

TECHNICAL MANUAL

**OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT,
AND REPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS INFORMATION AND
SUPPLEMENTAL MAINTENANCE INSTRUCTIONS
FOR**

**CRANE, TRUCK MOUNTED
HYDRAULIC, 25 TON (CCE)
HARNISCHFEGER MODEL MT-250,
NON-WINTERIZED
NSN 3810-00-018-2021
HARNISCHFEGER MODEL MT-250,
WINTERIZED NSN 3810-00-018-2007**

**HEADQUARTERS. DEPARTMENT OF THE ARMY
6 JUNE 1980**

This copy is a reprint which includes current pages from Changes 1 through 3.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 6 June 1980

**Operator Organizational, Direct Support, General Support,
and Depot Maintenance Manual
for
CRANE, TRUCK MOUNTED, HYDRAULIC, 25-TON (CCE),
HARNISCHFEGER MODEL MT-250, NON-WINTERIZED
(NSN 3810-00-018-2021)
(NSN 3810-00-018-2007)
HANISHCHFEGER MODEL MT-250, WINTERIZED**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual, direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

Part One. ENGINE OPERATOR'S MANUAL.....
Part Two ENGINE SERVICE MANUAL

- NOTE:* Part Three, ENGINE PARTS CATALOG, has been replaced by TM 5-381 0-293-20P and TM 5-3810-293-34P.
- NOTE:* Part Three, ENGINE PARTS CATALOG, has been replaced by TM 5-3810-293-20P and TM 5-3810-293-34P.
- NOTE:* Refer to TM 5-3810-293-14&P-1 for Crane Operator's Manual, Weighload Automatic Safe Load Indicator.
- NOTE:* Refer to TM 5-3810-293-14&P-2 for Crane Shop Manual, Front Axle, Transmissions, and Winches.

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified on AR 310-3, Military Publications. This technical manual does, however, contain available Information that is essential to the operation and maintenance of the equipment.

Approved for public release; distribution is unlimited.

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PART ONE

ENGINE OPERATOR'S MANUAL

Operators Manual

Series 53 Engines



Detroit Diesel Allison
Division of General Motors Corporation
Detroit, Michigan 48228

TO THE OPERATOR

This manual contains instructions on the operation and preventive maintenance of your Detroit Diesel engine. Sufficient descriptive material, together with numerous illustrations, is included to enable the operator to understand the basic construction of the engine and the principles by which it functions. This manual does not cover engine repair or overhaul.

Whenever possible, it will pay to rely on an authorized *Detroit Diesel Allison Service* Outlet for all your service needs from maintenance to major parts replacement. There are over 1500 authorized service outlets in the U.S. and Canada. They stock factory original parts and have the specialized equipment and personnel with technical knowledge to provide skilled and efficient workmanship.

The operator should familiarize himself thoroughly with the contents of the manual before running an engine, making adjustments, or carrying out maintenance procedures.

The information, specifications and illustrations in this publication are based on the information in effect at the time of approval for printing. Generally, this publication is reprinted annually. It is recommended that users contact an authorized Detroit Diesel Allison Service Outlet for information on the latest revision. The right is reserved to make changes at any time without obligation.

WARRANTY

The applicable engine warranty is contained in the form entitled POLICY ON OWNER SERVICE, available from authorized Detroit Diesel Allison Service Outlets.

TABLE OF CONTENTS

SUBJECT	PAGE
DESCRIPTION	
Principles of Operation.....	4
General Description	5
Model Description	6
General Specifications	8
Engine Model and Serial Number Designation	9
Built-In Parts Book	9
Cross Section Views of Engine.....	10
ENGINE SYSTEMS	
Fuel System.....	13
Air System	17
Lubricating System.....	22
Cooling System.....	25
ENGINE EQUIPMENT	
Instrument Panel, Instruments and Controls.....	31
Engine Protective Systems	33
Electrical Starting System	37
Hydraulic Starting System.....	38
Cold Weather Starting Aids.....	41
Governors.....	44
Transmissions.....	44
OPERATING INSTRUCTIONS	
Engine Operating Instructions	47
A.C. Power Generator Set Operating Instructions.....	51
LUBRICATION AND PREVENTIVE MAINTENANCE	
Lubrication and Preventive Maintenance.....	55
Fuel, Lubricants and Coolants.....	66
ENGINE TUNE-UP PROCEDURES	
Engine Tune-Up Procedures	73
Exhaust Valve Clearance Adjustment	74
Timing Fuel Injector	76
Limiting Speed Mechanical Governor (In-Line Engines)	77
Limiting Speed Mechanical Governor (6V-53 Engine)	82
Variable Speed Mechanical Governor (In-Line Open Linkage)	87
Variable Speed Mechanical Governor (In-Line Enclosed Linkage).....	91
Variable Speed Mechanical Governor (6V-53 Engine).....	96
Supplementary Governing Device Adjustment	101
Hydraulic Governor (In-Line Engine)	106
Hydraulic Governor (6V-53 Engine).....	109
TROUBLE SHOOTING	111
STORAGE	117
BUILT-IN PARTS BOOK	121
ALPHABETICAL INDEX	145

DESCRIPTION

PRINCIPLES OF OPERATION

The diesel engine is an internal combustion power unit, in which the heat of fuel is converted into work in the cylinder of the engine.

In the diesel engine, air alone is compressed in the cylinder; then, after the air has been compressed, a charge of fuel is sprayed into the cylinder and ignition is accomplished by the heat of compression.

The Two-Cycle Principle

In the two-cycle engine, intake and exhaust take place during part of the compression and power strokes respectively, as shown in Fig. 1. In contrast, a four-cycle engine requires four piston strokes to complete an operating cycle; thus, during one half of its operation, the four-cycle engine functions merely as an air pump.

A blower is provided to force air into the cylinders for expelling the exhaust gases and to supply the cylinders with fresh air for combustion. The cylinder wall contains a row of ports which are above the piston when it is at the bottom of its stroke. These ports admit the air from the blower into the cylinder as soon as the rim of the piston uncovers the ports as shown in Fig. 1 (scavenging).

The unidirectional flow of air toward the exhaust valves produces a scavenging effect, leaving the cylinders full of clean air when the piston again covers the inlet ports.

As the piston continues on the upward stroke, the exhaust valves close and the charge of fresh air is subjected to compression as shown in Fig. 1 (compression).

Shortly before the piston reaches its highest position, the required amount of fuel is sprayed into the combustion chamber by the unit fuel injector as shown in Fig. 1 (power). The intense heat generated during the high compression of the air ignites the fine fuel spray immediately. The combustion continues until the injected fuel has been burned.

The resulting pressure forces the piston downward on its power stroke. The exhaust valves are again opened when the piston is about halfway down, allowing the burned gases to escape into the exhaust manifold as shown in Fig. 1 (exhaust). Shortly thereafter, the downward moving piston uncovers the inlet ports and the cylinder is again swept with clean scavenging air. This entire combustion cycle is completed in each cylinder for each revolution of the crankshaft, or, in other words, in two strokes; hence, it is a "two-stroke cycle".

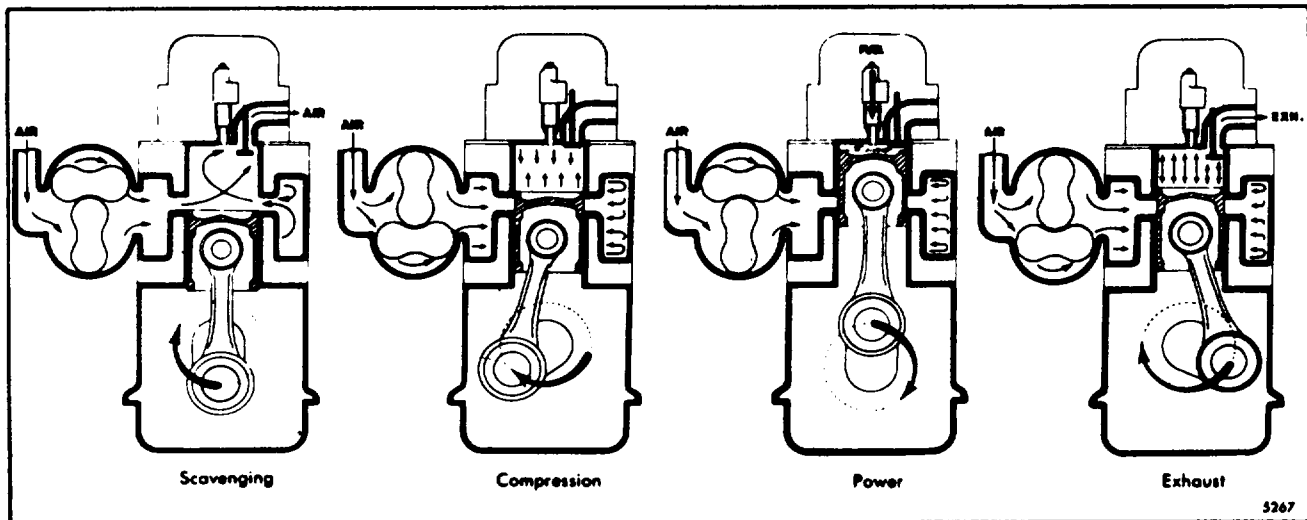


Fig. 1 - The Two-Stroke Cycle

GENERAL DESCRIPTION

The two-cycle diesel engines covered in this manual have the same bore and stroke and many of the major working parts such as injectors, pistons, connecting rods, cylinder liners and other parts are interchangeable.

The In-line engines, including the inclined marine models, include standard accessories such as the blower, water pump, governor and fuel pump, which, on some models, may be located on either side of the engine regardless of the direction the crankshaft rotates. Further flexibility in meeting installation requirements is achieved with the cylinder head which can be installed to accommodate the exhaust manifold on either side of the engine.

The V-type engine uses many In-line engine parts, including the 3-53 cylinder head. The blower is mounted on top of the engine between the two banks of cylinders and is driven by the gear train. The governor is mounted on the rear end of the 6V-53 blower. The meaning of each digit in the model numbering system is shown in Figs. 2 and 3. The letter L or R indicates left or right-hand engine rotation as viewed from the front of the engine. The letter A, B, C or D designates the blower and exhaust manifold location on the In-line engines as viewed from the rear of the engine while the letter A or C designates the location of the oil cooler and starter on the 6V-53 engine.

Each engine is equipped with an oil cooler, replaceable element type lubricating oil filter, fuel oil strainer, fuel oil filter, an air cleaner or air silencer, a governor, a heat exchanger and raw water pump or a fan and radiator, and a starting motor.

Full pressure lubrication is supplied to all main

bearings, connecting rod bearings, and camshaft bearings, and to other moving parts.

Oil is drawn by suction from the oil pan through the intake screen and pipe to the oil pump where it is pressurized and delivered to the oil filter and the oil cooler. From the oil cooler, the oil enters oil galleries in the cylinder block and cylinder head for distribution to the main bearings, connecting rod bearings, camshaft bearings, rocker arm mechanism and other functional parts.

The cooling system has a centrifugal water pump which circulates the engine coolant through the oil cooler and water jackets. The engine temperature is regulated by a thermostat(s).

Fuel is drawn from the supply tank through the fuel strainer and enters a gear type fuel pump at the inlet side. Upon leaving the pump under pressure, the fuel is forced through the fuel filter into the inlet manifold where it passes through fuel pipes into the inlet side of the fuel injectors. The fuel is filtered through elements in the injectors and then atomized through small spray tip orifices into the combustion chamber. Excess fuel is returned to the fuel tank through the fuel outlet galleries and connecting lines.

Air for scavenging and combustion is supplied by a blower which pumps air into the engine cylinders via the air box and cylinder liner ports. All air entering the blower first passes through an air cleaner or air silencer.

The engine may be started by either a hydraulic or an electric starting system.

The engine speed is regulated by a mechanical or hydraulic type engine governor, depending upon the engine application.