



Keihin Seimitsu Kogyo Co., Ltd.



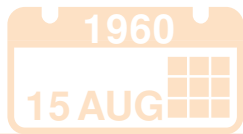
KSK Company Presentation

Production. Technology. Innovations by KSK.

Yukinao Takeya, January 2018

KSK

Facts & Figures



Established in 1960



President & CEO:
Tetsuro Komaba



485 employees in Japan

92 m. €

Annual sales
(fiscal year 2016)

7,500 t

Annual casting volume

500

Active part numbers

MAIN PRODUCTS

Transmission control box, power shift device, change lever, engine and transmission aluminum die-cast parts and assemblies

REFERENCE CUSTOMERS

Toyota Group (Aisin AI, Aisin AW, Daihatsu, Denso, Hino, Toyota), Isuzu, Mitsubishi-Fuso, UD Trucks, Dynax, ThyssenKrupp Presta

ALUMINUM MATERIAL

JIS ADC12 (DIN EN AC-46000)
JIS ADC14 (DIN EN AC-48100)

KSK

Product groups

Keihin Seimitsu Kogyo (KSK) is a manufacturer of aluminum diecast parts and assemblies and transmission control systems.

Product group 1: Aluminum diecast parts and assemblies for transmissions and engines

Product example: valve body for AT



Product group 2: Transmission control systems

Product example: power shift for medium duty truck



KSK Processes

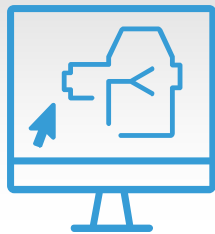
KSK is a systems supplier that manufactures products in an integrated manner from design to diecasting through to processing and assembly.

R&D department with 17 developers at Tochigi plant, Japan

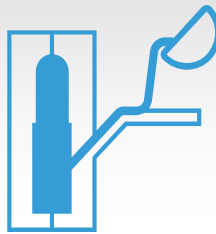
Two production sites in Japan and one in Indonesia

Diecasting machines with a range from 135 to 800 tons of clamping force

KSK - best when it comes to combine its die-casting and mechanical engineering prowess



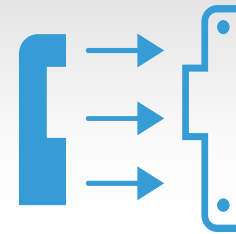
Design



Diecasting



Processing



Assembly

KSK

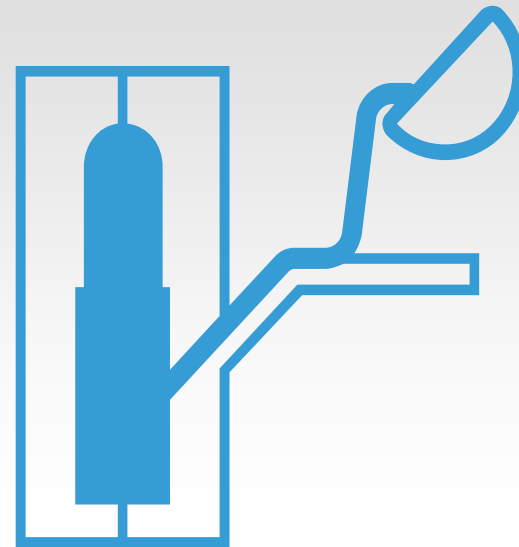
Diecasting materials

KSK's aluminum die-cast products are made of materials JIS ADC12 and JIS ADC14.

ADC12 is the material that is widely used in the Japanese automotive industry.

JIS ADC12 is close to EN AC-46000 and JIS ADC14 is close to EN AC-48100.

In the case of a valve housing DAIMLER has confirmed ADC12 as a feasible substitute for aluminum alloys used in the German automotive industry.



KSK Production



KSK has its own concept of Lean Manufacturing (*Monozukuri*) which is closely connected to its longstanding Kaizen activities (CIP).

One-piece flow production is the basis of KSK's manufacturing concept.

70% of machinery and 100% of tools are designed and manufactured in-house.



(The video is only shown at on-site presentations)

KSK Locations

5| Europe Liaison Office:

Function:

- Sales support

4| NKI plant:

Joint venture with
Astra Auto Parts

Land: 13,000 m²

Building: 3,000 m²

Functions:

- Sales
- Engineering
- Manufacturing

1| Hokkaido plant:

Land: 28,000 m²

Building: 6,506 m²

Function:

- Manufacturing

2| Tochigi plant:

Land: 33,000 m²,

Building: 13,587 m²

Functions:

- R&D
- Quality Assurance
- Engineering
- Production control
- Manufacturing
- Purchasing

3| Head Office

Yokohama City

Functions:

- Sales
- Administration

KSK

Certificates and Awards

Customers have repeatedly acknowledged KSK's strengths in the fields of innovation, *Kaizen*, as well as the reliability and quality of KSK's products.

Certificates

KSK in Japan:

- ISO14001 (2004)
- IATF16949 / ISO9001 (2005)

NKI in Indonesia:

- ISO14001 (2004)
- ISO 9001 (2000)

Customer and TPM awards

Recent awards:

- Toyota (2014): 'Technology Development Award'
- Hino (2015): 'Global Contribution Award'
- Hino (2015): 'Excellent Cost Reduction Award'
- Aisin AI (2015): 'Excellent Quality Award'
- The Japan Society for Technology of Plasticity (2015): 'Technology and Development Award'

TPM Awards:

- TPM Special Award for TPM Achievement (2010)
- TPM Award for Excellence in Consistent TPM Commitment (2014)

KSK

Clients

KSK is a tier 1 and 2 supplier to the automotive industry. Clients include Japanese producers of truck and passenger cars and customers abroad.

Transmission parts make up 71% of sales (2016).

Since the 1990s Toyota Group has evolved to make up 55% of sales today.

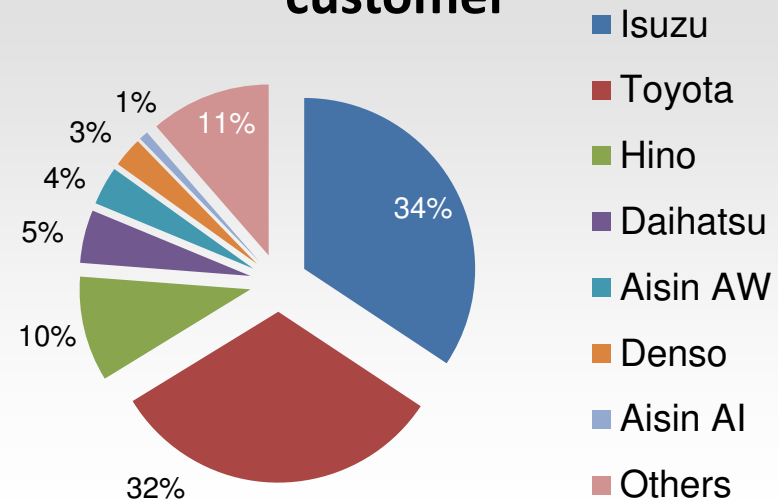
In Indonesia:

NKI supplies to the transplants of Japanese OEMs as well as to local automotive companies.

In Germany:

Supply of valve housings for DAIMLER power steerings started in 2001. KSK has continued to supply stable quality from Japan for >15 years.

Sales percent by customer



Innovations by KSK

'Semi-hot chamber diecasting' technology

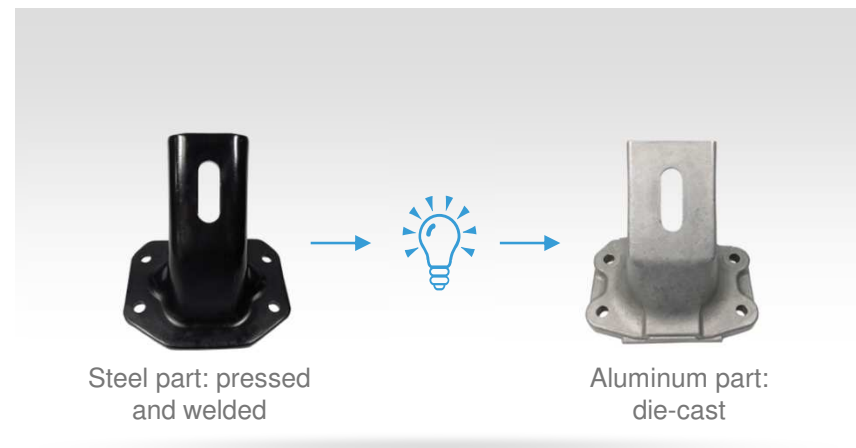
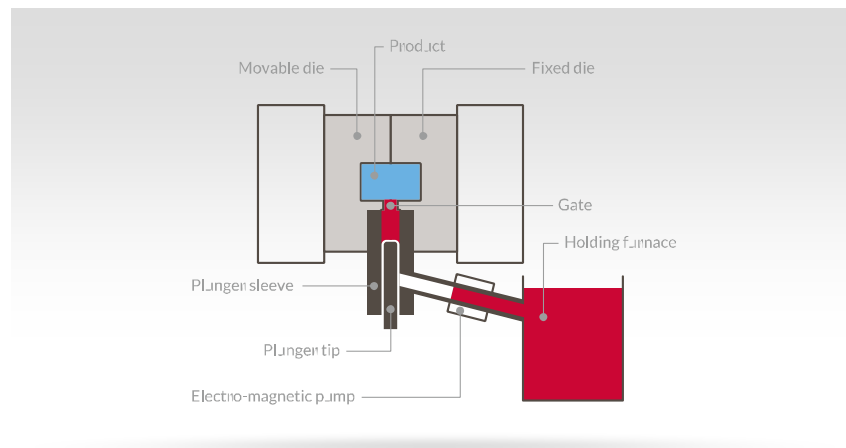
KSK actively suggests material conversion from steel to aluminum by this realizing substantial gains in weight and costs.

KSK's 'Semi-hot chamber diecasting' technology creates aluminum parts with extremely few blowholes and the properties of steel.

The low porosity-castings can be T6 heat treated. This allows for converting steel parts to KSK's high-strength, air-tight die-cast aluminum.

KSK participated in the development and was the 1st company in Japan to apply the technology.

Cost reduction 30% Weight reduction 55%



Innovations by KSK

'Center gate diecasting' technology

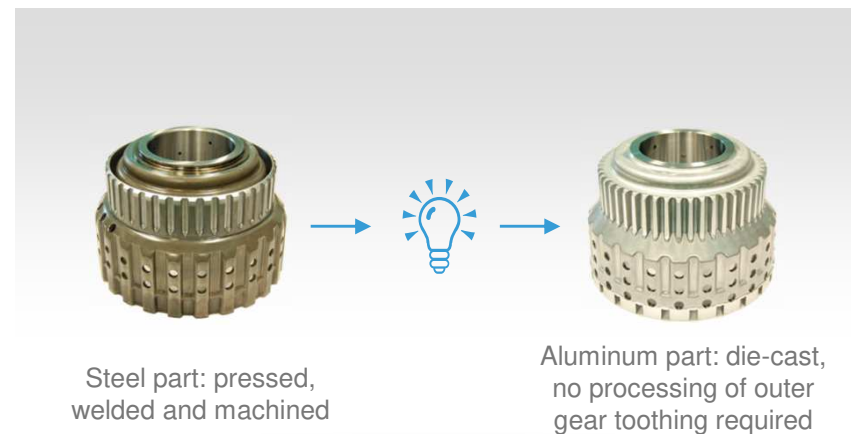
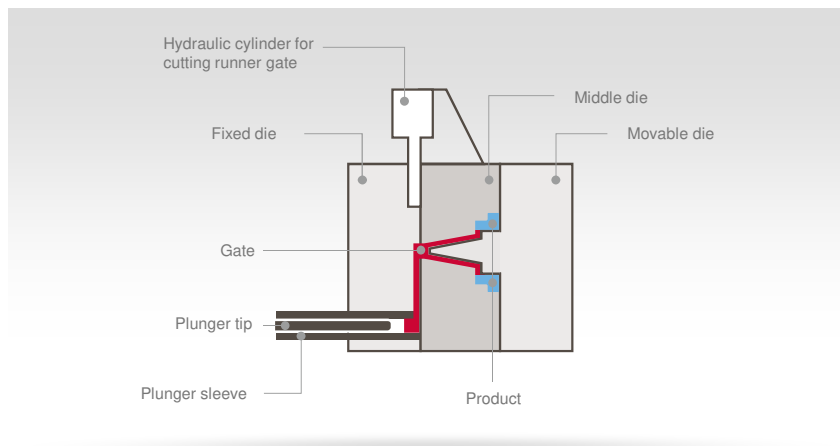
KSK actively suggests material conversion from steel to aluminum by this realizing substantial gains in weight and costs.

With the 'Center gate diecasting' technology the molten metal is evenly poured from the center into the mold.

This improves the quality of cylindrical parts and creates high-strength, high density parts that require less or no mechanical processing.

Even distribution of the metal in the cavity means constant cooling and less distortion.

Cost reduction 5-20% Weight reduction >50%



Innovations by KSK

The 'Ultimate One Piece Flow Line'

**KSK has taken Lean Production to a new level:
One Piece Flow from diecasting to packaging**



An ideal production line has no inventory in between its different manufacturing processes.

In 2014 KSK received Toyota's Technology Development Award for its OPF-line.

KSK managed to integrate diecasting into the subsequent mechanical processing line.

Inventory reduction 98%
Lead time reduction 65% **Cost reduction 25%**



Diecasting> Machining> Final Inspection

Innovations by KSK

'Plastic Flow Binding' technology

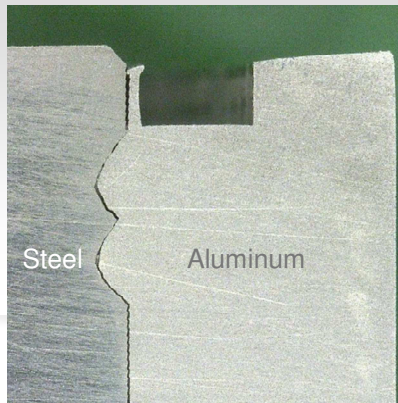
KSK developed a high-strength, high-precision method for joining materials as an alternative for the bolt joining of parts.

Pressure is applied to the aluminum part. The material 'flows' into fine steel grooves in order to obtain mechanical meshing (Patents acquired).

Application in serial production started in 2013. The below actuator housing (engine part) is assembled with a standard press machine.



Cost reduction 34% Weight reduction 18%



Innovations by KSK

One-Motor Electric Transmission Control

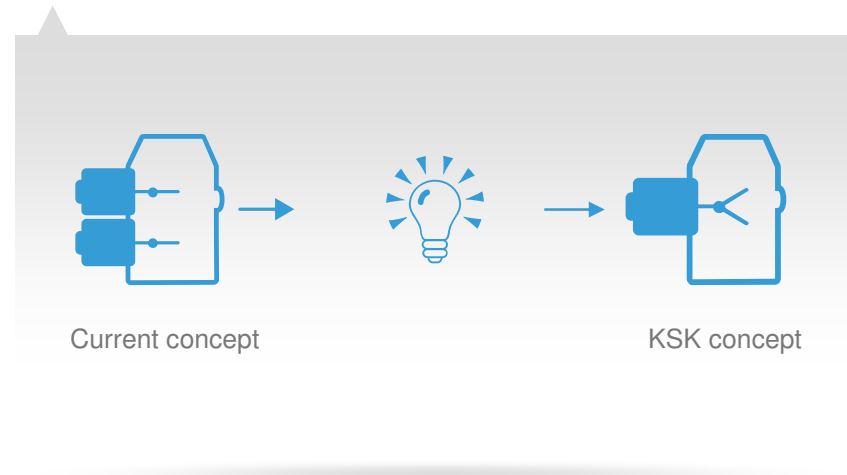
KSK is currently developing a simplified electric transmission control for use in lightweight and compact transmissions.

So far, transmission control systems required either the use of two motors or three solenoids.

The system is well-suited for automating manual transmissions (AMT) as well as for HVs & EVs.

KSK's innovative approach needs only one motor for operating a transmission (SHIFT and SELECT).

Space reduction 60% Weight reduction 60%
(prototype for commercial vehicles depicted)



Product group: Aluminum die-cast parts and assemblies

High strength and air-tight die-cast parts



Medium duty truck

1 CASE

Mass: 308g

2 FRONT COVER

mass: 490g

4 ENGINE FOOT

mass: 1000g



Light duty truck

3 SPRING SEAT

mass: 690g

5 COVER

mass: 315g



Mercedes E Class

6 VALVE HOUSING

mass: 380g

Product group: Aluminum die-cast parts and assemblies

High quality die-cast parts – Centergate diecasting method



ELGRAND

1 DRUM ASSY
mass: 1120g

6 PISTON; DIRECT CLUTCH
mass: 447g



MOVE

2 PISTON
mass: 182g

5 PISTON
mass: 61g



CAMRY

7 HUB
mass: 140g



TUNDRA

3 BALANCER
mass: 266g



IS350

4 PISTON; BRAKE
mass: 278g

Product group: Transmission control systems

Change lever – Passenger Cars



ATRAI

1 MT LEVER: INPANE TYPE
mass: 1350g



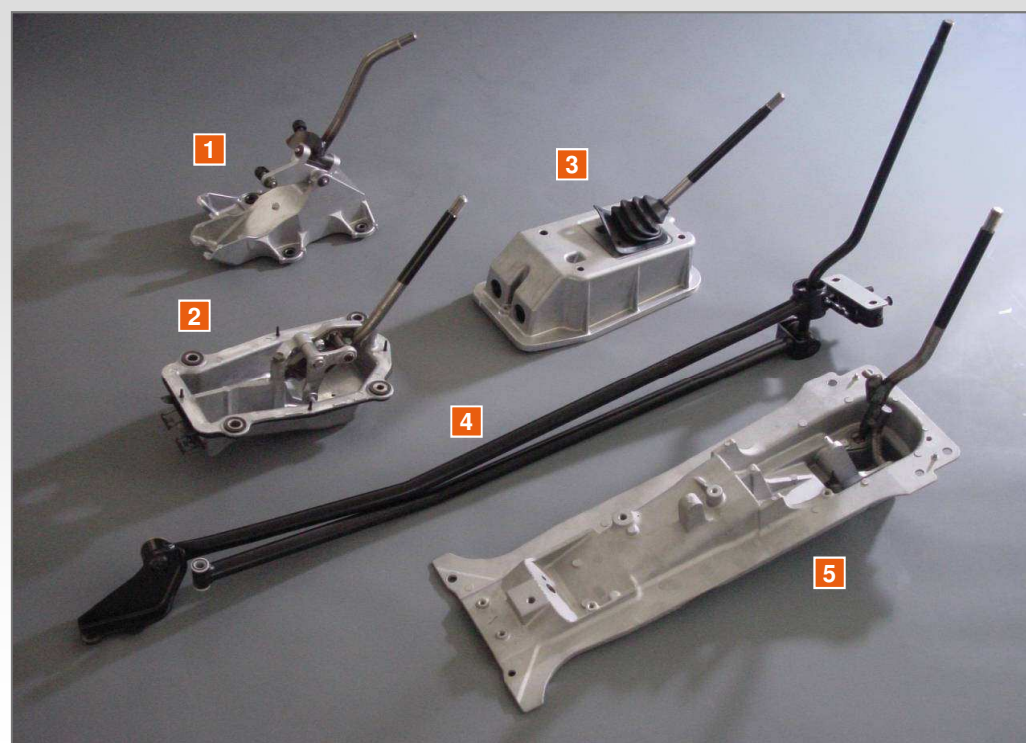
XENIA

2 MT LEVER
mass: 1320g



MOVE

4 MT LEVER
mass: 2340g



COPEN

4 MT LEVER
mass: 2340g



TERIOS

3 MT LEVER
mass: 1640g



HIJET

5 MT LEVER
mass: 2300g

Product group: Transmission control systems

Change lever – Commercial Vehicles



Light duty truck

- 1** MT LEVER – FOLDABLE & W/SWITCH TYPE
mass: 1400g
- 2** AMT LEVER ELECTRIC TYPE
mass: 1550g



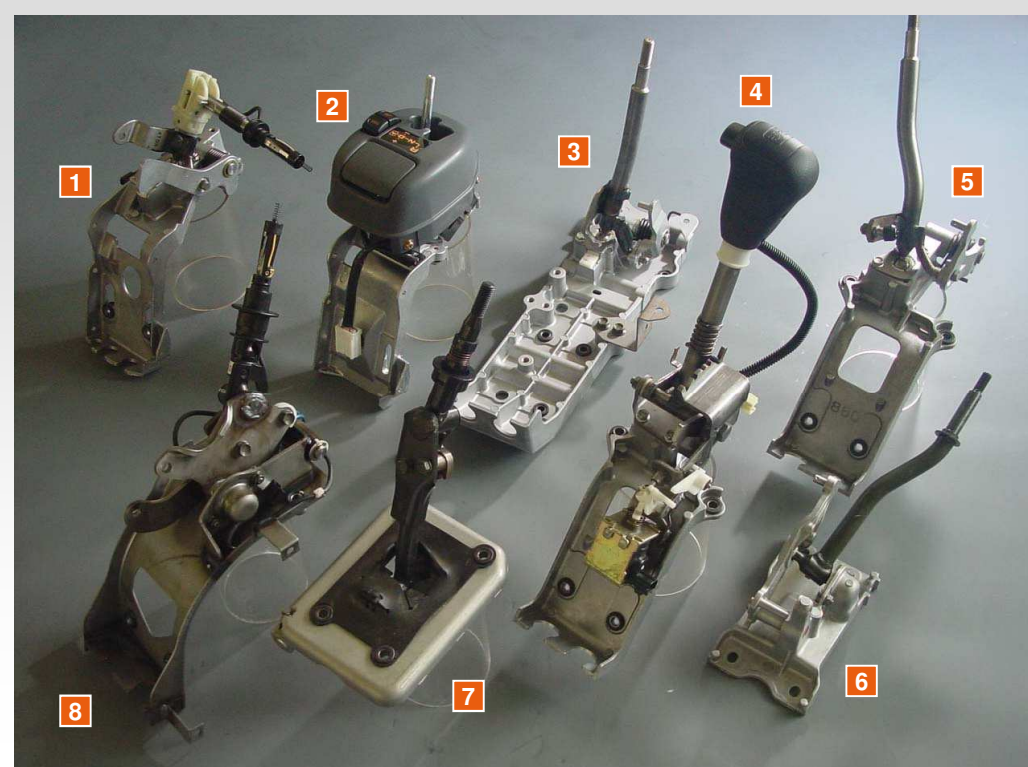
Medium duty truck

- 8** MT LEVER – TILT-FOLDABLE & W/SWITCH TYPE
mass: 2800g



Heavy duty truck

- 7** MT LEVER – TILT-FOLDABLE TYPE
mass: 2300g



Heavy duty truck

- 3** MT LEVER
mass: 2280g



Medium duty truck

- 5** MT LEVER
mass: 1470g
- 6** AT LEVER
mass: 3220g



Medium duty truck

- 6** MT LEVER
mass: 1520g

Product group: Transmission control systems

Control box & Power shift



DMAX

- 1** CONTROL BOX
mass: 1100g



Light duty truck

- 2** CONTROL BOX
mass: 1900g



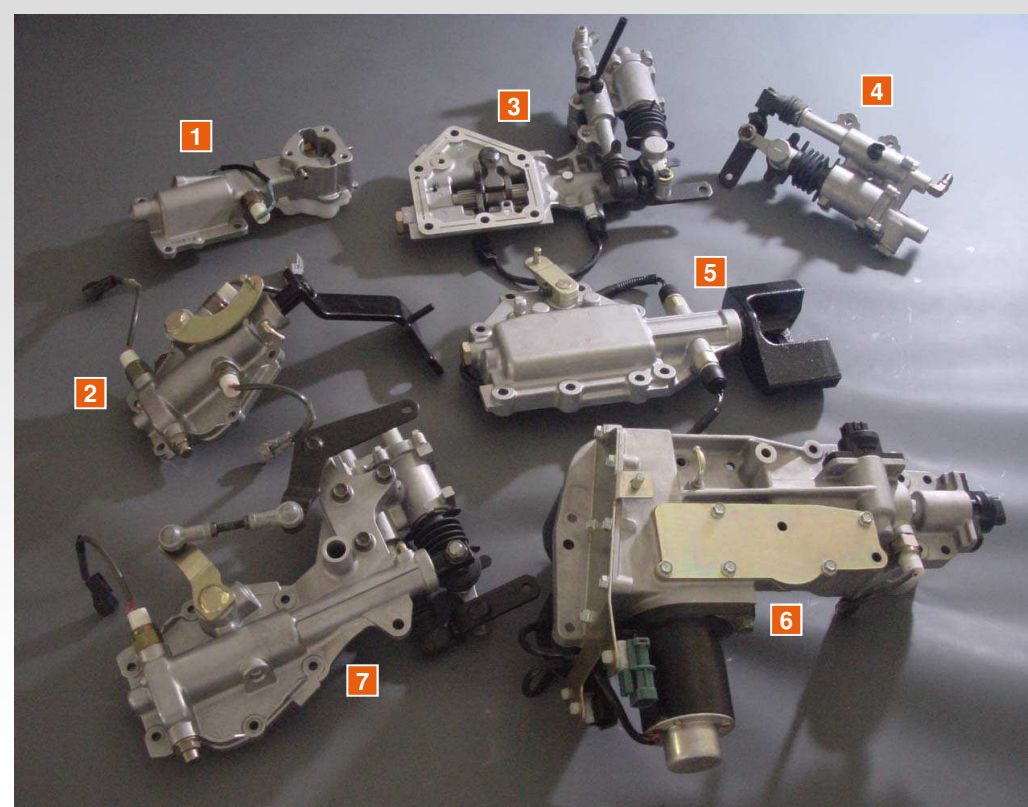
Medium duty truck

- 4** POWER SHIFT
mass: 1350g



Heavy duty truck

- 5** CONTROL BOX
mass: 4200g



Medium duty truck

- 3** CONTROL BOX
W/POWER SHIFT
mass: 4200g



Medium duty truck

- 7** CONTROL BOX
W/POWER SHIFT
mass: 4500g



Light duty truck

- 6** CONTROL BOX
W/ELECTRIC ACTUATOR
mass: 17500g

Product group: Aluminum die-cast parts and assemblies

Transmission parts – MT parts



FORWARD

- 1** FRONT COVER
(SEMI HOT
CHAMBER DIECAST)
mass: 490g



DMAX

- 2** SHIFT DURM
mass: 600g
- 3** OIL PUMP
mass: 500g



PRADO

- 4** HOUSING
mass: 410g



PROBOX

- 5** REAR COVER
mass: 830g

Product group: Aluminum die-cast parts and assemblies

Transmission parts – AT parts



CAMRY

- 1** HUB
(HIGH SILICONE DIECAST)
mass: 140g



MOVE

- 2** PISTON
mass: 65g



ELGRAND

- 3** DURM
(HIGH SILICONE DIECAST)
mass: 1120g



COROLLA

- 4** VALVE BODY
mass: 860g



CAYENNE

- 5** PISTON
mass: 250g



COROLLA

- 6** CYLINDER
mass: 240g



CAMRY

- 7** REAR COVER
mass: 2600g
- 8** COVER
mass: 80g

Product group: Aluminum die-cast parts and assemblies

Engine parts – Large size parts



ELF

1 FRONT COVER
mass: 2200g

2 OIL COOLER
mass: 2800g



SAFARI

3 COVER TIMING CHAIN
mass: 1170g

4 CASE OIL COOLER
mass: 1550g



Product group: Aluminum die-cast parts and assemblies

Engine parts – Small size parts



CROWN

- 1** RETAINER
mass: 260g



SAFARI

- 2** CAM BRKT
mass: 115 ~ 125g



PRIUS

- 3** COVER
mass: 310g



MOVE

- 4** HOUSING
mass: 500g



QUON

- 5** HOUSING
mass: 1550g



NOAH

- 6** HOUSING
mass: 560g



ELF

- 7** COVER
(SEMI HOT
CHAMBER DIECAST)
mass: 175g

Product group: Aluminum die-cast parts and assemblies

Others parts



Mercedes E CLASS

- 1** VALAE HOUSING
(SEMI HOT
CHAMBER DIECAST)
mass: 380g



HIJET

- 2** STRG CENTER ARM
mass: 2300g



ELF

- 3** SPRING SEAT
(SEMI HOT CHAMBER die-
cast ADC12-T6)
mass: 690g



CROWN

- 4** COVER
mass: 1280g



GIGA

- 5** RATERAL ROD
mass: 500g
6 RELAY LEVER
mass: 1000g



PANTHER

- 7** HIGHT CONTROL ARM
mass: 900g

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THIS IS KSK.