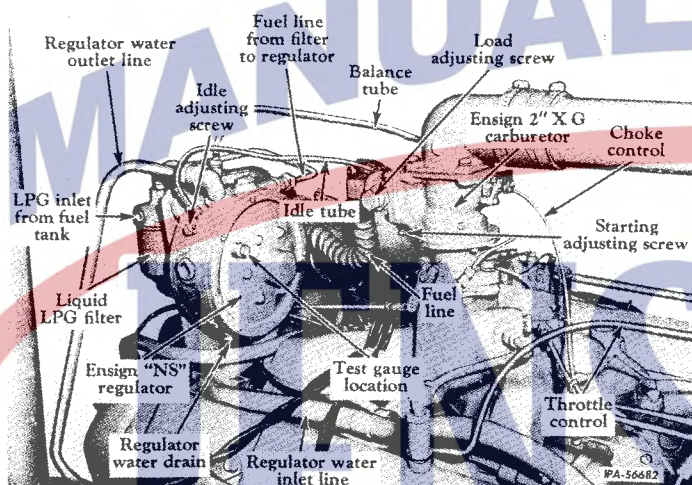
Be sure to use a good grade of clean fuel. Keep the containers or drums clean at all times. To avoid contaminating the fuel, do not use the last few gallons out of each drum or storage tank; instead, pour this into a separate storage tank and save it until the tank is filled. This fuel can then be used down to the last few gallons; the remainder should not be used for fuel.

Electrical System

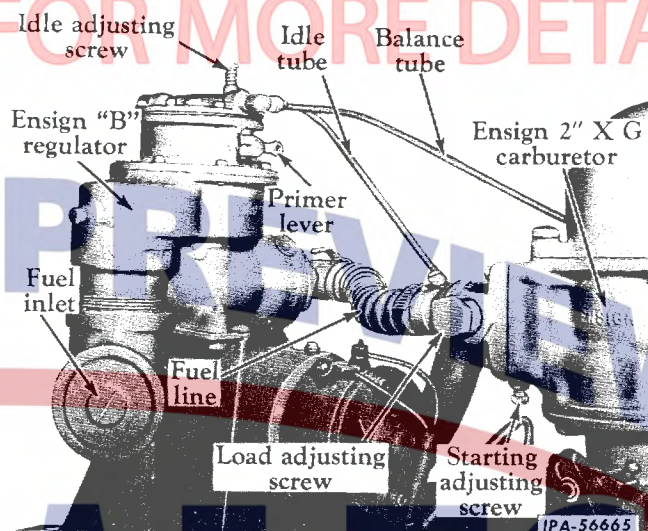
Service the battery as instructed on the tag attached to the battery. Connect the braided ground strap to the battery terminal. Connect the "generator to regulator" cable at the "F" terminal on the generator.

Do not start the engine until the generator has been polarized to the battery. (For instructions on polarizing the generator, refer to page 33.)

OPERATION



Illustr. 10
Power unit equipped to use liquefied gas.



Illustr. 10A
Power unit equipped to use natural gas.

ENGINES EQUIPPED FOR USING LIQUEFIED PETROLEUM GAS OR NATURAL GAS

Safety Precautions



Safety precautions in the handling of butane-propane cannot be overemphasized. There are state, county or city laws, ordinances, and fire regulations covering the utilization of liquefied petroleum gas or natural gas. Such laws, ordinances, and fire regulations on this subject must be adhered to in addition to the safety rules given below.

Where local rules are more stringent than those given below, the local rules are to be given priority.

These rules apply to servicing any engine using liquefied petroleum gas (butane-propane) or natural gas for engine fuel, regardless of the nature of the work to be performed.

Select a location for servicing the engine where there will be good air circulation. This is to avoid accumulation of gas-air mixtures in and about the engine caused by undetected leaks.

Such location should be as far as possible from steam cleaners, hot water cleaners, hot dip tanks, etc., and any other device operating with open flame.

Shut off the main valves at the fuel tanks and allow the engine to run until all fuel in the system from the tank to the engine is exhausted. In the event the engine is inoperative, shut the valve at the tank. Drain the fuel system of liquefied petroleum gas outside the building before moving the unit into the shop.

"CAUTION" signs should be placed on either side of the engine. There is to be no smoking in the vicinity. No work is to be performed on this engine or on others in a nearby zone involving open flames such as cutting, welding, grinding, chiseling, or any similar operation which may produce sparks.

OPERATION

A fire extinguisher (dry powder or carbon dioxide, CO₂) should be placed adjacent to the mechanic's working area, handy for immediate use. When liquefied petroleum gas ignites, it should be allowed to burn, if possible, until the source of fuel is shut off. Extinguishing the fire before this is accomplished can result in dangerous accumulations of gas which might cause a more serious flash or explosion.

After completing service work and before starting the engine, allow air to circulate around the engine to remove any possible gas accumulation.

Never use liquefied petroleum gas from the fuel tanks for cleaning parts. **NOTE:** This is mentioned because inspections have revealed that operators have used it as a substitute for solvents and compressed air, not realizing the extreme danger of this practice.

Whenever the nature of service work requires any operation on the fuel system, the following should be observed.

- (a) All threaded connections should be treated with an insoluble lubricant (Permatex or aviation gasket maker). Replace worn or defective fittings.
- (b) After connecting the fuel system, check it for leaks. Leaks are not permissible. Odorants, which are strong smelling compounds having an odor similar to spoiled cabbage, are added to liquefied petroleum gas as warning agents to indicate leakage of even small quantities of gas.

(c) A lather of soap, brushed on with a soft brush, will indicate the presence of leaks which are dangerous and wasteful. Never use open flame to check for leakage.

NOTE: Pay particular attention to short lengths of rubber hose used anywhere in the piping system to relieve stress and vibrations.

No work whatever is to be performed on liquefied petroleum gas or natural gas fuel tanks. Any necessary work should be performed by qualified concerns who normally service such containers and who are familiar with local

regulations, inspections and tests after any repairs are made.

It is important to remember that all liquefied petroleum gas systems are pressurized. Make certain that the tank valves are tightly closed and all fuel has been exhausted from the lines before starting any repair work on the fuel system.

Ensign Fuel Filter

The Ensign fuel filter is provided to stop the passage of scale, rust or other foreign matter that may be carried by the liquid fuel as it flows from the tank. The filter is designed for a working pressure of 250 pounds. Liquid fuel from the tank enters the filter and flows down and through the filter cartridge to the outlet passage. By removing the nut and filter bowl, the filter cartridge may be removed for cleaning or replacement.

This filter operates until it becomes clogged up sufficiently to restrict the flow of fuel. A clogged cartridge will cause a pressure drop within the filter, with consequent vaporization of the fuel, which may cause freezing at the filter and engine starvation for fuel due to liquid passages being required to pass gaseous fuel.

The filtering element should be removed and washed in cleaning solvent when it seems necessary. In reassembling the filter, make certain the contact surfaces of the bowl gasket and the fiber washer on the filter and stud nut are clean. Replace the bowl gasket and fiber washer if necessary. The filter should be air tested at a pressure of 150-175 pounds per square inch to check for possible leaks at the gasket.

Ensign Model "NS" Regulating Unit (LPG)

The filtered LPG enters the model "NS" regulating unit at the fuel inlet and flows through the high pressure valve which is controlled by the pressure regulator diaphragm, lever, and springs. Initial expansion of the liquid occurs within the area surrounding the high pressure valve.

Expanding LPG enters the vaporizer coil which is surrounded by hot water from the engine cooling system. Vaporized LPG leaves the coil at the main valve, at slightly below atmospheric pressure, ready for passage to the carburetor through the outlet. Control of the fuel flow is achieved by operation of the large regulator diaphragm, pin, and spring.