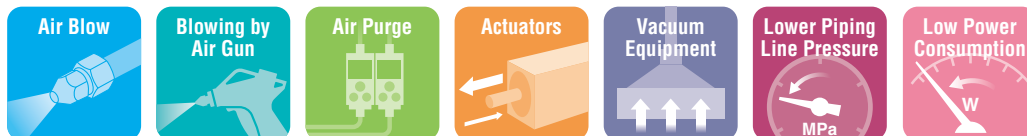


# Proposal for Air-saving System

— Contributes to CO<sub>2</sub> emissions reduction —



## Air Blow

### Nozzles for Blowing

Through the use of a smaller diameter nozzle, air consumption can be reduced by **62%**



### Pulse Valve

High peak pressure and low air consumption  
**35%** reduction



### Impact Blow Gun

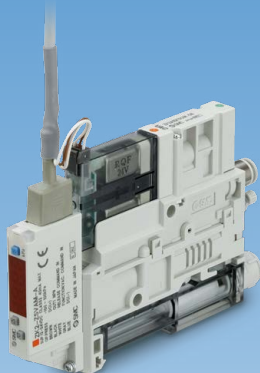
Air consumption  
**85%** reduction



## Vacuum Equipment

### Vacuum Ejector

Due to the energy-saving function, air consumption can be reduced by **93%**



## Actuators

### Air Saving Speed Controller

By simply mounting on your current air cylinder, air consumption can be reduced by **25%**



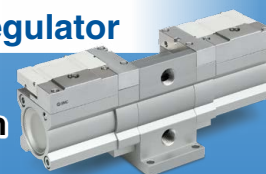
### Air Cylinder

By selecting an optimal size air cylinder, air consumption can be reduced by **29%**



### Booster Regulator

Power consumption  
**40%** reduction



# Successful cases of companies that implemented measures for energy saving

## Company A performance

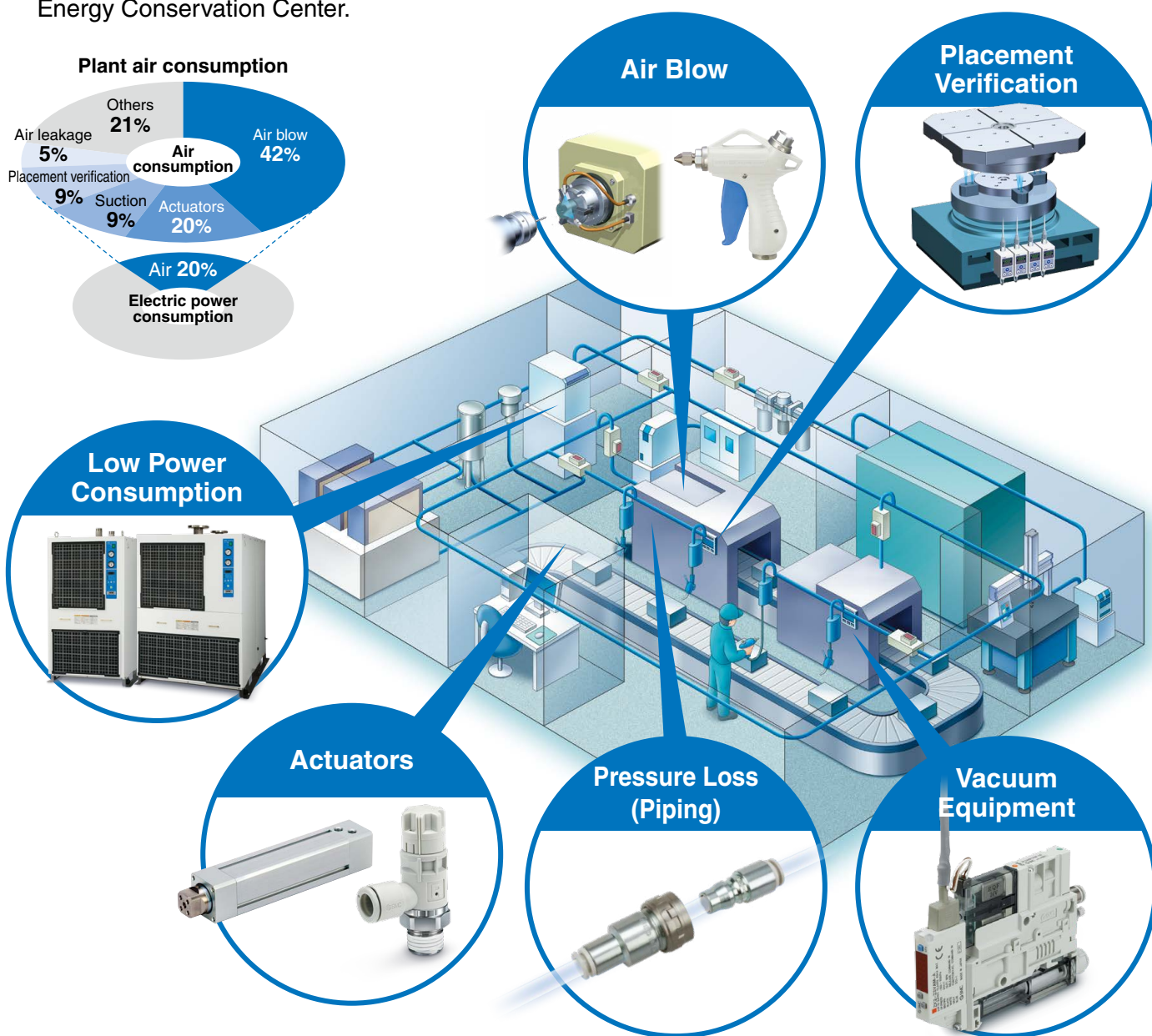
Electricity **3000 kW → 1400 kW**  
 CO<sub>2</sub> **0.9 t reduction/year**  
 Cost **¥80 million reduction/year**

## Company B performance

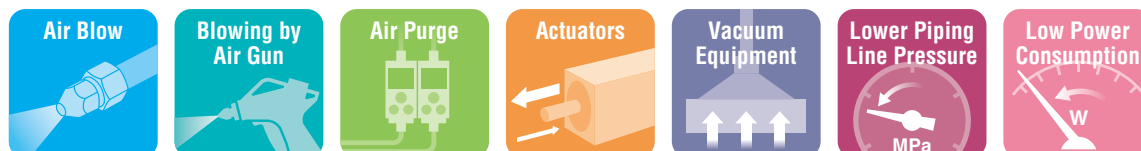
Electricity **10000 kW → 7000 kW**  
 CO<sub>2</sub> **1.7 t reduction/year**  
 Cost **¥150 million reduction/year**

## We will help you save energy.

- We will help you to improve and standardize your equipment and adopt new equipment.
- We also proactively promote activities through official organizations, such as holding seminars at the Energy Conservation Center.



### Energy-saving Themes



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## Air Purge



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## Actuators



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## Low Power Consumption



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# Nozzles for Blowing KN Series

Air Blow

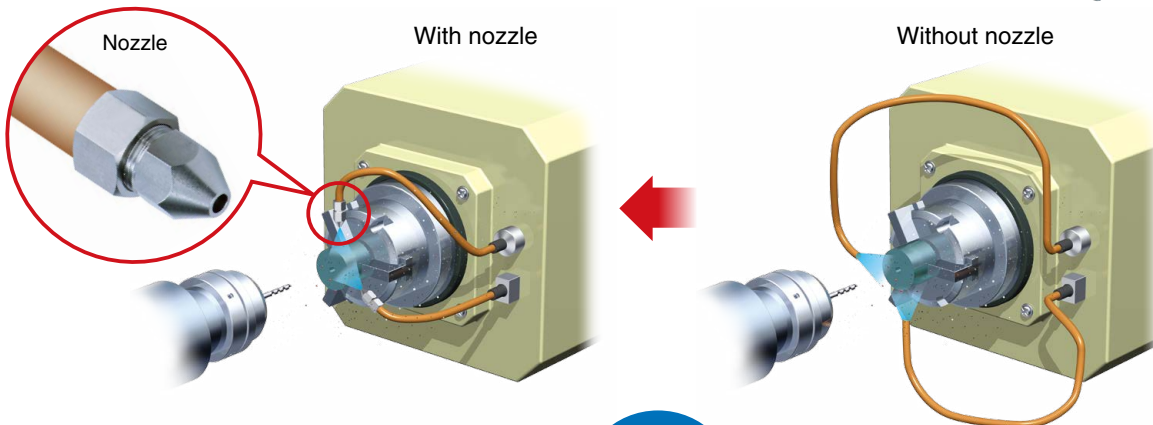
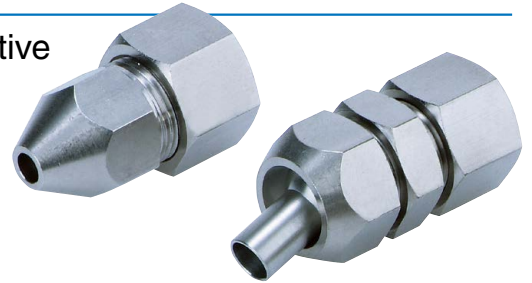


Air consumption

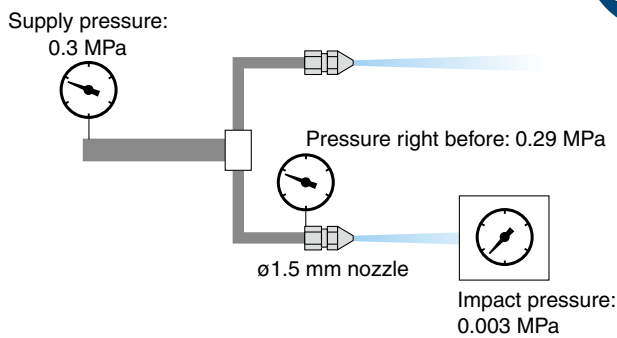
**62%  
reduction**

**Air consumption can be reduced through the use of a smaller diameter nozzle.**

Blow circuit that facilitates effective pressure use



## Energy-saving Model



Collective piping: TU0805, 2 m  
Intermediate and end piping: TU0604, 0.5 m each  
Distance: 100 mm

Air consumption per nozzle:  
**74 L/min (ANR)**

Blow time: 2 sec.  
Annual operating cycles: 90000

**4464 m<sup>3</sup>/year (ANR)**  
**(¥6696/year)**

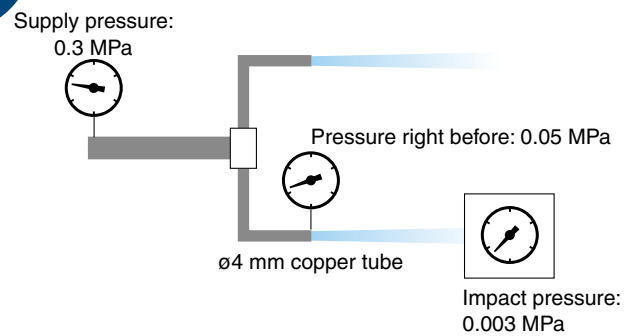
**(¥10584/year reduction)**

**62%  
reduction**

Energy-saving Model

Effects of Energy Saving

## Existing Model



Collective piping: TU0805, 2 m  
Intermediate and end piping: TU0604, 0.5 m each  
Distance: 100 mm

Air consumption per nozzle:  
**192 L/min (ANR)**

Blow time: 2 sec.  
Annual operating cycles: 90000

**11520 m<sup>3</sup>/year (ANR)**  
**(¥17280/year)**

Existing Model

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)



# Intermittent Blow Circuit IZE110-X238

Air Blow



Air consumption

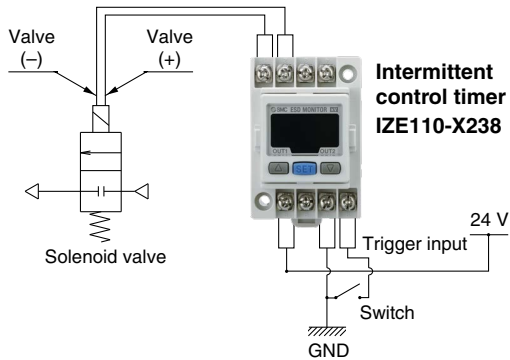
**50%  
reduction**

By using intermittent blow based on an intermittent control timer, air consumption can be reduced by **50%**.

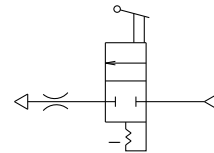


## Intermittent Blow Circuit

[Output under timer control]



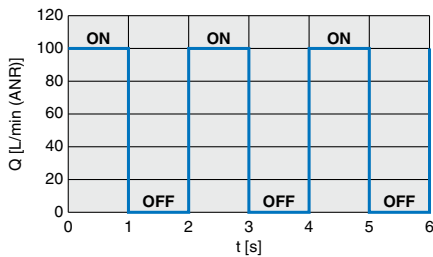
## Continuous Blow Circuit



## Energy-saving Circuit

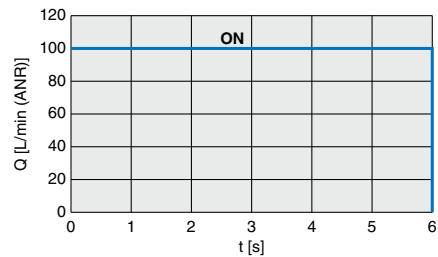
The duty ratio can be freely adjusted.  
By setting the duty ratio to one that has the same blow effectiveness, air consumption can be reduced.

Example:



## Existing Circuit

The duty ratio is equivalent to 100%.



## Intermittent Blow Circuit

Pressure right before: 0.2 MPa  
Blow time: 10 s  
(Frequency: 12 times/h)  
One blow operation:  
ON for 1 s, OFF for 1 s;  
Repeated a total of 5 times  
Working hours: 10 h/day  
(250 days/year)  
Nozzle diameter: 1 mm

**318.2 m<sup>3</sup>/year (ANR)**  
**(¥477/year)**  
**(¥477/year reduction)**

Energy-saving Circuit

Effects of  
Energy  
Saving

**50%  
reduction**

## Existing Circuit

Pressure right before: 0.2 MPa  
Blow time: 10 s  
(Frequency: 12 times/h)  
Working hours:  
10 h/day (250 days/year)  
Nozzle diameter: 1 mm

**636.3 m<sup>3</sup>/year (ANR)**  
**(¥954/year)**

Existing Circuit

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

# Pulse Valve Valve for Dust Collector JSXFA Series



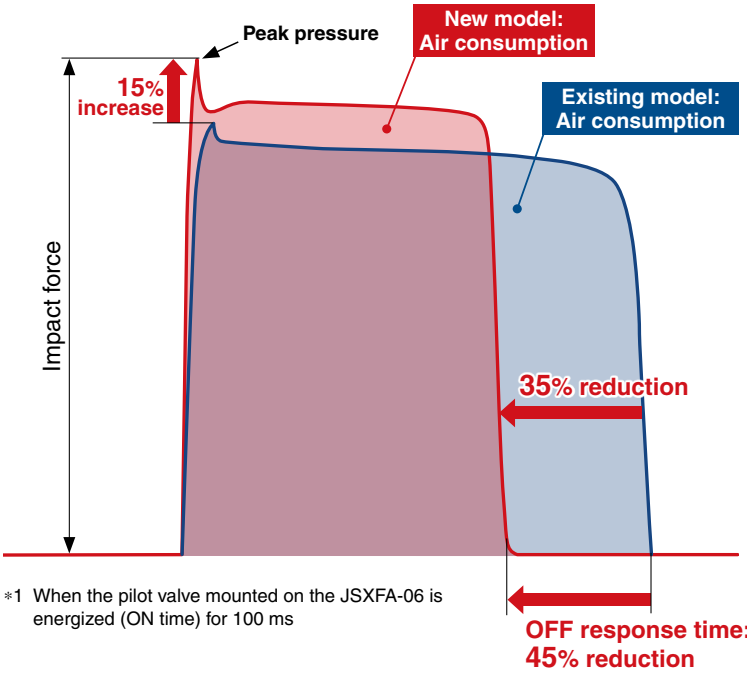
Peak pressure

**15%<sup>\*1</sup>**  
increase

Air consumption

**35%<sup>\*1</sup>**  
reduction

High peak pressure and low air consumption



\*1 When the pilot valve mounted on the JSXFA-06 is energized (ON time) for 100 ms

Energy-saving Model	Existing Model
<ul style="list-style-type: none"> <li>·Optimized internal geometry</li> <li>·Improved response</li> </ul>	<ul style="list-style-type: none"> <li>·Flow path construction with a large pressure loss</li> <li>·Long response time</li> </ul>
<p>Injection quantity per cycle: <b>57 L/cycle (ANR)</b></p>	<p>Injection quantity per cycle: <b>88 L/cycle (ANR)</b></p>
<p>Pressure: 0.9 MPa Energizing time: 100 ms Annual operating cycles: 240000</p>	<p>Pressure: 0.9 MPa Energizing time: 100 ms Annual operating cycles: 240000</p>
<p><b>13680 m<sup>3</sup>/year (ANR)</b> <b>(¥20520/year)</b></p>	<p><b>21120 m<sup>3</sup>/year (ANR)</b> <b>(¥31680/year)</b></p>
<p><b>(¥11160/year reduction)</b></p>	
<p><b>35% reduction</b></p> <p>Energy-saving Model</p>	<p>Existing Model</p>

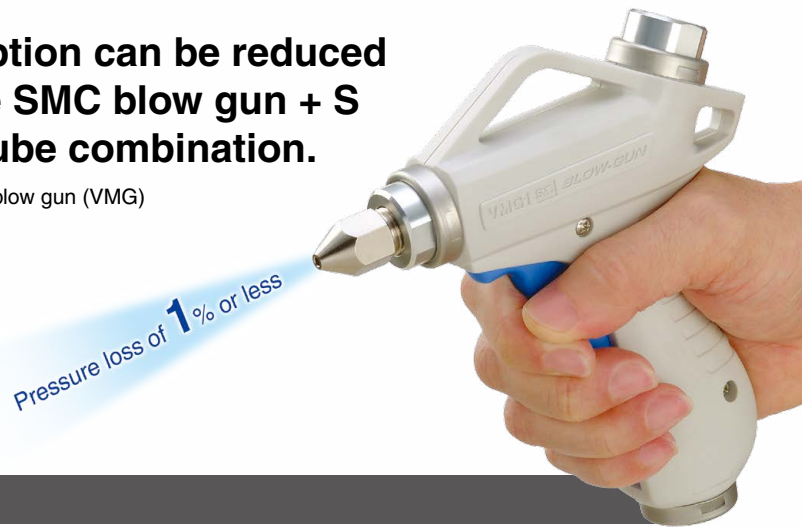
Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

# Blow Gun VMG Series

Power consumption  
**20% reduction**

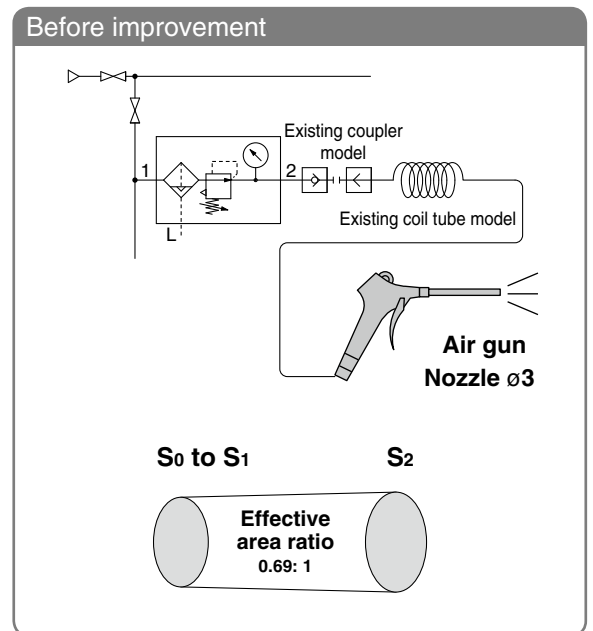
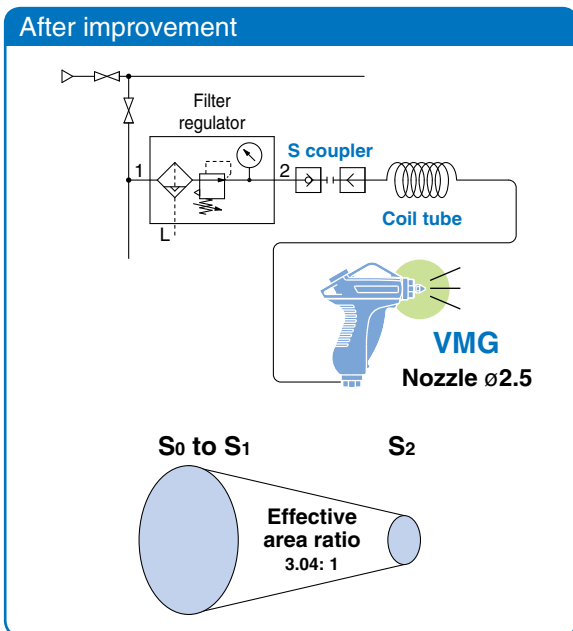
**Power consumption can be reduced by 20% with the SMC blow gun + S coupler + coil tube combination.**

\* 10% reduction with only the blow gun (VMG)



## Example of Improvement

Review the blow work and change to the SMC blow gun, S coupler, and coil tube combination to create a larger effective area.

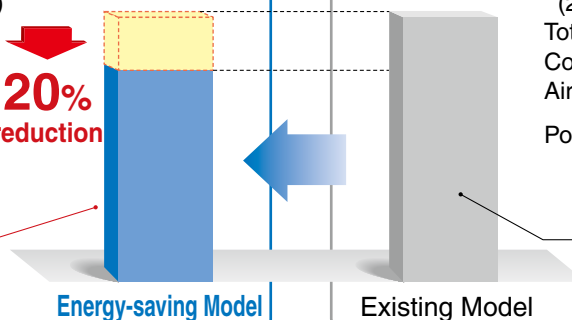


Effects of  
Energy Saving

## Energy-saving Model

Impact pressure: 0.011 MPa (Distance: 100 mm)  
Blow time: 10 s (Frequency: 12 times/h)  
Working hours: 10 h/day (250 days/year)  
Total working hours: 8300 h  
Compressor pressure: **0.5 MPa**  
Air consumption: **257 L/min (ANR)**

Power consumption by compressor: **20% reduction**  
**1.25 kW**  
(¥155625/year)  
**(¥38595/year reduction)**



## Existing Model

Impact pressure: 0.011 MPa (Distance: 100 mm)  
Blow time: 10 s (Frequency: 12 times/h)  
Working hours: 10 h/day (250 days/year)  
Total working hours: 8300 h  
Compressor pressure: 0.6 MPa  
Air consumption: 287 L/min (ANR)

Power consumption by compressor:  
**1.56 kW**  
(¥194220/year)

Corresponding value: Electricity unit ¥15/kWh

# Digital Gap Checker *ISA3 Series*

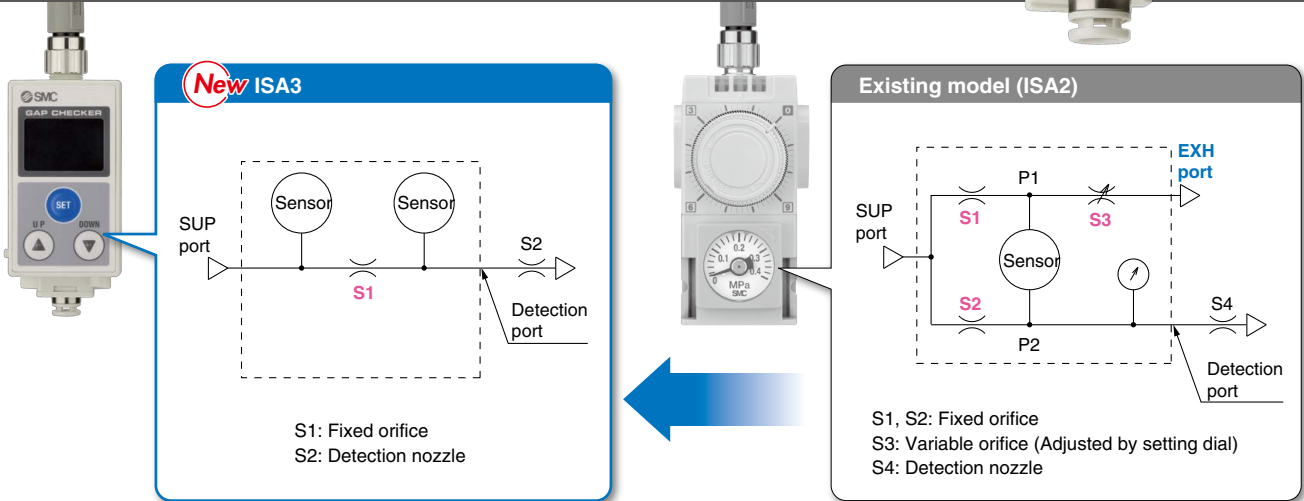


Air consumption  
**60% reduction**

Air consumption when a workpiece is seated is now **0 L/min** due to the new detection principle.



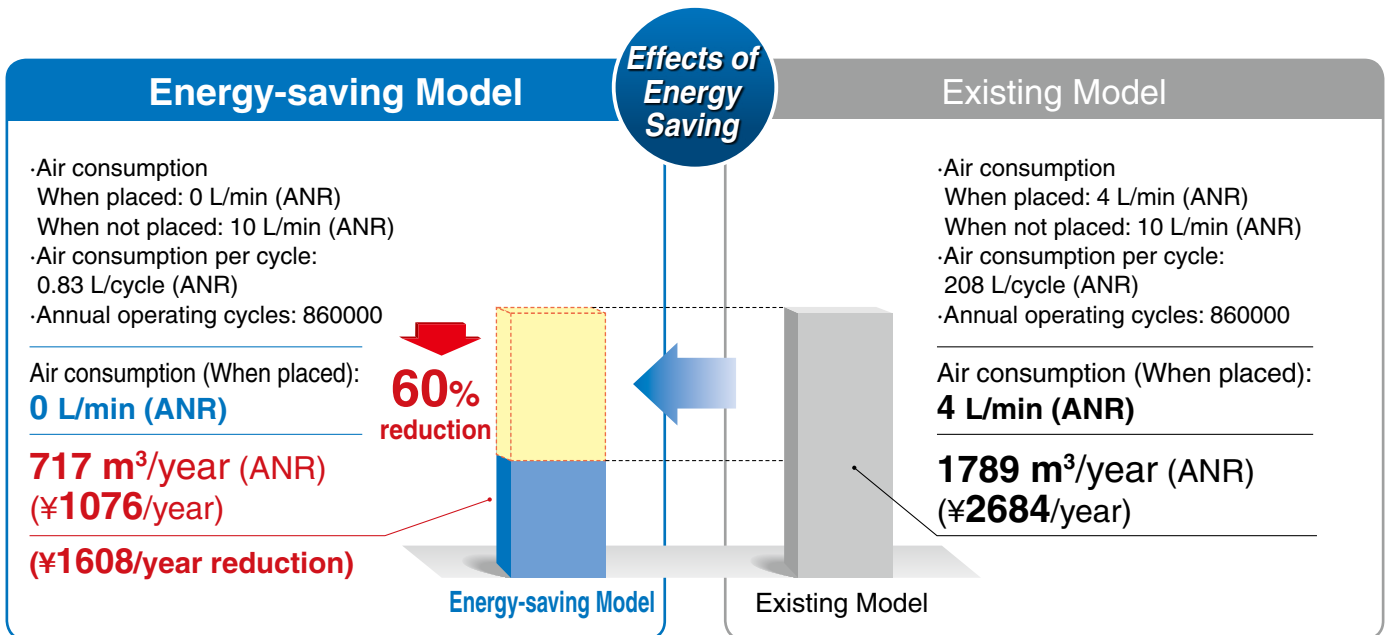
## Comparison of detection circuit



Due to the new detection principle, the need for air to be exhausted from the product has been eliminated. This makes the flow consumption 0 L/min when a workpiece is seated.

The result is a great reduction in air consumption compared with the existing model.

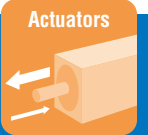
\* Conditions: Unseated for 5 seconds and seated for 20 seconds (For the G type)



Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)



# Air Cylinder JMB Series



Air consumption  
**29% reduction**

Air consumption can be reduced by selecting an optimal size air cylinder.



Intermediary Bore Sizes

Air consumption can be reduced by up to **29%**

Bore size (mm)	ø40	ø45	ø50	ø56	ø63	ø67	ø80	ø85	ø100
Air consumption L/min (ANR)	1.4	1.8	2.2	2.8	3.6	4.1	5.8	6.6	9.1

Conditions/Supply pressure: 0.5 MPa  
Load factor: 50%, At 100 mm stroke

**18% reduction**
**22% reduction**
**29% reduction**
**27% reduction**

**Example** Bore size for 85 kg workpieces

Conditions/Supply pressure: 0.5 MPa, Load factor: 50%

Bore size (mm)	Theoretical output (N)	Output for load factor of 50% (kg)	Judgment
ø63	1559	79.5	Not acceptable (Insufficient)
ø80	2513	128.2	Acceptable (Excessive)

When intermediary bore size ø67 is used

ø67	1763	89.9	OK
-----	------	------	----

Existing size: ø80  
↓  
Could be switched to intermediary bore size ø67

### Energy-saving Model

Bore size: ø67  
Stroke: 100 mm  
Pressure: 0.5 MPa  
Load factor: 50%

Per single reciprocation:  
**4.1 L/min (ANR)**

When it is operated 1000000 times/year

**4100 m<sup>3</sup>/year (ANR)**  
**(¥6150/year)**  
**(¥2550/year reduction)**

**Effects of Energy Saving**

### Existing Model

Bore size: ø80  
Stroke: 100 mm  
Pressure: 0.5 MPa  
Load factor: 50%

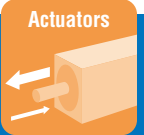
Per single reciprocation:  
**5.8 L/min (ANR)**

When it is operated 1000000 times/year

**5800 m<sup>3</sup>/year (ANR)**  
**(¥8700/year)**

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

# Double Power Cylinder *MGZ Series*



Air consumption

**14%  
reduction**

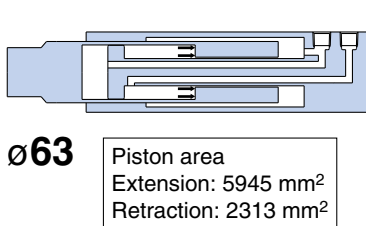
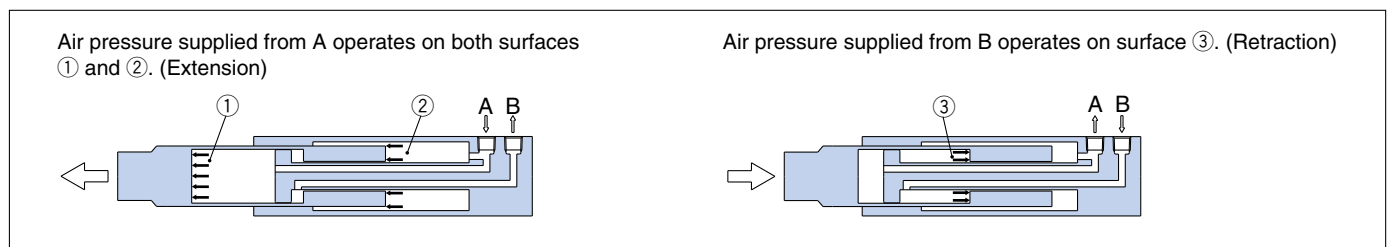
## Air consumption can be reduced by **14%** due to the reduced cylinder size.

It is possible to reduce air consumption in the retracting direction, compared with a standard cylinder with equivalent output in the extending direction, due to the doubled piston area in the extending direction.



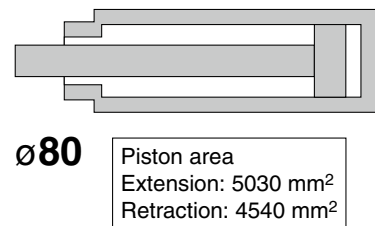
### Double extension output power!

SMC's unique cylinder construction doubles the piston area in the extending direction. This is an ideal air cylinder for lifting and press applications.



Increased energy saving and space saving  
Reduced cylinder size

**Size reduction**  
ø63 ← ø80



### Energy-saving Model

Bore size: **ø63**  
Stroke: 200 mm  
Pressure on the extension side: 0.5 MPa

Theoretical output (Extension side): 2973 N  
Per single reciprocation:  
**9.9 L (ANR)**

When it is operated  
900000 times/year

**8910 m<sup>3</sup>/year (ANR)**  
**(¥13370/year)**  
**(¥2160/year reduction)**

**14%  
reduction**

Energy-saving Model

### Effects of Energy Saving

### Existing Model

Bore size: ø80  
Stroke: 200 mm  
Pressure: 0.5 MPa

Theoretical output (Extension side): 2520 N  
Per single reciprocation:  
**11.5 L (ANR)**

When it is operated  
900000 times/year

**10350 m<sup>3</sup>/year (ANR)**  
**(¥15530/year)**

Existing Model

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

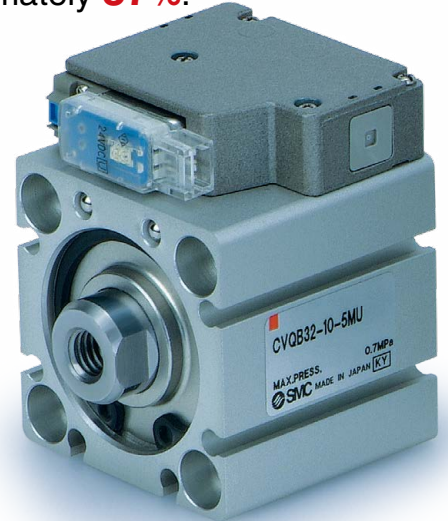
# Compact Cylinder with Solenoid Valve *CVQ Series*



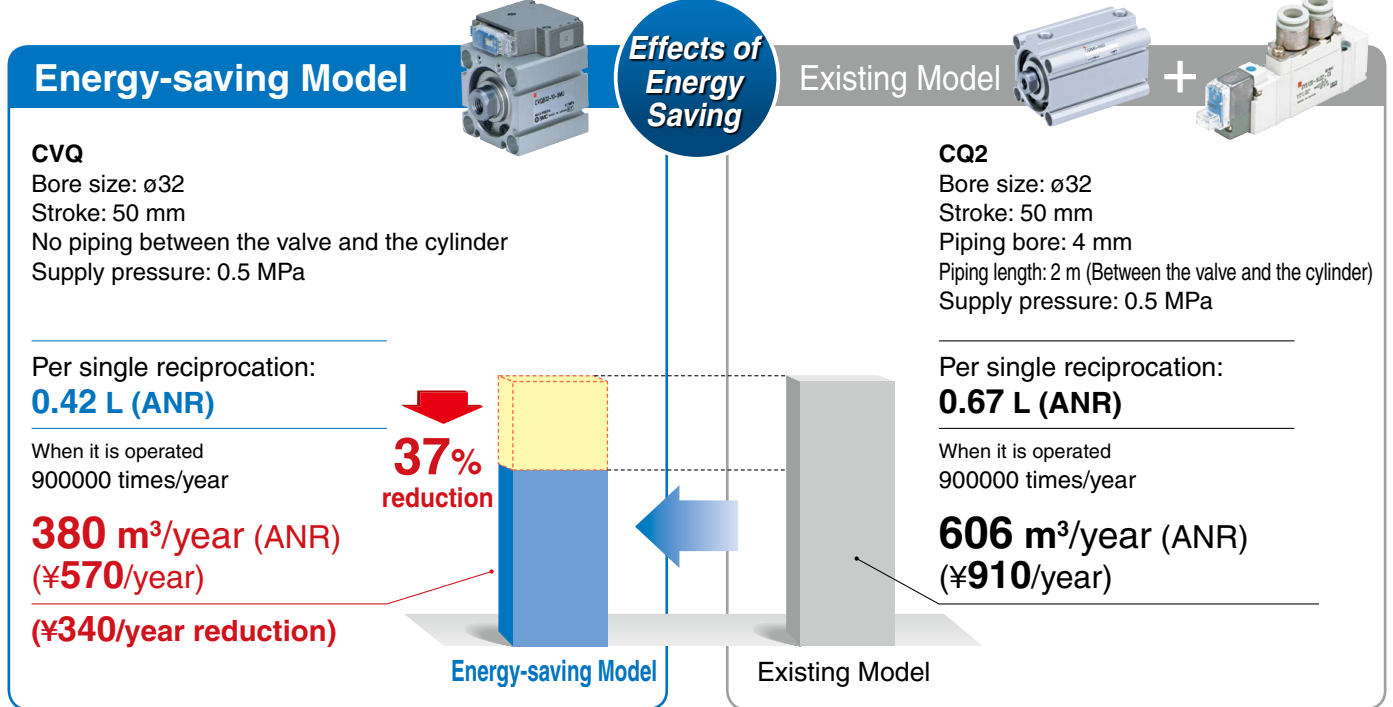
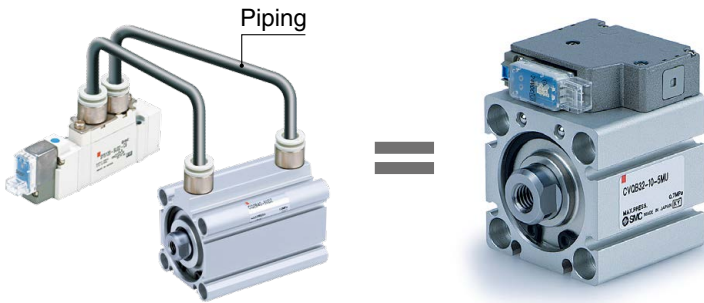
Air consumption  
**37% reduction**

## Energy Saving

Air consumption between the valve and cylinder can be reduced by approximately **37%**.

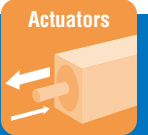


Valve and compact cylinder integrated for compactness



Corresponding value: Air unit  $\text{¥}1.5/\text{m}^3$  (ANR)

# Booster Regulator VBA Series



Air consumption  
**33% reduction**

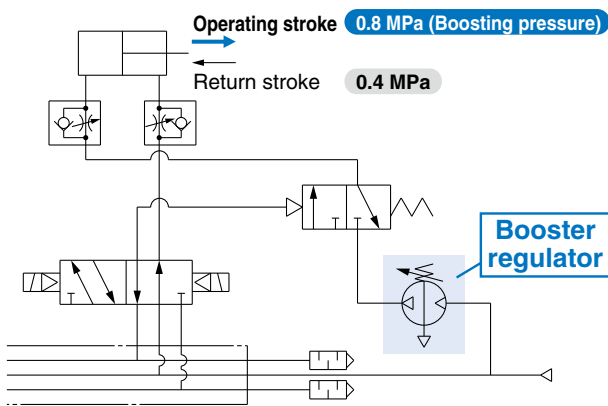
Air consumption can be reduced by **33%** due to the optimization of the booster circuit.



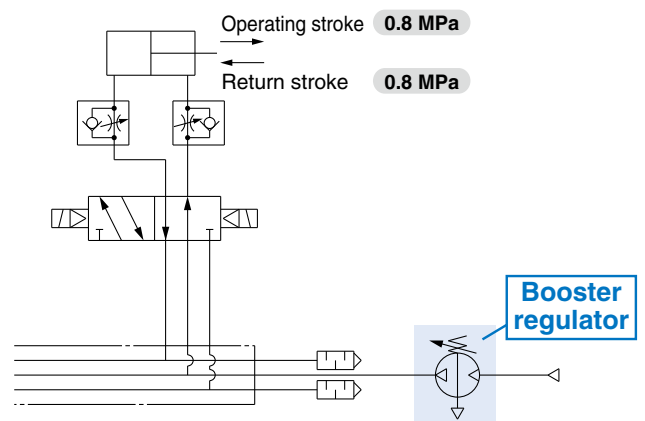
## Boost an insufficiently powered portion with a booster regulator

- Optimized booster circuit: Now with a space-saving booster circuit

Example of a one-side booster circuit  
(Boosting pressure on the operating stroke only)



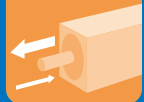
Example of a two-side booster circuit



Energy-saving Circuit	Effects of Energy Saving	Existing Circuit
When boosting pressure is on the extension side only Retraction: 0.4 MPa Extension: 0.8 MPa (Boosting pressure)		Bore size: $\phi 50$ Stroke: 200 mm Pressure: 0.4 MPa Boosting pressure: 0.8 MPa
Per single reciprocation: <b>8.7 L (ANR)</b>		Per single reciprocation: <b>13 L (ANR)</b>
When it is operated 900000 times/year <b>7830 m<sup>3</sup>/year (ANR)</b> (¥11750/year) <b>(¥5800/year reduction)</b>		When it is operated 900000 times/year <b>11700 m<sup>3</sup>/year (ANR)</b> (¥17550/year)
Energy-saving Model		Existing Circuit

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

# Air Saving Speed Controller AS-R/AS-Q Series



Air consumption

**25%  
reduction**

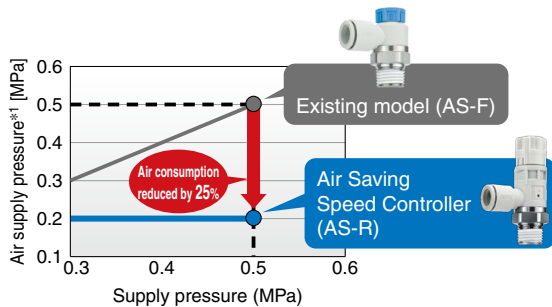
## Reduce air consumption just by mounting to your current air cylinder!

Mounting and operation are the same as a regular speed controller.

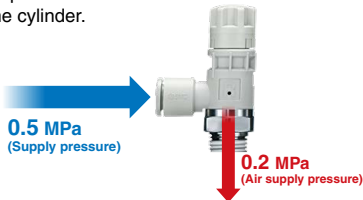


With pressure-reduction function  
**AS-R Series**

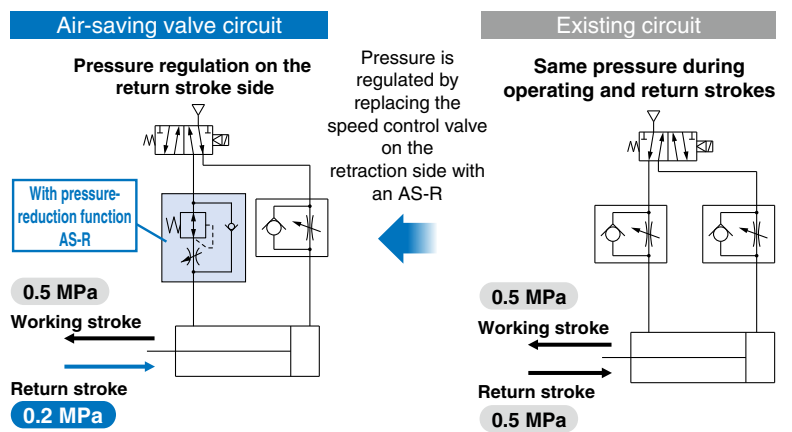
By reducing the pressure on the return stroke to 0.2 MPa, air consumption can be reduced.



\*1 Cylinder pressure on the return stroke side  
\* The air consumption reduction rate indicates the rate for one cycle of the cylinder.



When it is not necessary to apply force at the end of the working stroke, by using a lifter, pusher, etc.



### Energy-saving Model

Bore size:  $\phi 50$   
Stroke: 200 mm  
Pressure on the extension side: 0.5 MPa  
Pressure on the retraction side: 0.2 MPa

Per single reciprocation:  
**3.3 L/min (ANR)**

When it is operated  
900000 times/year

**3011 m<sup>3</sup>/year (ANR)**  
**(¥4520/year)**

**(¥1330/year reduction)**

**25%  
reduction**

Energy-saving Model

### Effects of Energy Saving

### Existing Model

Bore size:  $\phi 50$   
Stroke: 200 mm  
Pressure: 0.5 MPa

Per single reciprocation:  
**4.3 L/min (ANR)**

When it is operated  
900000 times/year

**3902 m<sup>3</sup>/year (ANR)**  
**(¥5850/year)**

Existing Model

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)



# Vacuum Ejector ZK2 Series



Air consumption

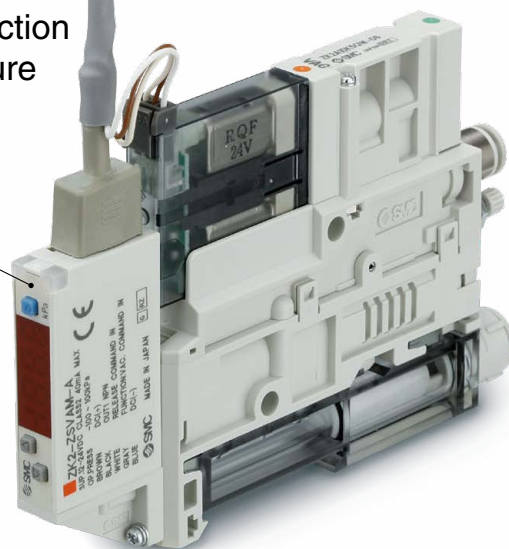
**93% reduction**\*1

\*1 Based on SMC's measuring conditions

## Energy-saving Ejector

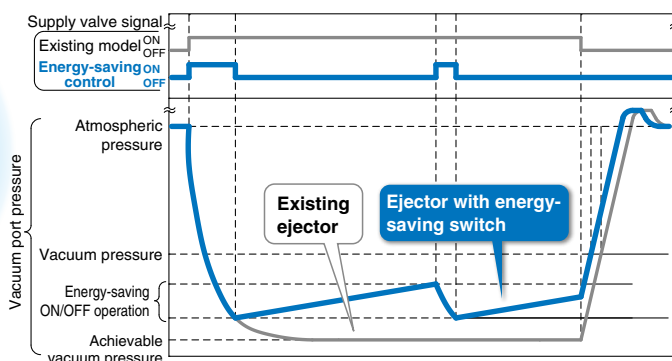
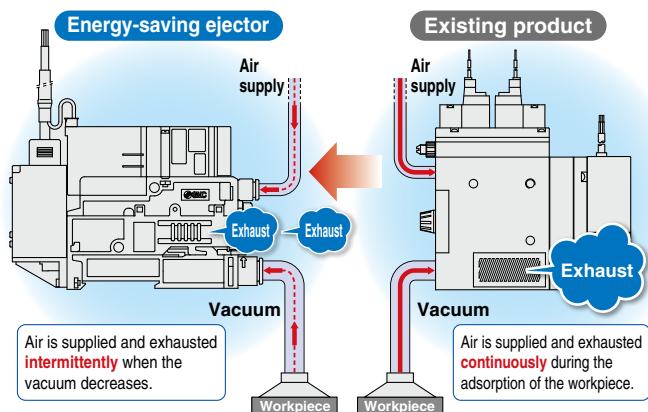
The digital pressure switch for vacuum with energy-saving function cuts supply air when the pressure reaches the desired vacuum.

Digital pressure switch for vacuum with energy-saving function



The digital pressure switch **with energy-saving function** can reduce air consumption by **90%\*2**. \*2 Based on SMC's measuring conditions

While the suction signal is ON, the ON/OFF operation of the supply valve is also performed automatically within the set value.



### Energy-saving Model

- Air consumption: 58 L/min (ANR)
- Vacuum suction flow rate: 61 L/min (ANR)
- Vacuum generation time: 0.6 s/cycle  
(Vacuum is continuously generated and air is consumed for 6 s (1 cycle))
- Annual operating cycles: 1100000  
(450 cycles/h, 10 h/day, 250 days/year)

Air consumption (When placed):  
**58 L/min (ANR)**  
**638 m<sup>3</sup>/year (ANR)**  
**(¥957/year)**  
**(¥13070/year reduction)**

Energy-saving Model

### Effects of Energy Saving

### Existing Model

- Air consumption: 85 L/min (ANR)
- Vacuum suction flow rate: 44 L/min (ANR)
- Vacuum generation time: 6 s/cycle  
(Vacuum is continuously generated and air is consumed for 6 s (1 cycle))
- Annual operating cycles: 1100000  
(450 cycles/h, 10 h/day, 250 days/year)

Air consumption (When placed):  
**85 L/min (ANR)**  
**9350 m<sup>3</sup>/year (ANR)**  
**(¥14025/year)**

Existing Model

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

# Multistage Ejector ZL112A Series

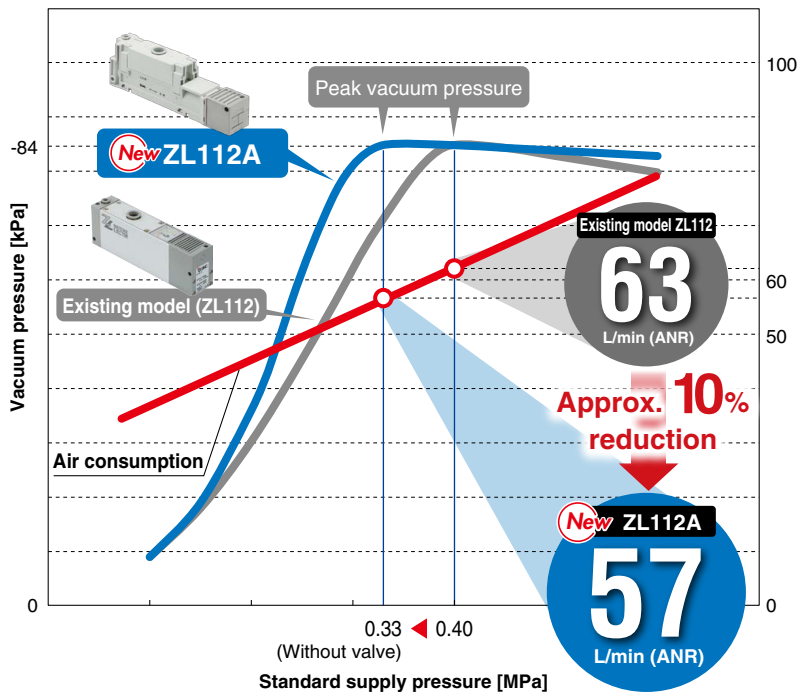
Vacuum Equipment



Air consumption

**10% reduction**

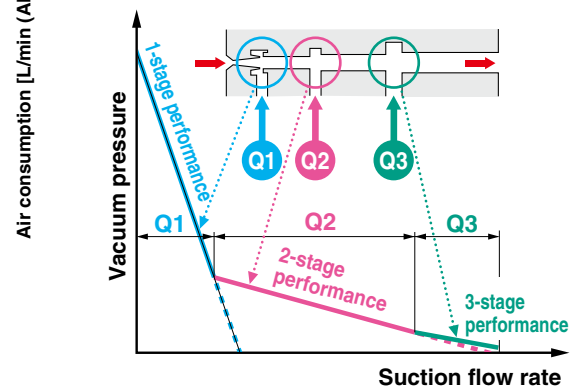
Air consumption can be reduced by **10%** due to the optimization of the diffuser flow path.



## 3-stage diffuser construction

Suction flow rate increased by **250%**

(Versus  $\phi 1.3$ , 1-stage model)

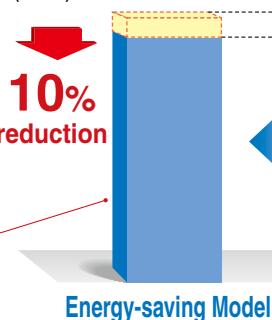


## Energy-saving Model

Standard supply pressure: 0.33 MPa (Without valve)  
 Maximum vacuum pressure: -84 kPa  
 Maximum suction flow rate: 100 L/min (ANR)  
 Air consumption: 57 L/min (ANR)

When work is carried out for 2500 hours per year, and 30 minutes per hour

**4275 m<sup>3</sup>/year (ANR)**  
 (¥6413/year)  
 (¥675/year reduction)



Effects of Energy Saving

## Existing Model

Standard supply pressure: 0.4 MPa  
 Maximum vacuum pressure: -84 kPa  
 Maximum suction flow rate: 100 L/min (ANR)  
 Air consumption: 63 L/min (ANR)

When work is carried out for 2500 hours per year, and 30 minutes per hour

**4725 m<sup>3</sup>/year (ANR)**  
 (¥7088/year)

Corresponding value: Air unit ¥1.5/m<sup>3</sup> (ANR)

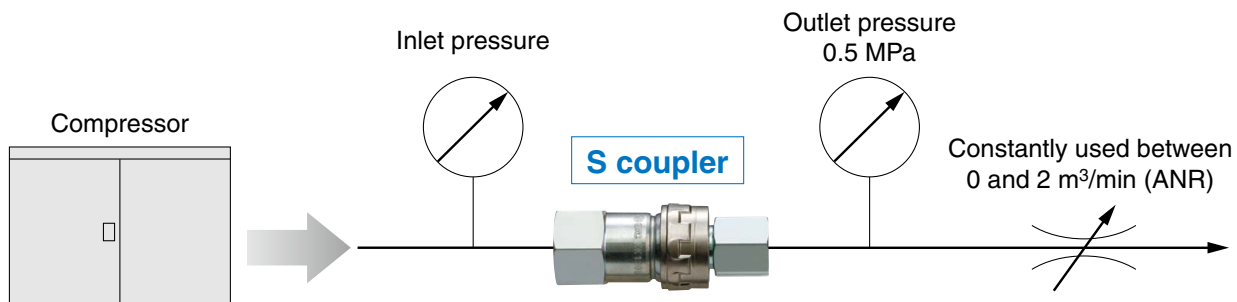
# S Couplers *KK130 Series*



Pressure loss

**7%**  
reduction

The built-in valve is of a special shape, resulting in reduced pressure loss.



Energy-saving Model	Effects of Energy Saving	Existing Model
Operating pressure at the outlet: 0.5 MPa Compressor efficiency: 0.7 Annual operating time: 2500 hours Flow rate: 1.2 m <sup>3</sup> /min (ANR)	<p><b>7%</b> reduction</p>	Operating pressure at the outlet: 0.5 MPa Compressor efficiency: 0.7 Annual operating time: 2500 hours Flow rate: 1.2 m <sup>3</sup> /min (ANR)
Inlet pressure: <b>0.54 MPa</b> Power consumption by compressor: <b>¥262000/year</b> (¥11000/year reduction)		Inlet pressure: <b>0.58 MPa</b> Power consumption by compressor: <b>¥273000/year</b>
Energy-saving Model		Existing Model

Corresponding value: Electricity unit ¥15/kWh

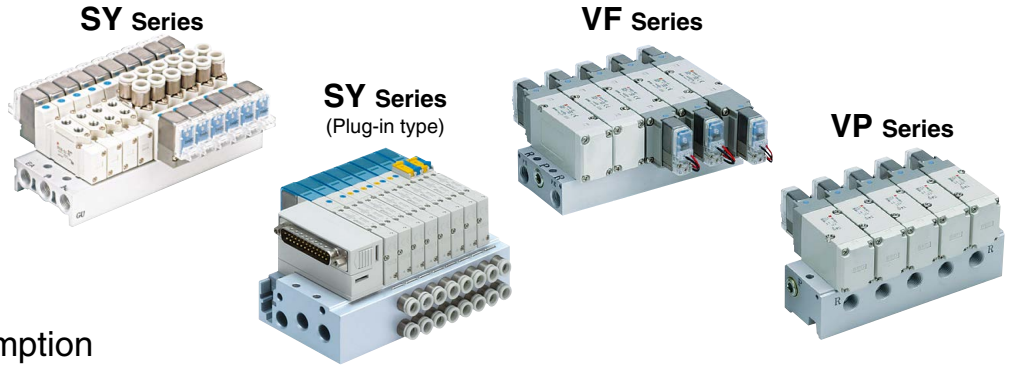
# 3/4/5-Port Solenoid Valve



Power consumption

**75%  
reduction**

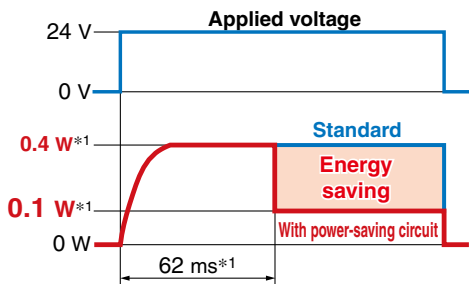
The power-saving circuit can reduce the consumption of electric power when the device is energized.



- Reduces power consumption when energized

Power consumption can be reduced by approx. 1/4 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 62 ms\*1 at 24 VDC.) Refer to the electrical power waveform as shown below.

Electrical power waveform with power-saving circuit



\*1 SY/SYJ series

## Low Power Consumption Valve

Energy-saving Product

Type	Model	Power consumption W*2	
		Standard	With power-saving circuit
4/5-port	<b>SJ2000</b>	0.55	0.23
	<b>SJ3000</b>	0.4	0.15
	<b>New SY3000/5000/7000</b>	0.4	0.15
	<b>SY3000/5000/7000/9000</b>	0.4	0.1
	<b>SYJ3000/5000/7000</b>	0.4	0.1
3-port	<b>VF1000/3000/5000</b>	1.55	0.55
	<b>SYJ300/500/700</b>	0.4	0.1
	<b>VP300/500/700</b>	1.55	0.55
	<b>V100</b>	0.4	0.1

\*2 With DC light

### Energy-saving Model

**SY: 0.1 W**  
(With power-saving circuit)

**292 Wh/year**  
(¥4.3/year)

Power consumption per valve:  
(¥13.2/year reduction)

Energy-saving Model

Effects of  
Energy  
Saving

### Existing Model

**SY: 0.4 W**

**1168 Wh/year (ANR)**  
(¥17.5/year)

Existing Model

When the energizing  
time is 8 hours/day,  
356 days/year

**75%  
reduction**

Corresponding value: Electricity unit ¥15/kWh

# Refrigerated Air Dryer *IDF□FS Series*

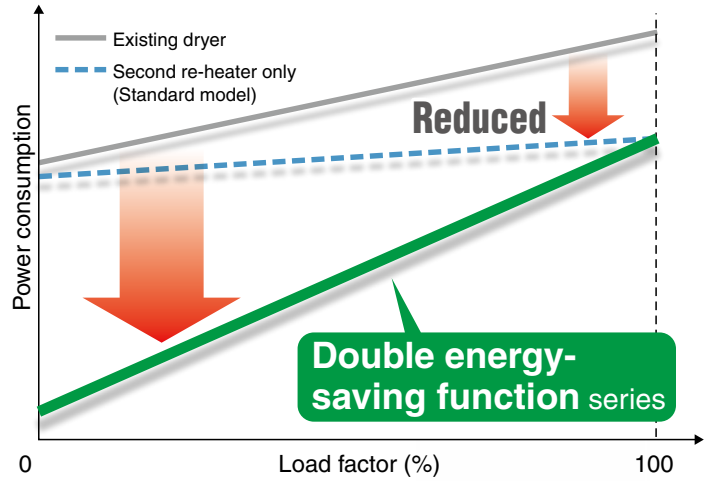


## Double energy-saving function series



Power consumption  
**76% reduction**

The addition of a second re-heater + digital scroll results in high energy savings.




## Energy-saving design

Up to a **76%** (1 kW)\*1 reduction

- \*1 Operating conditions: The IDF125FS in energy-saving operation mode
- Ambient temperature 32°C ● Inlet air temperature 40°C
- Inlet air pressure 0.7 MPa ● Air flow rate = Rated flow x 0.4
- Power supply frequency 60 Hz ● Power supply voltage 200 V ● Set dew point = 30°C



## Example 1 year (Spring to Winter) Power consumption **Reduced**



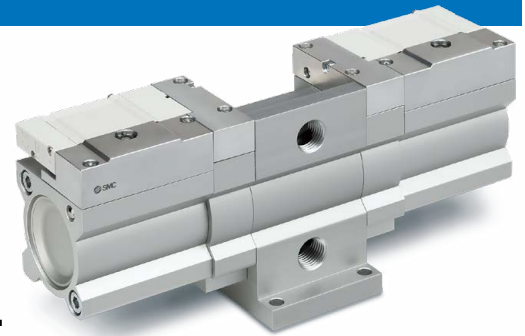
Compared with the standard model (constant compressor operation), the **Double energy-saving function series** can reduce power consumption by **43%!**

\*1 The IDF125FS was used for this example.

\* [Trial calculation conditions] Days of operation per year = 240 days (60 days each in spring, summer, autumn, and winter), Operating hours per day = 12 hours  
For details about the dryer operating conditions for each season, refer to the **Web Catalog** (IDF□FS series.).



# Booster Regulator (Size: 10A) *VBA-X3145*



Air consumption  
**40% reduction**\*1

- 3 piston construction
- The drive chamber on one side can be operated by the exhaust return circuit.

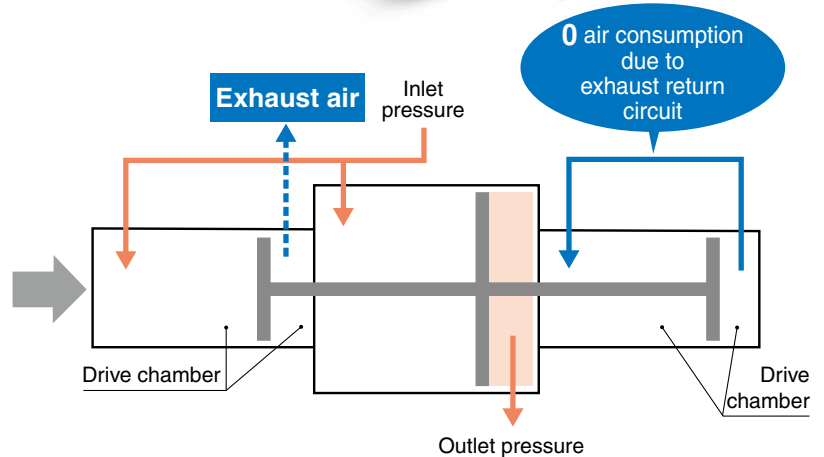
\*1 Based on SMC's measuring conditions

Operation noise: **65 dB (A)**\*2

\*2 Based on SMC's measuring conditions

15 dB (A) reduction compared with the existing model (VBA series)

- Exhaust noise: Reduced noise due to exhaust of reused low-pressure air
- Metal noise: Reduced noise due to the adoption of a construction in which the internal switching part doesn't come into contact with any metal parts



\* Please contact your local sales representative for more details.

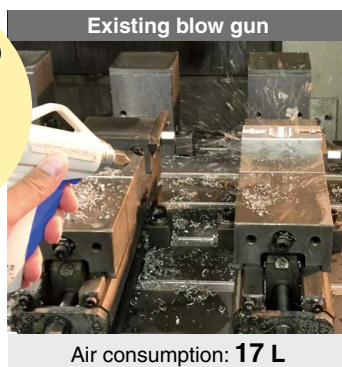
# Air Saving Impact Blow Gun *IBG1 Series*

Increased impact force due to higher peak pressure  
Drastic reduction in air consumption and labor time



High peak pressure  
**3 times or more**\*1  
(Compared with the existing model)

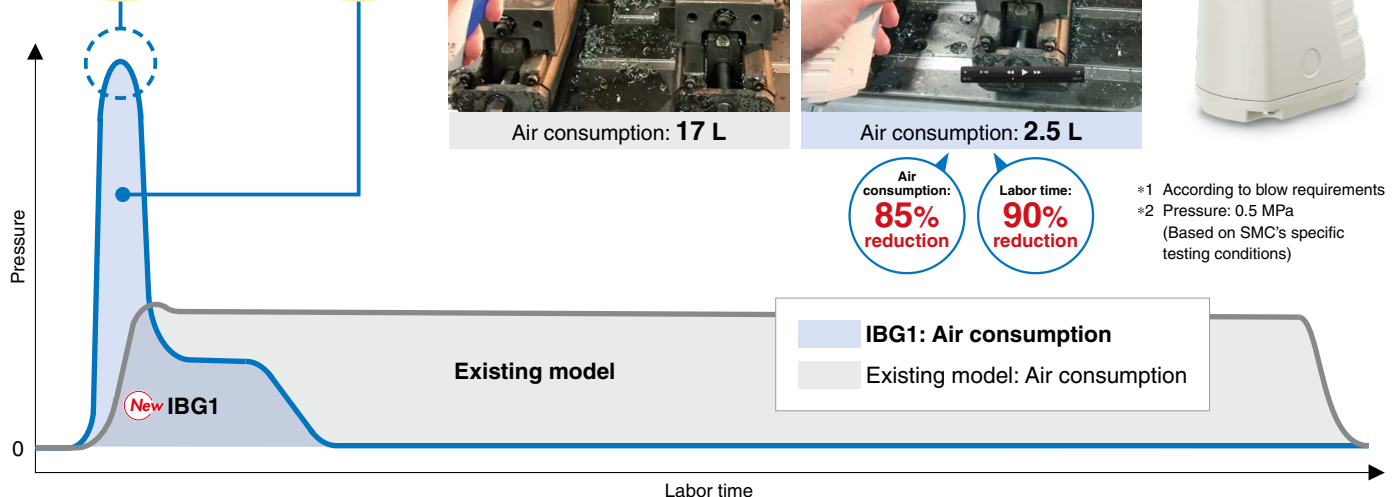
Air consumption  
**85% reduction**\*2



Air consumption: **85% reduction**

Labor time: **90% reduction**

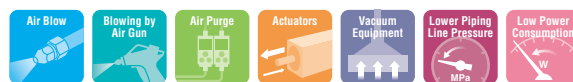
\*1 According to blow requirements  
\*2 Pressure: 0.5 MPa  
(Based on SMC's specific testing conditions)



\* Please contact your local sales representative for more details.

# Proposal for Air-saving System

— Contributes to CO<sub>2</sub> emissions reduction —



**SMC Corporation**