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SAFETY

Yanmar considers safety of great importance and recommends that anyone that comes into close contact with its products, such as those who install, operate, maintain or service Yanmar products, exercise care, common sense and comply with the safety information in this manual and on the engine and marine gear's safety labels. Keep the labels from becoming dirty or torn and replace them if they are lost or damaged. Also, if you need to replace a part that has a label attached to it, make sure you order the new part and label at the same time.



This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.

SAFETY PRECAUTIONS

⚠ DANGER

Indicates a hazardous situation which, if not avoided, *will* result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, *could* result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, *could* result in minor or moderate injury.

NOTICE

Indicates a situation which can cause damage to the engine and marine gear, personal property and / or the environment or cause the equipment to operate improperly.

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Item		Specification		
		KMH60A	KMH61A	KMH61V
Type		Down Angle Hydraulic		V-Drive Hydraulic
Angle		8˚		12˚
Maximum Input Torque		960 N·m (708 ft·lb)	1070 N·m (789 ft·lb)	1070 N·m (789 ft·lb)
Maximum Input Speed		3300 min^{-1} (rpm)		
Reduction Ratio (F/R)		1.55 / 1.55		2.43 / 2.43
		2.04 / 2.04		1.98 / 1.98
		2.43 / 2.43		1.49 / 1.49
		–		1.24 / 1.24
Direction of Rotation	Input	Counterclockwise viewed from stern		Clockwise viewed from stern
	Output	Clockwise (Recommendation) or Counterclockwise viewed from stern		
Shift		Mechanical Cable		
Lubrication		Forced Lubrication		
Oil Capacity		2.8 L (3.0 qt)		7.5 L (7.9 qt)
Bellhousing Size		SAE #3		
Clutch Size		SAE 11.5 in.		
Dry Mass		58 kg (127 lb) without heat exchanger or damper		83.9 kg without heat exchanger or damper

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TROUBLESHOOTING

TROUBLESHOOTING CHART

Before performing troubleshooting, verify that all items of the operating instructions have been complied with.

The following chart will assist in troubleshooting. **CAUTION!** ***If any indicator fails to illuminate when the key switch is in the ON position, see your authorized Yanmar Marine dealer or distributor for service before operating the engine and marine gear.***

No.	Problem	Possible Cause	Action
1	Oil temperature	Oil level high during operation	Pump out oil until oil level is at maximum mark on dipstick.
		Oil level low	Add oil.
		Plugged or restricted heat exchanger	Replace heat exchanger and flush water system.
		No coolant in cooling system	Check cooling system and repair.
		Unknown	See your authorized Yanmar Marine dealer or distributor.
2	Oil on marine gear housing	Loose screws	Tighten to specification.
		Loose hardware	Tighten or replace.
		Loose dipstick	Tighten or replace.
		Loose oil strainer	Tighten or replace.
		Oil level too high during operation	Pump out oil until oil level is at maximum mark on dipstick.
		Unknown	See your authorized Yanmar Marine dealer or distributor.
3	Oil and water mixed	Damaged heat exchanger	See your authorized Yanmar Marine dealer or distributor.
4	Shifts hard	Selector control	See your authorized Yanmar Marine dealer or distributor.
		Linkage	See your authorized Yanmar Marine dealer or distributor.
		Unknown	See your authorized Yanmar Marine dealer or distributor.

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Periodic Maintenance Schedule

○: Check ◇: Replace				
System	**Item**	**Periodic Maintenance Interval**		
		Daily	**After Initial 50 hours**	**Every 250 hours or one year, whichever comes first**
Whole	Visual inspection of marine gear exterior	○ Before starting		
Lubricating System	Check the marine gear oil level and refill if necessary	○ Before starting		
	Change the marine gear oil and clean the oil strainer		◇	◇
	Change electric trolling valve oil filter element (if equipped)		◇	◇

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COMPONENT IDENTIFICATION

Note: KMH60A shown. Other models are similar.

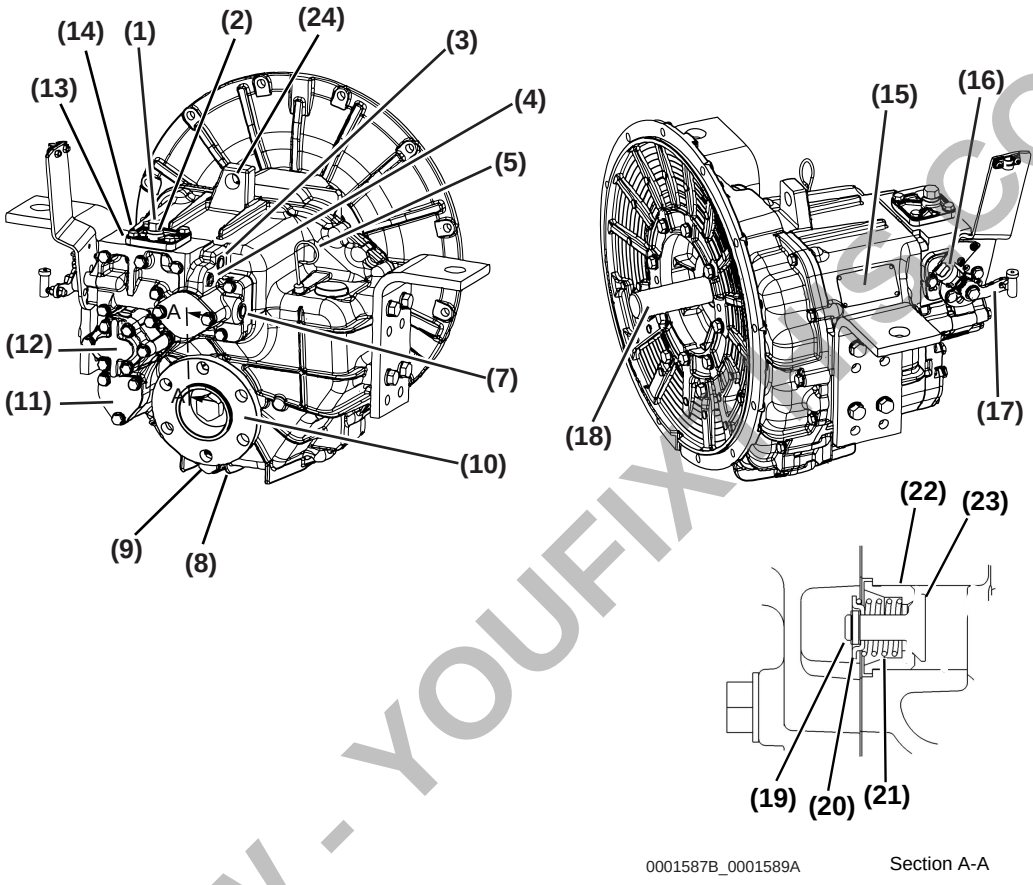


Figure 1

1 – Control Pressure Sensor Location
2 – O-Ring
3 – Port To Heat Exchanger
4 – Temperature Sensor Location
5 – Oil Dipstick
6 – Parallel Pin
7 – Port From Heat Exchanger
8 – Seal Washer
9 – Drain Plug With Magnet
10 – Output Flange
11 – Oil Strainer
12 – Oil Pump
13 – Gasket
14 – Upper Cover
15 – Nameplate
16 – Neutral Safety Switch
17 – Shifting Lever
18 – Input Shaft
19 – Spring Pin
20 – Spring Retainer
21 – Spring
22 – 2nd Relief Shim
23 – 2nd Relief Valve
24 – Marine Gear Lifting Eye

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TECHNICAL DATA

When installing the KMH marine gears, the following items should be specially noted:

- Installation should be done by a specialist only.
- Align and install the marine gear and engine correctly.
- Align correctly with engine and propeller shaft.
- Select a suitable damping coupling between the engine and the marine gear. See your authorized Yanmar dealer or distributor for assistance.
- Choose an adequate heat exchanger.
- Mount the marine gear correctly in the boat.

	KMH60A	KMH61A	KMH61V
Shifting Pressure	3.67 to 3.77 MPa (532 to 547 psi)	4.33 to 4.43 MPa (628 to 642 psi)	4.33 to 4.43 MPa (628 to 642 psi)
Maximum Input Speed	3300 min^{-1} (rpm)		
Oil Capacity without Heat Exchanger			
Available	2.8 L (3.0 qt)		7.5 L (7.9 qt)
Effective	0.5 L (0.5 qt)		0.4 L (0.4 qt)

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PERIODIC MAINTENANCE PROCEDURES

After Initial 50 Hours of Operation

Perform the following maintenance after the initial 50 hours of operation.

- **Changing the Marine Gear Oil and Cleaning the Marine Gear Oil Strainer**
- **Changing the Electric Trolling Valve Oil Filter Element (If Equipped)**

Changing the Marine Gear Oil and Cleaning the Marine Gear Oil Strainer

Optimum effectiveness of oil can only be assured if the marine gear oil is changed and the oil strainer is washed with clean oil regularly, according to the maintenance schedule.

1. Position a container under the marine gear to collect the waste oil.
2. Remove the M16 drain plug (**(Figure 1, (1))**, **(Figure 2, (1))**) and seal (**(Figure 1, (2))**, **(Figure 2, (2))**).

KMH60A / KMH61A

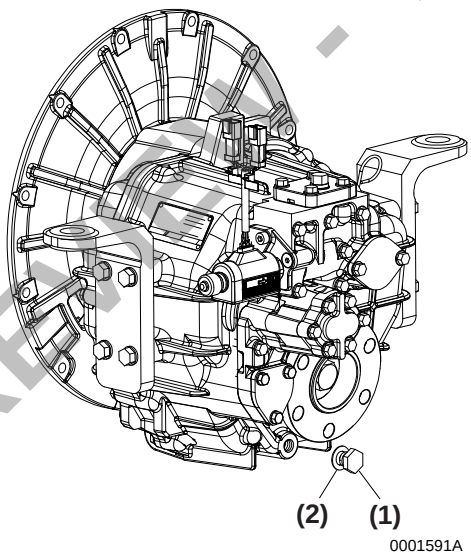


Figure 1

KMH61V

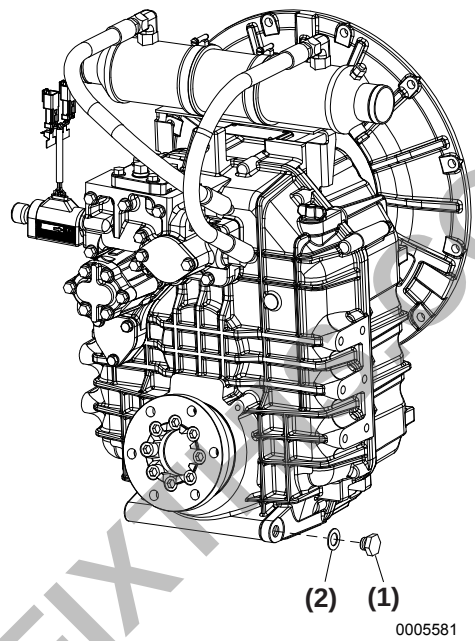


Figure 2

3. Check the drain plug seal for damage. Replace if necessary.
4. Remove three M8x40 bolts (**(Figure 3, (2))**, **(Figure 4, (2))**) and washers.

KMH60A / KMH61A

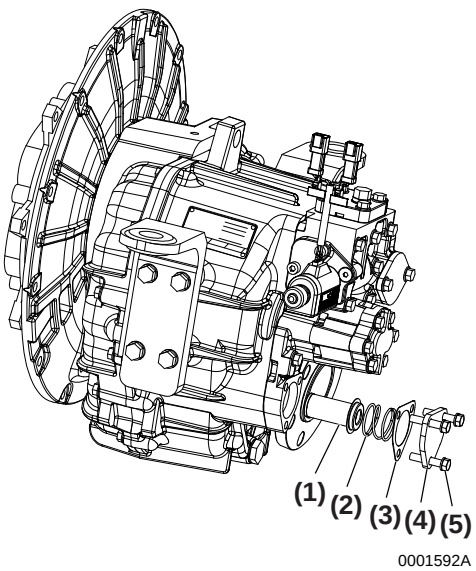


Figure 3

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