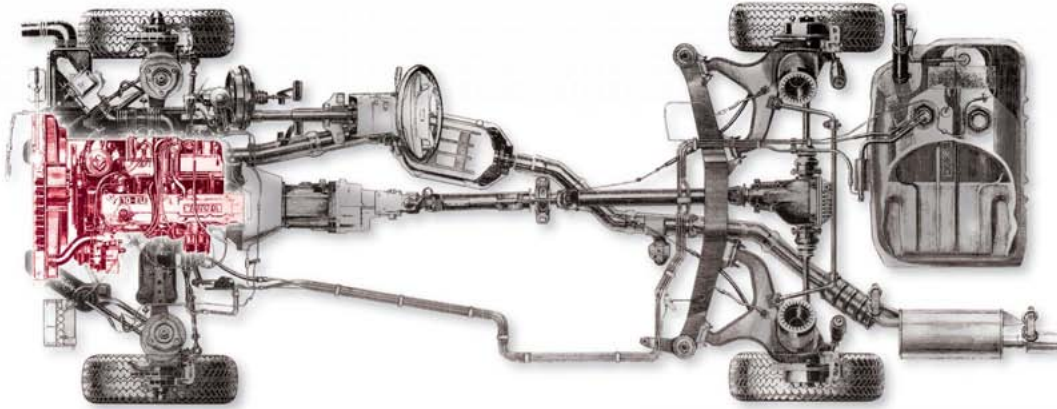


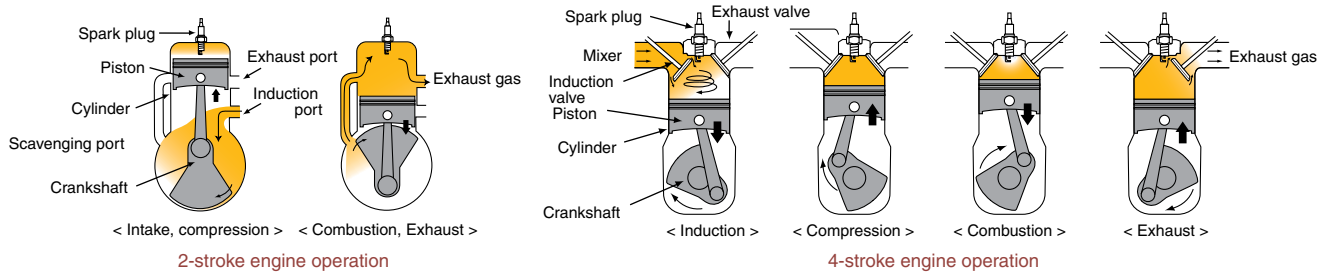
# Mechanism of Engine



### MECHANISM 1

## Combustion setup

Most vehicles nowadays use gasoline engines. However, depending on the combustion type, gasoline engines are divided into "2-stroke" and "4-stroke" categories. Gasoline is burned in the cylinder to create heat energy. Heat energy is then turned into kinetic energy as it is transferred from piston to crankshaft. One engine movement can be divided into 4 steps - induction, compression, combustion, and exhaust. 2-stroke engines only have a two-step up/down piston movement ("Induction and Compression" step and "Combustion and Exhaust" step). 4-stroke engines have four piston movements as previously mentioned. With the same displacement, a 2-stroke has a larger output than a 4-stroke. However, most cars use a 4-stroke engine due to the increased fuel economy and exhaust capability.



### MECHANISM 2

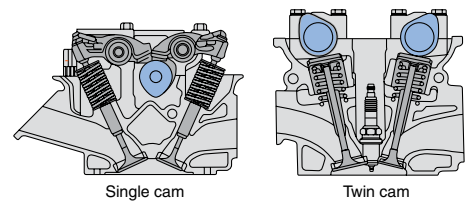
## Engine Makeup

When viewed externally from top to bottom, the engine is divided into an upper cylinder head, a cylinder block, and an oil pan. Many cylinder heads and cylinder blocks are made from cast iron or aluminum alloy. A gasket is placed between the two and they are locked together. This head gasket increases air tightness, and prevents gas, and oil & coolant leaks, as it is a sheet type of packing. The cylinder head is made up of a combustion chamber together with pistons and an intake/exhaust valve & camshaft is built in. A water jacket is provided to circulate coolant around the combustion chamber. In addition, the cylinder block is the main part and houses the pistons. The lower part is made up of a shaft bearing area that holds the crankshaft.

### MECHANISM 3

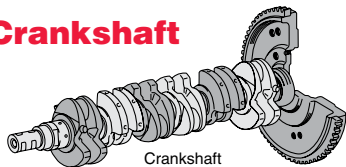
## Valve System

The system that drives the engine intake/exhaust can be a single cam (SOHC) driving the valve with a cam shaft, or a twin cam (DOHC) that separately drives the induction and exhaust valves with two cam shafts. Timing adjustments can be carried out easily to the camshaft as it is of a singular design. However, the operation of the parts situated midway along the shaft is sluggish. Although smooth, high-speed RPM is possible by using just one twin cam for the two camshafts, the structure is complicated and adjustments are difficult.



### MECHANISM 4

## Crankshaft

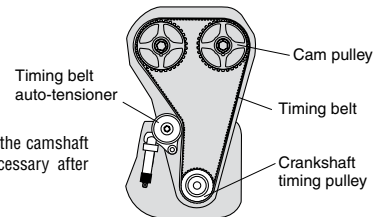


The crankshaft is a component that allows the pistons up/down movements inside the cylinder into a rotary motion, and is built into the lower part of the cylinder block. The crankshaft consists of a crank journal that is on the crankshaft's main axle, a crank pin that connects the piston's connecting rod (con-rod) and a crank arm that connects the crank pin and the crank journal. The crankshaft has been made out of special steel and cast iron for wear resistance, sturdiness and strength, so that large amounts of power can be transferred from the pistons and turned into high speed RPM.

### MECHANISM 5

## Timing belt

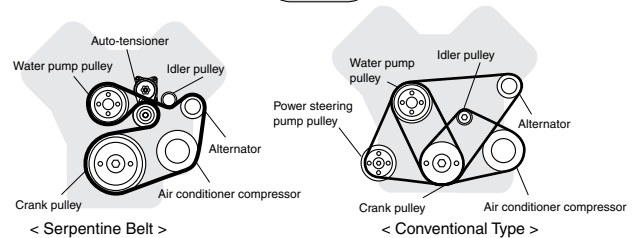
The role of the timing belt (a device with a chain instead of a belt is called a "timing chain") is to transfer power to the camshaft through the cam pulley for valve open/close operation. If the belt system is being used, replacement is necessary after approximately one hundred thousand kilometers.



### MECHANISM 6

## Role of the Belt and Auto-tensioner

On the exterior of the crankshaft timing pulley there is another belt that transfers crankshaft power to the alternator (generator), the air conditioner's condenser, and to the water pump that sends coolant around the engine. Conventionally, a number of belts were used. However, nowadays it has become mainstream to have a single Serpentine Belt driving all the devices at once. An auto-tensioner is installed to adjust the tension of this belt.



# Changing Engine Oil

ENGINE

●SCREWDRIVER ●T-SHAPED WRENCH ●SOCKET ●OTHER TOOLS

Remove the undercover **1**

●OFFSET WRENCH ●OTHER TOOLS

Remove the drain plug **2**

## Change the oil easily and effectively with a **KTC** oil drainer.

### Use a tray to catch the waste oil.

- Use a large wide hat type funnel to catch the waste oil.
- Use a funnel with an attached net to prevent debris such as drain plug from falling into the tank.
- Remove the wide hat for use in hard to reach areas.
- Offsetting is possible from the unit and the pipe making work easy. (\*This pack (Oriru-kun) is not included)

### Air pressure for easy discharge of used oil.

- Discharge is possible without a complex operation.
- Discharged hose can be stored when it is not being used.

### A large tank with a level gauge attached.

- The tank's free capacity can be seen and calculated.
- Large amounts of oil can be stored safely in large capacity tanks.

### Moveable parts tray

- Convenient for temporarily storing tools, i.e. draining plug, etc. Size: 95 x150 x 45

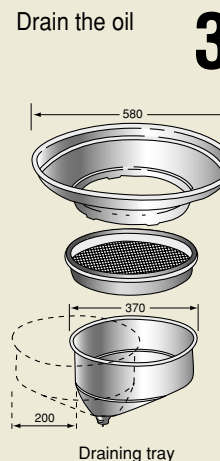
### Pipe handles allow for easy movement.

### Large castors provide easy movement and stability.

- Curbs and steps pose no problems. (2 front wheels)

### The castor wheels are equipped with a double brake mechanism that prevents both travel and swivel.

- The machine can be held steady during operation. (1 rear wheel and both front wheels of the machine (Oriru-kun))



## OIL DRAINER

No.	Draining Tray		Castor's Diameter		Air Coupler Draining for Input	Draining Hose	Draining by Air Pressure	▼kg
	Full Capacity	Wide Pad	Front (fixed)	Rear (moving)				
GOD80B	12 ℓ	●	φ150	φ80	20PM by Nitto Koki	φ19 2m	●	32

- Draining Tray Size: Large Diameter 580 (Small Diameter 370) x Height 300mm

\*Comes in packs of 3

\*Replacement parts are available. Check with your dealer for details.

\*Only use engine oil. Do not use any other type of oil.

**Tank**  
**80 ℓ**

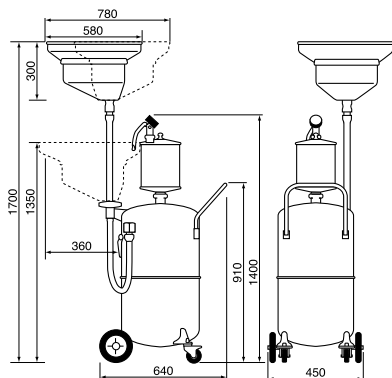
## ●OIL DRAINER



## Multi-functional

The transparent cylinder shows the state of draining clearly.

Talk to customers while checking the waste oil.



### Suction Adaptor

Suction Adaptor A	For Volkswagen
Suction Adaptor B	For BMW

### Suction nozzle (detachable)

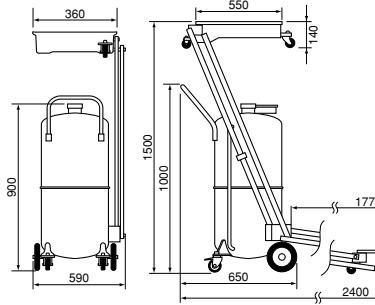
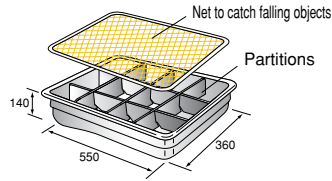
Flexible suction nozzle	Made of resin	Outer diameter φ5×700mm
Flexible suction nozzle	Made of resin	Outer diameter φ6×700mm
Flexible suction nozzle	Made of resin	Outer diameter φ8×700mm
Metal suction nozzle	Copper ore	Outer diameter φ5×700mm
Metal suction nozzle	Copper ore	Outer diameter φ6×700mm
Flexible suction nozzle	Made of resin	Outer diameter φ7×1,000mm

### 3 Drain the oil

#### ● OIL DRAINER



Thin tray; easy to get under vehicle.  
Partition prevents splashing oil during transfer. The net catches falling objects.



#### OIL DRAINER

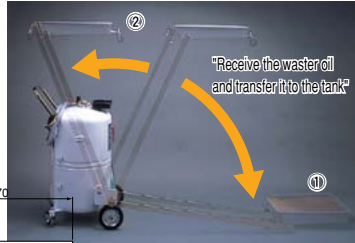
No.	Draining Tray		Castor's Diameter		Air Coupler Draining for Input	Draining Hose	Draining by Air Pressure	▼kg
	Full Capacity	Wide Pad	Front (fixed)	Rear (moving)				
GOD115C	14 ℓ	-	φ 180	φ 80	20PM by Nitto Koki	φ 19 2m	●	46

• Draining Tray Size: Length 360 × Width 550 × Height 140mm

#### Arm-type

Applicable to cars that cannot be elevated.  
Convenient in a shop where high-roof vehicles or RVs cannot be elevated.

Tank  
**115 ℓ**



#### ● OIL DRAINER



Wide opening easy to receive waste oil

Convenient height. Reaches 1700mm, enough to approach drain at the high position. Prevents splashing of waste oil.

#### OIL DRAINER

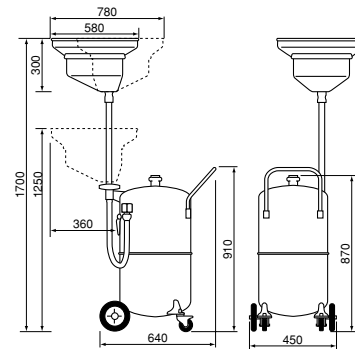
No.	Draining Tray		Castor's Diameter		Air Coupler Draining for Input	Draining Hose	Draining by Air Pressure	▼kg
	Full Capacity	Wide Pad	Front (fixed)	Rear (moving)				
GOD80A	13 ℓ	●	φ 150	φ 80	20PM by Nitto Koki	φ 19 2m	●	35

• Draining Tray Size: Large Diameter 580 (Small diameter 370) × Height 300mm

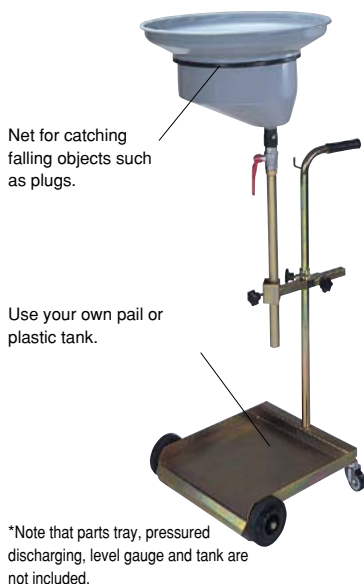
#### Standard Design

Valuable unit with the large tray and convenient height, useful also for car inspection.

Tank  
**80 ℓ**



#### ● OIL DRAINER



Net for catching falling objects such as plugs.

Use your own pail or plastic tank.

\*Note that parts tray, pressured discharging, level gauge and tank are not included.

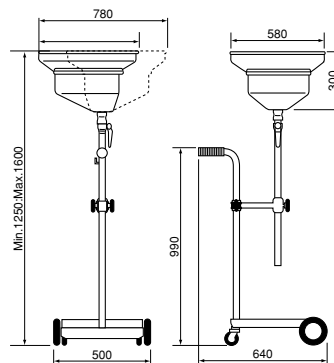
#### OIL DRAINER

No.	Draining Tray		Castor's Diameter		Air Coupler Draining for Input	Draining Hose	Draining by Air Pressure	▼kg
	Full Capacity	Wide Pad	Front (fixed)	Rear (moving)				
GOD20D	13 ℓ	●	φ 125	φ 60	-	-	-	17

• Draining Tray Size: Large Diameter 580 (Small Diameter 370) × Height 300mm

#### Practical Design

Excellent cost performance, Simplified model with minimal function.



**OIL DRAINER**

No.	Tank		Castor's Diameter		Air Coupler Draining for Input	Induction Hose	Oil Discharge Methods	▼kg
	Full Capacity	Available Capacity	Fixed					
<b>GOD24B</b>	24 ℓ	20 ℓ	φ 125		20PM by Nitto Koki	φ 19 2m	manual	13.7

\*Only use engine oil. Do not use any other type of oil.

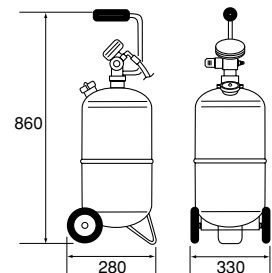
\*Replacement parts are available. Check with your dealer for details.

**Movable model**

Small, movable, lift-out type.

Convenient for providing outside services

**Tank**  
**24 ℓ**



**Suction nozzle (detachable)**

<b>Flexible suction nozzle</b>	Made of resin	Outer diameter φ5×700mm
<b>Flexible suction nozzle</b>	Made of resin	Outer diameter φ6×700mm
<b>Flexible suction nozzle</b>	Made of resin	Outer diameter φ8×700mm
<b>Metal suction nozzle</b>	Copper ore	Outer diameter φ5×700mm
<b>Metal suction nozzle</b>	Copper ore	Outer diameter φ6×700mm
<b>Flexible suction nozzle</b>	Made of resin	Outer diameter φ7×1,000mm

**COMPACT OIL DRAINER (CARRING TYPE)**

Expected release date: September 2005



Drain the oil **3**



**KTC Oil Filter Wrench Series**

There are four KTC wrenches available to deal with the various types of oil filters - cup type, chain type, band type and adjustable type. In particular, there are 31 sizes in total for the cup size - 12 sizes for domestic cars, 13 sizes for imported cars and 6 sizes for larger vehicles.

Remove and replace the oil filter **4**



**Characteristics of KTC Oil Filter Wrenches**

**A low height, easy fit, non-slip large design**

A design that is restricted in height, easy to operate, and has a large area for the oil filter wrench and the oil filter to work in (depth of the fitting area).

**Improved operation!**

With its gripped outer shape, slippage when fitting the oil filter by hand is reduced.

**The aluminum tool weighs only 60% of conventional steel products.**

Through aluminum die-casting, the wrench has been molded into a single entity\* to weigh just 60% of conventional steel products.

\*With a large diameter, an insert manufacturing method is employed that has applied steel onto the driving angles (Structural steel).

**Drive tool choice**

Depending on the working requirement, an inserting type or a hexagonal type is available. (For domestic and imported vehicles: Use the driver 3/8"sq. hexagonal 2-faced width 24mm) (For larger diameters: Use the 1/2"sq. hexagonal 2-faced width 27mm)

**CUP TYPE OIL FILTER WRENCH SET D.PAT.**

**CUP TYPE OIL FILTER CARTRIDGE WRENCH SET**

**Cup type oil filter wrench set (12 sets)**

<b>No. AVSA12A</b>	▼kg 4.1
Oil filter wrench	AVSA-063, 064, 067, 073, 074, 079, 080, 089, 092, 095, 099, 101
Metal case (390×245×75)	

**Cup type oil filter wrench set (8 sets)**

<b>No. AVSA08A</b>	▼kg 3.7
Oil filter wrench	AVSA-064, 067, 073, 079, 080, 095, 099, 101
Metal case (390×245×75)	



AVSA12A



AVSA08A

\*Please check the merchandise inventory for a product that is marked by before placing an order.