

# INDUSTRIAL DIESEL ENGINE

2AA1-3AA1

2AB1-3AB1

MODELS

## WORKSHOP MANUAL

ISUZU MOTORS LIMITED

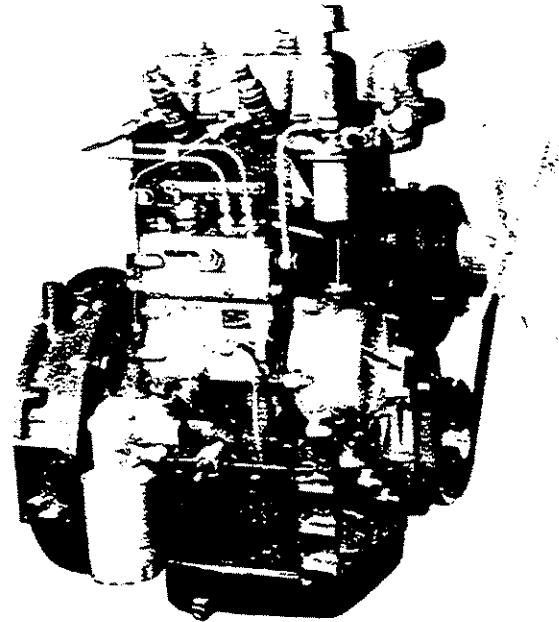
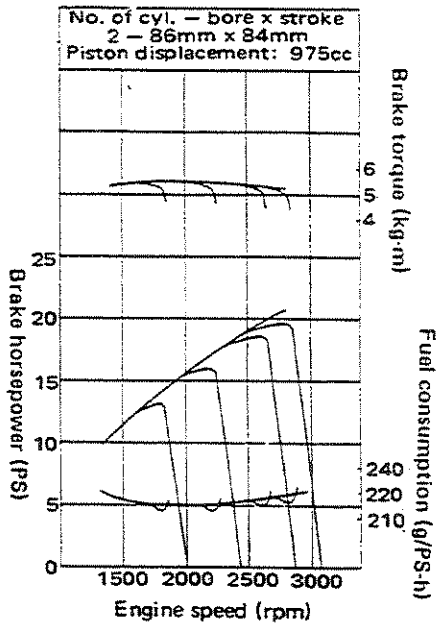


## C O N T E N T S

- Section 1. Engine
- Section 2. Lubricating System
- Section 3. Cooling System
- Section 4. Fuel System
- Section 5. Engine Electricals

2AA1

### PERFORMANCE CURVES (for Industrial use)



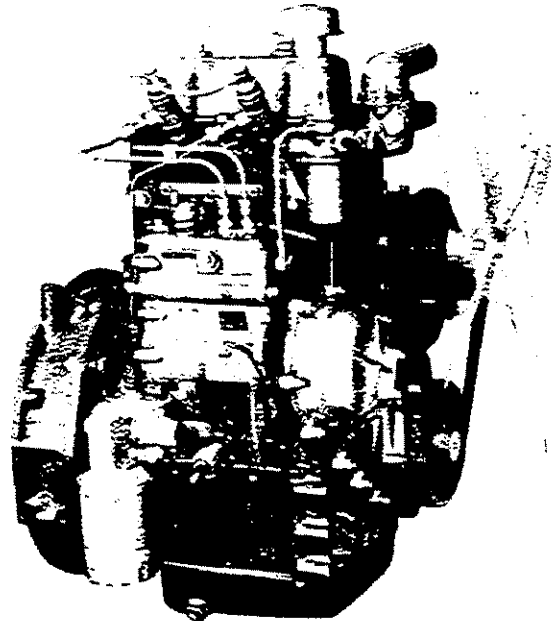
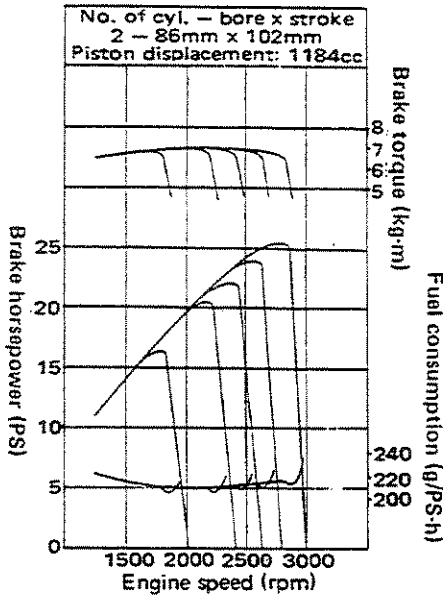
### Main data and Specifications

Name of engine	Isuzu 2AA1	Dry weight	160 kg
Type of engine	4 cycle, water cooled, overhead valve, in-line, swirl-chamber.	Dimension (L x W x H)	547 mm x 506 mm x 668 mm
No. of cyl. — bore x stroke	2 — 86mm x 84mm	Firing order	1 — 2
Piston displacement	975cc	Injection pump	Reformed Bosch, in-line
Compression ratio	20	Governor	All speed mechanical type
Engine performance		Generator	AC, 12V — 10A
		Starter	12V — 1.2kW
		Air cleaner	Not equipped
		Cooling fan	380φ draw-in, 4 blades
		Engine oil capacity	3.6 ℓ
		Cooling water capacity	3.1 ℓ
Rated output PS/rpm (Governed horsepower)			
10.0 / 1400	Max. torque		
13.0 / 1800	5.4 kg-m/2000 rpm		
16.0 / 2200	Fuel consumption		
17.5 / 2400	210 g/PS-h		
18.5 / 2600	(at Full load)		
19.5 / 2800			

Test condition: Equipped with 380φ cooling fan, generator and air cleaner. Without silencer. Atmospheric condition — 760 mmHg, 20°C, 65%. Brake-in. (JIS D-1005 1969)

2AB1

**PERFORMANCE CURVES**  
(for Industrial use)



**Main data and Specifications**

Name of engine	Isuzu 2AB1	Dry weight	165 kg
Type of engine	4 cycle, water cooled, overhead valve, in-line, swirl-chamber.	Dimension (L x W x H)	547mm x 506mm x 693mm
No. of cyl. — bore x stroke	2 — 86mm x 102mm	Firing order	1 — 2
Piston displacement	1184cc	Injection pump	Reformed Bosch, in-line
Compression ratio	20	Governor	All speed mechanical type
Engine performance		Generator	AC, 12V — 10A
		Starter	12V — 1.2kW
		Air cleaner	Not equipped
		Cooling fan	380φ draw-in, 4 blades
		Engine oil capacity	3.6 l
		Cooling water capacity	3.2 l

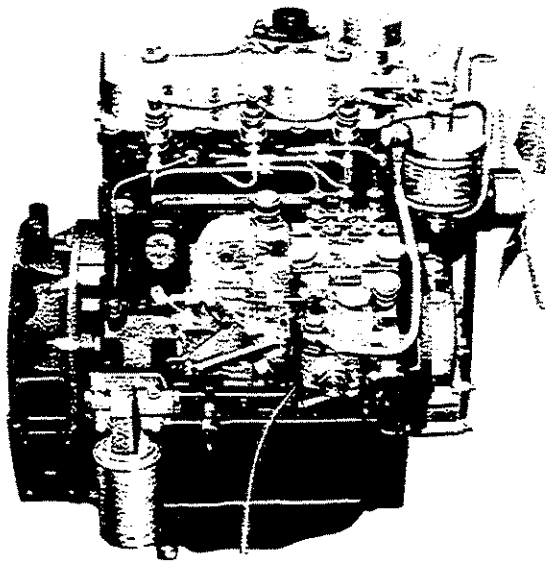
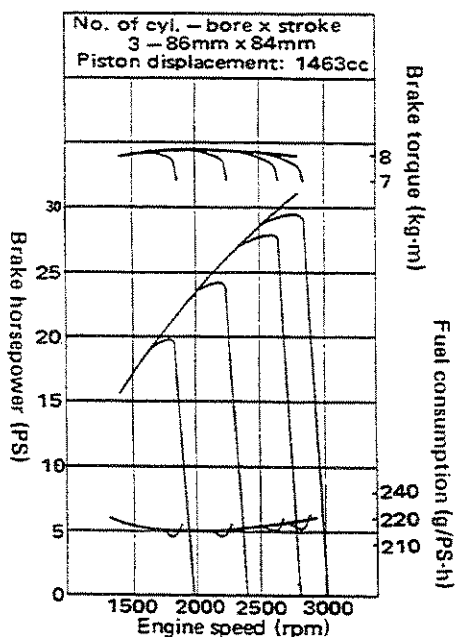
Rated output PS/rpm (Governed horsepower)
12.5 / 1400
16.5 / 1800
20.0 / 2200
22.0 / 2400
24.0 / 2600
25.5 / 2800

Max. torque  
7.0 kg-m/2000 rpm

Fuel consumption  
210 g/PS-h  
(at Full load)

Test condition: Equipped with 380φ cooling fan, generator and air cleaner. Without silencer. Atmospheric condition — 760 mmHg, 20°C, 65%. Brake-in. (JIS D-1005 1969)

## 3AA1

**PERFORMANCE CURVES**  
 (for Industrial use)

**Main data and Specifications**

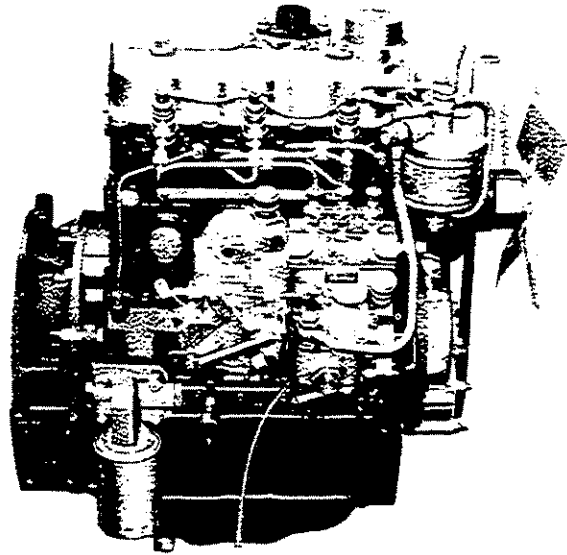
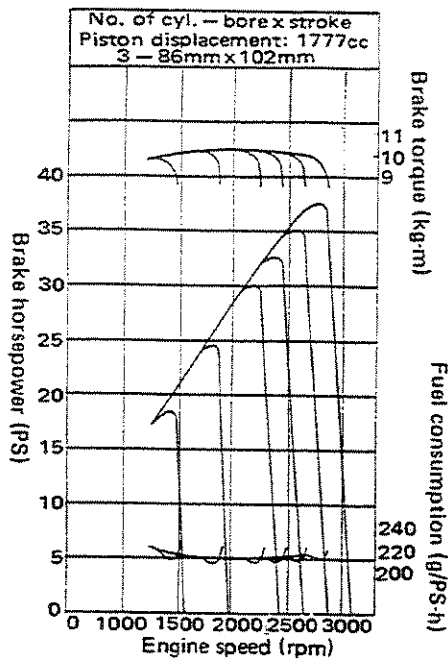
Name of engine	Isuzu 3AA1
Type of engine	4 cycle, water cooled, overhead valve, in-line, swirl-chamber.
No. of cyl. — bore x stroke	3 — 86mm x 84mm
Piston displacement	1463cc
Compression ratio	20
Engine performance	

Rated output PS/rpm (Governed horsepower)
15.0 / 1400
20.0 / 1800
24.5 / 2200
26.5 / 2400
28.0 / 2600
29.5 / 2800

Max. torque	8.2 kg-m/2000rpm
Fuel consumption	210 g/PS-h (at Full load (min.))

Dry weight	197 kg
Dimension (L x W x H)	653mm x 515mm x 668mm
Firing order	1 — 3 — 2
Injection pump	Reformed Bosch, in-line
Governor	All speed mechanical type
Generator	AC, 12V — 10A
Starter	12V — 1.8kW
Air cleaner	Not equipped
Cooling fan	380φ draw-in, 4 blades
Engine oil capacity	6.2 ℓ
Cooling water capacity	4.2 ℓ

Test condition: Equipped with 380φ cooling fan, generator and air cleaner. Without silencer. Atmospheric condition — 760 mmHg, 20°C, 65%. Brake-in. (JIS D-1005 1969)

**3AB1****PERFORMANCE CURVES**  
(for Industrial use)**Main data and Specifications**

Name of engine	Isuzu 3AB1	Dry weight	217 kg
Type of engine	4 cycle, water cooled, overhead valve, in-line, swirl-chamber.	Dimension (L x W x H)	653mm x 515mm x 693mm
No. of cyl. — bore x stroke	3 — 86mm x 102mm	Firing order	1 — 3 — 2
Piston displacement	1777cc	Injection pump	Reformed Bosch, in-line
Compression ratio	20	Governor	All speed mechanical type
Engine performance		Generator	AC, 12V — 10A
Rated output PS/rpm (Governed horsepower)		Starter	12V — 1.8kW
18.5 / 1400		Air cleaner	Not equipped
25.0 / 1800	Max. torque	Cooling fan	380ϕ draw-in, 4 blades
31.0 / 2200	10.5 kg-m/2000 rpm	Engine oil capacity	6.2 ℓ
33.0 / 2400	Fuel consumption	Cooling water capacity	4.4 ℓ
36.0 / 2600	210 g/PS-h		
38.0 / 2800	(at Full load (min.))		

Test condition: Equipped with 380ϕ cooling fan, generator and air cleaner. Without silencer. Atmospheric condition — 760 mmHg, 20°C, 65%. Brake-in. (JIS D-1005 1969)

# ENGINE

## Steps to be followed prior to engine overhauling

The following check-ups should be made to determine whether or not the engine is in need of overhauling.

The engine is to be overhauled if one or more of the following conditions apply.

### 1. Check compression pressure in cylinders

After allowing engine coolant to reach 75°C remove 4 nozzles and check compression pressure in cylinders by cranking the engine (at speed of 250 rpm) with the intake shutter wide open.

If compression pressure is lower than the value specified in the following table, the engine is in need of overhauling.

Inspection item		Value indicating need for servicing
Compression pressure kg/cm <sup>2</sup>	3AA1	20
	2AA1	20
	3AB1	20
	2AB1	20

### 2. Check oil consumption

Assuming oil mileage (or hours/1tr) of a new engine to be as 100%, the engine is due for overhauling when oil mileage (or hours/1tr) is declined to 50%.

### 3. Check fuel consumption

Assuming fuel mileage (or hours/1tr) is declined to 60%.

### 4. Check for abnormal operating noises.

## 1-1 Major disassembly

Drain the engine crankcase and cooling system prior to disassembly.

- (1) Disconnect the fuel pipe at the joint on the fuel filter and on the injection pipe.
- (2) Remove the bolts attaching the fuel filter and remove the fuel filter assembly.
- (3) Disconnect the injection pipes.
- (4) Disconnect the leak-off pipe from the nozzle holders.
- (5) Remove the oil filter assembly and disconnect the rocker arm shaft oil feed pipe.

*Note: When removing oil filter assembly use care not to spill engine oil.*

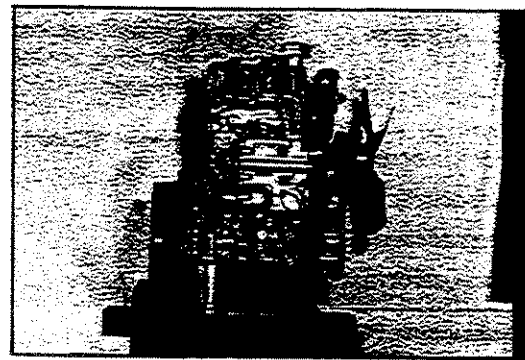


Fig. 1-1

- (6) Remove the bolts attaching the timing gear case and remove the injection pump assembly.

*Note: Use a suitable cover on the injection pump to prevent entry of dust or other foreign matter into the delivery valve holder.*



## ENGINE

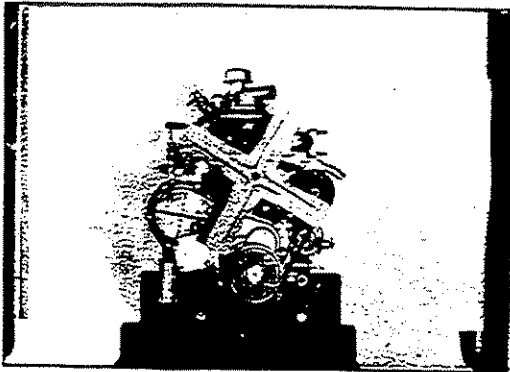


Fig. 1-2

- (7) Remove the injection nozzle holders.
- (8) Remove the oil pressure indicator switch.
- (9) Remove the generator adjust plate bolts and lower mounting bolt and remove the generator assembly.

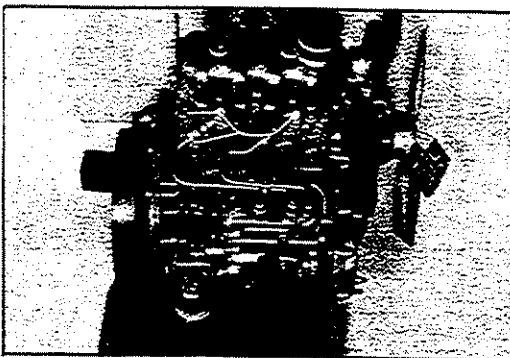


Fig. 1-3

- (10) Remove the fan, fan pulley and fan belt.
- (11) Remove the starter motor mounting bolts and remove the starter motor assembly.
- (12) Pull out the oil level gauge (oil dipstick) and remove the manifold assembly.

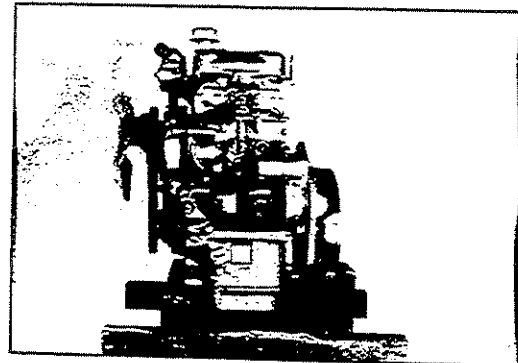


Fig. 1-4

- (13) Remove the bolts fixing the water pump and remove the water pump assembly.
- (14) Flatten out the crankshaft pulley bolt lock washer. Take out the bolt and remove the pulley, using a puller.
- (15) Remove the timing gear case.



Fig. 1-5

- (16) Remove the idle gear.
- (17) Remove the cylinder head cover. Then, remove the rocker arm shaft assembly.

*Note: Loosen the rocker arm shaft bracket bolts evenly in progression.*

## ENGINE

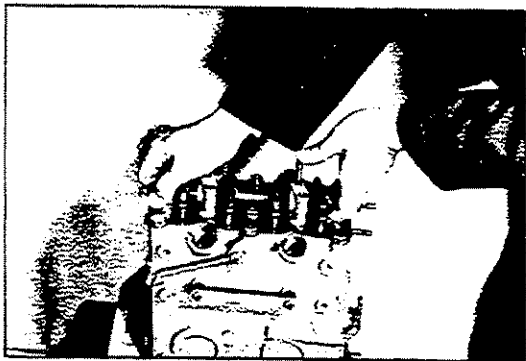


Fig. 1-6

- (18) Pull out the push-rods and remove the cylinder head and gasket.

*Note:* Loosen the cylinder head bolts in sequence in 2-3 steps in progression.

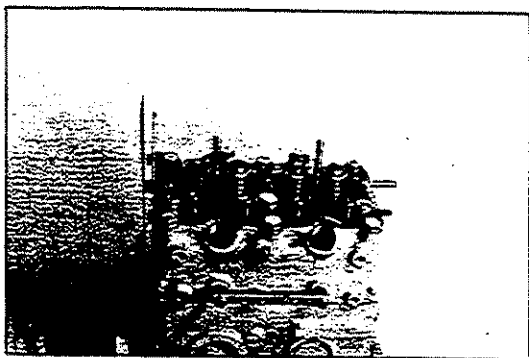


Fig. 1-7

- (19) Remove the crankcase together with the oil pan.

*Note:* If the crankcase is stuck to the cylinder body insert a screw driver into the grooves in the crankcase and pry it off.

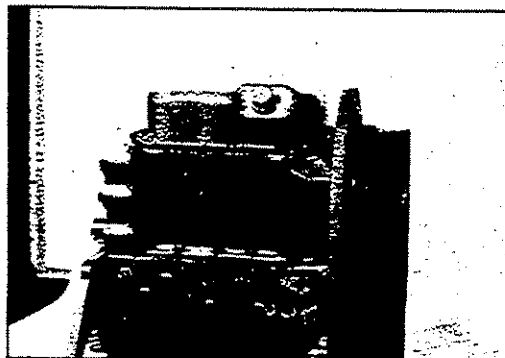


Fig. 1-8

- (20) Disconnect the pipe at the joint on the cylinder body side. Remove the bolts and remove the oil pump assembly from the cylinder body.

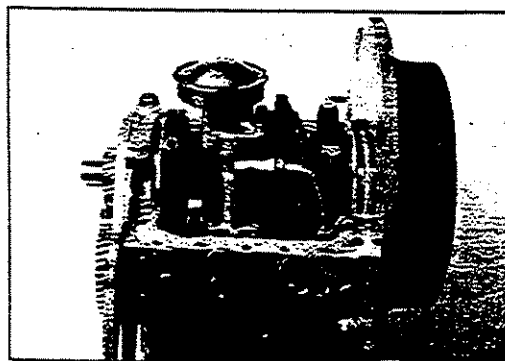


Fig. 1-9

- (21) Remove the camshaft thrust plate fixing bolts and remove the camshaft.

*Note:* Remove the camshaft, using care not to scratch the camshaft bearings.

- (22) Remove the engine front plate.