



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)

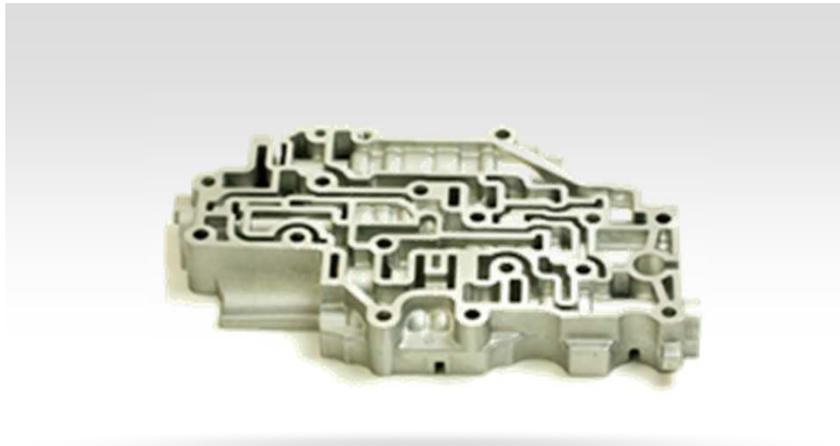
# KSK

## 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

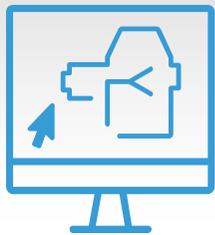
**KSK is a systems supplier that manufactures products in an integrated manner from design to diecasting through to processing and assembly.**

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

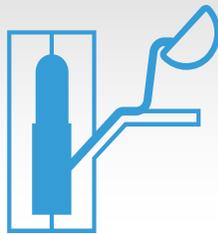
Two production sites in Japan and one in Indonesia

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

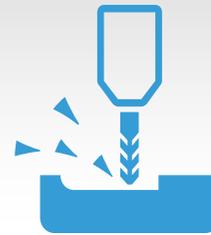
**KSK - best when it comes to combine its die-casting and mechanical engineering prowess**



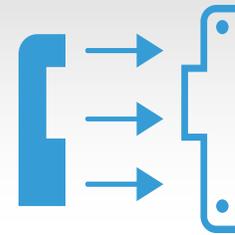
Design



Diecasting



Processing



Assembly

# KSK

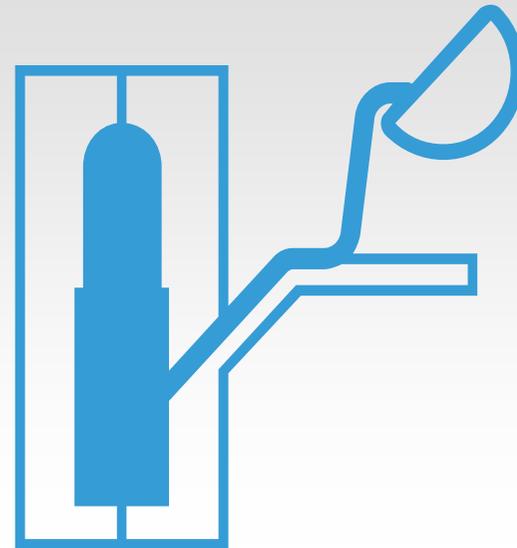
## Diecasting materials

**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 word "KAIZEN" is written in a bold, expressive calligraphic style using black ink on a white background. The characters are thick and dynamic, with visible brush strokes and a small red seal at the bottom right.



(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 m<sup>2</sup>

Building: 3,000 m<sup>2</sup>

Functions:

- Sales
- Engineering
- Manufacturing

## 1| Hokkaido plant:

Land: 28,000 m<sup>2</sup>

Building: 6,506 m<sup>2</sup>

Function:

- Manufacturing

## 2| Tochigi plant:

Land: 33,000 m<sup>2</sup>,

Building: 13,587 m<sup>2</sup>

Functions:

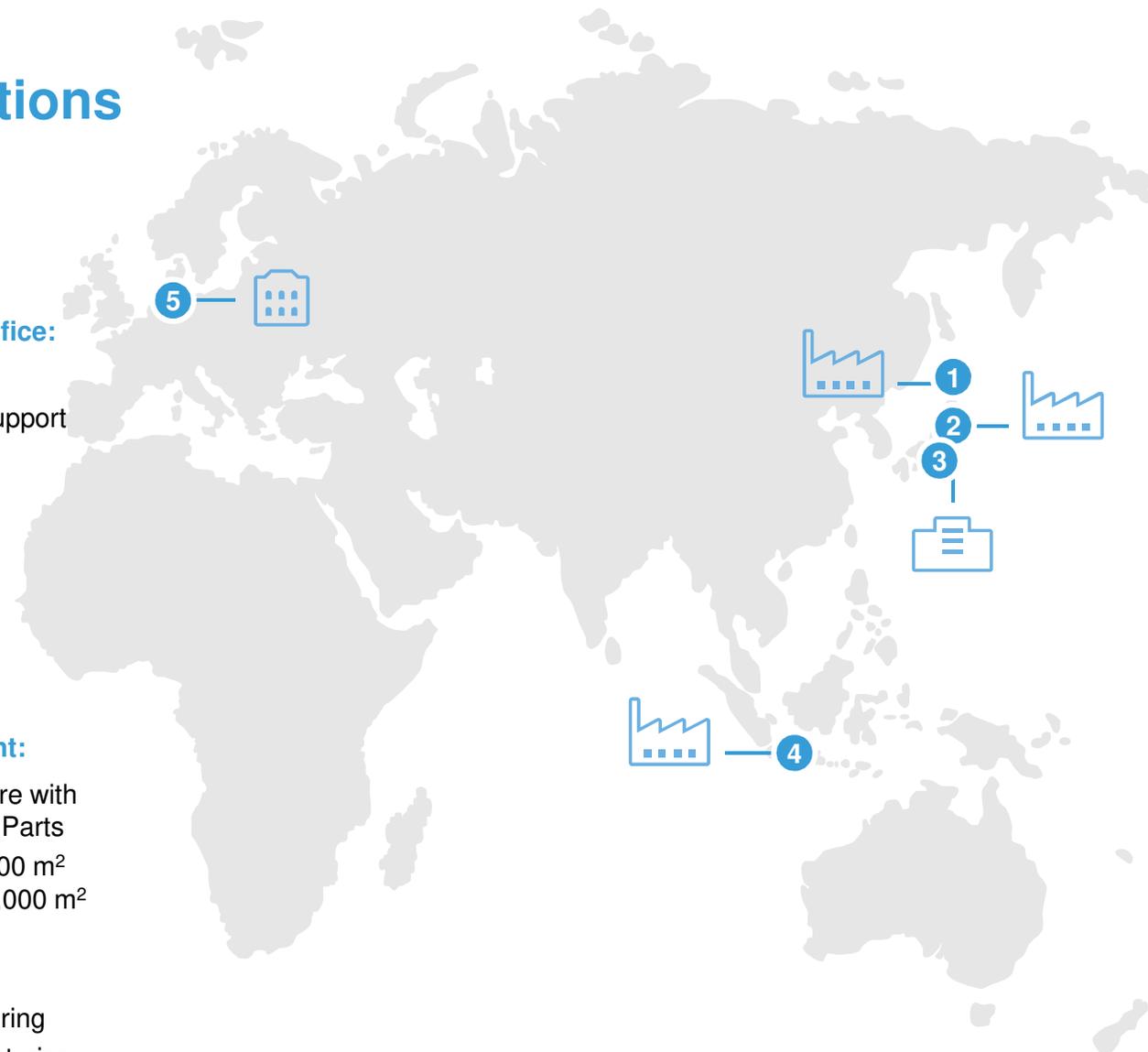
- R&D
- Quality Assurance
- Engineering
- Production control
- Manufacturing
- Purchasing

## 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.**

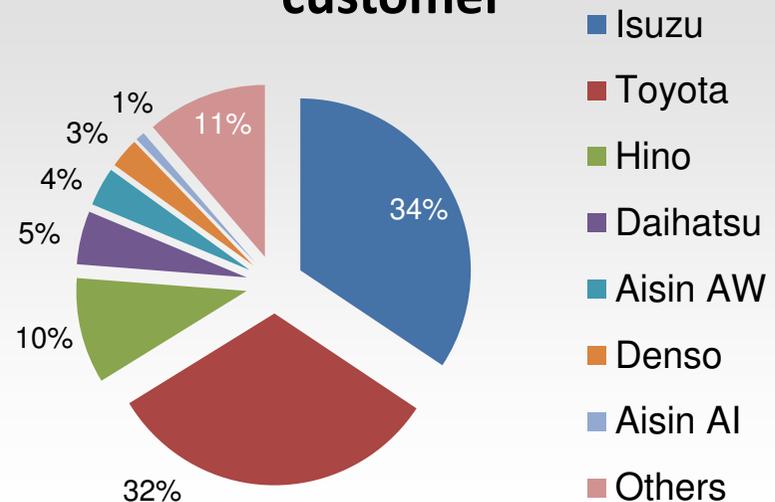
### **In Indonesia:**

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

### **In Germany:**

Supply of valve housings for DAIMLER power steering 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

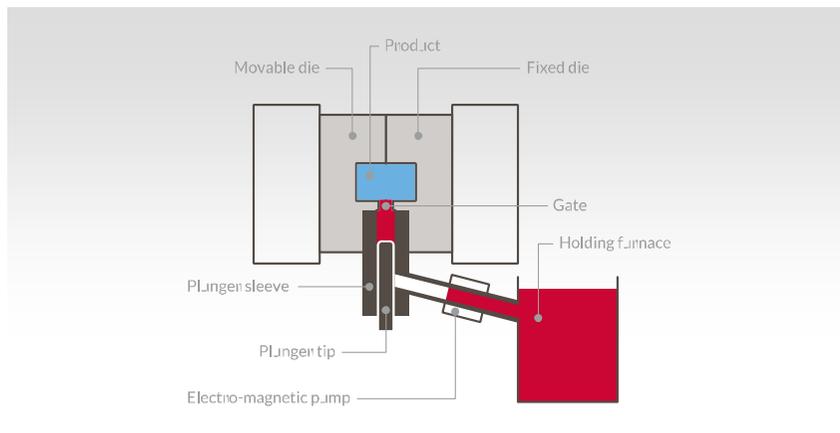
**KSK actively suggests material conversion from steel to aluminum by this realizing substantial gains in weight and costs.**

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 1<sup>st</sup> company in Japan to apply the technology.

**Cost reduction 30% Weight reduction 55%**



# Innovations by KSK

## 'Center gate diecasting' technology

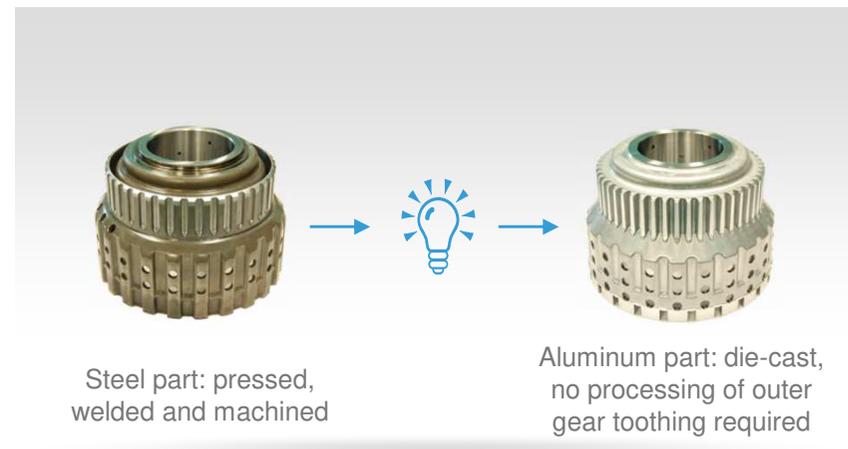
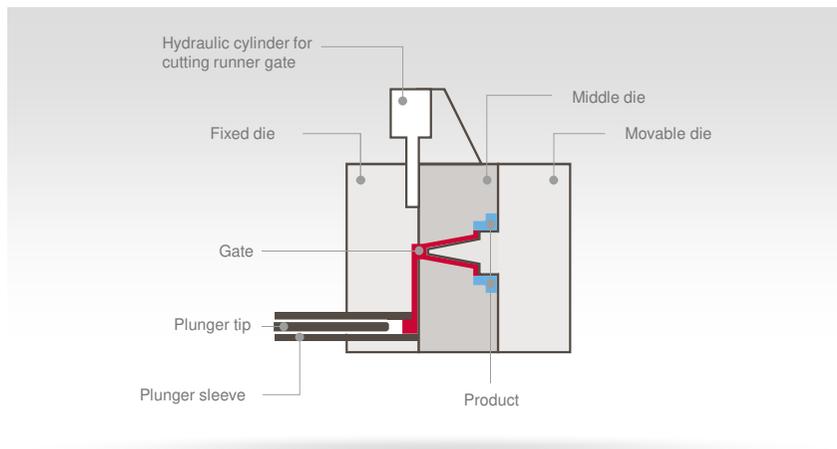
**KSK actively suggests material conversion from steel to aluminum by this realizing substantial gains in weight and costs.**

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

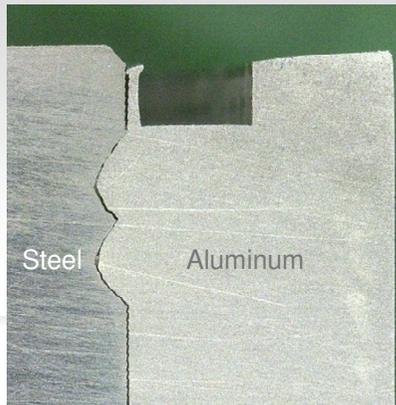
**KSK developed a high-strength, high-precision method for joining materials as an alternative for the bolt joining of parts.**

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

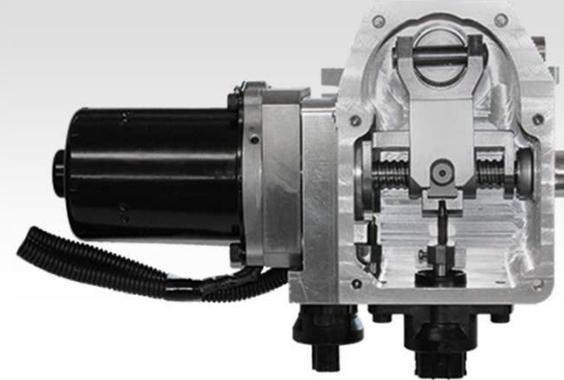
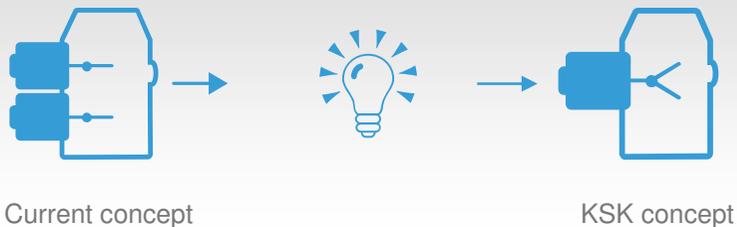
**KSK is currently developing a simplified electric transmission control for use in lightweight and compact transmissions.**

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



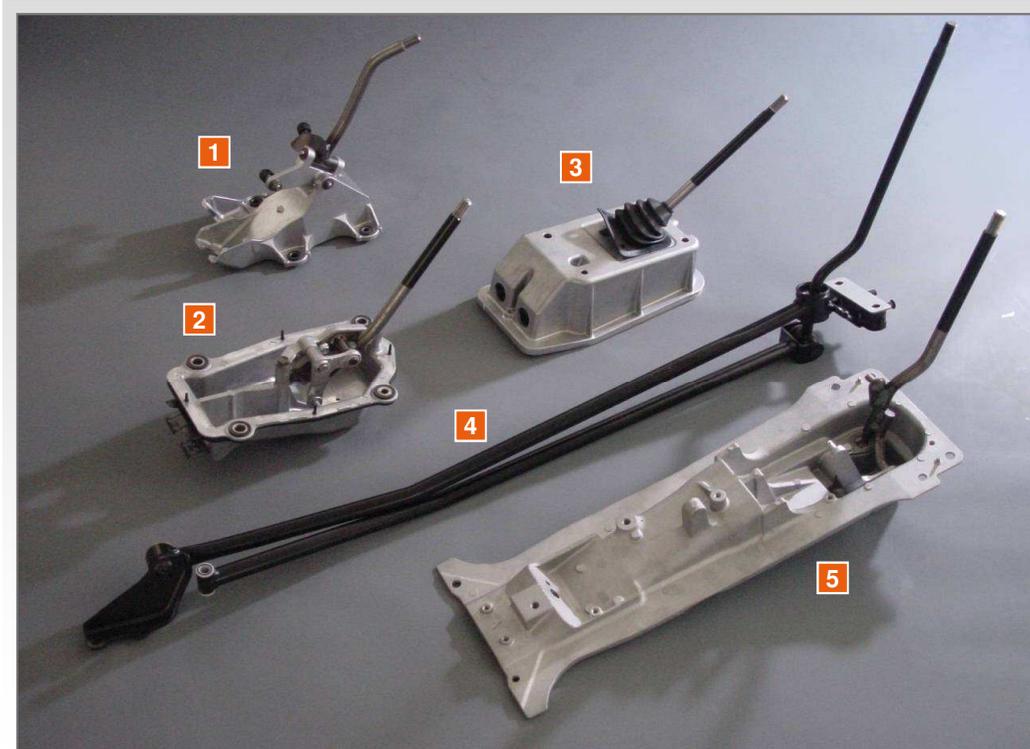
**XENIA**

**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



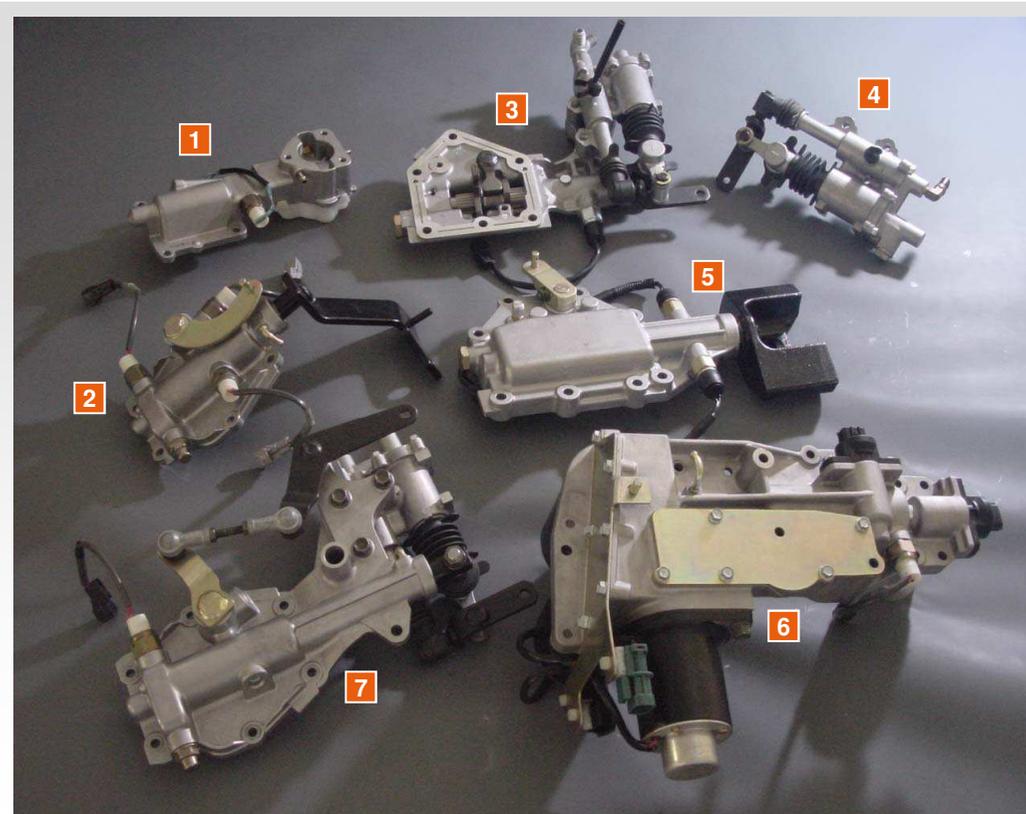
**Medium duty truck**

- 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



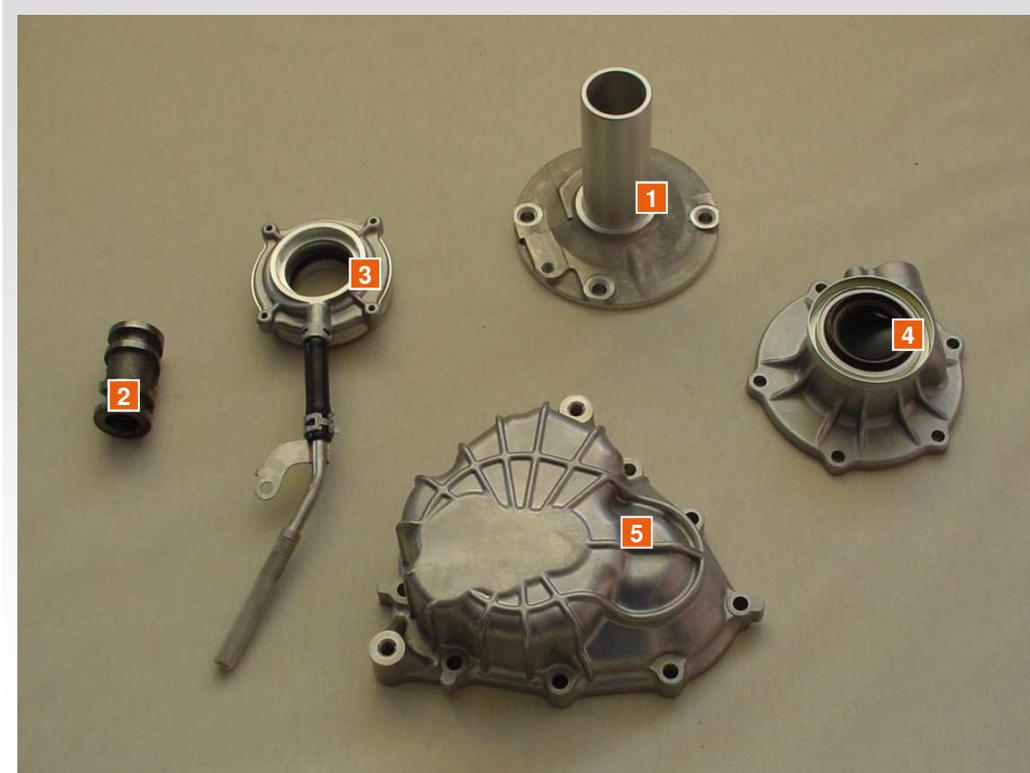
### FORWARD

- 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



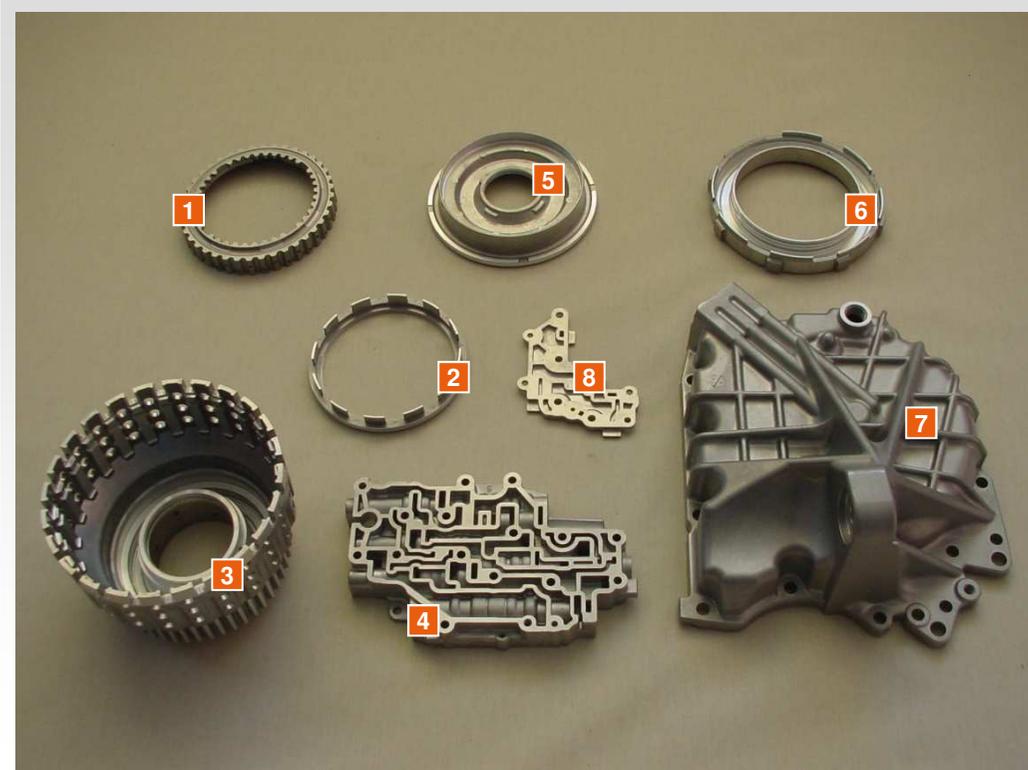
### ELGRAND

- 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

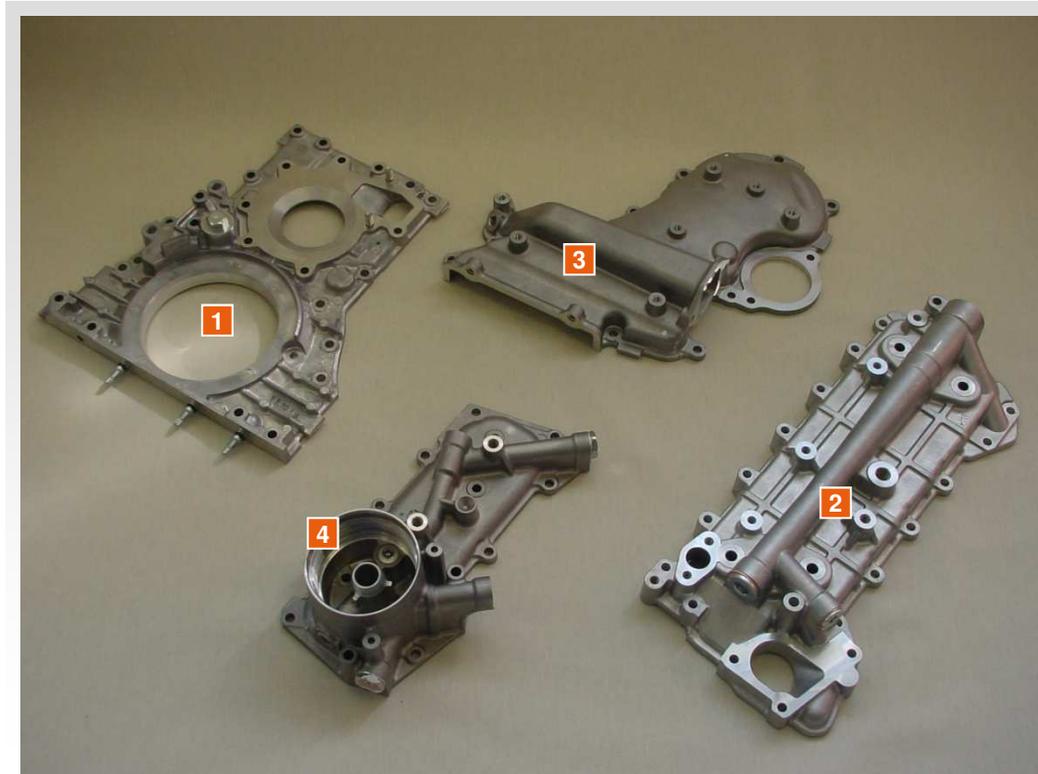
**2** OIL COOLER  
mass: 2800g



### 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



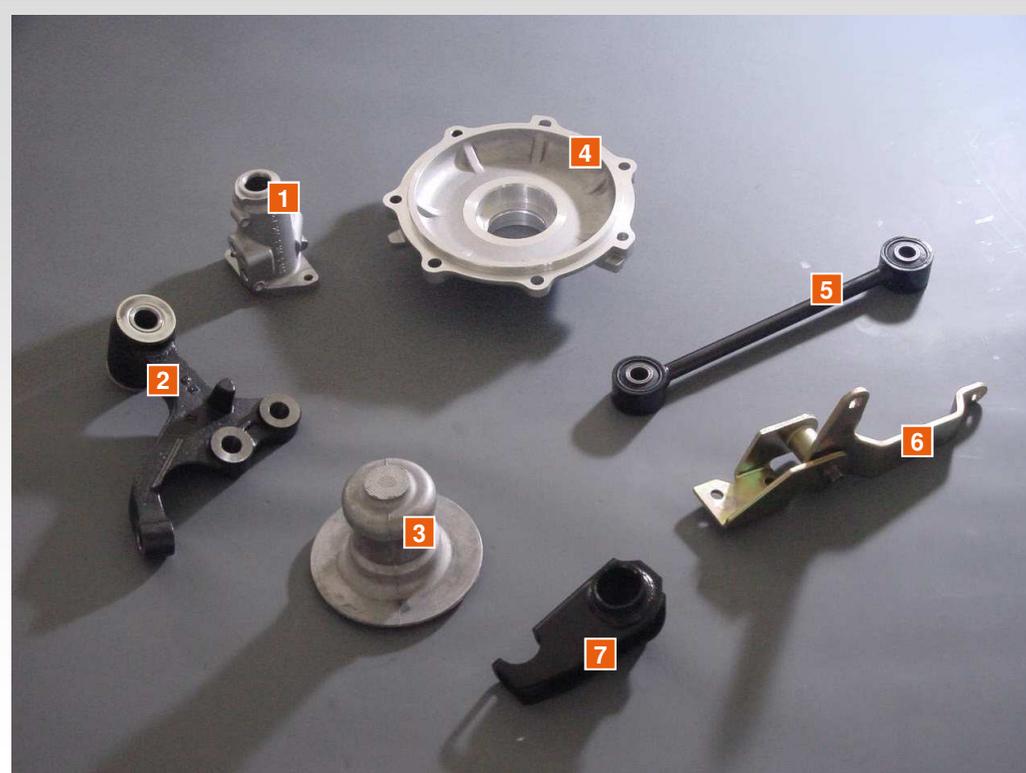
### HIJET

- 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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五感の  
つくり



THIS IS KSK.