

**PRE - PRODUCTION  
ISSUE**

**SUZUKI** OUTBOARD MOTOR

***V6*** **DF200**  
**DF225** ***FOUR***  
**DF250** ***STROKE***

**SERVICE MANUAL**

## FOREWORD

This manual contains an introductory description of the SUZUKI DF200/225/250 Outboard motors and procedures for inspection, service and overhaul of their main components.

General knowledge information is not included.

**Please read the GENERAL INFORMATION section to familiarize yourself with basic information concerning this motor. Read and refer to the other sections in this manual for information regarding proper inspection and service procedures.**

This manual will help you better understand these outboard motors, assisting you in providing your customers with optimum and quick service.

- This manual has been prepared using the latest information available at the time of publication.  
Differences may exist between the content of this manual and the actual outboard motor.
- Illustrations in this manual are used to show the basic principles of operation and work procedures and may not represent the actual outboard motor in exact detail.
- This manual is intended for use by technicians who already possess the basic knowledge and skills to service SUZUKI outboard motors.  
Persons without such knowledge and skills should not attempt to service SUZUKI outboard engines by relying on this manual only and should contact an authorized SUZUKI outboard motor dealer.

### **⚠ WARNING**

**Apprentice mechanics or do-it-yourself mechanics that don't have the proper tools and equipment may not be able to properly perform the services described in this manual.**  
**Improper repair may result in injury to the mechanic and may render the engine unsafe for the boat operator and passengers.**

#### NOTE:

This manual is compiled based on 2004 (K4) model.

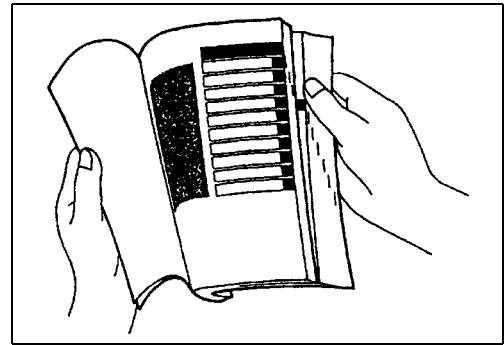
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# HOW TO USE THIS MANUAL

## TO LOCATE WHAT YOU ARE LOOKING FOR:

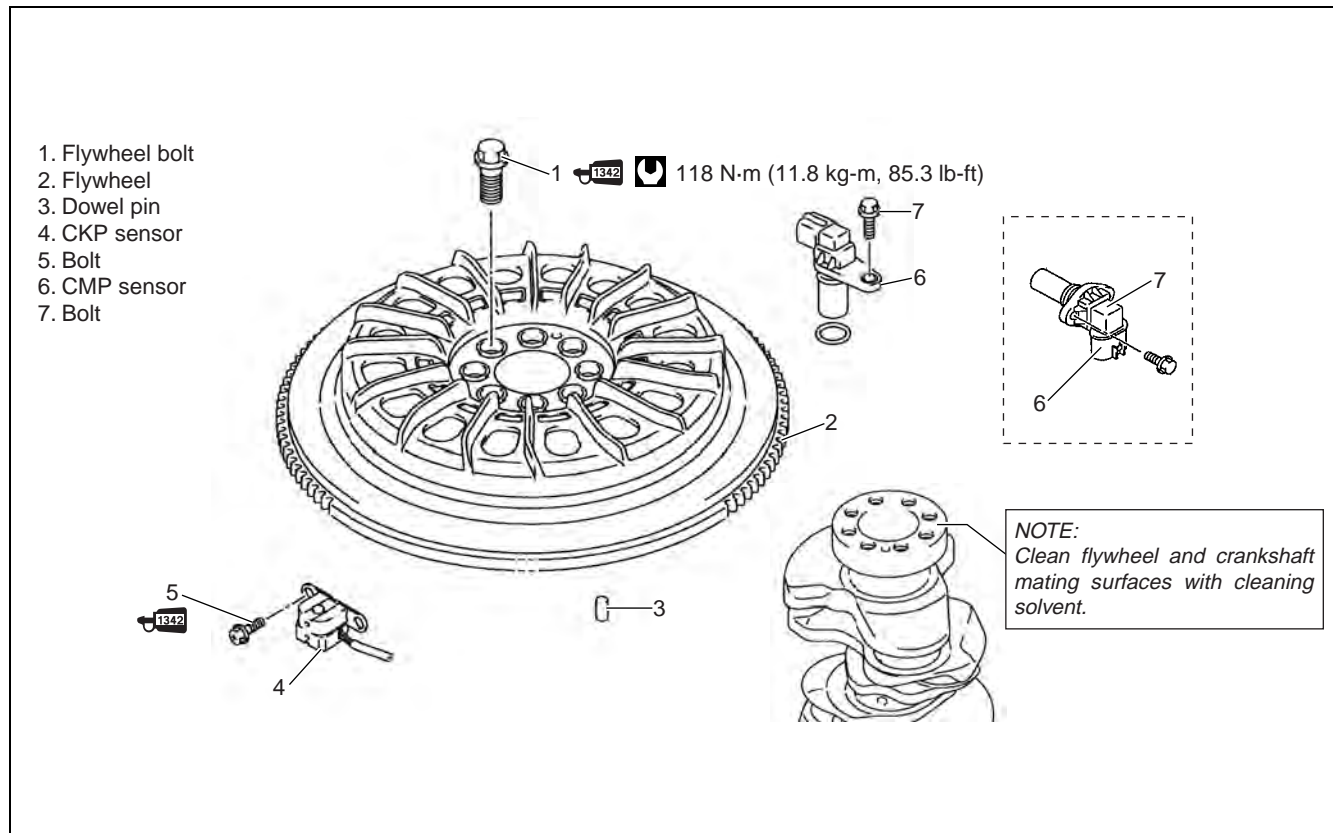
1. The text of this manual is divided into sections.
2. The section titles are listed on the previous page in a GROUP INDEX. Select the section needed for reference.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. The first page of each section contains a table of contents to easily locate the item and page you need.



## COMPONENT PARTS AND IMPORTANT ITEM ILLUSTRATIONS








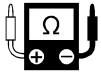

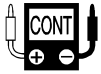
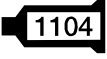
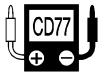



Under the name of each system or unit, an exploded view is provided with work instructions and other service information such as the tightening torque, lubrication and locking agent points.

### Example:



## SYMBOL

Listed in the table below are the symbols indicating instructions and other important information necessary for proper servicing. Please note the definition for each symbol. You will find these symbols used throughout this manual. Refer back to this table if you are not sure of any symbol(s) meanings.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Apply THREAD LOCK "1342".
	Apply oil. Use the engine oil unless otherwise specified.		Apply THREAD LOCK SUPER "1333B".
	Apply SUZUKI OUTBOARD MOTOR GEAR OIL.		Measure in DC voltage range.
	Apply SUZUKI SUPER GREASE "A".		Measure in resistance range.
	Apply SUZUKI WATER RESISTANT GREASE.		Measure in continuity test range.
	Apply SUZUKI BOND "1104".		Use peak voltmeter "Stevens CD-77".
	Apply SUZUKI BOND "1207B".		Use special tool.
	Apply SUZUKI SILICONE SEAL.		

# ABBREVIATIONS

Abbreviations used in this service manual are as follows:

BTDC	: Before Top Dead Center
CKP	: Crankshaft position
CMP	: Camshaft position
CTP	: Close Throttle position
DC	: Direct Current
DOHC	: Double Over Head Camshaft
ECM	: Engine Control Module
EX (Ex.)	: Exhaust
IAC	: Idle Air Control
IAT	: Intake Air Temperature
IN (In.)	: Intake
MAP	: Manifold absolute pressure
OCV	: Oil control valve
PCV	: Positive Crankcase Ventilation
PORT	: Port
PTT	: Power Trim & Tilt
SPS	: Shift Position Sensor
STBD	: Starboard
TPS	: Throttle Position Sensor
VSV	: Vacuum switching valve
VVT	: Variable Valve Timing

# GENERAL INFORMATION

1

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## WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

### **⚠ WARNING**

Indicates a potential hazard that could result in death or injury.

### **CAUTION**

Indicates a potential hazard that could result in motor damage.

*NOTE:*

*Indicates special information to make maintenance easier or instructions clearer.*

*Please note, however, that the warnings and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the outboard motor. In addition to the WARNING and CAUTION stated, you must also use good judgement and observe basic mechanical safety principles.*

## GENERAL PRECAUTIONS

### **⚠ WARNING**

- Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the outboard motor.
- To avoid eye injury, always wear protective goggles when filing metals, working on a grinder, or doing other work, which could cause flying material particles.
- When two or more persons work together, pay attention to the safety of each other.
- When it is necessary to run the outboard motor indoors, make sure that exhaust gas is vented outdoors.
- When testing an outboard motor in the water and on a boat, ensure that the necessary safety equipment is on board. Such equipment includes: flotation aids for each person, fire extinguisher, distress signals, anchor, paddles, bilge pump, first-aid kit, emergency starter rope, etc.
- When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all of the material manufacturer's instructions.
- Never use gasoline as a cleaning solvent.
- To avoid getting burned, do not touch the engine, engine oil or exhaust system during or shortly after engine operation.
- Oil can be hazardous. Children and pets may be harmed from contact with oil. Keep new and used oil away from children and pets. To minimize your exposure to oil, wear a long sleeve shirt and moisture-proof gloves (such as dishwashing gloves) when changing oil. If oil contacts your skin, wash thoroughly with soap and water. Launder any clothing or rags if wet with oil. Recycle or properly dispose of used oil.
- After servicing fuel, oil/engine cooling system and exhaust system, check all lines and fittings related to the system for leaks.
- Carefully adhere to the battery handling instructions laid out by the battery supplier.

**CAUTION**

- If parts replacement is necessary, replace the parts with Suzuki Genuine Parts or their equivalent.
- When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
- Be sure to use special tools when instructed.
- Make sure that all parts used in assembly are clean and also lubricated when specified.
- When use of a certain type of lubricant, bond or sealant is specified, be sure to use the specified type.
- When removing the battery, disconnect the negative cable first and then the positive cable. When reconnecting the battery, connect the positive cable first and then the negative cable.
- When performing service to electrical parts, if the service procedures do not require using battery power, disconnect the negative cable at the battery.
- Tighten cylinder head and case bolts and nuts, beginning with larger diameter and ending with smaller diameter. Always tighten from inside to outside diagonally to the specified tightening torque.
- Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, locking nuts, cotter pins, circlips, and certain other parts as specified, always replace them with new. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.
- Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
- Use a torque wrench to tighten fasteners to the torque values when specified.
- Remove grease or oil from screw/bolt threads unless a lubricant is specified.
- After assembly, check parts for tightness and operation.

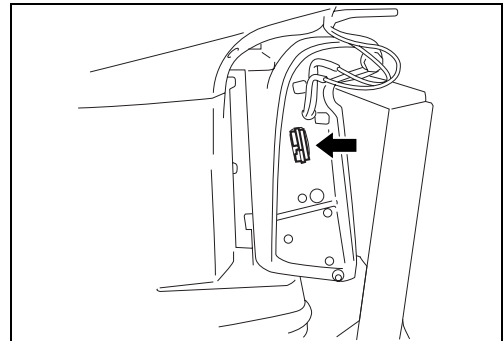
- To protect the environment, do not unlawfully dispose of used motor oil, other fluids and batteries.
- To protect the Earth's natural resources, properly dispose of used motor parts.



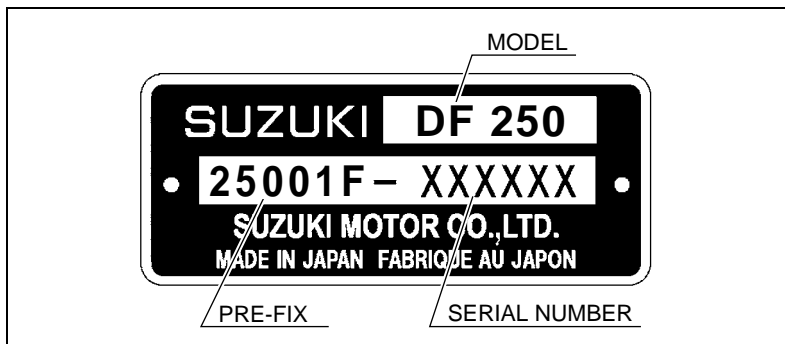
## IDENTIFICATION NUMBER LOCATION

### MODEL, PRE-FIX, SERIAL NUMBER

The MODEL, PRE-FIX and SERIAL NUMBER of motor are stamped on a plate attached to the clamp bracket.

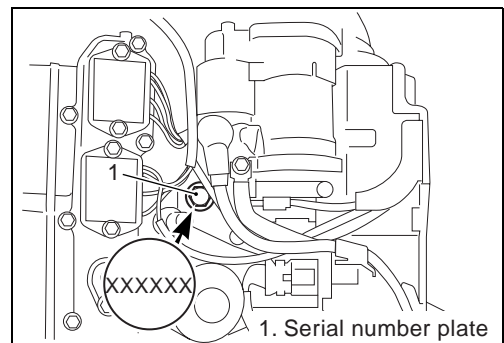


### Example



### ENGINE SERIAL NUMBER

A second engine serial number plate is pressed into a boss on the cylinder block.



## FUEL AND OIL

### GASOLINE RECOMMENDATION

Suzuki highly recommends that you use alcohol-free unleaded gasoline with a minimum pump octane rating of 87 (R/2+M/2 method) or 91 (Research method). However, blends of unleaded gasoline and alcohol with equivalent octane content may be used.

Allowable maximum blend of a single additive (not combination):

5% Methanol, 10% Ethanol, 15% MTBE

#### CAUTION

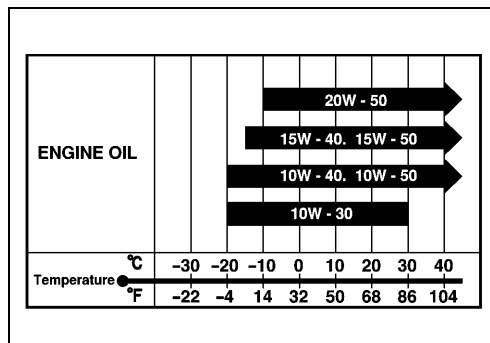
**If leaded gasoline is used, engine damage may result.  
Use only unleaded gasoline.**

### ENGINE OIL

Use only oils that are rated SE, SF, SG, SH or SJ under the API (American Petroleum Institute) classification system.

The viscosity rating should be SAE 10W-40.

If SAE 10W-40 motor oil is not available, select an alternative according to the chart at right.



## ENGINE BREAK-IN

The first 10 hours are critically important to ensure correct running of either a brand new motor or a motor that has been reconditioned or rebuilt. How the motor is operated during this time will have direct bearing on its life span and long-term durability.

**Break-in period: 10 hours**

## WARM-UP RECOMMENDATION

Allow sufficient idling time (more than 5 minutes) for the engine to warm up after cold engine starting.

## THROTTLE RECOMMENDATION

**NOTE:**

*Avoid maintaining a constant engine speed for an extended period at any time during the engine break-in by varying the throttle position occasionally.*

**1. FIRST 2 HOURS**

For first 15 minutes, operate the engine in-gear at idling speed.

During the remaining 1 hour and 45 minutes, operate the engine in-gear at less than 1/2 (half) throttle (3 000 r/min).

**NOTE:**

*The throttle may be briefly opened beyond the recommended setting to plane the boat, but must be reduced to the recommended setting immediately after planing.*

**2. NEXT 1 HOUR**

Operate the engine in-gear at less than 3/4 (three-quarter) throttle (4 000 r/min).

**3. LAST 7 HOURS**

Operate the engine in-gear at desired engine speed.

However, do not operate continuously at full throttle for more than 5 minutes.

## PROPELLERS

An outboard motor is designed to develop its rated power within a specified engine speed range. The maximum rated power delivered by the DF200/225/250 models are shown below.

<b>Recommended full throttle speed range</b>	<b>DF200</b>	<b>5 000 – 6 000 r/min</b>
	<b>DF225</b>	<b>5 000 – 6 000 r/min</b>
	<b>DF250</b>	<b>5 500 – 6 100 r/min</b>

If the standard propeller fails to meet the above requirement, use another pitch propeller to hold the engine speed within the range specified above.

### Propeller selection chart

<b>Right-hand rotation models</b>			
<b>Blade x Diam. (in.) x Pitch (in.)</b>			
3	x	16	x 17
3	x	16	x 18 and 1/2
3	x	16	x 20
3	x	16	x 21 and 1/2
3	x	16	x 23
3	x	16	x 24 and 1/2

<b>Counter rotation models</b>			
<b>Blade x Diam. (in.) x Pitch (in.)</b>			
3	x	16	x 17
3	x	16	x 18 and 1/2
3	x	16	x 20
3	x	16	x 21 and 1/2
3	x	16	x 23
3	x	16	x 24 and 1/2

### CAUTION

**Installing a propeller with pitch either too high or too low will cause incorrect maximum engine speed, which may result in severe damage to the motor.**

### NOTE:

*In case of twin installation, always use on both engines, the same size right-hand rotation and counter-rotation propellers.*

## POWERHEAD DIRECTION OF ROTATION

This outboard motor is designed with a L.H. (left hand) rotation powerhead utilizing an offset crankshaft.

This design has the advantage of reducing the size of the motor and keeping the overall motor's weight closer to the boat transom and therefore closer to the boat C/G (center of gravity).

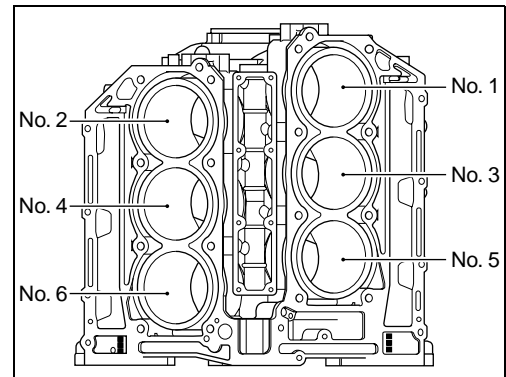
Rotation of the driveshaft is accomplished through a crankshaft drive gear and a driveshaft driven gear.

These gears are located beneath the powerhead in the same oil bath location as the camshaft chain.

As the rotational direction of the driven gear will be opposite of the drive gear, a left-hand rotation powerhead design was adopted to retain a conventional, standard rotation (right-hand) propeller shaft output.

## CYLINDER NUMBER

Cylinder number is as mentioned in the right figure.



## \* SPECIFICATIONS

\* These specifications are subject to change without notice.  
For DF200Z/225Z/250Z specification, see page 1-11.

Item	Unit	Data		
		DF200T	DF225T	DF250T
<b>PRE-FIX</b>		<b>20001F</b>	<b>22501F</b>	<b>25001F</b>

### DIMENSIONS & WEIGHT

Overall length (front to back)		mm (in.)	897 (35.3)
Overall width (side to side)		mm (in.)	572 (22.5)
Overall height	UL	mm (in.)	1 834 (72.2)
	XX	mm (in.)	1 961 (77.2)
Weight (without engine oil)	UL	kg (lbs)	263 (580)
	XX	kg (lbs)	268 (591)
Transom height	UL	mm (in. type)	632 (25)
	XX	mm (in. type)	759 (30)

### PERFORMANCE

Maximum output	kW (PS)	147 (200)	165 (225)	184 (250)
Recommended operating range	r/min	5 000 – 6 000	5 000 – 6 000	5 500 – 6 100
Idle speed	r/min	650 ± 50 (in-gear: Approx. 650)		

### POWER HEAD

Engine type	4-stroke DOHC		
Number of cylinders	V-6		
Bore	mm (in.)	95 (3.74)	
Stroke	mm (in.)	85 (3.35)	
Total displacement	cm <sup>3</sup> (cu. in)	3 614 (220.5)	
Compression ratio	: 1	9.5	
Spark plug	NGK	BKR6E	
Ignition system	Full-transistorized ignition		
Fuel supply system	Multi-point sequential electronic fuel injection		
Exhaust system	Through prop exhaust		
Cooling system	Water cooled		
Lubrication system	Wet sump by trochoid pump		
Starting system	Electric		
Throttle control	Remote control		

Item	Unit	Data		
		DF200T	DF225T	DF250T

**FUEL & OIL**

Fuel		Suzuki highly recommends that you use alcohol-free unleaded gasoline with a minimum pump octane rating of 87 (R+M/2 method) or 91 (Research method). However, blends of unleaded gasoline and alcohol with equivalent octane content may be used.
Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating SAE 10W-40
Engine oil amounts	L (US/Imp. qt)	8.0 (8.5/7.0) : Oil change only 8.2 (8.7/7.2) : Oil filter change
Gear oil		SUZUKI Outboard Motor Gear Oil (SAE #90 hypoid gear oil)
Gearcase oil capacity	ml (US/Imp. oz)	1 100 (37.2/38.7)

**BRACKET**

Trim angle	degree	0 – 19 (PTT system)
Number of trim position		PTT system
Maximum tilt angle	degree	70

**LOWER UNIT**

Reversing system	Gear
Transmission	Forward-Neutral-Reverse
Reduction system	Bevel gear
Gear ratio	12 : 22 (1.83)
Drive line impact protection	Spline drive rubber hub
Propeller shaft rotation (when shift into forward)	Clockwise
Propeller	Blade x Diam. (in.) x Pitch (in.)
	3 x 16 x 17
	3 x 16 x 18 and 1/2
	3 x 16 x 20
	3 x 16 x 21 and 1/2
	3 x 16 x 23
	3 x 16 x 24 and 1/2

**REDUCTION SYSTEM**

1st reduction gear ratio (Crankshaft drive gear: Driven gear)	32 : 40 (1.25)
2nd reduction gear ratio (Lower unit gear)	12 : 22 (1.83)
Total reduction gear ratio	2.29 (40/32 x 22/12)

\* These specifications are subject to change without notice.  
For DF200T/225T/250T specification, see page 1-9.

Item	Unit	Data		
		DF200Z	DF225Z	DF250Z
<b>PRE-FIX</b>		<b>20001Z</b>	<b>22501Z</b>	<b>25001Z</b>

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Spark plug	NGK	BKR6E	
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Fuel supply system	Multi-point sequential electronic fuel injection		
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Lubrication system	Wet sump by trochoid pump		
Starting system	Electric		
Throttle control	Remote control		



Item	Unit	Data		
		DF200Z	DF225Z	DF250Z

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Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating SAE 10W-40
Engine oil amounts	L (US/Imp. qt)	8.0 (8.5/7.0) : Oil change only 8.2 (8.7/7.2) : Oil filter change
Gear oil		SUZUKI Outboard Motor Gear Oil (SAE #90 hypoid gear oil)
Gearcase oil capacity	ml (US/Imp. oz)	1 100 (37.2/38.7)

**BRACKET**

Trim angle	degree	0 – 19 (PTT system)
Number of trim position		PTT system
Maximum tilt angle	degree	70

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Reversing system	Gear
Transmission	Forward-Neutral-Reverse
Reduction system	Bevel gear
Gear ratio	12 : 22 (1.83)
Drive line impact protection	Spline drive rubber hub
Propeller shaft rotation (when shift into forward)	Counterclockwise
Propeller	Blade x Diam. (in.) x Pitch (in.)
	3 x 16 x 17
	3 x 16 x 18 and 1/2
	3 x 16 x 20
	3 x 16 x 21 and 1/2
	3 x 16 x 23
	3 x 16 x 24 and 1/2

**REDUCTION SYSTEM**

1st reduction gear ratio (Crankshaft drive gear: Driven gear)	32 : 40 (1.25)
2nd reduction gear ratio (Lower unit gear)	12 : 22 (1.83)
Total reduction gear ratio	2.29 (40/32 x 22/12)

## \* SERVICE DATA

\* These service data are subject to change without notice.

Item	Unit	Data		
		DF200T/Z	DF225T/Z	DF250T/Z

### POWERHEAD

Recommended operating range	r/min	5 000 – 6 000	5 000 – 6 000	5 500 – 6 100
Idle speed	r/min	650 ± 50 (in-gear: Approx. 650)		
**Cylinder compression	kPa (kg/cm <sup>2</sup> , psi)	1 100 – 1 700 (11 – 17, 156 – 242)		
**Cylinder compression max. difference between any other cylinders	kPa (kg/cm <sup>2</sup> , psi)	100 (1.0, 14)		
**Engine oil pressure	kPa (kg/cm <sup>2</sup> , psi)	400 – 600 (4.0 – 6.0, 57 – 85) at 3 000 r/min (at normal operating temp.)		
Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating SAE 10W-40		
Engine oil amounts	L (US/lpm. qt))	8.0 (8.5/7.0) : Oil change only 8.2 (8.7/7.2) : Oil filter change		
Thermostat operating temperature	°C (°F)	58 – 62 (136 – 144)		

\*\* Figures shown are guidelines only, not absolute service limits.

Item	Unit	Data		
		DF200T/Z	DF225T/Z	DF250T/Z

**CYLINDER HEAD/CAMSHAFT**

Cylinder head distortion	Limit	mm (in.)	0.03 (0.001)			
Manifold seating faces distortion	Limit	mm (in.)	0.10 (0.004)			
Cam height	IN	STD	mm (in.)	43.020 – 43.180 (1.6937 – 1.7000)	42.420 – 42.580 (1.6701 – 1.6764)	44.920 – 45.080 (1.7685 – 1.7748)
		Limit	mm (in.)	42.920 (1.6898)	42.320 (1.6661)	44.820 (1.7646)
	EX	STD	mm (in.)	43.620 – 43.780 (1.7173 – 1.7236)	43.620 – 43.780 (1.7173 – 1.7236)	44.420 – 44.580 (1.7488 – 1.7551)
		Limit	mm (in.)	43.520 (1.7134)	43.520 (1.7134)	44.320 (1.7449)
Camshaft journal oil clearance	Top, 2nd, 3rd, 4th	STD	mm (in.)	0.043 – 0.085 (0.0017 – 0.0033)		
		Limit	mm (in.)	0.120 (0.0047)		
Camshaft journal (housing) inside diameter	Top, 2nd, 3rd, 4th	STD	mm (in.)	26.000 – 26.021 (1.0236 – 1.0244)		
		Limit	mm (in.)	—		
Camshaft journal outside diameter	Top, 2nd, 3rd, 4th	STD	mm (in.)	25.936 – 25.957 (1.0211 – 1.0219)		
		Limit	mm (in.)	—		
Camshaft runout	Limit	mm (in.)	0.10 (0.004)			
Cylinder head bore to tappet clearance	STD	mm (in.)	0.025 – 0.066 (0.0010 – 0.0026)			
	Limit	mm (in.)	0.150 (0.0059)			
Tappet outer diameter	STD	mm (in.)	33.959 – 33.975 (1.3370 – 1.3376)			
Cylinder head bore	STD	mm (in.)	34.000 – 34.025 (1.3386 – 1.3396)			

Item	Unit	Data		
		DF200T/Z	DF225T/Z	DF250T/Z

**VALVE/VALVE GUIDE**

Valve diameter	IN		mm (in.)	35.9 (1.4)
	EX		mm (in.)	31.4 (1.2)
Tappet clearance (Cold engine condition)	IN	STD	mm (in.)	0.23 – 0.27 (0.009 – 0.011)
	EX	STD	mm (in.)	0.33 – 0.37 (0.013 – 0.015)
Valve seat angle	IN		—	15°, 45°, 60°
	EX		—	15°, 45°, 60°
Valve guide to valve stem clearance	IN	STD	mm (in.)	0.020 – 0.047 (0.0008 – 0.0019)
		Limit	mm (in.)	0.070 (0.0028)
	EX	STD	mm (in.)	0.045 – 0.072 (0.0018 – 0.0028)
		Limit	mm (in.)	0.090 (0.0035)
Valve guide inside diameter	IN, EX	STD	mm (in.)	5.500 – 5.512 (0.2165 – 0.2170)
Valve guide protrusion	IN, EX	STD	mm (in.)	11.4 – 11.8 (0.45 – 0.46)
Valve stem outside diameter	IN	STD	mm (in.)	5.465 – 5.480 (0.2152 – 0.2157)
	EX	STD	mm (in.)	5.440 – 5.455 (0.2142 – 0.2148)
Valve stem deflection	IN	Limit	mm (in.)	0.14 (0.006)
	EX	Limit	mm (in.)	0.18 (0.007)
Valve stem runout	IN, EX	Limit	mm (in.)	0.05 (0.002)
Valve head radial runout	IN, EX	Limit	mm (in.)	0.08 (0.003)
Valve head thickness	IN	STD	mm (in.)	1.1 (0.04)
		Limit	mm (in.)	0.7 (0.03)
	EX	STD	mm (in.)	1.05 (0.04)
		Limit	mm (in.)	0.7 (0.03)
Valve seat contact width	IN	STD	mm (in.)	1.1 – 1.3 (0.04 – 0.05)
	EX	STD	mm (in.)	1.1 – 1.3 (0.04 – 0.05)
Valve spring free length		STD	mm (in.)	40.2 (1.58)
		Limit	mm (in.)	38.6 (1.52)
Valve spring tension		STD	N (kg, lbs)	147 – 173 (15.0 – 17.7, 33.1 – 39.0) for 31.1 mm (1.22 in)
		Limit	N (kg, lbs)	136 (13.9, 30.6) for 31.1 mm (1.22 in)
Valve spring squareness		Limit	mm (in.)	2.0 (0.08)

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