Figures show reliable effects.

<table>
<thead>
<tr>
<th>Company A performance</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>1400 kW</td>
<td>3000 kW</td>
</tr>
<tr>
<td>CO₂</td>
<td>0.9 t reduction/year</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>$800,000 reduction/year</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company B performance</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>7000 kW</td>
<td>10000 kW</td>
</tr>
<tr>
<td>CO₂</td>
<td>1.7 t reduction/year</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>$1,500,000 reduction/year</td>
<td></td>
</tr>
</tbody>
</table>

We help you save energy.

- We help you to improve and standardize your equipment, and adopt new equipment.
- We also proactively promote activities through official organizations, and by holding seminars at energy-saving centers.

<Energy-saving themes>
- Air Blow
- Blowing by Air Gun
- Air Purge
- Actuators
- Lower Pressure in the Piping Line
- Low Power Consumption
- Air Line Maintenance
**Recommend Energy-saving Equipment**

**Air Blow**
- Nozzles for Blowing Series KN P.1
- Compact Manometer Series PPA P.1

**Blowing by Air Gun**
- Blow Gun Series VMG P.2

**Air Purge**
- 2-Color Display Digital Flow Switch Series PFM P.3

**Actuators**
- Pressure Valve Series ASR P.4
- Regulator with Backflow Function Series AR/ARM/ARJ P.5
- Direct Operated Precision Regulator Series ARP P.6
- Compact Cylinder with Solenoid Valve Series CVQ P.7
- Non-rotating Double Power Cylinder Series MGZ P.8
- Booster Regulator Series VBA P.9

**Lower Pressure in the Piping Line**
- S Couplers Series KK130 P.10

**Low Power Consumption**
- 3/4/5 Port Solenoid Valve Series SY/VQ/VF S0700 P.11
- Energy Saving Type 2 Port Solenoid Valve Series VXE P.12
- Coolant Valve Series SGC P.13
- Refrigerated Air Dryer Series IDF/E P.13
- Refrigerated Thermo-chiller Series HRZ

**Air Line Maintenance**
- Digital Flow Switch for Air Series PF2A
- Digital Flow Switch for Water Series PF2W
- 2-Color Display High-Precision Digital Flow Switch Series ISE30A
- Compact Digital Pressure Switch Series ISE10
- 2-Color Display Digital Pressure Switch Series ISE80
Nozzles for Blowing

Series KN

Reduction of the air consumption with a small diameter nozzle
• Blow circuit facilitating effective pressure use

Energy-saving Circuit
• Making it shorter with a less bent copper tube
• Installing a nozzle (ø2) at the end of the copper tube
Flow rate per nozzle
6 scfm
Blow time: 2 sec.
Annual operating cycles: 900,000
181,164 ft³/year ($77/year reduction)

Conventional Circuit
• Copper tube with many bends
• Direct air blow by copper tube
Flow rate per nozzle
10 scfm
Blow time: 2 sec.
Annual operating cycles: 900,000
302,000 ft³/year ($128.30/year)

Corresponding value: Air unit 1.5c/ft³ (ANR)
Refer to the catalog for details.

Energy-saving model
Conventional model

Related Equipment
• Use to measure workpiece collision pressure.

Standard sensing head/KNP
Needle sensing head/KNP

Compact manometer
Series PPA

SHOP ONLINE at www.airlinehyd.com 800-999-7378
Blow Gun

Series VMG

20% reduction in power consumption with the SMC “blow gun” + “S coupler” + “coil tube”

- Blow gun facilitating effective pressure use
- Pressure loss of 1% or less (Nozzle diameter: ø2.5)

### Energy-saving Circuit

- Impact pressure: 16.5 psi (Distance: 100 mm)
- Blow time: 10 seconds (Frequency: 12 times/hour)
- Working hours: 10 hours/day (250 days/year)
- Total working hours: 8,300 hours
- Compressor pressure: **75 psi**
- Air consumption: **9 scfm**

**Power consumption by compressor:**

1.25 kW

($1,556.25/year)

($385.95/year reduction)

### Conventional Circuit

- Impact pressure: 16.5 psi (Distance: 100 mm)
- Blow time: 10 seconds (Frequency: 12 times/hour)
- Working hours: 10 hours/day (250 days/year)
- Total working hours: 8,300 hours
- Compressor pressure: 90 psi
- Air consumption: 10 scfm

**Power consumption by compressor:**

1.56 kW

($1,942.20/year)

Refer to the energy saving program and catalog for details.
### Reducing Air Consumption from the Exhaust Port of a Part Presence Sensor

- A simple part presence circuit using a digital flow switch.

*This cannot be used at a place where it is possible for water or oil to enter or remain in the piping between the detection nozzle and a sensor.*

### Energy-saving Circuit

<table>
<thead>
<tr>
<th>PFM</th>
<th>ISAvH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection nozzle diameter: Ø2.0</td>
<td>Detection nozzle diameter: Ø2.0</td>
</tr>
<tr>
<td>Supply pressure: 30 psi</td>
<td>Supply pressure: 30 psi</td>
</tr>
<tr>
<td>0 scfm ($0/year)</td>
<td>0.8 scfm</td>
</tr>
<tr>
<td><strong>100%</strong></td>
<td><strong>175,000 ft³/year</strong> ($74.30/year reduction)</td>
</tr>
</tbody>
</table>

Excluding air consumption from a detection nozzle

> Corresponding value: Air unit 0.15¢/ft³ (ANR)

* Refer to the catalog for details.
Pressure Valve

Series ASR

Reduction of the air consumption by regulating the non-operating return-stroke side

- Construction combining a regulator with check valve and a flow control valve
- When the retraction side is on the non-operating side that does not require power

Air-saving Valve
Pressure regulation on the return stroke side

Conventional Valve
Same pressure during operating and return strokes

Energy-saving Circuit
Bore size: ø50
Stroke: 200 mm
Pressure on the extension side: 75 psi
Pressure on the retraction side: 30 psi

Per single reciprocation

- 0.12 scfm
- 75 psi operating stroke
- 30 psi return stroke

When it is operated 900,000 times/year

106,000 ft³/year

($13.30/year reduction)

Energy-saving model

Conventional Circuit
Bore size: ø50
Stroke: 200 mm
Pressure: 75 psi

Per single reciprocation

- 0.15 scfm
- 75 psi operating stroke
- 75 psi return stroke

When it is operated 900,000 times/year

138,000 ft³/year

($58.50/year)

Conventional model

Corresponding value: Air unit 0.15¢/ft³ (ANR)

- Refer to the catalog for details.
### Regulator with Backflow Function

**Series AR\(\square\)K**
- **Series ARM10/11**
- **Series ARJ210 (X209)**

---

**Lowering of the pressure of a non-operating stroke for the entire cylinder**
- Reduction of the air consumption by regulating the non-operating return-stroke side
- When the retraction side is on the non-operating side that does not require power

---

**Energy-saving Circuit**

<table>
<thead>
<tr>
<th>Bore size: ø50</th>
<th>Stroke: 200 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure on the extension side: 75 psi</td>
<td>Pressure on the retraction side: 30 psi</td>
</tr>
</tbody>
</table>

**Per single reciprocation**
- **0.12 scfm**
- **106,000 ft³/year (\$13.30/year reduction)**

When it is operated 900,000 times/year

**Conventional Circuit**

<table>
<thead>
<tr>
<th>Bore size: ø50</th>
<th>Stroke: 200 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure: 75 psi</td>
<td></td>
</tr>
</tbody>
</table>

**Per single reciprocation**
- **0.15 scfm**
- **138,000 ft³/year (\$58.50/year)**

When it is operated 900,000 times/year

---

*Corresponding value: Air unit 1.w5c/m³ (ANR)*

*Refer to the catalog for details.*
Greatly reducing the bleed air flow compared with the conventional model (ARP3000)

- Constantly bleeding a small amount of air in order to make precise pressure adjustment possible
- Interchangeable mounting available
  ARP3000 → ARP30

(No equivalent models for APR20 and 40 are available since they are newly added ones.)

### Energy-saving Model

When setting 45 psi
- **0.03 scfm** or less
  - When air supplying time is 24 hours/day, 250 days/year
  - **10,100 ft³** ($4.30/year)
  - **80%**
  - ($17.30/year to $28.10/year reduction)

### Conventional Model

When setting 45 psi
- **0.14 to 0.2 scfm**
  - When air supplying time is 24 hours/day, 250 days/year
  - **51,000 to 76,000 ft³/year** ($21.60 to $32.40/year)

---

Corresponding value: Air unit 1.5/ft³ (ANR)
- Refer to the catalog for details.
Reduction of the flow consumption between a cylinder and a valve

- Piping between a cylinder and a valve not necessary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th><strong>Energy-saving Model</strong></th>
<th><strong>Conventional Model</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CVQ</strong></td>
<td>Bore size: ø32</td>
<td>Bore size: ø32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stroke: 50 mm</td>
<td>Stroke: 50 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No piping between a valve and a cylinder</td>
<td>Piping bore: 4 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply pressure: 75 psi</td>
<td>Piping length: 2 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supply pressure: 75 psi</td>
<td></td>
</tr>
</tbody>
</table>
| | | | Per single reciprocation
| | | | 0.02 scfm
| | | | When it is operated
| | | | 900,000 times/year
| | | | Energy-saving model
| | | | 0.02 scfm
| | | | ($13,400 ft³/year) ($5.70/year)
| | | | 13,400 ft³/year ($5.70/year)
| | | | 21,400 ft³/year ($9.10/year)
| | | | 21,400 ft³/year ($9.10/year)
| | | | Corresponding value: Air unit 1.5¢/ft³ (ANR)
| | | | Refer to the catalog for details.
Double Power Cylinder

Series MGZ

Reduction of the air consumption by reducing the cylinder size

- Possible to reduce air consumption in the retracting direction, compared with a standard cylinder with equivalent output in the extending direction, thanks to a doubled piston area for the extending direction.

Double extension output power!!

SMC’s unique construction doubles the piston area for the extending direction. An ideal air cylinder for lifting and press applications.

Air pressure supplied from A operates on both surfaces ① and ②.
(Extension)

Air pressure supplied from B operates on surfaces ③.
(Retraction)

More energy-saving and compact cylinder through reducing the cylinder size

Energy-saving Circuit

Bore size: ø63
Stroke: 200 mm (8 inch)
Pressure on the extension side: 75 psi
Theoretical output (Extension side): 2,973 N
Per single reciprocation

0.35 scfm

When it is operated 900,000 times/year

314,650 ft³/year
($133.70/year)

($21.60/year reduction)

Conventional Circuit

Bore size: ø80
Stroke: 200 mm (8 inch)
Pressure: 75 psi
Theoretical output (Extension side): 567 lbf
Per single reciprocation

0.4 scfm

When it is operated 900,000 times/year

365,000 ft³/year
($155.30/year)

Corresponding value: Air unit 1.5¢/m³ (ANR)

Refer to the catalog for details.
Boost an insufficiently powered application with a booster regulator

Optimizing the booster circuit: Replacing it with a minimum sized booster circuit

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

Example of two-side booster circuit

Energy-saving Circuit
When boosting pressure on the extension side only
Retraction: 60 psi
Extension: 120 psi (Boosting pressure)
Per single reciprocation

0.3 scfm

When it is operated 900,000 times/year

276,500 ft³/year
($117.50/year)

($58.00/year reduction)

Corresponding value: Air unit 1.5¢/ft³ (ANR)

Refer to the catalog for details.

Conventional Circuit

Bore size: ø50
Stroke: 200 mm (8 inch)
Pressure: 60 psi
Boosting pressure: 120 psi
Per single reciprocation

0.5 scfm

When it is operated 900,000 times/year

413,100 ft³/year
($175.50/year)
Since pressure loss is smaller than the conventional model (Series KK13), even if inlet pressure is reduced, equivalent outlet pressure and flow rate can be achieved when it is used for blowing air.

Enables lower compressor discharge pressure. It is possible to reduce the cost with lower air and energy consumption of compressors.

**Energy-saving Circuit**
- Operating pressure at the outlet: 75 psi
- Compressor efficiency: 0.7
- Annual operating time: 2500 hours
- Flow rate: 42 ft³/min (ANR)

**Conventional Circuit**
- Operating pressure at the outlet: 75 psi
- Compressor efficiency: 0.7
- Annual operating time: 2500 hours
- Flow rate: 42 ft³/min (ANR)

Inlet pressure

**81 psi**

7%

Power consumption by compressor

$2,620.00/year

($110.00/year reduction)

Corresponding value: Electricity unit 15¢/kWh

Refer to the energy saving program and catalog for details.
Reduction of the power consumption when energized

- Power consumption is reduced by power saving circuit.

Power consumption is decreased by approx. 1/3 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 electrical power waveform as shown below.

### Electrical power waveform with power saving circuit

- Applied voltage: 24 V
- Standard
- Energy saving
- With power saving circuit
- Effective energizing time: 62 ms\(^1\)

### Energy-saving Product

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Power consumption W(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/5 port</td>
<td>SJ2000</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>SJ3000</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>SYJ3000/5000/7000/9000</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>SYJ3000/5000/7000</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>VQZ1000/3000/5000</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>VF1000/3000/5000</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>S0700</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>VQ/VQC1000/2000</td>
<td>0.4</td>
</tr>
<tr>
<td>3 port</td>
<td>SYJ3000/5000/7000</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>VQZ1000/2000/3000</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>VP300/500/7000</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>V100</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>S070</td>
<td>0.35</td>
</tr>
</tbody>
</table>

\(^2\) With DC light

### Low Power Consumption Valve

#### Energy-saving Model

**SY: 0.1 W**

(With power-saving circuit)

When the energizing time is 5 hours/day, 250 days/year

- 0.13 kWh/year (2c/year)
- 81% reduction
- 0.08 kWh/year reduction

**Corresponding value:** Electricity unit 15¢/kWh

#### Conventional Model

**SY: 0.55 W**

When the energizing time is 5 hours/day, 250 days/year

- 0.69 kWh/year (10¢/year)

Refer to the catalog for details.
Energy Saving Type 2 Port Solenoid Valve

Direct Operated  
Series VXE21/22/23

Pilot Operated  
Series VXED21/22/23

Zero Differential Pressure Type Pilot Operated  
Series VXEZ22/23

Built-in energy saving circuit.
Electrical consumption reduced by approx. 1/3 during holding compared with a conventional model (New Series VX).

- Coil heat reduction
- Interchangeable
  The mounting dimensions and its basic specifications are equivalent to those of conventional models.
- Replaceable coil
  Possible to change the solenoid coil assembly for the VX2, VXD and VXZ with the energy saving coil type.
  (Restricted for the rated voltage 12, 24 VDC)

**Energy-saving Model**

<table>
<thead>
<tr>
<th>Series</th>
<th>VXE21: 1.5 W</th>
<th>VXE22: 2.3 W</th>
<th>VXE23: 3.0 W</th>
</tr>
</thead>
</table>

Series VXE23
Energizing time: 5 hours/day, 250 days/year

3.8 kWh/year (57¢/year)
($1.40/year reduction)

**Conventional Model**

New VX21: 4.5 W
New VX22: 7.0 W
New VX23: 10.5 W

Series VX23
Energizing time: 5 hours/day, 250 days/year

13.1 kWh/year ($1.97/year)

- Replacement for conventional models (24 DCV, N.C. valve only)
- No energy saving effect when the energizing time is 200 ms or less per operation

Corresponding value: Electricity unit 15¢/kWh
Refer to the catalog for details.

SHOP ONLINE at www.airlinehyd.com 800-999-7378
Coolant Valve

Reduction of the power consumption when energized

- Flow rate: Av factor (In case of 75 psi specification)
  - SGC2: 155  SGC3: 284  SGC4: 440
- Service life: 5 million cycles or more (Based on SMC’s test condition)

Energy-saving Model

<table>
<thead>
<tr>
<th>SGC: 0.35 W (Without light) (24 VDC) 0.58 W (With light)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC (Without light)  Energizing time: 5 hours/day, 250 days/year</td>
</tr>
<tr>
<td>0.4 kWh/year (6c/year)  ▲68 to 88%</td>
</tr>
<tr>
<td>(84c/year reduction)</td>
</tr>
</tbody>
</table>

Conventional Model

<table>
<thead>
<tr>
<th>VNC1: 1.8 W (Without light) (24 VDC) 2 W (With light)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNC2 to 9 (Without light)  Energizing time: 5 hours/day, 250 days/year</td>
</tr>
<tr>
<td>6 kWh/year (90c/year)</td>
</tr>
</tbody>
</table>

Corresponding value: Electricity unit 15c/kWh
- Refer to the catalog for details.

Refrigerated Air Dryer

Reduction of the power consumption using a high-performance heat exchanger

- Improved air flow capacity (by an average of 17% as measured in 12 models)

Energy-saving Model

<table>
<thead>
<tr>
<th>IDF15E: 620 W  Air flow capacity: 109 scfm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time: 24 hours/day, 250 days/year</td>
</tr>
<tr>
<td>3,720 kWh/year ($558.00/year)  ▲6%</td>
</tr>
<tr>
<td>($37.80/year reduction)</td>
</tr>
</tbody>
</table>

Conventional Model

<table>
<thead>
<tr>
<th>IDF15C: 662W  Air flow capacity: 85 scfm (ANR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time: 24 hours/day, 250 days/year</td>
</tr>
<tr>
<td>3,972 kWh/year ($595.80/year)</td>
</tr>
</tbody>
</table>

Corresponding value: Electricity unit 15c/kWh
- Refer to the catalog for details.

SHOP ONLINE at www.airlinehyd.com 800-999-7378
Double Inverter Type Refrigerated Thermo-chiller

Series HRZ

Reduction of the power consumption by using a DC inverter refrigerator and inverter pump.

Energy-saving Model

HRZ010-WS: 1.1 kWh/h
Operating conditions: 14°F
0 kW with 50% load
2 kW with 50% load
Operating time: 24 hours/day, 250 days/year

6,600 kWh/year ($990.00/year)

Conventional Model

6.2 kWh/h
Operating conditions: 14°F
0 kW with 50% load
2 kW with 50% load
Operating time: 24 hours/day, 250 days/year

37,200 kWh/year ($5,580.00/year)

Corresponding value: Electricity unit 15¢/kWh
Refer to the catalog for details.

Digital Switches

Improve control and visibility of pressure and flow rate.

- Pressure, flow control of the main line and equipment line.
- Measuring instruments are used effectively. Flow rate is numerically controlled, and targets and effects are clearly shown.

Digital Flow Switches

Digital Flow Switch for Air
Digital Flow Switch for Water
2-Color Display Digital Flow Switch

Digital Pressure Switches

2-Color Display High-Precision Digital Pressure Switch
Compact Digital Pressure Switch
2-Color Display Digital Pressure Switch