HI NSHI - H10- 011

SERVI CE MANUAL

YANMAR Mar i ne Gear

KMBP/KMBA/KM4A
KBM20/KBM21/KMH4A

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Model	KM3P, KM3A, KM4A, KBW20,KBW21, KMH4A

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• This manual has been updated to include model KMH4A in addition to the previous models KM3P, KM3A, KM4A, KBW20,KBW21.					

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Introduction

This manual describes the handling and maintenance for KM3P, KM3A, KM4A, KBW20, KBW21 and KMH4A Marine Gears. Please use the manual to help you make necessary adjustments to the marine gear accurately, quickly, and safely. This manual explains the use with a standard engine.

In order to improve the quality of your marine gear, you will be notified of any modifications which have been made.

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1. To Perform Service Safely

1.1 Warning Symbols

- Most accidents are caused by negligence of basic safety rules and precautions.
  For accident prevention, it is important to avoid such causes before development to accidents. Please read this manual carefully before starting repair or maintenance to fully understand safety precautions and appropriate inspection and maintenance procedures.
  Attempting a repair or maintenance job without sufficient knowledge may cause an unexpected accident.

- It is impossible to cover every possible danger in repair or maintenance in the manual. Sufficient consideration for safety is required in addition to the matters marke ⚠CAUTION. Especially for safety precautions in a repair or maintenance job not described in this manual, receive instructions from a knowledgeable leader.

- Warning Symbols used in this manual and their meanings are as follows :

⚠ DANGER	***DANGER-Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.***
⚠ WARNING	***WARNING-Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.***
⚠ CAUTION	***CAUTION-Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.***

- Any matter marked **[NOTICE]** in this manual is especially important in serving. If not observed, the product performance and quality may not be guaranteed.

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1.2 Precautions for Safe Servicing

(1) Service Shop (Place)

⚠ CAUTION ● **Sufficiently wide and flat place**

The floor space of the service shop for inspection and maintenance shall be sufficiently wide and flat without any hole.

[Otherwise]

An accident such as a violent fall may be caused.

⚠ CAUTION ● **Clean, orderly arranged place**

No dust, mud, oil or parts shall be left on the floor surface.

[Otherwise]

An unexpected accident may be caused.

⚠ CAUTION ● **Bright, safety illuminated place**

The working place should be illuminated sufficiently and safely.
For a job in a dark position involving difficulty in observation, use a portable safety lamp. The bulb shall be covered with a wire cage.

[Otherwise]

The bulb may be broken accidentally to cause ignition of leaking oil.

⚠ CAUTION ● **Place equipped with a fire extinguisher**

Keep a first aid kit and fire extinguisher close at hand in preparation for an emergency of fire.

(2) Working Wear

⚠ CAUTION ● **Wears for safe operation**

Wear a helmet, working clothes, safety shoes and other safety protectors matching each job. Especially, wear well-fitting working clothes.

[Otherwise]

A serious accident such as trapping by a machine may arise.

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(3) Tools to Be Used

⚠ WARNING ● **Appropriate holding and lifting**

Never operate when the marine gear is supported with blocks or wooden pieces or only with a jack. To lift and hold the marine gear, always use a crane with a sufficient allowance in limit load or a rigid jack.

[Otherwise]

A serious accident may arise.

⚠ WARNING ● **Use of appropriate tools**

Use tools matching the jobs to be done. Use a correotly sized tool for loosening or tightening a machine part.

[Otherwise]

A serious injury or marine gear damage may arise.

(4) Use of Genuine parts, Oil and Grease

⚠ CAUTION ● **Always use genuine product**

[Otherwise]

Shortening of marine gear life or an unexpected accident may arise.

(5) Bolt and Nut Tightening Torques

⚠ WARNING ● **Always tighten to the specified torque if designated in the manual**

[Otherwise]

Loosening or falling may cause parts damage or an injury.

(6) Handling Of Product

⚠ WARNING



● **Pay attention to hot portions**

Do not touch the engine or marine gear during running or immediately after it is stopped

[Otherwise]

Scalding may be caused by a high temperature.

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(7) Waste Disposal

⚠ CAUTION Observe the following instructions with regard to waste disposal. Negligence of each instruction will cause environmental pollution.

- Waste fluids such as engine and marine gear oil and cooling water shall be discharged into a container without spillage onto the ground.
- Do not let waste fluids be discharged into the sewerage, a river or the sea.
- Harmful wastes such as oil, fuel, coolants, solvents, filter elements and battery shall be disposed according to the relevant laws and reguiations. Ask a qualified disposal company for example.

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2. General

2.1 Specifications

• KM3P

Engine output (max.) (Flywheel) kw(hp)/rpm			41.2(56)/3800				
Clutch			Constant mesh gear with serve cone clutch (wet type)				
Reduction ratio	Forward		2.36	2.61	3.20	2.36	2.61
	Reverse		3.16	3.16	3.16	3.16	3.16
Direction of rotation	Input shaft		Counter-clockwise, viewed from stern				
	Output shaft	Forward	Clockwise, viewed from stern				
		Reverse	Counter-clockwise, viewed from stern				
Position of shift lever			Right side, viewed from stern				
Lubrication oil			SAE 20/30				
Lubrication oil capacity ℓ			0.35				
Applicable engin (Standard name)			3JH3E, 4JH3E				
Dry mass kg(N)			13(127)				

• KM3A

Engine output (max.) (Flywheel) kw(hp)/rpm			41.2(56)/3800				
Output shaft			excentric down angle				
Clutch			Constant mesh gear with serve cone clutch (wet type)				
Reduction ratio	Forward		2.33	2.64	3.21	2.33	2.64
	Reverse		3.04	3.04	3.04	3.04	3.04
Direction of rotation	Input shaft		Counter-clockwise, viewed from stern				
	Output shaft	Forward	Clockwise, viewed from stern				
		Reverse	Counter-clockwise, viewed from stern				
Position of shift lever			Right side, viewed from stern				
Lubrication oil			SAE 20/30				
Lubrication oil capacity ℓ			0.45				
Applicable engin (Standard name)			3JH3E, 4JH3E				
Dry mass kg(N)			13(127)				

• KM4A

Engine output (max.) (Flywheel) kw(hp)/rpm		73.6(100)/3800			
Output shaft		excentric 7° down angle			
Clutch		Constant mesh gear with serve cone clutch (wet type)			
Direction of rotation	Input shaft	Counter-clockwise, viewed from stern			
	Output shaft	Bi-rotation			
Reduction ratio (Both forward and reverse)		3.30	2.63	2.14	
Position of shift lever		Right side, viewed from stern			
Lubrication oil		Same as Engine lube oil			
Lubrication oil capacity ℓ		1.3			
Lube oil cooler		Sea-water cooling			
Applicable engin (Standard name)		4JH3E, 4JH3-TE, 4JH3-HTE			
Dry mass kg(N)		28(274)			

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• KBW20

Engine output (max.) (Flywheel) kw(hp)/rpm			41.2(56)/3800						
Reduction system			One·stage recuction, helical gear						
Reversing system			Constant mesh gear						
Clutch			Wet type multi-disc, mechanically operated						
Reduction ratio	Forward		2.17	2.62	3.28	2.17	2.62	3.28	
	Reverse		3.06			3.06			
Direction of rotation	Input shaft		Counterclockwise as viewed from stern						
	Output shaft	Forward	Clockwise as viewed from stern						
		Reverse	Counterclockwise as viewed from stern						
Lubrication oil			DEXRON.ATF						
Lubrication oil capacity ℓ			1.2						
Applicable engin (Standard name)			4JH3E						
Dry mass kg(N)			26(255)						

• KBW21

Engine output (max.) (Flywheel) kw(hp)/rpm		73.6(100)/3800					
Reduction system		One·stage recuction, helical gear					
Reversing system		Constant mesh gear					
Clutch system		Wet type multi-disc, mechanically operated					
Reduction ratio	Forward	2.17	2.62	——	2.17	2.62	
	Reverse	3.06			3.06		
Direction of rotation	Input shaft	Counterclockwise as viewed from stern					
	Output shaft Forward	Clockwise as viewed from stern					
	Output shaft Reverse	Counterclockwise as viewed from stern					
Lubrication oil		DEXRON.ATF					
Lubrication oil capacity ℓ		1.2					
lube oil cooler		Sea-water cooling					
Applicable engin (Standard name)		4JH3-TE, 4JH3-HTE					
Dry mass kg(N)		30(294)					

• KMH4A

Engine output (max.) (Flywheel) kw(hp)/rpm		91.9(125)/3800		
Output shaft		excentric 8° down angle		
Reduction system		One-stage recuction, helical gear		
Reversing system		Constant mesh gear		
Clutch		Wet type multi-disc, hydraulic operation		
Reduction ratio (Both forward and reverse)		2.04	2.45	
Direction of rotation	Input shaft	Counter-clockwise, viewed from stern		
	Output shaft Forward	Clockwise, viewed from stern		
	Output shaft Reverse	Counter-clockwise, viewed from stern		
Lubrication oil		SAE30		
Lubrication oil capacity ℓ		2.0		
Lubrication oil cooler		Sea-water cooling		
Applicable engin (Standard name)		4JH3-TE, 4JH3-HTE, 4JH3-DTE		
Dry mass kg(N)		31(304)		

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