Plant Air Energy Saving

Compressor power

Proposal for a 50% reduction

—Contributes to CO_2 emissions reduction—

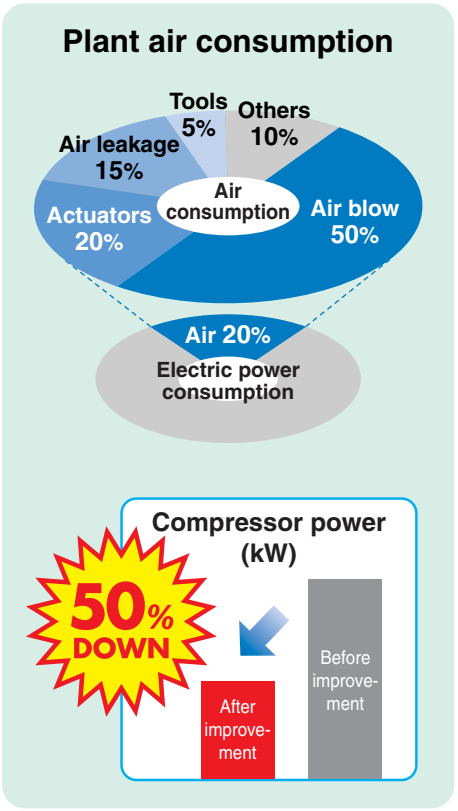
Figures show reliable effects.

Company A performance

Electricity	1400 kW ← 3000 kW
CO_2	0.9 t reduction/year
Cost	¥80 million reduction/year

Company B performance

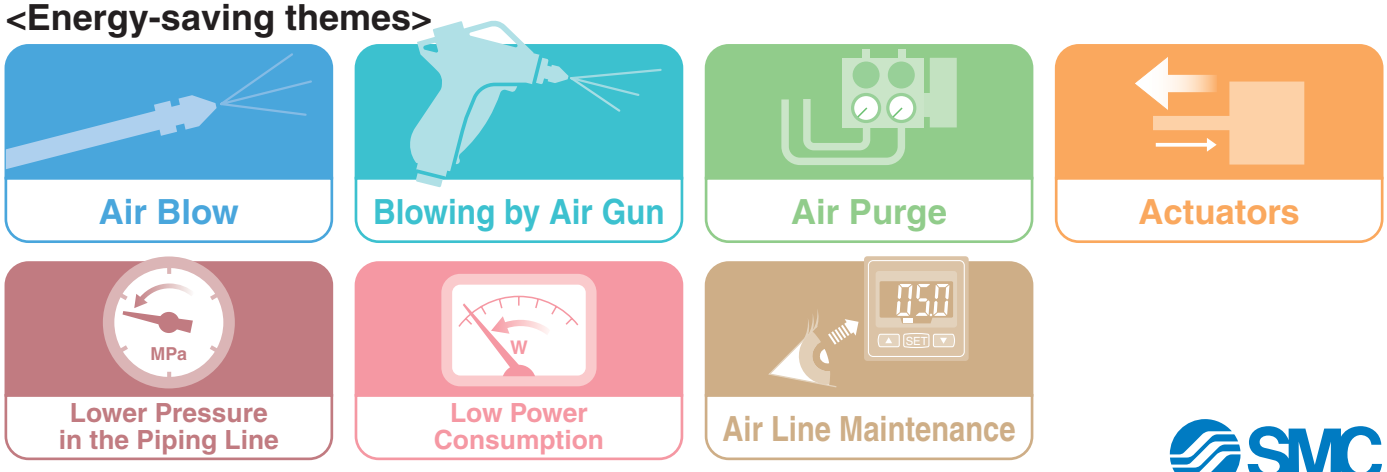
Electricity	7000 kW ← 10000 kW
CO_2	1.7 t reduction/year
Cost	¥150 million reduction/year



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, such as holding seminars at the energy-saving center.

<Energy-saving themes>



SMC

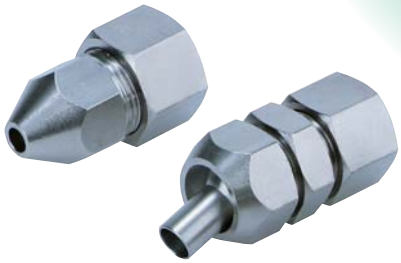
P-E09-6A

INDEX Recommend Energy-saving Equipment

Nozzles for Blowing

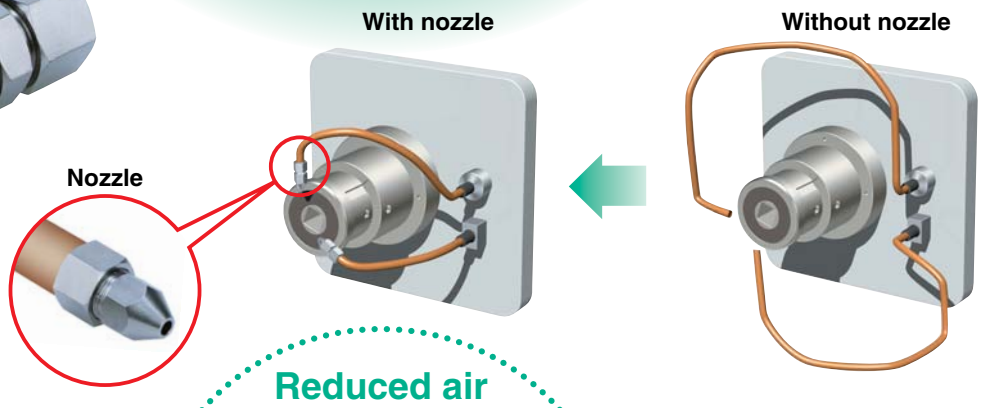
Air Blow

Series KN



Reduction of the air consumption with a small diameter nozzle

- **Blow circuit facilitating effective pressure use**



Reduced air consumption

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

171 ℓ/min (ANR)

Blow time: 2 sec.
Annual operating cycles: 900,000

5,130 m³/year (ANR) (¥7,700/year)

(¥**5,130**/year reduction)

Conventional Circuit

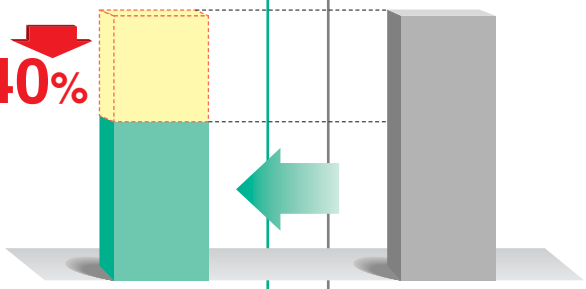
- Copper tube with many bends
- Direct air blow by copper tube

Flow rate per nozzle

285 ℓ/min (ANR)

Blow time: 2 sec.
Annual operating cycles: 900,000

8,550 m³/year (ANR) (¥12,830/year)



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

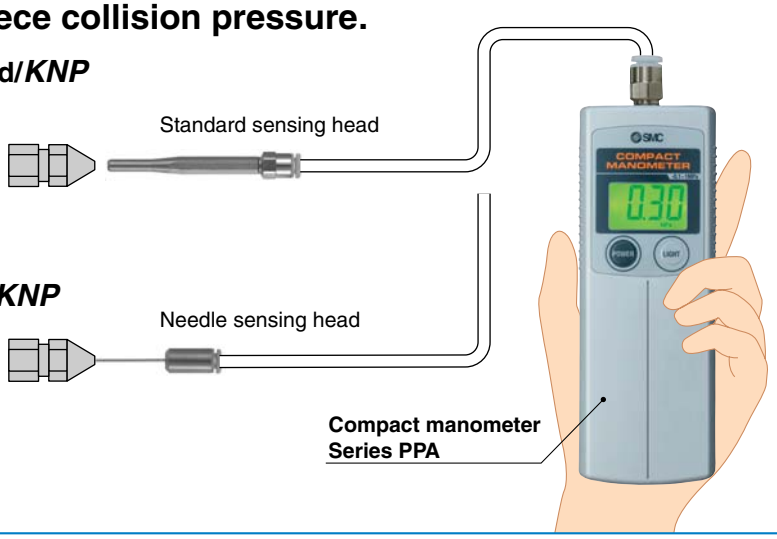
Refer to the catalog for details.

Related Equipment

- **Use to measure workpiece collision pressure.**

Standard sensing head/*KNP*

Needle sensing head/*KNP*



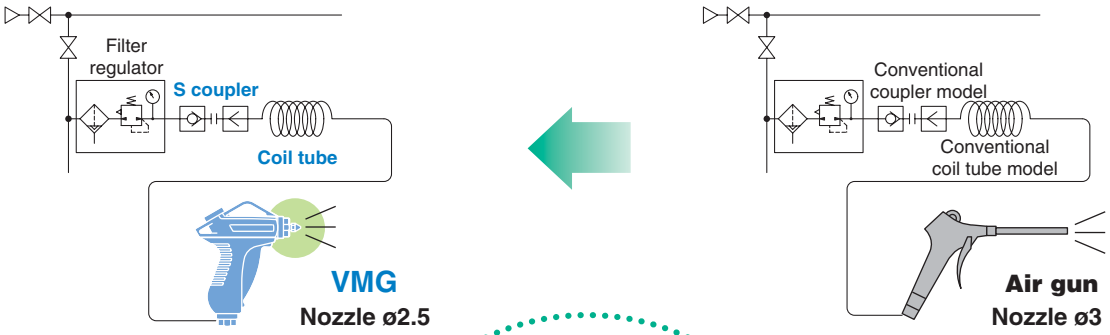
Blow Gun

Blowing by Air 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)**



Reduced power consumption

Energy-saving Circuit

Impact pressure: 0.011 MPa
(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: **0.5 MPa**
Air consumption: **257 ℓ/min** (ANR)

Power consumption by compressor
1.25 kW
(¥155,625/year)

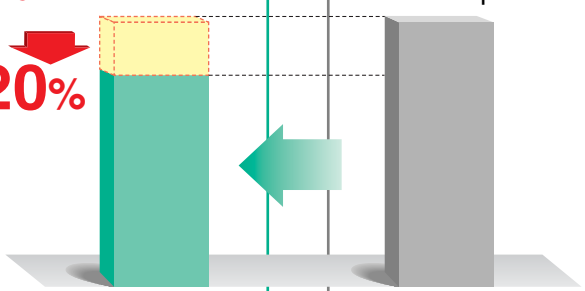
▲20%

(¥**38,595**/year reduction)

Conventional Circuit

Impact pressure: 0.011 MPa
(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: 0.6 MPa
Air consumption: 287 ℓ/min (ANR)

Power consumption by compressor
1.56 kW
(¥194,220/year)



Corresponding value: Electricity unit ¥15/kWh

● Refer to the energy saving program and catalog for details.

SMC

2-Color Display Digital Flow Switch

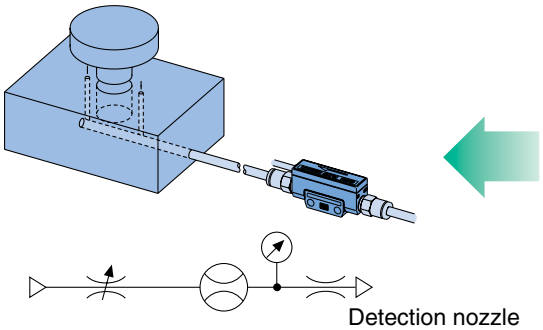
Air Purge

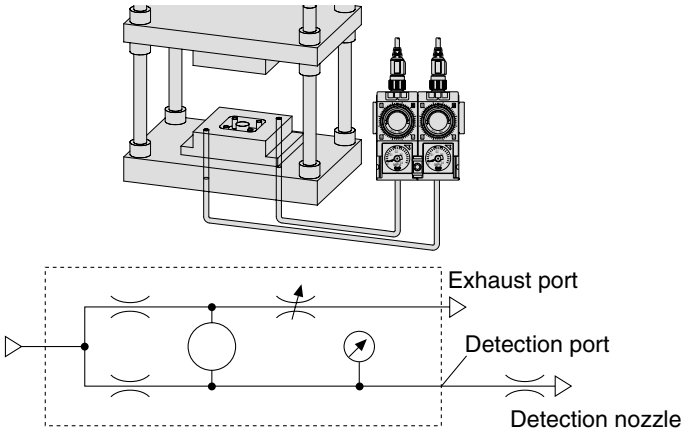
Series ***PFM***

Series ***PFMV***

Reduction of the 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 a detection nozzle and a sensor.

Reduced air consumption

Energy-saving Circuit

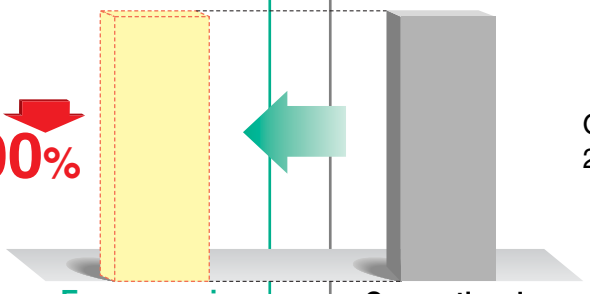
PFM

Detection nozzle diameter: ø2.0
Supply pressure: 0.2 MPa

0 ℓ/min (ANR) (¥0/year)

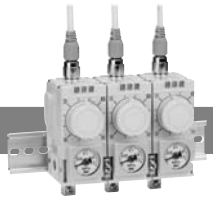
▲100%

(¥**7,430**/year reduction)



Excluding air consumption from a detection nozzle

Conventional Circuit



ISA2-H□

Detection nozzle diameter: ø2.0
Supply pressure: 0.2 MPa

22 ℓ/min (ANR)

Operating time: 15 hours/day, 250 days/year

4,950 m³/year (ANR) (¥7,430/year)

Excluding air consumption from a detection nozzle

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

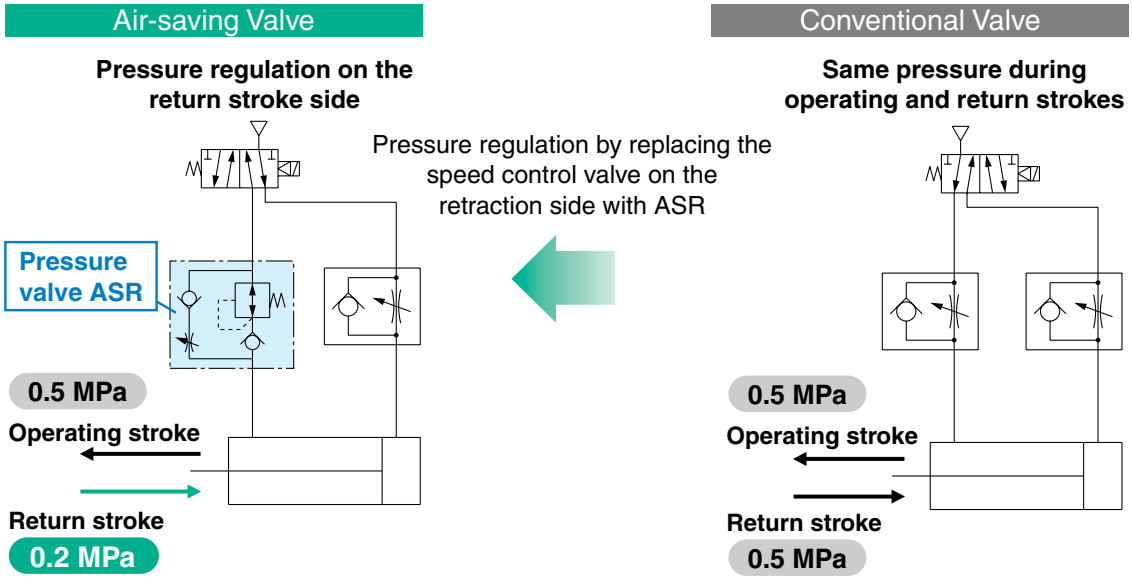
● Refer to the catalog for details.

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**



Reduced air consumption

Energy-saving Circuit

Bore size: ø50
Stroke: 200 mm
Pressure on the extension side: 0.5 MPa
Pressure on the retraction side: 0.2 MPa

Per single reciprocation

3.3ℓ (ANR)

When it is operated 900,000 times/year

3,011 m³/year (ANR) (¥4,520/year)

(¥**1,330**/year reduction)

Conventional Circuit

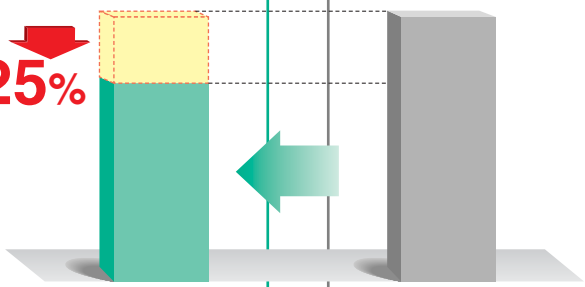
Bore size: ø50
Stroke: 200 mm
Pressure: 0.5 MPa

Per single reciprocation

4.3ℓ (ANR)

When it is operated 900,000 times/year

3,902 m³/year (ANR) (¥5,850/year)



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

● Refer to the catalog for details.

Regulator with Backflow Function

Actuators

Series *AR□K*

Series *ARM5*

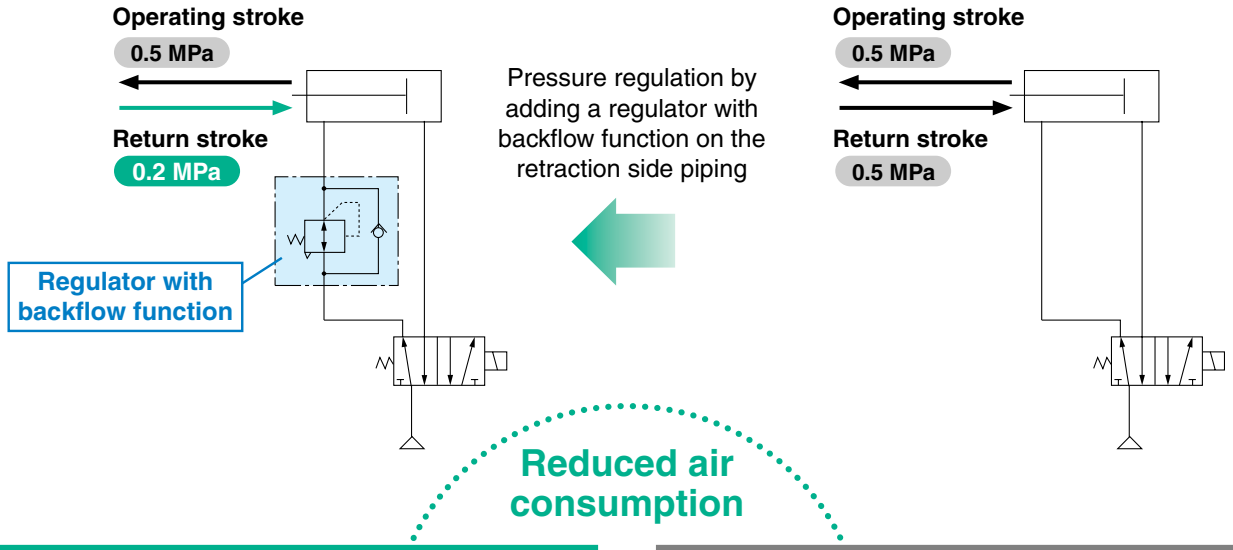
Series *ARM10/11*

Series *ARJ210 (X209)*

Series *ARJ1020F*

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**



Reduced air consumption

Energy-saving Circuit

Bore size: ø50
Stroke: 200 mm
Pressure on the extension side: 0.5 MPa
Pressure on the retraction side: 0.2 MPa

Per single reciprocation

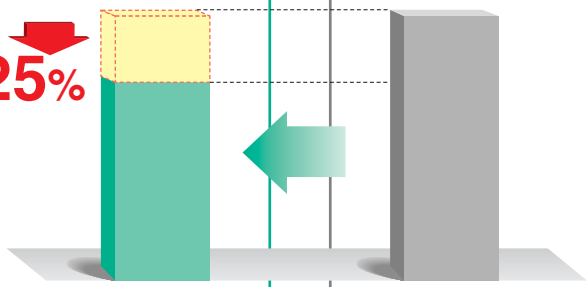
3.3ℓ (ANR)

When it is operated 900,000 times/year

3,011 m³/year (ANR) (¥4,520/year)

(¥**1,330**/year reduction)

▲25%



Energy-saving product

Conventional Circuit

Bore size: ø50
Stroke: 200 mm
Pressure: 0.5 MPa

Per single reciprocation

4.3ℓ (ANR)

When it is operated 900,000 times/year

3,902 m³/year (ANR) (¥5,850/year)

Conventional product

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

● Refer to the catalog for details.

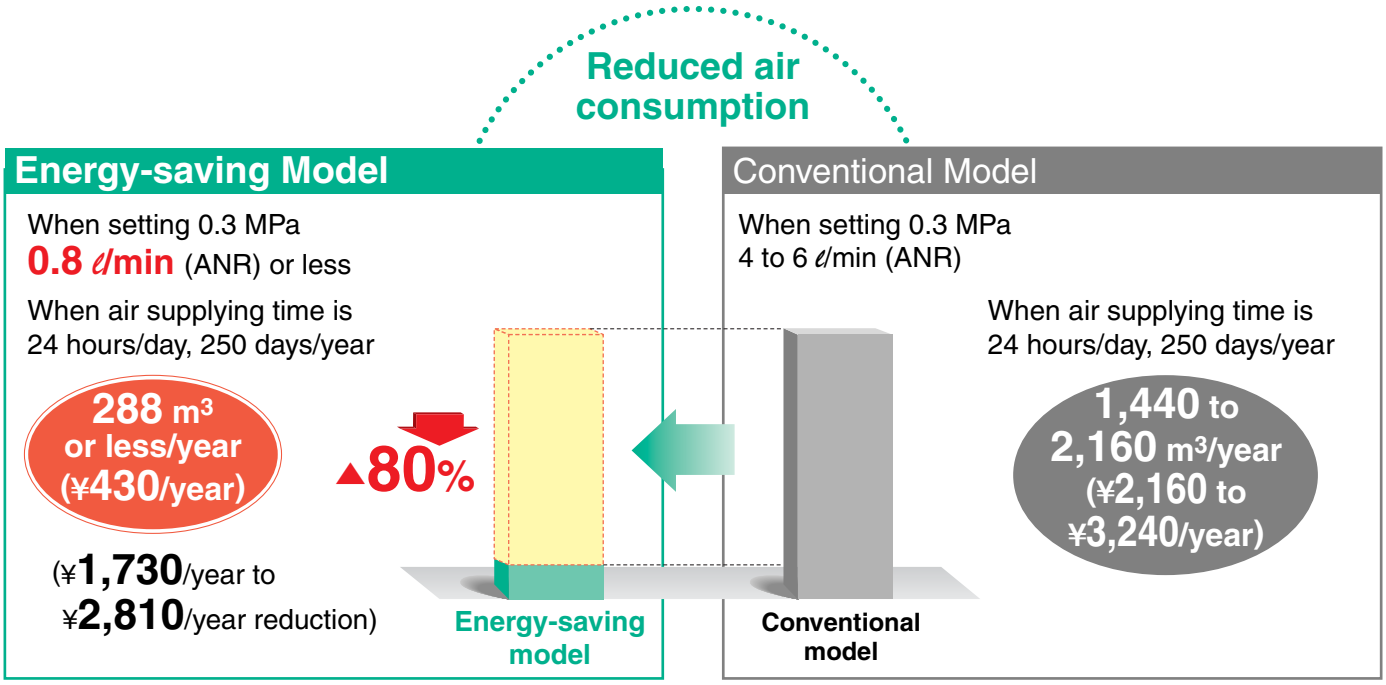
Direct Operated Precision Regulator

Actuators

Series ***ARP20 to 40***

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.)

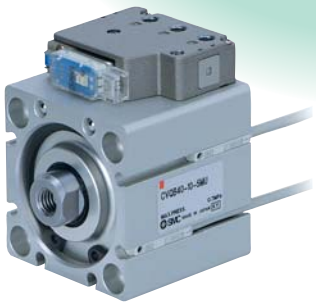


Corresponding value: Air unit ¥1.5/m³ (ANR)

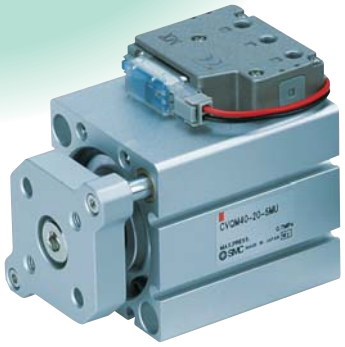
● Refer to the catalog for details.

Compact Cylinder with Solenoid Valve

Series ***CVQ***

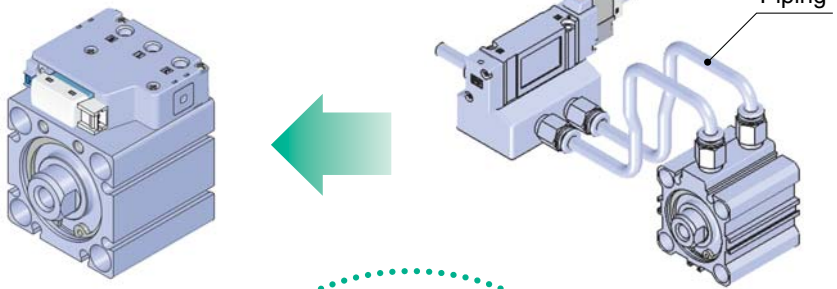


Series ***CVQM***



Reduction of the flow consumption between a cylinder and a valve

- **Piping between a cylinder and a valve not necessary**



Reduced air consumption

Energy-saving Model

CVQ

Bore size: ø32
Stroke: 50 mm
No piping between a valve and a cylinder
Supply pressure: 0.5 MPa

Per single reciprocation

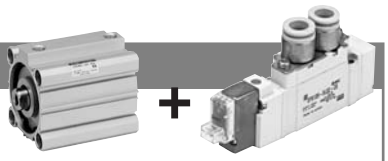
0.42 ℓ (ANR)

When it is operated 900,000 times/year

380 m³/year (ANR) (¥570/year)

(¥**340**/year reduction)

Conventional Model



CQ2

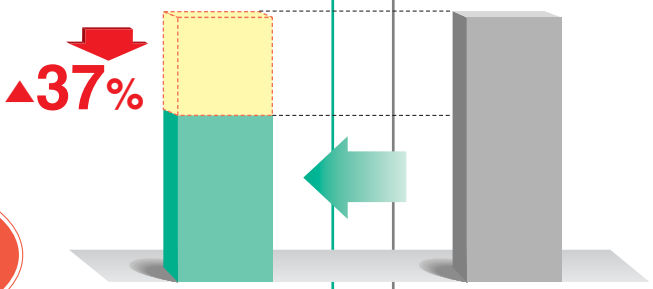
Bore size: ø32
Stroke: 50 mm
Piping bore: 4 mm
Piping length: 2 m
Supply pressure: 0.5 MPa

Per single reciprocation

0.67 ℓ (ANR)

When it is operated 900,000 times/year

606 m³/year (ANR) (¥910/year)



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

● Refer to the catalog for details.

Double Power Cylinder

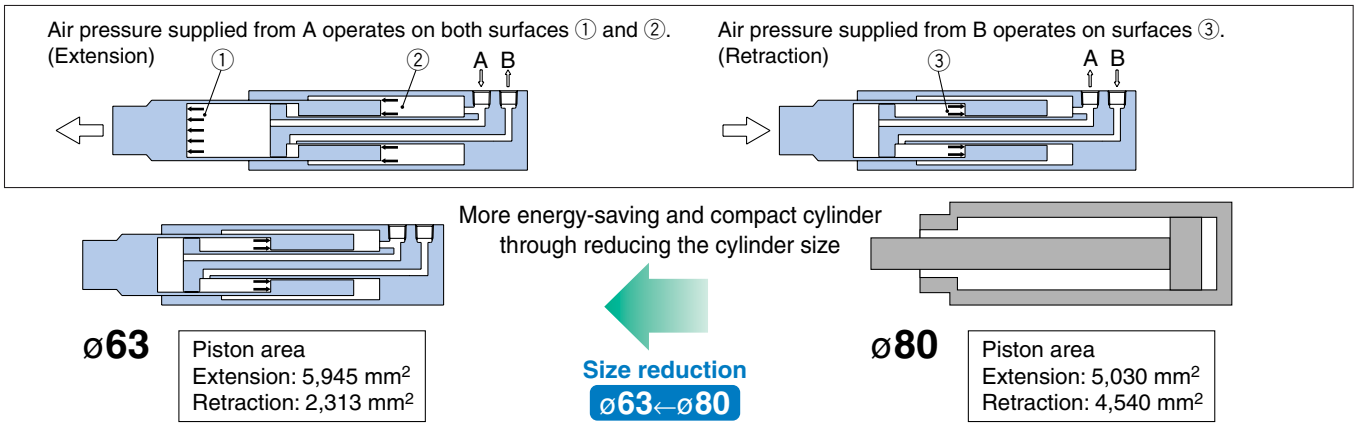
Series ***MGZ***

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.



Reduced air consumption

Energy-saving Circuit

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

Theoretical output (Extension side): 2,973 N
Per single reciprocation

9.9ℓ (ANR)

▲14%

When it is operated 900,000 times/year

8,910 m³/year (ANR) (¥13,370/year)

(¥**2,160**/year reduction)

Conventional Circuit

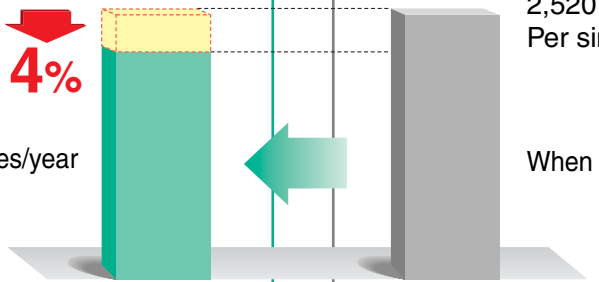
Bore size: ø80
Stroke: 200 mm
Pressure: 0.5 MPa

Theoretical output (Extension side): 2,520 N
Per single reciprocation

11.5ℓ (ANR)

When it is operated 900,000 times/year

10,350 m³/year (ANR) (¥15,530/year)



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

● Refer to the catalog for details.

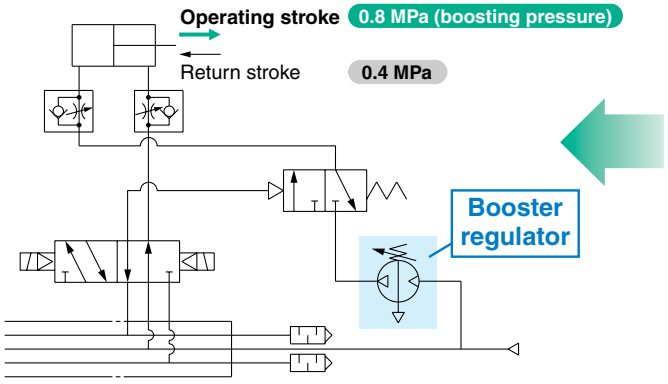
Booster Circuit

Series ***VBA***

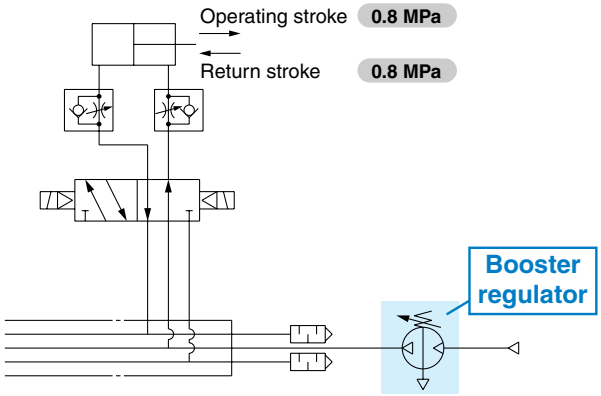
Boost an insufficiently powered portion with a booster regulator

- **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



Reduced air consumption

Energy-saving Circuit

When boosting pressure on the extension side only
Retraction: 0.4 MPa
Extension: 0.8 MPa (Boosting pressure)

Per single reciprocation

8.7 ℓ (ANR)

When it is operated 900,000 times/year

7,830 m³/year (ANR) (¥11,750/year)

(¥**5,800**/year reduction)

Conventional Circuit

Bore size: ø50
Stroke: 200 mm
Pressure: 0.4 MPa
Boosting pressure: 0.8 MPa

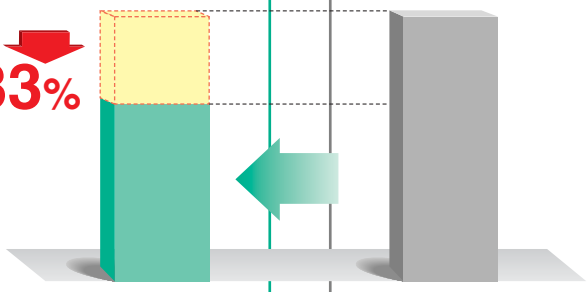
Per single reciprocation

13 ℓ (ANR)

When it is operated 900,000 times/year

11,700 m³/year (ANR) (¥17,550/year)

▲33%



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

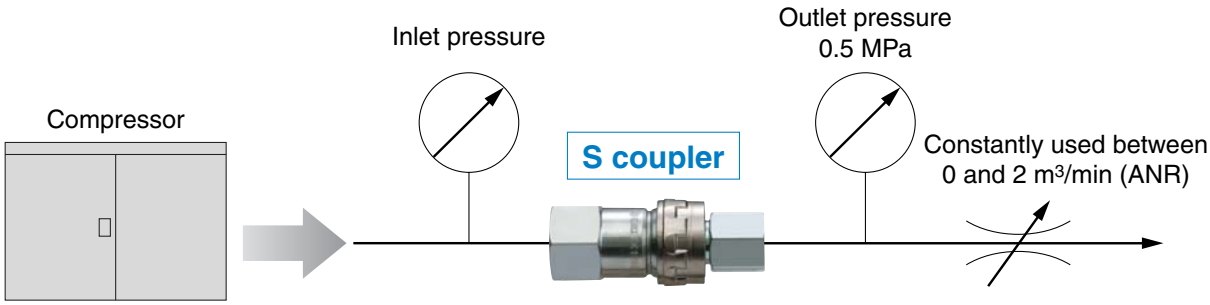
● Refer to the catalog for details.

S Couplers

Lower Pressure in the Piping Line

Series KK130

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



Reduced Pressure Loss

Energy-saving Circuit

Operating pressure at the outlet: 0.5 MPa
Compressor efficiency: 0.7
Annual operating time: 2500 hours
Flow rate: 1.2 m³/min (ANR)

Inlet pressure

0.54 MPa

Power consumption by compressor ¥262,000/year

(¥**11,000**/year reduction)

▲7%

Energy-saving model

Conventional Circuit

Operating pressure at the outlet: 0.5 MPa
Compressor efficiency: 0.7
Annual operating time: 2500 hours
Flow rate: 1.2 m³/min (ANR)

Inlet pressure

0.58 MPa

Power consumption by compressor ¥273,000/year

Conventional model

Corresponding value: Electricity unit ¥15/kWh

● Refer to the energy saving program and catalog for details.

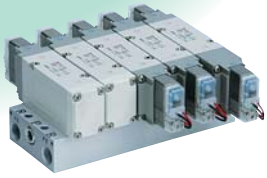
3/4/5 Port Solenoid Valve

Low Power Consumption

Series SY

Series VQ

Series VF



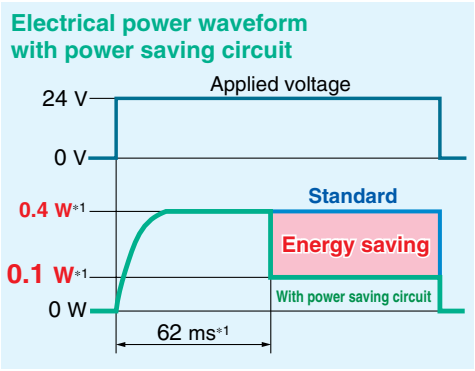
Series S0700

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



*1 Series SY/SYJ

Low Power Consumption Valve

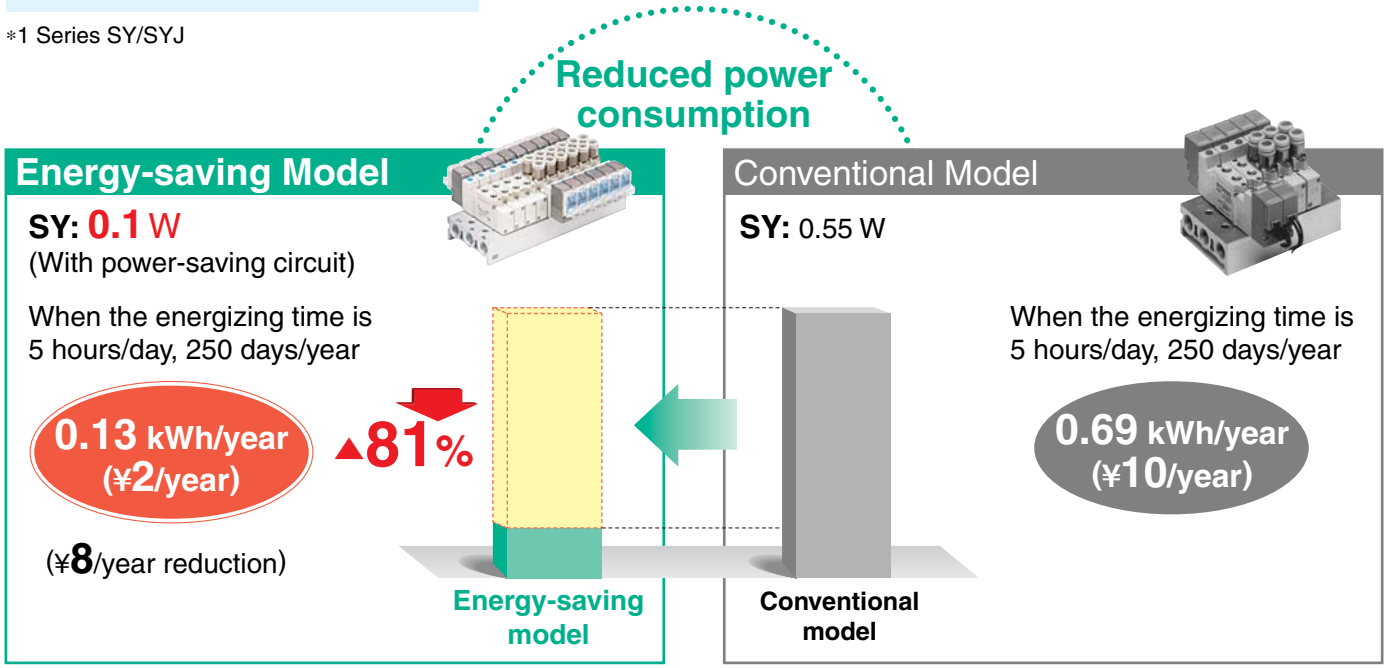
Energy-saving Product

Type	Model	Power consumption W*2	
		Standard	With power saving circuit
4/5 port	SJ2000	0.55	0.23
	SJ3000	0.4	0.15
	SY3000/5000/7000/9000	0.4	0.1
	SYJ3000/5000/7000	0.4	0.1
	VQZ1000/3000/5000	0.4	—
	VF1000/3000/5000	1.55	0.55
	S0700	0.35	—
	VQ/VQC1000/2000	0.4	—
3 port	SYJ300/500/700	0.4	0.1
	VQZ100/200/300	0.4	—
	VP300/500/700	1.55	0.55
	V100	0.35	0.1
	S070	0.35	—

Conventional Product

Power consumption W*2
Standard
—
—
0.55
0.55
1
2
—
1
0.55
1
2
—
—

*2 With DC light



Corresponding value: Electricity unit ¥15/kWh

● Refer to the catalog for details.

Energy Saving Type 2 Port Solenoid Valve

Low Power Consumption

Direct Operated

Series ***VXE21/22/23***

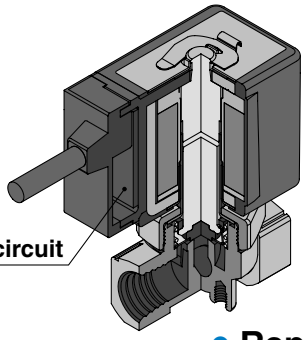
Pilot Operated

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)
- **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**

Reduced power consumption

Energy-saving Model

VXE21: 1.5 W
VXE22: 2.3 W
VXE23: 3.0 W

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

3.8 kWh/year (¥57/year)

(¥**140**/year reduction)

▲70%

Energy-saving model

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 (¥197/year)

Conventional model

Corresponding value: Electricity unit ¥15/kWh

Refer to the catalog for details.

SMC

Coolant Valve

Low Power Consumption

Series SGC

Reduction of the power consumption when energized

- **Flow rate: Av factor** (In case of 0.5 MPa specification)
  SGC2: 155 SGC3: 284 SGC4: 440
- **Service life: 5 million cycles or more** (Based on SMC's test condition)

Reduced power consumption

Energy-saving Model

SGC: 0.35 W (Without light)
(24 VDC) 0.58 W (With light)

SGC (Without light)
Energizing time: 5 hours/day, 250 days/year

0.4 kWh/year (¥6/year)

(¥84/year reduction)

▲68 to 88%

Energy-saving model

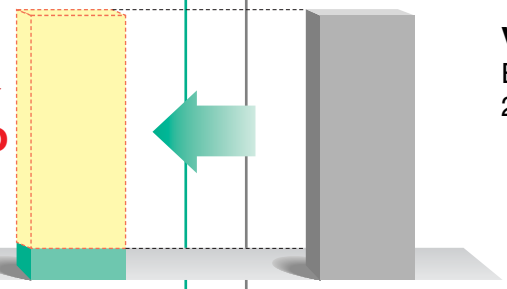
Conventional Model

VNC1: 1.8 W (Without light)
(24 VDC) 2 W (With light)
VNC2 to 9: 4.8 W (Without light)
(24 VDC) 5 W (With light)

VNC2 to 9 (Without light)
Energizing time: 5 hours/day, 250 days/year

6 kWh/year (¥90/year)

Conventional model



Corresponding value: Electricity unit ¥15/kWh

● Refer to the catalog for details.

Refrigerated Air Dryer

Low Power Consumption

Series IDF□E

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

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

Reduced power consumption

Energy-saving Model

IDF15E: 620 W
Air flow capacity: 3100 ℓ/min (ANR)

Operating time: 24 hours/day, 250 days/year

3,720 kWh/year (¥55,800/year)

(¥3,780/year reduction)

▲6%

Energy-saving model

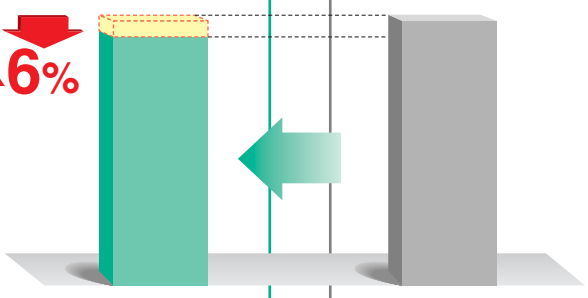
Conventional Model

IDF15C: 662W
Air flow capacity: 2400 ℓ/min (ANR)

Operating time: 24 hours/day, 250 days/year

3,972 kWh/year (¥59,580/year)

Conventional model



Corresponding value: Electricity unit ¥15/kWh

● Refer to the catalog for details.

Double Inverter Type Refrigerated Thermo-chiller

Low Power Consumption

Series HRZ

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

Reduced power consumption

Energy-saving Model

HRZ010-WS: 1.1 kWh/h

Operating conditions: –10°C
0 kW with 50% load
2 kW with 50% load
Operating time: 24 hours/day,
250 days/year

6,600 kWh/year (¥99,000/year)

(¥**459,000**/year reduction)

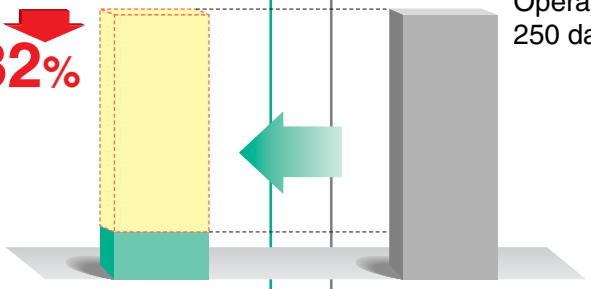
Conventional Model

6.2 kWh/h

Operating conditions: –10°C
0 kW with 50% load
2 kW with 50% load
Operating time: 24 hours/day,
250 days/year

37,200 kWh/year (¥558,000/year)

▲82%



Energy-saving model

Conventional model

Corresponding value: Electricity unit ¥15/kWh

● Refer to the catalog for details.

Digital Switches

Air Line Maintenance

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 — *Series PF2A*

Digital Flow Switch for Water — *Series PF2W*

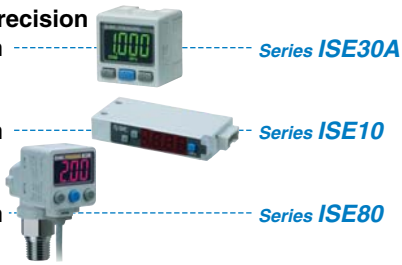
2-Color Display Digital Flow Switch — *Series PFM*

Digital Pressure Switches

2-Color Display High-Precision Digital Pressure Switch — *Series ISE30A*

Compact Digital Pressure Switch — *Series ISE10*

2-Color Display Digital Pressure Switch — *Series ISE80*



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