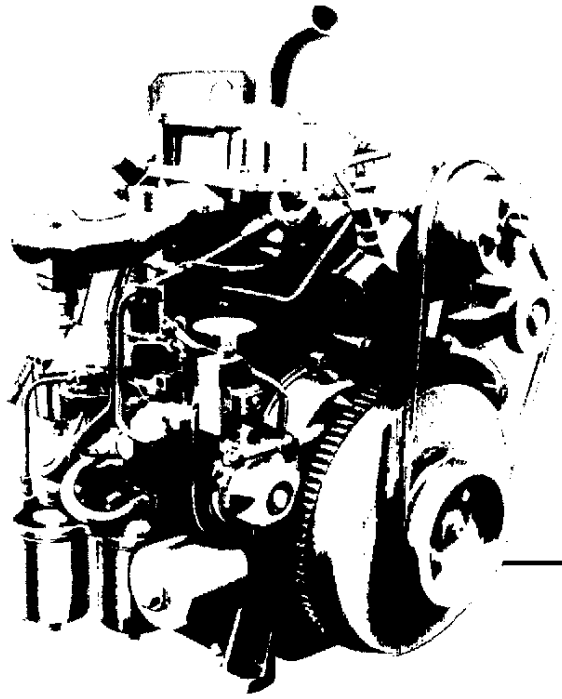
Onan

Service Manual

RDJE
RDJEA
Diesel Engines



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(SPEC A)
10-88
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Safety Precautions

It is recommended that you read your engine manual and become thoroughly acquainted with your equipment before you start the engine.

WARNING ***This symbol is used throughout this manual to warn of possible serious personal injury.***

CAUTION ***This symbol refers to possible equipment damage.***

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

Safety Codes

- All local, state and federal codes should be consulted and complied with.
- This engine is not designed or intended for use in aircraft. Any such use is at the owner's sole risk.

General

- Provide appropriate fire extinguishers and install them in convenient locations. Use an extinguisher rated ABC by NFPA.
- Make sure that all fasteners on the engine are secure and accurately torqued. Keep guards in position over fans, driving belts, etc.
- If it is necessary to make adjustments while the engine is running, use extreme caution when close to hot exhausts, moving parts, etc.

Protect Against Moving Parts

- Do not wear loose clothing in the vicinity of moving parts, such as PTO shafts, flywheels, blowers, couplings, fans, belts, etc.
- Keep your hands away from moving parts.

Batteries

- Before starting work on the engine, disconnect batteries to prevent inadvertent starting of the engine.
- DO NOT SMOKE while servicing batteries, Lead acid batteries give off a highly explosive hydrogen gas which can be ignited by flame, electrical arcing or by smoking.
- Verify battery polarity before connecting battery cables. Connect negative cable last.

Fuel System

- DO NOT fill fuel tanks while engine is running.
- DO NOT smoke or use an open flame in the vicinity of the engine or fuel tank. Internal combustion engine fuels are highly flammable.
- Fuel lines must be of steel piping, adequately secured, and free from leaks. Piping at the engine should be approved flexible line. Do not use copper piping for flexible lines as copper will work harden and become brittle enough to break.
- Be sure all fuel supplies have a positive shutoff valve.

Exhaust System

- Exhaust products of any internal combustion engine are toxic and can cause injury, or death if inhaled. All engine applications, especially those within a confined area, should be equipped with an exhaust system to discharge gases to the outside atmosphere.
- Do not use exhaust gases to heat a compartment.
- Make sure that your exhaust system is free of leaks. Ensure that exhaust manifolds are secure and are not warped by bolts unevenly torqued.

Exhaust Gas is Deadly!

Exhaust gases contain carbon monoxide, a poisonous gas that might cause unconsciousness and death. It is an odorless and colorless gas formed during combustion of hydrocarbon fuels. Symptoms of carbon monoxide poisoning are:

- Dizziness
- Headache
- Weakness and Sleepiness
- Vomiting
- Muscular Twitching
- Throbbing in Temples

If you experience any of these symptoms, get out into fresh air immediately, shut down the unit and do not use until it has been inspected.

The best protection against carbon monoxide inhalation is proper installation and regular, frequent inspections of the complete exhaust system. If you notice a change in the sound or appearance of exhaust system, shut the unit down immediately and have it inspected and repaired at once by a competent mechanic.

Cooling System

- Coolants under pressure have a higher boiling point than water. DO NOT open a radiator pressure cap when coolant temperature is above 212° F (100° C) or while engine is running.

Keep the Unit and Surrounding Area Clean

- Make sure that oily rags are not left on or near the engine.
- Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and present a potential fire hazard.

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WARNING

TO AVOID POSSIBLE PERSONAL INJURY OR EQUIPMENT DAMAGE, AN AUTHORIZED SERVICE REPRESENTATIVE MUST PERFORM ALL SERVICE.

SPECIFICATIONS
RDJE/RDJEA

Dimensions (inches)	
Height	28.71 (729.2 mm)
Width	19.75 (501.6 mm)
Length	23.04 (585.2 mm)
Weight	307 lb.
Number of Cylinders (in-line)	2
Displacement (cu in.)	70 inch³ (1.2 litre)
Bore	3.5 (88.90 mm)
Stroke	3.625 (92.08 mm)
Main Bearings are Leaded Bronze, Precision Type for Replacement (qty.)	2
Connecting Rod Bearings Tri-metal Replaceable	yes
Piston Rings (chrome plated)	
Oil Control	1
Compression	3
Stellite Faced Valves	yes
Stellite Replaceable Valve Seats	yes
Valve Rotator	yes
Governor (internal flyball type—externally adjustable)	yes
Governor Regulation (percent)	5
Nominal Battery Voltage	12
Battery Size	
SAE Group 1H, 6 volt	two
Amp/Hr SAE 20 hr (minimum)	120 (432 kC)
Solenoid Shift Starter	yes
Injection Pump (American Bosch type)	PSU
Injection Order	1-2
Primary and Secondary Fuel Filters	yes
Fuel Pump Lift (feet)	6 (1.8 m)
Oil Pump (gear type)	yes
Oil Filter (full flow)	yes
Oil Capacity U.S. quarts (includes Filter)	3 (2.84 litre)
Exhaust Connections (pipe tapped)	1-1/2 (38.1 mm)
Power Take-off (inches)	
Shaft Length	4 (101.6 mm)
Shaft Diameter	1-3/4 (44.5 mm)
Keyway Length	3 (76.2 mm)
Keyway Width	3/8 (9.53 mm)
Keyway Depth	3/16 (4.76 mm)
Compression Ratio	19.0:1.0

NOTE: The RDJE and RDJEA are almost identical engines, the differences being that the RDJE is an even firing engine; both pistons move up and down together. The RDJEA is an odd firing engine; one piston moves up while the other moves down. For the above reasons, the crankshafts, injection pumps, camshafts, and associated piece parts are different.

DIMENSIONS AND CLEARANCES

RDJE/RDJEA

All clearances given at room temperature of 70° F (21° C).
All dimensions in inches (millimetres in parentheses) unless otherwise specified.

CAMSHAFT

Bearing Journal Diameter, Front	2.500—2.505 (63.500—63.627)
Bearing Journal Diameter, Rear	1.1875—1.1880 (30.1625—30.1752)
Bearing Clearance Limit	0.0015—0.0030 (0.0381—0.0762)
End Play	0.007—0.039 (0.1778—0.9906)
Cam Tappet Diameter	0.875—0.873 (22.1615—22.1742)
Cam Tappet Hole Diameter	0.8755—0.8765 (22.2377—22.2631)

CONNECTING RODS

Large Bore Diameter	2.1871—2.1876 (55.5523—55.5650)
Small Bore Diameter	1.044—1.045 (26.5176—26.543)
Large Bearing Bore to Small Bearing Bore (Center-to-Center)	5.998—6.002 (152.3492—152.4508)
Clearance, Bearing to Crankshaft	0.001—0.003 (0.0254—0.0762)

CYLINDER

Bore Honed Diameter	3.4995—3.5005 (88.8873—88.9127)
Maximum Allowable Taper	0.005 (0.127)
Maximum Allowable Out-Of-Round	0.001 (0.025)

CRANKSHAFT

Main Bearing Journal Diameter	2.2437—2.4450 (56.989—62.103)
Main Bearing Clearance	0.0030—0.0043 (0.076—0.109)
Connecting Rod Journal Diameter	2.0597—2.0605 (52.3240—52.3367)
Rod Bearing Clearance	0.0019—0.0038 (0.0482—0.0965)
End Play	0.010—0.015 (0.254—0.381)

PISTONS AND RINGS

Clearance in Cylinder	
Measure 90° to pin, just below oil ring	0.0055—0.0075 (0.1397—0.1905)
Ring Groove Width	
Top	0.0970—0.0980 (2.464—2.489)
No 2	0.0965—0.0975 (2.451—2.477)
No 3	0.0965—0.0975 (2.451—2.477)
No 4	0.1880—0.1897 (4.775—4.818)
Ring Gap	0.010—0.020 (0.254—0.508)
Width—All Rings	0.0925—0.0935 (2.3495—2.3749)

PISTON PIN

Clearance in Piston	Thumb Push Fit
Connecting Rod Bushing Clearance	0.0002—0.0007 (0.0050—0.0178)

STARTING MOTOR (Prestolite)

Rotation	Counterclockwise
Pinion Clearance to Pinion Stop (Solenoid Plunger Bottomed)	0.070—0.120 (1.78—3.05)
Pinion Rest Position—Distance from Pinion Housing Mounting Face to Outer Edge of Pinion	1-9/32 — 1-15/64 (32.54—37.31)
Armature End Play	0.005—0.030 (0.030—0.760)

VALVE—INTAKE

Stem Diameter	0.3405—0.3415 (8.6487—8.6741)
Guide Clearance	0.0015—0.0030 (0.0381—0.0762)
Valve Face	42°
Clearance	0.017 (0.4318)

VALVE—EXHAUST

Stem Diameter	0.3405—0.3415 (8.6487—8.6741)
Guide Clearance	0.0025—0.0045 (0.0635—0.1143)
Valve Face	45°
Clearance	0.017 (0.4318)

VALVE GUIDE

Length	1.7812 (45.2424)
Outside Diameter	0.469—0.4696 (11.9126—11.9253)
Inside Diameter (after reaming)	
Exhaust	0.344—0.345 (8.7376—8.7630)
Intake	0.342—0.343 (8.6868—8.7122)
Cylinder Block Bore Diameter	0.467—0.468 (11.8618—11.8872)

VALVE SEATS

Bore Diameter	
Intake	1.361—1.362 (34.570—34.595)
Exhaust	1.364—1.365 (34.646—34.671)
Depth (from cylinder head face)	0.433—0.439 (10.9982—11.1506)
Insert—Outside Diameter	1.364—1.365 (34.6456—34.6710)
Seat Width	0.0469—0.0625 (1.1912—1.5875)
Angle	45°
Available Oversizes	0.002 (0.0508)
	0.005 (0.127)
	0.010 (0.254)
	0.025 (0.635)

VALVE SPRINGS

Load—Valve Open	87—97 lbs (12.0—13.4 N*)
Load—Valve Closed	45—49 lbs (6.2—6.8 N*)

* N. Base unit, Newtons. Unit of force.