



- Touchless 3D measuring
- Fast initial measurement due to minimal setting-up time
- Precise measurements over the whole file time

POWER STEERING, WHEEL ALIGNMENT DAN WHEEL BALANCE



Oleh :
Muhkamad Wakid, S.Pd.

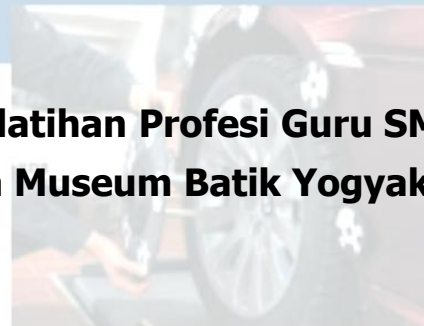
Disampaikan pada Pendidikan dan Pelatihan Profesi Guru SMK Otomotif
Di Jurdiknik Otomotif FT UNY/ Wisma Museum Batik Yogyakarta
Februari 2008

Introduction

Power Steering

Wheel Alignment

Wheel Balance



Introduction

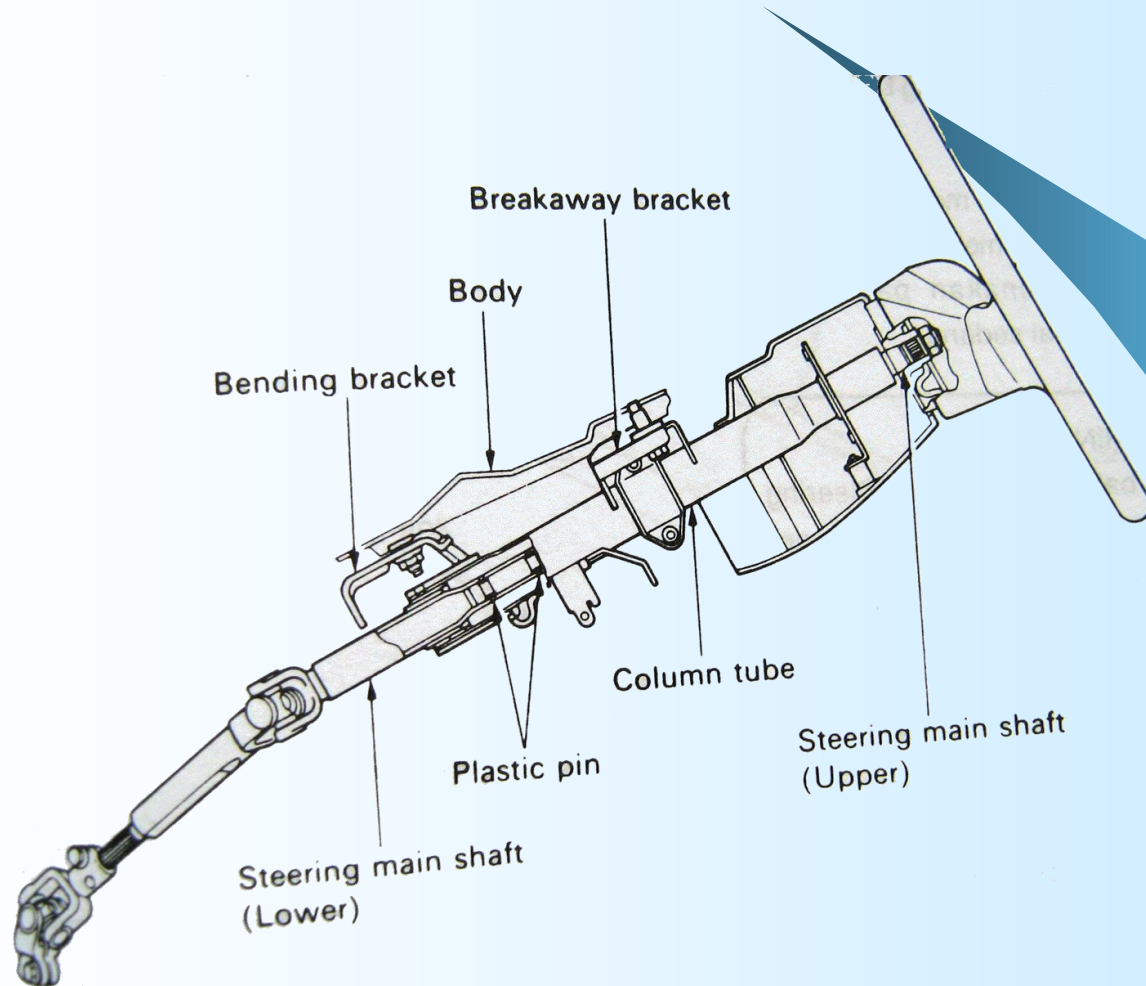


Muhkamad Wakid (Bantul, 17 Juli 1977)

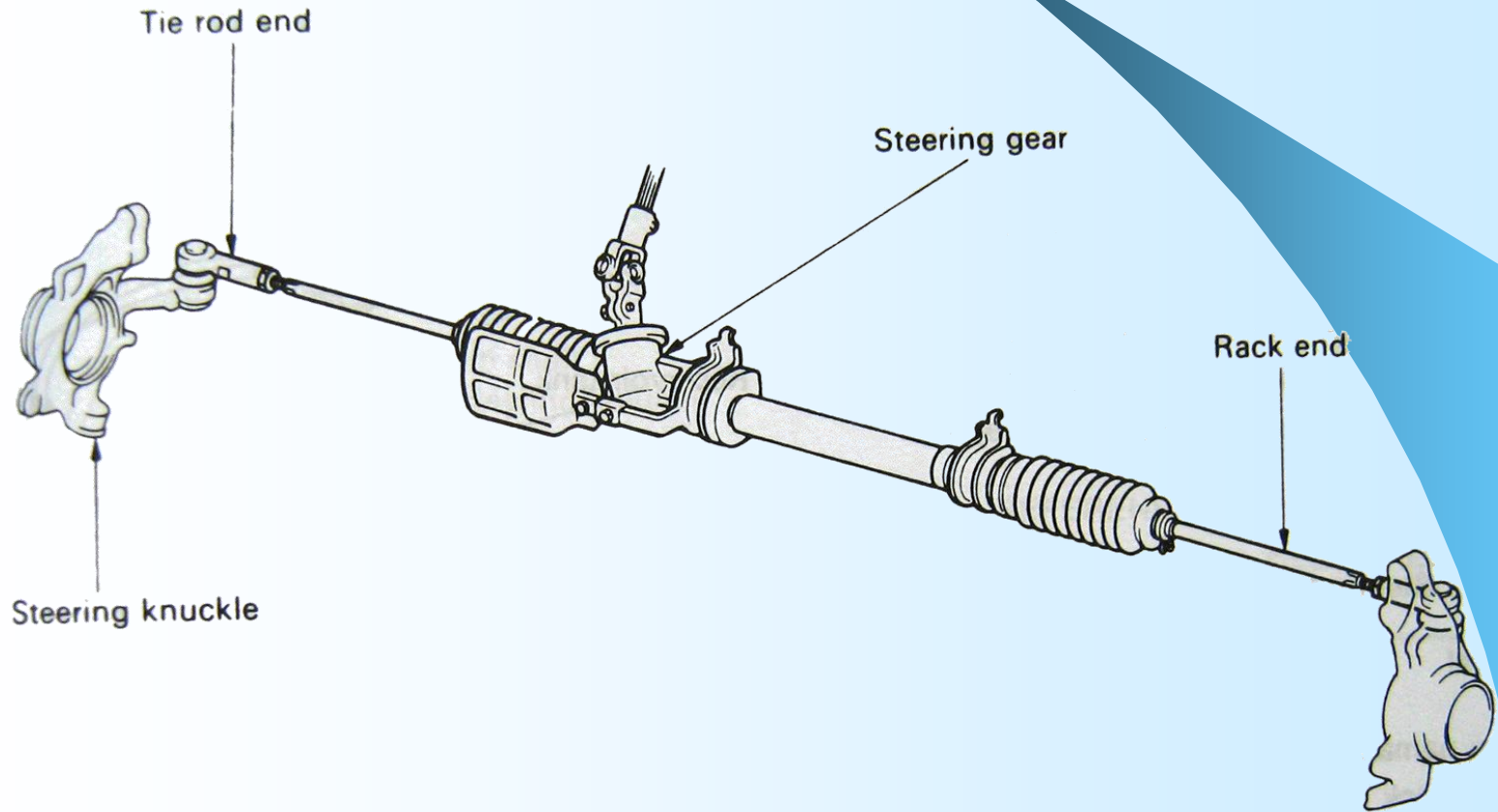
- 🏭 Bengkel Otomotif Jurdiknik Otomotif FT UNY
- 🔧 Spesialisasi Chasis, Listrik dan Komputer
- 🏠 Rt 02, Dk 13, Murtigading, Sanden, Bantul, Yk (Parent's Home)
- 🏠 Rt 07, Kasihan, Tamantirto, Kasihan, Bantul Yk
- ☎️ 081328705185 – 0274 7130740 – 08882812559
- 📧 wakid_m@yahoo.com, wakid_1@yahoo.com, etc.
- ⌘ Anggota sub-konsorsium otomotif DIY
- ⌘ Wakabid Sertifikasi “Lembaga Sertifikasi Profesi Teknik Otomotif (LSP-TO) Indonesia Cabang Yogyakarta”



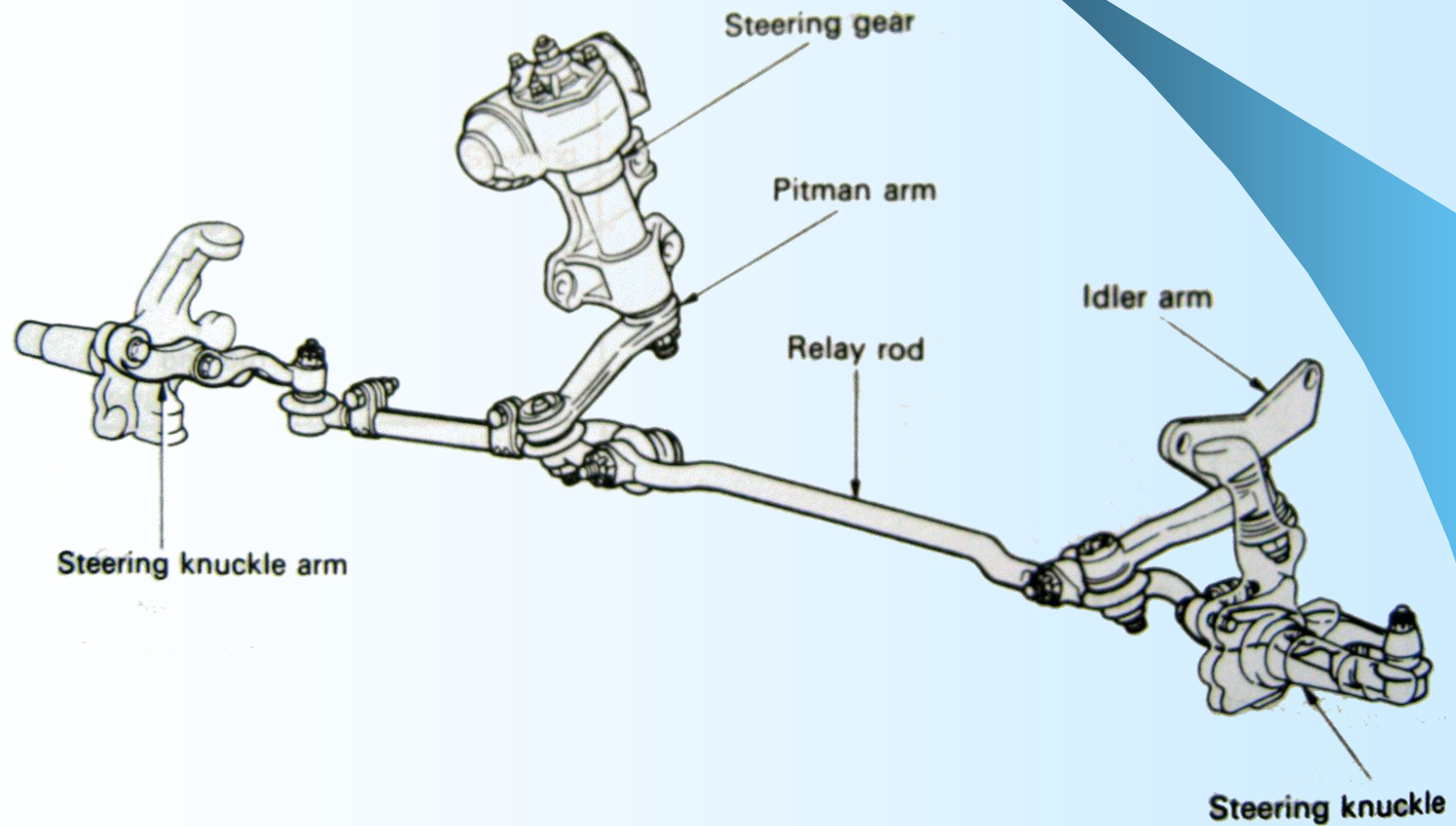
STEERING COLUMN



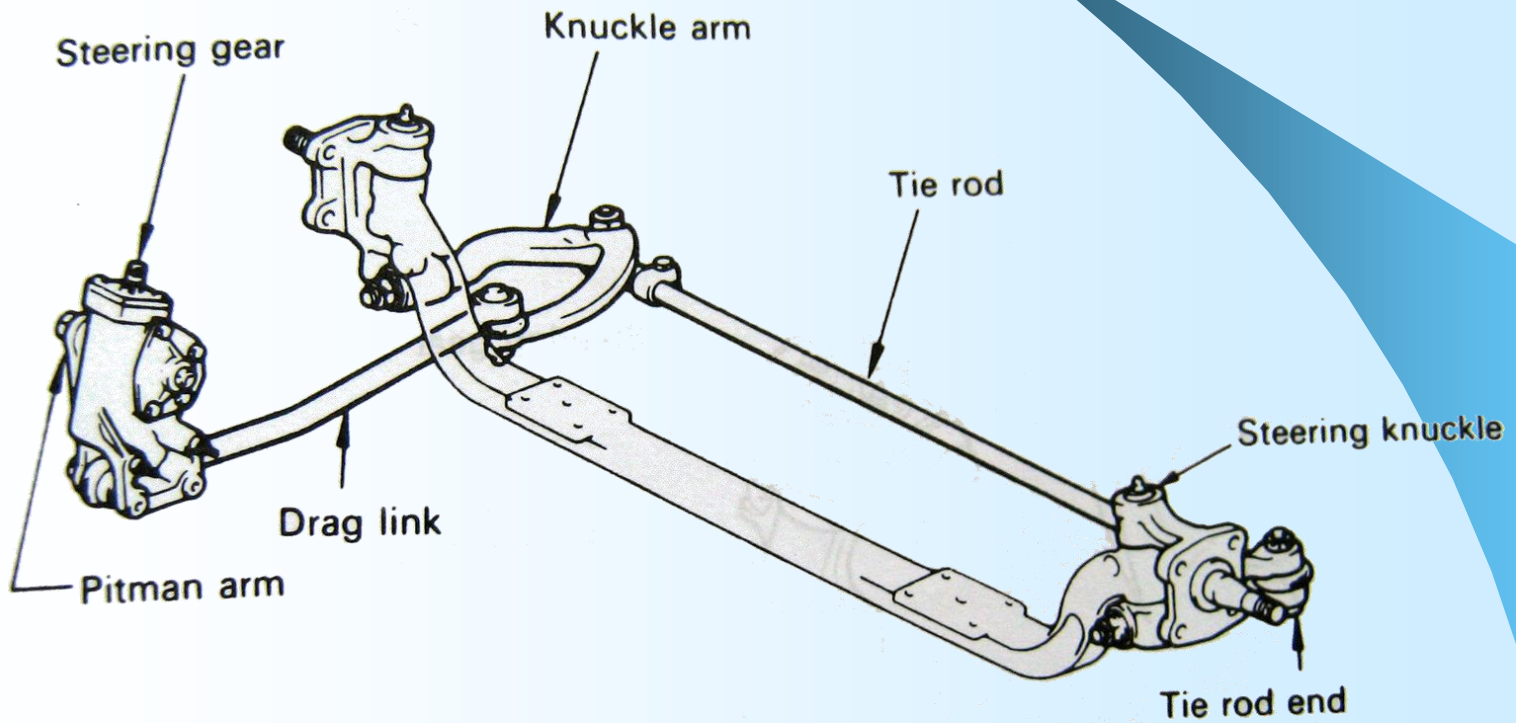
STEERING GEAR



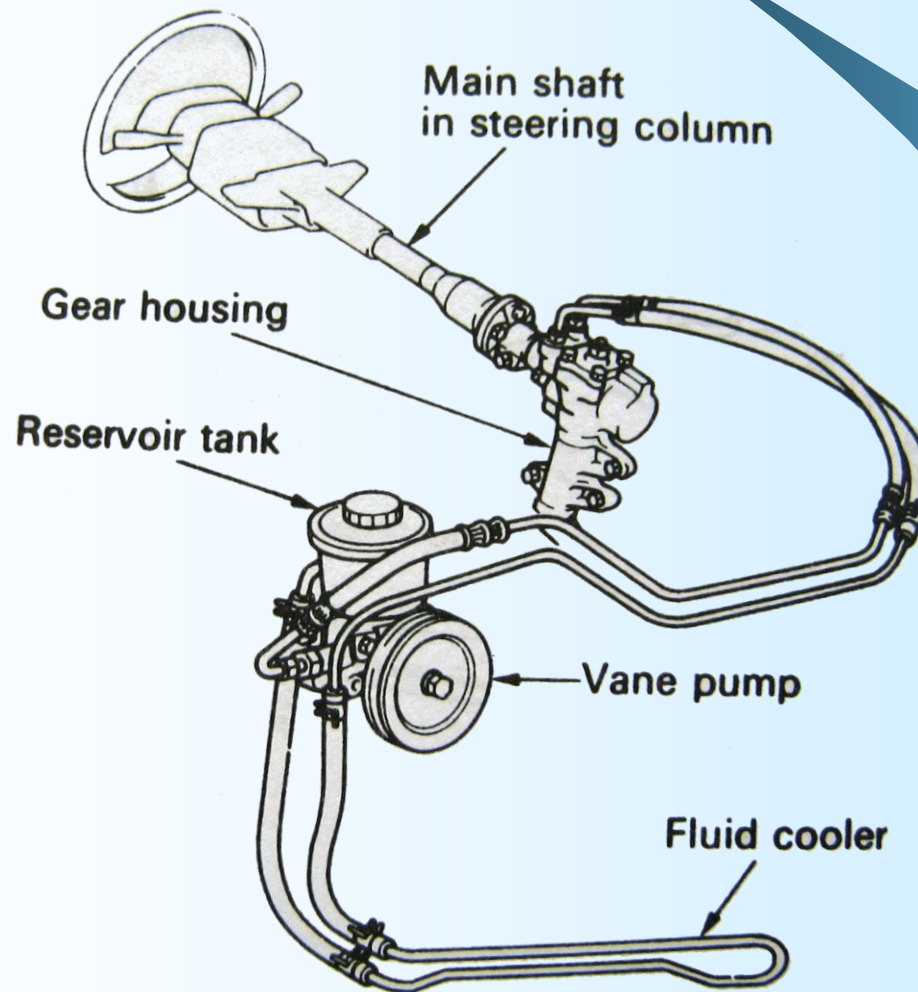
STEERING GEAR



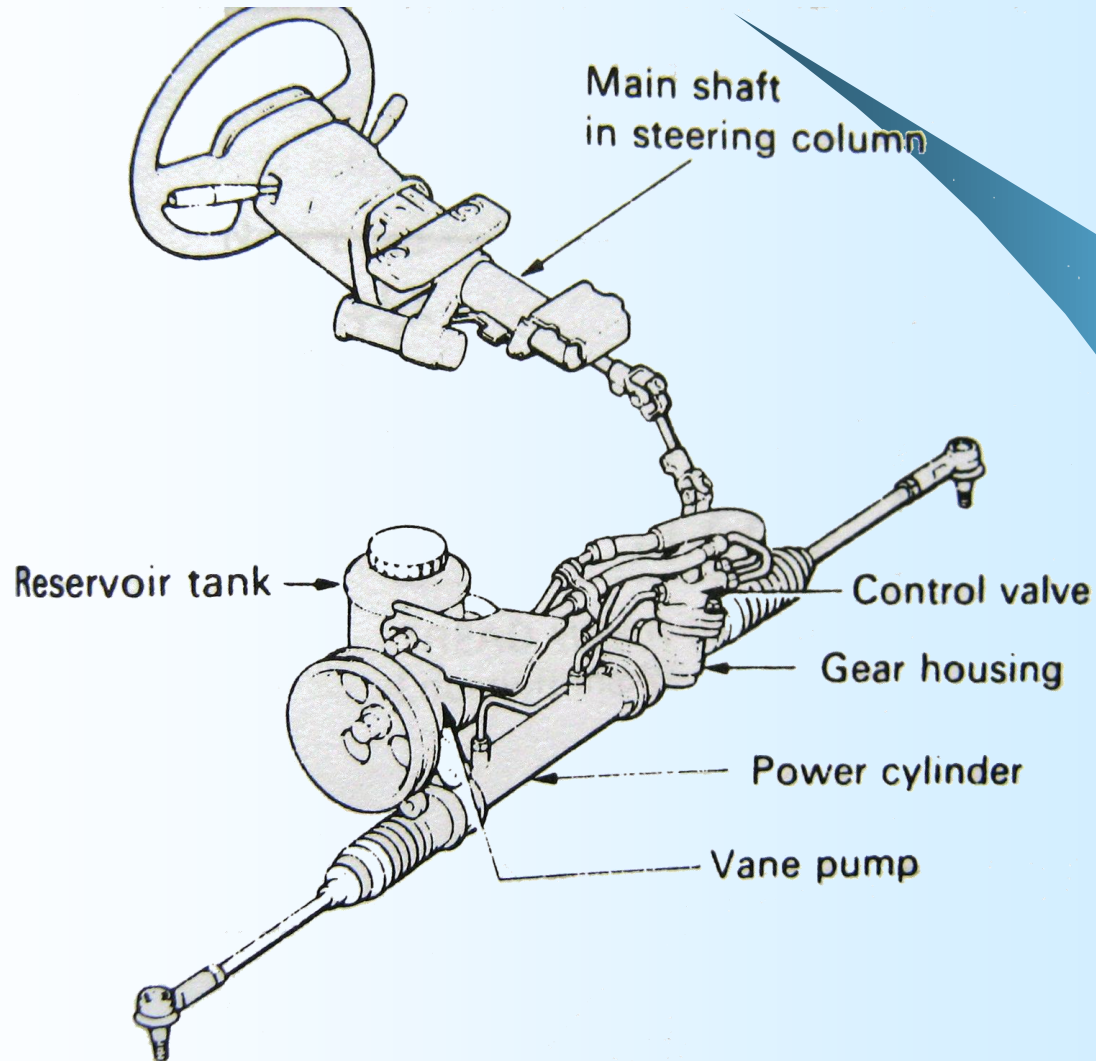
STEERING GEAR



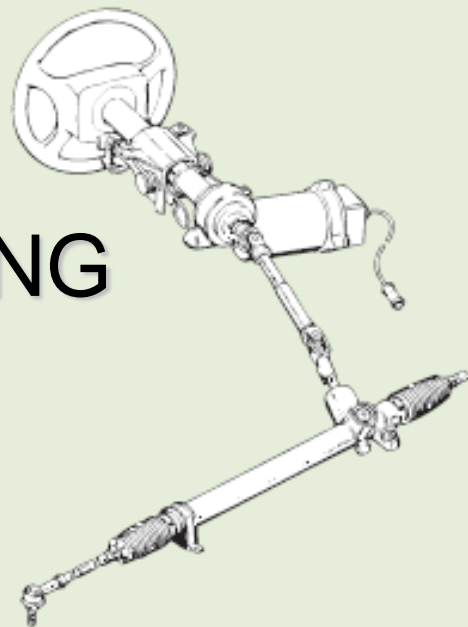
INTEGRATED TYPE OF POWER STEERING



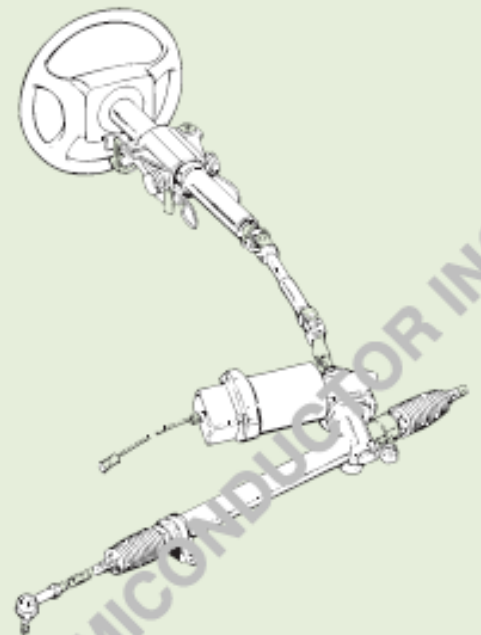
RACK N PINION TYPE OF POWER STEERING



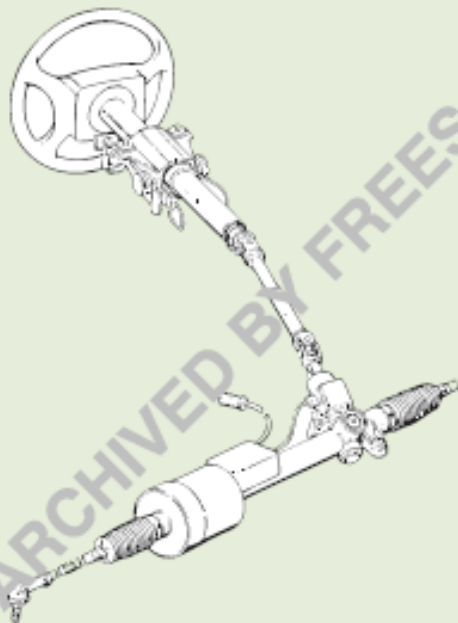
ELECTRIC POWER STEERING



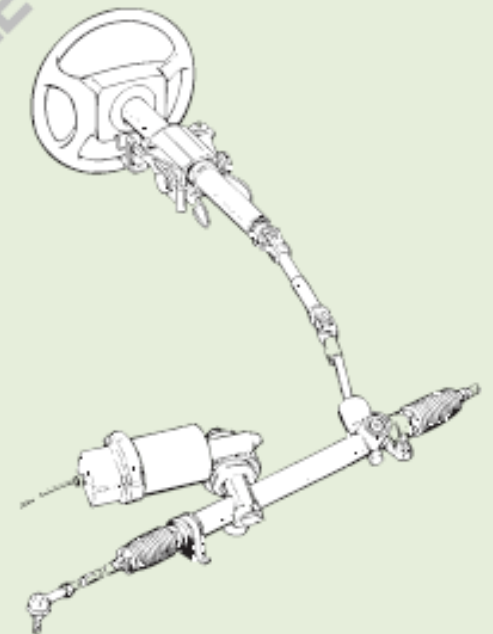
Column Type



Pinion Type



Rack Type



Double Pinion Type

ARCHIVED BY FREESCALE SEMICONDUCTOR INC

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

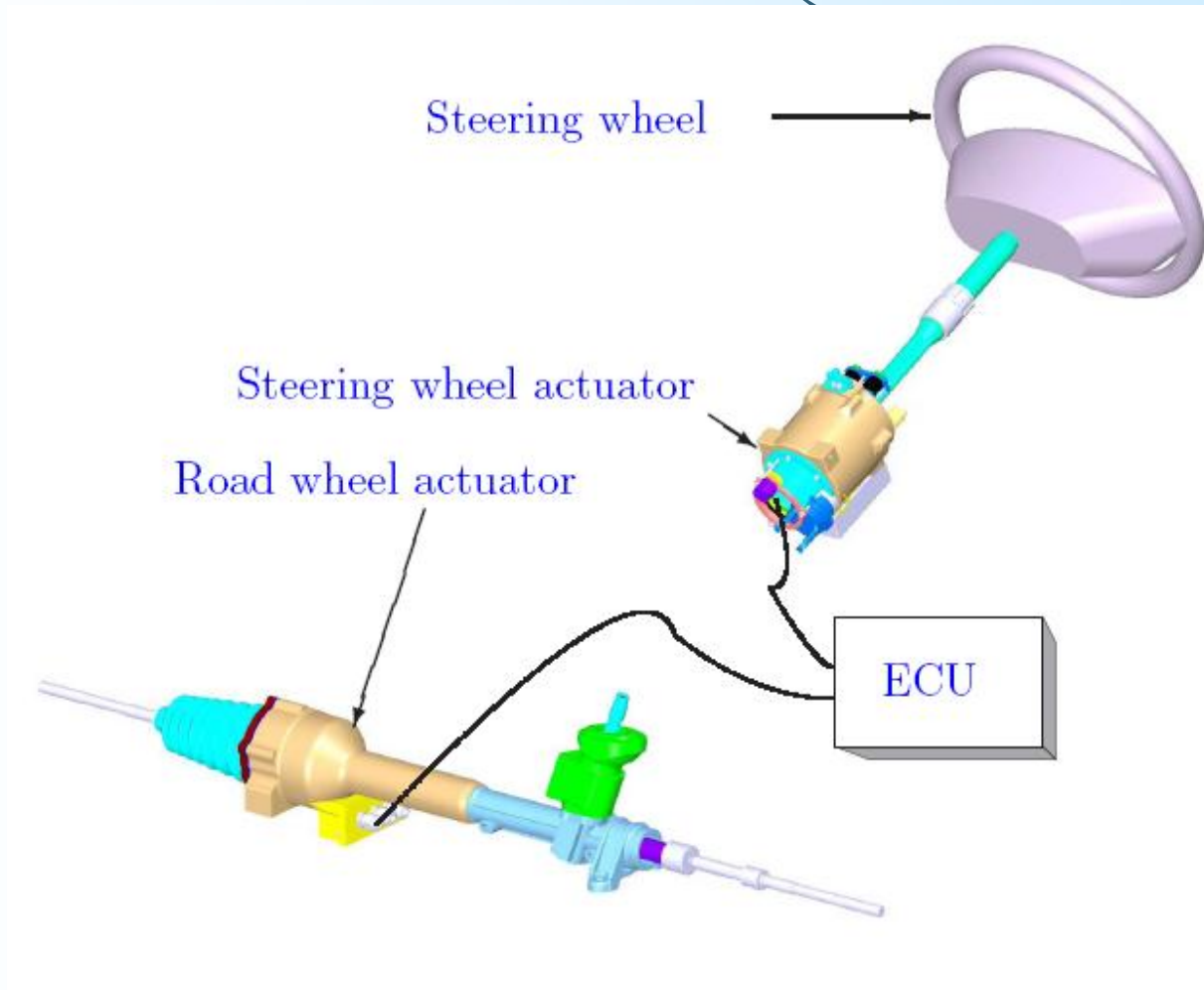
- The rack and power-assist unit form a single unit.
- This steering system is compact and easy to install on the vehicle.
- Power-assist is provided directly to the rack, enabling low friction and inertia and an ideal steering feeling.



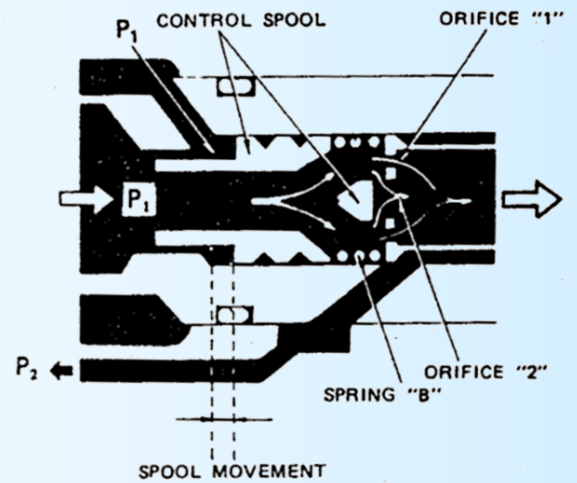
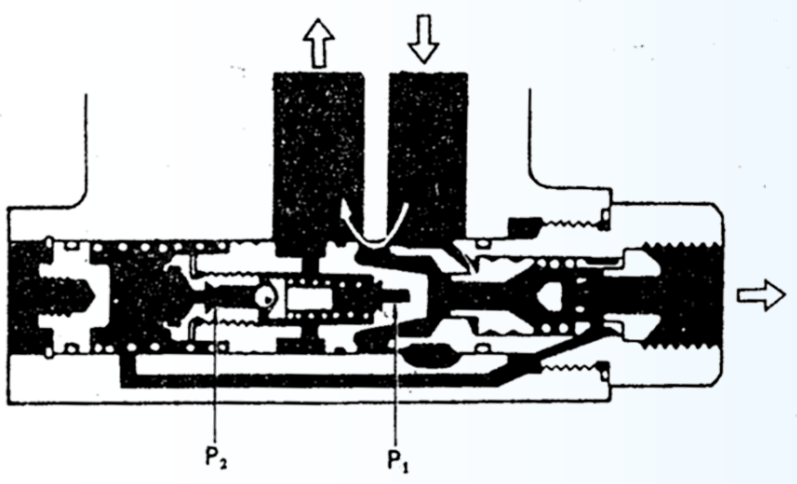
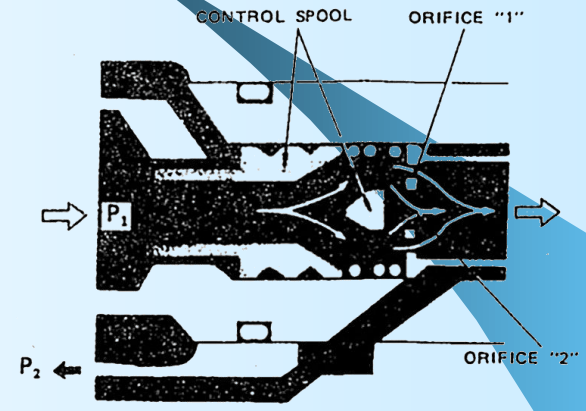
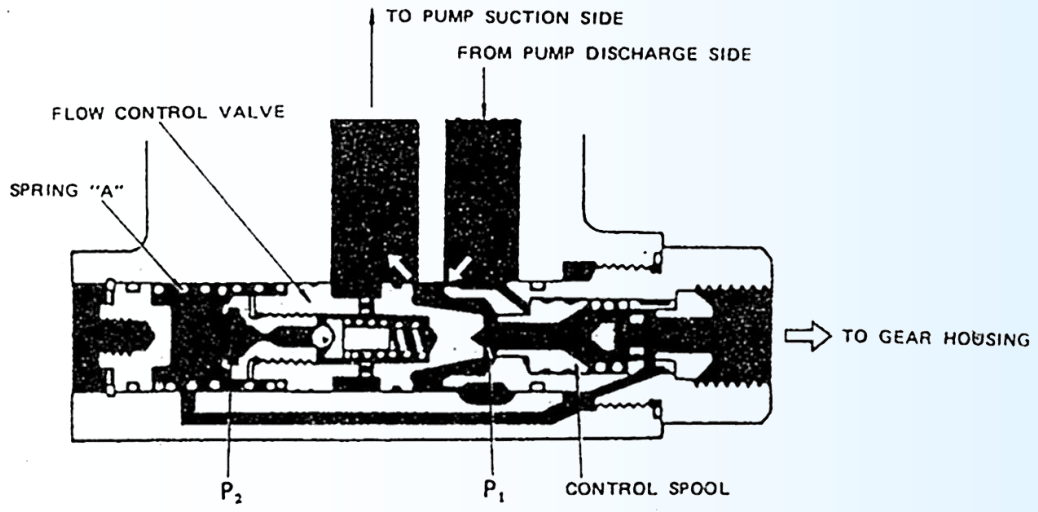
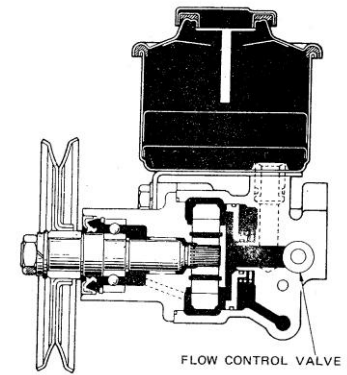
Rack-cross EPS

- 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.

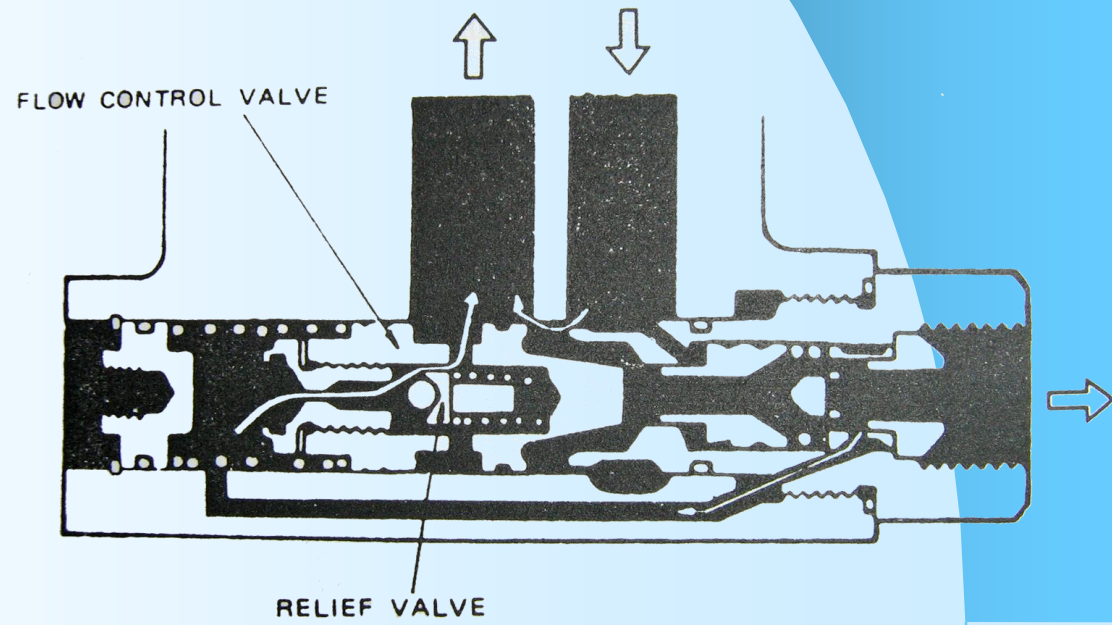
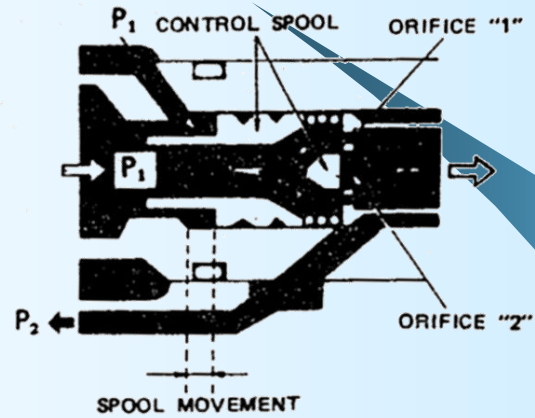
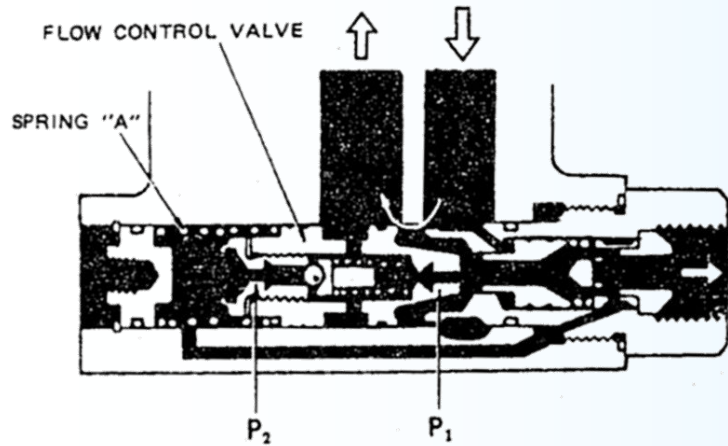
STEERING BY WIRE



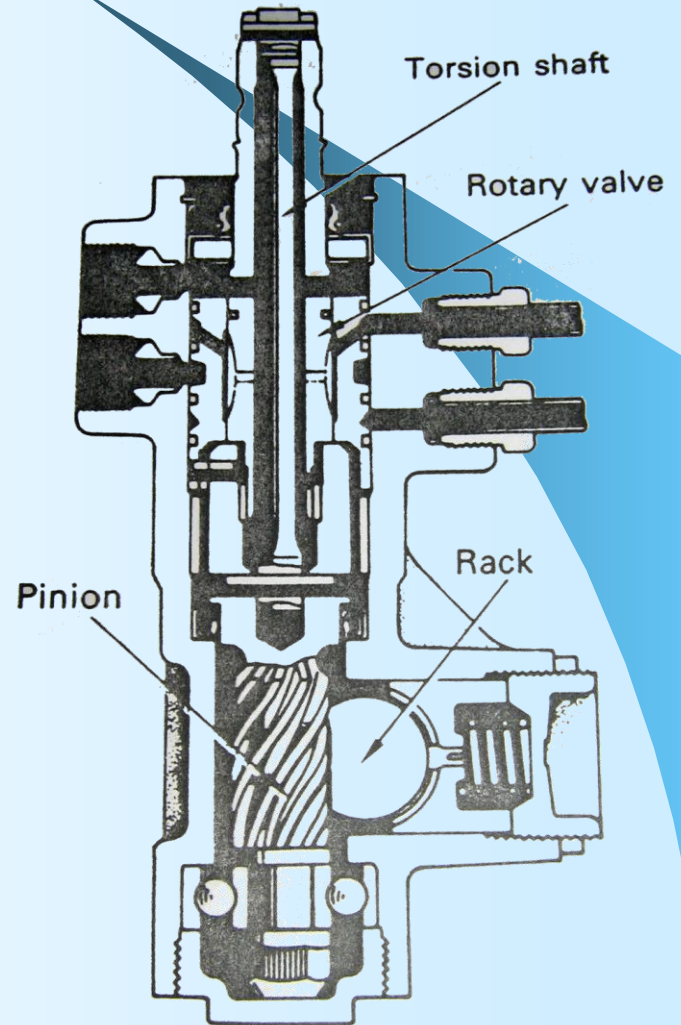
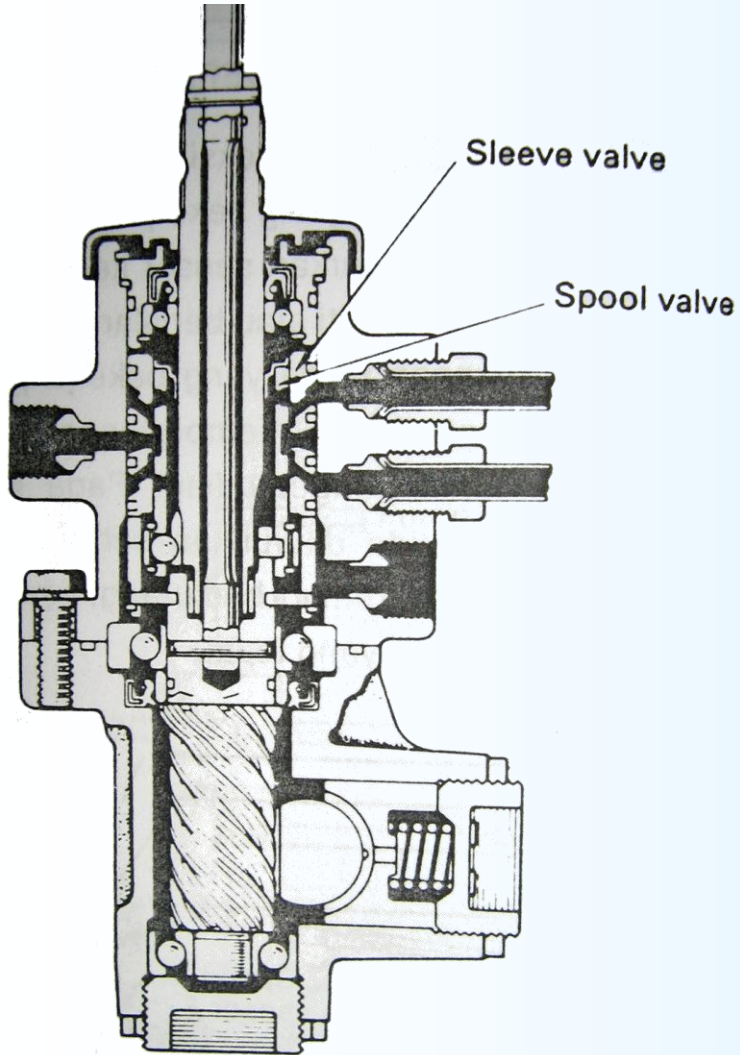
Pompa Power Steering



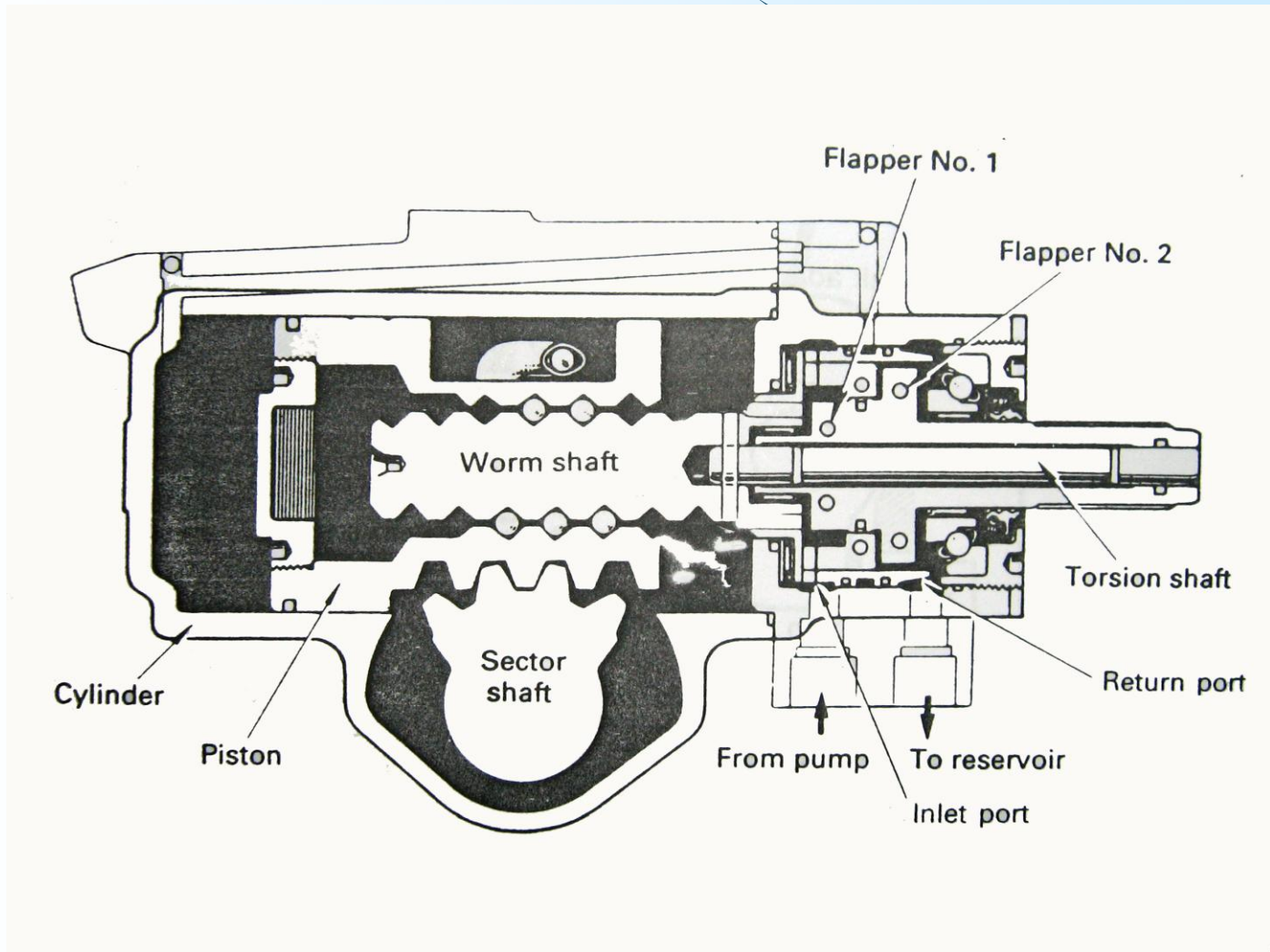
Pompa Power Steering



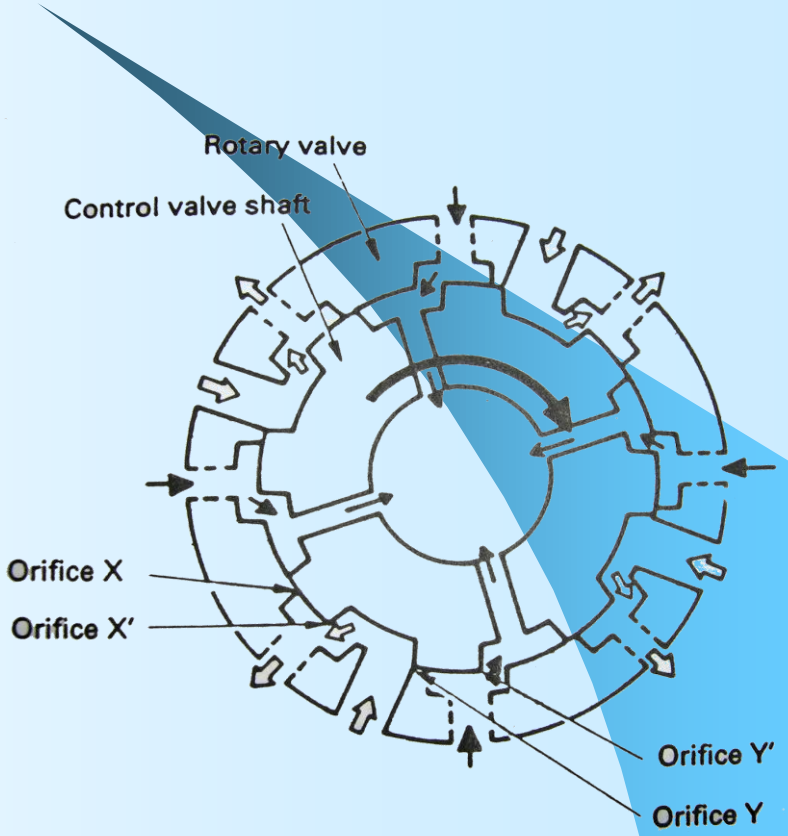
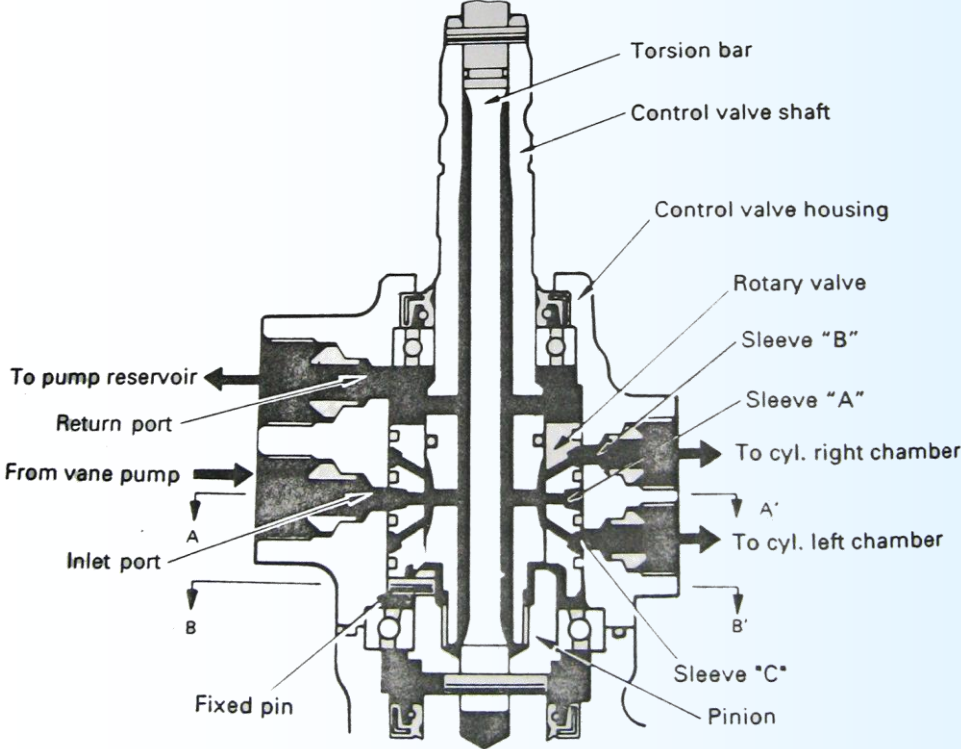
CONTROL VALVE



CONTROL VALVE



CONTROL VALVE



WHEEL ALIGNMENT



The DSP600-E-B standard configuration (shown with R811M-V-B-E cabinet with optional remote indicator) fits most service bay applications."



- Touchless 3D measuring
- Fast initial measurement due to minimal setting-up time
- Precise measurements over the whole life time



1 Trolley with PC and TFT



4 16 self-adhesive body adapters



2 4 measuring pillars with two high speed cameras each



5 4 self-adhesive adapters for the ride-height



3 4 mobile tripods for the measuring pillars



6 4 magnetic wheel adapters



Fast mounting of the self-adhesive body adapters



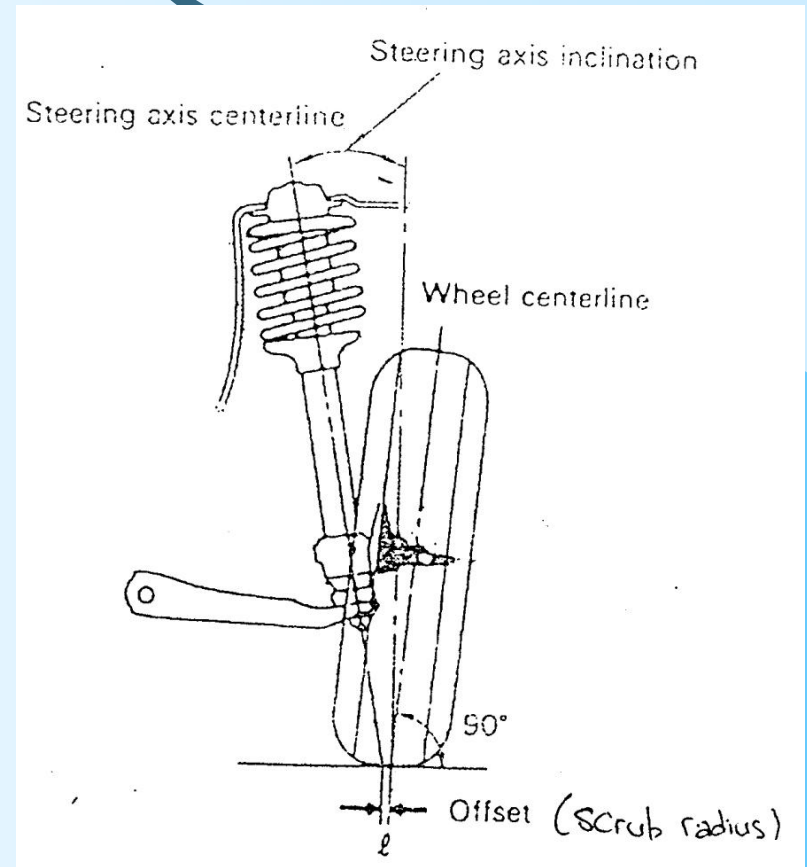
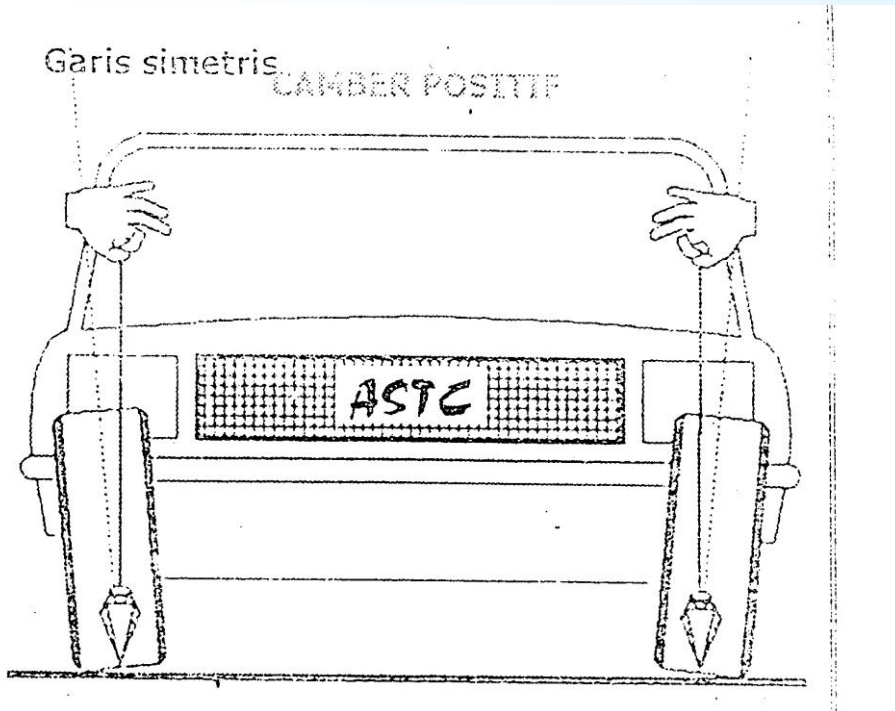
Easy fixation of the magnetic wheel adapter



7 4 guide rails for the tripods

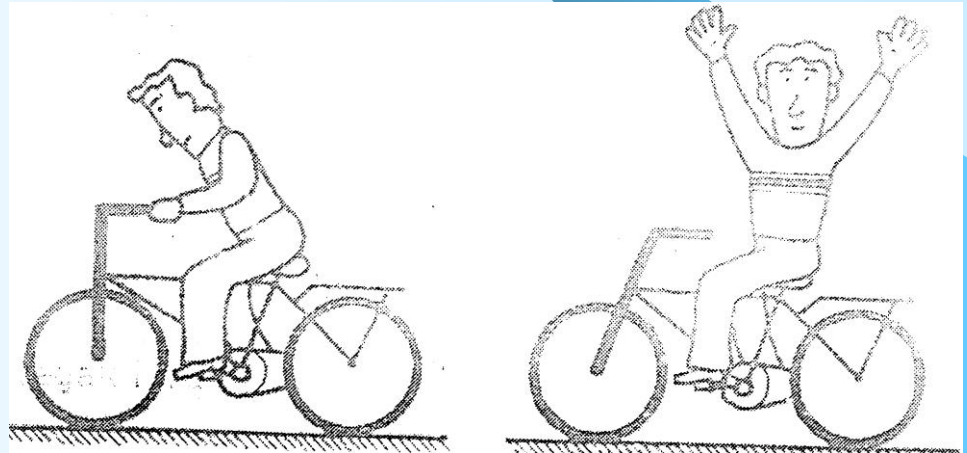
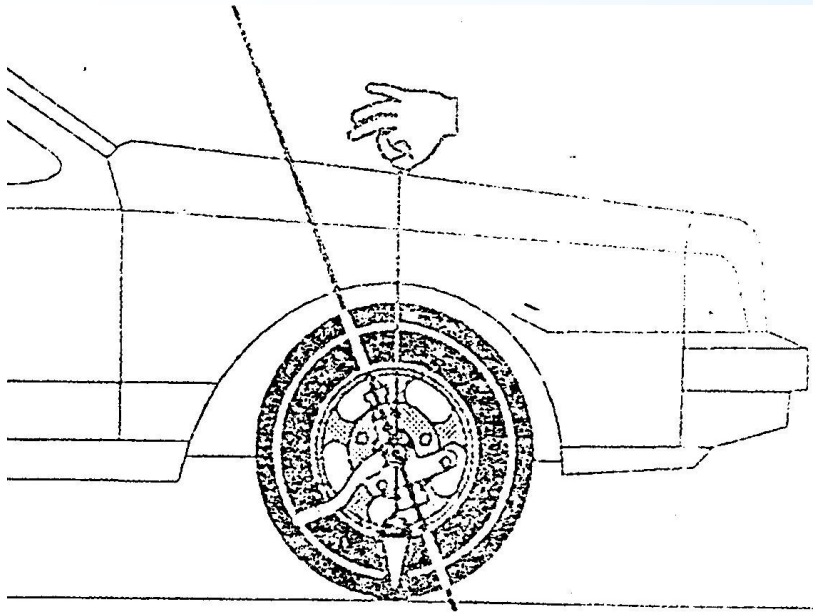
WHEEL ALIGNMENT

“Camber”



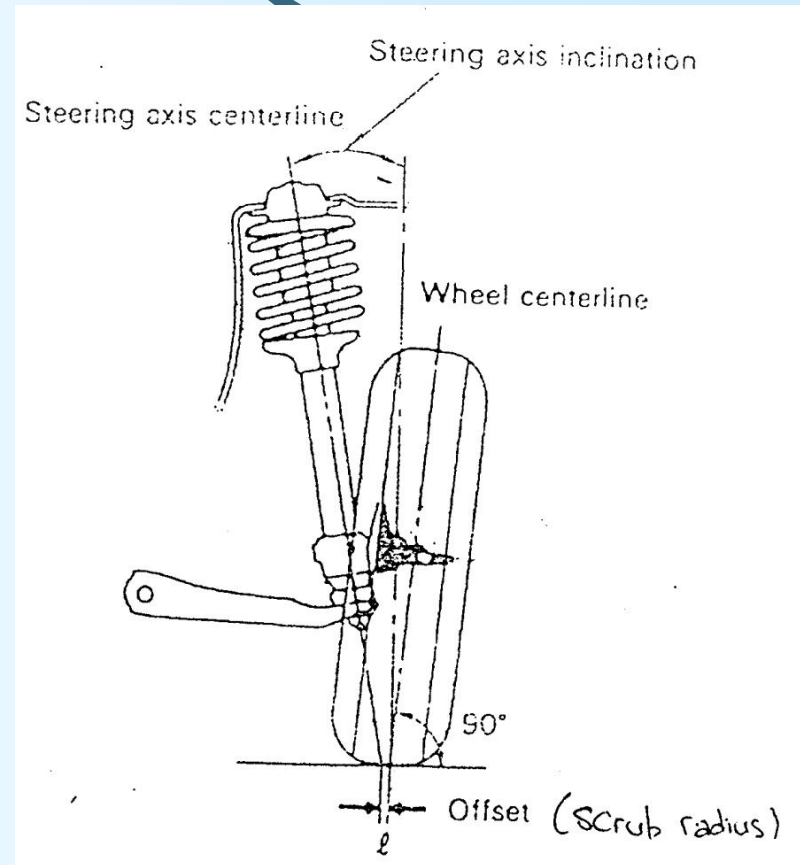
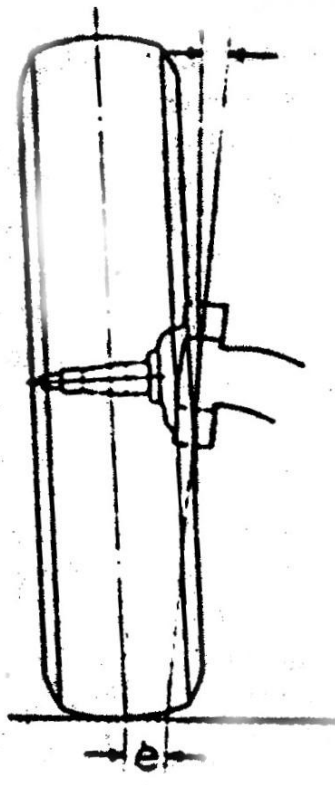
WHEEL ALIGNMENT

“Caster”



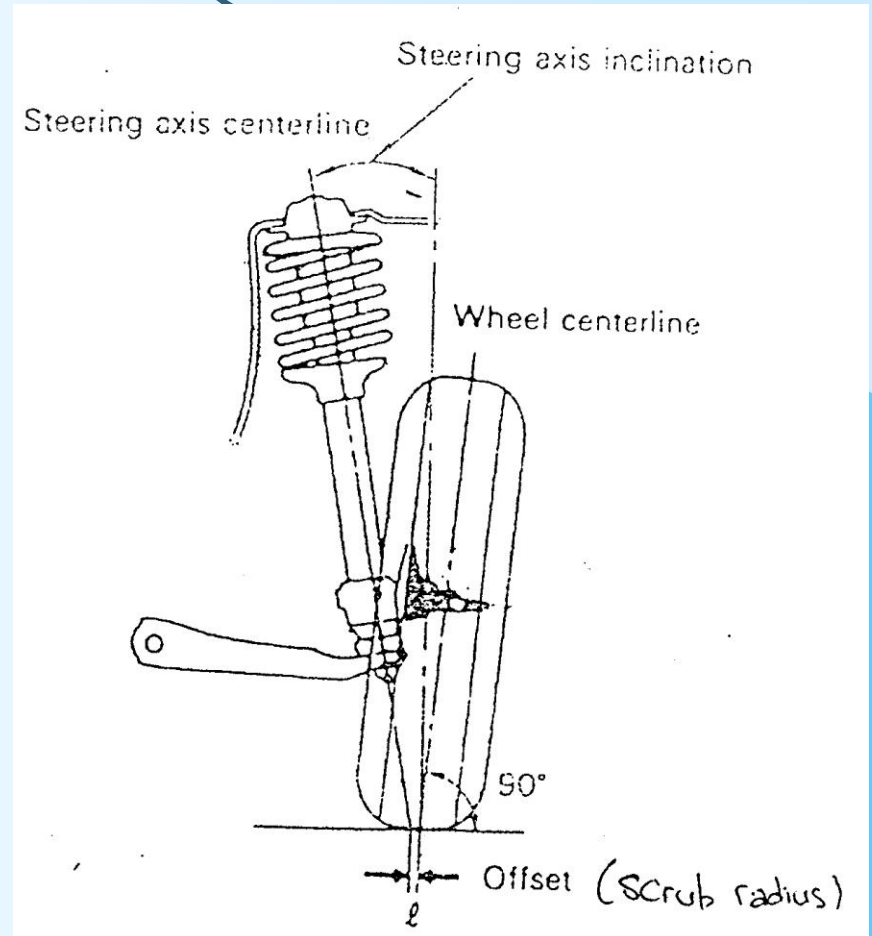
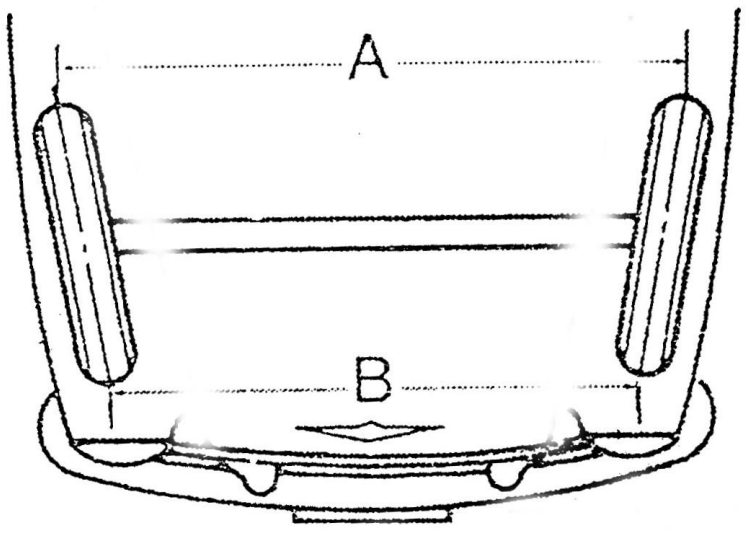
WHEEL ALIGNMENT

“King-pin Incl (KPI/ SAI)”



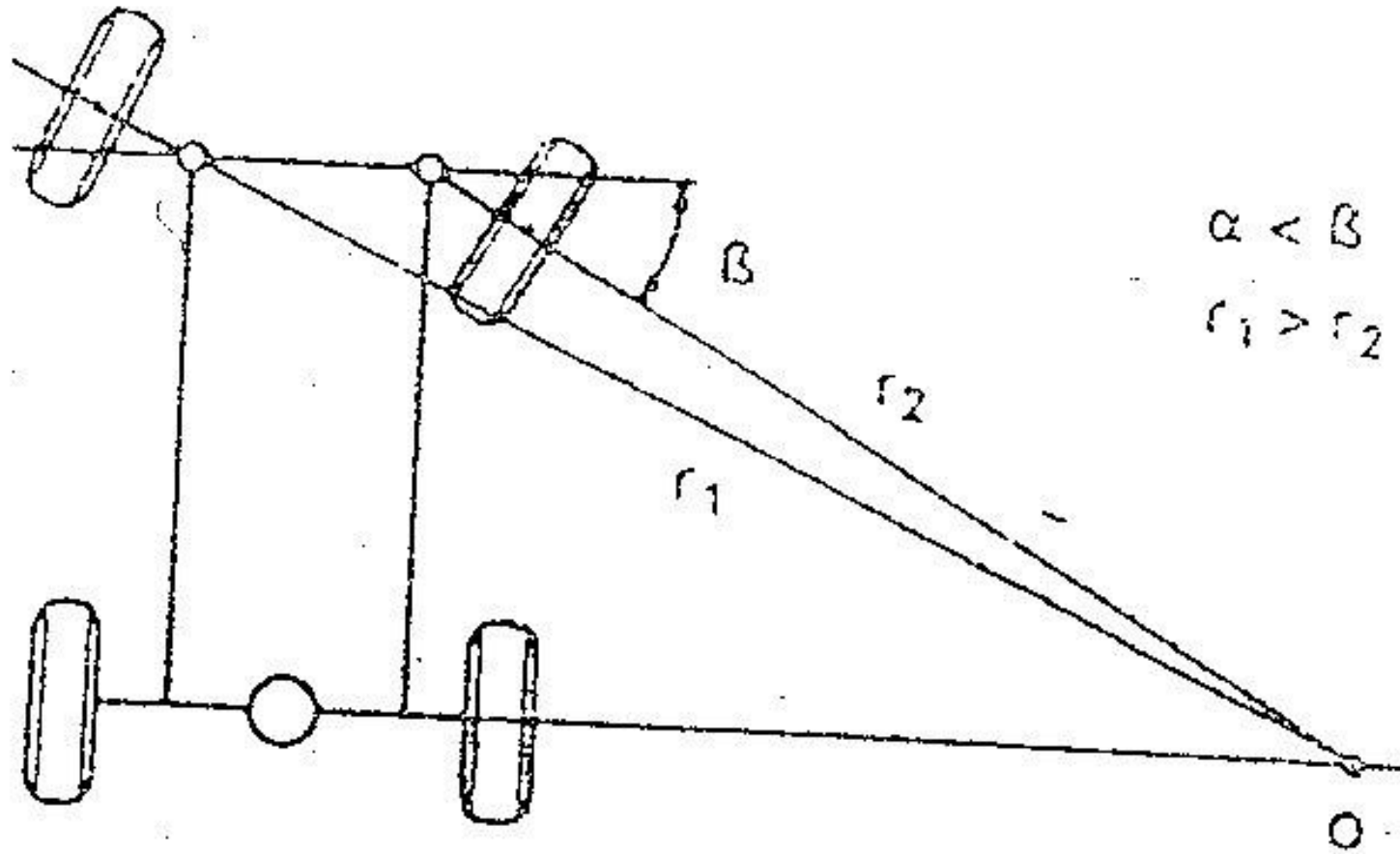
WHEEL ALIGNMENT

“Toe-In”



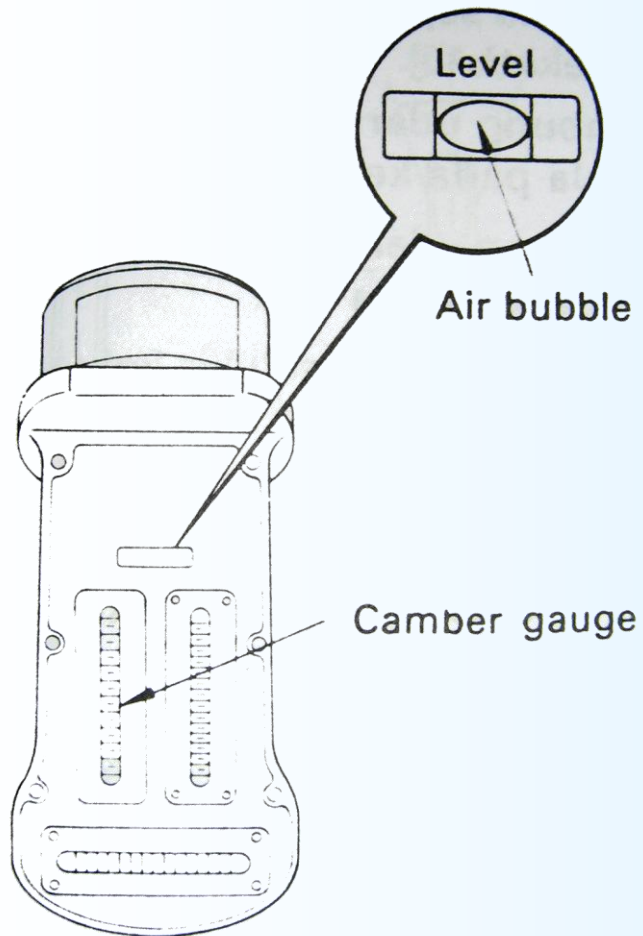
WHEEL ALIGNMENT

“Turning Radius”



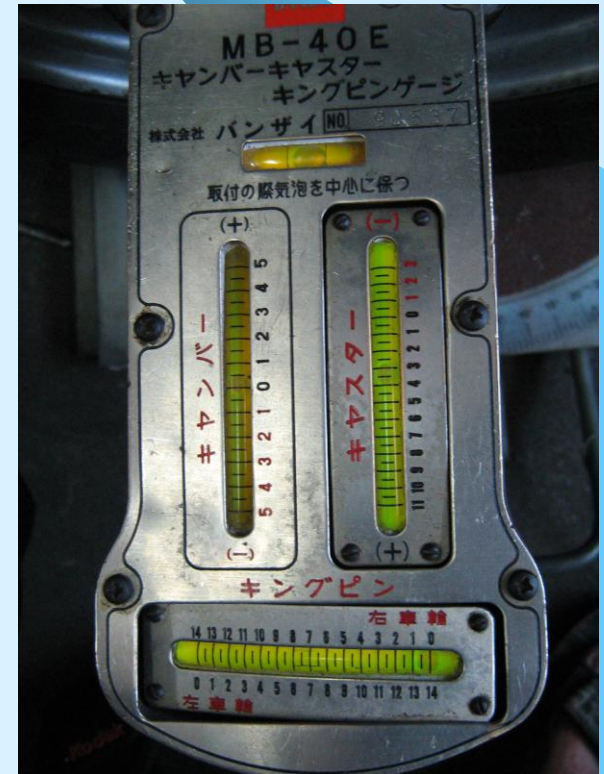
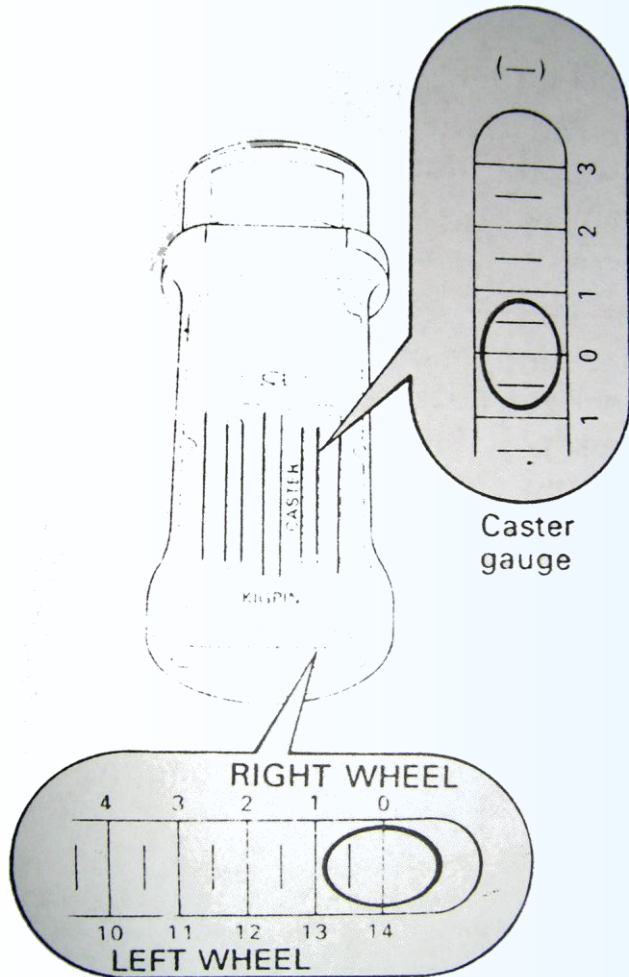
WHEEL ALIGNMENT

“Equipment”



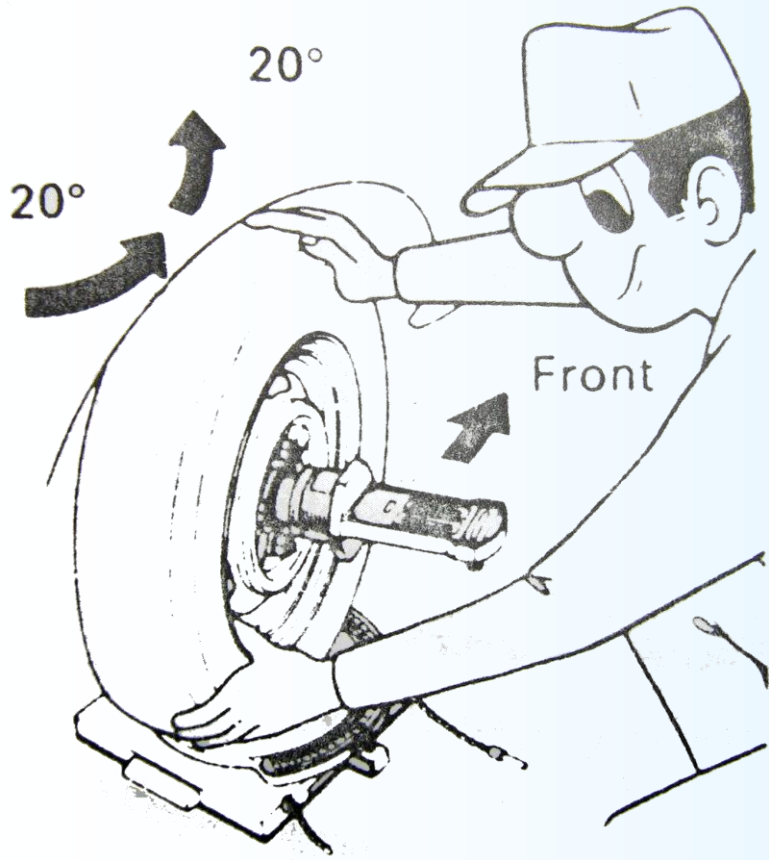
WHEEL ALIGNMENT

“Equipment”



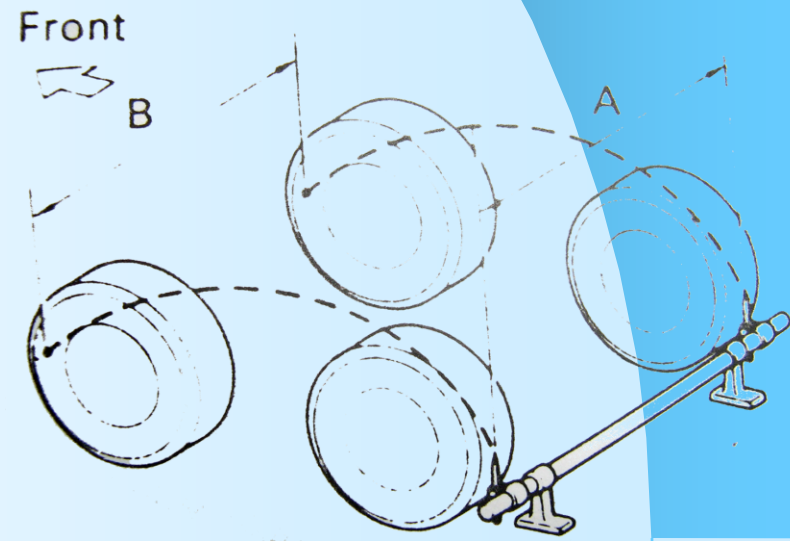
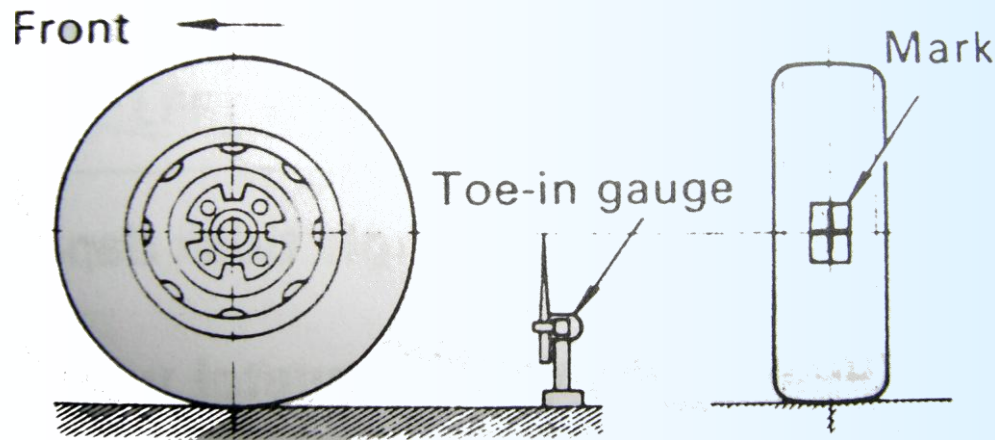
WHEEL ALIGNMENT

“Equipment”



WHEEL ALIGNMENT

“Equipment”



WHEEL ALIGNMENT “Equipment”



**WHEEL ALIGNMENT
CABLES OR RADIO 8 SENSOR**

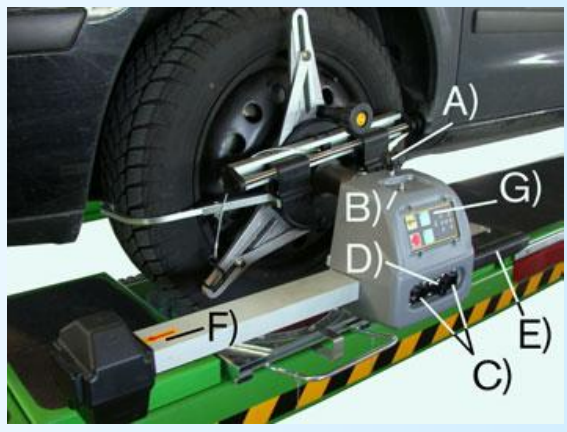
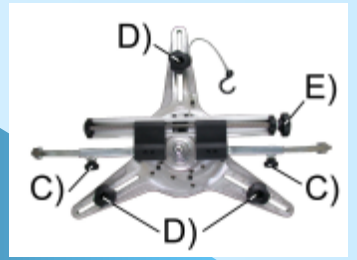
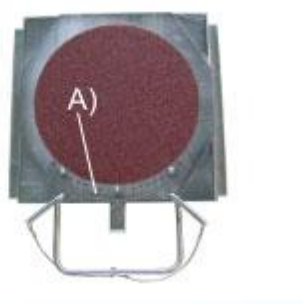


**WHEEL ALIGNMENT
6 SENSOR**



WIRELESS WHEEL ALIGNMENT 8 SENSOR

WHEEL ALIGNMENT “Equipment”



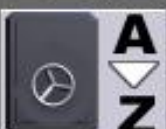
Nussbaum



UNIVERSITAS NEGERI YOGYAKARTA
KARANG MALANG YOGYAKARTA

12:19:04

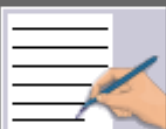
Start



- 
Kia
- 
Lada
- 
Lamborghini
- 
Lancia
- 
LDV
- 
Lexus



Databank



KIA

Kia



Lada



Lamborghini



Lancia



LDV



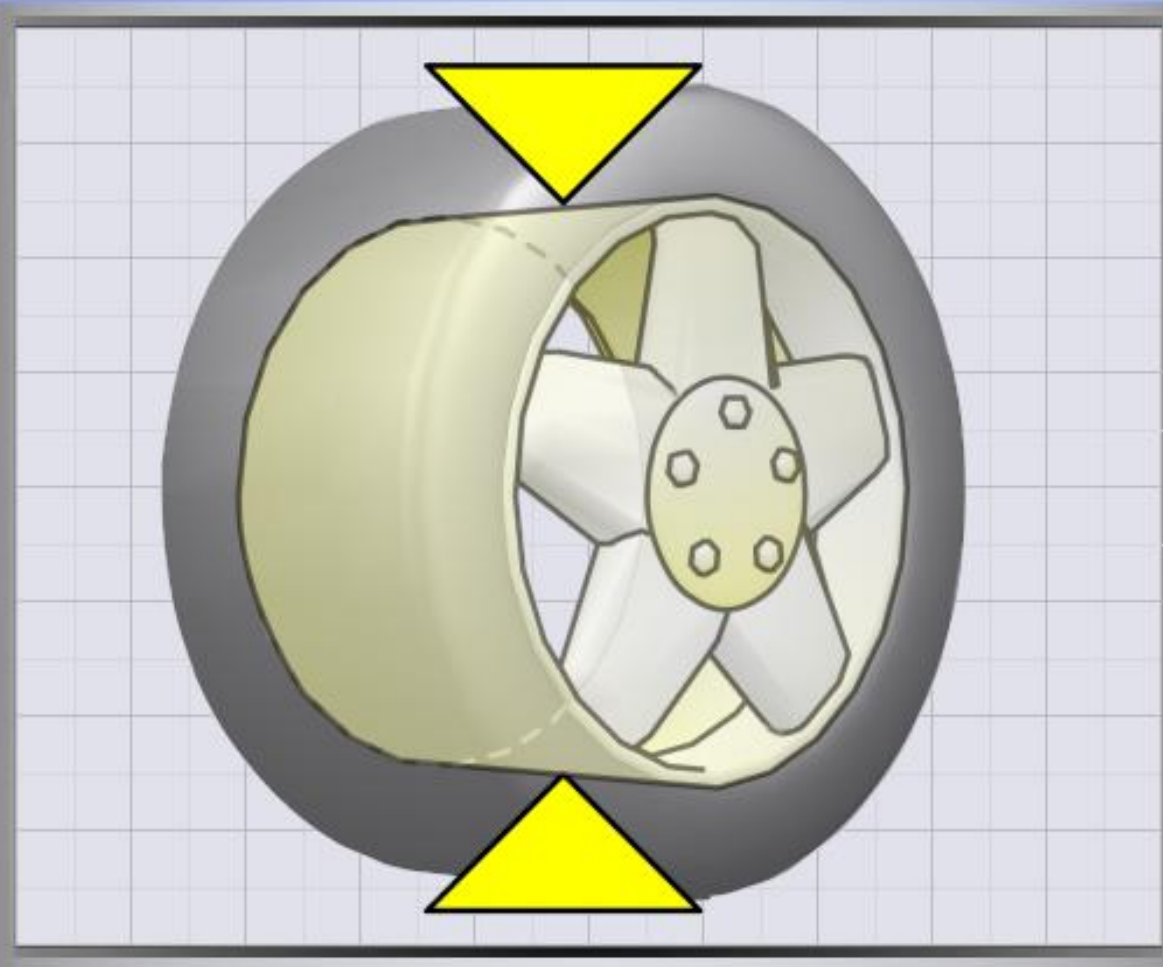
Lexus

STD	****	****
MENTOR		
STD	1995	1999
OPTIMA		
STD	2001	****
PRIDE		
STD	1991	****
RIO		
STD	2001	****
ROCSTA		
STD	1990	1995
SEDONA		
STD	1999	****
SEPHIA		
STD	1993	1998
STD	1999	****
SHUMA		
STD	1998	****

STD



Diameter Selection



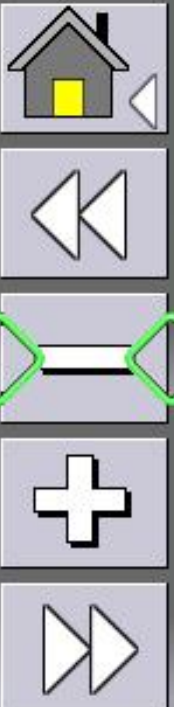
13'



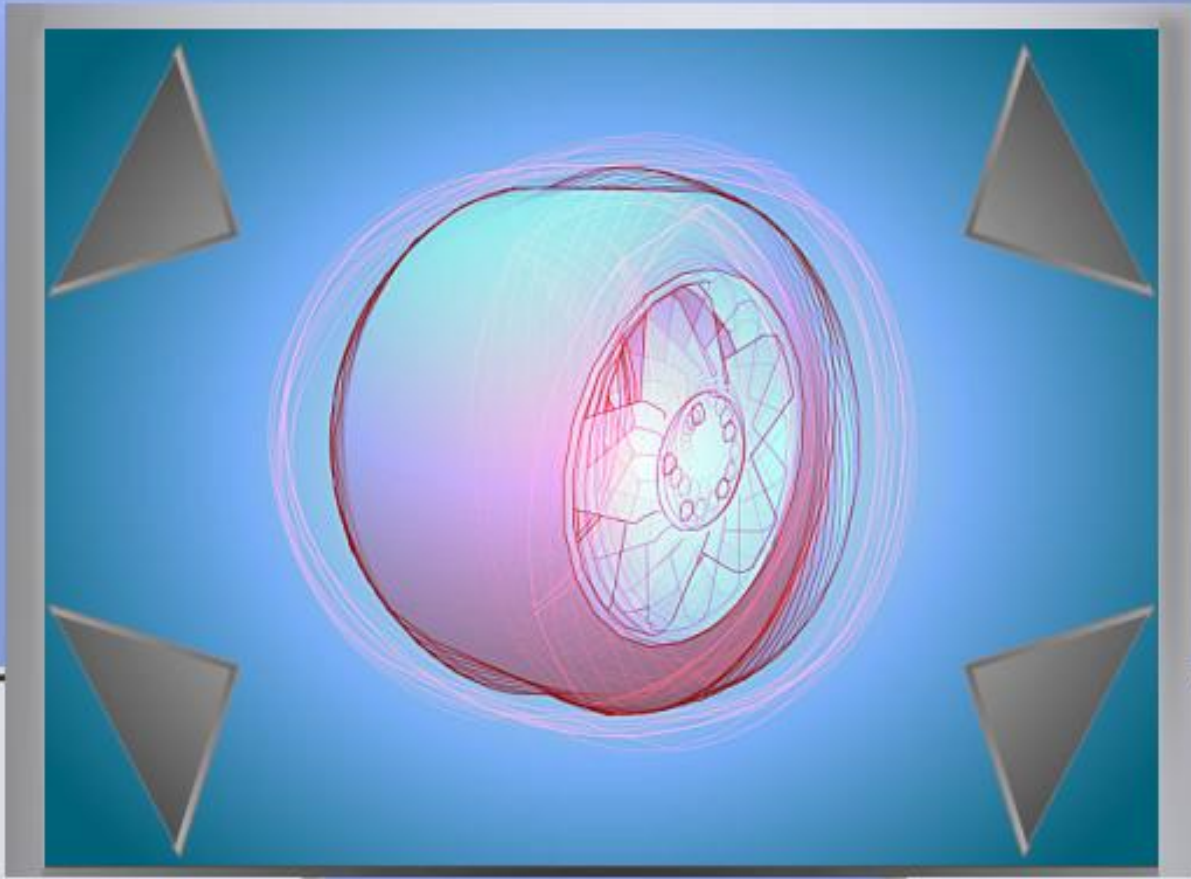
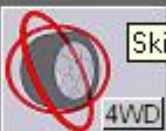
14'

Decrease

KIA SEPHIA



Roc selection, load and fuel level examination

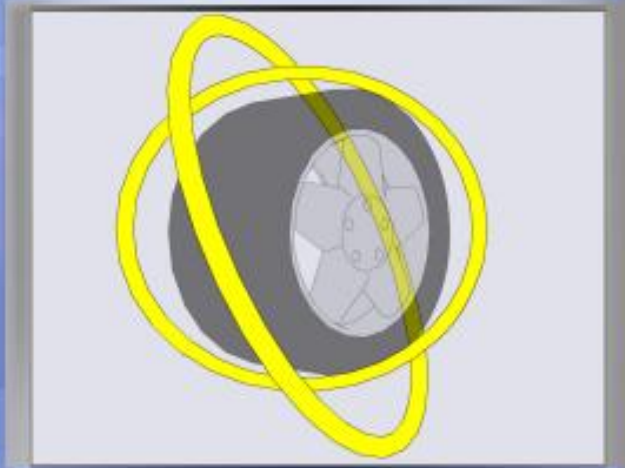
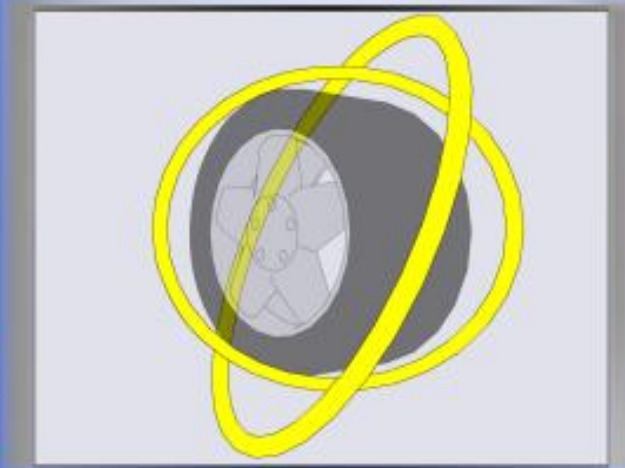
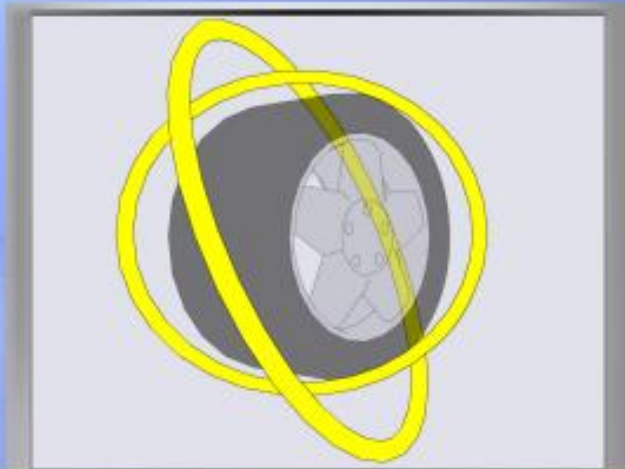
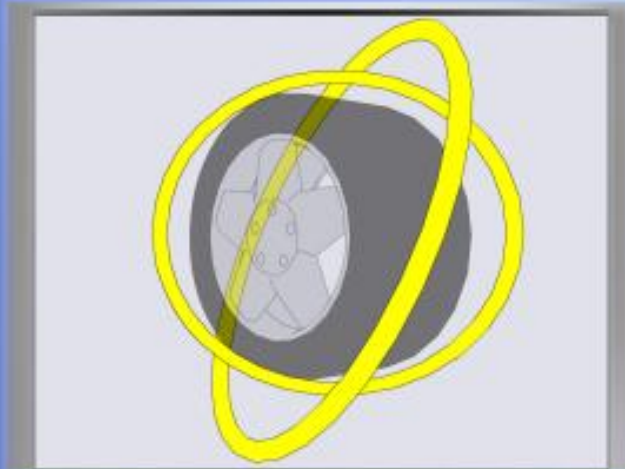


2-Point ROC

KIA SEPHIA



ROC

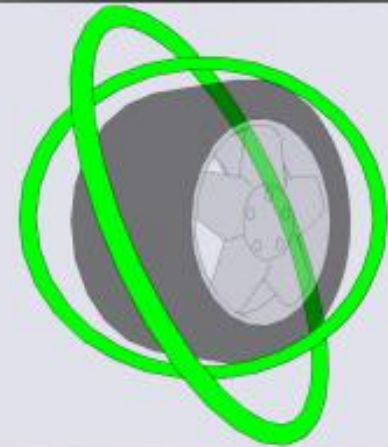
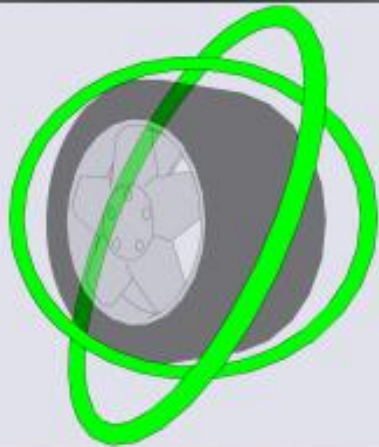


Skip ROC

KIA SEPHIA



ROC

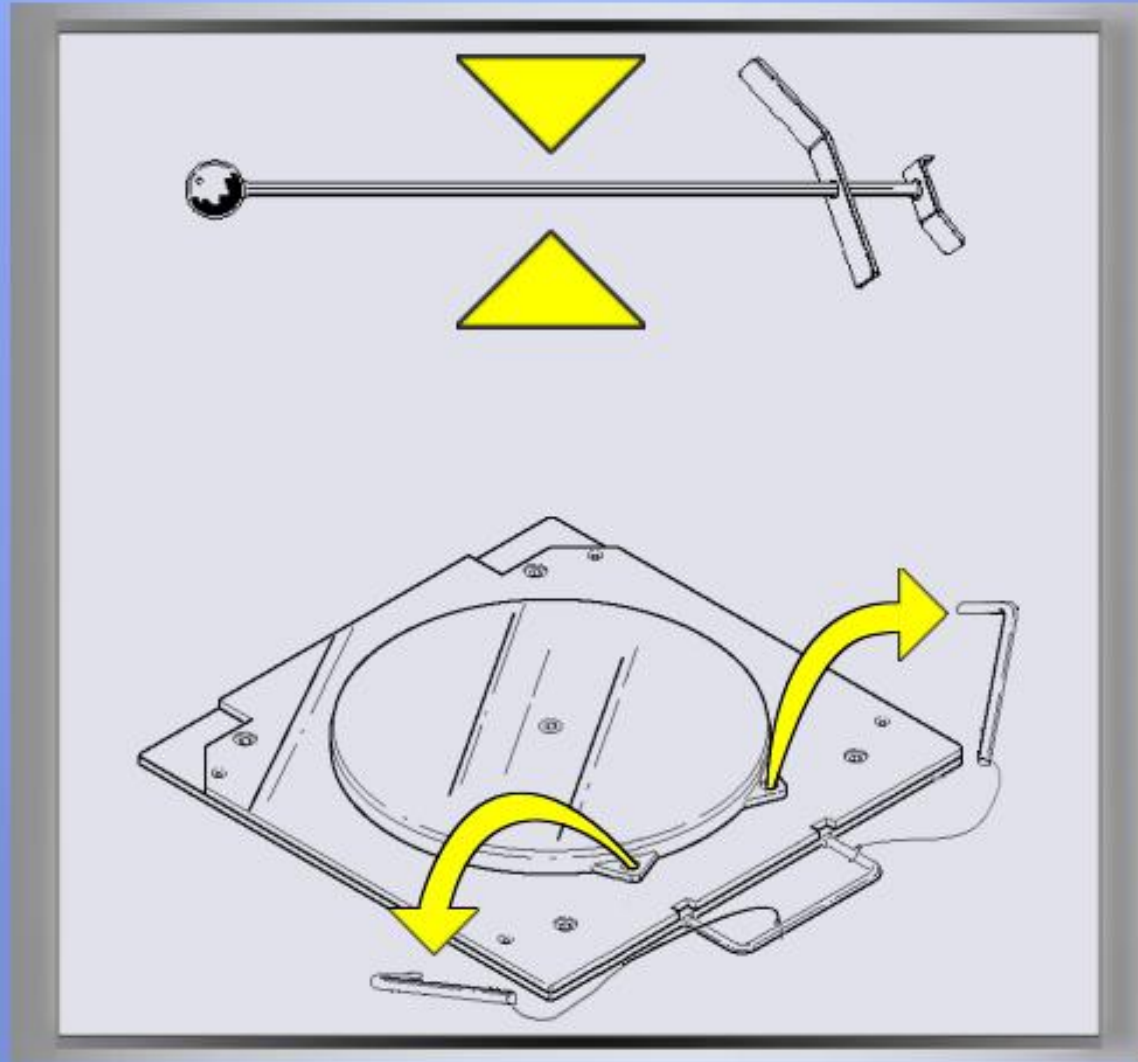


Skip ROC

KIA SEPHIA



Preparing a Vehicle for Alignment

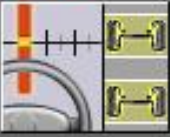
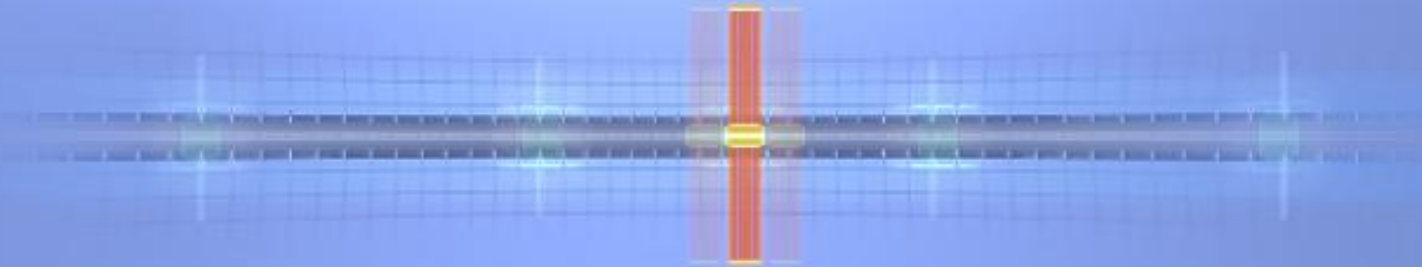


Yes

KIA SEPHIA



Wheel alignment



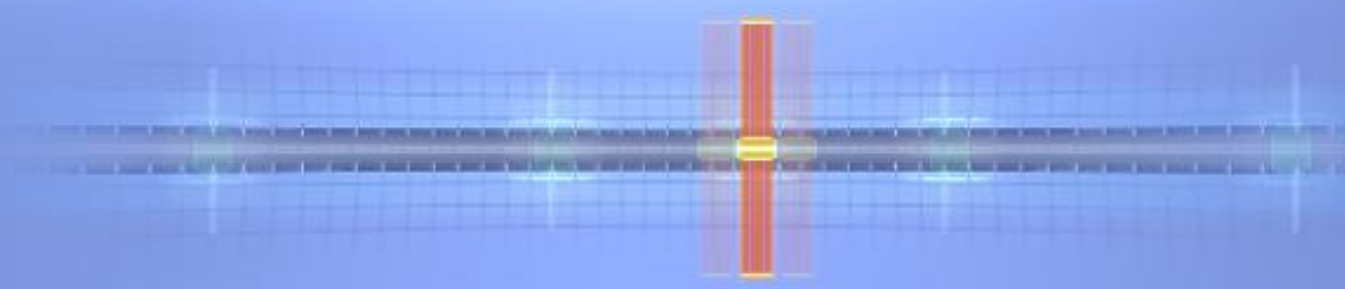
Skip Operation

Skip Operation

...



Steering angle



00°00'



00°00'

Skip Operation

...





Steering angle

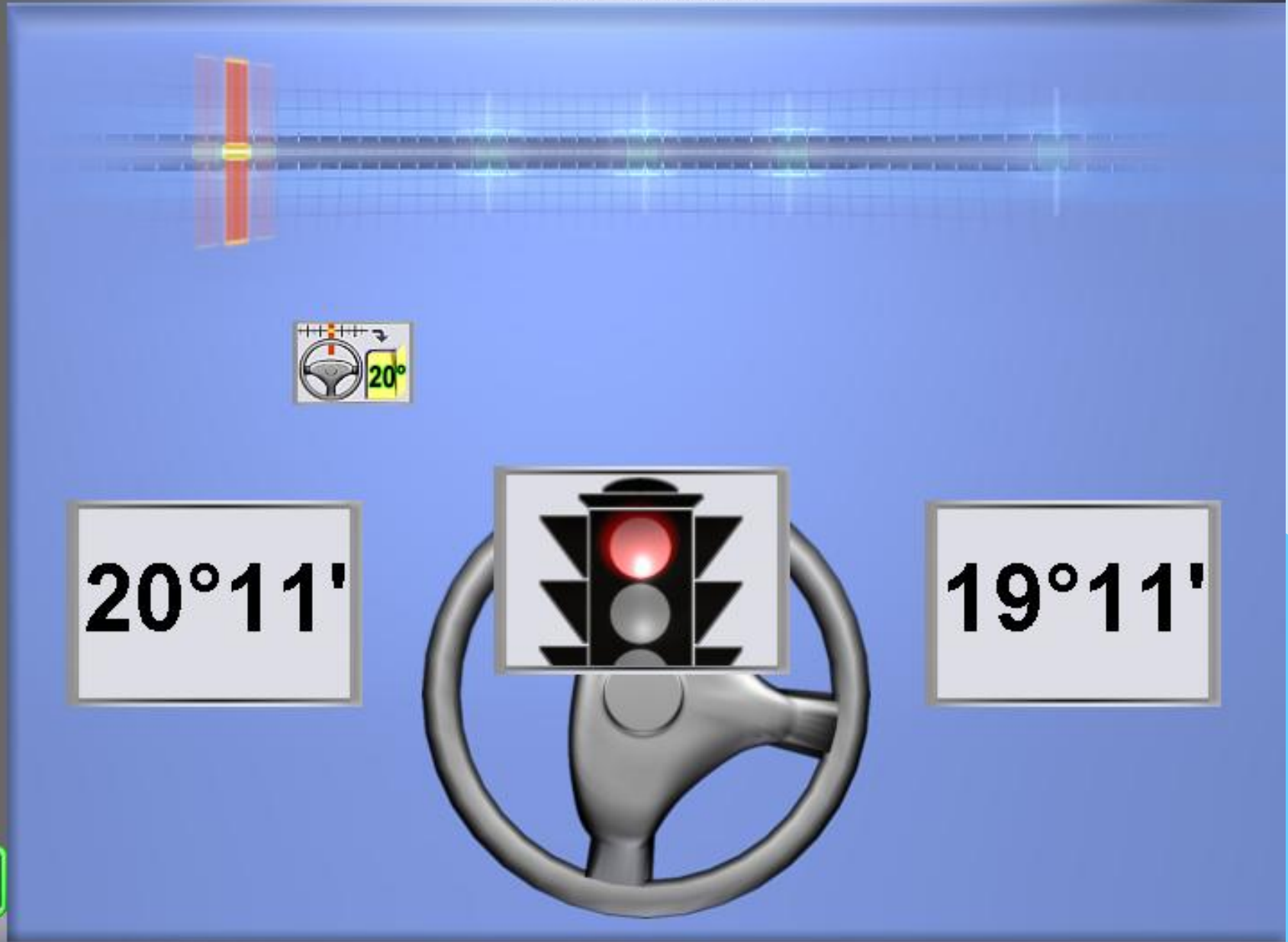
The simulation interface features a blue background with a grid. At the top, a red vertical bar with a yellow center is positioned on a horizontal line. Below this, a horizontal slider bar with a green indicator is shown. In the center, a steering wheel is overlaid with a traffic light icon, where the red light is illuminated. To the left of the steering wheel is a white box containing the text $19^{\circ}58'$. To the right is another white box containing the text $18^{\circ}58'$.

Skip Operation

...



Steering angle



$20^{\circ}11'$

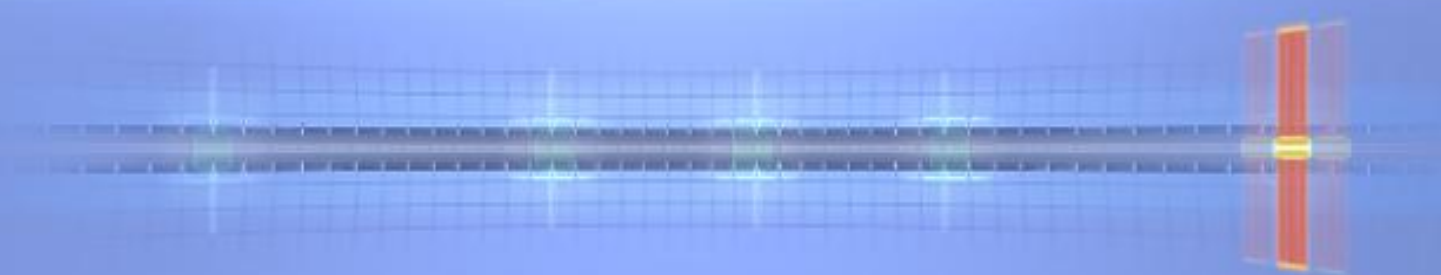
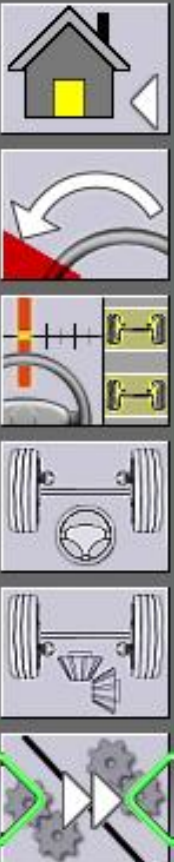
$19^{\circ}11'$

Skip Operation

...



Steering angle



18°34'



19°58'

Skip Operation

...



Steering angle



18°31'



20°00'

Skip Operation

Skip Operation

...

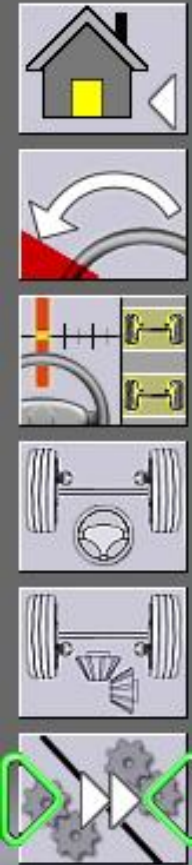


Steering angle

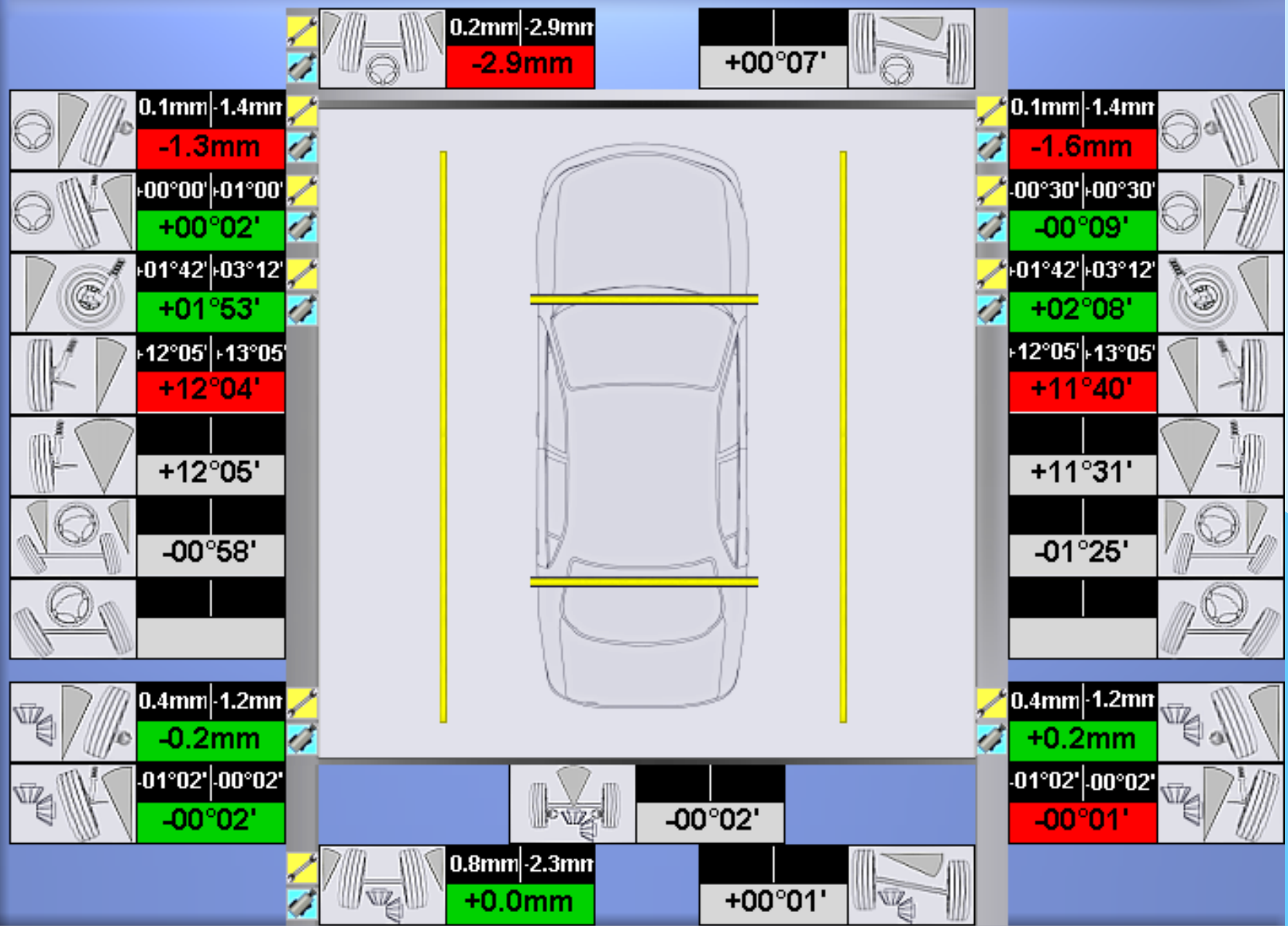
The interface features a central steering wheel with a traffic light icon in the center, where the red light is illuminated. Above the wheel is a horizontal scale with a green indicator bar. Two side panels show steering wheel icons with a 20-degree angle and a yellow '20°' label. A large digital display on the left shows '00°02'' and a large digital display on the right shows '00°00''. The background is a blue grid.

Skip Operation

...

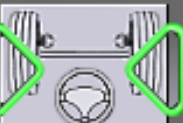
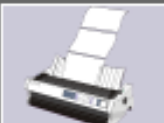


Data Summary





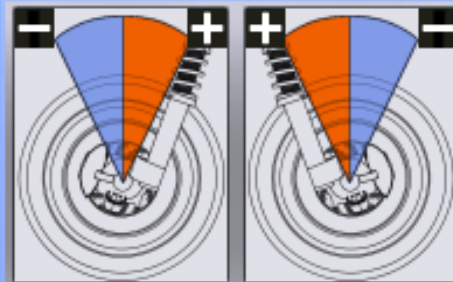
Front Axle



Caster

+01°42' +02°27' +03°12'

+01°47'



Caster

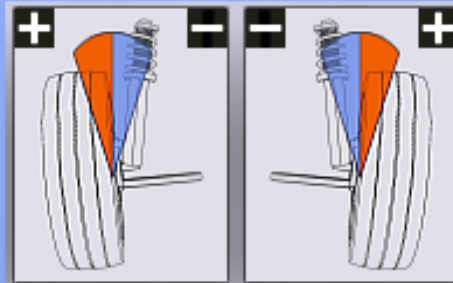
+03°12' +02°27' +01°42'

+01°46'

Camber

+01°00' +00°30' +00°00'

+00°00'



Camber

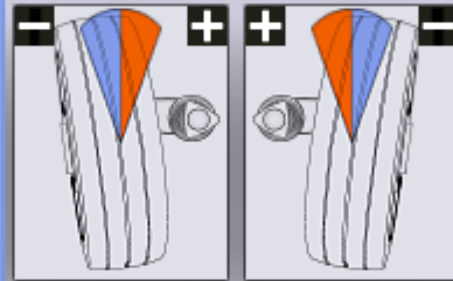
-00°30' +00°00' +00°30'

-00°08'

Half-toe

-0.1mm +0.7mm +1.4mm

+3.1mm



Half-toe

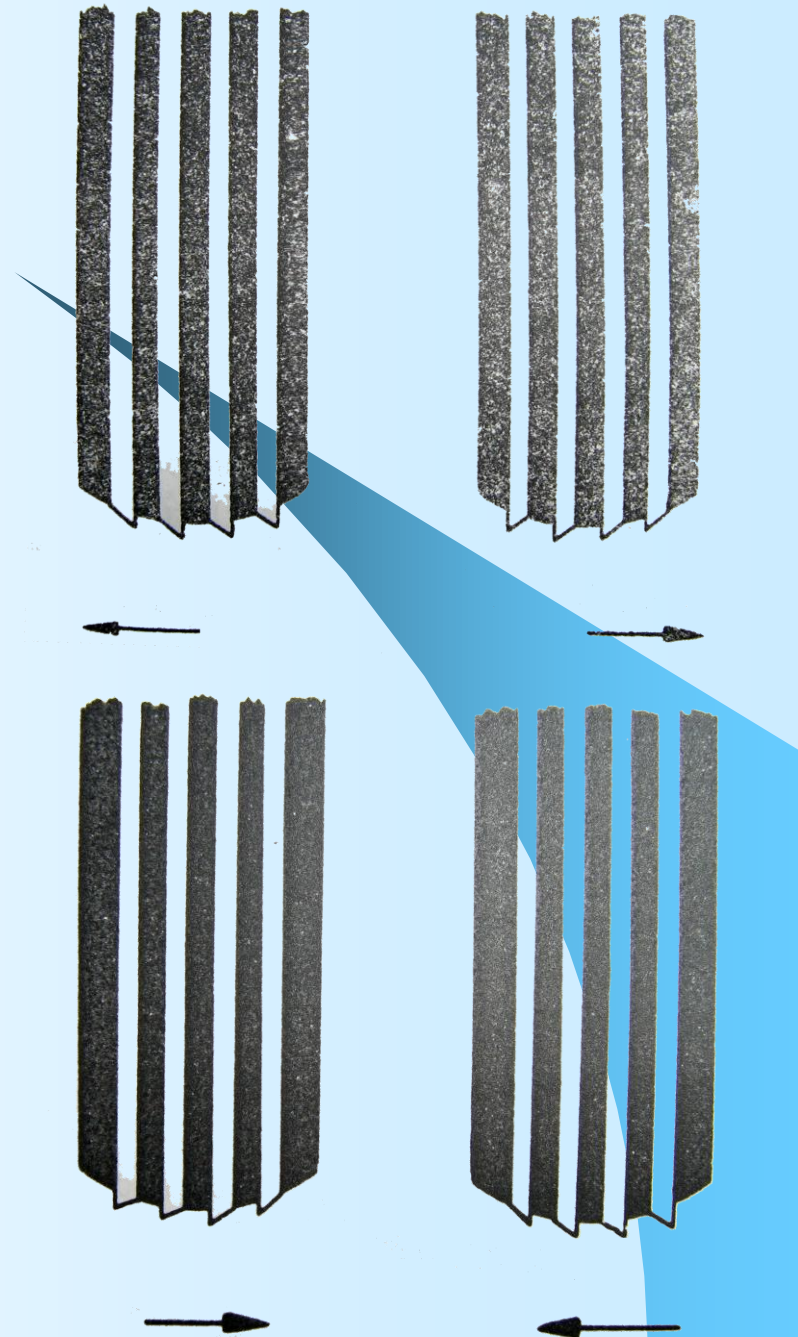
+1.4mm +0.7mm -0.1mm

-6.0mm

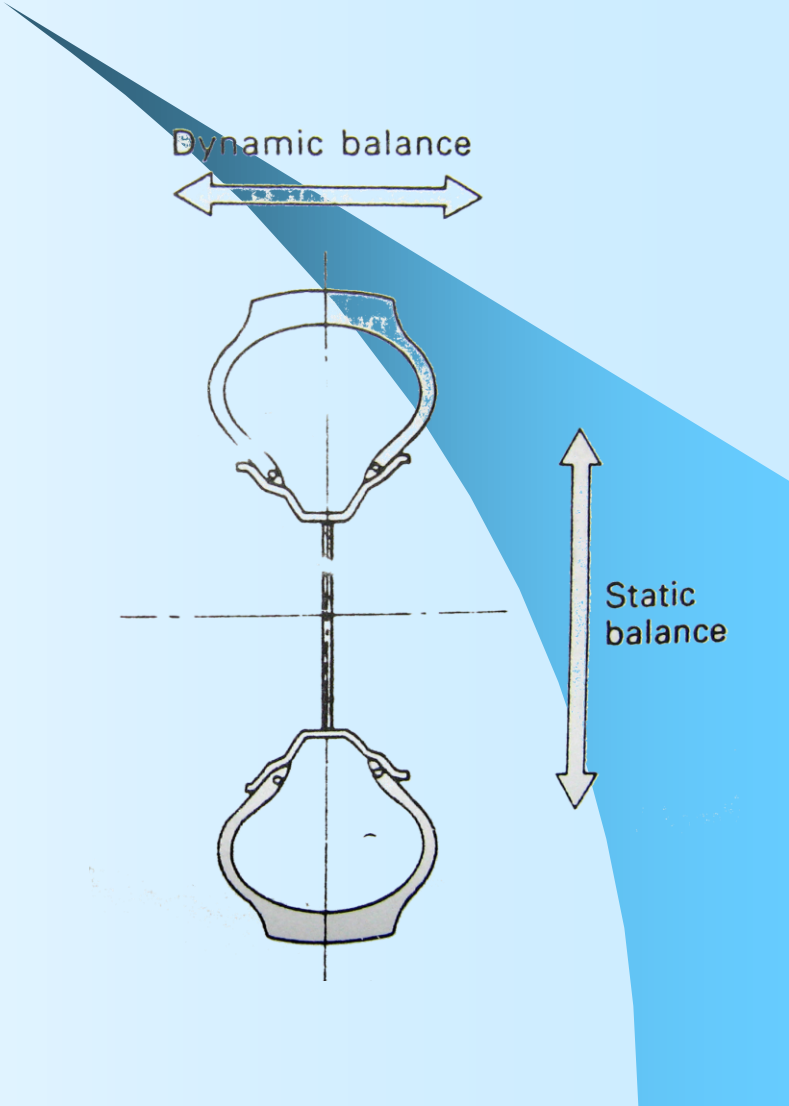
Front Axle

KIA SEPHIA

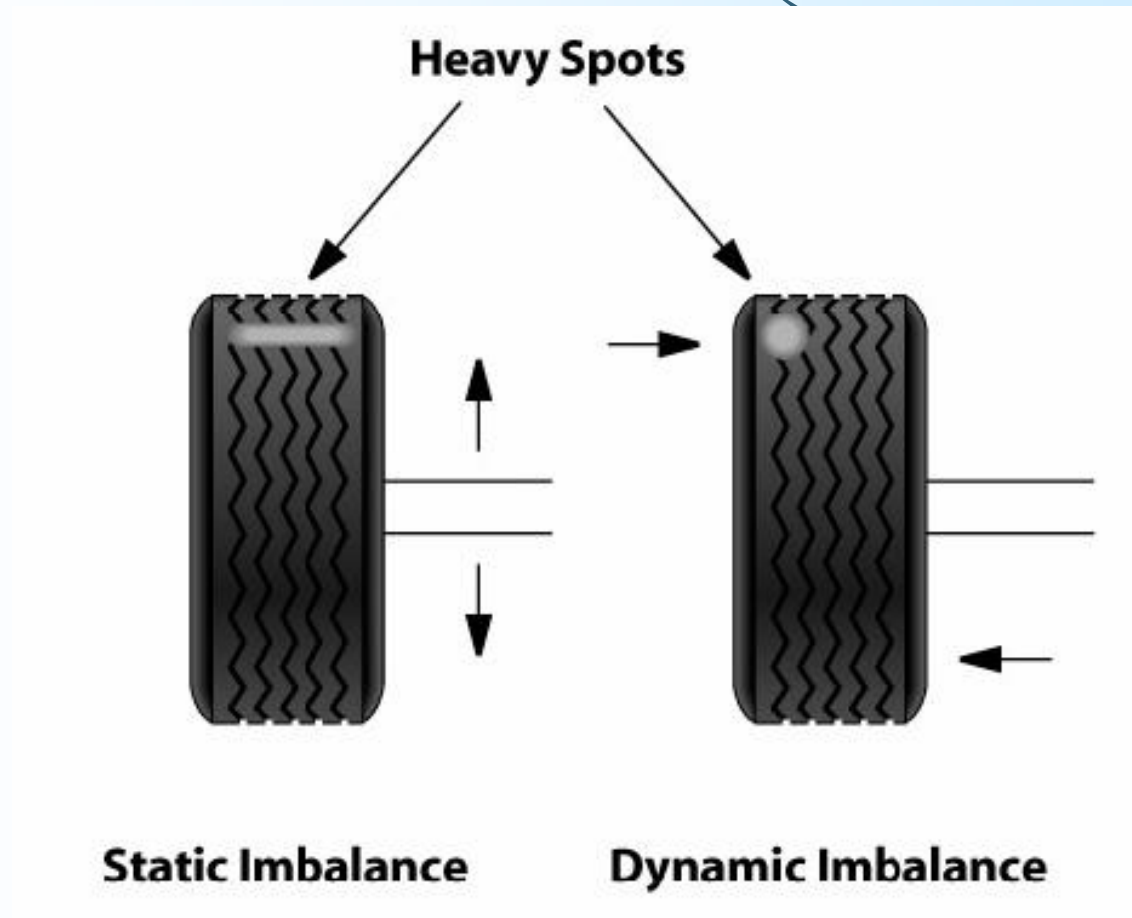
KEAUSAN BAN



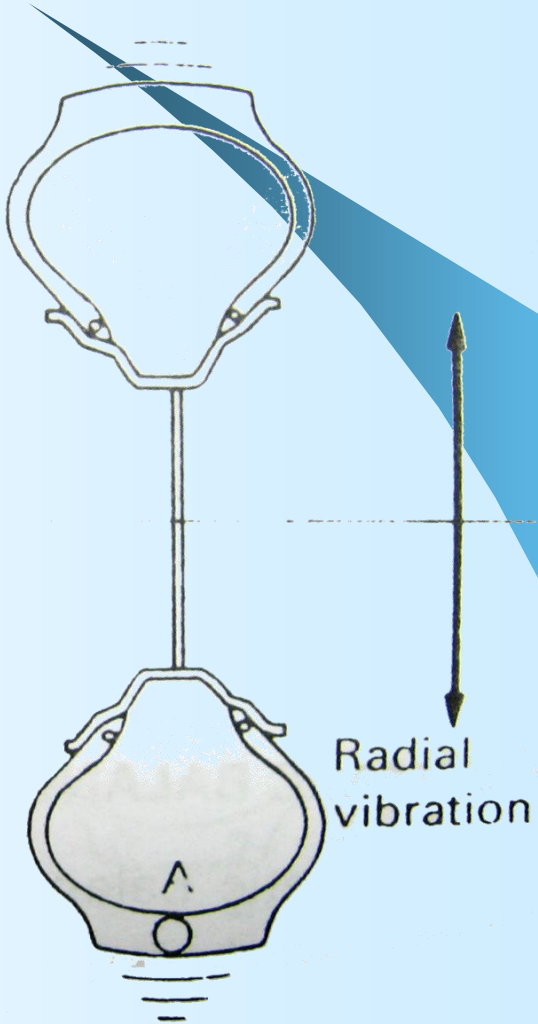
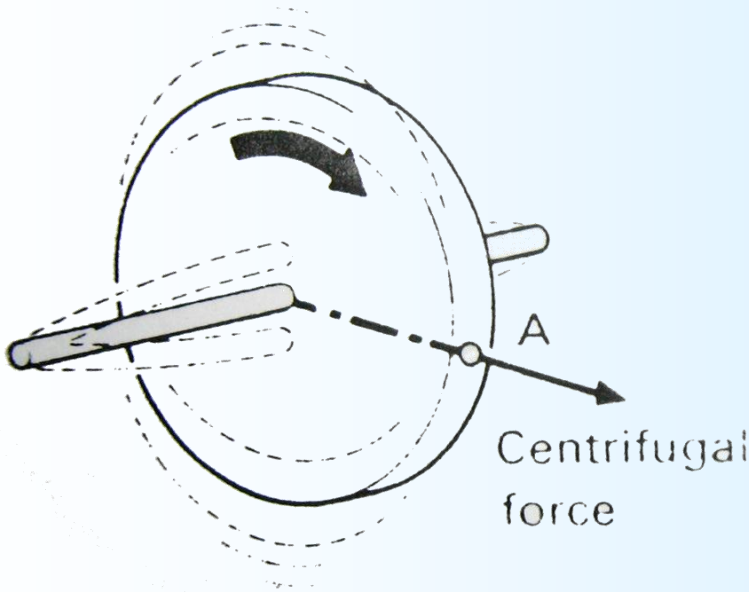
WHEEL BALANCE



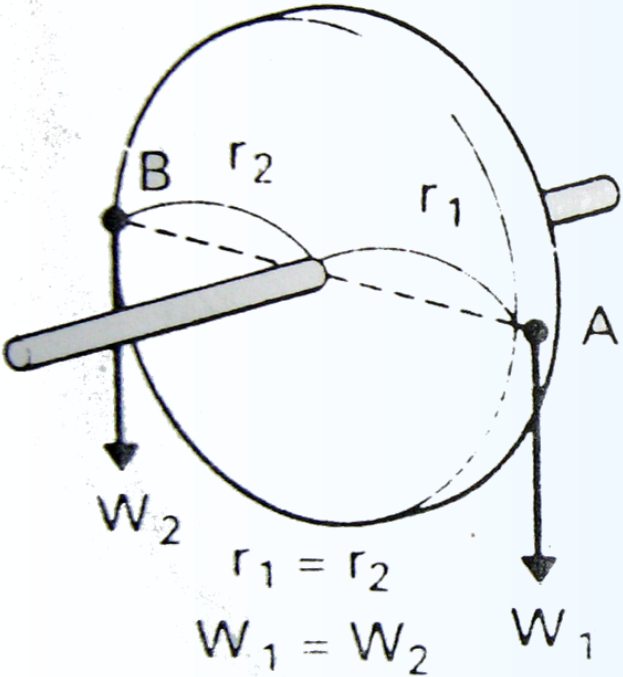
WHEEL BALANCE



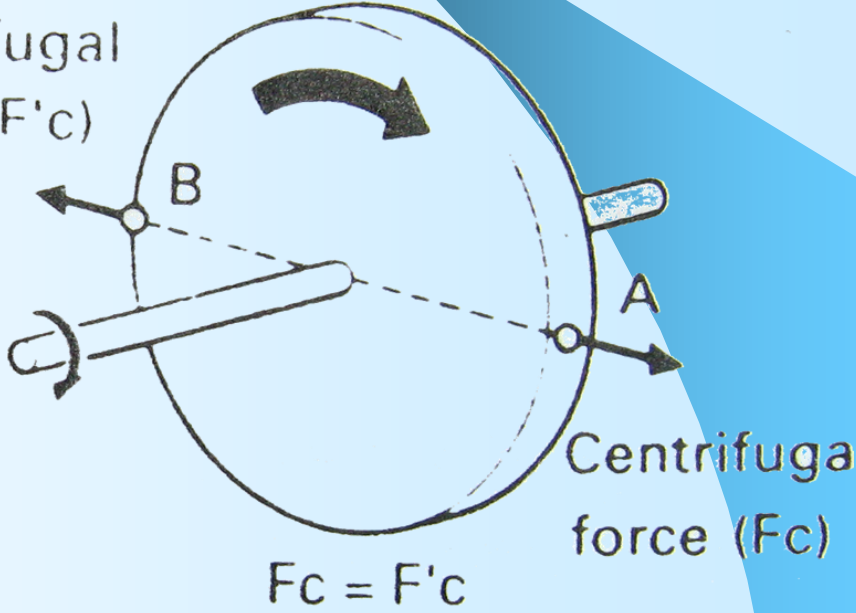
WHEEL BALANCE



WHEEL BALANCE



Centrifugal force ($F'c$)



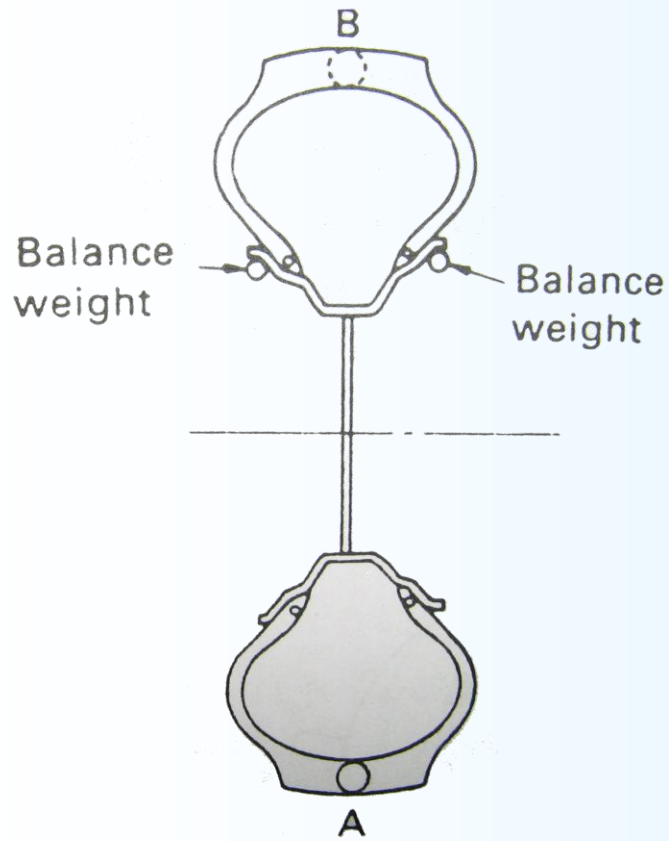
WHEEL BALANCE “HUNTER”



MONITOR WHEEL BALANCER W/
SPLIT FUNCTION



WHEEL BALANCE



User 1



g



Fine

ALU

1

2

3

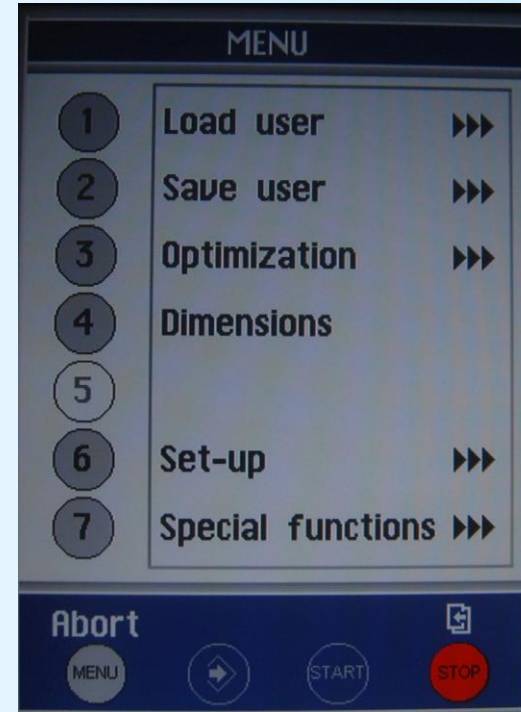
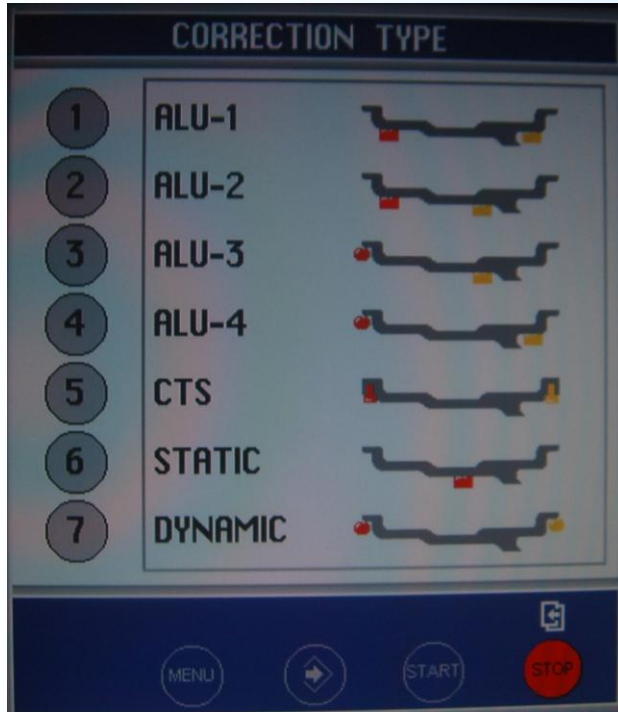
4

5

6

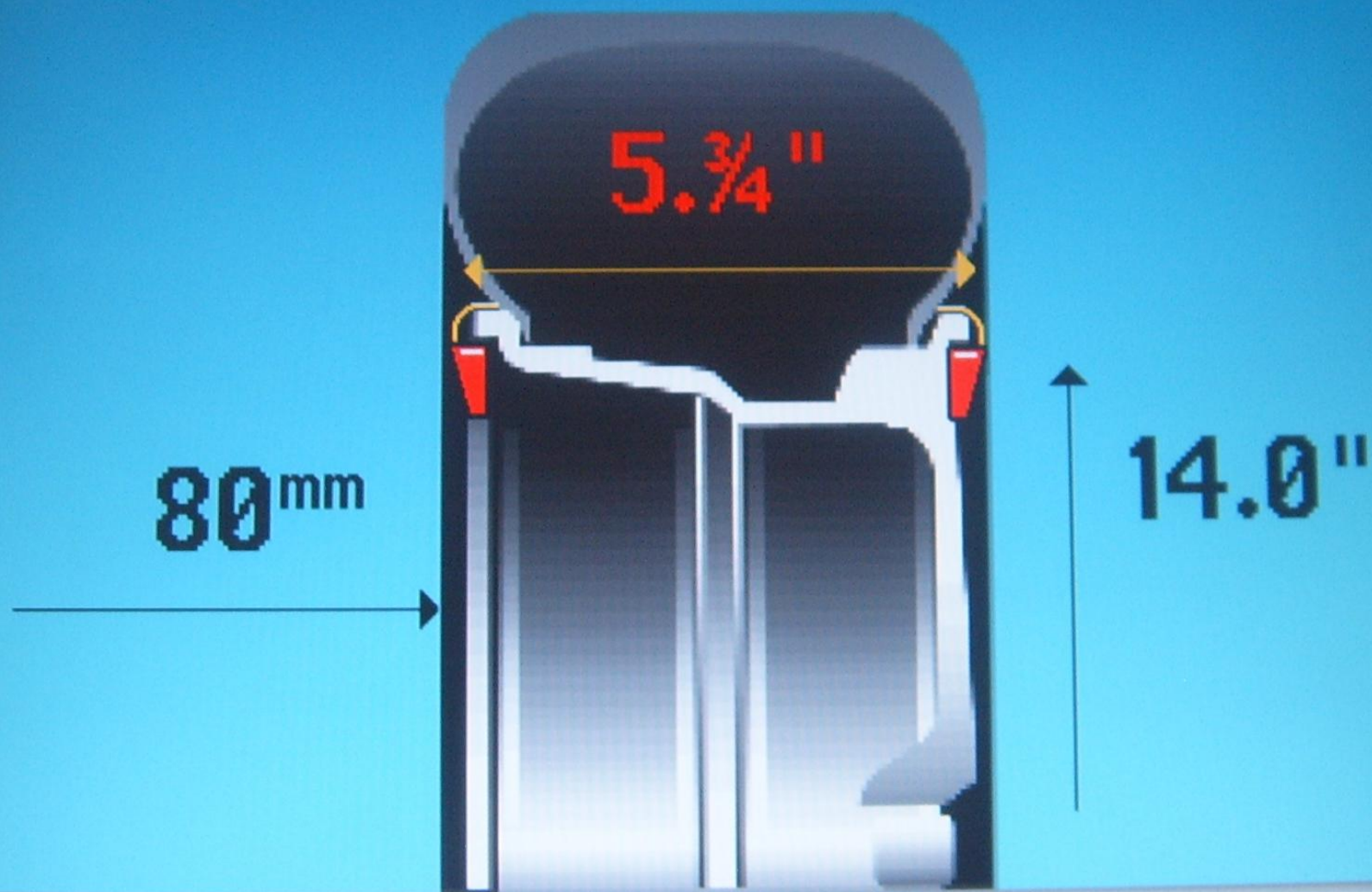
7

INTERFACE BALANCER



User 1

9



Select

-

+

Unit

ALU S

End

1

2

3

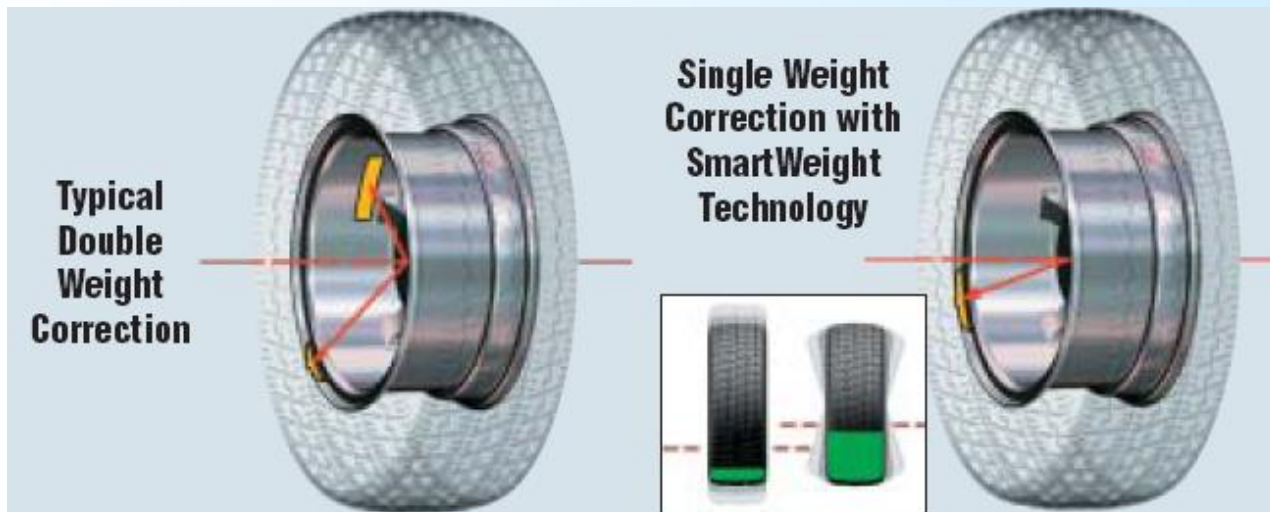
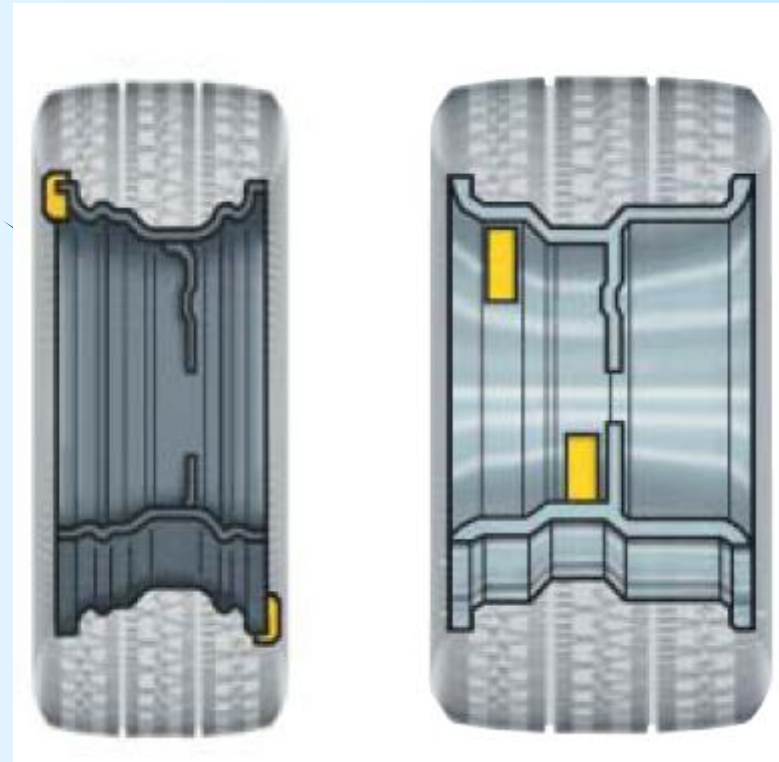
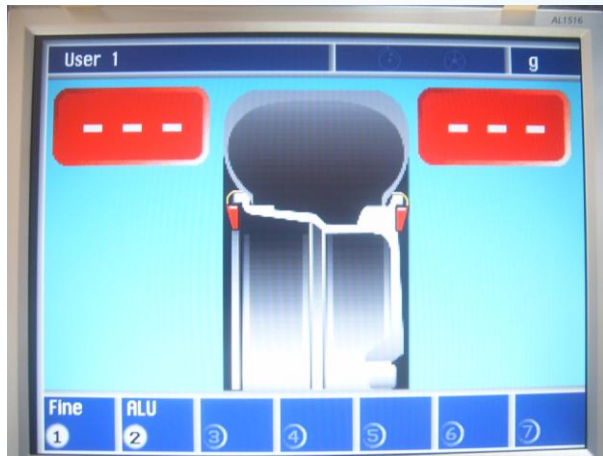
4

5

6

7

BALANCE WEIGHT



RUN-OUT

