



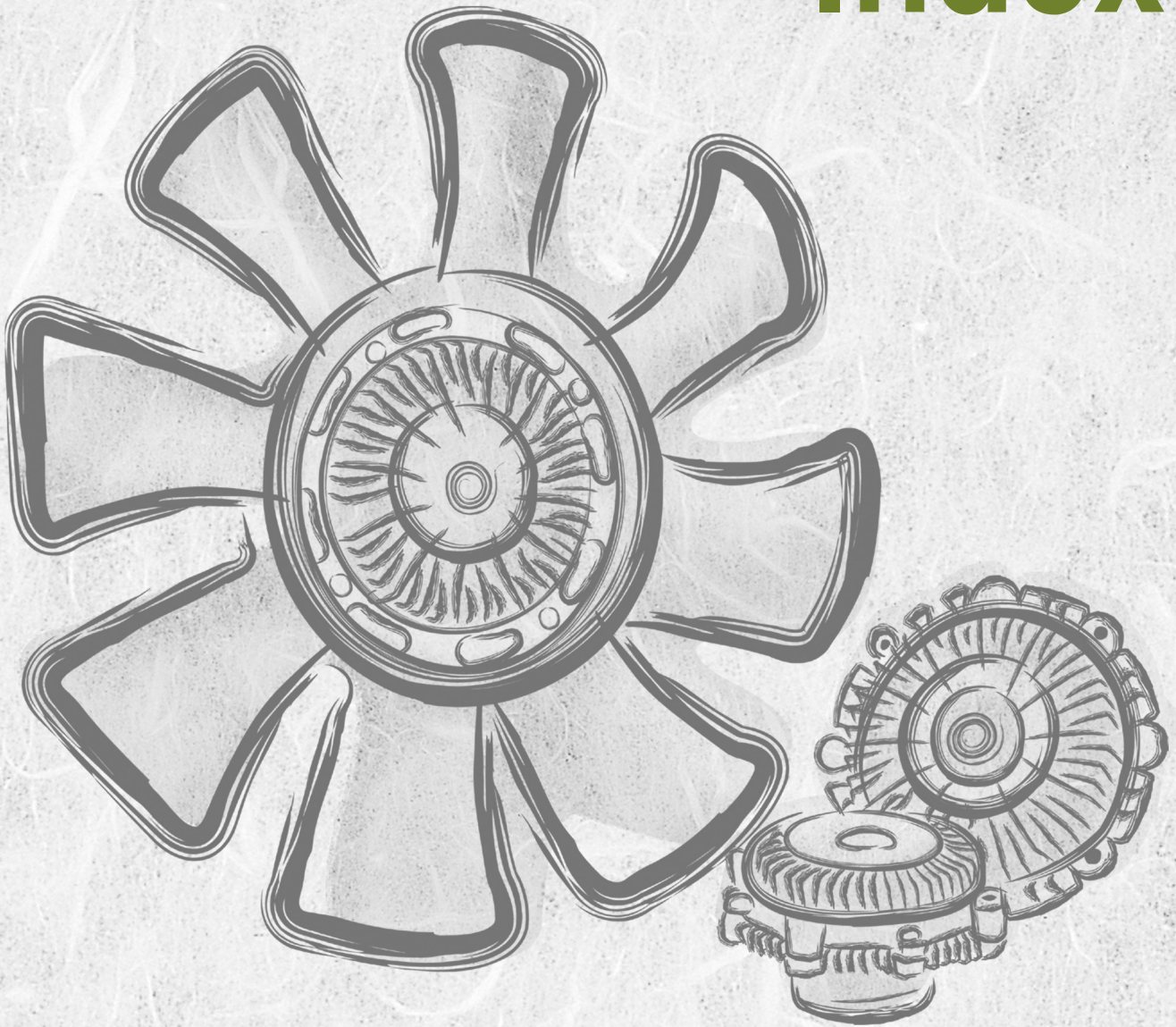
2006

Fan clutch



GMB
Korea Corporation

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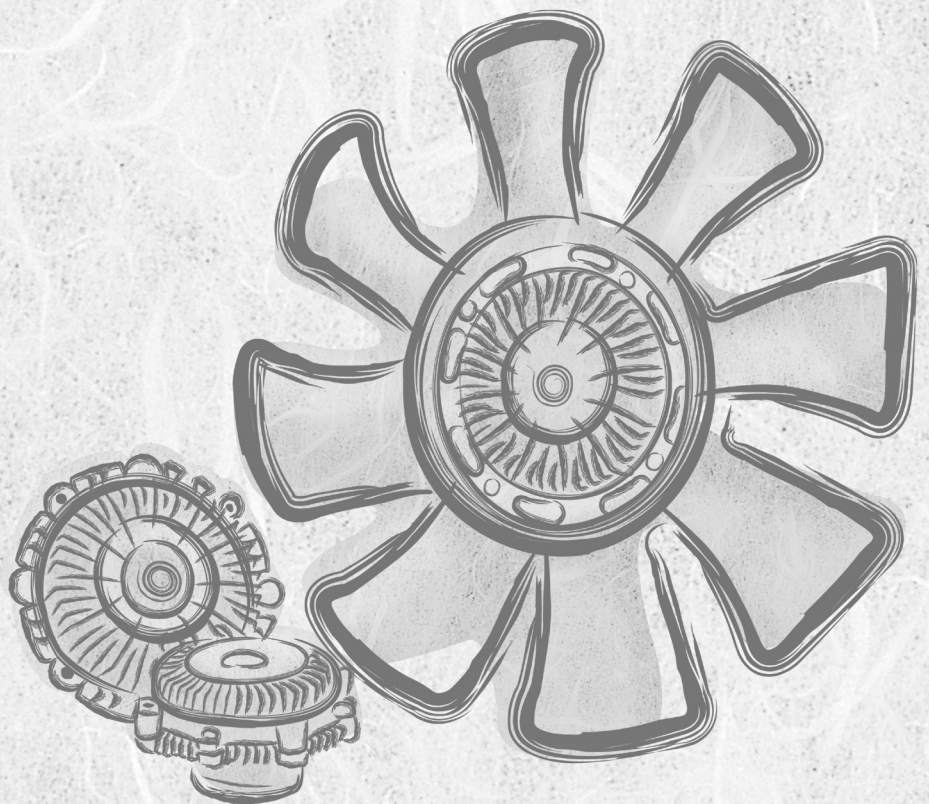
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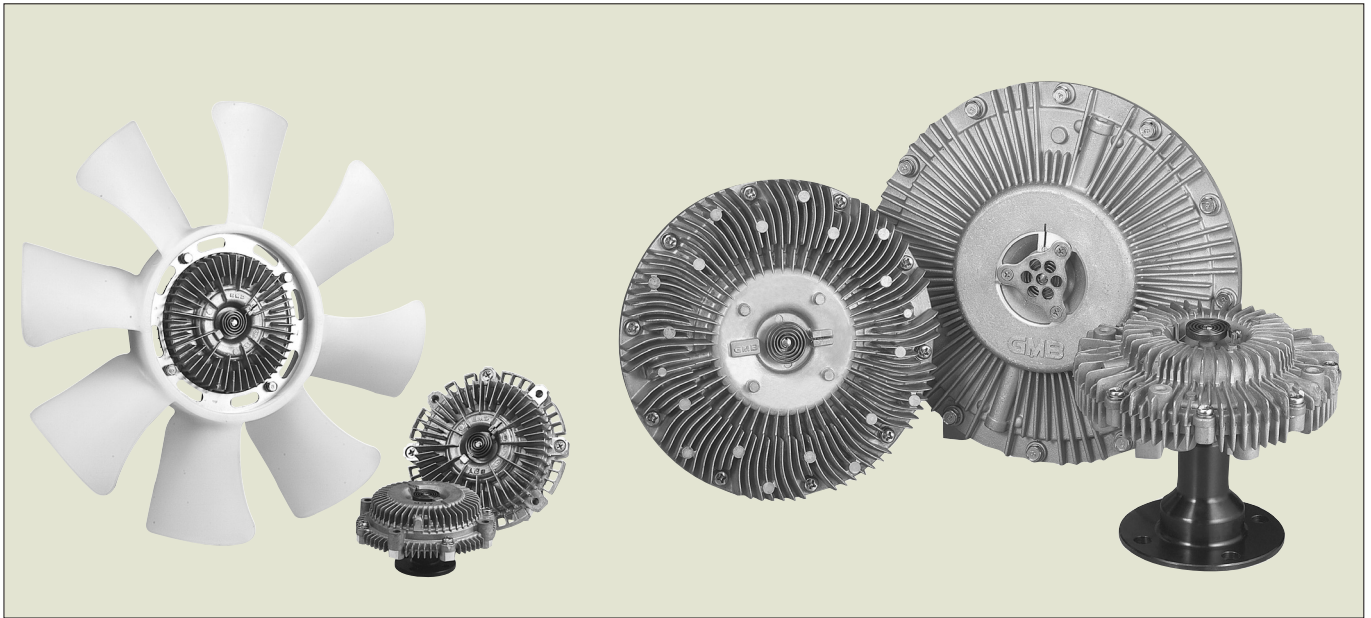
GMB

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.

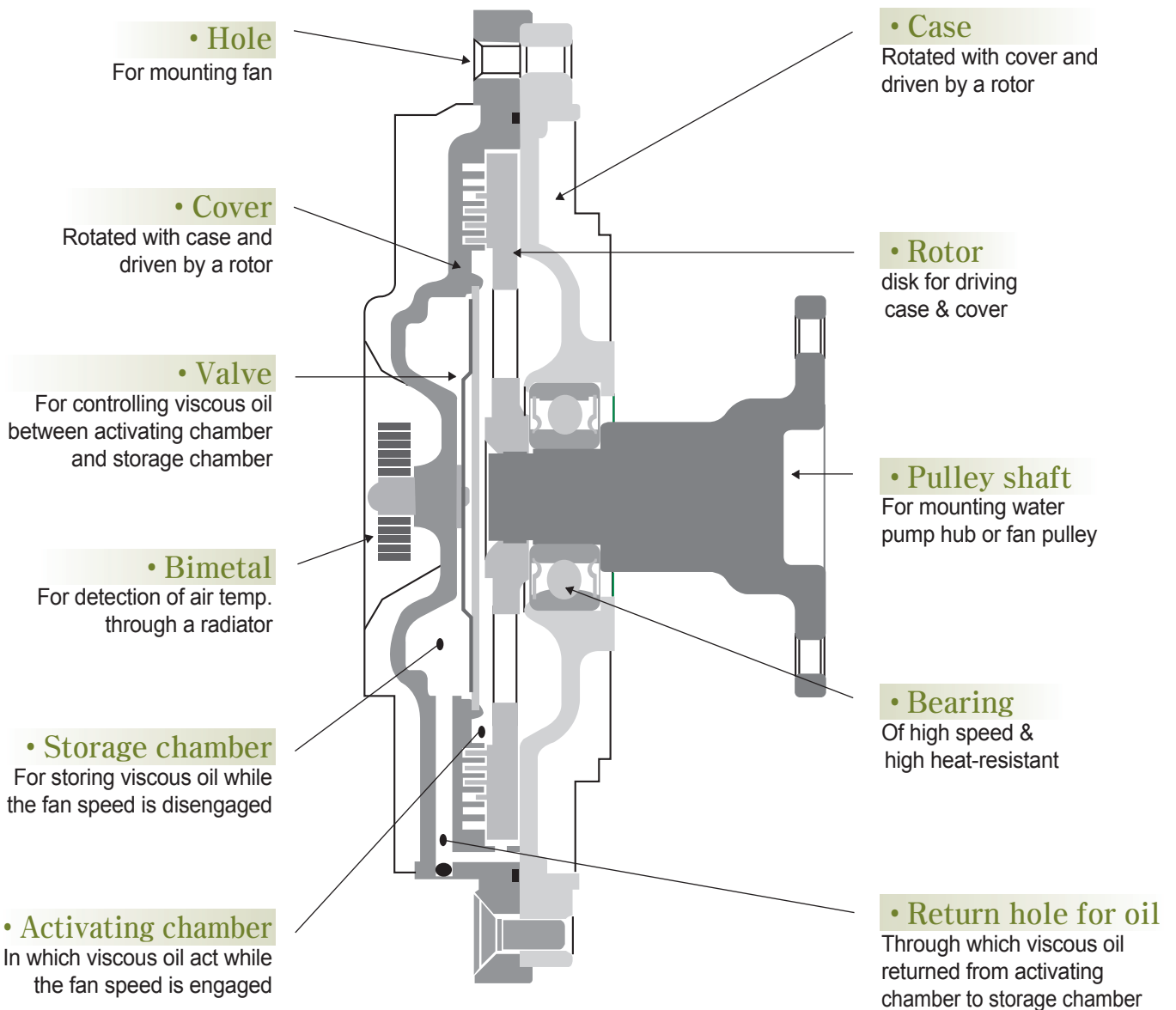
SEVERE DUTY FAN CLUTCHES

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.

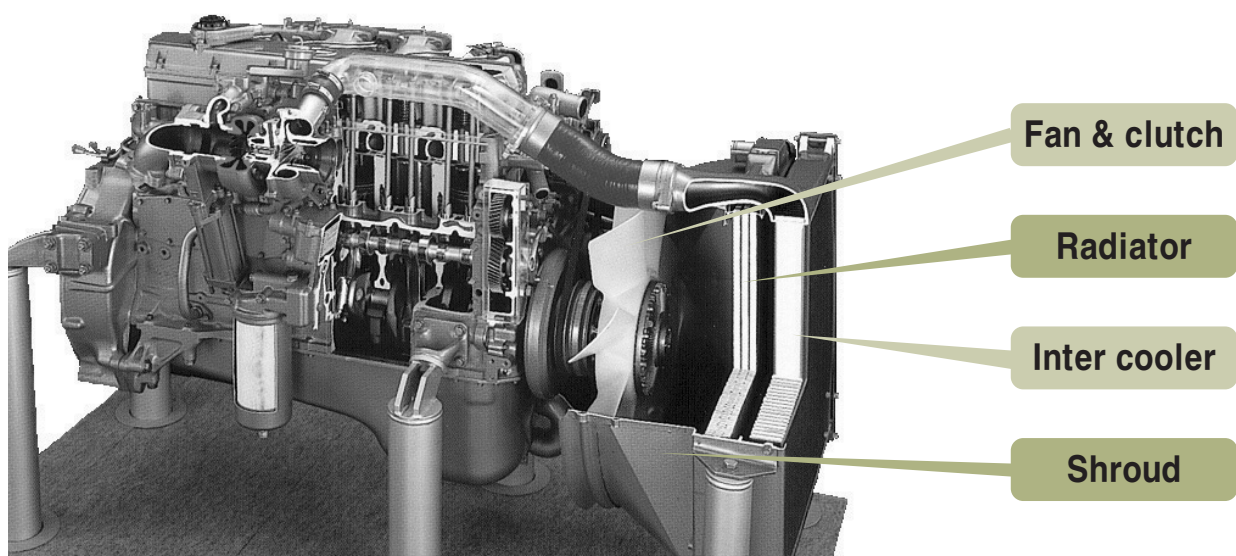
Overview of design

- 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)

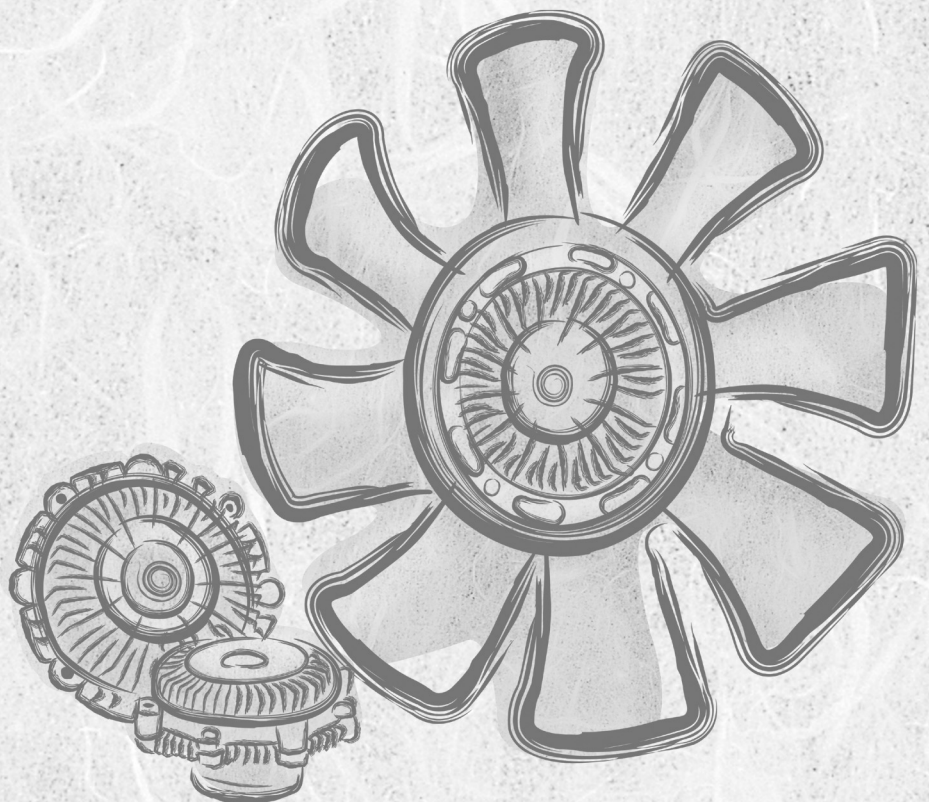


| OEM | CAR MODEL | INPUT SPEED (RPM) | FAN SPEED (Engaged RPM) | PERFORMANCE WITE FAN (SIZE) |
|------|--------------|-------------------|-------------------------|-----------------------------|
| HMC | BUS TRUCK | 2400 | 2150 ± 100 | Ø640x8P Ø700x8P |
| DWMC | BUS TRUCK | 2400 | 2100 ± 150 | Ø650x8P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
















GMB

FAN CLUTCH APPLICATION



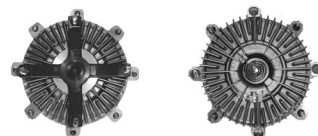

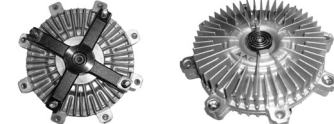

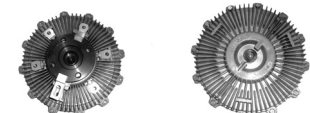

- HYUNDAI
- K I A
- GM DAEWOO(DAEWOO)
- SSANGYOUNG



| 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 |
| | | | |  |  |

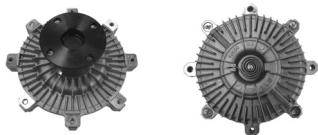
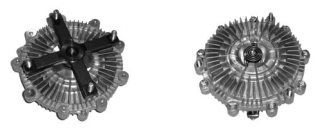
| GMB No. | OEM No. | ENGINE | ENG.SIZE | MODEL | Application year |
|--------------------|-------------|------------|------------------|--|---------------------|
| GWHY-23F | 25239-45101 | D4DA, D4DB | 3298cc 3567cc | MIGHTY Model All(Tropical exclusion) | 01M 98Y~ 04M 03Y |
| | | | |  | |
| GWHY-26F | 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 |
| | | | |  | |

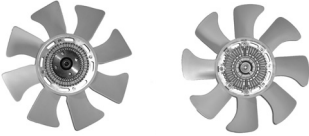
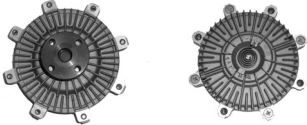

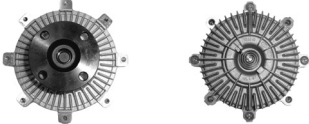
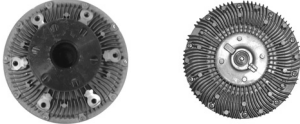
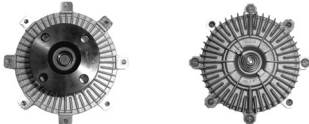
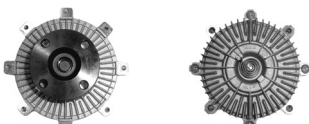
| GMB No. | OEM No. | ENGINE | ENG.SIZE | MODEL | Application year |
|-----------------|-------------|------------------------------------|--------------------|--|---------------------|
| GWHY-32F | 25237-42610 | 4D56 TCI | 2500cc | PREGIO, FRONTIER | 01M 01Y~ 07M 03Y |
| | | | |  | |
| GWHY-33F | 25720-8C300 | 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 |
| | | | |  | |

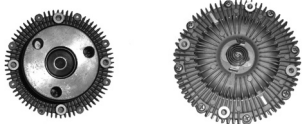
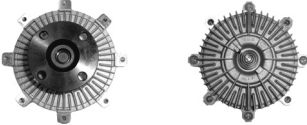
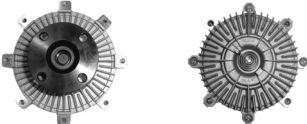
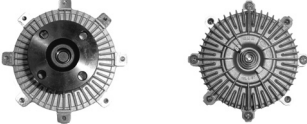
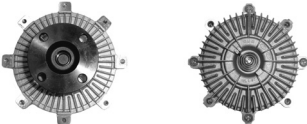
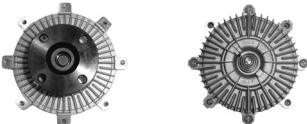
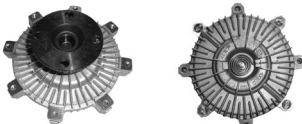
FAN CLUTCH

HYUNDAI

GMB

| 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 |
| | | | | | |
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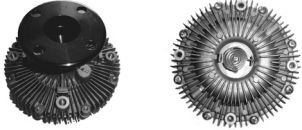
| GMB No. | OEM No. | ENGINE | ENG.SIZE | MODEL | Application year |
|-------------------|---------------|----------------|----------------------------|---|---------------------|
| GWK-02F | 0K410 15 140 | SH SL SS | 3581cc 3000cc 2700cc | TRADE / TITAN(2.5TON) TITAN(1.4TON), TOPIC  | 02M 92Y~ 06M 94Y |
| 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 |



MEMO

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MEMO

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