

# **4 Cylinder Carbureted Engines**

**Service Manual**

**ISS-1039-1**

Reprinted

***CASE III***



Due to a continuous program of research and development, some procedures, specifications and parts may be altered in a constant effort to improve machines.

Periodic revisions may be made to this publication and mailed automatically to distributors. It is recommended that customers contact their distributor for information on the latest revision.

## **4 CYLINDER CARBURETED ENGINES**

**FORM**

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**NOTE: Industrial Product Applications were formerly covered in  
Engine Service Manual GSS-1295-J.**



# SECTION INDEX

This manual is divided into major sections covering various components for INTERNATIONAL 4 – Cylinder Carbureted Engines (refer to "Introduction" for engine models).

These sections are also indexed by title with thumb index tabs as shown below and to the right.

To use this manual, grasp the right-hand side of book between thumb and fingers. Bend book back and find the pages containing the corresponding section index tab.

Section identification is also contained in the upper corner of each page.

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**SECTION 13 – IGNITION COIL, SPARK PLUGS AND BATTERIES**



# INTRODUCTION

The instructions contained in this service manual, are for the information and guidance of servicemen who are responsible for overhauling and repairing International 60, 135, 146, 153, 175 and 281 series four-cylinder carbureted engines specifically.

However, the instructions apply generally to the 1, 2A, 123, 4, 164, 169, 6, 264 and 9 series as well. Detailed specifications and data for all engines will be found in Section 1, Par. 2.

This manual provides the serviceman with a fast, convenient reference to information on maintenance and repairs, as well as descriptions of the major units and their functions in relation to other components of the engine.

## LUBRICATION

Instructions on the lubrication of each assembly is given in the Lubrication Chart in the operator's manual for the particular engine. When assembling any parts, always coat all wearing surfaces with the lubricant specified in the chart. Except for such installations as taper pins, etc., whose surfaces should be clean and dry, use sufficient quantities of lubricant to prevent any danger of seizing, scoring, or excessive wear when the assembly is first operated. Failure to provide "starting lubrication may result in serious damage.

## GASKETS AND SEALS

Always use new gaskets and seals. When installing a seal, be sure to install it as specified in the instructions. Be extremely careful not to damage the seal in any way during installation.

## SERVICE TOOLS

International engines are designed so that few service tools are required other than those in the mechanic's tool kit. However, when the use of inexpensive special service equipment will facilitate work, such equipment is mentioned in this manual. Other than this, it is assumed that servicemen will select such tools as are required. Information regarding special tool equipment is given in the "SERVICE TOOLS MANUAL," ISS-1531, CTS-1147 or GSS-1251. Your distributor has most of this equipment and is in an excellent position to service these engines.

## SERVICE PARTS

Always use genuine IH service parts. The best material obtainable and experience gained through many years of engine manufacturing, enable International Harvester to produce quality that will not be found in imitation or "just as good" repair parts. No serviceman can afford to guarantee a repair job that is not serviced with genuine IH parts. No owner should be satisfied with other than genuine IH parts.

For the correct service parts to be used, always refer to the parts catalog for that particular engine. The loose-leaf parts catalogs are accurate and are brought up-to-date continually by issuing new pages covering any changes in part numbers.

## SERIAL NUMBERS

The engine serial number is stamped on the crankcase where it is plainly visible.

## ENGINE APPLICATION CHART

Refer to Engine Service Charts Manual Form ISS-1516 for Engine Service Charts.

Series	Machines used on
1	U-1 Power Unit
2	U-2A Power Unit
4	U-4 Power Unit
6	U-6 Power Unit
6	T-6 PAYdozer
9	U-9 Power Unit
9	T-9 PAYdozer
60	UC-60 Power Unit
123	U-123 Power Unit
123	I-100 and 100HC PAYtractor
123	I-130 PAYtractor
123	I-140 and 140HC PAYtractor
123	T-4 and T-4B PAYdozer
135	UC-135 and UC-135B Power Unit
135	T-340 and T-340A PAYdozer
135	T-5 and TC-5B PAYdozer
135	2404 PAYtractor
146	2424 PAYtractor
146	TD-500 and TD-500C PAYdozer
153	UC-153 Power Unit
153	4000 PAYlift
153	2444 PAYtractor
153	2500 Constructall
153	2504 PAYtractor
153	3514 PAYtractor
153	H-25B PAYloader
164	U-164 Power Unit
169	U-169 Power Unit

(Continued on next page)

# INTRODUCTION

PAGE II

## ENGINE APPLICATION CHART (Cont.)

Series	Machines used on
175	U-175 Power Unit
264	U-264 Power Unit
264	T-6 (61) PAYdozer (38951 to 39765*)
281	U-281 Power Unit
281	T-6 (61) PAYdozer (39766 and up *)

\* – Chassis Serial Number



## 1. DESCRIPTION

The IH 4-cylinder carbureted engines are all equipped with updraft type carburetors.

The 135, 135B, 175 and 281 series valve-in-head engines are all equipped with replaceable type cylinder sleeves. The 135 and 135B series sleeves are the wet type; the 175 and 281 series are dry type. The 153 series is a sleeveless version of the 135B engine.

The aluminum alloy, tin-plated, solid-skirt pistons are cam ground, and are fitted with two or three (according to series of engine) compression and one oil control rings. The full-floating type piston pins are held in place by snap rings at the ends of each pin.

The 60 series valves are in the block and the cast iron pistons are fitted in the cylinder bore in the crankcase, using two compression rings and one oil control ring.

The crankshaft main and connecting rod bearing journals are fully hardened. Steel-backed tri-metal main bearings support the crankshaft with the center bearing absorbing the crankshaft end thrust. These bearings are the precision insert type and require no machining during assembly or replacement.

The camshaft is driven by the idler gear and supported by three bearings. The end thrust is controlled by a thrust plate.

The connecting rods are heat-treated pressed steel and contain a bronze bushing at the upper end for installation of the piston pin. The lower end and cap contain the locking type selective fit bearing inserts that require no machining during assembly or replacement. The rods and caps are marked for identification and reassembly.

The lubrication system of the engine is forced fed. The cylinder walls are lubricated by oil forced out the sides of connecting rod bearings and thrown up to the pistons and the cylinder walls.

The crankcase, valve housing, and governor housing are ventilated through a pipe connected to the intake air filter to hold condensation to a minimum. The engine is protected against dust by a replaceable-element oil filter system. Seals are used at all shaft openings to prevent unnecessary wear of engine parts by the entry of dust, and to effectively prevent oil leakage.

A sensitive variable-speed governor makes it possible for the operator to select the most economical speed for the job to be done.

The magneto equipped engines are equipped with IH waterproof, high tension magnetos having automatic impulse coupling, or with distributors, thus insuring a hot spark for all engine speeds and for easy starting.

Refer to "SPECIFICATIONS" in Section 1, Par. 2.

# GENERAL

## 2. SPECIFICATIONS

DESCRIPTION	1 and 60 Series	2A Series	123 Series	135, 135B and 153 Series	146 Series	4 Series
Number of cylinders . . . . .	4	4	4	4	4	4
Bore and stroke-inches . . . . .	2-5/8 x 2-3/4	3 x 4	3-1/8 x 4	3-1/4 x 4-1/16 3-3/8 x 4-1/4(153)	3-3/8 x 4-1/16	3-3/8 x 4-1/4
Displacement-cubic inches. . . . .	60	113	123	135, 152 (153)	146	152
RPM-governed . . . . .	2500	1800	*	*	*	1650
RPM-governed high idle . . . . .	2750	1980	*	*	*	1815
RPM-governed low idle . . . . .	450-500	500-550	400-450	*	*	400-450
Compression ratio-gasoline . . . . .	7.0:1	6.0:1	7.3:1 (gasoline) 4.8:1 (distillate)	7.8:1 (135, 135B)8:1 (153)	7.6:1	5.9:1
Compression pressure at cranking speed (150 rpm) psi. **	---	---	175(gasoline) 95(distillate)	177 (135) 180(135B,153)	180	---
Compression pressure at hand cranking speed (50 rpm) psi. . . . .	89-93	119-125	---	---	---	115-120
<b>CRANKSHAFT</b>						
Crank pin diameter-inches. . . . .	1.498-1.499	1.749-1.750	1.749-1.750	1.809-1.810 (135) 2.059-2.060 (135B, 153)	2.059-2.060	2.2475-2.2485
Main journal diameter-inches. . . . .	1.623-1.624	2.124-2.125	2.124-2.125	2.244-2.245 (135) 2.6235-2.6245 (135B, 153)	2.6235-2.6245	2.4975-2.4985
Maximum permissible journal out-of-roundness-inch. . . . .	0.003	0.003	0.003	0.003	0.003	0.003
Number main bearings . . . . .	3	3	3	3	3	3
Main bearing running clearance-inch. . . . .	0.0004-0.0034	0.0009-0.0039	0.0009-0.0039	0.0009-0.0039	0.0009-0.0039	0.0010-0.0035
Maximum permissible main bearing clearance-inch . . . . .	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055
End Clearance-inch . . . . .	0.006-0.010 (1) 0.004-0.008(60)	0.006-0.010	0.004-0.010	0.004-0.010(135) 0.004-0.010(135B, 153)	0.004-0.010	0.004-0.008
Maximum permissible end clearance-inch. . . . .	0.012	0.012	0.012	0.012	0.012	0.012
Thrust taken by . . . . .	Center main bearing	Rear main bearing	Rear main bearing	Rear main bearing	Rear main bearing	Center main bearing

\* - Refer to Operators Manual

\*\* - Compression pressures are based on the following conditions: Engine warmed up, battery fully charged, throttle wide open and all spark plugs removed.

Compression gauge readings given will apply at sea level barometric pressure. For each 1000 feet above sea level deduct 3-1/2 percent. For engines with high altitude pistons, the readings given will apply at 5000 feet. Deposits in combustion chambers will increase readings to some extent.

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