



Koyo®

STEERING SYSTEMS



KOYO SEIKO CO., LTD.

CAT. NO.145E

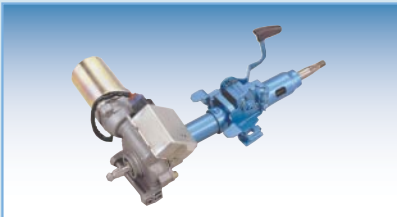
Koyo Seiko has developed numerous types of steering systems in order to satisfy customer demands for improved vehicle safety, driving stability and pleasure, and energy conservation. Koyo was the world's first company to commercially manufacture an electric power steering system, a type currently receiving attention worldwide because of its environmental friendliness. Our customers can select the type of steering system that optimally suits their needs from among our wide variety of products.

Power steering system types and characteristics

Electric Power Steering

EPS

FAVSS CO., LTD.



■ Column EPS

- The power-assist unit, controller and torque sensor are attached to the steering column.
- The system is compact and therefore easy to install on the vehicle.
- Application not only on fixed-type steering columns but also on tilt-type columns, etc. is possible.



■ Pinion EPS

- The power-assist unit is attached to the pinion shaft of the steering gear.
- The power-assist unit is located in the engine compartment, eliminating concern about passenger compartment noise and allowing the use of higher assist forces.
- This steering system excels in handling characteristics, and application of a variable-ratio steering gear enables the use of compact motors.



■ Rack Direct Drive EPS

- The rack and power-assist unit form a single unit.
- This steering system is compact and easy to install on the vehicle.
- Power-assist is provided directly to the rack, enabling low friction and inertia and an ideal steering feeling.



■ Rack-cross EPS

- The power-assist unit can be attached to the rack at virtually any position or angle, allowing automakers a tremendous amount of design flexibility.
- A power-assist unit with a large reduction ratio is used, enabling high output, and a superior driving feeling can be provided because of the reduction gear's high efficiency.

Electro-hydraulic Power Steering

H-EPS

FAVSS CO., LTD.



■ Electro-hydraulic power steering

- This energy-efficient hydraulic power steering system is driven by an electronically controlled electric motor and hydraulic pump.
- The motor, pump, reservoir tank, and controller compose a single unit, making installation on the vehicle easy and nearly eliminating the need for tube adjustments, etc. after installation.
- The hydraulic pump, driven by a high-performance brushless motor, is energy efficient and has quick response.

Normal Hydraulic Power Steering

NPS

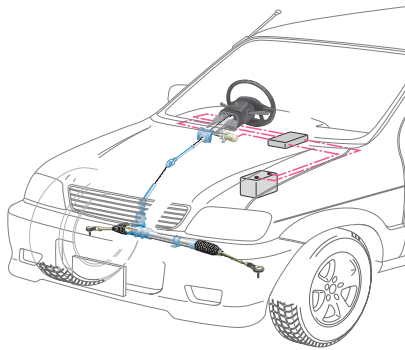


Electronically controlled hydraulic power steering

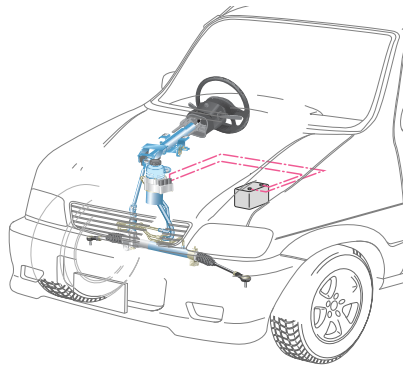
- This system offers both high power and a smooth steering feeling.
- Application on a wide range of vehicles from compact cars to trucks is possible.
- Electronic control by computer enables performance corresponding to vehicle speed and an ideal steering feeling.

Koyo continues its journey with engineers dedicated to creating new value.

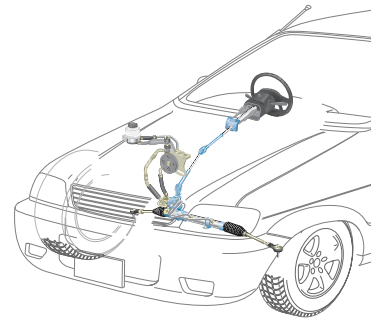
All types of power steering systems



■ Electric power steering (column EPS)



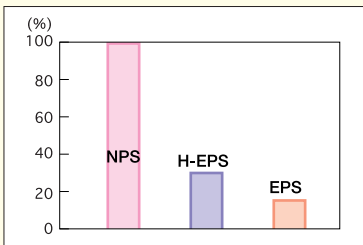
■ Electro-hydraulic power steering



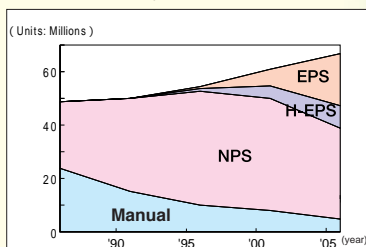
■ Normal hydraulic power steering

- Koyo's full-digital-control electric power systems are ideal for next-generation intelligent cars, which will integrate systems technology, information technology, environmental technology, etc. They also contribute to environmental protection through being lightweight and improving vehicle fuel efficiency.

Comparison of energy consumption



Transition of steering systems by type (worldwide)



Electric power steering offers fuel savings and environmental friendliness

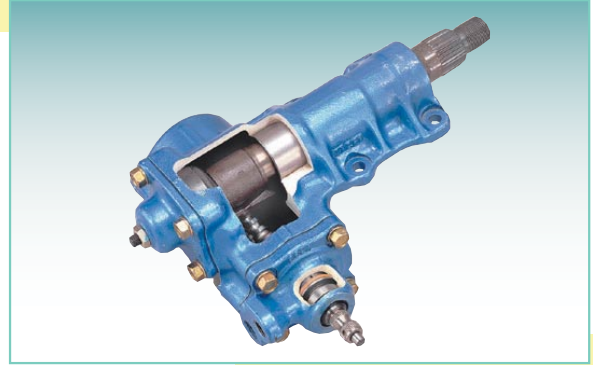
Components Supporting Steering Systems

Steering Gears

We manufacture rack & pinion type gears, which feature superior rigidity and □ a sharp steering feeling, as well as ball screw type gears, which have low friction. We also offer variable-ratio rack & pinion type gears, which have increased output at steering angles where this is required.



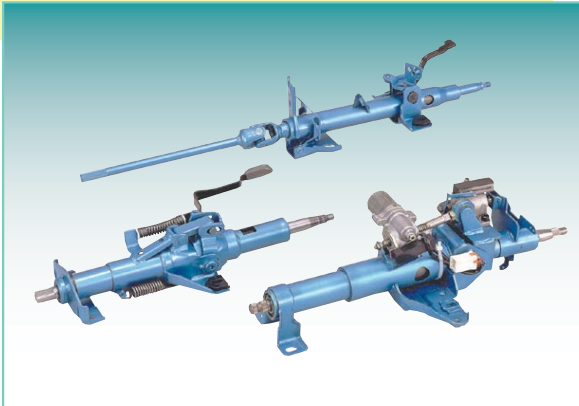
■ Rack & pinion type steering gear



■ Ball screw type steering gear

Steering Columns

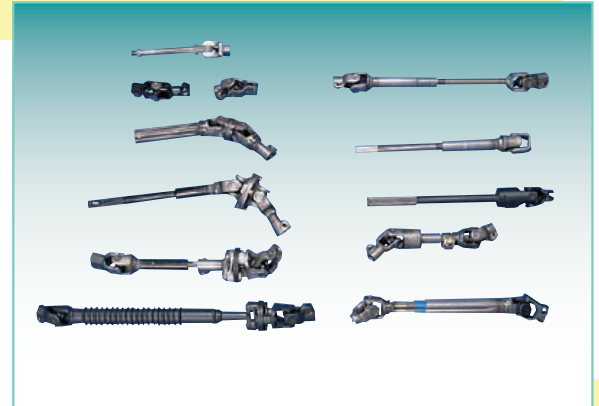
We manufacture a variety of columns, including tilt, telescopic and collapsible types.



■ Steering columns

Intermediate Shafts

Our full lineup includes wide-angle, constant velocity and vibration-absorbing types.



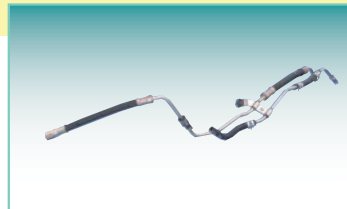
■ Intermediate shafts

Hydraulic Components

We manufacture a wide variety of components based on the latest design concepts in order to support the creation of high-performance steering systems with optimal functionality.



■ Hydraulic pumps



■ Hydraulic hoses and tubes



■ Reservoirs

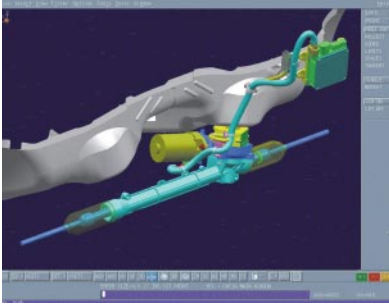


■ Electric motor and pump "powerpack" units

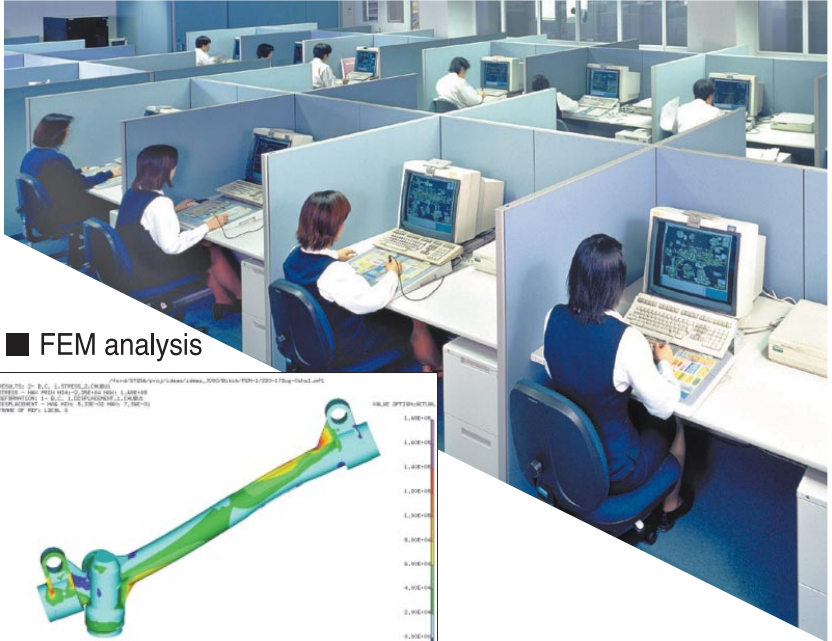
R&D

An R&D system utilizing the latest technology

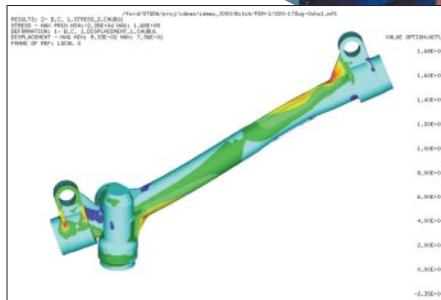
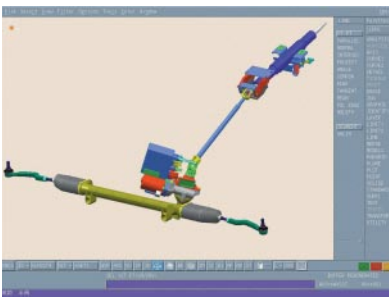
■ 3D CAD



■ CAD room



■ FEM analysis



Testing and Evaluation

Evaluation facilities enable simulation under a wide variety of conditions.

■ Electromagnetic anechoic chamber



■ Driving simulator



■ Steering endurance testing apparatus



Koyo® Steering systems

Network of Steering Bases Spanning the Globe

GLOBAL NETWORK



● Development bases
● Manufacturing bases

1 European Technical Center (France)

2 R&D Center (Japan)

3 North American Technical Center (USA)

Europe

1 KOYO STEERING LYON S.A.S. France
HYDROPERFECT INTERNATIONAL S.A. Chennevières

2 France
HYDROPERFECT INTERNATIONAL S.A. Blois

3 France
KOYO STEERING DIJON SAINT ETIENNE S.A.S.

4 France
KSDSE

Asia

5 Thailand
KOYO STEERING (THAILAND) CO.,LTD.
T&K AUTOPARTS SDN.BHD.

6 Malaysia
SONA KOYO STEERING SYSTEMS LTD.

7 India
YUBEI KOYO STEERING SYSTEM CO.,LTD.

8 Japan
KOYO SEIKO CO., LTD. NARA
KOYO SEIKO CO., LTD. TOYOHASHI

9 Japan
FAW KOYO STEERING SYSTEM CO.,LTD.

10 China
YUBEI KOYO STEERING SYSTEM CO.,LTD.

11 China
YUBEI KOYO STEERING SYSTEM CO.,LTD.

North&South America

12 USA
KOYO STEERING SYSTEMS OF USA INC. VIRGINIA
TENNESSEE KOYO STEERING SYSTEMS CO.

13 USA
KOYO STEERING BRASIL LTDA.

14 Brasil
KOYO STEERING ARGENTINA S.A.

15 Argentina
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Value & Technology

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