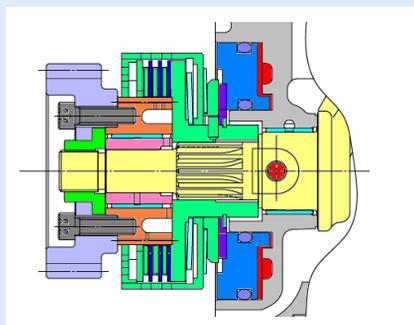


# Air Compressor

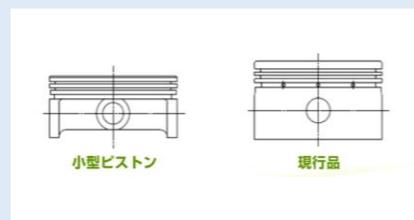


## Eco type Air Compressor



### Reduction in power consumption

Reduced power consumption during unloading by clutch structure



### Small size and light weight

Weight reduction by adopting aluminum monoblock case.

Overall height shortened by adopting a small piston.



### Reduction of oil carry over

Operation stops during unloading due to the clutch structure



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## Usage

### Truck/Buss/Construction and more...

A device that generates compressed air

## Adoption example

### production results

Heavy and Middle duty truck & buss

Annual production volume : 200,000pcs

Cumulative production volume 8million pcs  
(since 1948~)

## Specification

Bore	Φ85mm
Stroke	50mm
Cylinder	1cyl&2cyl
Volume	285cm <sup>3</sup> /rev
Air Pressure	1.5MPa
rpm(MAX)	3000min-1
Cooling type	Water Cooling
Lubrication type	Engine oil

For details, please contact us from our website.



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# Vacuum Pump (camshaft drive)



## Vacuum Pump (Vane type)

### Usage

- negative pressure source for vehicle
- Versatile

### Features

- Low cost due to mass production (for Passenger car)
- Oil-lubricated vane vacuum pump
- With anti-reverse rotation function (with relief valve)

### Specification

Volume	100~270 [cc/rev]
rpm(MAX)	3,750[rev/min]



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# Vacuum Pump (Gear drive)



## Vacuum Pump (Vane type)

### Usage

- negative pressure source for vehicle
- Versatile

### Features

- Low cost due to mass production (for commercial vehicle)
- Oil-lubricated vane vacuum pump
- Rotation speed can be adjusted by gear ratio

### Specification

Volume	60~90 [cc/rev]
rpm(MAX)	10,000[rev/min]



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# e-Vacuum Pump



## Motor drive Oil free e-vacuum pump

- **Motor drive**  
For EV/HEV and more...
- **Oil free**  
The vane/rotor material uses a carbon material suitable for non-lubrication.
- **Other**  
Free mounting position  
No oil piping required



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## Usage

- negative pressure source for vehicle
- Versatile

## Specification

Developed

	Passenger car	Light duty truck
Volt	DC12V	DC24V
Motor	With brush	Brushless
Vacuum	86 kPa[ <i>min</i> ]	85 kPa[ <i>min</i> ]
Time	8 sec[ <i>max</i> ] (Tank volume=4L)	13 sec[ <i>max</i> ] (Tank volume=7L)
Mass	1.25 kg	1.95 kg

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# Leveling Valve



TYPE I

Automatically adjusts the height of the air spring

## Usage

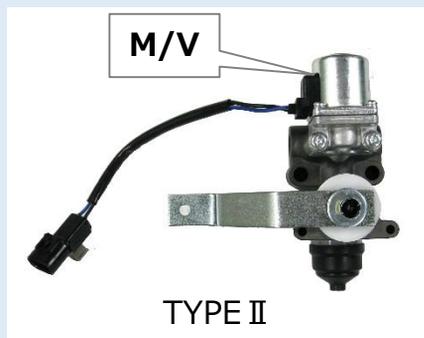
Automatically adjust valve for the air.

## Features

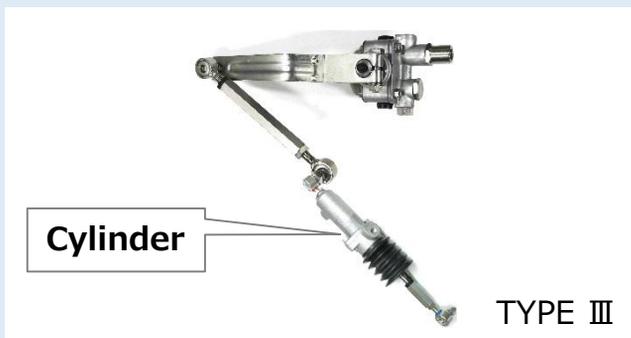
- Currently being produced for commercial vehicles. (low cost)
- Variety rich
- Available with solenoid valve (TYPE II)
- Available with cylinder (TYPE III)

## Specification

Temperatures[°C]	-30~80°C
Air pressure rengo	Max 850kPa (耐圧2MPa)



TYPE II



TYPE III



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# Bypass valve for exhaust



**Resistant to  
high temperatures and  
adhesion.**

**Electric butterfly valve  
for exhaust gas.**



**Gas resistance temperature 350°C**  
Thermal damage to the motor is reduced  
by the heat dissipation of the ADC material.



**Prevents condensate sticking**  
Cantilevered valve structure adopted



**Simple structure**  
high torque motor.



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## Usage

**Reduction of fuel consumption  
by exhaust heat recovery system**

**Improvement of exhaust gas by EGR system**

## Specification

Passage diameter	Φ 6 0
degree of opening	0 ~ 7 0 [deg]
Gas resistance temperature.	3 5 0 [°C]

---

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# Adjust air valve with solenoid valves



## Air valves With solenoid valve

### 用途

Vehicle height adjustment for buss

### Features

- Compatible with various sheet methods.  
(poppet valve, flapper valve, butterfly valve)

### Specification

Structure	Magnetic valve(normal close)
Pass diameter	Φ8.5
Drive volt	DC24V
response	200ms以下



TYPE A



TYPE B



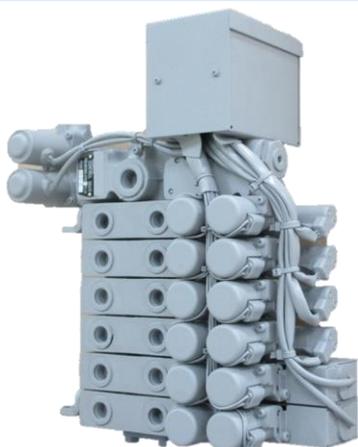
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# Radio control valve



**Operation unaffected by load fluctuations is possible.**  
**hydraulic switching valve.**

## Ecology

- Pressure can be controlled according to the load by the load sensing relief valve.
- Leakage can be reduced, heat generation can be suppressed, and pump load can be reduced.

## Improve operability

- Operation unaffected by load fluctuations with load sensing relief valve and flow control valve.  
There is no speed difference between heavy and light objects, and you can always operate the actual machine with the same operational feeling.
- High-precision spool position control is possible by adopting a high-speed response valve (response in milliseconds) and feedback control from a displacement detection sensor.



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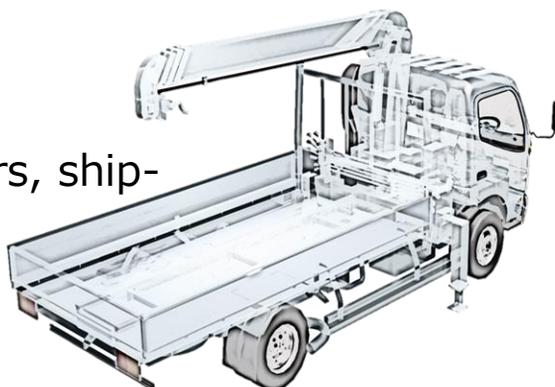


## Usage

**A valve that switches hydraulic pressure by remote control**

### Mounted

Truck-mounted cranes, carrier cars, ship-mounted cranes, etc.



## Mass products

**Truck-mounted cranes share 50% of DOM (Annual 11,000pcs/year)**

## Specification

Rated flow	30~60L/min
Maximum flow rate	90L/min
Maximum working pressure	21.6MPa
Number of stations	1~8連
Unload function	w/ , w/o
Relief valve	2-step pressure setting
Spool stroke sensor	w/ , w/o
Control	PWM, ON/OFF control
Other	Solenoid valve with surge suppressor

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## Other

**Hydraulic switching valves can be set according to various specifications.**

### < Remote control valve setting example >

Valve application example	No.	Pressure [MPa]	Flow rate (L/min)	Position sensor
For crane operation	4~8	17.2~19.6	90	Transformer Switch
For vehicle haulers (LDT,MDT)	2~4	17.2~19.6	90	Switch
For vehicle haulers (HDT)	2~6	17.2~19.6	90	Switch
Other , Special	1~8	14.7~21.6	90	Switch

### < Manual valve setting example >

Valve application example	No.	Pressure [MPa]	Flow rate (L/min)	Position sensor
For crane operation	4~7	17.2~19.6	90	Spring center
For vehicle haulers (LDT,MDT)	4	17.2~19.6	120	Spring center
For vehicle haulers (HDT)	1~6	17.2~19.6	90	Spring center, Detent

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# Bypass valve for EGR cooler



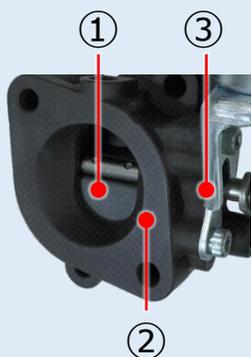
**Suppresses the generation of harmful substances contained in exhaust gas at cold start**



## Compact, light and simple

Uses a butterfly valve to operate with less force. The actuator is compact and lightweight. Further reduce the weight by selecting a resin actuator.

## High reliability to withstand condensate and deposits.



- ① A special coating is applied to the valve to prevent sticking.
- ② Surface treatment on the body prevents corrosion.
- ③ The shaft seal is doubled to prevent condensed water leakage from the shaft.

## Switches the flow of exhaust gas with high precision.

Optimal design reduces exhaust gas leakage. It switches the valve with high precision and enhances the bypass effect of the EGR cooler.



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## Usage

**Suppresses the generation of harmful substances in the EGR system.**

By using our EGR cooler bypass valve, you can improve the exhaust gas by bypassing the EGR cooler when the exhaust gas temperature is low.

## Adoption example

### Mass products

Used in light trucks and pickup trucks, more than 140,000 units have been manufactured.

## Specification

Gas flow	1245[L/min] MIN
Minimum working pressure	-60[kPa]
Operating temperature limit	-30~120[°C]

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# EGR valve



## EGR valve for engine

### Usage

EGR valve for industrial engine

### Features

- Weight reduction by downsizing the solenoid. (adopts a poppet type)

### Specification

Flow diameter[mm]	Φ9、φ10
Maximum Flow[L/min]	300[L/min] @Differential pressure 6.7kPa
Normal volt[V]	DC12V、DC24V
Control method	ON-OFF control



Double poppet type



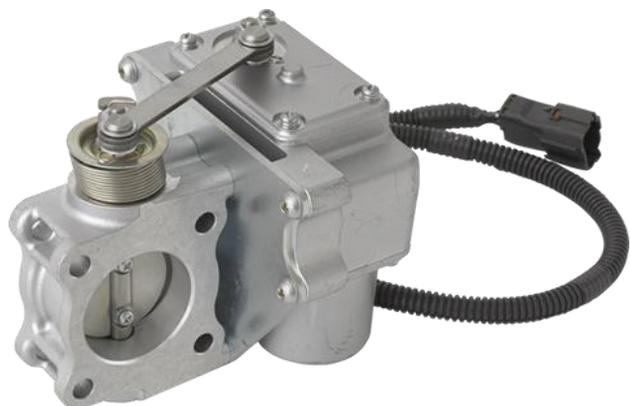
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# Stepless EGR valve

※ Developed product



## EGR valve for commercial vehicle

※ Developed product

### Usage

EGR valve for commercial vehicle

### Features

- Uses a butterfly valve that specializes in seat leakage.

### Specification

Maximum flow [L/min]	10,500[L/min] @差圧6.7kPa時
Responsiveness [msec]	250
Seat leakage [L/min]	20~40[L/min] @differential pressure 6.7kPa
Controller	Separate body, CAN communication



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# Grease system



**Proposing commercial vehicle achievements to flying cars!**

## Features

- **Production results for commercial vehicles**
- **Appropriate lubrication amount by pressure switch**
- **Automation of refueling work**
- **Reduction of refueling time**
- **Possible to supply oil to multiple locations**



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## Usage

### Centralized grease lubrication device

## Specification

### <Air pump unit>



An air-driven piston pump sends grease to the distributor when the solenoid valve is turned ON.

Discharge volume	16cm <sup>3</sup> /St
Air pressure range	0.49~0.93MPa
Grease tank capacity	0.5 or 1.0L
Grease level warning device	With alarm signal transmitter

### < distributor unit >



The required amount of grease sent from the air pump is distributed and supplied to each supply part.

Port No.	8 position (MAX)
Refueling amount	0.15・0.30・0.60cm <sup>3</sup>

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# Hydraulic cylinder



**High reliability**  
**High durability**

## **Equipped with hydraulic self-holding function**

When the hydraulic oil supply is stopped, the highly reliable check valve mechanism maintains the hydraulic pressure and holds the cylinder stop position.

## **Compatible with high oil pressure**

High-strength and durable structure generates large thrust force corresponding to high oil pressure.

(hydraulic pressure max37.3MPa)



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## Usage

### Telescopic two-way switchgear

Generates large thrust in both directions of cylinder expansion and contraction

## Adoption example

### Adopted for domestic heavy-duty, medium-duty and light-duty trucks

Annual production: 90,000 units

Total production: 2.3 million units (since 1982)

## Specification

Elongation side thrust	29.3kN (26.5MPa時)
Compression side thrust	12.5kN (26.5MPa時)
Stroke	349mm
Mass	6.1kg

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# Piston type Electric hydraulic pump



## Piston hydraulic pump with switching lever

### Usage

For commercial vehicles cab tilt  
Versatile

### 特長

- Electric hydraulic pump saves labor
- Compact and lightweight
- With emergency manual pump

### Specification

Operating voltage [V]	DC 24V
Rated discharge flow [cc/min]	600cc/min
Maximum pressure [MPa]	34.3MPa
Mass[kg]	5.8kg



Manual TYPE



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# Manual type hydraulic pump



## インパクトレンチ対応 ピストン式油圧ポンプ

### 用途

商用車キャブテイルト用、汎用性あり

### 特長

- ・インパクトレンチ駆動で電動レス
- ・小型・軽量
- ・車載用以外でも採用可能(お問合せ下さい)

### 製品仕様

定格吐出流量[cc/min]	330cc/min (1.27cm <sup>3</sup> /rev)
リリース圧力[MPa]	24.5MPa
質量[kg]	4.4kg



マニュアル(手動)タイプ



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# E-Cylinder



## Oil free Cylinder (For cab tilt system)

### Environmental improvement

- No oil leakage due to mechanical structure

### Improved mountability and weight reduction

- No oil pump and piping required
- Weight reduction across tilt system

### With fall prevention safety device



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## Usage

### Cab tilt device

It can also be diverted to other uses such as construction machinery, agricultural machinery, railways, industrial machinery, logistics, and mounting.



## Specification

Thrust: Max 20kN

Stroke: 485mm

Drive voltage: DC24V

Rated expansion/contraction speed: 15mm/s

Operating temperature range: -30°C to +80°C

Mass: 13kg

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# Hydraulic lock (cab lock)



## Hydraulic lock (cab lock)

### Usage

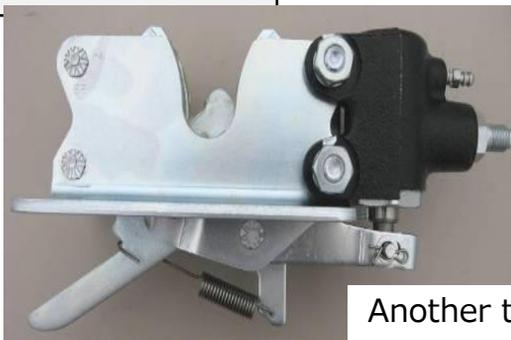
For commercial vehicles cab lock

### Features

- Automatic release of cab lock by hydraulic pressure
- Hydraulic cylinder mechanism that can fix / release the bar (rod) by hydraulic pressure

### Specification

Hydraulic pressure [MPa]	37.2 MPa
pin release pressure [MPa]	1.5 MPa
Pin fixing force[kN]	39.2 kN



Another type



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# POWER SHIFT



## pneumatic booster POWER SHIFT

### Usage

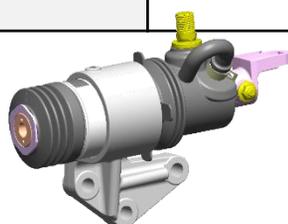
Reduced shift operation for commercial vehicle transmissions

### Features

- Approximately 3 times more power than manual operation.
- The boost start position can be set arbitrarily.
- Adoptable for applications other than in-vehicle use (please inquire)

### Specification

Air pressure [MPa]	0.5MPa ~ 1MPa
boost characteristics[N]	1500N @ manual 500N
Mass[kg]	2.6kg~3.5kg



コンパクトタイプ



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# Hydraulic power unit



## Power unit (gear pump)

### Compact and light by integrating frame and tank

By making the oil tank part aluminum die-cast and integrating the mounting flange, we have achieved a weight reduction of about 40% and high rigidity at the same time.

### Improved reliability with piping-less structure

By connecting the gear pump section directly to the oil tank section, piping is omitted, and since the piping path is shortened, the piping resistance is suppressed, and a structure that prevents suction failure such as air entrainment.



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## Usage

### For Wing van truck

Electric pump that supplies oil to hydraulic cylinders

## Adoption example

### Domestic HDT & MDT

Annual product 3,000pcs

Total product 20,000pcs (Since 1999)

## Specification

Discharge flow rate	6L/min (@8.8MPa)
Relief valve set pressure	14.7MPa
Rated discharge pressure	8.8MPa
Rated time	30sec
drive voltage	DC24V
Mass	16.6kg (oil less)

For details, please contact us from our website.

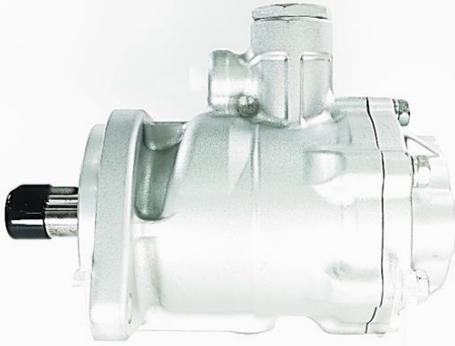


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# Swash plate type Axial piston motor



**Small size and  
light weight  
High reliability  
and durability**

## **Small size and light weight**

- Aluminum case and bottom cover
- Adoption of integrated and thin valve plate
- Use of a simple parking brake mechanism (low cost)

## **High reliability and durability**

- High operational reliability and durability cultivated through 30 years of market experience

## **Variation**

- Specifications tailored to the customer



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## Usage

- Hydraulic motor for crane winch and crane swing

## Adoption example

- For winches and swings of truck-mounted cranes
- For winches of large cranes

## Specification

Volume [cm <sup>3</sup> /rev]	Brake	MAX pressure [MPa]	MAX rpm [min <sup>-1</sup> ]	Mass [kg]
23	w/o	21.6	3000	7.0
25	w/o		4000	4.3
	w/		1500	4.6
28	w/o		2800	4.3
32	w/o		2200	6.4
	w/		1000	6.4
40	w/o		1500	6.4
	w/		1000	6.4

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# Hydraulic motor for winch



**Compact,  
High reliable,  
durable**

## Compact

- Built-in mechanical brake and counterbalance valve

## High reliability and durability

- There is a track record cultivated in the market for 30 years

## Usage

- For crane winch

## Adoption example

- For winches of truck-mounted cranes

## Specification

Volume [cm <sup>3</sup> /rev]	MAX pressure [MPa]	MAX rpm [min <sup>-1</sup> ]	Mass [kg]
36	27.5	2700	40
45			



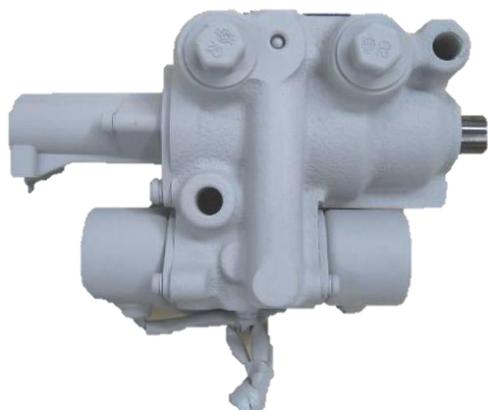
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# Hydraulic cylinder actuator



Can be set according to usage

## Can be set according to usage

- Setting with stroke sensor
- Surge killer solenoid setting
- Compatible with PWM control and ON-OFF control

## Usage

- Accelerator control, clutch ON-OFF, etc.

## Adoption example

- For accelerator control of truck-mounted cranes

## Specification

Cylinder diameter	Φ34mm
Rated operating pressure	1.37MPa
Rated Force	539N
Rated power	DC:12V/24V
Mass	2.5kg



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