



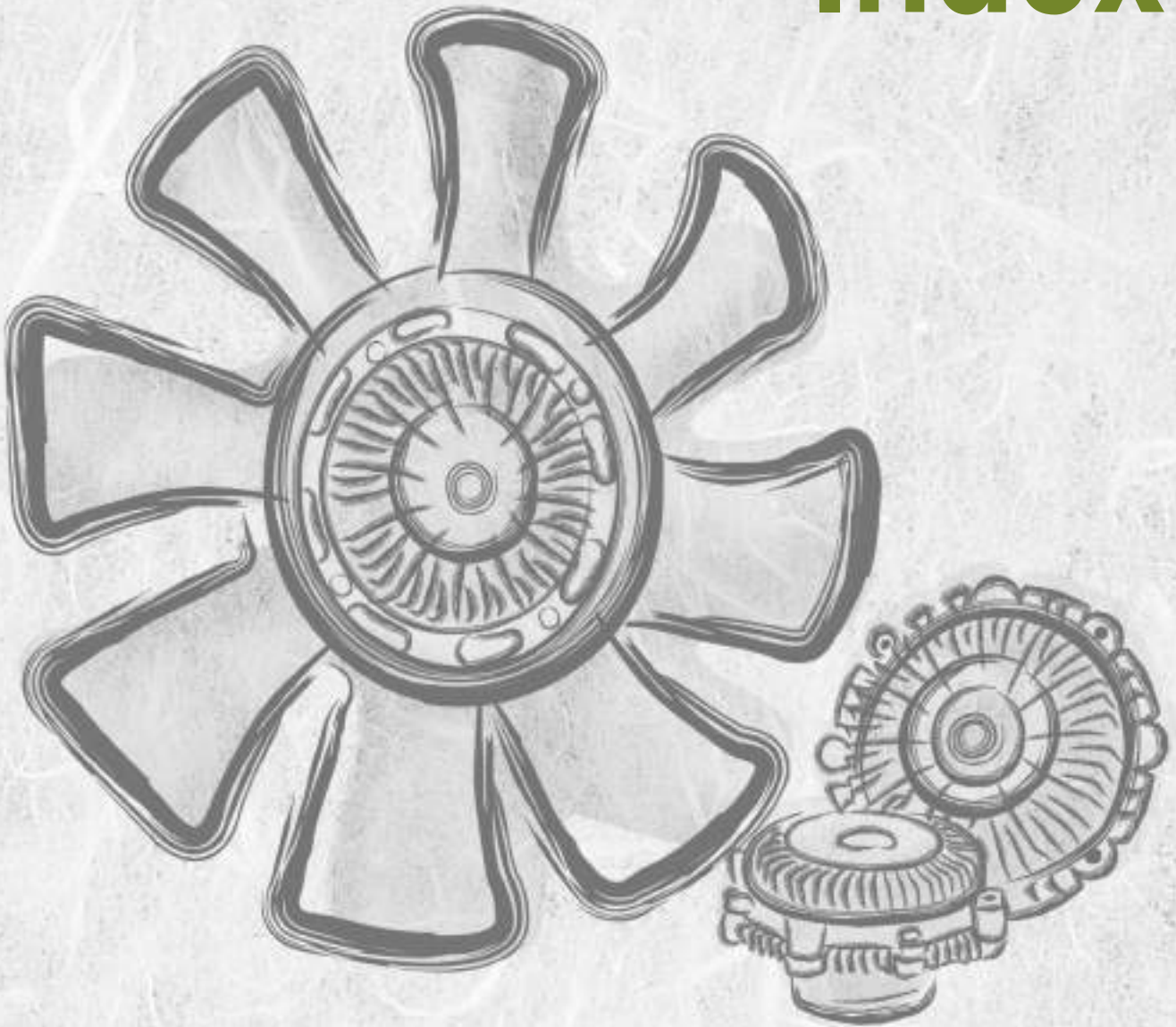
2006

Fan clutch



GMB
Korea Corporation

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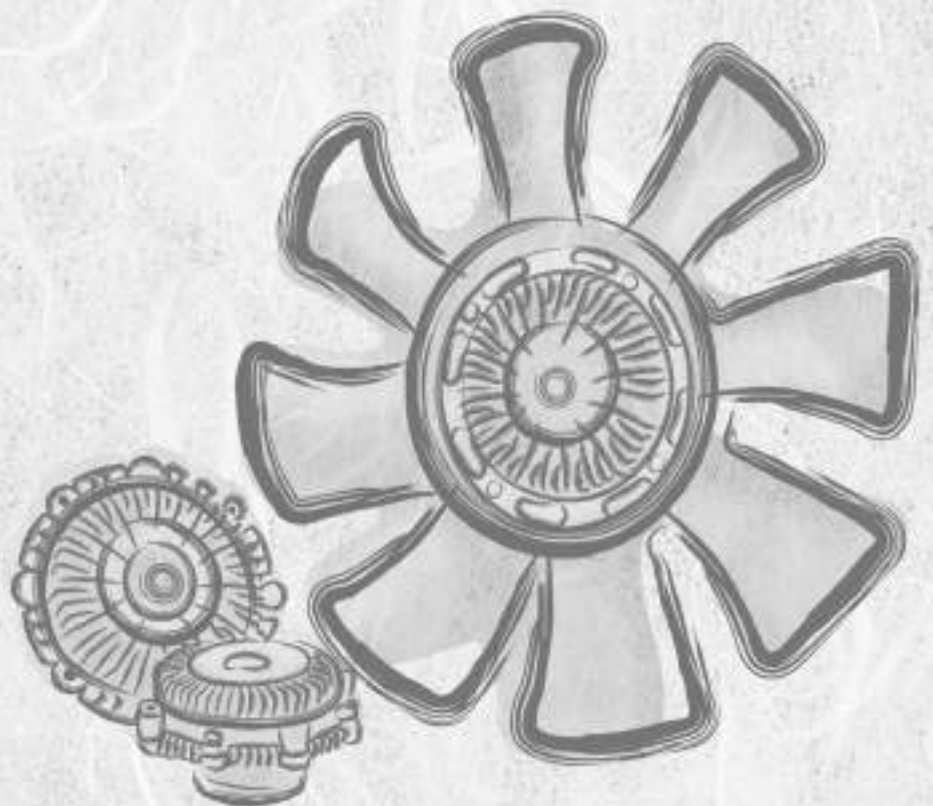
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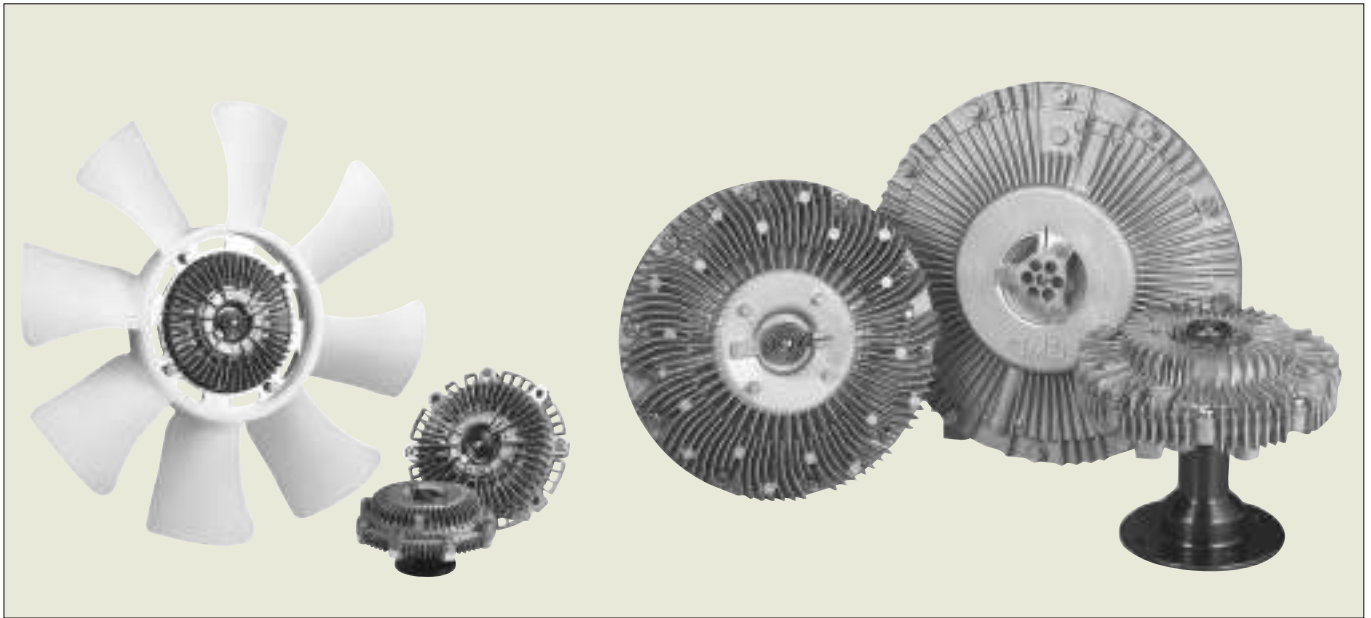
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FAN CLUTCH INFORMATION

- Fan clutches
- Design for parts
- Functions & Overview of design
- Definitions
- Troubleshooting
- GMB Auto Fan Clutch Type



Fan clutches



Fan clutches reduce the drain of engine horsepower and improve the efficiency of a vehicle's cooling system. Fan clutches are fluid coupling devices which provide air flow through the radiator by using the water pump shaft to power a rigid fan blade. Fan clutches are available in thermal and non-thermal designs.

Fan clutch replacement may be required when any of the following conditions exist:

Engine overheating

Silicone leaking from the fan clutch unit
Fan spins with little or no resistance (free wheels)

Greasy build up at thermal spring or where shaft exits rear housing

Fan clutch vibrates on shaft or will not turn
Squealing noises from the bearing

Note: The fan clutch should be checked for possible replacement when a water pump is installed.

THERMAL FAN CLUTCHES

Thermal fan clutches have a built-in thermostatic coil spring that detects the air temperature passing through the radiator and air conditioning

condenser. The fan clutch engages and provides air flow only when cooling is needed. When disengaged, the fan clutch "powers down" reducing horsepower drain and increasing fuel economy.

When engaged, the standard duty fan clutch spins at approximately 75% of the water pump speed. The heavy duty and severe duty clutches provide additional air flow, spinning at approximately 90% of the water pump speed.

All thermal fan clutches disengage and spin at about 33% of the water pump's speed when cooling is not required. This results in:

- MORE EFFICIENT USE OF ENGINE POWER**
- IMPROVED FUEL ECONOMY**
- LESS FAN NOISE**
- EXTENDED BELT AND WATER PUMP LIFE**

NON-THERMAL FAN CLUTCHES

Non-thermal fan clutches are constantly engaged and have a limited maximum spin rate. A non-thermal fan clutch achieves proper fan rotation speeds for necessary cooling;

however, the constant engagement of the fan clutch decreases engine efficiency in comparison to a thermal fan clutch.

IMPORT/COMPACT FAN CLUTCHES

These newly designed 5 & 6 inch fan clutches offer the look and fit of O.E. The slim design and the use of mounting studs (like O.E.) instead of bolts make installation much easier.

HEAVY DUTY FAN CLUTCHES

Heavy Duty fan clutches are designed specifically for light trucks, motorhomes and towing vehicles.

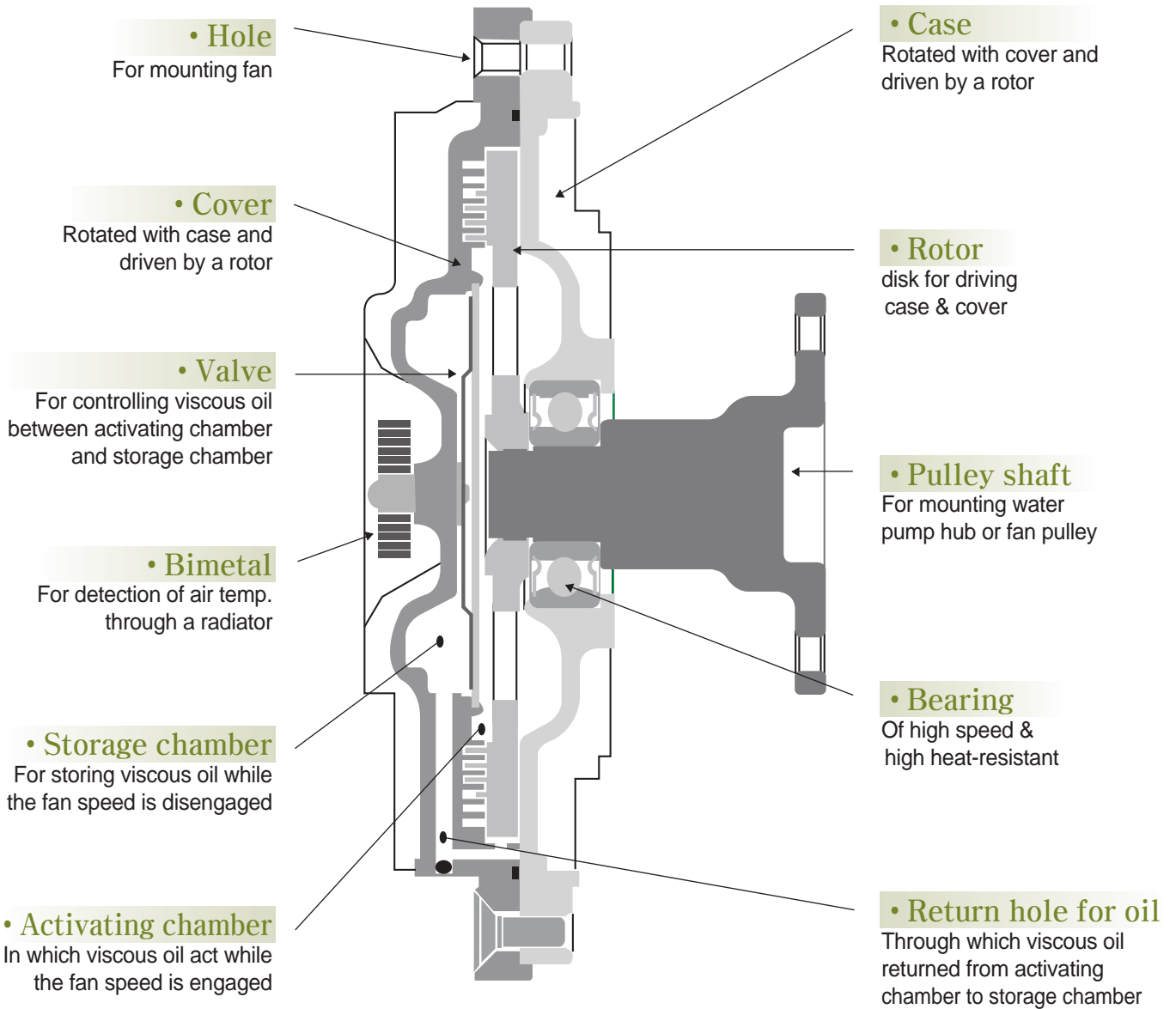
SEVERE DUTY FAN CLUTCHES

Severe Duty fan clutches feature the look and if of O.E. and are designed to meet the severe driving conditions of today's sport utility vehicles, light trucks and motorhomes.

All our fan clutches are designed and built to the highest quality standards and provide performance that meets or exceeds the O.E. specifications.

Design for parts

■ GMB Auto Fan Clutch : Features



Functions & Overview of design

Functions

- Auto Fan Clutch plays most important role in the engine cooling system.
- Auto Fan Clutch, driven by the water pump pulley(or fan pulley), controls fan speed automatically according to the temperature change of coolant.
- Auto Fan Clutch reduces noise and increase fuel-air ratio keeping the temperature of coolant constant.

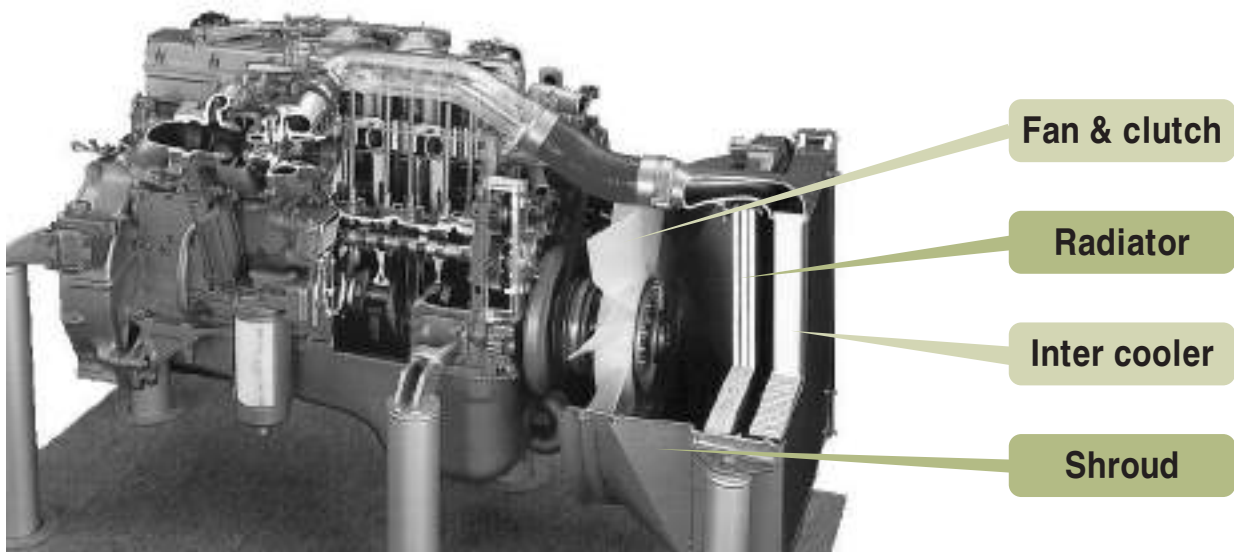
Overview of design

- Auto Fan Clutch must keep fan R.P.M uniform at specified operating temperature in order to satisfy cooling requirements for each vehicle.
- Auto Fan Clutch must not cause NVH & engine overcooling due to excessive fan R.P.M, and must not overheat engine because of insufficient fan R.P.M.
- Auto Fan Clutch has the durability tantamount to the vehicle life.

Definitions

■ A typical Auto Fan Clutch in engine room layout

: Generally, it is located at the rear of a radiator controlling fan speed according to the temperature change of coolant



Troubleshooting

Fan Clutch Overview

- 1) **Noise.** Fan noise is sometimes evident under the following normal conditions:
 - When clutch is engaged for maximum cooling.
 - During First few minutes after start-up until the clutch can redistribute the silicone fluid back to its normal Disengaged operating condition after overnight settling.

Fan noise or an excessive roar will generally occur continuously, however, under all high engine speed conditions (2500 rpm and up) if the clutch assembly is locked up due to an internal failure. If the fan cannot be rotated by hand or it here is a rough grating feel as the fan is turned, the clutch should be replaced.

- 2) **Looseness.** Under various temperature conditions, there is a visible lateral movement that can be observed at the tip of the fan blade. This is a normal condition due to the type of bearing used. Approximately 1/4"(6.5mm) maximum ateral movement measured at the fan tip is allowable. This is not cause for replacement.
- 3) **Silicone Fluid leak.** The operation of the unit is generally not affected by small fluid leaks which may occur in the area around the bearing assembly.
- 4) **Engine Overheating.** If the fan and clutch assembly free- wheels with no drag(revolves over five times when spun by hand), the clutch should be replaced.

HOW TO TELL IF A FAN CLUTCH IS DEFECTIVE:

- 1) **Check for oil streaks (or dust collected on oil streaks) on the fan clutch.** It's a sure sign that the intenral fluid that provides the clutch actions is leaking.
- 2) **Check for a worn bearing.** Grasp the fan blade on either end, with the engine off, and check for lateral movement. If there's more than 1/4" of side-to-side movement, the bearing is worn and the unit needs replacement.
- 3) **Check for proper fan clutch operation.** First, run the engine until operating temperature is reached. Next, with the engine off, give the fan blade a gentle spin. If it rotates more than twice, the clutch is worn and needs replacing. If fan rotation is rough or noisy, or the fan fails to turn, the unit is worn out and needs replacement.

Types

■ GMB Auto Fan Clutch : Type (Commercial vehicle:1Ton–3.5Ton)



OEM	CAR MODEL	INPUT SPEED (RPM)	FAN SPEED (Engaged RPM)	PERFORMANCE WITE FAN (SIZE)
HMC	PORTER GRACE GALLOPER STAREX	4000	3300 ± 150	Ø430x8P
HMC	MIGHTY CHORUS COUNTY	4000	3600 ± 150	Ø430x8P
KMC	BONGO TOPIC BESTA TITAN SPORTAGE PREGIO FRONTIER	4200 ↕ 5000	3000 ↕ 3750	Ø410x8P
DWMC	MUSSO ISTANA	4000 4000	3750 ± 150 3700 ± 150	Ø400x6P Ø460x9P

■ GMB Auto Fan Clutch : Type (Commercial vehicle:4.5Ton–5Ton)



OEM	CAR MODEL	INPUT SPEED (RPM)	FAN SPEED (Engaged RPM)	PERFORMANCE WITE FAN (SIZE)
HMC	4.5-5Ton TRUCK	3200	3000 ± 100	Ø520x6P
KMC	RHINO TRUCK	3500	3150 ± 150	Ø480x6P

■ GMB Auto Fan Clutch : Type (Commercial vehicle:380HP–430HP)

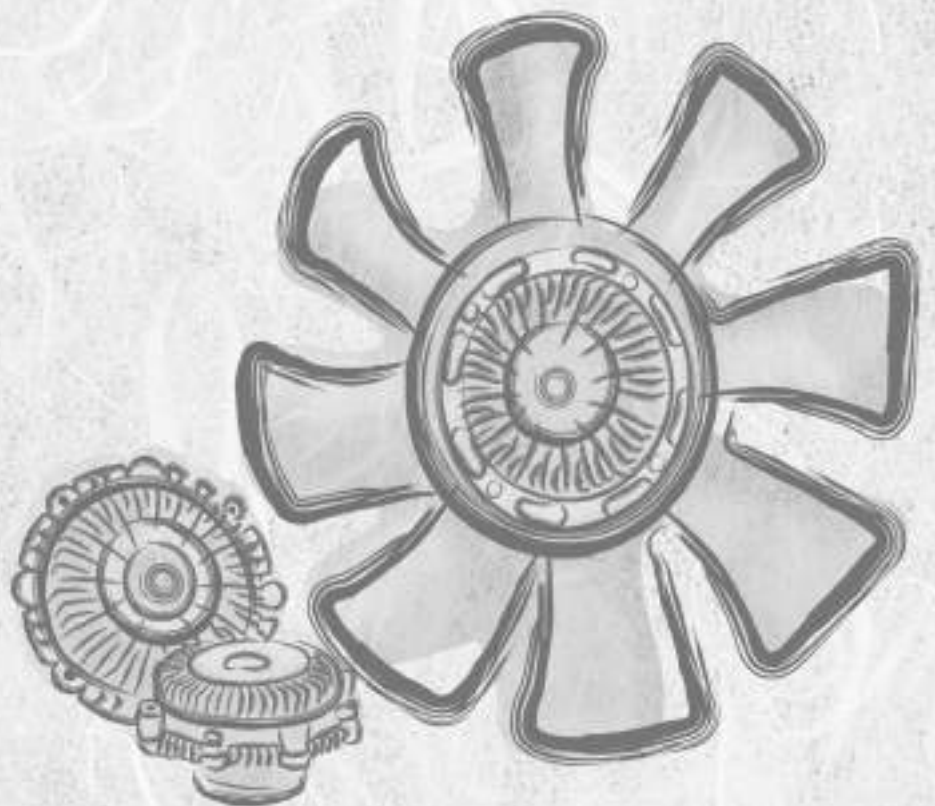


OEM	CAR MODEL	INPUT SPEED (RPM)	FAN SPEED (Engaged RPM)	PERFORMANCE WITE FAN (SIZE)
HMC	BUS TRUCK	2400	2150 ± 100	Ø640x8P Ø700x8P
DWMC	BUS TRUCK	2400	2100 ± 150	Ø650x8P Ø700x10P
















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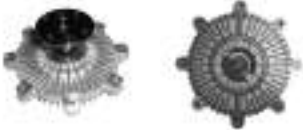
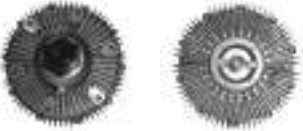



FAN CLUTCH APPLICATION






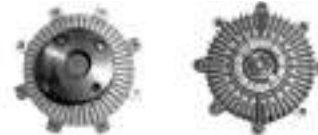


- HYUNDAI
- K I A
- GM DAEWOO(DAEWOO)
- SSANGYOUNG








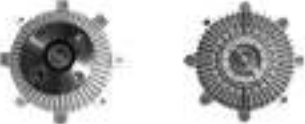


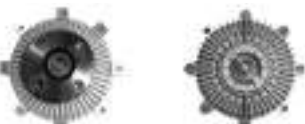
GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWHY-01F	25720-81041	D6AB, D6AV, D6AZ, D8AB, D8AY	11149cc 16031cc	AERO CITY, AERO SPACE, AERO EXPRESS Model All 	09M 89Y~ 12M 02Y
GWHY-02F	25237-93110	D6BJ, D6BR	7545cc	4.5TON, 5TON TRUCK, BUS 	01M 88Y~ 01M 97Y
GWHY-08F	25720-43600	MPI	2400cc	PORTER, GRACE(Export – EC exclusion) 	06M 90Y~ 12M 02Y
GWHY-09F	25239-72120	D6AB, D8AV, D8AY	16031cc	10~12TON TRUCK, CARGO, DUMP 	01M 98Y~ 12M 01Y
GWHY-10F	25239-41301	D4AF, D4AE(TC), D4AL(Tci)	3298 / 3567cc	2.5, 3.5TON MIGHTY, CHORUS Model All 	01M 92Y~ 12M 97Y
GWHY-12F	X25232-36001	V6	3000cc	GALLOPER 	08M 91Y~ 03M 00Y
GWHY-13F	25720-55010	D6BR	7545cc	AERO TOWN 	02M 95Y~ 04M 00Y
GWHY-15F	25720-43660	MPI	2400cc	PORTER, GRACE (Domestic, Export – EC Zone Only) 	03M 97Y~ 12M 02Y

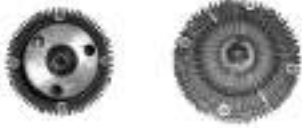
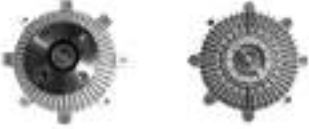
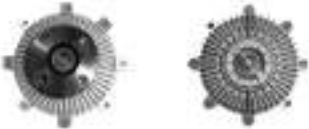
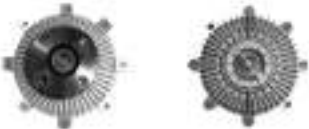
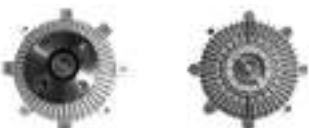
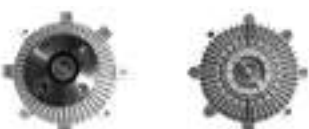

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWHY-17F	25239-70010	D8AY(Tropical), D8AB, D8AX (Domestic)	16031cc	15TON over CARGO, DUMP, TANK LORRY	01M 98Y~ 12M 01Y
					
GWHY-19F	25237-42560	D4BA, D4BB	2500cc 2600cc	GALLOPER, PORTER, GRACE	09M 96Y~ 05M 00Y
					
GWHY-19F-01	25237-42561	D4BA, D4BB	2500cc 2600cc	GALLOPER, PORTER, GRACE	06M 00Y~ 07M 03Y
					
GWHY-20F	25237-42920	D4BB, D4BF	2500cc 2600cc	STAREX	09M 96Y~ 05M 00Y
					
GWHY-20F-01	25237-42921	D4BB, D4BF	2500cc 2600cc	STAREX	06M 00Y~ 07M 03Y
					
GWHY-20F-02	25237-42922	D4BB, D4BF	2500cc 2600cc	STAREX, RIBERO	08M 03Y~ Now
					
GWHY-21F	25237-93200	D6BR	7545cc	8TON TRUCK	02M 97Y~ 04M 00Y
					
GWHY-22F	25239-45001	D4AF, D4AE(TC), D4AL(Tci)	3298cc 3567cc	COUNTY, CHORUS Model All (Tropical exclusion)	01M 98Y~ 04M 03Y
					

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWHY-23F	25239-45101	D4DA, D4DB	3298cc 3567cc	MIGHTY Model All(Tropical exclusion)	01M 98Y~ 04M 03Y
					
GWHY-26F	25237-42200	4D56, V6	2500cc 3000cc	TERRACAN	04M 00Y~ Now
					
GWHY-27F	25720-8A800	L	12900cc	AERO CITY, AERO SPACE, AERO EXPRESS Model All	01M 00Y~ 11M 03Y
					
GWHY-28F	25237-4A000	A	2500cc	STAREX, RIBERO, SORENTO, PORTER	03M 02Y~ Now
					
GWHY-29F	25720-55200	KK TCI	6600cc	AERO TOWN	05M 00Y~ Now
					
GWHY-30F-01	25237-42101	4D56 TCI	2500cc	STAREX, RIBERO, PORTER	06M 00Y~ 07M 03Y
					
GWHY-30F-02	25237-42102	4D56 TCI	2500cc	STAREX, RIBERO, PORTER	08M 03Y~ Now
					
GWHY-31F	25239-84410	L	12900cc	15TON over TRUCK, CARGO, DUMP, TANK LORRY	12M 03Y~ Now
					

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWHY-32F	25237-42610	4D56 TCI	2500cc	PREGIO, FRONTIER 	01M 01Y~ 07M 03Y
GWHY-33F	25720-8C300	D6AB, D6AV, D6AZ, D8AB, D8AY	11149cc 16031cc	AERO CITY, AERO SPACE, AERO EXPRESS Model All 	01M 03Y~ 10M 03Y
GWHY-35F	25239-45010	D4AF, D4AE, D4DA, D4DB	3298cc 3567cc	COUNTY, MIGHTY(D4AL exclusion) 	05M 03Y~ 12M 03Y
GWHY-36F	25239-45500	W	3907cc	MIGHTY Model All 	01M 04Y~ Now
GWHY-37F	25239-45020	D4AL	3567cc	MIGHTY (D4AL Only) 	05M 03Y~ 12M 03Y
GWHY-38F	25237-42750	4D56 TCI	2500cc	FRONTIER 	04M 03Y~ Now
GWHY-39F	25720-8C800	L	12900cc	AERO CITY, AERO SPACE, AERO EXPRESS Model All 	12M 03Y~ Now
GWHY-43F	25720-5E100	KK-CNG	6606cc	AERO TOWN 	09M 03Y~ Now

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWHY-45F	25237-42650	4D56 TCI	2500cc	STAREX, RIBERO, PORTER 	09M 04Y~ Now
GWHY-48F	25239-45550	W	3907cc	County Model All 	01M 04Y~ Now


GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWK-02F	0K410 15 140	SH SL SS	3581cc 3000cc 2700cc	TRADE / TITAN(2.5TON) TITAN(1.4TON), TOPIC 	02M 92Y~ 06M 94Y
GWK-03F	0K758 15 150D	SC SF	2367cc 2400cc	CERES OLD POWER BONGO 	01M90Y~ 06M 94Y
GWK-05F	0K770 15 140C	MAGMA R2	2200cc 2200cc	SPORTAGE(DSL) ROCSTA, BESTA PHOTO NOT AVAILABLE- AT TIME OF PRINTING	04M 89Y~ 06M 92Y
GWK-06F-01	0K028 15 140	FED	2000cc	SPORTAGE(North America) 	07M 96Y~ 02M 01Y
GWK-06F-03	0K048 15 140A	FED	2000cc	SPORTAGE(North America) 	12M 02Y~ 07M 04Y
GWK-11F	0K65A 15 140D	J2 JS	2665cc 2700cc	FRONTIER, PREGIO, TOPIC WIDE BONGO 	07M 94Y~ 10M 96Y
GWK-14F-01	0K01W 15 140	FED	2000cc	SPORTAGE(EC,Middle East,Domestic) 	07M 96Y~ 02M 01Y
GWK-14F-03	0K038 15 140A	FED	2000cc	SPORTAGE(EC,Middle East,Domestic) 	12M 02Y~ 07M 04Y

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWK-15F	0K77J 15 140	J2, JT	2665cc 2957cc	FRONTIER, PREGIO 	11M 96Y~ 04M 99Y
GWK-17F	0K77M 15 140	J2, JT	2665cc 2957cc	FRONTIER, PREGIO(the Middle East) 	05M 99Y~ 10M 02Y
GWK-19F	25215-4X100	J3	2902cc	TERRACAN 	06M 01Y~ 04M 03Y
GWK-20F-01	25215-4Z200	JT	2957cc	PREGIO(Brazil Export, 24 Person) 	11M 02Y~ 05M 05Y
GWK-22F	25230-2W100	RF TCI	1998cc	SPORTAGE 	11M 02Y~ 07M 04Y
GWK-23F	25215-4Z100	J2, JT	2665cc 2957cc	FRONTIER, PREGIO 	11M 02Y~ 10M 03Y
GWK-24F	25215-4X600	J3	2902cc	FRONTIER, PREGIO 	11M 03Y~ Now

FAN CLUTCH

GM DAEWOO

GMB

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWDW-02F	65. 06650-6010 65. 06650-6007	D1146 ENG			

FAN CLUTCH

SSANGYOUNG

GMB

GMB No.	OEM No.	ENGINE	ENG.SIZE	MODEL	Application year
GWSY-04F	21232-05000 A661 200 30 22	OM 601/602 ENG	2299cc 2874cc	MUSSO, KORANDO	10M 94Y~ 12M 00Y
GWSY-05F	A661 200 32 22	OM602 ENG	2874cc	ISTANA	09M 96Y~ 12M 02Y

