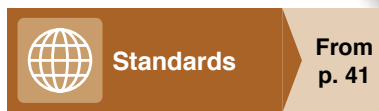
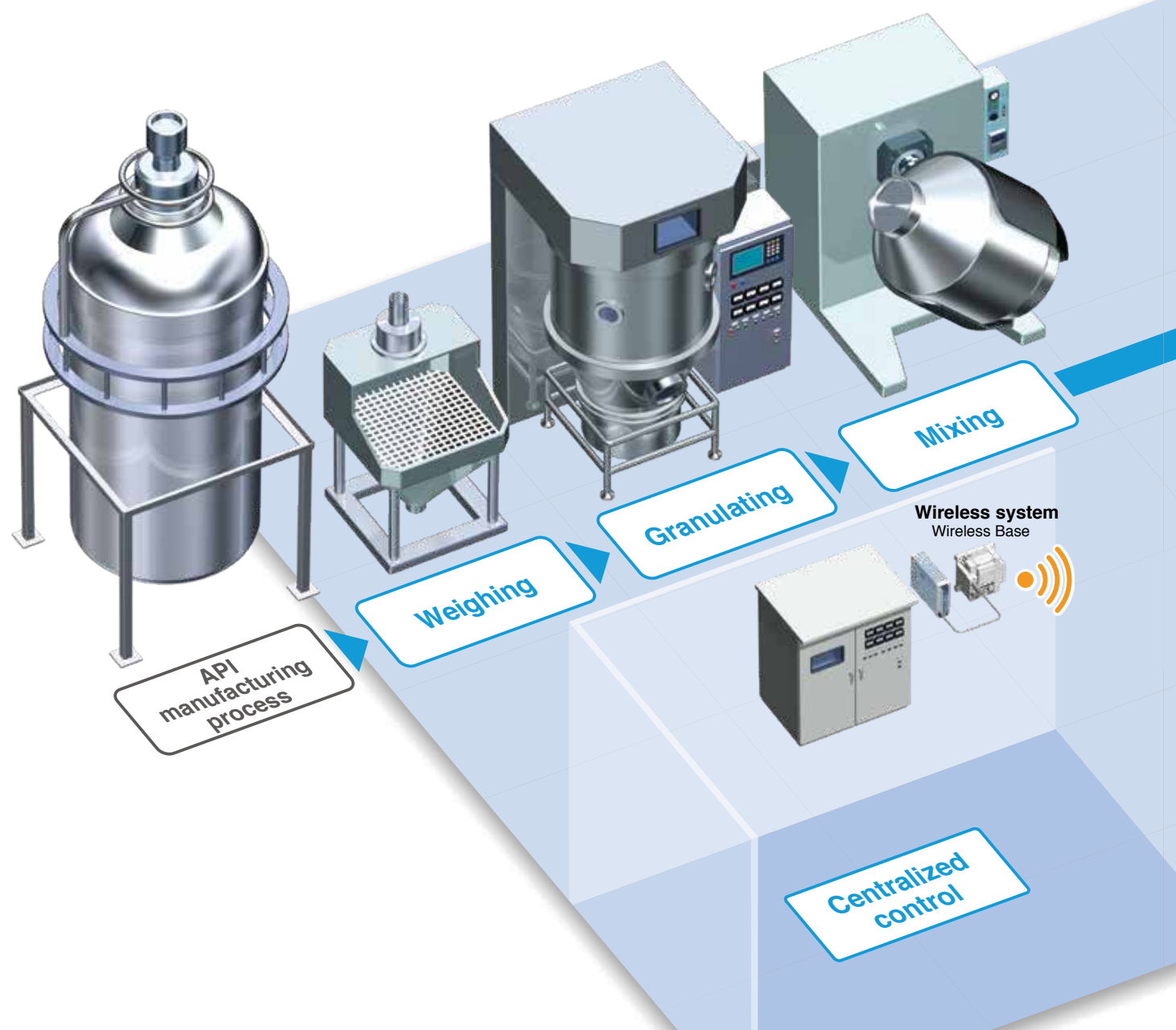




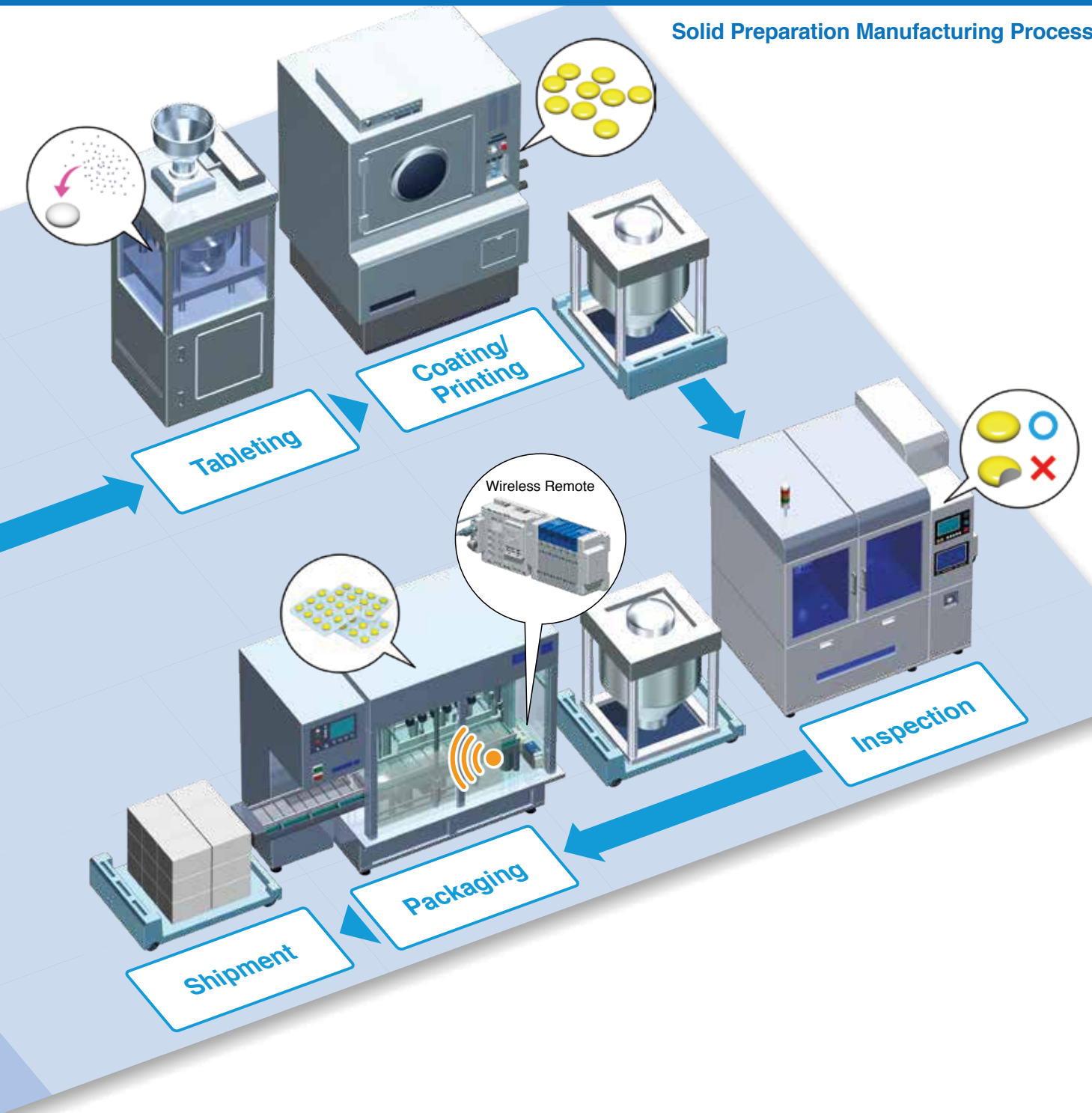
Equipment for Pharmaceutical Manufacturing




Solid Preparation Manufacturing Process



Solid Preparation Manufacturing Process



 **Energy Saving** From p. 51

 **Temperature Control** p. 59




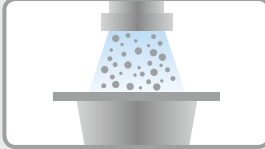
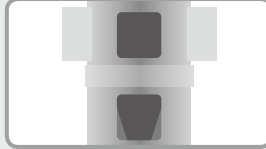
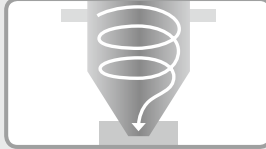
Product Support p. 63

 **Centralized Control** From p. 55

Next Generation Products From p. 60

Others From p. 64

Solid Preparation Manufacturing Process

| Solid Preparation Manufacturing Process | | Weighing  | Granulating  | Mixing  |
|---|--|---|---|---|
| | | Process for sieving pharmaceutical ingredients, implementing pretreatment (e.g. pulverization), and accurately weighing ingredients | Process for granulating powder ingredients that have been pulverized and weighed | Process for mixing granulated powder uniformly using a mixer |
| | |  |  |  |
| | | | | |
| Environmental Resistance | Water/Corrosion Resistant (Stainless Steel) | ● | ● | ● |
| | Dustproof | ● | ● | ● |
| | IP67/65 | ● | ● | ● |
| | Heat/Cold Resistant | ● | ● | ● |
| Sanitation | Hygienic | ● | ● | ● |
| | Grease for Food Processing Equipment (NSF-H1) | ● | ● | ● |
| Standards | Food Sanitation Law Compliant | ● | ● | ● |
| | FDA (Food and Drug Administration) Compliant | ● | ● | ● |
| Clean | Clean Room | ● | ● | ● |
| | Clean Blow | ● | ● | ● |
| | Grease-free | ● | ● | ● |
| High Speed | High Speed | ● | ● | ● |
| | High Frequency | ● | ● | ● |
| | Electric | ● | ● | ● |
| Electricity Countermeasures | Static Neutralization | ● | ● | ● |
| | Explosion Proof | ● | ● | ● |
| Energy Saving | Air Saving | ● | ● | ● |
| | Power Saving | ● | ● | ● |
| Centralized Control | Reduced Wiring | ● | ● | ● |
| | IO-Link Compatible Product | ● | ● | ● |
| | Pressure/Flow Control | ● | ● | ● |
| Temperature Control | Temperature Control | ● | ● | ● |
| | Constant Temperature | ● | ● | ● |
| Next Generation Products | Air Saving, Lightweight, and Compact | ● | ● | ● |
| | Wireless System | ● | ● | ● |
| Product Support | Calibration Certificate | ● | ● | ● |
| Others | High Pressure | ● | ● | ● |
| | Steam | ● | ● | ● |
| | Cleaning (Filtration Filter) | ● | ● | ● |
| | Adsorption Transfer | ● | ● | ● |
| | Dehumidification | ● | ● | ● |
| | Various Valves for Analyzing Reagents and Others | ● | ● | ● |

Solid Preparation Manufacturing Process

[illegible]

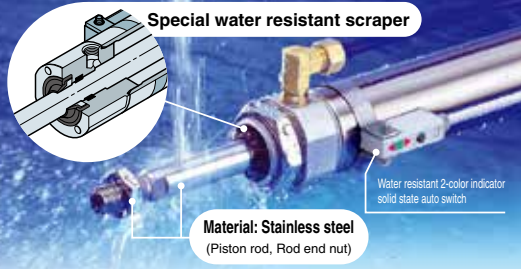
Environmental Resistance

Water Resistant

p. 29

This special scraper prevents water from entering the cylinder.

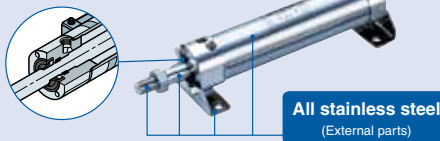
Water Resistant Cylinder



Corrosion Resistant (Stainless Steel)

p. 31

Stainless Steel Cylinder CJ5-S/CG5-S



Dustproof

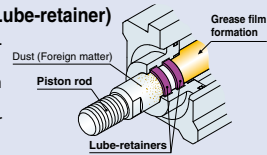
p. 33, 34

With stable lubrication function (Lube-retainer)

Lube-retainers are mounted at two locations.

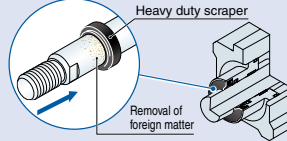
This provides the following two benefits.

- Grease film is formed on the piston rod surface to improve durability.
- The entry of dust and foreign matter is prevented.

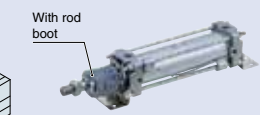


With heavy duty scraper

Removes foreign matter adhered to the rod



With rod boot/dust cover



Heat/Cold Resistant

p. 38

Heat Resistant: up to 150°C

Seal: Fluororubber

Heat-resistant grease

Heat resistant cylinder
(-10 to 150°C):

Symbol
-XB6

Cold Resistant: up to -40°C

Seal: Low nitrile rubber

Cold-resistant grease

Cold resistant cylinder
(-40 to 70°C):

Symbol
-XB7

Solid Preparation Manufacturing Process



API
manufacturing process

Weighing

Granulating

Mixing

Tableting

Sanitation

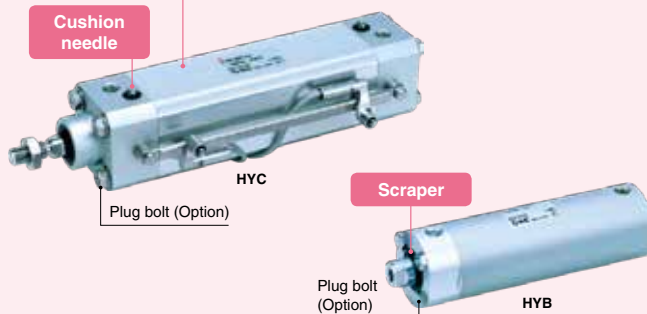
Hygienic

p. 39

A water-resistant cylinder configured for easy cleaning

Flat, grooveless configuration

Eliminates the auto switch grooves, the cushion needle holes, etc.



Grease for Food Processing Equipment (Certified by NSF-H1)

p. 40



Food grade grease (certified by NSF-H1) is used for all parts on which grease is applied.

<Applicable Series>

| Series | Symbol (Suffix) | Series | Symbol (Suffix) |
|--------|-----------------|--------|-----------------|
| MXQ | -X9 | CM2 | -XC85 |
| MXF | | CG1 | |
| MXW | | CA2 | |
| MXP | | CQ2 | |
| MXPJ | | CQS | |
| MXY | | MGP | |
| MIW | -X79 -X79A | | |
| MIS | | | |
| MH□ | | | |

Electricity Countermeasures



IP67/65 compliant p. 35, 36

IP67

Pressure Switch Gap Checker



5-Port Solenoid Valve



IP65

Pressure Switch



Digital Flow Switch



Static Neutralization p. 49

Bar Type IZS40/41/42

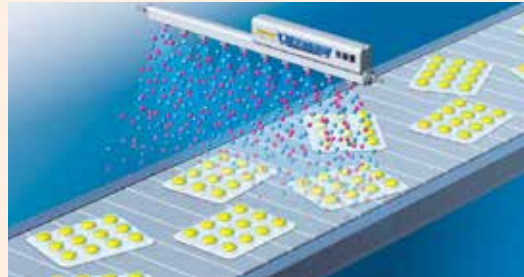
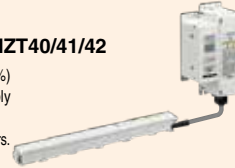
- Potential amplitude of 25 V or less with the dual AC type*1 (IZS42)
- Rapid neutralization of static electricity by a feedback sensor (IZS41)



*1 At an installation height of 300 mm

Separate Controller Bar Type IZT40/41/42

- Space saving: Height reduced by 57 mm (60%)
- The controller and high-voltage power supply module can be mounted separately.
- One controller can control a maximum of 4 ionizers.



Explosion Proof p. 50

Intrinsically Safe Explosion-proof System

5-Port Solenoid Valve

51-SY5000/7000/9000

- Exia II BT4 (TIIS approved product)



Pressure-resistant

3/5-Port Solenoid Valve

50-VFE/50-VPE

- Exd II BT4 (TIIS approved product)
- Waterproof: IP*6 equivalent



▶▶ Coating/Printing ▶▶▶ Inspection ▶▶▶ Packaging ▶▶▶ Shipment

High Speed

High Speed

p. 47

High Power Cylinder RHC

Smooth cushioning from high-speed operation (3000 mm/s) with light loads to low/medium-speed operation with heavy loads

Made to Order

Large Flow Speed Controller

AS3201F-01-□□SA-X778

The orifice diameter has been enlarged to support the high-speed operation of cylinders.

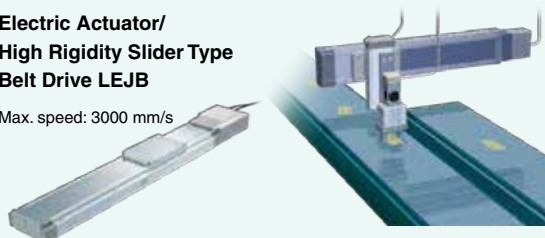


Electric

p. 48

Electric Actuator/
High Rigidity Slider Type
Belt Drive LEJB

Max. speed: 3000 mm/s



High Speed

High Frequency

p. 47

High speed, High frequency actuation MQML□□□H

H type (without fixed orifice) achieves speeds up to 3000 mm/s.



High Speed 2-Port Valve SX10

High-speed response ON: 0.45 ms
OFF: 0.4 ms (±0.05 ms)
Long service life: 5 billion cycles or more



Solid Preparation Manufacturing Process

Energy Saving

Power Saving

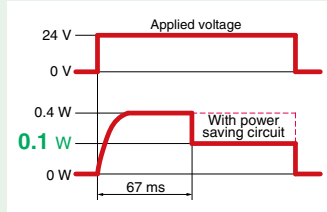
p. 54

Power consumption is reduced by power saving circuit.

Power consumption

0.1 W With power saving circuit **0.4 W** Standard (With indicator light)

[Electrical power waveform with power saving circuit]



Next Generation Products

Air Saving, Lightweight, and Compact

p. 61

Reduction in cylinder air consumption

* Please contact SMC for details.

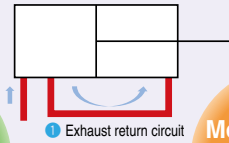
1/3 the air consumption

Total air consumption reduced by **70%**

Exhaust return circuit
Reduced by 45%

Tubing size
Reduced by 17%

Medium bore
Reduced by 20%



API manufacturing process

Weighing

Granulating

Mixing

Tableting

Temperature Control

Temperature Control

p. 59

Thermo-chiller Lineup

Standard Type HRS

1.1 kW to 5.9 kW With heating function

Temperature stability $\pm 0.1^\circ\text{C}$

Outstanding performance and multiple functions are now the global standard.

Lightweight/Compact

*1 UL Standards: Applicable to 60 Hz only



Standard Type HRS100/150

10 kW / 15 kW With heating function

Temperature stability $\pm 1.0^\circ\text{C}$

A model designed for outdoor use (HRS series)



Inverter Type HRSH090

9.5 kW to 11 kW With heating function

Temperature stability $\pm 0.1^\circ\text{C}$

Only for indoor use (HRSH series)

Lightweight and compact triple inverter model



Inverter Type HRSH

10 kW to 28 kW With heating function

Temperature stability $\pm 0.1^\circ\text{C}$

Globally compatible powerful and intelligent chiller

Outstanding energy saving due to the triple inverter



Basic Type HRSE

1.0 kW to 2.2 kW

Temperature stability $\pm 2.0^\circ\text{C}$

Convenient cooling of the required location

Efficient energy saving due to the triple control



High-performance Type HRZ, HRZD, HRW

1.0 kW to 30 kW With heating function

Temperature stability $\pm 0.1/0.3^\circ\text{C}$

High-performance type for semiconductor manufacturing equipment, etc.



Centralized Control

Reduced Wiring

p. 55

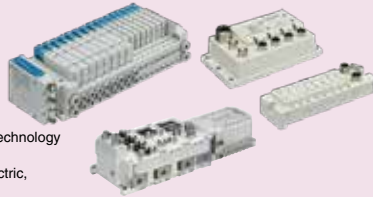
Reduced-wiring Fieldbus System

Communication protocols



■ Trademark

DeviceNet™ is a trademark of ODVA.
 EtherNet/IP™ is a trademark of ODVA.
 CompoNet™ is a trademark of ODVA.
 EtherCAT® is a registered trademark and patented technology
 licensed by Beckhoff Automation GmbH, Germany.
 Modbus® is a registered trademark of Schneider Electric,
 licensed to the Modbus Organization, Inc.



IO-Link Compatible Product

p. 56



Standards

p. 41, 42

Food Sanitation Law Compliant Products

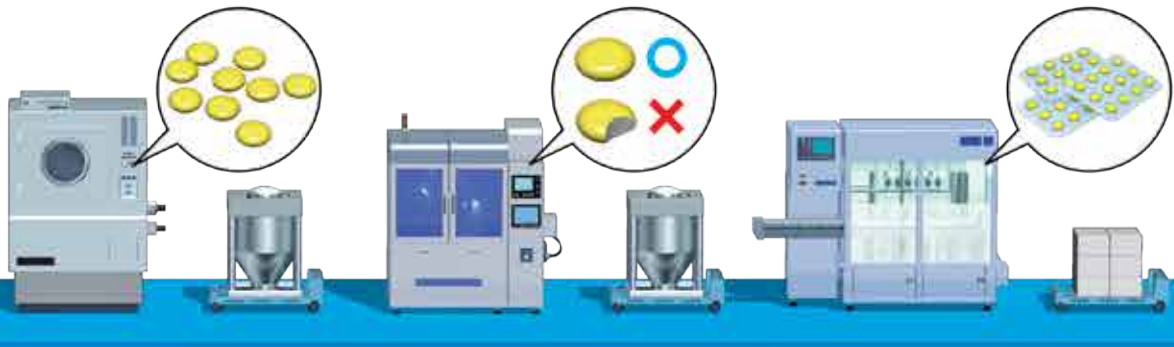
FDA (Food and Drug Administration) Compliant

Food Sanitation Law compliant
 Component materials have met apparatus and
 container-package standards.

FDA (Food and Drug Administration) compliant

*1 Compliant with the FDA's (Food and Drug Administration) § 177-1550 dissolution test
 *2 Compliant with the FDA's (Food and Drug Administration) § 177-2600 dissolution test
 *3 Compliant with the FDA's (Food and Drug Administration) 21CFR§177.2600 dissolution test

| | Series | Food Sanitation Law compliant | FDA (Food and Drug Administration) compliant |
|------------|----------|-------------------------------------|--|
| Tubing | TL/TIL | ● | ●*1 |
| | TLM/TILM | ● | ●*1 |
| | TH/TH | ● | ●*1 |
| | TD/TID | ● | ●*1 |
| | TU-X217 | ● | — |
| | TU-X214 | — | ●*2 |
| Fittings | KQG2 | ● | — |
| | KFG2 | ● | — |
| | KP | ● | — |
| Vacuum pad | ZP3P | — | ●*3 |



Coating/Printing

Inspection

Packaging

Shipment

Temperature Control

Constant Temperature

p. 59

Peltier-type Thermo-con/Thermoelectric Bath Lineup

Thermo-con
HEC/HECR

140 W to 1200 W With heating function

Temperature stability ± 0.01 to 0.03°C

High-precision temperature control type for semiconductor
 manufacturing equipment, medical equipment, etc.

Reagent cooling
equipmentChemical Thermo-con
HED

300 W to 750 W With heating function

Temperature stability $\pm 0.1^\circ\text{C}$

All wetted parts are made of fluororesin.
 Controls the temperature of chemicals by directly
 cooling and heating them

Thermoelectric Bath
HEB/INR-244

140 W to 320 W With heating function

Temperature stability $\pm 0.01^\circ\text{C}$

Accurately controls the temperature of the water in the bath



Others

Dehumidification

p. 69

Membrane Air Dryer
IDG□A/IDG

Non-fluorocarbon

Compatible with low dew points (-60°C)

No vibration or heat discharge

Dry air can be easily
 supplied using the hol-
 low fiber membrane.

Thermo-dryer
IDH□

CE

Stable supply of temperature and
 pressure controlled dry clean air

Moisture Control Tube
IDK

Prevents condensation in piping for small cylinders/air grippers

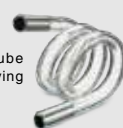
Linear shape

Suitable for applica-
 tions where cylinders
 do not rotate

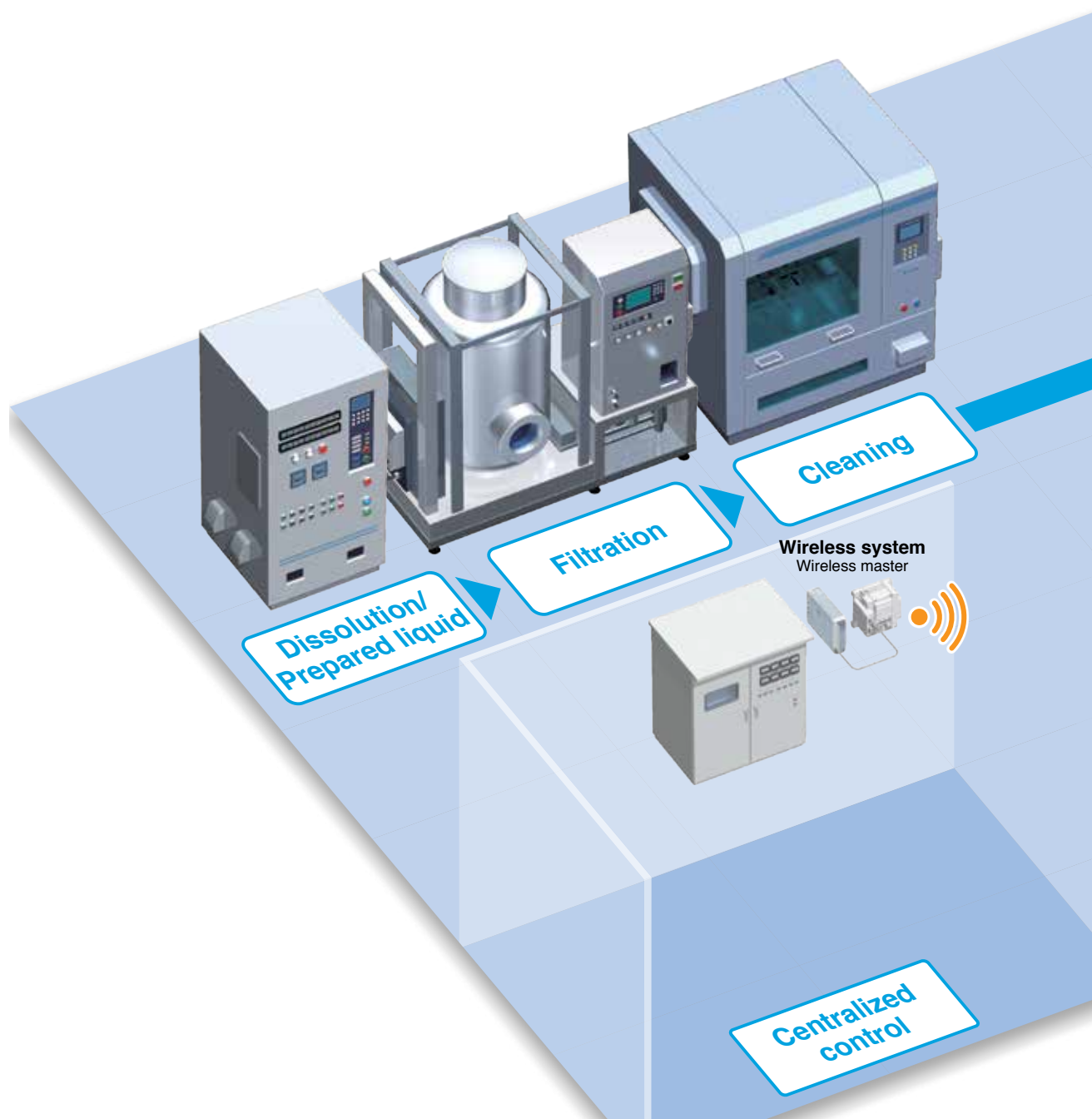


Coil shape



Reduces the tube
 buckling of moving
 parts





Solid Preparation Manufacturing Process



 **Environmental Resistance**  **From p. 29**

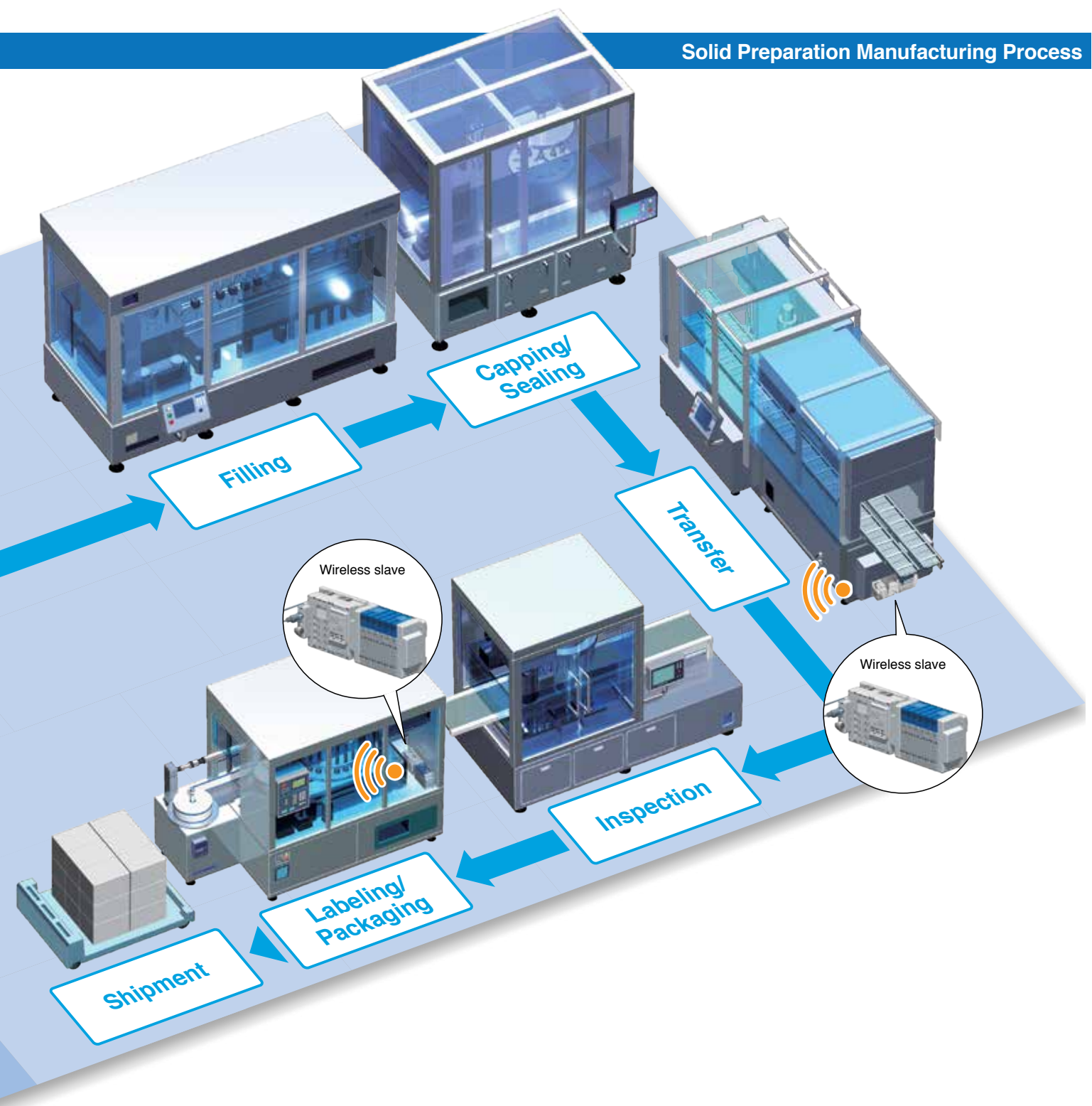
 **Standards**  **From p. 41**


 **High Speed**  **From p. 47**

 **Sanitation**  **From p. 39**

 **Clean**  **From p. 43**

 **Electricity Countermeasures**  **From p. 49**



 **Energy Saving** From p. 51

 **Temperature Control** p. 59





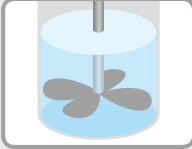
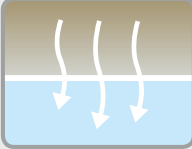
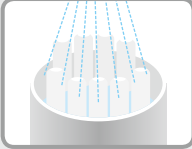

Product Support p. 63

 **Centralized Control** From p. 55

Next Generation Products From p. 60

Others From p. 64

Solution Preparation Manufacturing Process

| Solution Preparation Manufacturing Process | | Dissolution/ Prepared liquid | Filtration | Cleaning | Filling |
|--|--|---|---|--|--|
| | |  |  |  |  |
| | | Process for dissolving solid medicinal substances or additive agents in a solvent to produce solution preparations, such as injection solutions, ophthalmic solutions, and transfusions | Process for removing bacteria and foreign substances from the dissolved preparation and for manufacturing a clean prepared liquid | Process for aseptically drying vials, ampules, syringes, etc., after ultrasonic cleaning | Process for filling ampules, vials, etc., with the dissolved and filtered solution preparations using various filling machines |
| | |  |  |  |  |
| | | | | | |
| Environmental Resistance | Water/Corrosion Resistant (Stainless Steel) | ● | ● | ● | ● |
| | Dustproof | | | ● | ● |
| | IP67/65 | ● | ● | ● | ● |
| | Heat/Cold Resistant | ● | ● | ● | |
| Sanitation | Hygienic | ● | ● | ● | ● |
| | Grease for Food Processing Equipment (NSF-H1) | ● | ● | ● | ● |
| Standards | Food Sanitation Law Compliant | ● | ● | ● | ● |
| | FDA (Food and Drug Administration) Compliant | ● | ● | ● | ● |
| Clean | Clean Room | ● | ● | ● | ● |
| | Clean Blow | ● | ● | ● | ● |
| | Grease-free | ● | ● | ● | ● |
| High Speed | High Speed | | | | ● |
| | High Frequency | | | | ● |
| | Electric | | | | ● |
| Electricity Countermeasures | Static Neutralization | | | | ● |
| | Explosion Proof | ● | ● | ● | ● |
| Energy Saving | Air Saving | | | | ● |
| | Power Saving | | | | ● |
| Centralized Control | Reduced Wiring | | | | ● |
| | IO-Link Compatible Product | | | | ● |
| | Pressure/Flow Control | ● | ● | ● | ● |
| Temperature Control | Temperature Control | ● | ● | | ● |
| | Constant Temperature | ● | ● | | ● |
| Next Generation Products | Air Saving, Lightweight, and Compact | | | ● | ● |
| | Wireless System | | | ● | ● |
| Product Support | Calibration Certificate | ● | ● | ● | ● |
| Others | High Pressure | ● | | ● | ● |
| | Steam | ● | ● | ● | ● |
| | Cleaning (Filtration Filter) | ● | ● | ● | ● |
| | Adsorption Transfer | | | | ● |
| | Dehumidification | | | | ● |
| | Various Valves for Analyzing Reagents and Others | ● | ● | ● | ● |

Solution Preparation Manufacturing Process

| Capping/Sealing | Transfer | Inspection | Labeling/Packaging |
|--|---|---|--|
| | | | |
| Process for sealing ampoules, vials, etc., using a sealing machine | Process for transferring capped and sealed ampoules, vials, etc., to the inspection machine | Process for measuring insoluble particulates and inspecting appearance, etc., using various automatic inspection machines | Process for protecting pharmaceutical products with specified packaging materials which prevent the transformation or deterioration of the pharmaceuticals |
| | | | |

Solution Preparation Manufacturing Process

Sanitation

Hygienic

p. 39

A water-resistant cylinder configured for easy cleaning

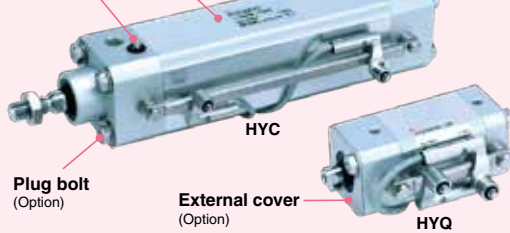
Grease for food processing equipment (certified by NSF-H1) is available.

Flat, grooveless configuration

Eliminates the auto switch grooves, the cushion needle holes, etc.



Cushion needle



Scraper

Plug bolt (Option)

HYB

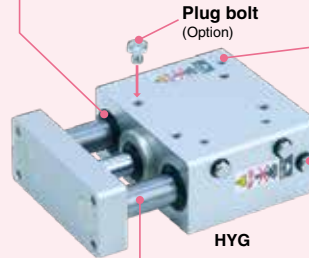
HYC

External cover (Option)

HYQ

New scraper

Grease retention in guide rod and cylinder rod

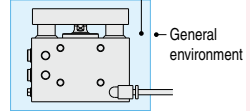


Plug bolt (Option)

Breathing port on guide

<Application example>

Water dispersion environment



Piping at the breathing port on guide allows breathing outside the water dispersion environment.

Special coating

Guide accommodates a special coating.

Solution Preparation Manufacturing Process



Dissolution/
Prepared liquid

Filtration

Cleaning

Filling

Capping/Sealing

Sanitation

Grease for Food Processing Equipment (Certified by NSF-H1) p. 39, 40

Cylinder
CJ5-S/CG5-S



Made to Order

| Series | Symbol (Suffix) | Series | Symbol (Suffix) |
|--------|-----------------|--------|-----------------|
| CM2 | -XC85 | MXQ | -X9 |
| CG1 | | MXF | |
| CQ2 | | MXW | |
| CQS | | MXP | |
| MGP | | MXPJ | |
| | | MXV | -X79 |
| | | MIW | |
| | | MIS | |
| | | MH□ | |

Energy Saving

Air Saving

p. 51

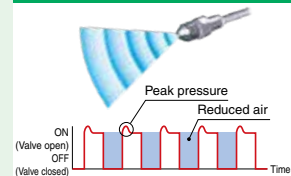
Pulse Blowing Valve

AXTS040□-□□-X2

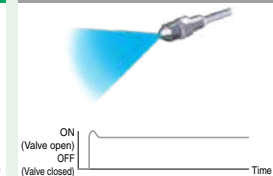
Made to Order

The peak pressure of repeatedly colliding air permits efficient blowing.
Air consumption reduced by 50% or more

Pulse blow



Continuous blow



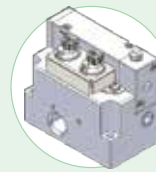
ON time adjustment needle
OFF time adjustment needle



Port size: 1/2
AXTS040□-□□-X2

Related product

* Please contact SMC for details.



Port size: 1/4
AXTS020-1P-X2

Sanitation

Hygienic

p. 39

Service life 5 times longer than the existing model (SMC ratio)

Waterproof examination result (Reference data)

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Hygienic Design Cylinder (HYB, HYQ, HYC, HYG) | | | | | |
| Water resistant cylinder | | | | | |
| Standard cylinder | | | | | |

Compared with the existing model: Approx. **5 times**

Washing in water/Temperature: 30°C, Flow rate: 160 cc/min

Hygienic Design Cylinder

HY□

External seal material: Choice of NBR or FKM
Mounting section: Conforms to ISO/VDMA standard (HYC series)



Transfer

Inspection

Labeling/Packaging

Shipment

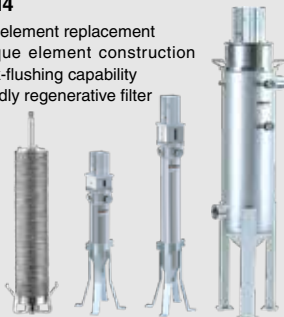
Others

Cleaning (Filtration Filter)

p. 66

Low Maintenance Filter FN1/FN4

No more element replacement
Our unique element construction
with back-flushing capability
Eco-friendly regenerative filter



HEPO II Element for FQ1

EJ101S
Material: PET



Filter for Cleaning Fluid/ Quick Change Filter FQ1



HEPO II Element EJ102S

All parts of this element are
made of polypropylene,
which is optimal for various
cleaning fluids including al-
kali and organic solvents.



Clean

Clean Blow

p. 44

Clean Air Filter SFD

(Hollow fiber element)
Filtration: 0.01 μm (Filtration efficiency: 99.99%)



SFD100
Up to 100 L/min (ANR)



SFD200
Up to 500 L/min (ANR)



SFD101/102
Made to Order
Up to 100 L/min (ANR)

Solution Preparation Manufacturing Process

Centralized Control

Pressure/Flow Control

p. 58

Electro-Pneumatic Regulator

Stepless control of air pressure in proportion to electrical signals

ITV0000

Max. flow rate: 6 L/min (ANR)



ITV1000

Max. flow rate: 200 L/min (ANR)
Grease-free (Wetted parts)



ITV2000

Max. flow rate: 1500 L/min (ANR)



ITV3000

Max. flow rate: 4000 L/min (ANR)



High Pressure Electro-Pneumatic Regulator

Max. flow rate: 3000 L/min (ANR)

ITVX



ITVH



Electronic Vacuum Regulator

ITV009□



ITV209□



Precision Regulator IR1000-A/IR2000-A/IR3000-A

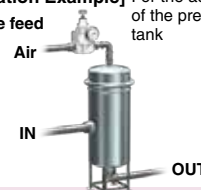
Sensitivity: **0.2%** (Full span)

Repeatability: **±0.5%** (Full span)

| Series | Set pressure range [MPa] |
|----------|--------------------------|
| IR1000-A | 0.005 to 0.2 |
| | 0.01 to 0.4 |
| | 0.01 to 0.8 |
| IR2000-A | 0.005 to 0.2 |
| | 0.01 to 0.4 |
| | 0.01 to 0.8 |
| IR3000-A | 0.01 to 0.2 |
| | 0.01 to 0.4 |
| | 0.01 to 0.8 |

[Application Example]

Pressure feed For the adjustment of the pressure in a tank



Solution Preparation Manufacturing Process



Dissolution/
Prepared liquid

Filtration

Cleaning

Filling

Capping/Sealing

Product Support

Calibration Certificate

p. 63

All of our pressure switches and flow switches come with a calibration certificate.

Pressure Switch: Suffix -X5

- Traceability system chart of standard instruments attached
- Calibration certificate of the product attached
- Traceability system chart of standard instruments attached
- Calibration certificate of standard instruments attached

Applicable Series

3-Screen Display
High-Precision Digital
Pressure Switch
ZSE20□(F)/ISE20□



·ZSE10(F)/ISE10

3-Screen Display
High-Precision Digital
Pressure Switch
ISE7□/7□G



·PSE53□
·PSE54□
·PSE550

Pressure Sensor
for General Fluids
PSE56□



·PSE200
·PSE300
·PSE57□

3-Screen Display
Sensor Monitor
PSE300AC



Flow Switch: Standard model no. (Available with -A)

- Inspection certificate (with serial number) attached
- Traceability system chart attached (Traceability system chart of standard instruments attached)

Applicable Series

2-Color Display
Digital
Flow Switch
PFMB



·PFM
·PF2D

3-Color Display
Digital
Flow Switch
PFMC



3-Color Display
Digital
Flow Switch
for Large Flow
PF3A7□H



3-Color Display
Digital
Flow Switch
for Water
PF3W



* Products other than those listed above are also available.
Please contact SMC for details.

Environmental Resistance



Corrosion Resistant (Stainless Steel)

p. 30 to 32

Cylinder
CJ5-S/CG5-S

All stainless steel specifications (External parts)
 Stainless steel 304 is used for external metal parts.
 Corrosion resistance is improved even in environments with exposure to water.



**Stainless Steel Foot Bracket,
 Flange Bracket,
 Single Knuckle Joint,
 Double Knuckle Joint**



| Description | Model |
|---|-------|
| External stainless steel cylinder | -XB12 |
| Made of stainless steel | -XC6 |
| Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel | -XC7 |
| Double clevis and double knuckle joint pins made of stainless steel | -XC27 |
| Made of stainless steel (Combination of XC7 and XC68) | -XC65 |
| Made of stainless steel (with hard chrome plated piston rod) | -XC68 |

Floating Joint
JS



Clean Regulator
SRH



Stainless Steel 316
**One-touch/
 Insert Fittings**
KQG2/KFG2



S Couplers
KKA



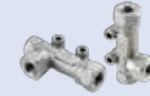
Speed
Controller
ASG



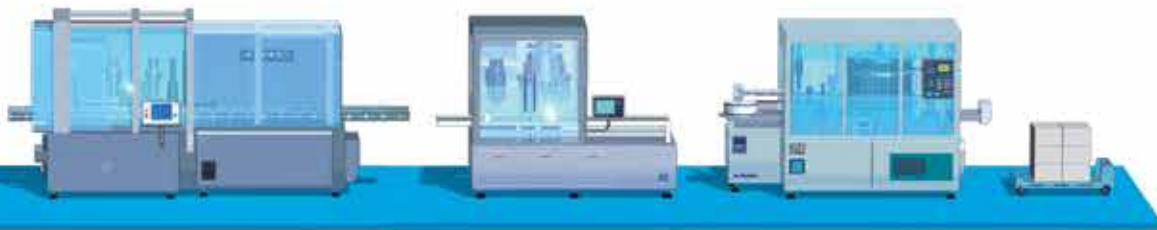
Pressure
Sensor for
General Fluids
PSE56□



All Stainless Steel
Vacuum Ejector
ZH□□-X267



Chemical
Liquid Valve
LVA



Transfer

Inspection

Labeling/Packaging

Shipment

Others

Various Valves for Analyzing Reagents and Others

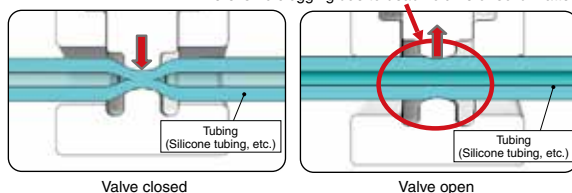
p. 70

Pinch Valve

The flow volume of the fluid is controlled by directly clamping the tube so as to open or close it.

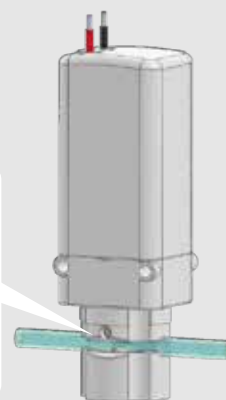
- The fluid does not come into contact with the moving parts of the valve, so there is no inflow of contaminants.
- By discarding a tube after use, the need for a washing process is eliminated, thus ensuring good hygiene.
- Tubes can be set or replaced easily.

There is no clogging due to dead volume or solid matter.



Valve closed

Valve open



Solenoid valve type



LPV

Solution Preparation Manufacturing Process

Next Generation Products

Air Saving, Lightweight, and Compact p. 60, 61

* Please contact SMC for details.

<5-Port Solenoid Valve/Plug-in Type>

Volume: **39% reduction**

Weight: **32% reduction**

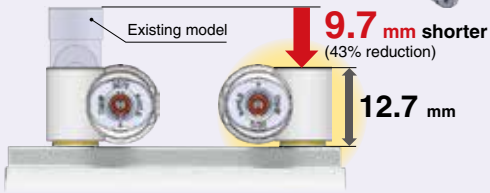


JSY3000 Series

<Compact Speed Controller>

Height: **43% reduction**

(22.4 mm → 12.7 mm)



Wireless System p. 62

Noise resistance

Uses the 2.4 GHz ISM frequency band
Frequency hopping: Every 5 ms

Communication response

Signal response time: **5 ms**

Number of I/O points

Max. 1280 inputs/1280 outputs
(Max. 128 inputs/128 outputs per module)

High-speed connection

From power supply ON to start of communication: **Min. 250 ms***1
*1 For wireless slave

Communication cables not required

Reduced wiring work, space, and cost
Minimized disconnection risk

Compatible protocols

EtherNet/IP



Trademark

EtherNet/IP™ is a trademark of ODVA.

Solution Preparation Manufacturing Process



Dissolution/
Prepared liquid

Filtration

Cleaning

Filling

Capping/Sealing

Next Generation Products

Air Saving, Lightweight, and Compact p. 60

* Please contact SMC for details.

<Square Air Cylinder>

Weight: Max. **57% reduction**



<Aluminum Rod Cylinder>

CQ2 Series

Weight:
Max. **20% reduction**



MB Series

Weight:
Max. **24% reduction**



CM2 Series

Weight:
Max. **20% reduction**



MGP Series

Weight:
Max. **39% reduction**



Others

High Pressure p. 64

3-Screen Display

High-Precision Digital Pressure Switch

ISE7□G IP67

It is possible to change the settings while checking the measured value.

General Fluids

5.0 MPa: ISE76G

10 MPa: ISE77G



Steam p. 65

Angle Seat Valve/Air Operated Type

VXB

Fluid temperature: 183°C (Steam) or less
Long service life: 3 million cycles (Steam),
5 million cycles (Air)



Bronze (CAC)

Stainless steel 316L equivalent

High Speed

High Speed

p. 47

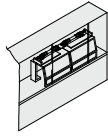
High Power Cylinder RHC

Smooth cushioning from high-speed operation (3000 mm/s) with light loads to low/medium-speed operation with heavy loads

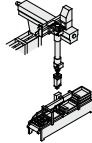


[Application Examples]

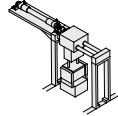
For the opening/closing of doors
(2000 mm/s, several tens kg)



For high-speed Z-axis operation
(Up to 3000 mm/s, several kg)



For transfer equipment
40 kg, 1000 mm/s (For ø32)



Made to Order

Large Flow Speed Controller AS3201F-01-□□SA-X778

The orifice diameter has been enlarged to support the high-speed operation of cylinders.



Electric

p. 48

Electric Gripper LEH

Z Type (2 fingers)
Compact, lightweight



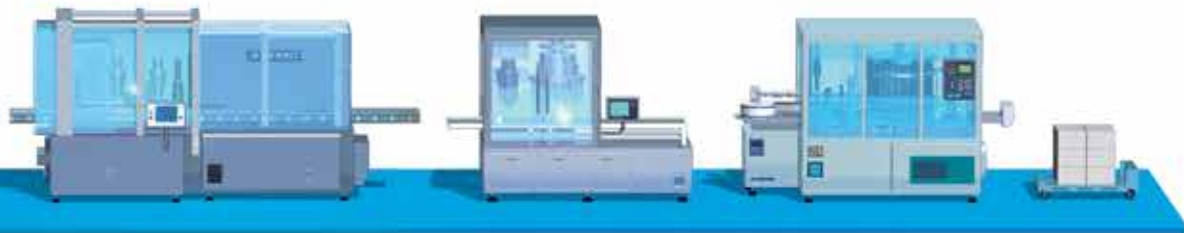
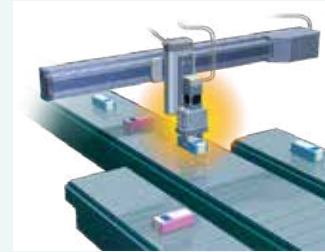
ZJ Type (2 fingers)
With dust cover
(IP50 equivalent)



F Type (2 fingers)
Can hold various types of workpieces with a long stroke



S Type (3 fingers)
Can hold round workpieces



Transfer

Inspection

Labeling/Packaging

Shipment

Electricity Countermeasures

Static Neutralization

p. 49

Fan Type

- Extensive static neutralization possible without using compressed air
- Wide ranging static neutralization devices from simple compact types to optional types with a louver



IZF10R

IZF21

IZF31

Nozzle Type IZN10E

The nozzle type can be selected according to the application.

- Energy-saving static neutralization nozzle
- High flow rate nozzle
- Female threads for piping



For static neutralization and particle elimination on reagent bottles

Desktop Duster Box ZVB

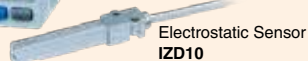
Static neutralization, dust removal, and dust collection processes have been integrated into one box.



Electrostatic Sensor



Electrostatic Sensor Monitor
IZE11



Electrostatic Sensor
IZD10

Handheld Electrostatic Meter IZH10



Solution Preparation Manufacturing Process

Temperature Control

Temperature Control

p. 59

Peltier-Type Chiller/Thermo-con HEC

Can precisely control the temperature of a heat source or process fluid



Reagent cooling equipment



Rack Mount Type HECR



Mountable in a 19-inch rack

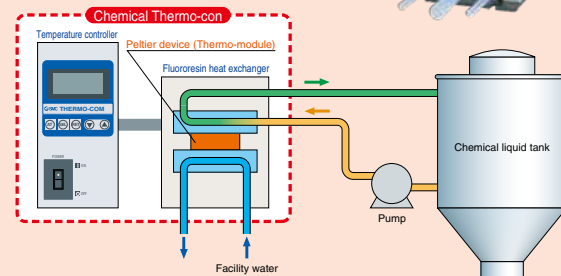


Constant Temperature

p. 59

Chemical Thermo-con HED

A fluororesin heat exchanger allows for the direct temperature control of chemical liquids. Industry-leading withstand pressure: 0.35 MPa



Solution Preparation Manufacturing Process



Dissolution/
Prepared liquid



Filtration



Cleaning



Filling



Capping/Sealing

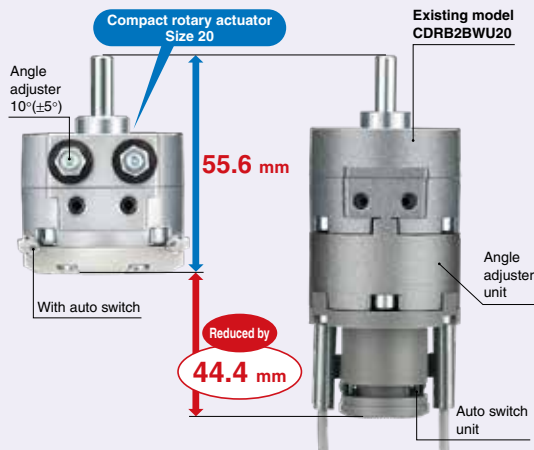
Next Generation Products

Air Saving, Lightweight, and Compact

p. 60, 61

Compact Rotary Actuator (Vane Type)

Size: 10, 15, 20, 30, 40

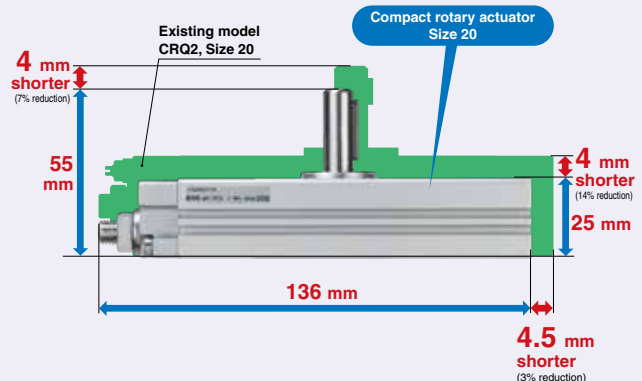


Weight: **48%** reduction (222 g → **115 g**) (For size 20)
Overall length: **44%** reduction (100 mm → **55.6 mm**) (For size 20)

Compact Rotary Actuator (Rack & Pinion Type)

Size: 10, 15, 20, 30, 40

* Please contact SMC for details.



Weight: **29%** reduction (700 g → **500 g**) (For size 20)
Height: **7%** reduction (59 mm → **55 mm**) (For size 20)

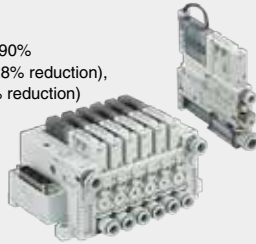
Others

Adsorption Transfer

p. 67

Vacuum Unit ZK2

Air saving: Air consumption reduced by 90%
Compact/Lightweight: Volume 88 cm³ (28% reduction),
Weight 81 g (59% reduction)
Nozzle diameter: ø0.7, ø1.0, ø1.2, ø1.5



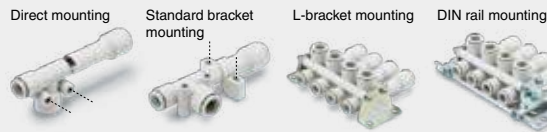
Vacuum Pad ZP3P

Good for film packaging applications where the shape of the workpiece changes easily from being lifted.
Silicone rubber compliant with the FDA (USA Food and Drug Administration) 21CFR§177.2600 elution test is used.



Body Ported Type Vacuum Ejector ZH

Overall length: Max. 11% reduction
Weight: Max. 74% reduction



All Stainless Steel Vacuum Ejector ZH□□-X267

All stainless steel (SCS13: Equivalent to stainless steel 304)
Sealant not required
Max. operating temperature: 260°C
Grease-free



Transfer

Inspection

Labeling/Packaging

Shipment

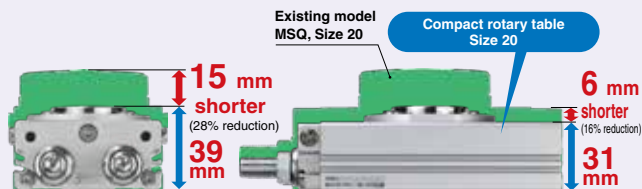
Next Generation Products

Air Saving, Lightweight, and Compact

p. 61

Compact Rotary Table (Rack & Pinion Type)

Size: 10, 20, 30, 50



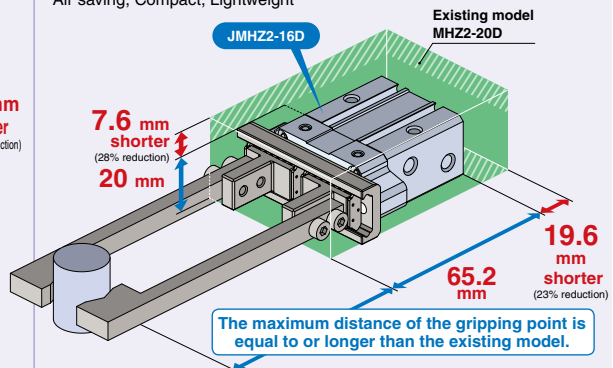
Weight: **32%** reduction (940 g → **640 g**) (For size 20)
Height: **28%** reduction (54 mm → **39 mm**) (For size 20)

Compact Air Gripper

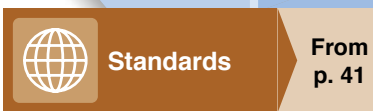
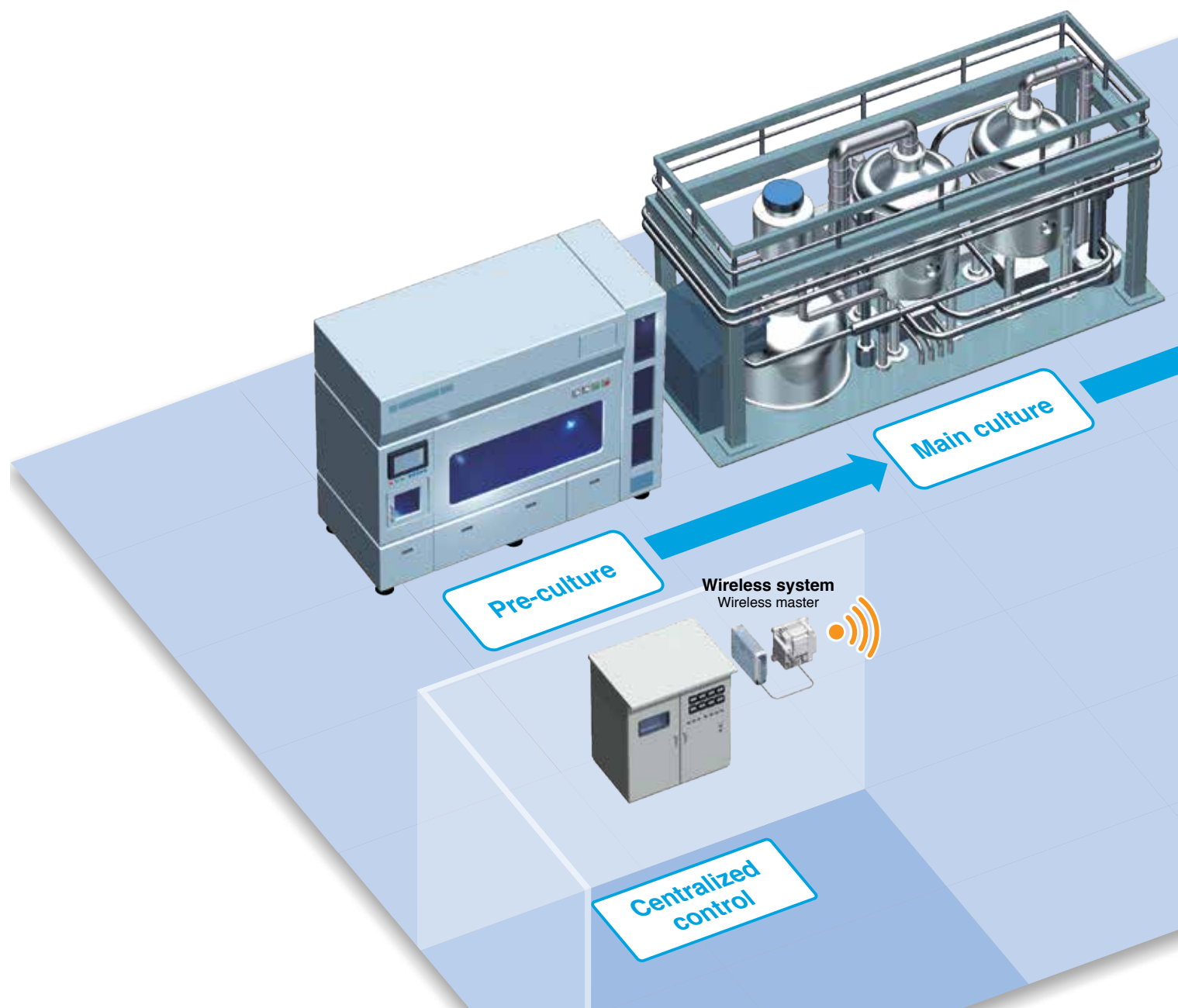
ø8, ø12, ø16, ø20

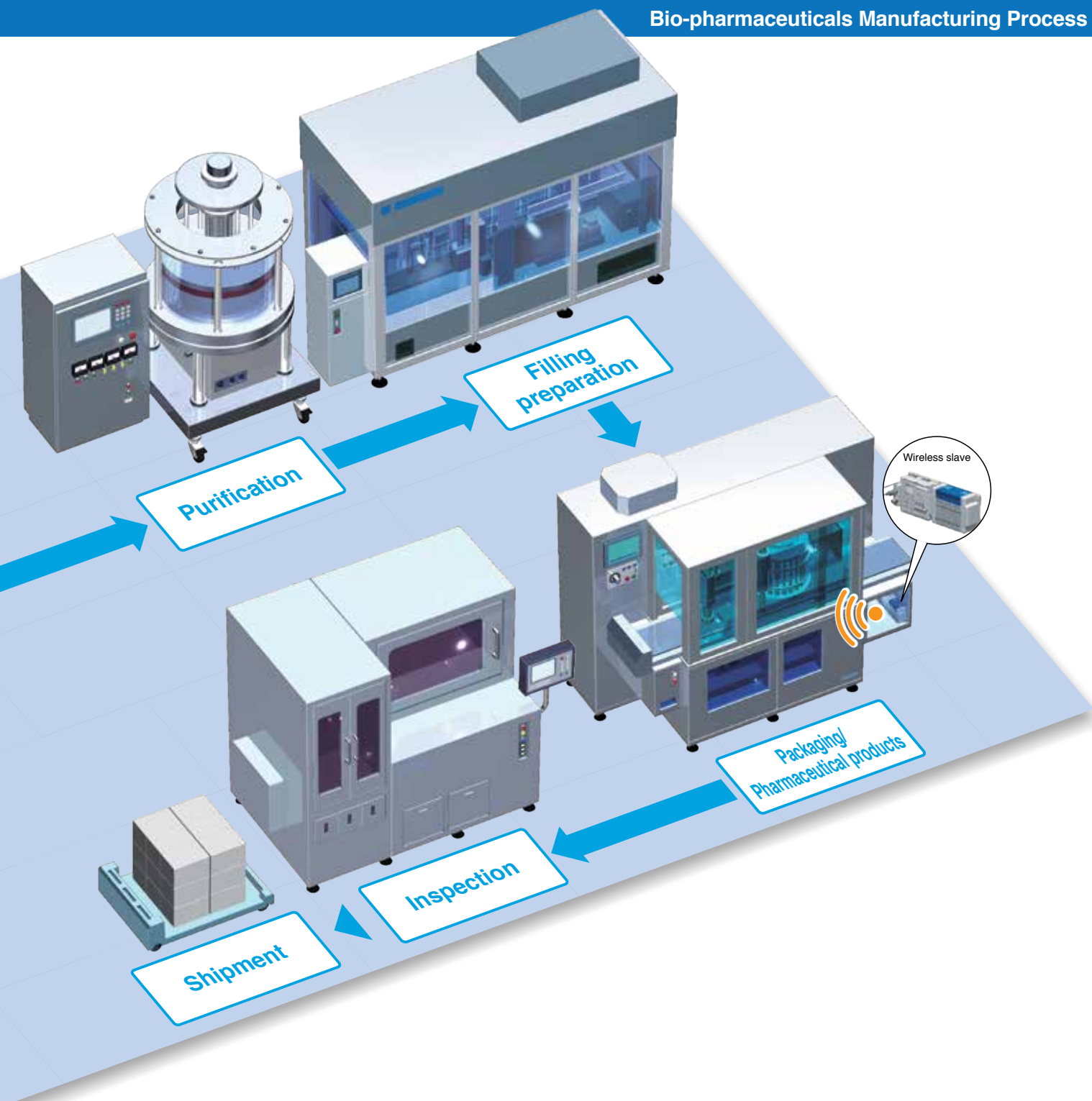
Thanks to downsizing (Size 20 → 16),
Air saving, Compact, Lightweight


* Please contact SMC for details.



Weight: **46%** reduction (235 g → **127 g**)
Height: **28%** reduction (27.6 mm → **20 mm**)
Overall length: **23%** reduction (84.8 mm → **65.2 mm**)





 **Energy Saving** From p. 51

 **Temperature Control** p. 59





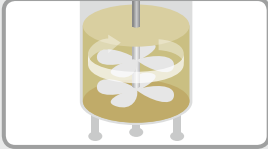
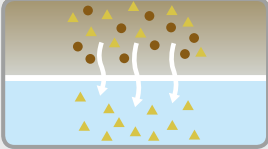
Product Support p. 63

 **Centralized Control** From p. 55



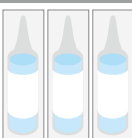
Next Generation Products From p. 60

Others From p. 64

Bio-pharmaceuticals Manufacturing Process

| Bio-pharmaceuticals Manufacturing Process | | Pre-culture | Main culture | Purification |
|---|--|---|--|--|
| | |  |  |  |
| | | Process for culturing cells (The cells are grown in a culture medium.) | Process for further culturing cells using a large culture tank subsequent to the pre-culture | Process for removing cells from the culture medium, and then removing impurities using a chromatography to enhance the purity of the API |
| | |  |  |  |
| Environmental Resistance | Water/Corrosion Resistant (Stainless Steel) | ● | ● | ● |
| | Dustproof | | | |
| | IP67/65 | ● | ● | ● |
| | Heat/Cold Resistant | | | |
| Sanitation | Hygienic | ● | ● | ● |
| | Grease for Food Processing Equipment (NSF-H1) | | | |
| Standards | Food Sanitation Law Compliant | ● | ● | ● |
| | FDA (Food and Drug Administration) Compliant | ● | ● | ● |
| Clean | Clean Room | ● | ● | ● |
| | Clean Blow | ● | ● | ● |
| | Grease-free | ● | ● | ● |
| High Speed | High Speed | | | |
| | High Frequency | | | |
| | Electric | | | |
| Electricity Countermeasures | Static Neutralization | | | |
| | Explosion Proof | ● | ● | ● |
| Energy Saving | Air Saving | ● | ● | ● |
| | Power Saving | ● | ● | ● |
| Centralized Control | Reduced Wiring | ● | ● | ● |
| | IO-Link Compatible Product | ● | ● | ● |
| | Pressure/Flow Control | ● | ● | ● |
| Temperature Control | Temperature Control | | | |
| | Constant Temperature | ● | ● | ● |
| Next Generation Products | Air Saving, Lightweight, and Compact | | | ● |
| | Wireless System | | | ● |
| Product Support | Calibration Certificate | ● | ● | ● |
| Others | High Pressure | | | ● |
| | Steam | | | |
| | Cleaning (Filtration Filter) | ● | ● | ● |
| | Adsorption Transfer | | | |
| | Dehumidification | ● | ● | ● |
| | Various Valves for Analyzing Reagents and Others | | | |

Bio-pharmaceuticals Manufacturing Process

| Filling preparation | Packaging/ Pharmaceutical products | Inspection |
|---|---|--|
|  |  |  |
| Process for filling containers with the purified API using a filling machine | Process for packaging finished pharmaceutical products | Process for inspecting finished products for cracks, the adhesion of foreign substances, etc. |
|  |  |  |
| | | <div>Water/Corrosion Resistant (Stainless Steel)</div> <div>Dustproof</div> <div>IP67/65</div> <div>Heat/Cold Resistant</div> <div>Environmental Resistance</div> |
| | | <div>Hygienic</div> <div>Grease for Food Processing Equipment (NSF-H1)</div> <div>Sanitation</div> |
| | | <div>Food Sanitation Law Compliant</div> <div>FDA (Food and Drug Administration) Compliant</div> <div>Standards</div> |
| | | <div>Clean Room</div> <div>Clean Blow</div> <div>Grease-free</div> <div>Clean</div> |
| | | <div>High Speed</div> <div>High Frequency</div> <div>Electric</div> <div>High Speed</div> |
| | | <div>Static Neutralization</div> <div>Explosion Proof</div> <div>Electricity Countermeasures</div> |
| | | <div>Air Saving</div> <div>Power Saving</div> <div>Energy Saving</div> |
| | | <div>Reduced Wiring</div> <div>IO-Link Compatible Product</div> <div>Pressure/Flow Control</div> <div>Centralized Control</div> |
| | | <div>Temperature Control</div> <div>Constant Temperature</div> <div>Temperature Control</div> |
| | | <div>Air Saving, Lightweight, and Compact</div> <div>Wireless System</div> <div>Next Generation Products</div> |
| | | <div>Calibration Certificate</div> <div>Product Support</div> |
| | | <div>High Pressure</div> <div>Steam</div> <div>Cleaning (Filtration Filter)</div> <div>Adsorption Transfer</div> <div>Dehumidification</div> <div>Various Valves for Analyzing Reagents and Others</div> <div>Others</div> |

Environmental Resistance



Corrosion Resistant (Stainless Steel)

p. 30

Process Gas Equipment

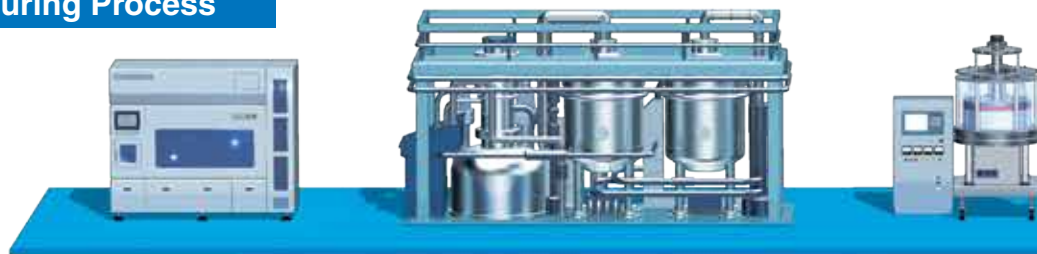
Regulator
Diaphragm Valve
Check Valve
Vacuum Generator
Flow Switch



Gas supply unit for culture equipment



Bio-pharmaceuticals Manufacturing Process



Pre-culture



Main culture



Purification



Centralized Control



Reduced Wiring

p. 55

Fieldbus System

Select from 3 product types and 14 protocols.

Type 1 Output type for solenoid valves

Compact equipment with decentralized valve manifolds

EX120/121/122/124/126/140/180/260

Type 2 Gateway type

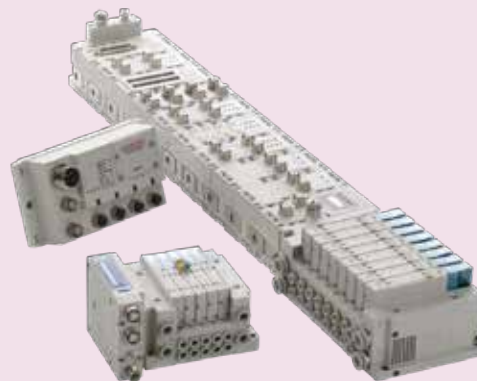
The use of a gateway unit further reduces wiring.

EX500/510

Type 3 Integrated input-output type

Valve manifolds and other units are installed in the same place.

EX245/250/600



Communication Protocols



Trademark

DeviceNet™ is a trademark of ODVA.
EtherNet/IP™ is a trademark of ODVA.
CompoNet™ is a trademark of ODVA.
EtherCAT® is a registered trademark and patented technology licensed by Beckhoff Automation GmbH, Germany.
Modbus® is a registered trademark of Schneider Electric, licensed to the Modbus Organization, Inc.

Clean

Clean Room

p. 43

Assembly and inspection in a standard workshop

↓

Clean room ISO Class 8 equivalent
Surface wiped with alcohol (to remove oil)

↓

Clean room ISO Class 8 equivalent
Clean booth ISO Class 5 equivalent
Interior packed after blowing surface with clean air
(anti-static electricity measures)

↓

Clean room ISO Class 8 equivalent
Exterior packed (Double packing)

↓

Shipping



Directional Control Valve



Air Cylinder



Air Gripper



Rotary Actuator



Pressure Control Equipment
Modular F.R.



Grease-free

p. 45, 46

Clean Regulator



Clean One-touch Fittings
(For blowing)



Clean Air Module



Digital Flow Switch



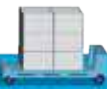
Clean Blow

p. 44

Clean Gas Filter



Clean Air Filter



Filling preparation

Packaging/
Pharmaceutical products

Inspection

Shipment

Next Generation Products

Wireless master unit

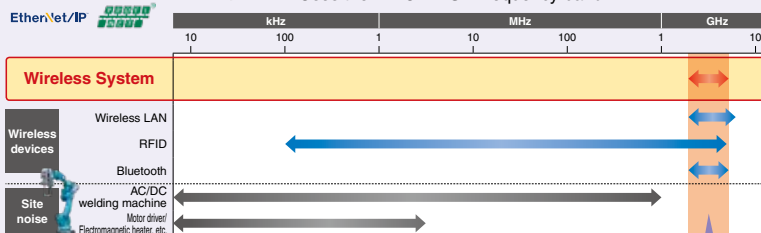
Wireless slave unit

Wireless System

p. 62

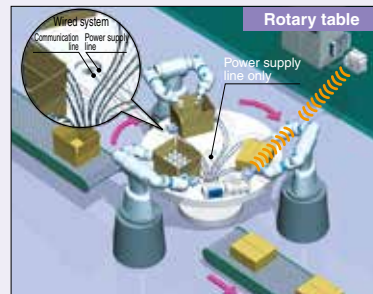
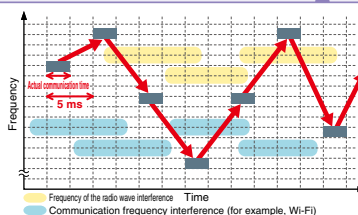
Wireless System EX600-W

Uses the 2.4 GHz ISM frequency band



Frequency hopping: Every 5 ms

A stable wireless environment is established using an original protocol which is not affected by interference. Interference from other wireless equipment is prevented.



Others

Various Valves for Analyzing Reagents and Others

p. 70

Compact Direct Operated 2/3-Port Solenoid Valve for Chemical Liquids LVM

Low Particle Generation Oil-free Metal-free

* Wetted parts

Isolated structure

Direct operated rocker type/poppet type

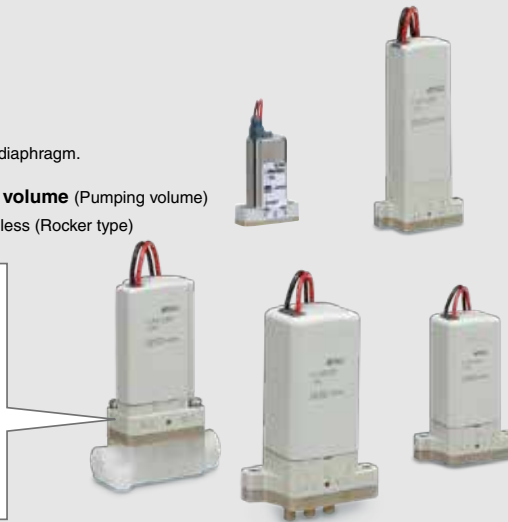
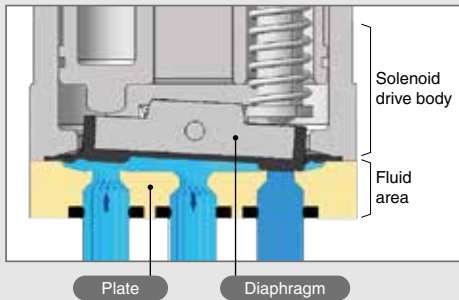
The solenoid drive body is separated from the fluid area by a diaphragm.

Power consumption (With power-saving circuit)

1.0 W or less

Change in volume (Pumping volume)

0.01 μL or less (Rocker type)



Bio-pharmaceuticals Manufacturing Process



Pre-culture



Main culture



Purification



Others

Various Valves for Analyzing Reagents and Others

p. 70

Pinch Valve

The flow volume of the fluid is controlled by directly clamping the tube so as to open or close it.

The fluid does not come into contact with the moving parts of the valve, so there is no inflow of contaminants.

By discarding a tube after use, the need for a washing process is eliminated, thus ensuring good hygiene.

Tubes can be set or replaced easily.



[Application Examples]

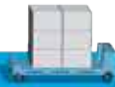
Waste liquid line for the blood analyzer

DNA analyzer



Bacteria identification and inspection device

Liquid filling device



Filling preparation

Packaging/
Pharmaceutical products

Inspection

Shipment

Others

Various Valves for Analyzing Reagents and Others

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Composite Manifold

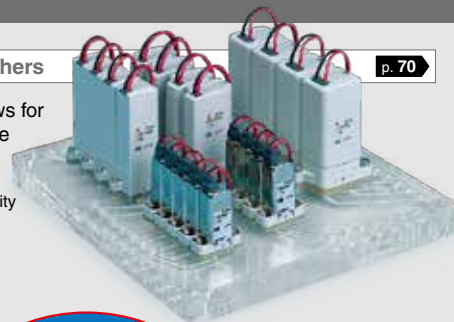
Weight
reduced
by 70%

Required space
reduced
by 50%

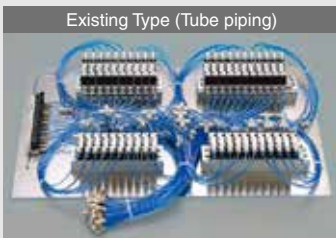
No piping
work
required

The unitization of devices allows for the whole unit to be made more compact.

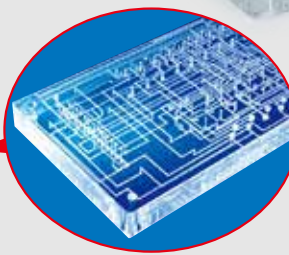
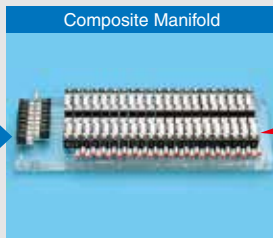
- Space saving
- Flow passage style with high flexibility
- Lightweight
- Reduced piping work
- Reduced wiring
- Transparent flow passage (Acrylic)



Existing Type (Tube piping)



Composite Manifold





Environmental Resistance

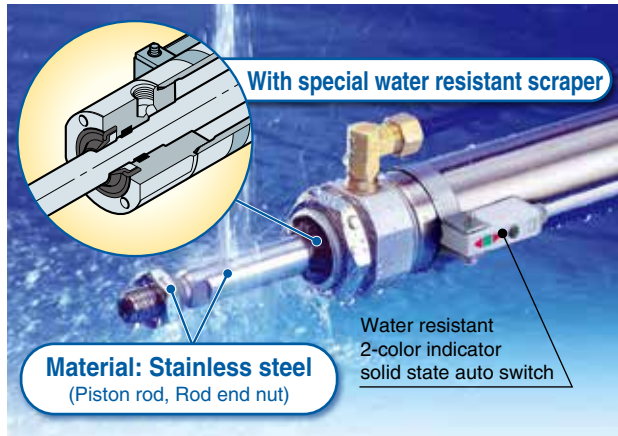
Water Resistant

Water Resistant Cylinders

- Applicable for use in environments with water splashing
CM2/CG1/CQ2/CA2/MB/MB1/MGPM/MGGM

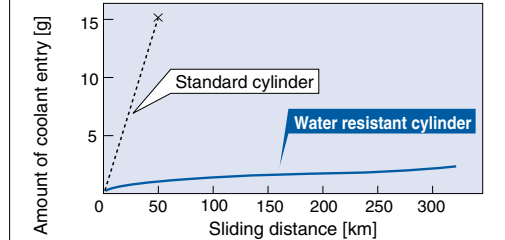
p. 89

- The use of a special scraper allows for improved water resistance compared with standard cylinders.



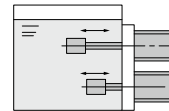
Dramatically improved water resistance

Relation of Coolant Entry and Sliding Distance * For rod size ø20



Conditions

Operating conditions.....Air
Pressure0.5 MPa
CoolantWater-soluble
Piston speed.....200 mm/s
Operating cycle.....60 cpm



| Description | Series | Bore size [mm] |
|-------------------------------|--------|---------------------------------|
| Air cylinder | CM2 | 20, 25, 32, 40 |
| Air cylinder | CG1 | 32, 40, 50, 63, 80, 100 |
| Compact cylinder | CQ2 | 20, 25, 32, 40, 50, 63, 80, 100 |
| Air cylinder | CA2 | 40, 50, 63, 80, 100 |
| Air cylinder | MB | 32, 40, 50, 63, 80, 100 |
| Square tube type air cylinder | MB1 | 32, 40, 50, 63, 80, 100 |
| Compact guide cylinder | MGPM | 20, 25, 32, 40, 50, 63, 80, 100 |
| Guide cylinder | MGGM | 32, 40, 50, 63, 80, 100 |

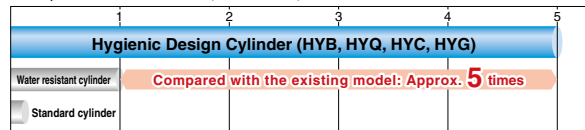
Hygienic Design Cylinder HY□

- Service life 5 times longer than water resistant cylinders



Service life 5 times longer than the existing model (SMC ratio)

Waterproof examination result (Reference data)



Washing in water/Temperature: 30°C, Flow rate: 160 cc/min

| Type | Series | Action | Bore size [mm] |
|-------------------|--------|---------------|---------------------------------|
| Round type | HYB | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Basic type | HYQ | | 20, 25, 32, 40, 50, 63 |
| ISO standard type | HYC | | 32, 40, 50, 63 |
| With guide | HYG | | 20, 25, 32, 40, 50, 63 |

p. 89

Stainless Steel Cylinder CJ5-S/CG5-S

- With special water resistant scraper
- External metal parts: Stainless steel 304, Seal: Choose from NBR or FKM
- Grease for food processing equipment (certified by NSF-H1)

| Series | Action | Bore size [mm] |
|--------|---------------|---------------------------------|
| CJ5-S | Double acting | 10, 16 |
| CG5-S | | 20, 25, 32, 40, 50, 63, 80, 100 |



p. 88

High Power Cylinder RHC-XC93

XC93: With greater water resistance + a stable lubrication function

- Smooth cushioning from high-speed operation (3000 mm/s) with light loads to low/medium-speed operation with heavy loads
- Provides 10 to 20 times the energy absorption capacity of general purpose cylinders*1

*1 CG1 series



p. 96



Environmental Resistance

Corrosion Resistant (Stainless Steel)

Stainless Steel Equipment

Pressure Control Equipment

Clean Regulator
SRH

Stainless Steel 316

p. 133



Fittings

Stainless Steel One-touch/
Insert Fittings
KQG2/KFG2

Stainless Steel 316

p. 136, 137



Stainless Steel One-touch
Fittings
KQ2-G

p. 136



Miniature Fittings/Stainless
Steel 316
MS

Stainless Steel 316

p. 137



S Couplers

Stainless Steel Type
KKA

p. 137



Flow Control Equipment

Stainless Steel Speed Controller
ASG

Stainless Steel 316

p. 145



Check Valve

Made to Order

INA-14-□

p. 146



Pressure Switches

3-Screen Display High-Precision
Digital Pressure Switch
ZSE20C(F)/ISE20C(H)

p. 148



Pressure Switches

Pressure Sensor
for General Fluids
PSE56□

Stainless Steel 316

IP65

p. 149



Flow Switches

3-Color Display Electromagnetic
Type Digital Flow Switch
LFE-X8

p. 153



Ejectors

All Stainless Steel Vacuum Ejector
ZH□□-X267

p. 117



Process Gas Equipment

Regulator
Diaphragm Valve
Check Valve
Vacuum Generator
Flow Switch

p. 169, 170



2-Port Valves for Fluid Control

High Purity Chemical
Liquid Valve
LVA

Stainless Steel 316

p. 160



Angle Seat Valve/
Air Operated Type
VXB

p. 156



Direct Operated 2-Port Solenoid Valve
VX2/VDW

p. 156, 157



High Vacuum Equipment

Stainless Steel High Vacuum
Angle/In-line Valve
XM/XY

p. 168



External Stainless Steel Compact Guide Cylinder MGPM□-X2532 Made to Order

For details on this product,
refer to the Web Catalog.

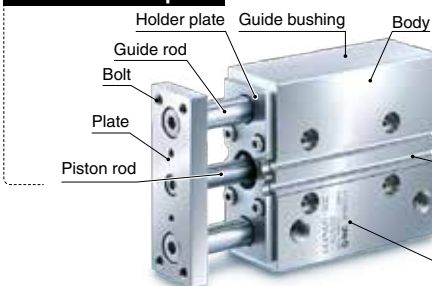
- Stainless steel is used for all external metal parts.

- Improved durability

A Lube-retainer (stable lubrication function) is installed on the guide rod.
A special water resistant scraper is installed on the piston rod.

- The overall length and mounting are the same as those of the standard model.

Stainless steel parts



Water resistant solid state auto switches can be mounted.
D-M9□A

Laser marking (Cylinder plate)
Can not be peeled off, even when wet

- For use with grease for food processing equipment (certified by NSF-H1)



Environmental Resistance

Corrosion Resistant (Stainless Steel)

Stainless Steel Cylinder CJ5-S/CG5-S

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- External metal parts: Stainless steel 304, Seal: Choose from NBR/FKM
- Grease for food processing equipment (certified by NSF-H1)

| Series | Action | Bore size [mm] |
|--------|---------------|---------------------------------|
| CJ5-S | Double acting | 10, 16 |
| CG5-S | | 20, 25, 32, 40, 50, 63, 80, 100 |



Floating Joint

Stainless Steel Type JS

p. 90



Stainless Steel Foot Bracket, Flange Bracket, Single Knuckle Joint, Double Knuckle Joint

p. 88



Made to Order

Stainless steel parts improve corrosion resistance.

p. 89

External Stainless Steel Cylinder: -XB12

Symbol

A cylinder that uses stainless steel that excels in rust resistance for all external parts that are exposed to the surrounding environment. Its external dimensions and installation dimensions are identical to those of the standard CM2 series.

<Applicable Series>

| Series | Description | Model |
|--------|-----------------------|-------|
| CM2 | Air cylinder | CM2 |
| | | CM2W |
| | Non-rotating rod type | CM2K |

Made of Stainless Steel: -XC6

Symbol

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

<Applicable Series>

| Series | Description | Model |
|--------|-------------------------------------|---------|
| CM2 | Air cylinder | CM2-Z |
| | | CM2W-Z |
| | Non-rotating rod type | CM2K-Z |
| | | CM2KW-Z |
| | Direct mount type | CM2R-Z |
| | Non-rotating rod, Direct mount type | CM2RK-Z |
| | Centralized piping type | CM2□□P |
| | Smooth cylinder | CM2Y-Z |
| | Air-hydro type | CM2H-Z |
| CG1 | Direct mount type, Air-hydro type | CM2RH-Z |
| | End lock cylinder | CBM2 |
| | Air cylinder | CG1-Z |
| | Double rod type | CG1W-Z |
| MB*2 | Direct mount type | CG1R-Z |
| | Smooth cylinder | CG1Y-Z |
| MB1*2 | | MB-Z*3 |
| | | MBW-Z*3 |
| CA2*2 | Air cylinder | MB1-Z*3 |
| | End lock cylinder | CBA2*1 |
| | Air-hydro type | CA2H |
| CS1*2 | | CA2W□H |
| | Air cylinder | CS1 |
| | Air-hydro type | CS1W |
| | | CS1H |

| Series | Description | Model |
|--------|---|---------|
| CQS | Compact cylinder | CQS |
| | | CQSW |
| | Non-rotating rod type | CQSK |
| CQ2 | Anti-lateral load type | CQS□S |
| | Compact cylinder | CQ2-Z |
| | | CQ2W-Z |
| | Axial piping type (Centralized piping type) | CQP2 |
| | Long stroke | CQ2-Z |
| | Anti-lateral load type | CQ2□S-Z |
| | Water-resistant compact cylinder | CQ2□□-Z |
| MU | Water resistant, axial piping | CQP2□□ |
| | Plate cylinder | MU-Z |
| CV | | CVM5 |
| | | CVM5K |
| | Valve mounted air cylinder | CV3 |
| | | CVS1 |
| MGP | Compact guide cylinder | MGP-Z |
| MGG | Guide cylinder | MGG |
| MGC | Guide cylinder | MGC |
| CXS | Dual rod cylinder | CXSM |
| CXSJ | Dual rod cylinder compact type | CXSJM |
| RHC | High power cylinder | RHC |

*1 Head side locking type only

*2 There is a maximum stroke limit for CA2, MB, MB1 (ø100), and CS1 cylinders.

*3 Only available for ø125 type



Environmental Resistance

Corrosion Resistant (Stainless Steel)

Made to Order

Stainless steel parts improve corrosion resistance.

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Tie-rod, Cushion Valve, Tie-rod Nut, etc. Made of Stainless Steel: -XC7

Symbol

When using in locations where the rust generation or corrosion likelihood exists, the standard parts material have been partly changed to the stainless steel.

<Applicable Series>

| Series | Description | Model |
|--------|------------------------|-----------------|
| MB | Standard type | MB-Z MBW-Z |
| | Non-rotating rod type | MBK-Z MBKW-Z |
| | Cylinder with end lock | MBB |
| | Smooth cylinder | MBY-Z |
| MB1 | Standard type | MB1-Z MB1W-Z |
| | Non-rotating rod type | MB1K-Z |

| Series | Description | Model |
|--------|----------------------------|------------------------------|
| CA2 | Standard type | CA2-Z CA2W-Z |
| | Non-rotating rod type | CA2K CA2KW |
| | End lock cylinder | CBA2 |
| | Smooth cylinder | CA2Y-Z |
| | | CV3 CVS1 CV3K CVS1K |
| CV | Valve mounted air cylinder | |

Double Clevis and Double Knuckle Joint Pins Made of Stainless Steel: -XC27

Symbol

To prevent the oscillating portion of the double clevis or the double knuckle joint from rusting, the material of the pin and the retaining ring has been changed to stainless steel.

<Applicable Series>

| Series | Description | Model |
|--------|-----------------------|--------|
| CM2 | Standard type | CM2-Z |
| | Non-rotating rod type | CM2K-Z |
| | End lock cylinder | CBM2 |
| | Smooth cylinder | CM2Y-Z |
| CG1 | Standard type | CG1-Z |
| | Non-rotating rod type | CG1K-Z |
| MB | Standard type | MB-Z |
| | Non-rotating rod type | MBK-Z |
| | With end lock | MBB |
| | Smooth cylinder | MBY-Z |
| MB1 | Standard type | MB1-Z |
| | Non-rotating rod type | MB1K-Z |
| CA2 | Standard type | CA2-Z |
| | Non-rotating rod type | CA2K |
| | End lock cylinder | CBA2 |
| | Smooth cylinder | CA2Y-Z |
| CS1 | Standard type | CS1 |
| | Low friction | CS1Q |

| Series | Description | Model |
|--------|----------------------------|---------------|
| CS2 | Standard type | CS2 |
| | Smooth cylinder | CS2Y |
| CV | Valve mounted air cylinder | CVS1 CVS1K |
| CQS | Standard type | CQS |
| | Long stroke | CQS |
| | Anti-lateral load type | CQS□S |
| | Non-rotating rod type | CQSK |
| CQ2 | Standard type | CQ2-Z |
| | Long stroke | CQ2-Z |
| | Anti-lateral load type | CQ2□S-Z |
| | Non-rotating rod type | CQ2K-Z |
| | Magnetic field resistant | CDQ2□P |

Made of Stainless Steel (Combination of XC7 and XC68): -XC65

Symbol

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

<Applicable Series>

| Series | Description | Model |
|--------|-----------------|-----------------|
| MB | Air cylinder | MB-Z MBW-Z |
| | Smooth cylinder | MBY-Z |
| | | MB1-Z MB1W-Z |
| MB1 | Air cylinder | |
| CA2 | Smooth cylinder | CA2Y-Z |

Made of Stainless Steel (With Hard Chrome Plated Piston Rod): -XC68

Symbol

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

<Applicable Series>

| Series | Description | Model |
|--------|-----------------|-----------------|
| MB | Standard type | MB-Z MBW-Z |
| | Smooth cylinder | MBY-Z |
| MB1 | Standard type | MB1-Z MB1W-Z |
| CA2 | Standard type | CA2-Z CA2W-Z |
| | Smooth cylinder | CA2Y-Z |
| CS1 | Standard type | CS1 |
| CS2 | Standard type | CS2 CS2W |
| | Smooth cylinder | CS2Y |



Environmental Resistance

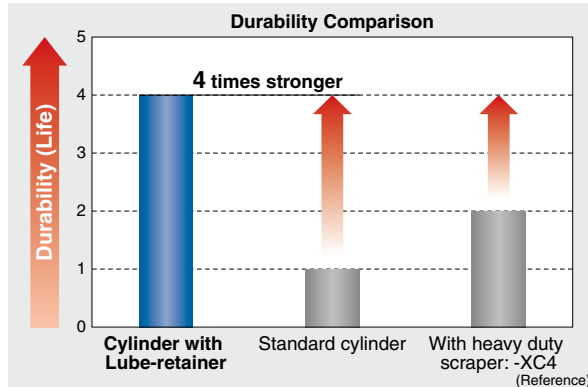
Dustproof

Cylinder with Stable Lubrication Function (Lube-retainer)

Applicable to operation in micro-powder (10 to 100 μm)/general environments
 CM2-Z/CG1-Z/CA2-Z/CDQS/CDQ2/MXQ□A/MGP/CXS

p. 89

Durability is 4 times stronger than the standard model in micro-powder environments.



Comparison with the standard model and model with heavy duty scraper (-XC4) (Relative ratio of B10)

* The durability test is conducted in accordance with SMC test conditions.

Lube-retainers are mounted at two locations.

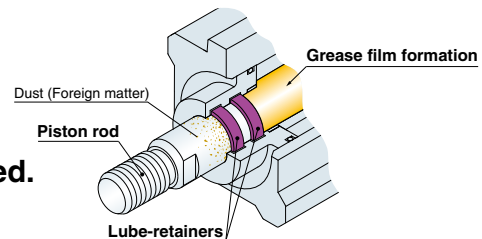
This provides the following two benefits.

- Grease film is formed on the piston rod surface to improve durability.
- The entry of dust and foreign matter is prevented.
- The number of operating cycles can be improved even in general environments.
- The overall length and mounting are the same as those of the standard model.

* Excludes some models

Even with the built-in stable lubrication function (Lube-retainer),
the overall length and mounting are the same as those of the standard model.

* Excludes some models



Applicable Cylinders

| | | | |
|---|--|--|---|
| Air Cylinder CM2 Series ø20 to ø40  | Air Cylinder CG1 Series ø20 to ø100  | Air Cylinder CA2 Series ø40 to ø100  | Compact Cylinder/Compact Type CQS Series ø20 to ø25  |
| Compact Cylinder CQ2 Series ø32 to ø100  | Air Slide Table MXQ□A Series ø6 to ø25  | Compact Guide Cylinder MGP Series ø20 to ø100  | Dual Rod Cylinder CXS Series ø6 to ø32  |

Dust Resistant Actuators (Made to Order)

The overall length dimensions are compatible with models with a heavy duty scraper (-XC4) (CQ2, MGP).
 (The CM2 series dimensions are the same as the standard model.)

p. 90

Applicable Cylinders

| | | | |
|---|--|---|--|
| Air Cylinder CM2-XC92 Series ø20 to ø40  | Compact Cylinder/Compact Type CQS-XC92 Series ø12 to ø25  | Compact Cylinder CQ2-XC92 Series ø32 to ø100  | Compact Guide Cylinder MGP-XC92 Series ø12 to ø100  |
|---|--|---|--|



Environmental Resistance

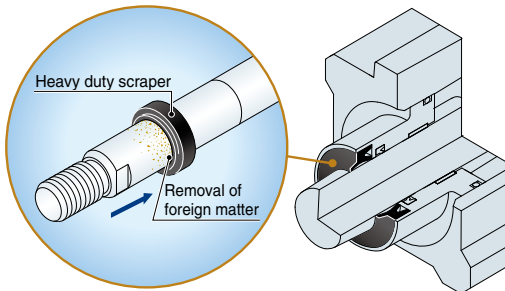
Dustproof

With Heavy Duty Scraper (-XC4)

The heavy duty scraper adopted on the wiper ring makes the cylinder suitable for use in powdery or dusty environments.

p. 90

Removes foreign matter adhered to the rod



Air Cylinder
CM2



Air Cylinder
CG1



Air Cylinder
MB



Square Tube Type Air Cylinder
MB1



Air Cylinder
CA2



Air Cylinder
CS1



Compact Cylinder
CQ2



Compact Cylinder with Air Cushion
RQ



Compact Guide Cylinder
MGP



Guide Cylinder
MGG



Guide Cylinder/Compact Type
MGC



Valve Mounted Air Cylinder
CVM5



Valve Mounted Air Cylinder
CV3



Cylinder with Lock
CNA2



Cylinder with Lock
CNG



With Rod Boot/Dust Cover

The rod is protected by the rod boot.
Prevents the adhesion of powder or dust to the rod



With rod boot

Air Cylinder
CM2



Air Cylinder
CG1



Air Cylinder
MB



Square Tube Type Air Cylinder
MB1



Air Cylinder
CA2



Air Cylinder
CS1



Air Cylinder
CS2



Valve Mounted
Air Cylinder
CVM5



Valve Mounted
Air Cylinder
CV3



Valve Mounted
Air Cylinder
CVS1



Cylinder with Lock
CNA2



Cylinder with Lock
CNG



With dust cover

Linear Guide Parallel Type
Air Gripper
MHZJ2



Wedge Cam Operation Slide
Guide Air Gripper
MHK2



Slide Guide Round Body Air
Gripper 3-Finger Type
MHS



Made to order

For micro-powder (10 to 100 μm) environments
→ With double Lube-retainer (-X85)

For dusty environments
→ With heavy duty scraper + Lube-retainer
(-X86□)





Environmental Resistance

IP65/67

Enclosure: IP67

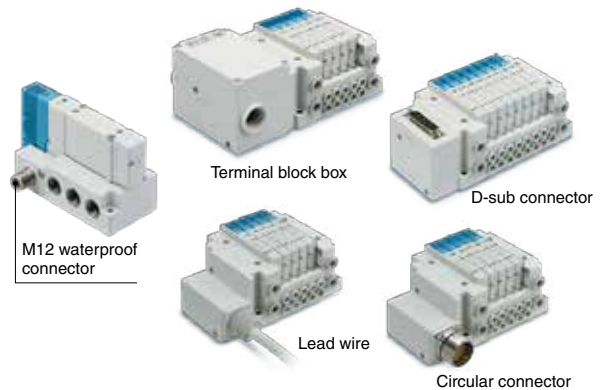
Plug-in Type

5-Port Solenoid Valve

SY Connector Connecting Base

- Due to the flow increase, the valve size can be reduced.
Saves energy and space

| Series | Flow rate characteristics | | Applicable cylinder size |
|--------|---------------------------|------|-----------------------------|
| | 4/2 → 5/3(A/B → EA/EB) | | |
| | C[dm³/(s·bar)] | b | |
| SY3000 | 1.6 | 0.19 | ø50 |
| SY5000 | 3.6 | 0.17 | ø63 |
| SY7000 | 5.9 | 0.20 | ø80 |



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3-Screen Display High-Precision Digital Pressure Switch ISE7□/7□G

- It is possible to change the settings while checking the measured value.
- Angled display
- IO-Link compatible



p. 148

3-Color Display Digital Gap Checker ISA3

- Check at a glance to see if a workpiece is placed or not.
- The clearance distance between the detection surface and the workpiece can be found intuitively.



p. 148

Enclosure: IP65

3-Screen Display High-Precision Digital Pressure Switch ZSE20B(F)/ISE20B ZSE20C(F)/ISE20C(H)

- It is possible to change the settings while checking the measured value.
- Visualization of settings



20B Series

20C Series

p. 148

Pressure Sensor for General Fluids PSE56□

- Wetted parts: Stainless steel 316L



p. 149

Pressure Sensor for General Fluids PSE57□

- Materials of parts in contact with fluid
Piping port: C3604 + Nickel plating
Pressure sensor: Al₂O₃ (Alumina 96%)
O-ring: FKM + Grease (PSE570/573/574)
Square ring: FKM (PSE575/576/577)



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3-Screen Display Sensor Monitor PSE300AC

- It is possible to change the settings while checking the measured value.
- NPN/PNP switch function
- Input range selection (for pressure/flow rate)



p. 150

Multi-Channel Digital Pressure Sensor Controller PSE200

p. 150



* Front face: IP65
Others: IP40



Environmental Resistance

IP65/67

Enclosure: IP65

3-Color Display Digital Flow Switch

PFMC

- 3-color/2-screen display
- Flow ratio 100:1
- Bypass structure



p. 151

3-Color Display Digital Flow Switch for Large Flow

PF3A7□H

- Flow range: Max. 12000 L/min
- Flow ratio 100:1
- Through bore construction



p. 151

3-Color Display Digital Flow Switch for Water

PF3W

- 3-color/2-screen display
- Integrated temperature sensor
- PVC piping type: Applicable to deionized water, chemical liquids, etc.

Integrated display



PVC piping type



Remote type



Sensor unit

Monitor unit*1

*1 Front face only

p. 152

3-Color Display Electromagnetic Type

Digital Flow Switch

LFE

- Applicable fluids: Water, Water-soluble coolant
- Pressure loss: 0.02 MPa or less

Integrated display



Remote type



Sensor unit

Monitor unit*1

*1 Front face only

p. 153

Digital Flow Switch for Air

PF2A

p. 152

Integrated display



Remote type



Monitor unit*1

*1 Front face only

Sensor unit

Digital Flow Switch for Deionized Water and Chemical Liquids

PF2D

p. 153



Sensor unit

Monitor unit*1

*1 Front face only

Made to Order

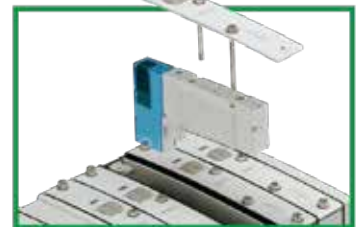
5-Port Solenoid Valve

SY5000-X500

- Enclosure: IP69K



* Please contact SMC for details.





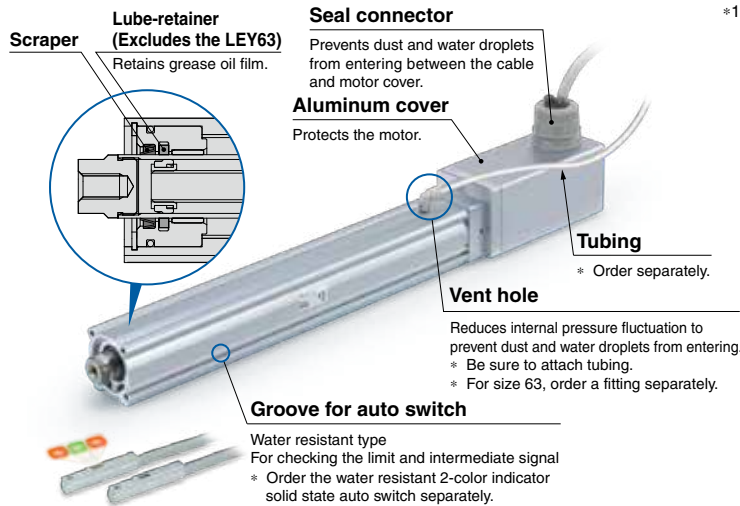
Environmental Resistance

IP65/67

Enclosure: IP65*¹

Electric Actuator/Rod Type Made to Order
Size: 25, 32
LEY-X5

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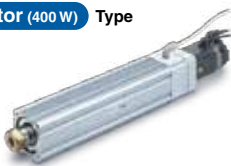
*1 IP65 equivalent

IP65 enclosure: The protection structure against solid foreign objects is dust-tight type and the protection structure against water is water-jet-proof type.

Dust-tight means that no dust can enter the inside of the equipment.

Water-jet-proof means that the product is not adversely affected by direct water jets from any direction. That is, even when direct water jets are applied to the product for 3 minutes by means of the pre-determined method, there is no water entry that hinders correct operation inside the equipment. Be sure to take appropriate protection measures when the product is used in an environment where it is constantly exposed to water or fluids other than water splash. In particular, the product cannot be used in an environment with oil, such as cutting oil or cutting fluid.

Step Motor (Servo/24 VDC)
Servo Motor (24 VDC)
Type
AC Servo Motor (100/200 W)
Type

Electric Actuator/Rod Type Option
Size: 63
LEY63□□□□□P
AC Servo Motor (400 W)
Type


Enclosure

IP-□□
First characteristic numeral
Second characteristic numeral

●First characteristic: Degree of protection against solid foreign objects

| | |
|---|---|
| 0 | Non-protected |
| 1 | Protected against solid foreign objects of 50 mm ø and greater |
| 2 | Protected against solid foreign objects of 12 mm ø and greater |
| 3 | Protected against solid foreign objects of 2.5 mm ø and greater |
| 4 | Protected against solid foreign objects of 1.0 mm ø and greater |
| 5 | Dust-protected |
| 6 | Dust-tight |

●Second Characteristic: Degree of protection against water

| | | |
|---|---|----------------------|
| 0 | Non-protected | — |
| 1 | Protected against vertically falling water drops | Dripproof type 1 |
| 2 | Protected against vertically falling water drops when enclosure is tilted 15° | Dripproof type 2 |
| 3 | Protected against rainfall when enclosure is tilted up to 60° | Rainproof type |
| 4 | Protected against splashing water | Splashproof type |
| 5 | Protected against water jets | Water-jet-proof type |

| | | |
|---|--|-------------------------------|
| 6 | Protected against powerful water jets | Powerful water-jet-proof type |
| 7 | Protected against the effects of temporary immersion in water | Immersible type |
| 8 | Protected against the effects of continuous immersion in water | Submersible type |

Example) In the case of products stipulated as IP65, we can know the degree of protection is dust-tight and water-jet-proof on the grounds that the first characteristic numeral is 6 and the second characteristic numeral is 5. Therefore, we can assume it will not be adversely affected by direct water jets from any direction.



Environmental Resistance

Heat/Cold Resistant

Heat Resistant

Cylinders, Air Grippers

Heat Resistant Cylinder (−10 to 150°C): -XB6

Symbol
p. 90

Seal material and grease have been changed so that the product can be used at temperature up to 150°C.



Specifications

| | |
|---------------|-----------------------|
| Seal material | Fluororubber |
| Grease | Heat-resistant grease |

<Applicable Series>

CJP2/CJ2/CM2/CG1/MB/MB1/CA2/CUJ/CU/CQS/CG5/CS1/CS2/
CQ2/MGP/MGQ/MGG/MGC/CXSJ/CXS/MK/CY3B

Heat Resistant Air Gripper (−10 to 100°C): -X4

Symbol
p. 100

Seal material and grease have been changed so that the product can be used at temperatures between −10 up to 100°C.



Specifications

| | |
|---------------------------|------------------------------|
| Ambient temperature range | −10°C to 100°C |
| Seal material | Fluororubber |
| Grease | Heat-resistant grease (GR-F) |

<Applicable Series>

MHC/MHF2/MHK2/MHL2/MHS/MHT2/MHW2/MHY2/MHZ

Cylinder with Heat Resistant Auto Switch (Max. 150°C): -XB14

Symbol
p. 90

Heat resistant compact cylinder which can mount heat resistant solid state switch (D-M9□J)



Specifications

| | |
|---------------------|--------------------------------|
| Applicable cylinder | Compact cylinder/Standard type |
| Series | CQ2 |
| Bore size [mm] | 16, 20, 25, 32, 40, 50, 63 |

Heat Resistant 2-Color Indicator Solid State Auto Switch (Single Unit)

- Heat resistant type
- The optimum operating range can be determined by the color of the light. (Red → Green ← Red)



Fittings, Tubing

From p. 135

Metal One-touch KQB2



Max. operating temperature: 150°C

Brass Sleeve Insert KF



Max. operating temperature: 150°C

Stainless Steel One-touch KQG2



Max. operating temperature: 150°C

Stainless Steel Insert KFG2



Max. operating temperature: 260°C*1
*1 Swivel elbow and with sealant types: −5 to 150°C

S Couplers KKA



Max. operating temperature: 150°C

Fluoropolymer LQ1



Max. operating temperature: 150°C*2

Fluoropolymer LQ3



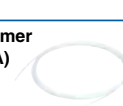
Max. operating temperature: 200°C*2

Bore Through Connector LQHB



Max. operating temperature: 200°C*2

Fluoropolymer (Super PFA) TL/TIL



Max. operating temperature: 200°C*2

Fluoropolymer (PFA) TLM/TILM



Max. operating temperature: 260°C*2

FEP TH/TIH



Max. operating temperature: 200°C*2

Soft Fluoropolymer TD/TID



Max. operating temperature: 260°C*2

2-Layer Soft Fluoropolymer Tubing TQ



Max. operating temperature: 100°C*2 (Air, Inert gas)

*2 It varies depending on the operating pressure. Be sure to refer to the Web Catalog.

Regulators

p. 130, 132

Regulator/Filter Regulator for High Temperature AR/AW-B-X440



Max. operating temperature: 80°C

Precision Regulator for High Temperature IR-T



Max. operating temperature: 100°C

Flow Switches

p. 153

Digital Flow Switch for Deionized Water and Chemical Liquids PF2D

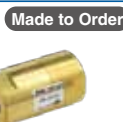


Max. fluid temperature: 90°C*3
*3 It varies depending on the fluid temperature.

Check Valves

p. 146

Check Valve XTO



Max. operating temperature: 80°C

Vacuum Pads

p. 119

Vacuum Pad ZP3P



Max. operating temperature: 200°C

Cold Resistant

Cylinders

Cold Resistant Cylinder (−40 to 70°C): -XB7

Symbol

p. 90

Ambient temperature range: −40 to 70°C

<Applicable Series>

CJP2/CJ2/CM2/CG1/CU/CQS/CQ2



Regulators

p. 130

Regulator for Low Temperature AR25 to 60-B-X425



Ambient temperature: −5 to 60°C

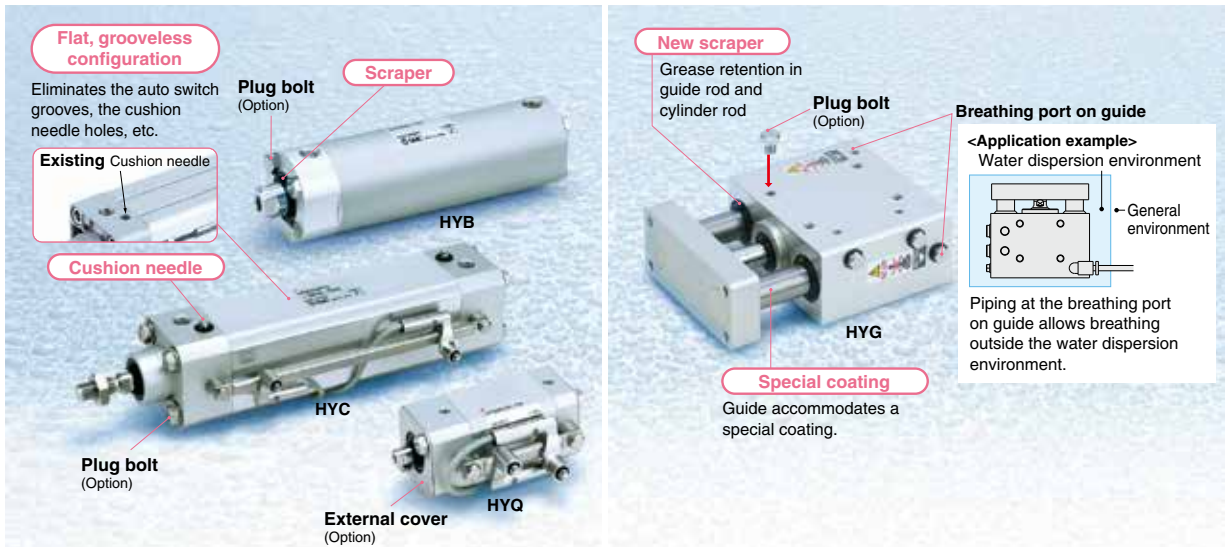
Filter Regulator for Low Temperature AW30 to 60-B-X430



Ambient temperature: −30 to 60°C

Sanitation Hygienic Grease for Food Processing Equipment

A hygienic design cylinder configured for easy cleaning



Hygienic Design Cylinder HY□

p. 89

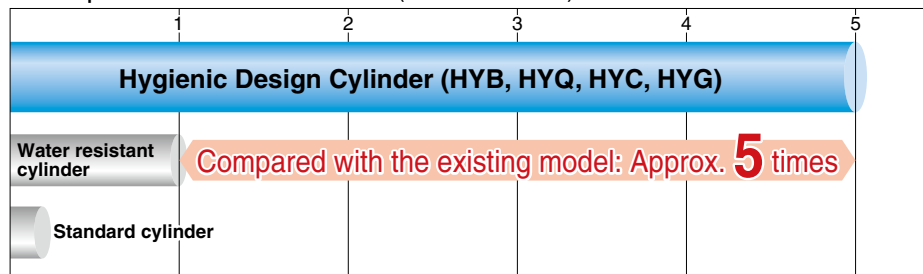
- Grease for food processing equipment (certified by NSF-H1) is available.



| Type | Series | Action | Bore size [mm] |
|-------------------|--------|---------------|---------------------------------|
| Round type | HYB | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Basic type | HYQ | | 20, 25, 32, 40, 50, 63 |
| ISO standard type | HYC | | 32, 40, 50, 63 |
| With guide | HYG | | 20, 25, 32, 40, 50, 63 |

Service life 5 times longer than the existing model (SMC ratio)

Waterproof examination result (Reference data)



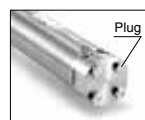
Washing in water/Temperature: 30°C, Flow rate: 160 cc/min

Stainless Steel Cylinder C□5-S

p. 88

- Exterior configuration reduces residual liquid
Electropolishing of mounting bracket surfaces makes them smoother to prevent build-up of liquids and foreign matter.
- With special water resistant scraper
- External metal parts: Stainless steel 304, Seal: Choose from NBR or FKM
- Grease for food processing equipment (certified by NSF-H1)

| Series | Action | Bore size [mm] |
|--------|---------------|---------------------------------|
| CJ5-S | Double acting | 10, 16 |
| CG5-S | | 20, 25, 32, 40, 50, 63, 80, 100 |





Sanitation

Grease for Food Processing Equipment

Made to Order

Grease for Food Processing Equipment

Food grade grease (certified by NSF-H1) is used for all parts on which grease is applied.

<Applicable Series>

| Series | Symbol (Suffix) | Series | Symbol (Suffix) | Series | Symbol (Suffix) |
|--------|-----------------|--------|-----------------|--------|-----------------|
| MXQ | -X9 | MIW | -X79 | CQ2 | -XC85 |
| MXF | | MIS | | CQS | |
| MXW | | MH□ | | MGP | |
| MXP | | CM2 | -XC85 | | |
| MXPJ | | CG1 | | | |
| MXY | | CA2 | | | |



Series other than shown on the left are also available. Please contact SMC for details.

Specifications

| | |
|---------------|---------------------------|
| Seal material | Nitrile rubber |
| Grease | Grease for food |
| Auto switch | Mountable |
| Dimensions | Same as the standard type |

⚠ Warning Precautions

Be aware that smoking cigarettes, etc., after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.

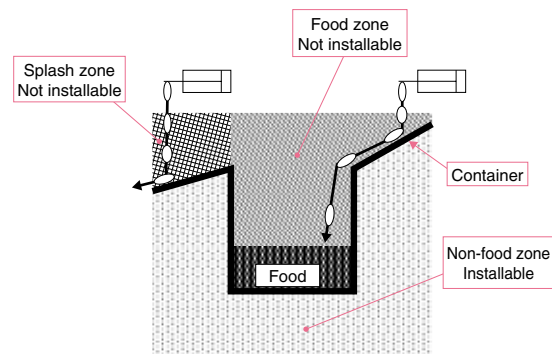
<Not installable>

Food zone.....An environment where food which will be sold as merchandise directly touches the cylinder's components

Splash zone.....An environment where food which will not be sold as merchandise directly touches the cylinder's components

<Installable>

Non-food zone ... An environment where there is no contact with food



- * Avoid using this product in the food zone. (Refer to the figure above.)
- * When the product is used in an area of liquid splash, or a water resistant function is required for the product, please consult with SMC.
- * Operate without lubrication from a pneumatic system lubricator.
- * Use the following grease pack for the maintenance work.
GR-H-010 (Grease: 10 g)
- * Please contact SMC for details about the maintenance intervals for this cylinder, which differ from those of the standard cylinder.

Made to Order

5-Port Solenoid Valve SY5000-X500

Enclosure: IP69K



* Please contact SMC for details.





Standards

Food Sanitation Law Compliant Products

FDA (Food and Drug Administration) Compliant

Food Sanitation Law compliant

Component materials have met apparatus and container-package standards.

FDA (Food and Drug Administration) compliant

*1 Compliant with the FDA's (Food and Drug Administration) § 177-1550 dissolution test

*2 Compliant with the FDA's (Food and Drug Administration) § 177-2600 dissolution test

*3 Compliant with the FDA's (Food and Drug Administration) 21CFR§177.2600 dissolution test

| | Series | Food Sanitation Law compliant | FDA (Food and Drug Administration) compliant |
|------------|----------|-------------------------------|--|
| Tubing | TL/TIL | ● | ●*1 |
| | TLM/TILM | ● | ●*1 |
| | TH/TIH | ● | ●*1 |
| | TD/TID | ● | ●*1 |
| | TU-X217 | ● | — |
| | TU-X214 | — | ●*2 |
| Fittings | KQG2 | ● | — |
| | KFG2 | ● | — |
| | KP | ● | — |
| Vacuum pad | ZP3P | — | ●*3 |

Fluoropolymer Tubing

p. 140

TL/TIL

Food Sanitation Law Compliant

FDA (Food and Drug Administration) Compliant

- Material: Super PFA
- Max. operating pressure: 1.0 MPa (at 20°C)*1
- Max. operating temperature: 260°C

*1 This may vary according to size.

| Applicable tubing O.D. | | Color |
|------------------------|--|-------------|
| Metric | ø4, ø6, ø8, ø10, ø12, ø19 | Translucent |
| Inch | ø1/8", ø3/16", ø1/4", ø3/8" ø1/2", ø3/4", ø1" | |



Fluoropolymer Tubing (PFA)

p. 140

TLM/TILM

Food Sanitation Law Compliant

FDA (Food and Drug Administration) Compliant

- Material: PFA
- Max. operating pressure: 2.3 MPa (at 20°C)*1
- Max. operating temperature: 260°C

*1 This may vary according to size.

| Applicable tubing O.D. | | Color |
|------------------------|---|-------------------------------------|
| Metric | ø2, ø3, ø4, ø6, ø8, ø10 ø12, ø16, ø19, ø25 | Translucent, Black, Blue, Red |
| Inch | ø1/8", ø3/16", ø1/4", ø3/8" ø1/2", ø3/4", ø1", ø1 1/4" | |



FEP Tubing (Fluoropolymer)

p. 140

TH/TIH

Food Sanitation Law Compliant

FDA (Food and Drug Administration) Compliant

- Material: FEP
- Max. operating pressure: 2.3 MPa (at 20°C)*1
- Max. operating temperature: 200°C

*1 This may vary according to size.

| Applicable tubing O.D. | | Color |
|------------------------|---|-------------------------------------|
| Metric | ø4, ø6, ø8, ø10, ø12 | Translucent, Black, Red, Blue |
| Inch | ø1/8", ø3/16", ø1/4" ø3/8", ø1/2", ø3/4" | |



Soft Fluoropolymer Tubing

p. 141

TD/TID

Food Sanitation Law Compliant

FDA (Food and Drug Administration) Compliant

- Material: Modified PTFE
- Max. operating pressure: 1.6 MPa (at 20°C)*1
- Max. operating temperature: 260°C

*1 This may vary according to size.

| Applicable tubing O.D. | | Color |
|------------------------|--------------------------------------|-------------|
| Metric | ø4, ø6, ø8, ø10, ø12 | Translucent |
| Inch | ø1/8", ø3/16", ø1/4" ø3/8", ø1/2" | |





Standards

Food Sanitation Law Compliant Products

FDA (Food and Drug Administration) Compliant

Compatible with Food Sanitation Law: p. 140 Polyurethane Tubing Food Sanitation Law Compliant TU-X217

| Applicable tubing O.D. | Color |
|---|---------------------------|
| Metric $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$ | Black, White, Blue, Clear |



Polyurethane Tubing p. 139 TU-X214 FDA (Food and Drug Administration) Compliant

| Applicable tubing O.D. | Color |
|--|---|
| $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$ | Black, White, Red, Blue, Yellow, Green, Clear, Orange |



Stainless Steel 316 One-touch Fittings p. 136 KQG2 Food Sanitation Law Compliant

- Materials: Metal parts stainless steel 316, seal parts special FKM
- Fluid temperature: -5 to 150°C
- Grease-free/Can be used with steam

| Series | Size | Applicable tubing O.D. |
|--------|--------|---|
| KQG2 | Metric | $\phi 3.2$, $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$, $\phi 16$ |
| KQG2 | Inch | $\phi 1/8"$, $\phi 5/32"$, $\phi 1/4"$, $\phi 5/16"$, $\phi 3/8"$, $\phi 1/2"$ |



Stainless Steel 316 Insert Fittings p. 137 KFG2 Food Sanitation Law Compliant

- Material: Stainless steel 316
Rubber materials are not used. (Excluding the swivel elbow)
- Fluid temperature: -65 to 260°C (Swivel elbow: -5 to 150°C)
- Grease-free/Can be used with steam

| Series | Size | Tubing O.D. x I.D. |
|--------|--------|---|
| KFG2 | Metric | $\phi 4 \times \phi 2.5$, $\phi 4 \times \phi 3$, $\phi 6 \times \phi 4$, $\phi 8 \times \phi 6$, $\phi 10 \times \phi 7.5$, $\phi 10 \times \phi 8$, $\phi 12 \times \phi 9$, $\phi 12 \times \phi 10$, $\phi 16 \times \phi 13$ |
| KFG2 | Inch | $\phi 1/8" \times \phi 0.086"$, $\phi 5/32" \times \phi 0.098"$, $\phi 1/4" \times \phi 5/32"$, $\phi 5/16" \times \phi 0.236"$, $\phi 3/8" \times \phi 1/4"$, $\phi 1/2" \times \phi 3/8"$ |



Clean One-touch Fittings for Blowing p. 137 KP Food Sanitation Law Compliant

- One-touch fittings for clean room blowing systems
- Completely oil-free (Fluoro-coated rubber portions)
- Wetted parts are non-metallic.
- Parts washed and assembled in a clean room, Packed in double packaging.
- Can be used in a vacuum (-100 kPa)

| Series | Applicable tubing O.D. |
|--------|--|
| KP | $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$ |



Vacuum Pad ZP3P p. 119 FDA (Food and Drug Administration) Compliant

- Good for film packaging applications where the shape of the workpiece changes easily from being lifted.
- Silicone rubber compliant with the FDA (USA Food and Drug Administration) 21CFR§177.2600 elution test is used.
- Blue colored pad
- Reduced leakage
- Reduction of wrinkles made on thin workpieces (film, vinyl, etc.) during adsorption

| Pad diameter |
|---|
| $\phi 20$, $\phi 25$, $\phi 35$, $\phi 50$ |





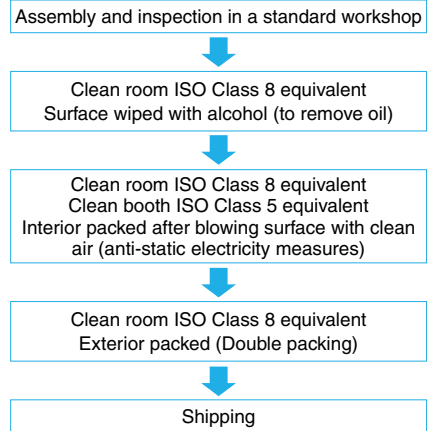
Clean

p. 173

Clean Room

Clean Series 10-/11-/12-/13-

Prevents particle generation in clean room



| 10 Series | 11 Series | 12 Series | 13 Series |
|---|--|--|---|
| <ul style="list-style-type: none"> Double seal type/ release to atmosphere | <ul style="list-style-type: none"> Single seal type/ vacuum suction | <ul style="list-style-type: none"> Compact guide cylinder Dual rod cylinder <p>Double seal type/release to atmosphere (10-series equivalent) and specially treated guide</p> | <ul style="list-style-type: none"> Rodless cylinder Compactly guide cylinder Air slide table <p>Specially treated cylinder tube exterior</p> |

Air Cylinder



Directional Control Valve

Fittings, speed controllers, pressure switches, etc., have the same structures as those of the standard products.

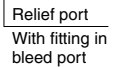


Main valve and pilot valve common exhaust

Compressed Air Cleaning Filter Series Modular F.R.



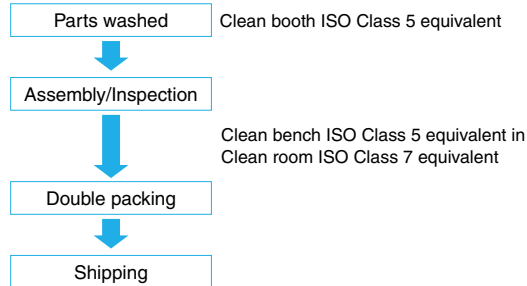
Drain guide With female thread



Relief port With fitting in bleed port

Special Clean Series

This series adheres to an even higher standard of cleanliness than the Clean Series. This line of products was developed, from structure and materials to assembly environment, for use in clean environments.



Clean Regulator

Wetted parts material: Stainless steel, FPM, PTFE



Clean One-touch Fittings (For blowing)

Wetted parts non-metal



Polypropylene resin

Clean Tubing*1

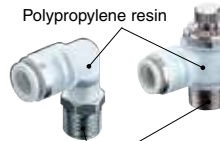
Polyolefin-based resin



*1 The tube, which is formed in a general environment, is finished by blowing highly clean air through its inside and over its outside in a clean room.

Clean One-touch Fittings/Speed Controller

Polypropylene resin



Metal parts
Brass (Electroless nickel plated) or
Stainless steel 304

Exhaust Cleaner for Clean Room



Clean Exhaust Filter



Clean Gas Filter

PTFE membrane element



Clean Air Filter

Polyolefin hollow fiber membrane element



Digital Flow Switch

Low Particle Generation: PFM/PFMB-X300



PFM-X300



PFMB-X300



Clean

p. 127

Clean Blow

Clean Air Filter

SFD

(Hollow fiber element)

- Filtration: 0.01 μm (Filtration efficiency: 99.99%)
- Initial pressure drop: 0.03 MPa
(Inlet pressure 0.7 MPa, Max. flow rate)
- Max. operating pressure: 1.0 MPa (at 20°C)



Clean Gas Filter

SF

Cartridge Type/Disposable Type

- Integrated production in a clean environment
Under a clean environment, all components have undergone ultrasonic cleaning. Assembly, inspection and antistatic double packaging processes are conducted in an integrated production system.

Assembly environment

Clean room: Class M5.5 (ISO class 7)*1
Clean booth: Class M3.5 (ISO class 5)*1

*1 Fed. Std. 209E (): based on ISO 14644-1

- High precision filtration
0.01 μm filtration (filtering efficiency of 99.99%) is realized with the PTFE membrane cartridge element. (Clean gas strainer: Nominal filtration of 120 μm)

Disposable Type: Multiple Disc Type

SFC10□



| Filtration | Flow rate [L/min(ANR)] (Inlet pressure 0.7 MPa, at pressure drop of 0.02 MPa) |
|---|--|
| 0.01 μm (Filtration efficiency: 99.99%) (Membrane element) | 240 |

Disposable Type: Straight Type

SFB30□



| Filtration | Flow rate [L/min(ANR)] (Inlet pressure 0.7 MPa, at pressure drop of 0.02 MPa) |
|---|--|
| 0.01 μm (Filtration efficiency: 99.99%) (Membrane element) | 45 |

Cartridge Type: Disc Type

SFA10□, SFA20□, SFA30□



| Series | Filtration | Flow rate [L/min(ANR)] (Inlet pressure 0.7 MPa, at pressure drop of 0.02 MPa) |
|--------|---|--|
| SFA10□ | 0.01 μm (Filtration efficiency: 99.99%) (Membrane element) | 26 |
| SFA20□ | | 70 |
| SFA30□ | | 140 |

Cartridge Type: Straight Type

SFB10□, SFB20□



| Series | Filtration | Flow rate [L/min(ANR)] (Inlet pressure 0.7 MPa, at pressure drop of 0.02 MPa) |
|----------------------|---|--|
| SFB10□ | 0.01 μm (Filtration efficiency: 99.99%) (Membrane element) | 45 |
| SFB20□ (Strainer) | Nominal 120 μm (Sintered metallic element) | 400 |

Clean Air Module

LLB

- Filtration: 0.01 μm (Filtration efficiency: 99.99%)
- Fluid contact space: Grease-free, Silicone-free
- Clean-room assembly and double-packaging

Built-in One-touch fitting

Clean One-touch fitting, KP series
Also compatible with threaded female connector

Digital flow switch

Measured flow range
· 5 to 100 L/min
· 50 to 500 L/min

Pressure outlet port

Pressure gauge and pressure switch are mountable.
(Order them separately.)

Regulator

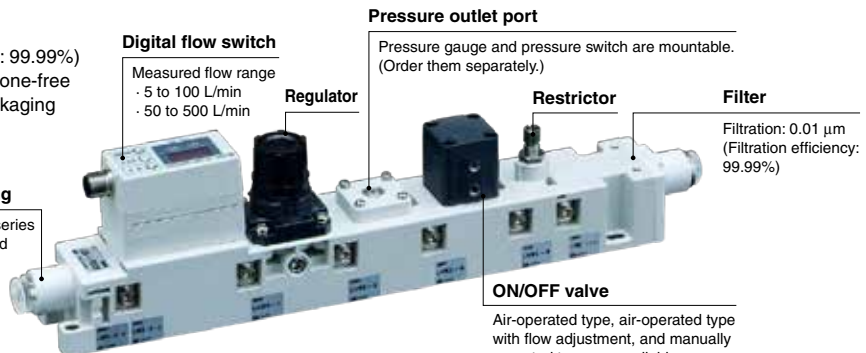
Restrictor

Filter

Filtration: 0.01 μm
(Filtration efficiency: 99.99%)

ON/OFF valve

Air-operated type, air-operated type with flow adjustment, and manually operated type are available.





Clean

Air Preparation Filters

p. 126, 127

In-line Air Filter/**ZFC-X05**
Clean Gas Filter/**SF**
Clean Gas Strainer/**SFB200**
Clean Air Filter/Hollow Fiber Element/**SFD**
Clean Air Module/**LLB**



Grease-free

Pressure Control Equipment

p. 131, 133

Clean Regulator/**SRH**
Clean Regulator/Fluororesin Type/**SRF**
Compact Manifold Regulator/**ARM** (-3, -5, -6, -7)
Grease-free Regulator/**AR-X2400** (Made to order)



Pressure Gauges

Pressure Gauge for General Purposes/**G36-X4**
Oil-free/External Parts Copper-free Pressure Gauge/**G46E**
Pressure Gauge for Clean Regulator/**G46-□-□-SRB**



Fittings

Metal One-touch Fittings/**KQB2**
One-touch Fittings Manifold/**KM-X17**
Insert Fittings/**KF**
Miniature Fittings/**M***1 (ø2, ø3.2, ø4, ø6)
Self-align Fittings/**H/DL/L/LL**
Rectangular Multi-connector/**KDM-X17**
Stainless Steel 316 One-touch Fittings/**KQG2**
Stainless Steel One-touch Fittings/**KQ2-G-X17**
Stainless Steel 316 Insert Fittings/**KFG2**
Miniature Fittings/**MS***1
S Couplers Stainless Steel Type/**KKA**
Clean One-touch Fittings/**KP**
Fluoropolymer Fittings/**LQ1/LQ3**
Fluoropolymer Bore Through Connector/**LQHB**

From p. 135



*1 Excludes some models

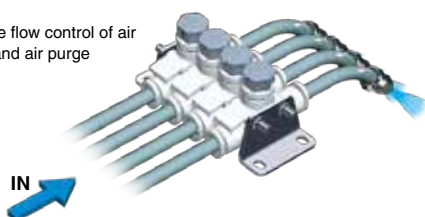
Restrictors

p. 146

Restrictor/**AS-X21**



For the flow control of air blow and air purge



Pressure Switches

From p. 148

3-Screen Display High-Precision Digital Pressure Switch/**ZSE20□(F)/ISE20□-X2/ZSE20C(F)/ISE20C(H)**
Compact Digital Pressure Switch/**ZSE10(F)/ISE10-X2**
3-Screen Display High-Precision Digital Pressure Switch/**ISE70/71-X2**
Pressure Sensor for General Fluids/**PSE56□**
Compact Pneumatic Pressure Sensor/**PSE54□-X2**



**Clean****Grease-free****Flow Switches**

From p. 150

2-Color Display Digital Flow Switch/**PFM**
 2-Color Display Digital Flow Switch/**PFMB**
 2-Color Display Digital Flow Switch/Low Particle Generation/
PFM7/PFMB7-X300
 3-Color Display Digital Flow Switch/**PFMC**
 3-Color Display Digital Flow Switch for Large Flow/**PF3A7□H**
 Flow Sensor/**PFMV**
 Digital Flow Switch for Air/**PF2A**
 3-Color Display Digital Flow Switch for Water/**PF3W**

**2/3-Port Solenoid Valves for Fluid Control**

From p. 156

Direct Operated 2-Port Solenoid Valve/**VX21/22/23** Oil-free (Option)
 Pilot Operated 2-Port Solenoid Valve/**VXD** Oil-free (Option)
 Zero Differential Pressure Type Pilot Operated 2-Port Solenoid Valve/
VXZ Oil-free (Option)
 Compact Direct Operated 2-Port Solenoid Valve/**VDW** Oil-free (Option)
 Pilot Operated 2-Port Solenoid Valve for Dry Air/**VQ-X2**
 Normal Close High Vacuum Solenoid Valve/**XSA**
 Compact Direct Operated 2/3-Port Solenoid Valve for Chemical Liquids/**LVM**
 Direct Operated 2/3-Port Isolated Valve/**LVMK20/200**

**Chemical Liquid Valves**

p. 160, 161

High Purity Chemical Liquid Valve/Air Operated, Integrated Fitting Type/**LVC**
 High Purity Chemical Liquid Valve/Air Operated, Threaded Type/**LVA**
 High Purity Chemical Liquid Valve/Manually Operated
 (Integrated Fitting Type/Threaded Type)/**LVH**
 Compact Type High Purity Air Operated Chemical Liquid Valve/**LVD**

**Process Gas Equipment**

p. 169, 170

Regulator for Ultra High Purity/**AP**
 Regulator for Ultra High Purity/**SL**
 Regulator for Ultra High Purity/**AZ**
 Back Pressure Regulator for Ultra High Purity/**BP**
 Air Operated Regulator for Ultra High Purity/**AP□PA**
 Air Operated Regulator for Ultra High Purity/**AZ□PA**
 Regulator for General Applications/**AK**
 Back Pressure Regulator for General Applications/**BP**
 Air Operated Regulator for General Applications/**AK□PA**
 Regulator for General Applications/**AK1000T**
 For Ultra High Purity/Air Operated Type/**AP**
 For Ultra High Purity/Manually Operated Type/**AP**
 Process Gas Diaphragm Valve/**AZ**
 Diaphragm Valve for General Applications/**AK**
 Check Valve/**AP64**
 Vacuum Generator/**AP7/70/71/72**
 Flow Switch/**AP74/74B**

**Sintered Metal Elements**

p. 172

Sintered Metal Element/**ES□**

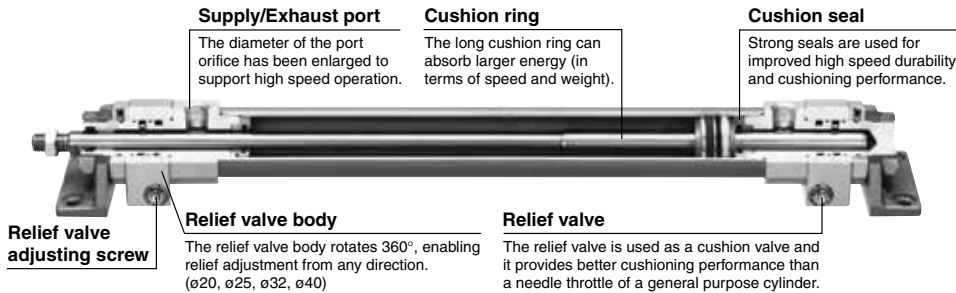


High Speed High Speed High Frequency

High Power Cylinder RHC

p. 96

- Smooth cushioning from high-speed operation (3000 mm/s) with light loads to low/medium-speed operation with heavy loads
- Provides 10 to 20 times the energy absorption capacity of general purpose cylinders (CG1 series)
- XC93: With greater water resistance + a stable lubrication function



Large Flow Speed Controller AS3201F-01-□□SA-X778

Made to Order

- The orifice diameter has been enlarged to support the high-speed operation of cylinders.



Low Friction Cylinder/Metal Seal Type MQML□□H

p. 96

High speed, High frequency actuation

- H type achieves speeds up to 3,000 mm/s (without fixed orifice)
- Continuous actuation up to 50 cycles per second

Long service life

Long service life of 10,000 km or 100 million full cycles

| Series | Bore size [mm] | Operating pressure range [MPa] | Driving speed [mm/s] |
|-----------------------------------|-------------------|---|----------------------|
| MQML Standard | 6 (Standard only) | ø6: 0.02 to 0.7 ø10 to ø25: 0.005 to 0.7 | 0.5 to 1000 |
| | 10 | | |
| | 16 | | |
| MQML□□H High speed/High frequency | 20 | 0.01 to 0.7 | 5 to 3000 |
| | 25 | | |
| | | | |

Variations

Compact Low Friction Cylinder MQQ



Low Friction Cylinder (Single Acting) MQP



Application Example



High Speed 2-Port Valve SX10

p. 157

- High-speed response ON: 0.45 ms, OFF: 0.4 ms (± 0.05 ms)
- Long service life: 5 billion cycles or more
- High frequency: 1200 Hz
- Width: 9 mm
- Low power consumption: 4 W





High Speed

From p. 102

Electric

**Electric Actuator/
Slider Type**

LEF



**Electric Actuator/
High Rigidity Slider Type**

LEJ



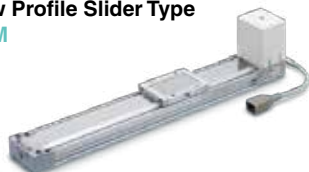
**Electric Actuator/
Guide Rod Slider**

LEL



**Electric Actuator/
Low Profile Slider Type**

LEM



**Electric Actuator/
Rod Type**

LEY



Electric Slide Table

LES



**Electric Actuator/
Miniature Rod Type/
Miniature Slide Table Type**

LEPY/LEPS



Electric Rotary Table

LER



Electric Gripper

LEH



Controllers/Drivers

<For Single Axis>

LECP6/LECA6/LECP1/LECP2/LECPA/LECPMJ/LEC-G

JXCE1/91/P1/D1/L1



<For Multiple Axes>

JXC73/83/93 (4 Axes)

JXC92 (3 Axes)



Drivers

LECSA/LECSB/LECS/LECSS/LECSS-T

LECY□





Electricity Countermeasures

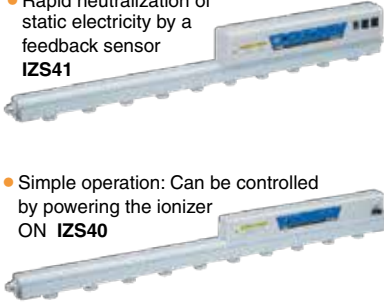
p. 154, 155

Static Neutralization

Ionizers

Bar Type

- Potential amplitude of the workpiece is reduced with Dual AC. **IZS42**
- Rapid neutralization of static electricity by a feedback sensor **IZS41**
- Simple operation: Can be controlled by powering the ionizer ON **IZS40**



Made to Order

Drop prevention cover

- Can even more reliably prevent emitter cartridges from dropping



Ionizer Vertical Stand

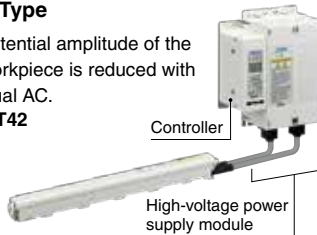
- Allows for the installation of a bar type ionizer on the table



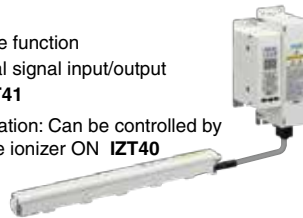
Separate Controller

Bar Type

- Potential amplitude of the workpiece is reduced with Dual AC. **IZT42**



- Auto-balance function With external signal input/output function **IZT41**
- Simple operation: Can be controlled by powering the ionizer ON **IZT40**



Made to Order

Drop prevention cover

- Can even more reliably prevent emitter cartridges from dropping



Nozzle Type

IZN10E

- Select either the energy saving static neutralization nozzle or the high flow static neutralization nozzle according to the application.
- The female threads for piping allow any type of nozzle to be installed to the ionizer.



For static neutralization and particle elimination on reagent bottles

Fan Type

IZF

- Can neutralize static electricity in a larger space with a built-in fan motor that requires no compressed air for blowing
- The variety of optional accessories, including louvers and automatic cleaning units, allow the product to be used in a wide range of applications.

Thickness: 40 mm



IZF21/31

Compact fan type
with simple functions
Thickness: 39 mm



With flow rate adjustment function

IZF10/10R

Desktop Duster Box

ZVB

- Static neutralization, dust removal, and dust collection processes have been integrated into one box.



A4 size [ZVB20]

A3 size [ZVB40]

Electrostatic Sensor

IZD10/IZE11

- Potential measurement: ± 20 kV ± 0.4 kV



Electrostatic Sensor Monitor
IZE11

Electrostatic Sensor
IZD10

Handheld Electrostatic Meter

IZH10

- Potential measurement: ± 20.0 kV



Antistatic Equipment

Antistatic One-touch Fittings

KA



Conductive Vacuum Pad

ZP3/ZP2/ZP



Antistatic Tubing

TAS/TAU



Antistatic Speed Controller

AS-X260





Electricity Countermeasures

Explosion Proof

Intrinsically Safe Explosion-proof System 5-Port Solenoid Valve

p. 83

51-SY5000/7000/9000

Rubber seal



- Exia II BT4 (TIIS approved product)
- 3 types of connectors are available: L plug connector, L plug connector with a cover, With IP65 compliant cable
- 3 types of barriers are available.

Explosion-proof 3/5-Port Solenoid Valve

p. 83

50-VFE/50-VPE

Rubber seal



- Exd II BT4 (TIIS approved product)
- Waterproof: IP*6 equivalent
- Exhausting equipment for the pilot valve is not required. (Common exhaust type for main and pilot valve [50-VFE3000])
- It is possible to be used in a manifold. (50-VFE)
- Can be used as a selector valve, divider valve, or for vacuum applications (50-VPE)

Electro-Pneumatic Positioner/Smart Positioner

p. 173

IP8□00/IP8□01



IP8001 (Lever type)



IP8101 (Rotary type)

- Explosion-proof construction
 - Electro-pneumatic positioner:
 - TIIS explosion-proof construction (Ex d IIB T5)
 - ATEX intrinsically safe explosion-proof construction (II2G Ex ib IIC T5/T6 Gb)
 - Smart positioner:
 - ATEX intrinsically safe explosion-proof construction (II1G Ex ia IIC T4/T5/T6 Ga)
- Enclosure: JISF8007 IP65 (Compliant with IEC 60529)
- Monitoring function
- HART transmission function (Smart positioner)

| Description | Series | Type | Port size (Rc, NPT, G) | Supply air pressure [MPa] | Input current |
|------------------------------|------------|-------------|---------------------------|------------------------------|---------------|
| Electro-pneumatic positioner | IP8000-X14 | Lever type | 1/4 | 0.14 to 0.7 | 4 to 20 mA DC |
| Electro-pneumatic positioner | IP8100-X14 | Rotary type | 1/4 | 0.14 to 0.7 | 4 to 20 mA DC |
| Smart positioner | 52-IP8001 | Lever type | 1/4 | 0.14 to 0.7 | 4 to 20 mA DC |
| Smart positioner | 52-IP8101 | Rotary type | 1/4 | 0.3 to 0.7 | 4 to 20 mA DC |

Energy Saving

Air Saving

Vacuum Unit ZK2

p. 116

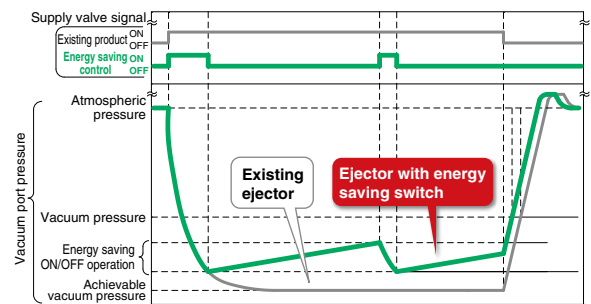
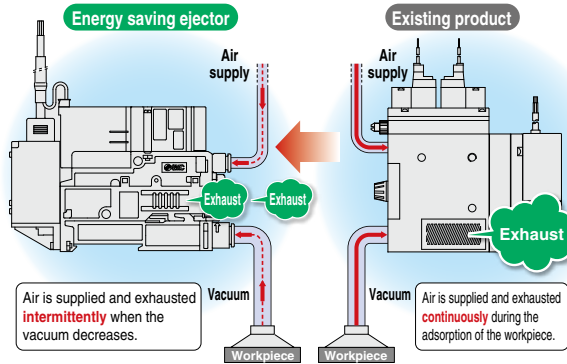
Energy Saving Ejector Vacuum Ejector Vacuum Pump System

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

Air consumption reduced by 90%*1

*1 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.



Power consumption cost per year reduced by 70,594 JPY/year

The energy saving function shortens the exhaust time, which reduces the annual power consumption cost.

| | Power consumption cost per year | Energizing time per year | Exhaust time | Compressor's consumption per unit time |
|---------------------------------|---------------------------------|--------------------------|--------------|--|
| ZK2/With energy saving function | 5,344 JPY/year | 1875 h/year | 0.6 s | 0.19 kWh |
| Existing product | 75,938 JPY/year | 18750 h/year | 6 s | 0.27 kWh |

Cost conditions

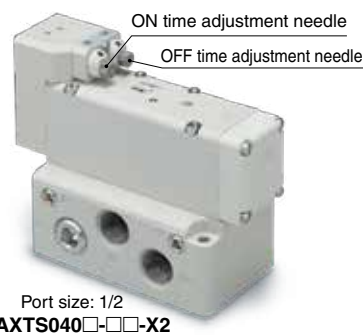
- Electric power charge: 15 JPY/kWh, Operating hours: 10 hours/day, Operating days: 250 days/year, When 10 units are used
- Power consumption of the compressor is the theoretical value from the air consumption of each product at 0.35 MPa.

Energy saving efficiency

Pulse Blowing Valve AXTS040□-□□-X2 Made to Order

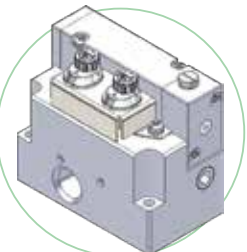
The peak pressure of repeatedly colliding air permits efficient blowing.

Air consumption reduced by 50% or more

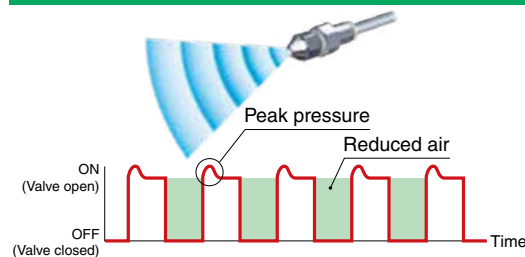


Related product

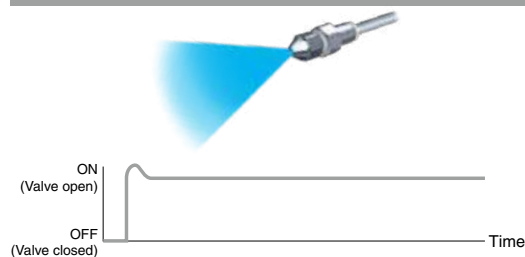
* Please contact SMC for details.



Pulse blow



Continuous blow





Energy Saving

Air Saving

Pulse Valve **Valve for Dust Collectors JSXFA**

* Please contact SMC for details.

Life: More than 10 times longer/1000 million cycles*¹ or more

*¹ Based on SMC's specific testing conditions

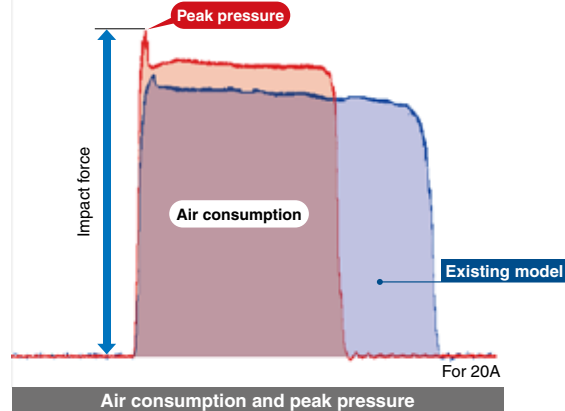
When the orifice diameter of the pilot valve is $\phi 5$ mm or more

High peak pressure with low air consumption

Peak pressure: 15% increase

Air consumption: 35% reduction

Fluid temperature: -40 to 140°F (-40 to -60°C)



Size: 20A, 25A, 40A

Compression fitting type



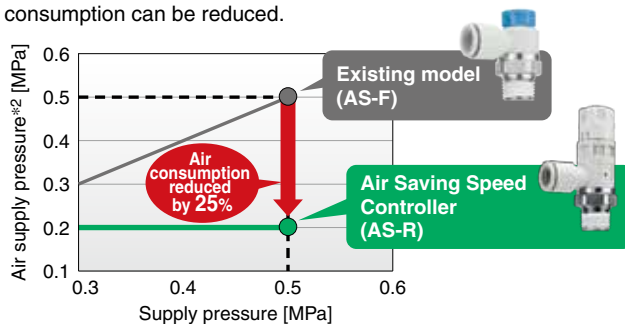
Direct piping type

Air Saving Speed Controller **AS-R/AS-Q**

p. 145

Air saving: 25%*¹ reduction in air consumption

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



*¹ The air consumption reduction rate indicates the rate for one cycle of the cylinder.

*² Cylinder pressure on the return stroke side



With pressure reduction function AS-R



With rapid supply and exhaust function AS-Q

When combined with an optimally-sized cylinder

Air consumption reduction ratio: 46%

For example, instead of using an $\phi 80$ bore cylinder in place of a $\phi 63$ bore cylinder that does not have enough force, it is possible to select an optimally-sized $\phi 67$ bore JMB series cylinder. In addition, an AS-R/AS-Q series combined with this cylinder can reduce air consumption by up to 46%.

Air Consumption (for one cycle)

| Speed controller | Air Saving Speed Controller AS-R/AS-Q Series | Elbow type AS Series |
|-------------------------|--|----------------------|
| Cylinder bore size [mm] | $\phi 67$ (Intermediary bore size) | $\phi 80$ |
| Air consumption [L] | 3.1 | 5.8 |

Conditions:

Working stroke pressure: 0.5 MPa

Return stroke pressure: 0.2 MPa

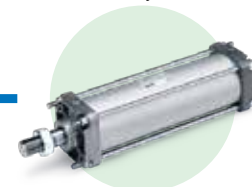
Stroke: 100 mm

* Utilizes the SMC sizing program

46% reduction

Air Saving Speed Controller

Air Cylinder JMB Series
Intermediary bore size



| Intermediary bore size | | | |
|------------------------|----------------|----------------------|------------------------|
| Bore size | $\phi 63$ | $\phi 67$ | $\phi 80$ |
| Force | Not acceptable | Acceptable (Optimal) | Acceptable (Excessive) |



Energy Saving

Power Saving

Thermo-chiller/
Inverter Type
HRSH090



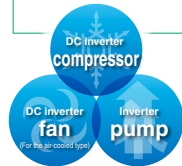
p. 163

Thermo-chiller/
Inverter Type
HRSH100 to 300

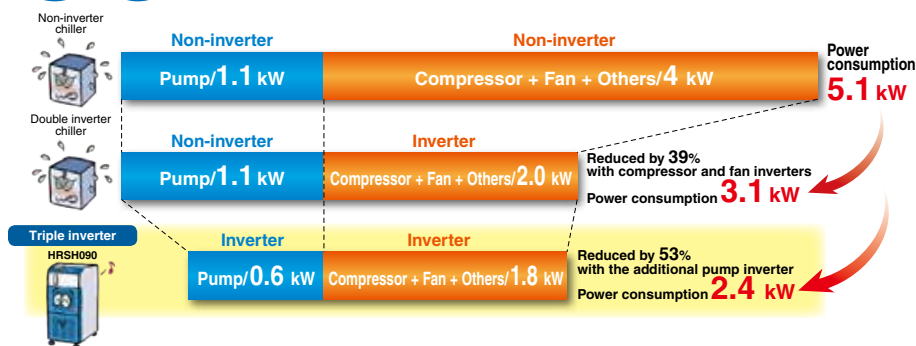


p. 164

Triple inverter



The inverter respectively controls the number of motor rotations of the compressor, fan and pump depending on the load from the user's equipment. Power consumption reduced by 53% compared with a non-inverter (HRSH090). With the inverter, it is possible to operate with the same performance even with the power supply of 50 Hz.



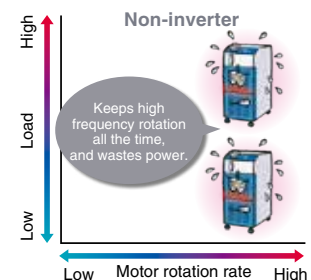
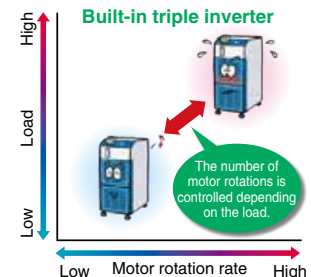
Operating ratio: Ratio of 9.5 kW (with heat load) to 0 kW (without heat load) Operating ratio: 50%, with heat load of 9.5 kW all the time

Conditions

Common conditions for non-inverter and triple inverter:

- Ambient temperature: 32°C
- Circulating fluid flow rate: 35 L/min at 0.3 MPa (60 Hz)
- Circulating fluid temperature: 20°C
- Heat load: 9.5 kW

Conditions for non-inverter chiller: Continuous operation of the compressor which can cool down 9.5 kW at 60 Hz. The pump shall be same as that of the HRSH.



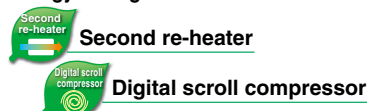
Refrigerated Air Dryer/Double Energy Saving Function Series

IDF□FS

p. 124

Double Energy Saving Function Series

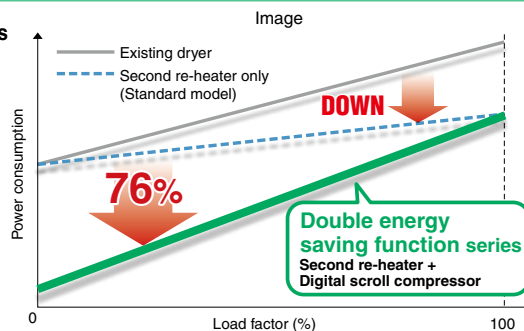
Energy-saving effects of the double energy saving function series



Energy-saving design



The double energy saving function series reduces power consumption by up to **76%!**



Operating conditions: The IDF125FS operated in the 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

Load factor Operating conditions that increase load factor:

- High inlet air temperature and ambient temperature
- A large amount of air to be processed
- Low inlet air pressure

Effect example 1 year (Spring to Winter) Power consumption **DOWN**

Compared with the standard model (constant compressor operation), the double energy saving function series

reduces power consumption by 43%!!



*1 [Trial calculation conditions] Days of operation per year = 240 days (60 days each in spring, summer, autumn, and winter), Operation hours per day = 12 hours, Electric power cost = ¥17/kWh
For details about the dryer operating conditions for each season, refer to the Web Catalog (IDF□FS series).



Energy Saving

Power Saving

Air Saving

5-Port Solenoid Valve

Plug-in **SY** p. 77



4-Port Solenoid Valve

SJ p. 77



5-Port Solenoid Valve

VF p. 78



3-Port Solenoid Valve

VP p. 79



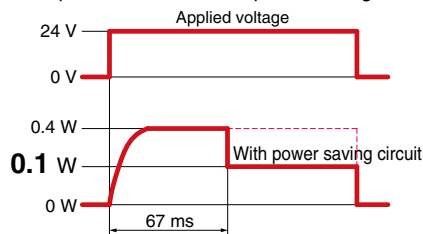
Reduces power consumption when energized

- 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 67 ms*¹ at 24 VDC.) Refer to the electrical power waveform as shown below.

* Only products with the indicator light are equipped with the power saving circuit.

[Electrical power waveform with power saving circuit]



*1 For the SY plug-in series

Low Power Consumption Valve Energy-saving Product

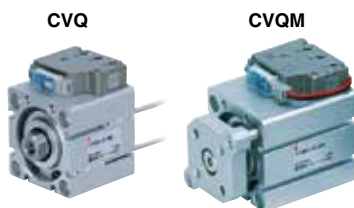
| Type | Model | Power consumption [W]* ² | |
|----------|--------------------------|-------------------------------------|---------------------------|
| | | Standard | With power-saving circuit |
| 4/5-port | SJ2000 | 0.55 | 0.23 |
| | SJ3000 | 0.4 | 0.15 |
| | Plug-in SY3000/5000/7000 | 0.4 | 0.1 |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

*2 With DC light

Valve Mounted Compact Cylinder p. 96

CVQ/CVQM

- Approx. 50% reduction in air consumption between cylinder and valve



S Couplers

KK130

- Energy saving by pressure loss reduction



Blow Gun

VMG

- A 20% reduction in power consumption can be achieved with the SMC "Blow gun" + "S coupler" + "Coil tube."



* 10% reduction with the "Blow gun (VMG)" only

Precision Regulator p. 132

IR1000-A/IR2000-A/IR3000-A

- Air consumption: Reduced by up to approx. 90%*¹

| IR | Existing model | Series |
|----------------------|-----------------|-------------------|
| 1 L/min(ANR) or less | 4.4 L/min(ANR) | IR1000-A/IR2000-A |
| 1 L/min(ANR) or less | 11.5 L/min(ANR) | IR3000-A |

*1 Compared with the existing IR1000/2000/3000



Multistage Ejector

ZL112A

- Air consumption: 10% reduction [63 → 57 L/min(ANR)]





Centralized Control

From p. 80

Reduced Wiring

Fieldbus System

IP67/65 specification models

| | | Output type for solenoid valves | | Gateway type | Integrated input-output type | | |
|----------------------|-------------------------|---------------------------------|-------|--------------|------------------------------|-------|-------|
| | Number of valve outputs | 32 | | | | | |
| | | 16 | EX260 | EX124 | | | |
| | Number of inputs | 16 | | EX500 | EX600 | EX245 | EX250 |
| | | 32 | | | | | |
| Applicable protocols | EtherNet/IP™ | ● | | ● | ● | | ● |
| | PROFINET | ● | | ● | | ● | |
| | Modbus®TCP | ◆ | | | ◆ | | ◆ |
| | Ethernet POWERLINK | ● | | | ● | | |
| | EtherCAT | ● | | | ● | | ◆ |
| | CC-Link IE Field | | | | ◆ | | ◆ |
| | PROFIBUS DP | ● | | ● | ● | | ● |
| | DeviceNet™ | ● | ● | ● | ● | | ● |
| | CC-Link | ● | ● | ● | ● | | ● |
| | AS-Interface | ◆ | | | ● | | ● |
| | CANopen | ◆ | | | | | ● |
| | CompoNet™ | | ◆ | | | | ● |
| | INTERBUS | | | | ◆ | | |
| | IO-Link | ◆ | | | | | |

*1 For details, refer to the catalog of each product.

IP20 specification models

| | | Output type for solenoid valves | | Gateway type | Integrated input-output type |
|----------------------|-------------------------|---------------------------------|-------------------|--------------|------------------------------|
| | Number of valve outputs | 32 | | | |
| | | 16 | EX120 EX121 EX122 | EX140 | EX180 |
| | Number of inputs | 16 | | | EX510 |
| | | 32 | | | |
| Applicable protocols | EtherNet/IP™ | | | | ◆ |
| | PROFINET | | | | ◆ |
| | Modbus®TCP | | | | |
| | Ethernet POWERLINK | | | | |
| | EtherCAT | | | ◆ | |
| | CC-Link IE Field | | | | |
| | PROFIBUS DP | | | | ● |
| | DeviceNet™ | ● | ● | ● | ● |
| | CC-Link | ● | ● | ● | ● |
| | AS-Interface | | | | |
| | CANopen | | | | |
| | CompoNet™ | ● | | | |
| | INTERBUS | | | | |
| | IO-Link | | | | |

●: Standard product ◆: Made to order



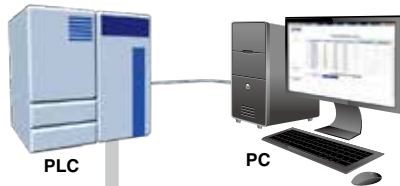
DeviceNet™ is a trademark of ODVA.
EtherNet/IP™ is a trademark of ODVA.
CompoNet™ is a trademark of ODVA.

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
Modbus® is a registered trademark of Schneider Electric, licensed to the Modbus Organization, Inc.



Centralized Control

IO-Link Compatible Product



Configuration File (IODD File*)

- Manufacturer
- Product part no.
- Set value

*1 IODD File:

IODD is an abbreviation of IO Device Description. This file is necessary for setting the device and connecting it to a master. Save the IODD file on the PC to be used to set the device prior to use.

For details on each device, refer to the **Web Catalog**.



IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard, IEC61131-9.

Various fieldbusses

Device settings can be set by the master.

- Threshold value
- Operation mode, etc.

Read the device data.

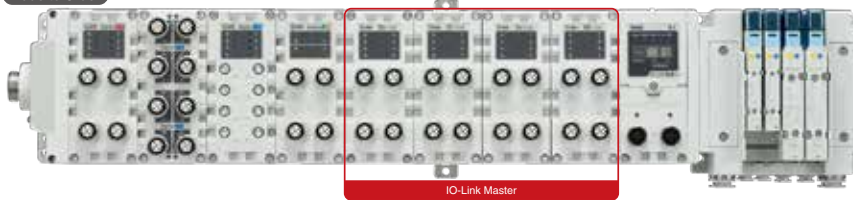
- Switch ON/OFF signal and analog value
- Device information: Manufacturer, Product part number, Serial number, etc.
- Normal or abnormal device status

SMC IO-Link Master EX600-GILB-X60

Made to Order

Fieldbus

CC-Link IE Field



IO-Link Master (Commercially available)



3-Screen Display High-Precision Digital Pressure Switch



ZSE20B(F)-L
/ISE20B-L

3-Screen Display High-Precision Digital Pressure Switch

1.0 MPa
1.6 MPa



For air
ISE70/ISE71

3-Screen Display High-Precision Digital Pressure Switch

1.0 MPa
2.0 MPa
5.0 MPa
10 MPa



For general fluids
ISE70G/ISE75G
ISE76G/ISE77G

3-Color Display Digital Flow Switch for Water



PF3W704-X445
PF3W720-X445
PF3W740-X445

Actuator Position Sensor



D-MP025/D-MP050
D-MP100/D-MP200

Valve SI Unit



EX260-SIL1-X207
EX260-SIL1-X210

Electro-Pneumatic Regulator



ITV10□0-X395
ITV20□0-X395
ITV30□0-X395

Step Motor Controller



JXCL1



Centralized Control

Pressure/Flow Control

3-screen display applicable series

Setting is possible while checking the measured value.

Main screen Measured value (Current pressure value)

Sub screen Label (Display item), Set value (Threshold value)

Visualization
of settings

| | |
|-----------------------------|------|
| Set value (Threshold value) | P-1 |
| Hysteresis value | H-1 |
| Delay time | dt-1 |
| Peak value | H-H1 |
| Bottom value | H-L0 |



Applicable Series

High-Precision Digital
Pressure Switch
ZSE20□(F)/ISE20□ Series
ISE7□/7□G Series

Sensor Monitor
PSE300AC Series

Digital Flow Monitor
PFG300 Series

Pressure Switches/Sensors

3-Screen Display High-Precision
Digital Pressure Switch

ZSE20□(F)/
ISE20□



Compact Digital
Pressure Switch
ZSE10(F)/ISE10



Compact Pneumatic
Pressure Sensor
PSE53□/54□



Pressure Sensor for
General Fluids

PSE56□/57□



3-Screen Display High-Precision
Digital Pressure
Switch

ISE7□/7□G



Variations



Flow Switches

3-Color Display
Digital Flow Switch for Large Flow

PF3A7□H



2-Color Display
Digital Flow Switch

PFMB



3-Color Display
Digital Flow Switch

PFMC



3-Color Display
Digital Flow Switch for Water

PF3W



3-Color Display
Electromagnetic Type
Digital Flow Switch

LFE



Variations





Centralized Control

Pressure/Flow Control

Regulators

Electro-Pneumatic Regulator **p. 134** ITV

- Stepless control of air pressure in proportion to electrical signals
- Sensitivity: 0.2% F.S. or less
- Linearity: $\pm 1\%$ F.S. or less
- Hysteresis: 0.5% F.S. or less
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C



5.0 MPa Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator **p. 134** ITVX

- Maximum supply pressure: 5.0 MPa
- Set pressure range: 0.01 to 3.0 MPa
- Max. flow rate: 3,000 L/min(ANR)



3.0 MPa Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator **p. 134** ITVH

- Maximum supply pressure: 3.0 MPa
- Set pressure range: 0.2 to 2.0 MPa
- Stability: $\pm 1\%$ F.S. or less
- Max. flow rate: 3,000 L/min(ANR)



Electronic Vacuum Regulator **p. 134** ITV

- Stepless control of vacuum pressure in proportion to electrical signals
- Sensitivity: 0.2% F.S. or less
- Linearity: $\pm 1\%$ F.S. or less
- Hysteresis: 0.5% F.S. or less
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C



Precision Regulator **p. 132** IR1000-A/2000-A/3000-A

- Air consumption: Reduced by up to approx. 90% (Compared to the existing SMC product)
- Sensitivity: 0.2% (Full span)
- Repeatability: $\pm 0.5\%$ (Full span)



Trademark
DeviceNet™ is a trademark of ODVA.

Others

Compact Proportional Solenoid Valve **p. 133** PVQ

- Stepless control of flow rate in proportion to current
- Repeatability: 3% or less
- Hysteresis: 10% or less



Flow Controller for Water **p. 153** FC2W-X110

- Automatically adjusts the flow rate
- Flow rate control accuracy: $\pm 5\%$ F.S.
- Response time: 10 s or less
- Grease-free





Temperature Control

From p. 163

Temperature Control

Constant Temperature

A chiller is used to control the temperature of circulating fluid and supply it to the heat source.

Refrigerated Thermo-chillers

Thermo-chiller/Standard Type HRS

Cooling capacity **1.1 kW to 5.9 kW**



Thermo-chiller/Standard Type HRS090

Cooling capacity **8.0 kW to 10.5 kW**



Thermo-chiller/Standard Type HRS100/150

Cooling capacity
9.0 kW to 16.5 kW



Thermo-chiller/Inverter Type HRS090

Cooling capacity
9.5 kW to 11 kW



Thermo-chiller/Inverter Type HRSH

Cooling capacity
10.5 kW to 28 kW



Thermo-chiller/Basic Type HRSE

Cooling capacity
1.0 kW to 2.2 kW



Thermo-chiller/Rack Mount Type HRR

Cooling capacity **1.2 kW to 3.0 kW**



Thermo-chiller/High-performance Type HRZ, HRZD, HRW

Cooling capacity **1.0 kW to 30 kW**



Thermo-chiller/Environmentally Resistant Type HRS-R (IP54)

Cooling capacity
1.9 kW to 5 kW



Peltier-Type Thermo-cons/Thermoelectric Baths

Thermo-con HEC/HECR

Cooling capacity **140 W to 1200 W**



Chemical Thermo-con HED

Cooling capacity **300 W to 750 W**



Thermoelectric Bath (Round Type) HEB

Cooling capacity **140 W to 280 W**



Thermoelectric Bath (Square Type) INR-244

Cooling capacity **140 W to 320 W**



Next Generation Products

Air Saving, Lightweight, and Compact

* Please contact SMC for details.

Square Air Cylinder

Equivalent: $\phi 12$, $\phi 16$, $\phi 20$, $\phi 25$, $\phi 32$, $\phi 40$

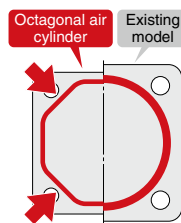
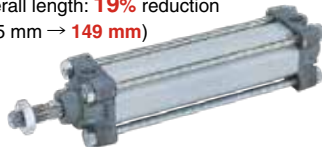
- Lightweight and compact due to its square piston shape
- Weight: **57%** reduction (150 g \rightarrow **64 g**)
- Overall length: **30%** reduction (134 mm \rightarrow **93.5 mm**)



Octagonal Air Cylinder

Bore size: $\phi 32$, $\phi 40$, $\phi 50$, $\phi 63$

- Lightweight and compact due to its octagonal piston shape
- Weight: **36%** reduction (480 g \rightarrow **306 g**)
- Overall length: **19%** reduction (185 mm \rightarrow **149 mm**)



Octagonal Compact Air Cylinder

Bore size: $\phi 20$, $\phi 25$, $\phi 32$, $\phi 40$

- Weight: **49%** reduction (179 g \rightarrow **92 g**)
- Overall length: **13%** reduction (57.5 mm \rightarrow **50 mm**)



Aluminum Rod Cylinder

- Special coating reduces sliding resistance and increases surface hardness
- Weight: **39%** reduction (2739 g \rightarrow **1704 g**) (MGP $\phi 50$, 25 mm stroke)

MGP Series

Bore size: $\phi 25$, $\phi 32$, $\phi 40$, $\phi 50$

Aluminum rod + Special coating



CQ2 Series

Bore size: $\phi 25$, $\phi 32$, $\phi 40$, $\phi 50$, $\phi 63$



CM2 Series

Bore size: $\phi 20$, $\phi 25$, $\phi 32$, $\phi 40$



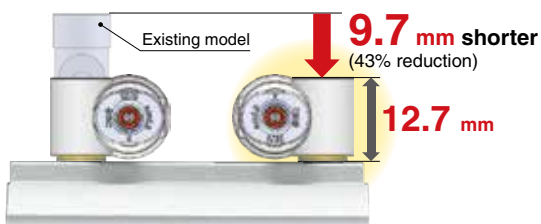
MB Series

Bore size: $\phi 32$, $\phi 40$, $\phi 50$, $\phi 63$



Compact Speed Controller

- Height: **43%** reduction (22.4 mm \rightarrow **12.7 mm**)



Compact Rotary Actuator (Vane Type)

Size: 10, 15, 20, 30, 40

- Weight: **48%** reduction (222 g \rightarrow **115 g**) (For size 20)
- Overall length: **44%** reduction (100 mm \rightarrow **55.6 mm**) (For size 20)



Next Generation Products

Air Saving, Lightweight, and Compact

* Please contact SMC for details.

Compact Rotary Actuator (Rack & Pinion Type)

Size: 10, 15, 20, 30, 40

- Weight: **29%** reduction (700 g → **500 g**) (For size 20)
- Height: **7%** reduction (59 mm → **55 mm**) (For size 20)



Compact Rotary Table (Rack & Pinion Type)

Size: 10, 20, 30, 50

- Weight: **32%** reduction (940 g → **640 g**) (For size 20)
- Height: **28%** reduction (54 mm → **39 mm**) (For size 20)



Compact Air Gripper

ø8, ø12, ø16, ø20

- Weight: **46%** reduction (235 g → **127 g**)
- Height: **28%** reduction (27.6 mm → **20 mm**)
- Overall length:
23% reduction (84.8 mm → **65.2 mm**)



Plug-in Type 5-Port Solenoid Valve

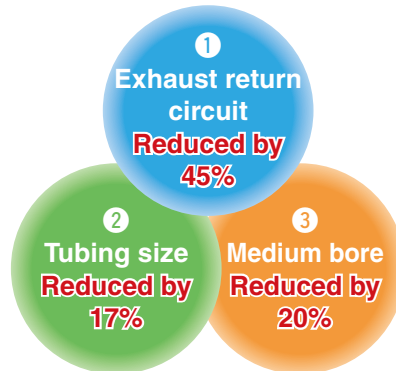
- Weight: **32%** reduction (1140 g → **770 g**) (JSY3000)
- Volume: **39%** reduction (1360 cm³ → **830 cm³**) (JSY3000)



Reduction in cylinder air consumption

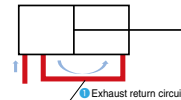
* Please contact SMC for details.

1/3 the air consumption



1 Exhaust return

Air is reused and consumption is
reduced by 45%



2 Adjustment of combined tubing resistance

Tubing bore size ø6 → ø4

Air consumption **reduced by 17%**

3 Selection of medium bore size

Improved cylinder force (ø50 → ø45)

Air consumption **reduced by 20%**

Total air consumption reduced by 70%

Next Generation Products

Wireless System

Wireless System EX600-W

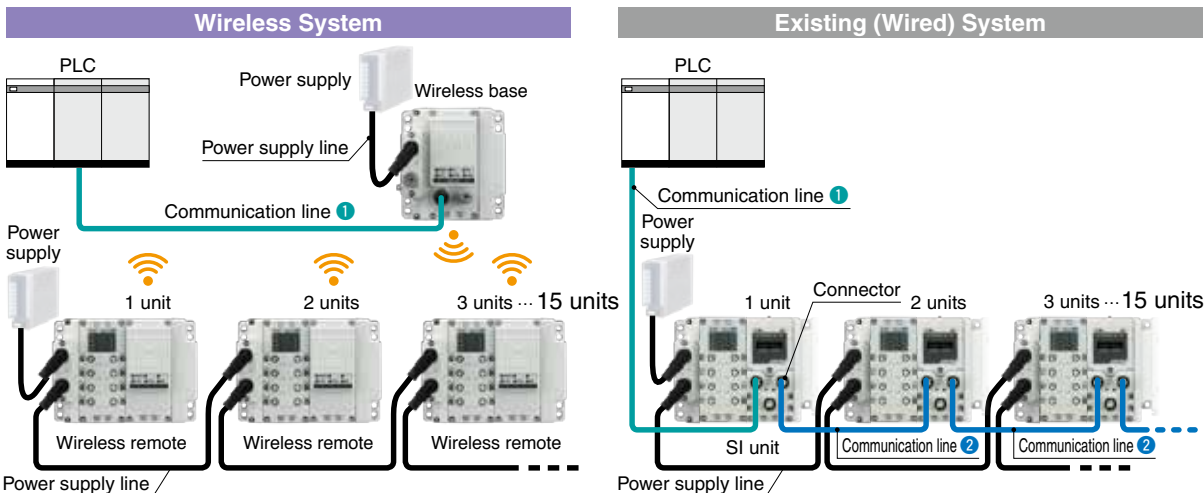
p. 82

- Noise resistance
Uses the 2.4 GHz ISM frequency band
Frequency hopping: Every 5 ms
- High-speed connection
From power supply ON to start of communication: Min. 250 ms*1
*1 For wireless slave
- Communication response
Signal response time: 5 ms
- Communication cables not required
Reduced wiring work, space, and cost
Minimized disconnection risk
- Number of I/O points
Max. 1280 inputs/1280 outputs
(Max. 128 inputs/128 outputs per module)
- Compatible protocols
EtherNet/IP[®]



■ Trademark
EtherNet/IP[™] is a trademark of ODVA.

Wiring material cost and installation work-hours can be reduced.



| SI unit: Comparison when 15 units are connected | Number of communication devices | Communication line | | Communication connectors required |
|---|--|----------------------------------|--------------------------------------|-----------------------------------|
| | | ① | ② | |
| Wireless system | Wireless base: 1 unit Wireless remote: 15 units | 1 line (Connector at one end) | — | 1 place |
| Existing (Wired) | SI unit: 15 units | 1 line (Connector at one end) | 14 lines (Connector at both ends) | 29 places |

Product Support

Calibration Certificate

Pressure Switch: Suffix -X5

From p. 148

- Traceability system chart attached
 - Traceability system chart of standard instruments attached
 - Calibration certificate of the product attached
 - Calibration certificate of standard instruments attached
- * Models whose standard part number includes symbols "K" or "T", indicating that a calibration certificate is attached to the product, are not applicable.

Applicable Series

3-Screen Display High-Precision Digital Pressure Switch ZSE20□(F)/ISE20□



Compact Digital Pressure Switch ZSE10(F)/ISE10



3-Screen Display High-Precision Digital Pressure Switch ISE7□



3-Screen Display High-Precision Digital Pressure Switch ISE7□G



Compact Pneumatic Pressure Sensor PSE53□



Compact Pneumatic Pressure Sensor PSE54□



Low Differential Pressure Sensor PSE550



Pressure Sensor for General Fluids PSE56□



Pressure Sensor for General Fluids PSE57□



Multi-Channel Digital Pressure Sensor Controller PSE200



2-Color Display Digital Pressure Sensor Controller PSE300



3-Screen Display Sensor Monitor PSE300AC



Example of Calibration Certificate for Pressure Switch (-X5)



+



+

Calibration certificate/
Traceability system chart of
standard instruments

* The images shown are just examples.
The contents described may vary
depending on the product.

Flow Switch: Standard model no. (Available with -A)

From p. 150

- Inspection certificate (with serial number) attached
- Traceability system chart attached (Traceability system chart of standard instruments attached)

Applicable Series

2-Color Display Digital Flow Switch PFM



2-Color Display Digital Flow Switch PFMB



3-Color Display Digital Flow Switch PFMC



3-Color Display Digital Flow Switch for Large Flow PF3A7□H



3-Color Display Digital Flow Switch for Water PF3W



Digital Flow Switch for Deionized Water and Chemical Liquids PF2D



Products other than those listed above are also available. Please contact SMC for details.

Others

High Pressure

**Pilot Operated
2-Port Solenoid Valve
N.O. type
VCH42**

p. 159

- Max. operating pressure: 5.0 MPa
- Service life: 10 million cycles
- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet for valve parts
- Operating pressure differential: 0.5 to 5.0 MPa


**Pilot Operated
2-Port Solenoid Valve
N.C. type
VCH41**

p. 159

- Max. operating pressure: 5.0 MPa
- Service life: 10 million cycles
- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet for valve parts
- Operating pressure differential: 0.5 to 5.0 MPa


**Pilot Operated
3-Port Solenoid Valve
VCH410**

p. 159

- Max. operating pressure: 5.0 MPa
- Service life: 10 million cycles
- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet for valve parts
- Uses NSF-H1 approved grease on guide rings (Sliding parts)
- Operating pressure differential: 0.5 to 5.0 MPa


**Silencer
VCHN3/4**

p. 159

- Max. operating pressure: 5.0 MPa (Solenoid valve inlet pressure)
- Reduces clogging with its double-layer structure
- Noise reduction: 35 dB(A)


**Check Valve
VCHC40**

p. 159

- Operating pressure range: 0.05 to 5.0 MPa
- Service life: 10 million cycles
- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet for valve parts
- Cracking pressure: 0.05 MPa


**Direct Operated Regulator
(Relieving Type)
VCHR30/40**

p. 159

- Max. operating pressure: 6.0 MPa
- Service life: 10 million cycles
- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet
- Uses NSF-H1 approved grease on guide rings (Sliding parts)
- Set pressure range: 0.5 to 5.0 MPa


**3.0 MPa Maximum Supply Pressure
High Pressure
Electro-Pneumatic
Regulator
ITVH**

p. 134

- Max. supply pressure: 3.0 MPa


**Electro-Pneumatic Regulator
ITVX**

p. 134

- Max. supply pressure: 5.0 MPa
- Stepless control of air pressure proportional to electrical signals
- Set pressure range: 0.01 to 3.0 MPa


**Pressure Sensor for
General Fluids
PSE576/577**

p. 149

- Rated pressure range: 0 to 5 MPa (PSE576) 0 to 10 MPa (PSE577)


**Pressure Switch
ISE7□G**

p. 148

- Rated pressure range: 0 to 5 MPa (ISE76G) 0 to 10 MPa (ISE77G)


**Regulator: High Pressure
AR-B-X425**

p. 130

- Max. operating pressure: 2.0 MPa
- Strong materials are used in the manufacturing of regulators intended for high-pressure operation.
- Proof pressure: 3.0 MPa
- Set pressure range: 0.1 to 1.7 MPa


**Air Filter: High Pressure
AF-A-X425**

p. 128

- Max. operating pressure: 2.0 MPa
- Strong materials are used in the manufacturing of air filters intended for high-pressure operation.
- Proof pressure: 3.0 MPa

Others

p. 169, 170

High Pressure

For General Applications

High inlet pressure: Max. 24.1 MPa

Wetted parts material including diaphragm 316 SS (fluoropolymer seat)

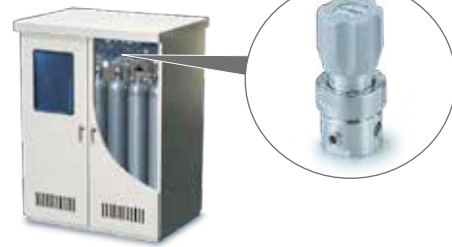
Ni-Cr-Mo alloy internals available for corrosion resistance

Regulator AK

For wide variety of applications from semiconductor to general



Gas supply unit for culture equipment



Air Operated Regulator AK□PA



Others

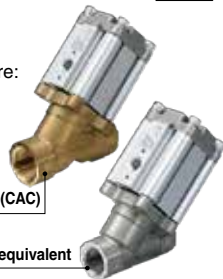
Steam

Angle Seat Valve/Air Operated Type VXB

p. 156

- Fluid temperature: 183°C (Steam) or less

Body material: **Bronze (CAC)**
Body material: **Stainless steel 316L equivalent**



Zero Differential Pressure Type Pilot Operated 2-Port Solenoid Valve VXS

p. 156

- Fluid temperature: 183°C (Steam) or less



Direct Operated 2-Port Solenoid Valve VX21/22/23

p. 156

- Fluid temperature: 183°C (Steam) or less



Stainless Steel 316 One-touch Fittings KQG2

p. 136

- Can be used with steam
- Fluid temperature: **-5 to 150°C**
- Grease-free
- Certified to meet current Food Sanitation Law standards (Component materials have met apparatus and container-package standards.)



Stainless Steel 316 Insert Fittings KFG2

p. 137

- Can be used with steam
- Fluid temperature: **-65 to 260°C** (Swivel elbow: -5 to 150°C)
- Grease-free
- Certified to meet current Food Sanitation Law standards (Component materials have met apparatus and container-package standards.)



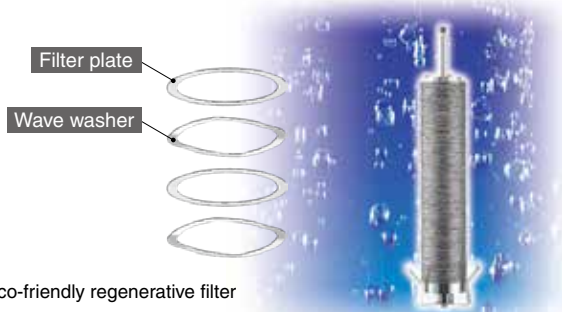
Others

p. 172

Cleaning (Filtration Filter)

Low Maintenance Filter
FN1/FN4

- Our unique element construction with back-flushing capability
The element of the filter is constructed of a series of grooved filter plates and wave washers placed one above the other.



- Eco-friendly regenerative filter
- A unique stainless steel element construction with back-flushing capability generates no industrial waste, thus requires no element replacement.

**High Precision Filter for Liquids**
FGH

- Filtration efficiency: 99% or more
- Prevents particle generation in the housing
Internal particle generation is eliminated by using stainless steel 316 and PTFE for the wetted material and adopting a clamp ring system.
- Integrity inspection conducted
100%-integrity inspection is conducted.
- Prevents residual liquid accumulation in the case
A simple structure prevents the residual liquid from accumulating in the case.

**HEPO II Element**

- Filtration accuracy: 2, 4, 6, 13 μm (Filtration efficiency: 99%)
- High precision filtration \rightarrow 99% or more
High accuracy filtration is achieved by using a HEPO II element with filtration accuracy of 2, 4, 6 or 13 μm (Filtration efficiency 99%).
- No outflow of fibers or elution of components from the filter media
There is almost no outflow of fibers or elution of components from the filter media because it uses ultrafine and long polyester fiber nonwoven fabric with no binder.
- Applicable for a wide range of liquids
The element is applicable for a wide range of liquids because it adopts PTFE seals.

**Quick Change Filter**
FQ1

- Element can be replaced without using any tool.
· Replacing the element
· Air release
· Drainage of liquid

FQ1012
Element size
L500
(L250 x 2 pcs.)

**HEPO II Element "EJ101S Series"**

- Material: PET
- Optimal for high precision filtration (99% or more) of a wide range of fluids
- Dimensions: $\phi 70 \times \text{L250}$ (EJ101S)

Recommended Flow Rate

| Absolute filtration accuracy [μm] | Recommended flow rate [L/min] ^{*1} |
|--|---|
| 2 | 20 |
| 4 | |
| 6 | |
| 13 | |

*1 Pressure loss: 0.01 to 0.02 MPa

• Operating temperature: 0 to 80°C • Differential pressure resistance: 0.5 MPa/25°C

**HEPO II Element "EJ102S Series"**

- All parts of this element are made of polypropylene, which is optimal for various cleaning fluids including alkali and organic solvents.
Nearly no fiber separation or release of chemicals, since fibers themselves are directly fused and no adhesives are used.
- Pressure loss is low and relatively long service life is provided due to a larger filtration area.
- Dimensions: $\phi 70 \times \text{L250}$

Recommended Flow Rate

| Absolute filtration accuracy [μm] | Recommended flow rate [L/min] |
|--|-------------------------------|
| 2 | 20 |
| 4 | |
| 6 | |
| 13 | |

• Operating temperature: 0 to 80°C • Differential pressure resistance: 0.5 MPa



Others

Adsorption Transfer

Vacuum Pad

From p. 119

ZP3P

- Silicone rubber compliant with the FDA (USA Food and Drug Administration) 21CFR§177.2600 elution test is used.



ZP3E

- Stable suction position
Improved ease of removal
- Pad diameter: ø32 to ø125



ZP3

- Pad diameter: ø1.5 to ø16



ZP2



Unit Type Ejectors/Vacuum Pump Systems

Vacuum Unit

ZK2

p. 116

- The digital pressure switch for vacuum with energy-saving function cuts supply air when the pressure reaches the desired vacuum.
Air consumption reduced by 90%
- Improved ejector efficiency: Suction flow increased by 50%
Air consumption reduced by 30%
(Compared with other SMC single-stage ejectors)



Individual wiring



D-sub connector



Flat ribbon cable

Ejectors

Multistage Ejector

ZL112A

p. 116

- Air consumption: 10% reduction
[63 → 57 L/min(ANR)]
- Lightweight: Max. 60% weight reduction
(450 g → 180 g)



Variations

With valve



With digital vacuum pressure switch



With vacuum pressure gauge



With vacuum port adapter



Port exhaust



Vacuum Ejector

ZH

p. 116

- Overall length: Max. 11% reduction
(6.7 mm shorter)
- Weight: Max. 74% reduction
(65.1 g lighter)
- Direct mounting, Standard bracket mounting, L-bracket mounting, DIN rail mounting



All Stainless Steel Vacuum Ejector

ZH□□-X267

p. 117

- All stainless steel
(SCS13: Equivalent to stainless steel 304)

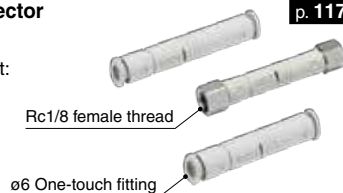


In-line Type Vacuum Ejector

ZU□A

p. 117

- Compact and lightweight:
O.D.: ø10.4
Weight: 3.9 g
Overall length: 52 mm



Vacuum Pad with Ejector

ZHP

p. 117

- Ejector and pad are integrated.
Space saving with reduced piping labor
- Pad diameter: ø63, ø80



Others

Adsorption Transfer

Air Suction Filters

p. 118

ZFA

- Prevents problems related to vacuum circuits or airborne contaminants
- Provides a large filter element surface



ZFB

- Vacuum tubes can be connected and removed by a one-touch operation.



ZFC

- Operating pressure range:
–100 kPa to 1.0 MPa
Both positive pressure and vacuum pressure can be used with one unit.



ZFC050

- Small suction filter which can be installed directly



Vacuum Saving Valves/Vacuum Flow

p. 121

ZP2V

- Can restrict the reduction of vacuum pressure even when there is no workpiece
- A switching operation is not required when changing workpieces.
- Built-in filter (40 μm)



ZH□-□□-X185

- By supplying compressed air, large blow and vacuum flow rates are available.
- A blow flow rate 4 times the supply air
- A vacuum flow rate 3 times the supply air



Related Products

Adsorption Plate SP

p. 122



Free Mount Cylinder for Vacuum ZCUK

p. 122



Vacuum Filter AFJ

p. 118



Exhaust Cleaner for Vacuum Pump AMV

p. 122



Vacuum Regulator IRV

p. 121



Electronic Vacuum Regulator ITV

p. 122



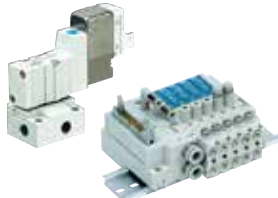
Related Equipment for Vacuum Systems

p. 122

Pressure Switches/Flow Switches



Directional Control Valves



Vacuum Pressure Switches/Pressure Gauges



Flow Control Equipment



Others

p. 123, 124

Dehumidification

Refrigerated Air Dryer

IDF

- Can be used in high-temperature environments
- Ambient temperature: Max. 45°C
- Inlet air temperature: Max. 65°C
- Air flow capacity: 16.4 m³/min
(24% increase compared with the existing model)
- * IDF90-20, Dew point 10°C, 60 Hz
- For use in Southeast Asia (IDFC)
- For use in Europe, Asia, and Oceania (IDFA)
- For use in North, Central, and South America (IDFB)



| Model | Rated inlet condition | Rated ambient temperature | Air flow capacity | | Port size |
|-------|-----------------------|---------------------------|-------------------|-------|-----------|
| | | | [m³/min] | | |
| | | | Dew point 10°C | | |
| | | | 50 Hz | 60 Hz | |
| IDF60 | 35°C | 32°C | 5.6 | 6.5 | R1 |
| IDF70 | 0.7 MPa | | 8.0 | 9.1 | R1 1/2 |
| IDF80 | 40°C | | 11.6 | 13.6 | R2 |
| IDF90 | 0.7 MPa | | 14.3 | 16.4 | |

Refrigerated Air Dryer (Standard Inlet Air Temperature Type) IDF□E/F/D

- Air flow capacity
 - 50 Hz: 0.11 to 11.7 m³/min
 - 60 Hz: 0.13 to 13.2 m³/min
 - Ambient temperature: Max. 40°C
 - Inlet air temperature: Max. 50°C
 - Air flow capacity
 - 50 Hz: 17 to 57 m³/min
 - 60 Hz: 20 to 69 m³/min
 - Air-cooled type/water-cooled type lineup
 - Can be used in high-temperature environments (IDF100F to 150F)
 - Ambient temperature: Max. 45°C
 - Inlet air temperature: Max. 60°C
 - Energy-saving design (IDF100F to 150F)
- The exhaust heat amount has been reduced by 25% to suppress rises in ambient temperature (air-cooled type) and reduce the facility water amount (water-cooled type).



IDF□E

Air-cooled type Water-cooled type
IDF□F

IDF□D

Refrigerated Air Dryer
(High Inlet Air Temperature Type)

IDU□E

- Air flow capacity
 - 50 Hz: 0.34 to 11.7 m³/min
 - 60 Hz: 0.39 to 13.3 m³/min
- Ambient temperature: Max. 40°C
- Inlet air temperature: Max. 80°C



IDU□E

Refrigerated Air Dryer

Double Energy Saving Function Series

IDF100FS/125FS/150FS

- Air flow capacity
 - 50 Hz: 16.7 to 26 m³/min
 - 60 Hz: 19.6 to 28.1 m³/min
 - Can be used in high-temperature environments
 - Ambient temperature: Max. 45°C
 - Inlet air temperature: Max. 60°C
 - ECO switch
- Optimal operation by switching between the energy-saving operation mode and the normal operation mode depending on the season and operating environment



Thermo-dryer with Air Temperature Adjustment Function

IDH□

- Stable supply of temperature and pressure controlled dry clean air
- It is possible to supply compressed air of the same condition and quality regardless of the season.



Membrane Air Dryer

IDG□A/IDG

- Dry air can be easily supplied using the hollow fiber membrane.
- Non-fluorocarbon
- Power supply not required



Moisture Control Tube

IDK

- Prevents condensation in piping for small cylinders/air grippers



Others

Various Valves for Analyzing Reagents and Others

Compact Direct Operated 2/3-Port Solenoid Valve for Chemical Liquids
LVM

p. 158

Low Particle Generation Oil-free Metal-free

* Wetted parts

- Isolated structure
Direct operated rocker type/poppet type
The solenoid drive body is separated from the fluid area by a diaphragm.
- Power consumption (With power-saving circuit): 1.0 W or less (Holding)
- Change in volume (Pumping volume): 0.01 μL or less (Rocker type)

**Pinch Valve**

LPV

- The flow volume of the fluid is controlled by directly clamping the tube so as to open or close it.
- The fluid does not come into contact with the moving parts of the valve, so there is no inflow of contaminants.
- By discarding a tube after use, the need for a washing process is eliminated, thus ensuring good hygiene.
- Tubes can be set or replaced easily.

[Application Examples]

Waste liquid line for the blood analyzer

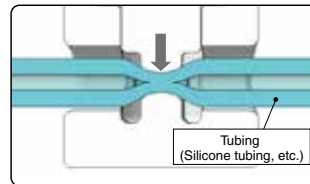
DNA analyzer

Bacteria identification and inspection device

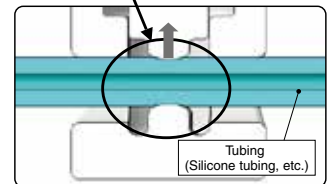
Liquid filling device



There is no clogging due to dead volume or solid matter.



Valve closed



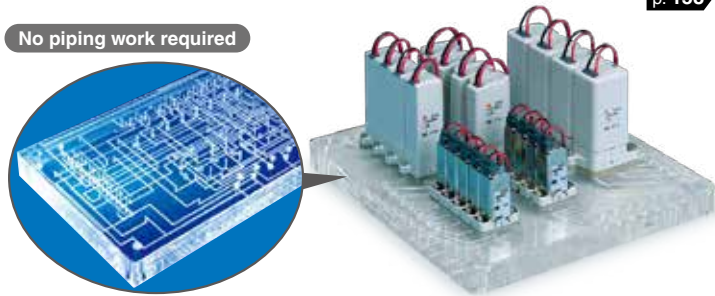
Valve open

Composite Manifold

p. 158

Required space reduced by 50% Weight reduced by 70% No piping work required

- The unitization of devices allows for the whole unit to be made more compact.
- Space saving
- Flow passage style with high flexibility
- Lightweight
- Reduced piping work
- Reduced wiring
- Transparent flow passage (Acrylic)



Directional Control Valves

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Pilot Operated 4/5-Port Solenoid Valves

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Pilot Operated 3-Port Solenoid Valves

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Direct Operated 3-Port Solenoid Valves

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Air Cylinders

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Standard Air Cylinders (Round Type)

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| Air Cylinder/JCM/JCDM | p. 84 |
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| Air Cylinder/CG1/CDG1 | p. 85 |

Standard Air Cylinders (Square Cover)

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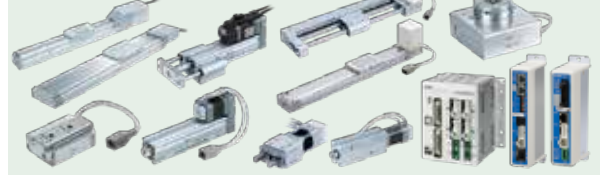
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Directional Control Valves

Pilot Operated 4/5-Port Solenoid Valves

4-Port Solenoid Valve/Cassette Type Manifold **SJ2000/3000**

Rubber seal



- Low-profile cassette type with baseless structure
- Takes up minimal space with a body width of 7.5 mm (SJ2000) or 10 mm (SJ3000)
- The SJ2000 and the SJ3000 can be combined.
- The multi-pin connector makes it easy to add or subtract stations or to exchange valves.
- One side solenoid
- 4-position, dual 3-port specifications are available.
- Manifold type no.: SS5J2, SS5J3

| Series | Flow rate characteristics | | | Applicable cylinder size | Power consumption [W] |
|--------|---------------------------|------|------|--------------------------|---|
| | 4/2 → 3/5 (A/B → E) | | | | |
| | C [dm³/(s·bar)] | b | Cv | | |
| SJ2000 | 0.36 | 0.13 | 0.08 | ø20 | 0.55 (Standard) 0.23 (With power saving circuit) |
| SJ3000 | 0.56 | 0.11 | 0.12 | ø25 | 0.4 (Standard) 0.15 (With power saving circuit) |

5-Port Solenoid Valve/Plug-in Type **SY3000/5000/7000**

Metal seal
Rubber seal



- Due to the flow increase, the valve size can be reduced!
Saves energy and space
- Power consumption: 0.1 W (With power saving circuit)/0.35 W (Standard)
- Service life: 200 million cycles (Metal seal)/70 million cycles (Rubber seal)
- Plug-in sub-plate has been newly added!
- Plug-in metal base (IP40)/Plug-in connector connecting base (IP67)
- Manifold type no.: SS5Y3, SS5Y5, SS5Y7

| Series | Flow rate characteristics | | Applicable cylinder size | Power consumption [W] |
|--------|---------------------------|------|-----------------------------|--|
| | 4/2 → 5/3 (A/B → EA/EB) | | | |
| | C [dm³/(s·bar)] | b | | |
| SY3000 | 1.6 | 0.19 | ø50 | 0.35 (Standard) 0.1 (With power saving circuit) |
| SY5000 | 3.6 | 0.17 | ø63 | |
| SY7000 | 5.9 | 0.20 | ø80 | |

5-Port Solenoid Valve **SY3000/5000/7000/9000**

Rubber seal



- The combined mounting of a 3-port valve and a 5-port valve is possible.
- Power consumption: 0.1 W (With power saving circuit)
- A wide variety of manifold options are available, such as the aluminum body manifold, DIN rail, and stacking type manifold.
- Manifold type no.: SS5Y3, SS5Y5, SS5Y7, SS5Y9

| Series | Flow rate characteristics | | | Applicable cylinder size | Power consumption [W] |
|--------|---------------------------|------|------|--------------------------|--|
| | 4/2 → 5/3 (A/B → EA/EB) | | | | |
| | C [dm³/(s·bar)] | b | Cv | | |
| SY3000 | 1.1 | 0.30 | 0.26 | ø40 | 0.35 (Standard) 0.1 (With power saving circuit) |
| SY5000 | 2.8 | 0.29 | 0.66 | ø63 | |
| SY7000 | 4.5 | 0.27 | 1.1 | ø80 | |
| SY9000 | 10 | 0.29 | 2.5 | ø100 | |
| SY300 | 1.1 | 0.3 | 0.26 | ø40 | |
| SY500 | 2.8 | 0.29 | 0.66 | ø63 | |

5-Port Solenoid Valve/Plug-in Type **S0700**

Rubber seal



- A variety of common wiring methods are available.
- Slim, compact plug-in manifold: Required installation space reduced by 45%*1, Height reduced by 20 mm*1
*1 Compared with plug-in manifold stacking base
- 4-position, dual 3-port valve
- Manifold type no.: SS0751, SS0750

| Series | Flow rate characteristics | | | Applicable cylinder size | Power consumption [W] |
|--------|---------------------------|------|------|-----------------------------|--------------------------|
| | 1 → 4/2 (P → A/B) | | | | |
| | C [dm³/(s·bar)] | b | Cv | | |
| S0700 | 0.39 | 0.39 | 0.11 | ø25 | 0.35 |

Directional Control Valves

Pilot Operated 4/5-Port Solenoid Valves

5-Port Solenoid Valve/Plug Lead Type **S0700**

Rubber seal



- Valve width: 7.4 mm
- Driveable cylinders: Up to $\phi 32$ (Body ported)
- Power consumption: 0.35 W
- Weight: 39 g (Body ported)
- Manifold type no.: SS0752, SS0755

| Series | Flow rate characteristics | | Applicable cylinder size | Power consumption [W] |
|------------------------|---------------------------|------|--------------------------|-----------------------|
| | 1 → 4/2 (P → A/B) | | | |
| | C [dm³/(s·bar)] | Cv | | |
| SS0752 Body ported | 0.62 | 0.18 | ø32 | 0.35 |
| SS0755 Base mounted | 0.39 | 0.11 | ø25 | 0.35 |

5-Port Solenoid Valve **VF1000/3000/5000**

Rubber seal

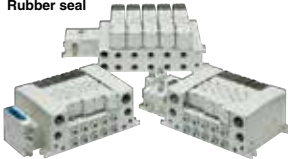


- Built-in full-wave rectifier (AC)
- Built-in strainer in the pilot valve
- Manifold type no.: VV5F1, VV5F3, VV5F5

| Series | Flow rate characteristics | | | Applicable cylinder size | Power consumption [W] |
|--------|---------------------------|------|------|-----------------------------|---|
| | 4/2 → 5/3 (A/B → EA/EB) | | | | |
| | C [dm³/(s·bar)] | b | Cv | | |
| VF1000 | 0.53 | 0.28 | 0.13 | ø40 | 1.55 (Standard) |
| VF3000 | 3.1 | 0.32 | 0.75 | ø80 | 0.55 (With power saving circuit) 0.4 (Low wattage specification) |
| VF5000 | 10.0 | 0.49 | 2.9 | ø125 | 1.55 (Standard) 0.55 (With power saving circuit) |

5-Port Solenoid Valve **VQC4000/5000**

Metal seal
Rubber seal



- Compact with a large flow capacity
VQC4000: Can drive cylinders up to $\phi 160$
VQC5000: Can drive cylinders up to $\phi 180$
- An extensive range of protocols are available.
- Power saving: Power consumption of 0.4 W (Low wattage type)
- Long service life: 100 million cycles (According to SMC life test conditions)
- Enclosure IP67 compliant

| Series | Flow rate characteristics | | | Applicable cylinder size | Power consumption [W] |
|---------|---------------------------|------|-----|-----------------------------|-------------------------------|
| | 4/2 → 5/3 (A/B → EA/EB) | | | | |
| | C [dm³/(s·bar)] | b | Cv | | |
| VQC4000 | 7.3 | 0.38 | 2.0 | ø160 | 1.0 0.4 (Low wattage type) |
| VQC5000 | 17 | 0.31 | 4.7 | ø180 | 1.0 0.4 (Low wattage type) |

Directional Control Valves

Pilot Operated 3-Port Solenoid Valves

3-Port Solenoid Valve/Pilot Operated Poppet Type **VP300/500/700**

Rubber seal



- Built-in full-wave rectifier (AC)
- Longer life expectancy: 50 million cycles or more
- Built-in strainer in the pilot valve
- The external pilot type can be used for vacuum applications.
- Manifold type no.: VV3P3, VV3P5, VV3P7

| Series | Flow rate characteristics | | | Power consumption [W] | For use in vacuum applications |
|--------|---------------------------|------|-----|---|--------------------------------|
| | 2 → 3 (A → P) | | | | |
| | C [dm³/(s·bar)] | b | Cv | | |
| VP300 | 4.2 | 0.23 | 1.0 | 1.55 (Standard) 0.55 (With power saving circuit) | –100 kPa |
| VP500 | 8.9 | 0.20 | 2.1 | 0.4 (Low wattage specification) | –100 kPa |
| VP700 | 15.3 | 0.22 | 3.7 | 1.55 (Standard) 0.55 (With power saving circuit) | –100 kPa |

Direct Operated 3-Port Solenoid Valves

3-Port Solenoid Valve **V100**

Rubber seal



- Power consumption: 0.1 W (With power saving circuit)
- Manifold type no.: VV100-S41

| Series | Type | Flow rate characteristics | | | Power consumption [W] | For use in vacuum applications |
|--------|-----------|---------------------------|------|-------|--|--------------------------------------|
| | | 2 → 3 | | | | |
| | | C [dm³/(s·bar)] | b | Cv | | |
| V100 | Standard | 0.037 | 0.11 | 0.008 | 0.35 (Standard) 0.1 (With power saving circuit) | –100 kPa |
| V100 | High flow | 0.076 | 0.07 | 0.016 | 1 | –100 kPa |

3-Port Solenoid Valve **S070**

Rubber seal



- 7 mm wide compact solenoid valve manifold
- Weight of valve alone: 5 g
- Single unit specifications, base mounted manifolds, and body ported manifolds can be selected.
- Manifold type no.: SS073

| Series | Flow rate characteristics | | | Power consumption [W] | Max. operating pressure |
|--------|------------------------------|------|-------|---------------------------------|-------------------------|
| | C [dm ³ /(s·bar)] | b | Cv | | |
| S070 | 0.042 | 0.27 | 0.011 | 0.5 | 0.5 MPa |
| | 0.060 | 0.28 | 0.016 | 0.5 | 0.3 MPa |
| | 0.042 | 0.27 | 0.011 | 0.35 | 0.3 MPa |
| | 0.060 | 0.28 | 0.016 | 0.35 | 0.1 MPa |
| | 0.021 | 0.27 | 0.006 | 0.1 (With power saving circuit) | 0.3 MPa |
| | 0.042 | 0.28 | 0.011 | 0.1 (With power saving circuit) | 0.1 MPa |

Directional Control Valves

Reduced-wiring Fieldbus System (Serial Transmission System)

Serial Transmission System EX



For Output

*1 The applicable protocols differ depending on the series. For details, refer to the catalog of each series.

| Series | Enclosure | Communication protocol*1 | Applicable valve |
|--------|-----------|--|---|
| EX120 | IP20 | DeviceNet™ CC-Link CompoNet™ | SY3000, 5000, 7000 (Plug-in) VQ1000, 2000 SV1000, 2000, 3000, 4000 |
| EX121 | IP20 | CompoBus/S | SY3000, 5000 |
| EX122 | IP20 | NKE (Wiring saving system) S-LINK V (Made to order) | SY3000, 5000 |
| EX123 | IP65 | NKE (Wiring saving system) | VQ2000, 4000, 5000 |
| EX124 | IP65 | CC-Link CompoBus/S DeviceNet™ (Made to order) | VQ2000, 4000, 5000 |
| EX126 | IP67 | CC-Link | SY3000, 5000, 7000 (Plug-in) SV1000, 2000, 3000 VQC1000, 2000, 4000, 5000 |
| EX140 | IP20 | DeviceNet™ CC-Link CompoBus/S NKE (Wiring saving system) | SZ3000 SQ1000, 2000 |
| EX180 | IP20 | DeviceNet™ CC-Link EtherCAT (Made to order) AnyWireASLINK (Made to order) | SJ2000, 3000 S0700 |

Serial Transmission System EX260



For Output

*1 The applicable protocols differ depending on the series. For details, refer to the catalog of each series.

| Series | Enclosure | Communication protocol*1 | Applicable valve |
|--------|-----------|--|---|
| EX260 | IP67 | DeviceNet™ PROFIBUS DP CC-Link EtherCAT PROFINET EtherNet/IP™ Ethernet POWERLINK | SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000, 5000 SV1000, 2000, 3000 S0700 (IP40) |

Serial Transmission System EX250



For Input/Output

*1 The applicable protocols differ depending on the series. For details, refer to the catalog of each series.

| Series | Enclosure | Communication protocol*1 | Applicable valve |
|--------|-----------|---|---|
| EX250 | IP67 | DeviceNet™ PROFIBUS DP CC-Link AS-Interface CANopen EtherNet/IP™ | SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000, 5000 SV1000, 2000, 3000 S0700 (IP40) |

■ Trademark

- DeviceNet™ is a trademark of ODVA.
- EtherNet/IP™ is a trademark of ODVA.
- CompoNet™ is a trademark of ODVA.
- EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Directional Control Valves

Reduced-wiring Fieldbus System (Serial Transmission System)

Fieldbus System EX245



- For Input/Output
- AIDA specifications compliant*1
- *1 Abbreviation of the Automation Initiative of German (Deutschland) Automobile Manufacturers
- Push Pull connectors
- One-touch installation and removal
- Reduced wiring time
- Modules can be combined flexibly.

| Series | Enclosure | Communication protocol | Applicable valve |
|--------|-----------|---|---|
| EX245 | IP65 | PROFINET INTERBUS (Made to order) PROFIBUS DP (Made to order) | SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000, 5000 SV1000, 2000, 3000 |

Serial Transmission System EX600

For Input/Output



*1 The applicable protocols differ depending on the series. For details, refer to the catalog of each series.

| Series | Enclosure | Communication protocol*1 | Applicable valve |
|--------|-----------|---|---|
| EX600 | IP67 | PROFIBUS DP DeviceNet™ CC-Link EtherNet/IP™ EtherCAT PROFINET Modbus/TCP (Made to order) POWERLINK (Made to order) | SY3000, 5000, 7000 (Plug-in) SV1000, 2000, 3000 VQC1000, 2000, 4000, 5000 S0700 (IP40) |

Serial Transmission System EX500

For Input/Output, Gateway Type



*1 The applicable protocols differ depending on the series. For details, refer to the catalog of each series.

| Series | Enclosure | Communication protocol*1 | Applicable valve |
|--------|-----------|---|---|
| EX500 | IP67 | EtherNet/IP™ PROFINET DeviceNet™ PROFIBUS DP | SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000, 5000 SV1000, 2000, 3000 S0700 (IP40) |

Serial Transmission System EX510

For Input/Output, Gateway Type



*1 The applicable protocols differ depending on the series. For details, refer to the catalog of each series.

| Series | Enclosure | Communication protocol*1 | Applicable valve |
|--------|-----------|--|---|
| EX510 | IP20 | CC-Link DeviceNet™ PROFIBUS DP EtherNet/IP™ (Made to order) PROFINET (Made to order) | SJ2000, 3000 SY3000, 5000, 7000 (Plug-in) SY3000, 5000, 7000, 9000 SYJ3000, 5000, 7000 SQ1000, 2000 SZ3000 VQ1000, 2000 VQZ1000, 2000, 3000 S0700 |

■ Trademark

- DeviceNet™ is a trademark of ODVA.
- EtherNet/IP™ is a trademark of ODVA.
- EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Directional Control Valves

Reduced-wiring Fieldbus System (Serial Transmission System)

Wireless System EX600-W



- Usable even in welding environments
- Noise resistance
- Uses the 2.4 GHz ISM frequency band
- Frequency hopping: Every 5 ms
- High-speed connection: From power supply ON to start of communication: Min. 250 ms
- Communication response (Signal response time): 5 ms
- Communication cables not required
- Number of I/O points: Max. 1280 inputs/1280 outputs (Max. 128 inputs/128 outputs per module)

| Series | Enclosure | Communication protocol | Applicable valve |
|---------|-----------------|--------------------------|---|
| EX600-W | IP67 equivalent | EtherNet/IP™ PROFINET | SY3000, 5000, 7000 (Plug-in) SV1000, 2000, 3000 S0700 (IP40) VQC1000, 2000, 4000, 5000 |

M8/M12 Connector PCA/EX9/EX500



- Communication cable/connector: CC-Link, DeviceNet™, PROFIBUS DP
- Compliant with IEC61076-2-101 and IEC60947-5-2 Standards
- IP67 (IEC60529)
- Field-wireable connectors: No exclusive tools required, Reduction in wiring time
- SPEEDCON: Just insert the connector and make a 1/2 rotation.

■ **Trademark**
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Air Operated Valves

5-Port Air Operated Valve SYA3000/5000/7000



- Can be used with the same manifolds as the SY3000/5000/7000 series non plug-in type.

| Series | Flow rate characteristics | | | Applicable cylinder size |
|---------|---------------------------|------|------|--------------------------|
| | 4/2 → 5/3 (A/B → EA/EB) | | | |
| | C [dm³/(s·bar)] | b | Cv | |
| SYA3000 | 1.1 | 0.30 | 0.26 | ø40 |
| SYA5000 | 2.8 | 0.29 | 0.66 | ø63 |
| SYA7000 | 4.5 | 0.27 | 1.1 | ø80 |

5-Port Air Operated Valve VFA1000/3000/5000



- Can be used with the same manifolds as the VF1000/3000/5000 series.

| Series | Flow rate characteristics | | | Applicable cylinder size |
|---------|---------------------------|------|------|--------------------------|
| | 4/2 → 5/3 (A/B → EA/EB) | | | |
| | C [dm³/(s·bar)] | b | Cv | |
| VFA1000 | 0.53 | 0.28 | 0.13 | ø40 |
| VFA3000 | 3.1 | 0.32 | 0.75 | ø80 |
| VFA5000 | 10.0 | 0.49 | 2.9 | ø125 |

Directional Control Valves

Air Operated Valves

3-Port Air Operated Valve **VPA300/500/700**

Rubber seal



- Can be used with the same manifolds as the VP300/500/700 series internal pilot type.
- Easy conversion to N.C. or N.O.

| Series | Flow rate characteristics | | |
|--------|------------------------------|------|-----|
| | 2 → 3 (A → R) | | |
| | C [dm ³ /(s·bar)] | b | Cv |
| VPA300 | 4.2 | 0.26 | 1.0 |
| VPA500 | 8.9 | 0.20 | 2.1 |
| VPA700 | 15.3 | 0.22 | 3.7 |

Explosion Proof Valves

Explosion-proof 3/5-Port Solenoid Valve **50-VFE/50-VPE**

Rubber seal



- Exd II BT4 (TIIS approved product)
- Waterproof: IP*6 equivalent
- Exhausting equipment for the pilot valve is not required. (Common exhaust type for main and pilot valve [50-VFE3000])
- It is possible to be used in a manifold. (50-VFE)
- Can be used as a selector valve, divider valve, or for vacuum applications (50-VPE)
- Manifold type no.: 50-VV5FE3, 50-VV5FE5

| Series | No. of ports | Effective area mm ² (Cv) | Power consumption [W] |
|------------|--------------|-------------------------------------|-----------------------|
| 50-VFE3000 | 5-port | 18 (1.0) | 3.5 |
| 50-VFE5000 | 5-port | 45 (2.5) | 3.5 |
| 50-VPE500 | 3-port | 41.4 (2.3) | 3.5 |
| 50-VPE700 | 3-port | 72 (4) | 3.5 |

Intrinsically Safe Explosion-proof System 5-Port Solenoid Valve **51-SY5000/7000/9000**

Rubber seal



- Exia II BT4 (TIIS approved product)
- 3 types of connectors are available: L plug connector, L plug connector with a cover, With IP65 compliant cable
- 3 types of barriers are available.
- Manifold type no.: 51-SS5Y5, 51-SS5Y7

| Series | Flow rate characteristics | | | Power consumption [W] |
|-----------|---------------------------|------|------|--------------------------|
| | 4/2 → 5/3 (A/B → EA/EB) | | | |
| | C [dm³/(s·bar)] | b | Cv | |
| 51-SY5000 | 2.8 | 0.29 | 0.66 | 0.52 |
| 51-SY7000 | 4.1 | 0.29 | 1.0 | 0.52 |
| 51-SY9000 | 9.6 | 0.43 | 2.6 | 0.52 |

Air Cylinders

Standard Air Cylinders (Round Type)

Pin Cylinder CJP2/CDJP2/CJP



- Two auto switches can be mounted even on the ø4, 5 st.
- A ø2 One-touch fitting and a speed controller can be connected.
- With auto switch (CDJP2 series: CDJP2)

| Type | Series | Action | Bore size [mm] |
|----------|--------|-----------------------------|----------------|
| Standard | CJP2 | Double acting, Single rod | 4, 6, 10, 16 |
| Standard | CJPB | Single acting (Panel mount) | 4, 6, 10, 15 |
| Standard | CJPS | Single acting (Plug mount) | 4, 6, 10, 15 |

Air Cylinder CJ2/CDJ2



- Double foot and head flange have been added to the available mounting types.
- Easy fine adjustment of auto switch position
- The auto switch mounting type, band, or rail can be selected with the model number.
- Part numbers with a rod end bracket and/or pivot bracket are available.
(It is not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (CDJ2-Z series: CDJ2, CDJ2W, CDJ2K, CDJ2Z, CDJ2ZW, CDJ2RA, CDJ2RK)

| Type | Series | Action | Bore size [mm] |
|-----------------------------------|---------|--------------------------------------|----------------|
| Standard | CJ2-Z | Double acting, Single rod | 6, 10, 16 |
| Standard | CJ2-Z | Single acting (Spring return/extend) | 6, 10, 16 |
| Standard | CJ2W-Z | Double acting, Double rod | 6, 10, 16 |
| Non-rotating rod | CJ2K-Z | Double acting, Single rod | 10, 16 |
| Non-rotating rod | CJ2K-Z | Single acting (Spring return/extend) | 10, 16 |
| Built-in speed controller | CJ2Z-Z | Double acting, Single rod | 10, 16 |
| Built-in speed controller | CJ2ZW-Z | Double acting, Double rod | 10, 16 |
| Direct mount | CJ2RA-Z | Double acting, Single rod | 10, 16 |
| Direct mount | CJ2RA-Z | Single acting (Spring return/extend) | 10, 16 |
| Non-rotating rod/ Direct mount | CJ2RK-Z | Double acting, Single rod | 10, 16 |
| Non-rotating rod/ Direct mount | CJ2RK-Z | Single acting (Spring return/extend) | 10, 16 |
| With end lock | CBJ2 | Double acting, Single rod | 16 |

Air Cylinder JCM/JCDM



- Overall length shortened by up to 97 mm
- Weight reduced by up to 54% (0.69 kg → 0.32 kg)
- Various cover types are available.
- Port sizes: M5, Rc, NPT1/8
- Male and female rod ends are available.
- With auto switch (JCDM series: JCDM)

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------------------|----------------|
| Standard | JCM | Double acting, Single rod | 20, 25, 32, 40 |

Air Cylinders

Standard Air Cylinders (Round Type)

Air Cylinder CM2/CDM2



- Female rod end is available as standard.
- Easy fine adjustment of auto switch position
- Single clevis and trunnion pivot brackets are available.
- Part numbers with a rod end bracket and/or pivot bracket are available.
(It is not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (CDM2-Z series: CDM2, CDM2W, CDM2K, CDM2KW, CDM2R, CDM2RK, CDM2□P, CDBM2)

| Type | Series | Action | Bore size [mm] |
|-----------------------------------|---------|--------------------------------------|----------------|
| Standard | CM2-Z | Double acting, Single rod | 20, 25, 32, 40 |
| Standard | CM2-Z | Single acting (Spring return/extend) | 20, 25, 32, 40 |
| Standard | CM2W-Z | Double acting, Double rod | 20, 25, 32, 40 |
| Non-rotating rod | CM2K-Z | Double acting, Single rod | 20, 25, 32, 40 |
| Non-rotating rod | CM2K-Z | Single acting (Spring return/extend) | 20, 25, 32, 40 |
| Non-rotating rod | CM2KW-Z | Double acting, Double rod | 20, 25, 32, 40 |
| Direct mount | CM2R-Z | Double acting, Single rod | 20, 25, 32, 40 |
| Non-rotating rod/ Direct mount | CM2RK-Z | Double acting, Single rod | 20, 25, 32, 40 |
| Centralized piping | CM2□P | Double acting, Single rod | 20, 25, 32, 40 |
| With end lock | CBM2 | Double acting, Single rod | 20, 25, 32, 40 |
| Low friction | CM2Q | Double acting, Single rod | 20, 25, 32, 40 |

Air Cylinder CG1/CDG1



- Female rod end is available as standard.
- Easy fine adjustment of auto switch position
- No trunnion mounting female thread has been added to the basic type.
- Part numbers with a rod end bracket and/or pivot bracket are available.
(It is not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (CDG1-Z series: CDG1, CDG1W, CDG1K, CDG1KW, CDG1R, CDG1KR, CDBG1)

| Type | Series | Action | Bore size [mm] |
|-----------------------------------|---------|--------------------------------------|---------------------------------|
| Standard | CG1-Z | Double acting, Single rod | 20, 25, 32, 40, 50, 63, 80, 100 |
| Standard | CG1-Z | Single acting (Spring return/extend) | 20, 25, 32, 40 |
| Standard | CG1W-Z | Double acting, Double rod | 20, 25, 32, 40, 50, 63, 80, 100 |
| Non-rotating rod | CG1K-Z | Double acting, Single rod | 20, 25, 32, 40, 50, 63 |
| Non-rotating rod | CG1KW-Z | Double acting, Double rod | 20, 25, 32, 40, 50, 63 |
| Direct mount | CG1R-Z | Double acting, Single rod | 20, 25, 32, 40, 50, 63 |
| Direct mount, Non-rotating rod | CG1KR-Z | Double acting, Single rod | 20, 25, 32, 40, 50, 63 |
| With end lock | CBG1 | Double acting, Single rod | 20, 25, 32, 40, 50, 63, 80, 100 |
| Low friction | CG1□G | Double acting, Single rod | 20, 25, 32, 40, 50, 63, 80, 100 |

Standard Air Cylinders (Square Cover)

Air Cylinder JMB/JMDB



- Intermediary bore sizes: ø45, ø56, ø67, ø85
Air saving, Space saving
- Overall length shortened by 27 mm
- Weight reduced by up to 30% (1.43 kg → 1.00 kg)
- Air saving: Reduced by up to 29%
Air consumption can be reduced by optimal size selection.
- Reduces labor time
Air cushion adjustment is not required due to the non-adjustable air cushion.
- With auto switch (JMDB series: JMDB)

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------------------|---|
| Standard | JMDB | Double acting, Single rod | 32, 40, 45, 50, 56, 63, 67, 80, 85, 100 |

Air Cylinders

Standard Air Cylinders (Square Cover)

Air Cylinder MB/MDB



- Weight has been reduced by changing the shape of the rod cover and head cover. Max. 10% lighter
- Part numbers with a rod end bracket and/or pivot bracket are available.
(It is not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (MDB-Z series: MDB, MDBW, MDBK, MDBKW, MDBB, MDB□Q)

| Type | Series | Action | Bore size [mm] |
|------------------|--------|---------------------------|------------------------------|
| Standard | MB-Z | Double acting, Single rod | 32, 40, 50, 63, 80, 100, 125 |
| Standard | MBW-Z | Double acting, Double rod | 32, 40, 50, 63, 80, 100, 125 |
| Non-rotating rod | MBK-Z | Double acting, Single rod | 32, 40, 50, 63, 80, 100 |
| Non-rotating rod | MBKW-Z | Double acting, Double rod | 32, 40, 50, 63, 80, 100 |
| With end lock | MBB | Double acting, Single rod | 32, 40, 50, 63, 80, 100 |
| Low friction | MB□Q | Double acting, Single rod | 32, 40, 50, 63, 80, 100 |

Air Cylinder MB1/MDB1



- Weight: 10% lighter (ø50-100 stroke)
Weight has been reduced by changing the shape of the rod cover and head cover.
- Small auto switches can be mounted on 4 surfaces.
- Fastener on auto switch mounting groove for dust-prevention (Option)
- With auto switch (MDB1 series: MDB1, MDB1W, MDB1K)

| Type | Series | Action | Bore size [mm] |
|------------------|--------|---------------------------|------------------------------|
| Standard | MB1-Z | Double acting, Single rod | 32, 40, 50, 63, 80, 100, 125 |
| Standard | MB1W-Z | Double acting, Double rod | 32, 40, 50, 63, 80, 100, 125 |
| Non-rotating rod | MB1K-Z | Double acting, Single rod | 32, 40, 50, 63, 80, 100 |

Air Cylinder CA2/CDA2



- Weight reduced by up to 15%
- Easy air cushion control
- Various switches, such as compact auto switches and magnetic field resistant auto switches, can be mounted.
- Part numbers with a rod end bracket and/or pivot bracket are available.
(It is not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (CDA2 series: CDA2, CDA2W, CDA2K, CDA2KW, CDBA2, CDA2□H, CDA2W□H, CDA2□Q)

| Type | Series | Action | Bore size [mm] |
|------------------|--------|---------------------------|---------------------|
| Standard | CA2-Z | Double acting, Single rod | 40, 50, 63, 80, 100 |
| Standard | CA2W-Z | Double acting, Double rod | 40, 50, 63, 80, 100 |
| Non-rotating rod | CA2K | Double acting, Single rod | 40, 50, 63 |
| Non-rotating rod | CA2KW | Double acting, Double rod | 40, 50, 63 |
| With end lock | CBA2 | Double acting, Single rod | 40, 50, 63, 80, 100 |
| Air-hydro | CA2□H | Double acting, Single rod | 40, 50, 63, 80, 100 |
| Air-hydro | CA2W□H | Double acting, Double rod | 40, 50, 63, 80, 100 |
| Low friction | CA2□Q | Double acting, Single rod | 40, 50, 63, 80, 100 |

Air Cylinder CS1/CDS1



- Large bore air cylinder with square cover, tie-rod type
- With auto switch (CDS1 series: CDS1, CDS1W, CDS1□Q)

* The air-hydro type is only available in ø125, ø140, and ø160.

| Type | Series | Action | Bore size [mm] |
|--------------|--------|---------------------------|-----------------------------------|
| Standard | CS1 | Double acting, Single rod | 125, 140, 160, 180, 200, 250, 300 |
| Standard | CS1W | Double acting, Double rod | 125, 140, 160, 180, 200, 250, 300 |
| Low friction | CS1□Q | Double acting, Single rod | 125, 140, 160 |

Air Cylinders

Standard Air Cylinders (Square Cover)

Air Cylinder **CS2/CDS2**



- Weight has been reduced by a maximum of 58% compared to the CS1 series.
- With auto switch (CDS2 series: CDS2)

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------------------|----------------|
| Standard | CS2 | Double acting, Single rod | 125, 140, 160 |
| Standard | CS2W | Double acting, Double rod | 125, 140, 160 |

Compact Air Cylinders

Mini Free Mount Cylinder **CUJ/CDUJ**



- Space saving: Total length reduced by 64% and capacity by 70% (Compared to the CU series)
- With auto switch (CDUJ series: CDUJ)

| Type | Series | Action | Bore size [mm] |
|----------|--------|-------------------------------|-------------------------|
| Standard | CUJ | Double acting, Single rod | 4, 6, 8, 10, 12, 16, 20 |
| Standard | CUJ | Single acting (Spring return) | 4, 6, 8, 10, 12, 16, 20 |

Free Mount Cylinder **CU/CDU**



- Space-saving cylinder that enables the direct mounting of cylinders on multiple sides
- With auto switch (CDU series: CDU, CDUW, CDUK, CDUKW, CDU-A, ZCDUK)

| Type | Series | Action | Bore size [mm] |
|------------------------------|--------|--------------------------------------|-----------------------|
| Standard | CU | Double acting, Single rod | 6, 10, 16, 20, 25, 32 |
| Standard | CU | Single acting (Spring return/extend) | 6, 10, 16, 20, 25, 32 |
| Standard | CUW | Double acting, Double rod | 6, 10, 16, 20, 25, 32 |
| Non-rotating rod | CUK | Double acting, Single rod | 6, 10, 16, 20, 25, 32 |
| Non-rotating rod | CUK | Single acting (Spring return/extend) | 6, 10, 16, 20, 25, 32 |
| Non-rotating rod | CUKW | Double acting, Double rod | 6, 10, 16, 20, 25, 32 |
| Long stroke/Standard | CU | Double acting, Single rod | 6, 10, 16, 20, 25, 32 |
| Long stroke/Non-rotating rod | CUK | Double acting, Single rod | 6, 10, 16, 20, 25, 32 |
| With air cushion | CU-A | Double acting, Single rod | 20, 25, 32 |
| For vacuum | ZCUK | Double acting, Single rod | 10, 16, 20, 25, 32 |

Compact Cylinder/Compact Type **CQS/CDQS**



- With this compact square type cylinder, auto switch mounting on 3 or 4 sides is possible.
This compact cylinder does not protrude from the body when mounting an auto switch.
- Newly added compact type foot brackets and double clevis pivot bracket
- With auto switch (CDQS series: CDQS, CDQSW, CDQSK, CDQSKW, CDQS□S)

| Type | Series | Action | Bore size [mm] |
|-------------------|--------|--------------------------------------|----------------|
| Standard | CQS | Double acting, Single rod | 12, 16, 20, 25 |
| Standard | CQS | Single acting (Spring return/extend) | 12, 16, 20, 25 |
| Standard | CQSW | Double acting, Double rod | 12, 16, 20, 25 |
| Non-rotating rod | CQSK | Double acting, Single rod | 12, 16, 20, 25 |
| Non-rotating rod | CQSKW | Double acting, Double rod | 12, 16, 20, 25 |
| Anti-lateral load | CQS□S | Double acting, Single rod | 12, 16, 20, 25 |

Air Cylinders

Compact Air Cylinders

Compact Cylinder JCQ/JCDQ



- Compact: Overall length shortened by 6.5 mm, Width shortened by 6 mm, Height shortened by 4 mm
- Weight reduced by up to 45% (150 g → 82 g)
- Volume reduced by up to 40%
- With auto switch (JCDQ series: JCDQ)

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------------------|---|
| Standard | JCQ | Double acting, Single rod | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |

Compact Cylinder CQ2/CDQ2



- Space-saving cylinder designed with a compact body
- Small auto switches can be mounted on 4 surfaces. (2 surfaces for ø12 to ø25)
- No projection of the auto switch
- Weight: Reduced by 5 to 13% (Compared with the existing CQ2 series)
- Newly added compact type foot brackets and double clevis pivot bracket
- Part numbers with a rod end bracket and/or mounting bolt are available. (It is not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (CDQ2 series: CDQ2, CDQ2W, CDQ2K, CDQ2KW, CDQP2, CDQ2□S, CDBQ2)

| Type | Series | Action | Bore size [mm] |
|--|---------|--------------------------------------|---|
| Standard | CQ2-Z | Double acting, Single rod | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Standard | CQ2W-Z | Double acting, Double rod | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Standard | CQ2-Z | Single acting (Spring return/extend) | 12, 16, 20, 25, 32, 40, 50 |
| Large bore size | CQ2-Z | Double acting, Single rod | 125, 140, 160, 180, 200 |
| Large bore size | CQ2W-Z | Double acting, Double rod | 125, 140, 160, 180, 200 |
| Long stroke | CQ2-Z | Double acting, Single rod | 32, 40, 50, 63, 80, 100 |
| Non-rotating rod | CQ2K-Z | Double acting, Single rod | 12, 16, 20, 25, 32, 40, 50, 63 |
| Non-rotating rod | CQ2KW-Z | Double acting, Double rod | 12, 16, 20, 25, 32, 40, 50, 63 |
| Axial piping (Centralized piping type) | CQP2 | Double acting, Single rod | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Axial piping (Centralized piping type) | CQP2 | Single acting (Spring return/extend) | 12, 16, 20, 25, 32, 40, 50 |
| Anti-lateral load | CQ2□S-Z | Double acting, Single rod | 32, 40, 50, 63, 80, 100 |
| With end lock | CBQ2 | Double acting, Single rod | 20, 25, 32, 40, 50, 63, 80, 100 |

Environment Resistant Cylinders

Stainless Steel Cylinder CJ5-S/CDJ5-S/CG5-S/CDG5-S



- Applicable for use in an environment with water splashing
- With auto switch (CDJ5-S series: CDJ5-S, CDG5-S series: CDG5-S)

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|---------------------------------|
| Standard | CJ5-S | Double acting | 10, 16 |
| Standard | CG5-S | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |

Stainless Steel Foot Bracket, Flange Bracket, Single Knuckle Joint, Double Knuckle Joint CJ2, CM2, CG1, CQ2



- External dimensions and mounting dimensions are interchangeable with the standard type.
- Post-mounting is possible.
- Bracket applicable cylinders
CJ2, CM2, CG1, CQ2

Air Cylinders

Environment Resistant Cylinders

Stainless Steel: Made to Order

- Parts changed to stainless steel

| Model | Description |
|-------|---|
| -XB12 | External stainless steel cylinder |
| -XC6 | Made of stainless steel |
| -XC7 | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel |
| -XC27 | Double clevis and double knuckle joint pins made of stainless steel |
| -XC65 | Made of stainless steel (Combination of XC7 and XC68) |
| -XC68 | Made of stainless steel (With hard chrome plated piston rod) |

Hygienic Design Cylinder HY□/HYD□



- Improved water resistant air cylinder with an easily washable configuration
- 5 times the lifespan of the improved water resistant cylinder (SMC comparison)
- With auto switch (HYDB series: HYDB, HYDQB series: HYDQB, HYDC series: HYDC, HYDG series: HYDG)

| Type | Series | Action | Bore size [mm] |
|--------------|--------|---------------|---------------------------------|
| Basic | HYB | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Basic | HYQ | Double acting | 20, 25, 32, 40, 50, 63 |
| ISO Standard | HYC | Double acting | 32, 40, 50, 63 |
| With guide | HYG | Double acting | 20, 25, 32, 40, 50, 63 |

Water Resistant Cylinder (Pneumatic/Hydraulic)



- Can be used in environments where contact with water or coolant occurs
- With water resistant 2-color indicator auto switch
- Suitable for factory machinery, food manufacturing machinery, car washers, etc.

| Type | Series | Action | Bore size [mm] |
|--|--------|---------------|---------------------------------|
| Air cylinder | CM2-Z | Double acting | 20, 25, 32, 40 |
| Air cylinder | CG1-Z | Double acting | 32, 40, 50, 63, 80, 100 |
| Air cylinder | MB-Z | Double acting | 32, 40, 50, 63, 80, 100 |
| Square tube type air cylinder | MB1 | Double acting | 32, 40, 50, 63, 80, 100 |
| Compact cylinder | CQ2-Z | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Air cylinder | CA2-Z | Double acting | 40, 50, 63, 80, 100 |
| Compact guide cylinder | MGP-Z | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Guide cylinder | MGG | Double acting | 32, 40, 50, 63, 80, 100 |
| Compact hydraulic cylinder compliant with JIS Standards (10 MPa) | CHKDB | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Hydraulic cylinder compliant with JIS Standards (7 MPa) | CH2F | Double acting | 32, 40, 50, 63, 80, 100 |

Cylinder with Stable Lubrication Function (Lube-retainer)



- Applicable to operation in micro-powder (10 to 100 μm) / general environments
- Durability is 4 times stronger than the standard model in micro-powder environments.
- The overall length and mounting are the same as those of the standard model. (Except for some models)
- Grease film is formed on the piston rod surface to improve durability.
- Prevents the entry of dust and foreign matter
- The number of operating cycles can be improved even in general environments.

| Type | Series | Action | Bore size [mm] |
|------------------------|--------|---------------|---------------------------------|
| Air cylinder | CM2-Z | Double acting | 20, 25, 32, 40 |
| Air cylinder | CG1-Z | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Air cylinder | CA2-Z | Double acting | 40, 50, 63, 80, 100 |
| Compact cylinder | CQS | Double acting | 20, 25 |
| Compact cylinder | CQ2-Z | Double acting | 32, 40, 50, 63, 80, 100 |
| Air slide table | MXQ□A | Double acting | 6, 8, 12, 16, 20, 25 |
| Compact guide cylinder | MGP-Z | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Dual rod cylinder | CXS | Double acting | 6, 8, 12, 16, 20, 25, 32 |

Air Cylinders

Environment Resistant Cylinders

Dust Resistant Cylinder



- Applicable for environments with flying micro-powder such as ceramic powder, toner powder, paper powder, and metallic powder (Excludes weld spatter)
- 4 times stronger than the standard model
- 2 Lube-retainers on the rod cover prevent micro-powder of 30 µm or smaller from entering.
- The Lube-retainers create a coat of grease on the piston rod for improved durability.

| Type | Series | Action | Bore size [mm] |
|------------------------|----------|---------------|---|
| Air cylinder | CM2-XC92 | Double acting | 20, 25, 32, 40 |
| Compact cylinder | CQS-XC92 | Double acting | 12, 16, 20, 25 |
| Compact cylinder | CQ2-XC92 | Double acting | 32, 40, 50, 63, 80, 100 |
| Compact guide cylinder | MGP-XC92 | Double acting | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |

Measures Against Dust: Made to Order -XC4

- Cylinders with a heavy duty scraper on the wiper ring are suitable for use in extremely dusty environments and those where they will be exposed to earth or sand, such as in die-casted equipment, construction machinery, and industrial vehicles.

| Model | Description |
|-------|-------------------------|
| -XC4 | With heavy duty scraper |
| -XC35 | With coil scraper |

Heat Resistant/Cold Resistant: Made to Order -XB6, XB7

- Air cylinder for use in low-temperature and high-temperature environments

| Model | Description |
|-------|--|
| -XB6 | Heat resistant cylinder (–10 to 150°C) |
| -XB7 | Heat resistant cylinder (–40 to 70°C) |
| -XB14 | Cylinder with heat resistant auto switch |
| -XC5 | Heat resistant cylinder (–10 to 110°C) |

Floating Joints

Floating Joint J



- The floating joint can absorb any off-centering or loss of parallel accuracy of the double acting cylinder, making centering unnecessary.

| Type | Series | Applicable cylinder bore size [mm] |
|----------------------------------|-----------------------------|---|
| Lightweight and compact type | JT | 20, 25, 32, 40 |
| Light weight type for light load | JC | 20, 25, 32, 40, 50, 63 |
| Standard | JA, JAF, JAL | 6, 10, 15, 20, 25, 30, 40, 50, 63, 80, 100, 125, 140, 160 |
| Standard | JA-X530, JAF-X530, JAL-X530 | 180, 200 |
| Heavy load | JAH, JAHF, JAHL | 40, 50, 63, 80, 100 |
| For compact cylinders | JB | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160 |
| Stainless steel type | JS | 10, 15, 16, 20, 25, 32, 40, 50, 63 |

Mechanically Jointed Rodless Cylinders

Mechanically Jointed Rodless Cylinder with Protective Cover MY1□W



- Improves dustproof and water resistance with a protective cover, Features a side seal that prevents dust and water from entering from the side

| Type | Series | Action | Bore size [mm] |
|--------------------|--------|---------------|----------------------------|
| Slide bearing | MY1MW | Double acting | 16, 20, 25, 32, 40, 50, 63 |
| Cam follower guide | MY1CW | Double acting | 16, 20, 25, 32, 40, 50, 63 |

Air Cylinders

Magnetically Coupled Rodless Cylinders

Magnetically Coupled Rodless Cylinder **CY3**



- Further improvements have been made on the CY1 series.
- The mounting dimensions are the same as those of the CY1 series.
Upgraded bearing performance and reduced sliding resistance
- NPT thread and G thread are available as standard.

| Type | Series | Action | Bore size [mm] |
|--------------|--------|---------------|-----------------------------------|
| Basic | CY3B | Double acting | 6, 10, 15, 20, 25, 32, 40, 50, 63 |
| Direct mount | CY3R | Double acting | 6, 10, 15, 20, 25, 32, 40, 50, 63 |

Clean Rodless Cylinder **CYP**



- Low particle generation transfer in clean environments

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|----------------|
| Standard | CYP | Double acting | 15, 32 |

Table Cylinders

Compact Slide **MXH**



- Allowable moment improved by up to 240%
- With new high rigidity linear guide
Allowable moment improved
- The weight has been reduced by incorporating a new high rigidity linear guide and piston.
Weight: 19% reduction (ø20-10 stroke)
- Piping is possible in 3 directions.

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|----------------|
| Standard | MXH | Double acting | 6, 10, 16, 20 |

Compact Cylinder with Linear Guide **MXZ**



- Compact: Overall length: 49.5 mm, Width: 30 mm
- The integration of the linear guide and the cylinder allows for reduced design and assembly time.
- Lightweight workpieces such as electronic boards can be stopped, positioned, and clamped.
- Port location selectable
- Auto switch mountable on 3 surfaces

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|----------------|
| Standard | MXZ | Double acting | 12, 16, 20, 25 |

Air Slide Table **MXS**



- Integrated with a worktable in a compact manner
- An air slide table that is ideal for precision assembly work
- High rigidity and high accuracy
- Smooth movement without looseness has been achieved through the adoption of a cross roller guide.
- Compact and lightweight
- Provides twice the output of the existing cylinder through the adoption of the dual rod function

| Type | Series | Action | Bore size [mm] |
|-----------|--------|---------------|----------------------|
| Standard | MXS | Double acting | 6, 8, 12, 16, 20, 25 |
| Symmetric | MXS□L | Double acting | 6, 8, 12, 16, 20, 25 |

Air Cylinders

Table Cylinders

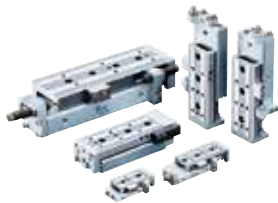
Air Slide Table **MXQ□**



- Height: 10% reduction (27 mm: Existing model 30 mm)
- Product weight: 22% reduction (298 g: Existing model 380 g)
- Allowable kinetic energy: 64% improvement (0.09 J: Existing model 0.055 J)

| Type | Series | Action | Bore size [mm] |
|------------------------------------|--------|---------------|----------------------|
| Double ported type | MXQ□A | Double acting | 6, 8, 12, 16, 20, 25 |
| Low thrust with high rigidity type | MXQ□B | Double acting | 6, 8, 12, 16, 20 |
| Single side ported type | MXQ□C | Double acting | 8, 12 |
| Height interchangeable type | MXQ | Double acting | 6, 8, 12, 16, 20, 25 |

Air Slide Table **MXQ**



- Integrated guide rail and table
- High rigidity and high accuracy has been achieved through the adoption of the recirculating linear guide.

| Type | Series | Action | Bore size [mm] |
|-----------|--------|---------------|----------------------|
| Standard | MXQ | Double acting | 6, 8, 12, 16, 20, 25 |
| Symmetric | MXQ□L | Double acting | 6, 8, 12, 16, 20, 25 |

Air Slide Table/Reversible Type **MXQR**



- Integrated guide rail and table
- High rigidity and high accuracy has been achieved through the adoption of the recirculating linear guide.
- Position of the piping and adjusters can be changed on site according to the installation conditions.
- Features installation compatibility with the MXQ series
- Shock absorber also available for ø6
- Soft type/short stroke type shock absorbers (RJ) can be mounted.

| Type | Series | Action | Bore size [mm] |
|------------|--------|---------------|----------------------|
| Reversible | MXQR | Double acting | 6, 8, 12, 16, 20, 25 |

Low Profile Slide Table **MXF**



- The parallel design of the guide and cylinder creates a slim and compact slide.

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|----------------|
| Standard | MXF | Double acting | 8, 12, 16, 20 |

Air Slide Table **MXW**



- This table unit is compatible with a long stroke using a linear guide.
- Table rigidity is constant throughout the entire stroke.

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|-------------------|
| Standard | MXW | Double acting | 8, 12, 16, 20, 25 |

Air Cylinders

Table Cylinders

Air Slide Table **MXP**



- Cylinder with built-in linear guide, Compact air slide table

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|------------------|
| Standard | MXPJ | Double acting | 6 |
| Standard | MXP | Double acting | 6, 8, 10, 12, 16 |

Air Slide Table/Long Stroke Type **MXY**



- High rigidity and high accuracy, Maximum of 400 strokes

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|----------------|
| Standard | MXY | Double acting | 6, 10, 12 |

Guide Cylinders (MG Series)

Compact Guide Cylinder **JMGP**



- Compact: Overall length shortened by 30.5 mm, Height shortened by 16 mm
- Weight: Max. 69% lighter (0.32 kg → 0.1 kg)
- 3 mounting options: Top mounting, Bottom mounting, Rear mounting
- Piping is possible in 4 directions.
- The solid state auto switch D-M9□ is mountable.
- Suitable for pushing, lifting, or clamping in a transport line.

| Type | Bearing | Series | Action | Bore size [mm] |
|------------|---------------|--------|---------------|---|
| Basic type | Slide bearing | JMGPM | Double acting | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |

Compact Guide Cylinder **MGP**



- Weight reduced by up to 24% with a shorter guide rod and thinner plate.
- The space required between the bottom of the cylinder body and your equipment is reduced because of the shortening of the guide rod by a max. of 22 mm.
- Round type and magnetic field resistant auto switches can be mounted directly without a spacer.
- With flange: MGP□F

| Type | Bearing | Series | Action | Bore size [mm] |
|----------------------|--|---------|---------------|---|
| Basic type | Slide bearing | MGPM-Z | Double acting | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Basic type | Ball bushing | MGPL-Z | Double acting | |
| Basic type | High-precision ball bushing | MGPA-Z | Double acting | |
| With air cushion | Slide bearing | MGPM-AZ | Double acting | 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| | Ball bushing | MGPL-AZ | Double acting | |
| | High-precision ball bushing | MGPA-AZ | Double acting | |
| Water resistant | Slide bearing | MGPMR-Z | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| With end lock | Slide bearing/ Ball bushing bearing | MGP | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Heavy duty guide rod | Slide bearing | MGPS | Double acting | 50, 80 |

Air Cylinders

Guide Cylinders (MG Series)

Compact Guide Cylinder **MGQ**



- Air cylinder with an integrated guide that achieves lateral load resistance and high non-rotating accuracy
- Suitable for stoppers and lifters in the conveyor line

| Type | Bearing | Series | Action | Bore size [mm] |
|----------|----------------------|--------|---------------|---------------------|
| Standard | Slide bearing | MGQM | Double acting | 12, 16, 20, 25, 32, |
| Standard | Ball bushing bearing | MGQL | Double acting | 40, 50, 63, 80, 100 |

Guide Cylinder **MGG**



- Basic cylinder with integrated guide rods in a compact configuration
- A linear transfer unit that achieves lateral load resistance and high non-rotating accuracy

| Type | Bearing | Series | Action | Bore size [mm] |
|---------------|----------------------|--------|---------------|---------------------------------|
| Standard | Slide bearing/ | MGG | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| With end lock | Ball bushing bearing | MGG | Double acting | |

Guide Cylinder/Compact Type **MGC**



- Linear transfer unit with compact guide body and front plate
- Compact, lightweight, and space saving

| Type | Series | Action | Bore size [mm] |
|----------|--------|---------------|--------------------|
| Standard | MGC | Double acting | 20, 25, 32, 40, 50 |

Guide Cylinders (CX Series)

Dual Rod Cylinder **CXSJ**



- Features a more compact body compared to the CXS series dual rod cylinder
- Auto switches can be confirmed from 4 directions.
- Axial piping is also available. (Bore size: 6 and 10)

| Type | Bearing | Series | Action | Bore size [mm] |
|----------|----------------------|--------|---------------|-----------------------|
| Standard | Slide bearing | CXSJM | Double acting | 6, 10, 15, 20, 25, 32 |
| Standard | Ball bushing bearing | CXSJL | Double acting | 6, 10, 15, 20, 25, 32 |

Dual Rod Cylinder **CXS**



- Compact cylinder with a high-precision guide function for pick & place applications

| Type | Bearing | Series | Action | Bore size [mm] |
|------------------|--|--------|---------------|-----------------------|
| Basic type | Slide bearing/ Ball bushing bearing | CXS | Double acting | 6, 10, 15, 20, 25, 32 |
| With air cushion | | CXS | Double acting | 20, 25, 32 |
| With end lock | | CXS | Double acting | 6, 10, 15, 20, 25, 32 |
| Double rod type | | CXSW | Double acting | 6, 10, 15, 20, 25, 32 |

Air Cylinders

Lock Cylinders

Cylinder with Lock CNG/CDNG



- Locking cylinder ideal for intermediate stops, emergency stops, and drop prevention (Bi-directional lock)
- With auto switch (CDNG series: CDNG)

| Type | Series | Action | Bore size [mm] | Lock mechanism |
|----------|--------|---------------------------|----------------|----------------|
| Standard | CNG | Double acting, Single rod | 20, 25, 32, 40 | Spring lock |

Cylinder with Lock CNA2/CDNA2



- Locking cylinder ideal for intermediate stops, emergency stops, and drop prevention (Bi-directional lock)
- Magnetic field resistant 2-color indicator solid state auto switch D-P3DW□ series mountable
- With auto switch (CDNA2 series: CDNA2, CDNA2W)

| Type | Series | Action | Bore size [mm] | Lock mechanism |
|----------|--------|---------------------------|---------------------|----------------|
| Standard | CNA2 | Double acting, Single rod | 40, 50, 63, 80, 100 | Spring lock |
| Standard | CNA2W | Double acting, Double rod | 40, 50, 63, 80, 100 | Spring lock |

Specialty Cylinders

Smooth Cylinder CJ2Y/CM2Y/CG1Y/MBY/CA2Y/CS2Y/CQSY/CQ2Y



- Reduces stick-slip in a low-speed range
- Stable operation is possible even at a low speed of 5 mm/s. (Measurement based on JIS B 8377)
- Low sliding is possible even in bi-directional operations.
- Lightweight/Improved functions (The new structure is equivalent to the standard models.)
- Interchangeable with the standard models
- With auto switch (CJ2Y-Z series: CJ2Y, CDM2Y-Z series: CDM2Y-Z, CDG1Y-Z series: CDG1Y, MDBY-Z series: MDBY, CDA2Y-Z series: CDA2Y, CDS2Y series: CDS2Y, CDQSY series: CDQSY, CDQ2Y-Z series: CDQ2Y)

| Type | Series | Action | Bore size [mm] | Min. operating pressure [MPa] |
|------------------|--------|---------------|-----------------|-------------------------------|
| Air cylinder | CJ2Y-Z | Double acting | 10, 16 | 0.03 |
| Air cylinder | CM2Y-Z | Double acting | 20, 25, 32, 40 | 0.02 |
| Air cylinder | CG1Y-Z | Double acting | 20, 25, 32, 40 | 0.02 |
| Air cylinder | CG1Y-Z | Double acting | 50, 63, 80, 100 | 0.01 |
| Air cylinder | MBY-Z | Double acting | 32, 40 | 0.02 |
| Air cylinder | MBY-Z | Double acting | 50, 63, 80, 100 | 0.01 |
| Air cylinder | CA2Y-Z | Double acting | 40 | 0.02 |
| Air cylinder | CA2Y-Z | Double acting | 50, 63, 80, 100 | 0.01 |
| Air cylinder | CS2Y | Double acting | 125, 140, 160 | 0.005 |
| Compact cylinder | CQSY | Double acting | 12, 16 | 0.03 |
| Compact cylinder | CQSY | Double acting | 20, 25 | 0.02 |
| Compact cylinder | CQ2Y-Z | Double acting | 32, 40 | 0.02 |
| Compact cylinder | CQ2Y-Z | Double acting | 50, 63, 80, 100 | 0.01 |

Air Cylinders

Specialty Cylinders

Low Speed Cylinder **CJ2X/CM2X/CQ2X/CUX**



- Reduces adhesion/quick extension
- Smooth operation is possible even at 0.5 mm/s. (1 mm/s for ø16 or smaller)
- The minimum operating pressure has been reduced by half. (Compared to the previous version)
- Improved functions (The new structure is equivalent to the standard models.)
- Interchangeable with the standard models
- With auto switch (CDJ2X-Z series: CDJ2X-Z, CDM2X-Z series: CDM2X, CDQ2X series: CDQ2X, CDUX series: CDUX)

| Type | Series | Action | Bore size [mm] | Min. piston speed [mm/s] |
|---------------------|---------------|---------------|-------------------------|--------------------------|
| Air cylinder | CJ2X-Z | Double acting | 10, 16 | 1 |
| Air cylinder | CM2X-Z | Double acting | 20, 25, 32, 40 | 0.5 |
| Compact cylinder | CQ2X | Double acting | 12, 16 | 1 |
| Compact cylinder | CQ2X | Double acting | 20, 25 | 0.5 |
| Compact cylinder | CQ2X | Double acting | 32, 40, 50, 63, 80, 100 | 0.5 |
| Free mount cylinder | CUX | Double acting | 10, 16 | 1 |
| Free mount cylinder | CUX | Double acting | 20, 25, 32 | 0.5 |

Low Friction Cylinder/Metal Seal **MQQ/MQM/MQP**



- Covers a range of driving speeds and output controls not possible with standard cylinders thanks to its metal seal structure with minimal sliding resistance

| Type | Series | Bore size [mm] | Operating pressure range [MPa] | Driving speed [mm/s] |
|---------------------------|----------------|------------------------|--------------------------------|----------------------|
| Standard | MQQT | 10, 16, 20, 25, 30, 40 | 0.005 to 0.5 | 0.3 to 300 |
| Anti-lateral load | MQQL | 10, 16, 20, 25, 30, 40 | 0.005 to 0.7 | 0.5 to 500 |
| Anti-lateral load | MQML | 6 | 0.02 to 0.7 | 0.5 to 1000 |
| Anti-lateral load | MQML | 10, 16, 20, 25 | 0.005 to 0.7 | 0.5 to 1000 |
| High speed/High frequency | MQML□□H | 10, 16, 20, 25 | 0.01 to 0.7 | 5 to 3000 |
| Single acting | MQP | 4, 6, 10, 16, 20 | 0.001 to 0.7 | — |

High Power Cylinder **RHC**



- Provides 10 to 20 times the energy absorption capacity of general purpose cylinders (CG1 series)
- Smooth cushioning from high-speed operation (3000 mm/s) with light loads to low/medium-speed operation with heavy loads
- XC93: With greater water resistance + a stable lubrication function 5 times stronger against water (liquids) than the standard model (RHC series)

| Type | Series | Action | Bore size [mm] |
|----------|-----------------|---------------|---------------------------------|
| Standard | RHC | Double acting | 20, 25, 32, 40, 50, 63, 80, 100 |
| Standard | RHC-XC93 | Double acting | 32, 40 |

Valve Mounted Air Cylinders

Valve Mounted Compact Cylinder **CVQ**



- Integrated valve and compact cylinder
- Saves manpower, space, and energy

| Type | Series | Action | Bore size [mm] | Component: Cylinder | Component: Valve |
|----------|------------|---------------|----------------|---------------------|------------------|
| Standard | CVQ | Double acting | 32, 40, 50, 63 | CQ2 | SY3000 |

Air Cylinders/Rotary Actuators

Valve Mounted Air Cylinders

Valve Mounted Air Cylinder **CV□/CDV□**



- Valve is mounted on a round cylinder.
- Built-in speed controller for some models
- A cylinder with a valve makes it easy to adjust the speed.
- With auto switch (CDVJ series: CDVJ5, CDVJ3, CDVM series: CDVM5, CDVM5K, CDVM3, CDVM3K, CDV3 series: CDV3, CDV3K, CDVS1 series: CDVS1, CDVS1K)

| Type | Series | Action | Bore size [mm] | Component: Cylinder | Component: Valve |
|------------------|--------|--------------------------------------|---------------------|---------------------|------------------|
| Standard | CVJ5 | Double acting | 10, 16 | CJ2 | SYJ3190 |
| Standard | CVJ3 | Single acting (Spring return/extend) | 10, 16 | CJ2 | SYJ319 |
| Standard | CVM5 | Double acting | 20, 25, 32, 40 | CM2 | VZ3□90 |
| Standard | CVM3 | Single acting (Spring return/extend) | 20, 25, 32, 40 | CM2 | VZ319 |
| Standard | CV3 | Double acting | 40, 50, 63, 80, 100 | CA2-Z | V3□08 |
| Standard | CVS1 | Double acting | 40, 50, 63, 80, 100 | CA2-Z | VS4□24 |
| Non-rotating rod | CVM5K | Double acting | 20, 25, 32, 40 | CM2K | VZ3□90 |
| Non-rotating rod | CVM3K | Single acting (Spring return/extend) | 20, 25, 32, 40 | CM2K | VZ319 |
| Non-rotating rod | CV3K | Double acting | 40, 50, 63 | CA1K | V3□08 |
| Non-rotating rod | CVS1K | Double acting | 40, 50, 63 | CA1K | VS4□24 |

ISO Cylinders

Hygienic Design Cylinder/ISO Standard Type **HYC**



- Compliant with ISO Standards (VDMA)
- Easily washable configuration, Improved water resistant air cylinder
- 5 times the lifespan of the improved water resistant cylinder (SMC comparison)
- With auto switch (HYDC series: HYDC)

| Type | Series | Action | Bore size [mm] |
|-------------------|--------|---------------|----------------|
| ISO Standard type | HYC | Double acting | 32, 40, 50, 63 |

Rotary Actuators/Vane Type

Rotary Actuator **CRB2/CDRB2**



- It is possible to move the auto switch mounting position as desired.
- Direct mounting
- Connection port position: Select from side ported or axial ported (When a switch and angle adjuster are installed, only the side ported is selectable.)
- Low-pressure operation: 0.2 MPa (Size 10), 0.15 MPa (Sizes 15 to 40)
- It is possible to adjust the angle as desired.
- With auto switch (CDRB2 series: CDRB2□W, CDRB2□WU)

| Type | Series | Vane type | Size | Rotating angle Single | Rotating angle Double |
|---------------------|---------|-----------|-------------|-----------------------|-----------------------|
| Standard | CRB2 | Single | 10, 15, 20, | 90°, 180°, 270° | 90°, 100° |
| With angle adjuster | CRB2□WU | Double | 30, 40 | 90°, 180°, 270° | 90°, 100° |

Rotary Actuators

Rotary Actuators/Rack & Pinion Type

Mini Rotary Actuator **CRJ**



- Compact, lightweight
- Flexible mounting: Top, bottom, or side mounting is possible.
- Front or side ported is selectable.

| Series | Rack type | Size | Rotating angle Basic type | Rotating angle With external stopper |
|--------|-----------|-------|------------------------------|---|
| CRJ | Single | 05, 1 | 90°, 100°, 180°, 190° | 90°, 180° |

Rotary Actuator **CRA1/CDRA1**



- Compact auto switches (D-M9□ type) are mountable on 2 surfaces. Auto switch can be mounted from the front.
- Weight reduced by up to 14%
- With air cushion, Easy adjustment of cushion valve
- With auto switch (CRA1 series: CDRA1, CDRA1□□U, CDVRA1)

| Type | Series | Rack type | Size | Rotating angle |
|---------------------|---------|-----------|---------------------|---|
| Standard | CRA1 | Single | 30, 50, 63, 80, 100 | 30: 90°, 180° 50 to 100: 90°, 100°, 180°, 190° |
| Angle adjustable | CRA1□□U | Single | 50, 63, 80, 100 | 90°, 100°, 180°, 190° |
| With solenoid valve | CVRA1 | Single | 50, 63, 80, 100 | 90°, 100°, 180°, 190° |

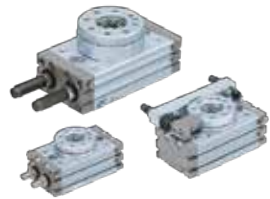
Compact Rotary Actuator **CRQ2/CDRQ2**



- With cushion
- Equipped with an angle adjustment mechanism
- Single or double axis is selectable.
- With auto switch (CDRQ2 series: CDRQ2)

| Series | Rack type | Size | Rotating angle |
|--------|-----------|--------------------|-----------------|
| CRQ2 | Double | 10, 15, 20, 30, 40 | 90°, 180°, 360° |

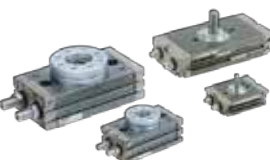
Rotary Table **MSQ**



- Integrated table and rotary actuator
- Equipped with an angle adjustment mechanism
- Easy alignment when mounting the load and the body
- Built-in shock absorber type and external absorber type are selectable.

| Type | Series | Rack type | Size | Rotating angle |
|------------------------|--------|-----------|--|----------------|
| High precision type | MSQA | Double | 1, 2, 3, 7, 10, 20, 30, 50 | 0 to 190° |
| Basic type | MSQB | Double | 1, 2, 3, 7, 10, 20, 30, 50, 70, 100, 200 | 0 to 190° |
| With external absorber | MSQ□□L | Double | 10, 20, 30, 50 | 90°, 180° |
| With external absorber | MSQ□□H | Double | 10, 20, 30, 50 | 90°, 180° |

Low Speed Rotary Actuator **CRQ2X/CDRQ2X/MSQX**



- It is possible to transfer workpieces at lower speeds. (5 s/90°)
- With auto switch (CDRQ2X series: CDRQ2X)

| Series | Rack type | Size | Rotating angle |
|--------|-----------|--------------------|---------------------------|
| CRQ2X | Double | 10, 15, 20, 30, 40 | 80° to 100°, 170° to 190° |
| MSQX | Double | 10, 20, 30, 50 | 0° to 190° |

Air Grippers

Parallel Type Air Grippers

Linear Guide Parallel Type Air Gripper **MHZ□2**



- The linear guide improves rigidity and accuracy.
- Dustproof and drip proof construction
- Dust cover material is selectable.

| Type | Series | Cylinder bore size [mm] |
|------------------------------|----------|---------------------------|
| Compact | MHZA2-6 | 6 |
| Compact, with dust cover | MHZAJ2-6 | 6 |
| Standard | MHZ2 | 6, 10, 16, 20, 25, 32, 40 |
| Long stroke | MHZL2 | 10, 16, 20, 25 |
| Long stroke, with dust cover | MHZL2 | 10, 16, 20 |
| With dust cover | MHZJ2 | 6, 10, 16, 20, 25, 32, 40 |

Low Profile Air Gripper **MHF2**



- Reduced height of approx. 1/3 of that of the standard gripper
- Low profile design that reduces moment generation
- Short, middle, and long strokes are available.
- Compact, but the double piston mechanism provides it with a strong gripping force.

| Series | Cylinder bore size [mm] |
|--------|-------------------------|
| MHF2 | 8, 12, 16, 20 |

Wide Type Parallel Style Air Gripper **MHL2**



- Lightweight: Max. 10% lighter: 585 g → 525 g
Weight reduced by changing the body shape and internal construction
- Built-in dust protection mechanism (Standard)
Dust-resistant option (Made to order: -X85, -X86□)
- Long stroke: One unit can handle workpieces of various diameters.
- A large amount of gripping force is provided, through the use of a double piston mechanism, while maintaining a compact design.
- Small auto switches can be directly mounted.

| Series | Bore size [mm] |
|--------|----------------|
| MHL2-Z | 10, 16, 20, 25 |

Wide Type Air Gripper **MHL2**



- Long strokes
- Ideal for holding large-size workpieces that have dimensional variances
- The double pistons provide a large amount of gripping force.
- Built-in dust protection mechanism

| Series | Cylinder bore size [mm] |
|--------|-------------------------|
| MHL2 | 10, 16, 20, 25, 32, 40 |

Wedge Cam Operation Slide Guide Air Gripper **MHK2**



- Wedge shaped cam driving mechanism
- High rigidity with a slide type guide
- A dustproof, drip proof, external force resistant, and environmental resistant type that can be used for a variety of applications
- To suit the environment, a selection of dust cover materials (chloroprene rubber, fluororubber, silicone rubber) and stainless steel (SUS304) fingers are available.
- Long stroke option is selectable.

| Series | Cylinder bore size [mm] |
|--------|-------------------------|
| MHK2 | 12, 16, 20, 25 |
| MHKL2 | 12, 16, 20, 25 |

Air Grippers

Parallel Type Air Grippers

Slide Guide Round Body Air Gripper 2-Finger Type **MHS2**



- Vertically compact and lightweight due to the wedge shaped cam construction
- Ideal for operations in which external force is applied, such as press fitting operations
- Repeatability: ± 0.01 mm

| Series | Cylinder bore size [mm] |
|--------|----------------------------|
| MHS2 | 16, 20, 25, 32, 40, 50, 63 |

Slide Guide Round Body Air Gripper 3-Finger Type **MHS3**



- Vertically compact and lightweight due to the wedge shaped cam construction
- Ideal for operations in which external force is applied, such as press fitting operations
- Repeatability: ± 0.01 mm
- Long stroke type: Strokes 2 times longer than the standard type
- Gripping of cylindrical workpieces
- Reliable removal of the workpiece with through-holes and a center pusher

| Type | Series | Cylinder bore size [mm] |
|--------------------------------|----------|--|
| Double acting | MHS3 | 16, 20, 25, 32, 40, 50, 63, 80, 100, 125 |
| Single acting | MHS3-X84 | 16, 20, 25, 32, 40, 50, 63 |
| With dust cover | MHSJ3 | 16, 20, 25, 32, 40, 50, 63, 80 |
| Through-hole | MHSH3 | 16, 20, 25, 32, 40, 50, 63, 80 |
| With dust cover + Through-hole | MHSHJ | 16, 20, 25, 32, 40, 50, 63, 80 |
| Long stroke | MHSL3 | 16, 20, 25, 32, 40, 50, 63, 80, 100, 125 |

Slide Guide Round Body Air Gripper 4-Finger Type **MHS4**



- Vertically compact due to its wedge shaped cam construction
- Optimally holds rectangular workpieces for positioning operations
- Repeatability: ± 0.01 mm
- Positioning of rectangular workpieces

| Series | Cylinder bore size [mm] |
|--------|----------------------------|
| MHS4 | 16, 20, 25, 32, 40, 50, 63 |

Environment Resistant: Made to Order

- Seal material and grease have been changed so that the product can be used at temperatures between -10 up to 100°C .
- Dustproof and dripproof (-X77, -X78)
- Anti-corrosive measures (-X81)

| Model | Description |
|--------------|--|
| -X4 | Heat resistant (-10 to 100°C) |
| -X77A, -X77B | Dust cover adhesion (Powerful adhesive used) |
| -X78A, -X78B | Dust cover caulking (Silicone caulking agent used) |
| -X81A, -X81B | Anti-corrosive treatment of finger |

Angular Type Air Grippers

Angular Type Air Gripper/Compact Type **MHC2**



- MHC2-6: Auto switch mountable
- MHCA2-6: Short body
- MHCM2-7: Compact, lightweight

| Series | Cylinder bore size [mm] |
|---------|-------------------------|
| MHC2-6 | 6 |
| MHCA2-6 | 6 |
| MHCM2-7 | 7 |

Air Grippers

Angular Type Air Grippers

Angular Type Air Gripper/Standard Type **MHC2**



- A large holding moment is achieved through a double piston construction.
- Integral variable throttle

| Series | Cylinder bore size [mm] |
|--------|-------------------------|
| MHC2 | 10, 16, 20, 25 |

180° Angular Type Air Gripper/Cam Type **MHY2**



- Lightweight and compact through the use of a cam mechanism

| Series | Cylinder bore size [mm] |
|--------|-------------------------|
| MHY2 | 10, 16, 20, 25 |

180° Angular Type Air Gripper/Rack & Pinion Type **MHW2**



- Features a unique seal construction with a shortened overall length and dust proofing countermeasures that allow it to be used for removing workpieces from machine tools or for holding workpieces

| Series | Cylinder bore size [mm] |
|--------|-------------------------|
| MHW2 | 20, 25, 32, 40, 50 |

Environment Resistant: Made to Order

- Seal material and grease have been changed so that the product can be used at temperatures between -10 up to 100°C.
- Anti-corrosive measures (-X81)

| Model | Description |
|--------------|------------------------------------|
| -X4 | Heat resistant (-10 to 100°C) |
| -X81A, -X81B | Anti-corrosive treatment of finger |

Electric Actuators

Card Motor

Card Motor LAT3



- The transportation, pushing, and length measurement systems have been miniaturized through the use of a linear motor.
- Thickness 9 mm, Weight 130 g (At a stroke of 10 mm)
- Max. pushing force: 6 N
- Positioning repeatability: $\pm 5 \mu\text{m}$
- Pushing measurement accuracy: $\pm 10 \mu\text{m}$
- Max. operating frequency: 500 cpm

| Model | Stroke [mm] | Sensor (Optical linear encoder) Resolution | Pushing Max. instantaneous thrust | Positioning repeatability | Pushing measurement accuracy | Max. speed |
|-------|----------------|--|-----------------------------------|---------------------------|------------------------------|------------|
| LAT3F | 10, 20, 30, 50 | 1.25 μm | Up to 6 N | $\pm 5 \mu\text{m}$ | $\pm 10 \mu\text{m}$ | 400 mm/s |
| LAT3M | 50 | 5 μm | Up to 6 N | $\pm 20 \mu\text{m}$ | $\pm 40 \mu\text{m}$ | 400 mm/s |
| LAT3 | 10, 20, 30 | 30 μm | Up to 6 N | $\pm 90 \mu\text{m}$ | $\pm 100 \mu\text{m}$ | 400 mm/s |

Card Motor Controller LATCA



- Easy programming (Cycle time entry)
Just input 3 parameters: Positioning time, Target position, Load mass

| Type | Series | Power supply voltage | Parallel I/O | |
|---|--------|----------------------|----------------------------------|---|
| | | | Input | Output |
| Step data input type/ Pulse input type | LATCA | 24 VDC $\pm 10\%$ | 6 inputs (Optically isolated) | 4 outputs (Optically isolated, open collector output) |

Slider Type

Electric Actuator/Slider Type, Ball Screw Drive LEFS

Motorless Type

Clean Room Specification



LEFS Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Max. work load: 65 kg
- Positioning repeatability: $\pm 0.015 \text{ mm}$ (High precision type)
- Clean specification: Complies with ISO Class 4 (ISO14644-1) (11-LEFS)

LEFS Series AC Servo Motor

- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration/deceleration (20,000 mm/s^2)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: $\pm 0.01 \text{ mm}$ (High precision type)
- Clean specification: Complies with ISO Class 4 (ISO14644-1) (11-LEFS)
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Speed [mm/s] | Screw lead [mm] |
|-----------------------------------|---------|-------------|------------------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LEFS16 | 50 to 500 | Max. 15 | Max. 700 | 5, 10 |
| | LEFS25 | 50 to 800 | Max. 30 | Max. 1100 | 6, 12, 20 |
| | LEFS32 | 50 to 1000 | Max. 50 | Max. 1200 | 8, 16, 24 |
| | LEFS40 | 150 to 1200 | Max. 65 | Max. 1200 | 10, 20, 30 |
| Servo motor (24 VDC) | LEFS16A | 50 to 500 | Max. 10 | Max. 500 | 5, 10 |
| | LEFS25A | 50 to 800 | Max. 18 | Max. 800 | 6, 12, 20 |
| AC servo motor (100/200/400 W) | LEFS25S | 50 to 800 | Max. 20 | Max. 1500 | 6, 12, 20 |
| | LEFS32S | 50 to 1000 | Max. 45 | Max. 1500 | 8, 16, 24 |
| | LEFS40S | 150 to 1200 | Max. 60 | Max. 1500 | 10, 20, 30 |

Electric Actuators

Slider Type

Electric Actuator/Slider Type, Belt Drive **LEFB**

Motorless Type



LEFB Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

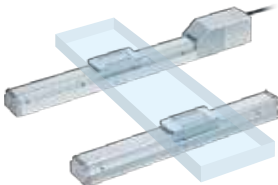
- Max. stroke: 2000 mm
- Max. speed: 2000 mm/s
- Positioning repeatability: ± 0.08 mm

LEFB Series AC Servo Motor

- Max. speed: 2000 mm/s
- Max. stroke: 3000 mm
- Max. acceleration/deceleration: 20000 mm/s²
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.06 mm
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Speed [mm/s] | Equivalent lead [mm] |
|---------------------------|---------|-------------|------------------------------|--------------|----------------------|
| Step motor (Servo/24 VDC) | LEFB16 | 300 to 1000 | 1 | 48 to 1100 | 48 |
| | LEFB25 | 300 to 2000 | 10 | 48 to 1400 | 48 |
| | LEFB32 | 300 to 2000 | 19 | 48 to 1500 | 48 |
| Servo motor (24 VDC) | LEFB16A | 300 to 1000 | 1 | 5 to 2000 | 48 |
| | LEFB25A | 300 to 2000 | 2 | 5 to 2000 | 48 |
| AC servo motor | LEFB25S | 300 to 2000 | 5 | Max. 2000 | 54 |
| | LEFB32S | 300 to 2500 | 15 | Max. 2000 | 54 |
| | LEFB40S | 300 to 3000 | 25 | Max. 2000 | 54 |

Electric Actuator/LEF Series Support Guide **LEFG**



- A support guide that is designed to support workpieces with significant overhang
- Easy installation with the same outer dimensions as the LEF series body, Contributes to the reduction of design and assembly labor
- The standardly equipped sealing band prevents the scattering of grease and the entry of foreign matter from outside.

| Drive method | Model | Stroke [mm] |
|--------------------|-----------|-------------|
| Ball screw drive/S | LEFG16-S | 50 to 500 |
| Ball screw drive/S | LEFG25-S | 50 to 800 |
| Ball screw drive/S | LEFG32-S | 50 to 1000 |
| Ball screw drive/S | LEFG40-S | 150 to 1200 |
| Belt drive/BT | LEFG16-BT | 300 to 1000 |
| Belt drive/BT | LEFG25-BT | 300 to 2000 |
| Belt drive/BT | LEFG32-BT | 300 to 2000 |
| Belt drive/BS | LEFG25-BS | 300 to 2000 |
| Belt drive/BS | LEFG32-BS | 300 to 2500 |
| Belt drive/BS | LEFG40-BS | 300 to 3000 |

Electric Actuator/High Rigidity Slider Type, Ball Screw Drive **LEJS**

Motorless Type

Clean Room Specification



- Low profile/Low center of gravity: Height reduced by approx. 36% (Reduced by 32 mm)
- Max. work load: 85 kg
- Positioning repeatability: ± 0.02 mm
- Max. acceleration/deceleration: 20000 mm/s²
- Clean specification: Complies with ISO Class 4 (Class 10) (11-LEJS)
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Speed [mm/s] | Screw lead [mm] |
|----------------|--------|-------------|------------------------------|--------------|-----------------|
| AC servo motor | LEJS40 | 200 to 1200 | Max. 55 | Max. 1800 | 8, 16, 24 |
| | LEJS63 | 300 to 1500 | Max. 85 | Max. 1800 | 10, 20, 30 |

Electric Actuators

Slider Type

Electric Actuator/High Rigidity Slider Type, Belt Drive **LEJB**



- Max. stroke: 3000 mm
- Max. speed: 3000 mm/s
- Max. acceleration/deceleration: 20000 mm/s²
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Speed [mm/s] | Screw lead [mm] |
|----------------|--------|-------------|------------------------------|--------------|-----------------|
| AC servo motor | LEJB40 | 200 to 2000 | Max. 20 | Max. 2000 | 27 |
| | LEJB63 | 300 to 3000 | Max. 30 | Max. 3000 | 42 |

Electric Actuator/Compact Slider Type **LEM**



- Low-profile, Low center of gravity
Table height: 28 mm
(In the case of LEMC/H/HT, size 25)
- Can be combined with various guides
- High maintainability
- Motor mounting position: Select from above or below, right or left
- Solid state auto switches can be mounted for limit confirmation and intermediate signal confirmation.
- Selectable controllability (Controller)
Complete control like an air cylinder (Allows for a 12 point intermediate stop)
Easy position setting by value input

| Guide type | Model | Stroke [mm] | Work load [kg] | Speed [mm/s] | Equivalent lead [mm] |
|----------------------------|-------|-------------|----------------|--------------|----------------------|
| Basic | LEMB | 50 to 2000 | 6, 11 | Max. 1000 | 48 |
| Cam follower guide | LEMC | 50 to 2000 | 10, 20 | Max. 1000 | 48 |
| Linear guide (Single axis) | LEMH | 50 to 1500 | 10, 20 | Max. 2000 | 48 |
| Linear guide (Double axis) | LEMHT | 100 to 1500 | 10, 20 | Max. 2000 | 48 |

Electric Actuator/Guide Rod Slider, Belt Drive **LEL**



- Low profile/Flat: Height 48 mm
- Profile reduced by the side mounting of the motor.
No interference with the motor, even with large workpieces.
- Auto switch mountable (Made to order)
- Max. stroke: 1000 mm
- Transfer speed: 1000 mm/s
- Positioning repeatability: ±0.1 mm

| Specification | Model | Bearing | Stroke [mm] | Work load [kg] | Speed [mm/s] |
|------------------------------|--------|----------------------|-------------|----------------|--------------|
| Step motor (Servo/24 VDC) | LEL25M | Sliding bearing | 100 to 1000 | 3 | Max. 500 |
| | LEL25L | Ball bushing bearing | 100 to 1000 | 5 | Max. 1000 |

Electric Actuators

Rod Type/Guide Rod Type

Electric Actuator/Rod Type, Motor Top/Parallel Type **LEY**

Motorless Type

Dust-tight/Water-jet-proof



LEY Series

Step Motor (Servo/24 VDC)

Servo Motor (24 VDC)

- Long stroke: Max. 500 mm
- Direct mounting: 3 directions
Bracket mounting: 3 types
- Auto switch can be mounted.
- Speed control/Positioning: Max. 64 points
- Either positioning or pushing control can be selected.
- It is possible to hold the actuator with the rod pushing on a workpiece, etc.
- Positioning repeatability: ± 0.02 mm or less
- Dust-tight/Water-jet-proof (IP65)

LEY Series

AC Servo Motor

- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration compatible (5000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.02 mm or less
- Dust-tight/Water-jet-proof (IP65 equivalent)
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|---------------------------|---------|-------------|-------------------|--------------|---------------------|
| Step motor (Servo/24 VDC) | LEY16 | 30 to 300 | Max. 141 | Max. 500 | 2.5, 5, 10 |
| | LEY25 | 30 to 400 | Max. 452 | Max. 500 | 3, 6, 12 |
| | LEY32 | 30 to 500 | Max. 707 | Max. 500 | 4, 8, 16 |
| | LEY40 | 30 to 500 | Max. 1058 | Max. 300 | 4, 8, 16 |
| Servo motor (24 VDC) | LEY16A | 30 to 300 | Max. 111 | Max. 500 | 2.5, 5, 10 |
| | LEY25A | 30 to 400 | Max. 130 | Max. 500 | 3, 6, 12 |
| AC servo motor | LEY25□S | 30 to 400 | Max. 485 | Max. 900 | 3, 6, 12 |
| | LEY32□S | 30 to 500 | Max. 588 | Max. 1200 | 5, 10, 20 |
| | LEY63□S | 100 to 800 | Max. 3343 | Max. 1000 | 5 (2.86), 5, 10, 20 |

Electric Actuator/Rod Type, In-line Motor Type **LEY□D**

Motorless Type

Dust-tight/Water-jet-proof



LEY Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Long stroke: Max. 500 mm
- Direct mounting: 3 directions, Bracket mounting: 3 types
- Auto switch can be mounted.
- Speed control/Positioning: Max. 64 points
- Either positioning or pushing control can be selected.
- It is possible to hold the actuator with the rod pushing on a workpiece, etc.
- Positioning repeatability: ± 0.02 mm or less

LEY Series AC Servo Motor

- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration/deceleration compatible (5000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.02 mm or less
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|---------------------------|---------|-------------|-------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LEY16D | 30 to 300 | Max. 141 | Max. 500 | 2.5, 5, 10 |
| | LEY25D | 30 to 300 | Max. 141 | Max. 500 | 2.5, 5, 10 |
| | LEY32D | 30 to 500 | Max. 707 | Max. 500 | 4, 8, 16 |
| | LEY40D | 30 to 500 | Max. 1058 | Max. 300 | 4, 8, 16 |
| Servo motor (24 VDC) | LEY16DA | 50 to 300 | Max. 111 | Max. 500 | 2.5, 5, 10 |
| | LEY25DA | 50 to 400 | Max. 130 | Max. 500 | 3, 6, 12 |
| AC servo motor | LEY25DS | 30 to 400 | Max. 485 | Max. 900 | 3, 6, 12 |
| | LEY32DS | 30 to 500 | Max. 736 | Max. 1000 | 4, 8, 16 |
| | LEY63DS | 100 to 800 | Max. 1910 | Max. 1000 | 5, 10, 20 |

Electric Actuators

Rod Type/Guide Rod Type

Electric Actuator/Guide Rod Type, Motor Top Mounting Type **LEYG**

Motorless Type



LEYG Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Compact integration of guide rods
- Achieves lateral load resistance and high non-rotating accuracy
- Lateral end load: 5 times more (Compared with a rod type, size 25, 100 stroke)
- Compatible with sliding bearings and ball bushing bearings
- Compatible with moment load and stopper (sliding bearings)
- Speed control/Positioning: Max. 64 points
- Either positioning or pushing control can be selected.
- It is possible to hold the actuator with the rod pushing on a workpiece, etc.
- Positioning repeatability: ± 0.02 mm or less

LEY Series AC Servo Motor

- High output motor (100/200 W)
- Improved high speed transfer ability
- High acceleration/deceleration compatible (5000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|---------------------------|----------|-------------|-------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LEYG16 | 30 to 200 | Max. 141 | Max. 500 | 2.5, 5, 10 |
| | LEYG25 | 30 to 300 | Max. 452 | Max. 500 | 3, 6, 12 |
| | LEYG32 | 30 to 300 | Max. 707 | Max. 500 | 4, 8, 16 |
| | LEYG40 | 30 to 300 | Max. 1058 | Max. 300 | 4, 8, 16 |
| Servo motor (24 VDC) | LEYG16A | 30 to 200 | Max. 111 | Max. 500 | 2.5, 5, 10 |
| | LEYG25A | 30 to 300 | Max. 130 | Max. 500 | 3, 6, 12 |
| AC servo motor | LEYG25□S | 30 to 300 | Max. 485 | Max. 900 | 3, 6, 12 |
| | LEYG32□S | 30 to 300 | Max. 588 | Max. 1200 | 5, 10, 20 |

Electric Actuator/Guide Rod Type, In-line Motor Type

LEYG□D

Motorless Type



LEYG Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Compact integration of guide rods
- Achieves lateral load resistance and high non-rotating accuracy
- Lateral end load: 5 times more (Compared with a rod type, size 25, 100 stroke)
- Compatible with sliding bearings and ball bushing bearings
- Compatible with moment load and stopper (sliding bearings)
- Speed control/Positioning: Max. 64 points
- Either positioning or pushing control can be selected.
- It is possible to hold the actuator with the rod pushing on a workpiece, etc.
- Positioning repeatability: ± 0.02 mm or less

LEY Series AC Servo Motor

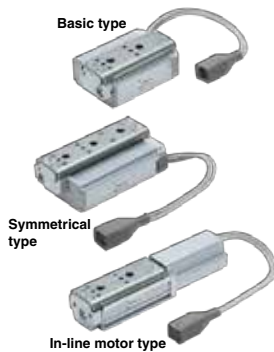
- High output motor (100/200 W)
- Improved high speed transfer ability
- High acceleration/deceleration compatible (5000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Compatible drivers: LECSS-T, LECY□
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|---------------------------|----------|-------------|-------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LEYG16D | 30 to 200 | Max. 141 | Max. 500 | 2.5, 5, 10 |
| | LEYG25D | 30 to 200 | Max. 452 | Max. 500 | 3, 6, 12 |
| | LEYG32D | 30 to 200 | Max. 707 | Max. 500 | 4, 8, 16 |
| | LEYG40D | 30 to 200 | Max. 1058 | Max. 300 | 4, 8, 16 |
| Servo motor (24 VDC) | LEYG16DA | 30 to 200 | Max. 111 | Max. 500 | 2.5, 5, 10 |
| | LEYG25DA | 30 to 300 | Max. 130 | Max. 500 | 3, 6, 12 |
| AC servo motor | LEYG25DS | 30 to 300 | Max. 485 | Max. 900 | 3, 6, 12 |
| | LEYG32DS | 30 to 300 | Max. 736 | Max. 1000 | 4, 8, 16 |

Electric Actuators

Slide Tables

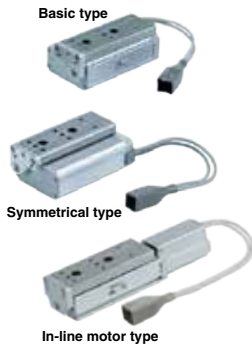
Electric Slide Table/Compact Type **LES**



- Compact: Workpiece mounting surface height reduced by up to 12% compared with the LESH
 - Vertical work load: Increased by up to 50%
 - Lightweight: Reduced by up to 29%
 - Max. pushing force: 180 N
 - Positioning repeatability: ± 0.05 mm
 - Cycle time can be reduced.
- Max. acceleration/deceleration: 5,000 mm/s²
Max. speed: 400 mm/s

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Work load [kg] Vertical | Speed [mm/s] | Screw lead [mm] |
|------------------------------|---------|---------------------------|------------------------------|----------------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LES8□ | 30, 50, 75 | Max. 1 | Max. 0.5 | Max. 400 | 4, 8 |
| | LES16□ | 30, 50, 75, 100 | Max. 3 | Max. 3 | Max. 400 | 5, 10 |
| | LES25□ | 30, 50, 75, 100, 125, 150 | Max. 5 | Max. 5 | Max. 400 | 8, 16 |
| Servo motor (24 VDC) | LES8□A | 30, 50, 75 | Max. 1 | Max. 1 | Max. 400 | 4, 8 |
| | LES16□A | 30, 50, 75, 100 | Max. 3 | Max. 3 | Max. 400 | 5, 10 |
| | LES25□A | 30, 50, 75, 100, 125, 150 | Max. 5 | Max. 4 | Max. 400 | 8, 16 |

Electric Slide Table/High Rigidity Type **LESH**



- Easy setting: Data can be set with only 2 items, position and speed.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Integrated guide rail and table
Uses a recirculating linear guide for high rigidity and high precision
- Reduced cycle time
Max. acceleration/deceleration: 5000 mm/s² Max. speed: 400 mm/s
- Max. pushing force: 180 N
- Positioning repeatability: ± 0.05 mm

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Work load [kg] Vertical | Speed [mm/s] | Screw lead [mm] |
|------------------------------|----------|--------------|------------------------------|----------------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LESH8□ | 50, 75 | Max. 2 | Max. 0.5 | Max. 400 | 4, 8 |
| | LESH16□ | 50, 100 | Max. 8 | Max. 2 | Max. 400 | 5, 10 |
| | LESH25□ | 50, 100, 150 | Max. 12 | Max. 4 | Max. 400 | 8, 16 |
| Servo motor (24 VDC) | LESH8□A | 50, 75 | Max. 2 | Max. 0.5 | Max. 400 | 4, 8 |
| | LESH16□A | 50, 100 | Max. 5 | Max. 2 | Max. 400 | 5, 10 |
| | LESH25□A | 50, 100, 150 | Max. 6 | Max. 2.5 | Max. 400 | 8, 16 |

Miniature

Electric Actuator/Miniature Rod Type **LEPY**



- Compact and lightweight
W 20.5 mm x H 30 mm x L 125.6 mm, Weight 240 g
- Max. pushing force: 50 N
- Positioning repeatability: ± 0.05 mm
- It is possible to set the position, speed, and force. (64 points)
- Max. speed (Horizontal): 350 mm/s

| Specification | Model | Stroke [mm] | Pushing force [N] | | Max. work load [kg] (Horizontal) | | Screw lead |
|------------------------------|--------|-------------|-------------------|---------|-------------------------------------|----------|------------|
| | | | Basic | Compact | Basic | Compact | |
| Step motor (Servo/24 VDC) | LEPY6 | 25, 50, 75 | Max. 20 | — | Max. 2.0 | — | 4.8 |
| | LEPY10 | 25, 50, 75 | Max. 50 | Max. 40 | Max. 6.0 | Max. 4.0 | 5, 10 |

Electric Actuators

Miniature

Electric Actuator/Miniature Slide Table Type **LEPS**



- Compact and lightweight
W 21 mm x H 41 mm x L 138.6 mm, Weight 290 g
- Max. pushing force: 50 N
- Positioning repeatability: ± 0.05 mm
- It is possible to set the position, speed, and force. (64 points)
- Max. speed (Horizontal): 350 mm/s

| Specification | Model | Stroke [mm] | Pushing force [N] | | Max. work load [kg] (Horizontal) | | Screw lead |
|---------------------------|--------|-------------|-------------------|---------|----------------------------------|----------|------------|
| | | | Basic | Compact | Basic | Compact | |
| Step motor (Servo/24 VDC) | LEPS6 | 25, 50 | Max. 20 | — | Max. 1.0 | — | 4.8 |
| | LEPS10 | 25, 50 | Max. 50 | Max. 40 | Max. 2.0 | Max. 2.0 | 5, 10 |

Rotary Tables

Electric Rotary Table **LER**



- Rotation angle: 360°, 320° (310°), 180°, 90°
() The value indicated in brackets shows the value for the LER10.
- Low profile: Height 42 mm (LER10)
- Space saving: Built-in step motor
- Shock-less/high speed actuation
Max. speed: 420°/sec (7.33 rad/sec)
Max. acceleration/deceleration: 3000°/sec² (52.36 rad/sec²)
- It is possible to set the speed, acceleration/deceleration, and position. Max. 64 points
- Energy saving: Automatic 40% power reduction after the table has stopped
- Easy setting: Data can be set with only 2 items, position and speed.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)

*1 Value when an external stopper is mounted

| Model | Rotating torque [N·m] | | Max. speed [°/s] | | Positioning repeatability [°] | |
|-------|-----------------------|-------------|------------------|-------------|---|---|
| | Basic | High torque | Basic | High torque | Basic | High torque |
| LER10 | 0.22 | 0.32 | 420 | 280 | ± 0.05 (At the end: ± 0.01)*1 | ± 0.05 (At the end: ± 0.01)*1 |
| LER30 | 0.8 | 1.2 | 420 | 280 | | |
| LER50 | 6.6 | 10 | 420 | 280 | | |

Grippers

Electric Gripper 2-Finger Type (Z Type) **LEHZ**



- Easy setting: Data can be set with only 2 items, position and force.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function
- It is possible to set the position, speed, and force. (64 points)

| Series | Body size | Open and close stroke/ both sides [mm] | Gripping force [N] | | Opening and closing speed [mm/s] |
|--------|-----------|--|--------------------|----------|----------------------------------|
| | | | Basic | Compact | |
| LEHZ | 10 | 4 | 6 to 14 | 2 to 6 | 5 to 80 |
| | 16 | 6 | 6 to 14 | 3 to 8 | 5 to 80 |
| | 20 | 10 | 16 to 40 | 11 to 28 | 5 to 100 |
| | 25 | 14 | 16 to 40 | 11 to 28 | 5 to 100 |
| | 32 | 22 | 52 to 130 | — | 5 to 120 |
| | 40 | 30 | 84 to 210 | — | 5 to 120 |

Electric Actuators

Grippers

Electric Gripper 2-Finger Type/With Dust Cover (ZJ Type) **LEHZJ**



- Easy setting: Data can be set with only 2 items, position and force.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function
- It is possible to set the position, speed, and force. (64 points)

| Series | Body size | Open and close stroke/ both sides [mm] | Gripping force [N] | | Opening and closing speed [mm/s] |
|--------|-----------|--|--------------------|----------|--|
| | | | Basic | Compact | |
| LEHZJ | 10 | 4 | 6 to 14 | 3 to 6 | 5 to 80 |
| | 16 | 6 | 6 to 14 | 4 to 8 | 5 to 80 |
| | 20 | 10 | 16 to 40 | 11 to 28 | 5 to 100 |
| | 25 | 14 | 16 to 40 | 11 to 28 | 5 to 100 |

Electric Gripper 2-Finger Type (F Type) **LEHF**



- Easy setting: Data can be set with only 2 items, position and force.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function
- It is possible to set the position, speed, and force. (64 points)

*1 (): For long strokes

| Series | Body size | Open and close stroke/ both sides [mm] | Gripping force [N] | | Opening and closing speed [mm/s] |
|--------|-----------|--|--------------------|-----------|--|
| | | | Basic | Compact | |
| LEHF | 10 | 16 (32)*1 | 3 to 7 | 3 to 7 | 5 to 80 |
| | 20 | 24 (48)*1 | 11 to 28 | 11 to 28 | 5 to 100 |
| | 32 | 32 (64)*1 | 48 to 120 | 48 to 120 | 5 to 100 |
| | 40 | 40 (80)*1 | 72 to 180 | 72 to 180 | 5 to 100 |

Electric Gripper 3-Finger Type (S Type) **LEHS**



- Easy setting: Data can be set with only 2 items, position and force.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function
- It is possible to set the position, speed, and force. (64 points)

| Series | Body size | Open and close stroke/ both sides [mm] | Gripping force [N] | | Opening and closing speed [mm/s] |
|--------|-----------|--|--------------------|------------|--|
| | | | Basic | Compact | |
| LEHS | 10 | 4 | 2.2 to 5.5 | 1.4 to 3.5 | 5 to 70 |
| | 20 | 6 | 9 to 22 | 7 to 17 | 5 to 80 |
| | 32 | 8 | 36 to 90 | — | 5 to 100 |
| | 40 | 12 | 52 to 130 | — | 5 to 120 |

Electric Actuators

Controllers/Drivers

Controller/Step Data Input Type **LECP6/LECA6**



- The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Easy operation and simple setting: Easy mode, Detail setting: Normal mode
- Teaching box, controller setting software

| Type | Series | Compatible motor | Power supply voltage | Parallel I/O | | Number of step data |
|----------------------|--------|---------------------------|----------------------|---------------------------------|---------------------------------|---------------------|
| | | | | Input | Output | |
| Step data input type | LECP6 | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | 11 (Photo-coupler isolation) | 13 (Photo-coupler isolation) | 64 points |
| | LECA6 | Servo motor (24 VDC) | 24 VDC $\pm 10\%$ | | | 64 points |

Multi-Axis Step Motor Controller **JXC73/83/92/93**



- Speed tuning control
- Linear/circular interpolation
- Positioning/pushing operation
- Absolute/relative position coordinate instructions
- Step data input (Max. 2048 points)
- Space saving, reduced wiring

■ **Trademark**
• EtherNet/IP™ is a trademark of ODVA.

| Type | Series | I/O type | Compatible motor | Power supply voltage | Number of axes |
|----------------------|--------|--------------|---------------------------|----------------------|----------------|
| Step data input type | JXC73 | NPN | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | Max. 4 axes |
| | JXC83 | PNP | | | Max. 4 axes |
| | JXC92 | EtherNet/IP™ | | | Max. 3 axes |
| | JXC93 | EtherNet/IP™ | | | Max. 4 axes |

Programless Controller **LECP1**



- No programming required
Capable of setting up an electric actuator operation without using a PC or teaching box
- Speed/acceleration 16-level adjustment
- Compatible with actuators with locks
- 3-level pushing force settings

| Type | Series | Compatible motor | Power supply voltage | Parallel I/O | | Number of step data |
|------------------|--------|---------------------------|----------------------|--------------------------------|--------------------------------|---------------------|
| | | | | Input | Output | |
| Programless type | LECP1 | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | 6 (Photo-coupler isolation) | 6 (Photo-coupler isolation) | 14 points |

Programless Controller (With Stroke Study) **LECP2**



- End to end operation similar to an air cylinder
- Positioning of 2 stroke end points + 12 intermediate points

| Type | Series | Compatible motor | Power supply voltage | Parallel I/O | | Number of step data |
|---|--------|---------------------------|----------------------|--------------------------------|--------------------------------|--|
| | | | | Input | Output | |
| Programless type (With stroke study) | LECP2 | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | 6 (Photo-coupler isolation) | 6 (Photo-coupler isolation) | 2 stroke end points, 12 intermediate points |

Electric Actuators

Controllers/Drivers

Step Motor Driver (Pulse Input Type) **LECPA**



- A driver that uses pulse signals to allow positioning at any position
The actuator can be controlled from the customers' positioning unit.
- Return-to-origin command signal
- With force limit function (Pushing force/Gripping force operations are available.)

| Type | Series | Compatible motor | Power supply voltage | Parallel I/O | | Number of step data |
|------------------|--------|---------------------------|----------------------|--------------------------------|--------------------------------|---------------------|
| | | | | Input | Output | |
| Pulse input type | LECPA | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | 5 (Photo-coupler isolation) | 9 (Photo-coupler isolation) | — |

Step Motor Controller/CC-Link Direct Input Type **LECPMJ**



- CC-Link Ver. 1.10 compatible
- External data import function
- Position and speed can be monitored by the PLC touch panel (display).
- Step data can be edited from the PLC touch panel (display).

| Type | Series | Compatible motor | Power supply voltage | Fieldbus |
|---------------------------|--------|---------------------------|----------------------|-------------------|
| CC-Link direct input type | LECPMJ | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | CC-Link Ver. 1.10 |

Step Motor Controller **JXCE1/91/P1/D1/L1**



- EtherCAT, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link compatible
- Two types of operation command:
Step no. defined operation, Numerical data defined operation
- Transition wiring of communication cables
- Numerical monitoring available
- IO-Link communication can be performed.

| Series | Compatible motor | Power supply voltage | Fieldbus |
|--------|---------------------------|----------------------|--------------|
| JXCE1 | Step motor (Servo/24 VDC) | 24 VDC $\pm 10\%$ | EtherCAT |
| JXC91 | | | EtherNet/IP™ |
| JXCP1 | | | PROFINET |
| JXCD1 | | | DeviceNet™ |
| JXCL1 | | | IO-Link |

Fieldbus-compatible Gateway (GW) Unit **LEC-G**



- The LE□ series electric actuators are applicable to Fieldbus protocols.
- Conversion unit for Fieldbus network and LEC serial communication
- 2 methods of operation:
Step data input, numerical data input
- Position, speed, and other values can be checked on the PLC.

| Series | Applicable fieldbus | Power supply voltage | Applicable controllers |
|--------|--|----------------------|------------------------------|
| LEC-G | CC-Link DeviceNet™ PROFIBUS DP EtherNet/IP™ | 24 VDC $\pm 10\%$ | LECP6 series LECA6 series |

■ Trademark

- DeviceNet™ is a trademark of ODVA.
- EtherNet/IP™ is a trademark of ODVA.
- EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Controllers/Drivers

AC Servo Motor Driver (Pulse Input Type) **LECS**



- Pulse input type motor driver
- Compatible motor capacity: 100 W, 200 W, 400 W
- Compatible encoders:
 - Incremental type
 - Absolute type
- Servo adjustment using auto gain tuning
- With display setting function

| Type | Series | Compatible motor | Power supply voltage | Parallel I/O | |
|--|---------|-----------------------------------|--|--------------|--------|
| | | | | Input | Output |
| Pulse input type (For incremental encoder) | LECSA | AC servo motor (100/200/400 W) | 100 to 120 VAC (50/60 Hz) 200 to 230 VAC (50/60 Hz) | 6 | 4 |
| Pulse input type (For absolute encoder) | LECSB | | | 10 | 6 |
| CC-Link direct input type (For absolute encoder) | LECS | | | — | — |
| SSCNET III type (For absolute encoder) | LECSS | | | — | — |
| SSCNET III/H type (For absolute encoder) | LECSS-T | | 200 to 240 VAC (50/60 Hz) | — | — |

AC Servo Motor Driver (MECHATROLINK Compatible) **LECYM/LECYU**



- Position control, speed control, and torque control can be used.
- Control encoder: Absolute 20-bit encoder
(Resolution: 1048576 p/rev)
- Applicable Fieldbus protocol: MECHATROLINK- II , MECHATROLINK- III

| Type | Series | Compatible motor | Power supply voltage | Parallel I/O | |
|---|--------|-----------------------------------|------------------------------|---------------------------------------|---|
| | | | | Input | Output |
| MECHATROLINK-II type (For absolute encoder) | LECYM | AC servo motor (100/200/400 W) | 200 to 230 VAC (50/60 Hz) | 7 (Number of optional allocations) | 1 (Number of fixed allocations) 3 (Number of optional allocations) |
| MECHATROLINK-III type (For absolute encoder) | LECYU | AC servo motor (100/200/400 W) | 200 to 230 VAC (50/60 Hz) | 7 (Number of optional allocations) | 1 (Number of fixed allocations) 3 (Number of optional allocations) |

Electric Actuators

Environment: Dust-tight/Water-jet-proof (IP65 Equivalent)

Electric Actuator/Rod Type LEY-X5



- Enclosure: IP65 equivalent
- Max. stroke: 500 mm

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|-------------------------------------|--------------|-------------|-------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | LEY25-X5 | 30 to 400 | Max. 452 | Max. 400 | 3, 6, 12 |
| Step motor (Servo/24 VDC) | LEY32-X5 | 30 to 500 | Max. 707 | Max. 400 | 4, 8, 16 |
| Servo motor (24 VDC) | LEY25A-X5 | 30 to 400 | Max. 130 | Max. 400 | 3, 6, 12 |
| AC servo motor | LEY25S-X5 | 30 to 400 | Max. 485 | Max. 900 | 3, 6, 12 |
| AC servo motor | LEY32S-X5 | 30 to 500 | Max. 588 | Max. 1200 | 5, 10, 20 |
| AC servo motor | LEY63□□□-□P | 100 to 800 | Max. 1910 | Max. 1000 | 5, 10, 20 |
| AC servo motor (In-line motor type) | LEY25DS-X5 | 30 to 400 | Max. 485 | Max. 900 | 3, 6, 12 |
| AC servo motor (In-line motor type) | LEY32DS-X5 | 30 to 500 | Max. 736 | Max. 1000 | 4, 8, 16 |
| AC servo motor (In-line motor type) | LEY63D□□□-□P | 100 to 800 | Max. 1910 | Max. 1000 | 5, 10, 20 |

Environment: Clean Room Specification

Electric Actuator/Slider Type, Ball Screw Drive 11-LEFS



LEFS Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Max. work load: 60 kg
- Positioning repeatability: ± 0.02 mm

LEFS Series AC Servo Motor

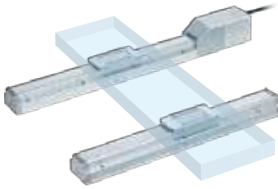
- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration/deceleration (20000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.02 mm
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Speed [mm/s] | Screw lead [mm] |
|--------------------------------|------------|-------------|------------------------------|--------------|-----------------|
| Step motor (Servo/24 VDC) | 11-LEFS16 | 50 to 500 | Max. 14 | Max. 500 | 5, 10 |
| Step motor (Servo/24 VDC) | 11-LEFS25 | 50 to 600 | Max. 25 | Max. 500 | 6, 12 |
| Step motor (Servo/24 VDC) | 11-LEFS32 | 50 to 800 | Max. 45 | Max. 500 | 8, 16 |
| Step motor (Servo/24 VDC) | 11-LEFS40 | 150 to 1000 | Max. 55 | Max. 500 | 10, 20 |
| Servo motor (24 VDC) | 11-LEFS16A | 50 to 500 | Max. 10 | Max. 500 | 5, 10 |
| Servo motor (24 VDC) | 11-LEFS25A | 50 to 600 | Max. 18 | Max. 500 | 6, 12 |
| AC servo motor (100/200/400 W) | 11-LEFS25S | 50 to 600 | Max. 20 | Max. 900 | 6, 12 |
| AC servo motor (100/200/400 W) | 11-LEFS32S | 50 to 800 | Max. 45 | Max. 1000 | 8, 16 |
| AC servo motor (100/200/400 W) | 11-LEFS40S | 150 to 1000 | Max. 60 | Max. 1000 | 10, 20 |

Electric Actuators

Environment: Clean Room Specification

Electric Actuator/LEF Series Support Guide 11-LEFG



- A support guide that is designed to support work pieces with significant overhang
- Easy installation with the same outer dimensions as the LEF series body, Contributes to the reduction of design and assembly labor
- The standardly equipped sealing band prevents the scattering of grease and the entry of foreign matter from outside.

| Drive method | Model | Stroke [mm] |
|--------------------|-------------|-------------|
| Ball screw drive/S | 11-LEFG16-S | 50 to 500 |
| Ball screw drive/S | 11-LEFG25-S | 50 to 600 |
| Ball screw drive/S | 11-LEFG32-S | 50 to 800 |
| Ball screw drive/S | 11-LEFG40-S | 150 to 1000 |

Electric Actuator/High Rigidity Slider Type, Ball Screw Drive 11-LEJS



- Low profile/Low center of gravity: Height reduced by approx. 36% (Reduced by 32 mm)
- Max. work load: 85 kg
- Positioning repeatability: ± 0.02 mm
- Max. acceleration/deceleration: 20000 mm/s²
- Clean room specification
- Motorless specification is available.

| Specification | Model | Stroke [mm] | Work load [kg] Horizontal | Speed [mm/s] | Screw lead [mm] |
|----------------|-----------|-------------|---------------------------|--------------|-----------------|
| AC servo motor | 11-LEJS40 | 200 to 1200 | Max. 55 | Max. 1200 | 8, 16 |
| AC servo motor | 11-LEJS63 | 300 to 1500 | Max. 85 | Max. 1200 | 10, 20 |

Motorless Type

Electric Actuator/Slider Type LEF



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, NIDEC SANKYO CORPORATION, KEYENCE CORPORATION, FUJI ELECTRIC CO., LTD., ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

| Specification | Model | Stroke [mm] | Work load [kg] | Speed [mm/s] | Screw lead [mm] |
|----------------------------|--------|-------------|----------------|--------------|------------------|
| Motorless Ball screw drive | LEFS25 | 50 to 800 | Max. 20 | Max. 900 | 6, 12 |
| Motorless Ball screw drive | LEFS32 | 50 to 1000 | Max. 45 | Max. 1000 | 8, 16 |
| Motorless Ball screw drive | LEFS40 | 150 to 1200 | Max. 60 | Max. 1000 | 10, 20 |
| Motorless Belt drive | LEFB25 | 300 to 2000 | 5 | Max. 2000 | Equivalent to 54 |
| Motorless Belt drive | LEFB32 | 300 to 2500 | 15 | Max. 2000 | Equivalent to 54 |
| Motorless Belt drive | LEFB40 | 300 to 3000 | 25 | Max. 2000 | Equivalent to 54 |

Electric Actuators

Motorless Type

Electric Actuator/High Rigidity Slider Type **LEJ**



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, NIDEC SANKYO CORPORATION, KEYENCE CORPORATION, FUJI ELECTRIC CO., LTD., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

| Specification | Model | Stroke [mm] | Work load [kg] | Speed [mm/s] | Screw lead [mm] |
|----------------------------|--------|-------------|----------------|--------------|-----------------|
| Motorless Ball screw drive | LEJS40 | 200 to 1200 | Max. 55 | Max. 1800 | 8, 16, 24 |
| Motorless Ball screw drive | LEJS63 | 300 to 1500 | Max. 85 | Max. 1800 | 10, 20, 30 |

Electric Actuator/Rod Type **LEY**



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, NIDEC SANKYO CORPORATION, KEYENCE CORPORATION, FUJI ELECTRIC CO., LTD., ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|------------------------|--------|-------------|-------------------|--------------|-----------------|
| Motorless Top/Parallel | LEY25 | 30 to 400 | Max. 485 | Max. 900 | 3, 6, 12 |
| Motorless In-line | LEY25D | 30 to 400 | Max. 485 | Max. 900 | 3, 6, 12 |
| Motorless Top/Parallel | LEY32 | 30 to 500 | Max. 588 | Max. 1200 | 4, 8, 16 |
| Motorless In-line | LEY32D | 30 to 500 | Max. 736 | Max. 1000 | 4, 8, 16 |
| Motorless In-line | LEY63D | 100 to 800 | Max. 1910 | Max. 1000 | 5, 10, 20 |

Electric Actuator/Guide Rod Type **LEYG**



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, NIDEC SANKYO CORPORATION, KEYENCE CORPORATION, FUJI ELECTRIC CO., LTD., ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

| Specification | Model | Stroke [mm] | Pushing force [N] | Speed [mm/s] | Screw lead [mm] |
|------------------------|---------|-------------|-------------------|--------------|-----------------|
| Motorless Top mounting | LEYG25 | 30 to 300 | Max. 485 | Max. 900 | 3, 6, 12 |
| Motorless In-line | LEYG25D | 30 to 300 | Max. 485 | Max. 900 | 3, 6, 12 |
| Motorless Top mounting | LEYG32 | 30 to 300 | Max. 588 | Max. 1200 | 4, 8, 16 |
| Motorless In-line | LEYG32D | 30 to 300 | Max. 736 | Max. 1000 | 4, 8, 16 |

Vacuum Equipment

Vacuum Ejectors/Vacuum Pump Systems

Vacuum Unit ZK2



- Compatible with ejector systems and vacuum pump systems
- The digital pressure switch for vacuum with energy-saving function cuts supply air when the pressure reaches the desired vacuum. Air consumption: 90% reduction
- Improved ejector efficiency: Suction flow increased by 50%, Air consumption reduced by 30%
 - * Compared to other SMC single-stage ejectors
- Compact/Lightweight: Volume 88 cm³ (28% reduction), Weight 81 g (59% reduction)

| Ejector series | Nozzle diameter [mm] | Max. suction flow [L/min (ANR)] | Air consumption [L/min (ANR)] | Guidelines for applicable pad [mm] | Vacuum pump system series |
|----------------|----------------------|---------------------------------|-------------------------------|------------------------------------|---------------------------|
| ZK2□07 | 0.7 | 29 | 24 | 2 to 40 | ZK2□00 |
| ZK2□10 | 1.0 | 44 | 40 | 2 to 50 | |
| ZK2□12 | 1.2 | 61 | 58 | 2 to 125 | |
| ZK2□15 | 1.5 | 67 | 90 | 2 to 150 | |

Multistage Ejector ZL112A



- Energy saving: Air consumption reduced by 10%
- Weight reduced by up to 60%
 - ZL112A: 180 g ← Existing model (ZL112): 450 g
- 3 stage diffuser construction
 - Suction flow rate increased by 250%
- 3 types of vacuum pressure sensors
- No tools are required! Maintenance labor can be reduced.

| Series | Nozzle diameter [mm] | Max. suction flow [L/min (ANR)] | Air consumption [L/min (ANR)] | Guidelines for applicable pad [mm] |
|--------|----------------------|---------------------------------|-------------------------------|------------------------------------|
| ZL112A | 1.2 | 100 | 57 | 2 to 250 |

Vacuum Ejectors

Vacuum Ejector ZH



Vacuum Ejector/Box Type
(Built-in Silencer) ZH



- Compact and lightweight
 - Overall length: Max. 11% reduction (6.7 mm shorter)
 - Port height: Max. 25% reduction (9.1 mm shorter)
 - Weight: Max. 74% reduction (65.1 g lighter)
- 4 mounting types:
 - Direct mounting, Standard bracket mounting, L-bracket mounting, DIN rail mounting

| Series | Nozzle diameter [mm] | Max. suction flow [L/min (ANR)] | Air consumption [L/min (ANR)] | Guidelines for applicable pad [mm] |
|---------|----------------------|---------------------------------|-------------------------------|------------------------------------|
| ZH05DSA | 0.5 | 6 | 13 | 2 to 13 |
| ZH07DSA | 0.7 | 12 | 27 | 2 to 20 |
| ZH10DSA | 1.0 | 26 | 52 | 2 to 32 |
| ZH13DSA | 1.3 | 40 | 84 | 2 to 50 |
| ZH15DSA | 1.5 | 58 | 113 | 2 to 100 |
| ZH18DSA | 1.8 | 76 | 162 | 2 to 125 |
| ZH20DSA | 2.0 | 90 | 196 | 2 to 150 |

Vacuum Equipment

Vacuum Ejectors

All Stainless Steel Vacuum Ejector ZH□□-X267



- All stainless steel (SCS13: Equivalent to stainless steel 304)
- Sealant not required
- Max. operating temperature: 260°C
- Grease-free

| Series | Nozzle diameter [mm] | Max. suction flow [L/min (ANR)] | Air consumption [L/min (ANR)] | Guidelines for applicable pad [mm] |
|-----------|----------------------|---------------------------------|-------------------------------|------------------------------------|
| ZH05-X267 | 0.5 | 5 | 13 | 2 to 13 |
| ZH07-X267 | 0.7 | 12 | 23 | 2 to 20 |
| ZH10-X267 | 1.0 | 24 | 46 | 2 to 32 |

In-line Type Vacuum Ejector ZU□A



- Compact and Lightweight
O.D.: ø10.4, Weight: 3.9 g, Overall length: 52 mm
- Port size:
ø6 One-touch fitting, Rc1/8 female thread
- Vacuum pressure reached [kPa]
Type S: -90
Type L: -48

| Series | Nozzle diameter [mm] | Max. suction flow [L/min (ANR)] | | Air consumption [L/min (ANR)] | Guidelines for applicable pad [mm] |
|--------|----------------------|---------------------------------|--------|-------------------------------|------------------------------------|
| | | Type S | Type L | | |
| ZU05□A | 0.5 | 7 | 13 | 14 | 2 to 13 |
| ZU07□A | 0.7 | 11 | 16 | 28 | 2 to 20 |

Vacuum Pad with Ejector ZHP



- Ejector and pad are integrated. Space saving with reduced piping labor!
- 2-stage ejector
Suction flow rate increased by 50%, Air consumption reduced by 30%
- Easier maintenance
Mounting with the lock plate reduces the steps required for pad replacement!
- Pad diameter: ø63, ø80

| Series | Pad diameter | Pad form | Nozzle nominal size |
|--------|--------------|---|------------------------|
| ZHP | ø63, ø80 | Bellows type with groove, Flat type with groove | ø0.7, ø1.0, ø1.2, ø1.5 |

Vacuum Equipment

Air Suction Filters

Air Suction Filter ZFA



- Prevents problems related to vacuum circuits or airborne contaminants
- Provides a large filter element surface

| Series | Port size | Flow rate [L/min (ANR)] | Filtration [μ m] |
|--------|-----------|-------------------------|-----------------------|
| ZFA10 | 1/8 | 50 | 30 |
| ZFA20 | 1/4 | 200 | 30 |

Air Suction Filter with One-touch Fittings ZFB



- Prevents problems related to vacuum circuits or airborne contaminants
- Vacuum tubes can be connected and removed by a one-touch operation.

| Series | Applicable tubing O.D. | | Flow rate [L/min (ANR)] | Filtration [μ m] |
|--------|------------------------|-----------------------|-------------------------|-----------------------|
| | Metric | Inch | | |
| ZFB10 | $\phi 4, \phi 6$ | $\phi 3/16, \phi 1/4$ | 10 to 20 | 30 |
| ZFB20 | $\phi 6, \phi 8$ | $\phi 1/4$ | 30 to 50 | 30 |
| ZFB30 | $\phi 8, \phi 10$ | $\phi 3/8$ | 75 | 30 |
| ZFB40 | — | $\phi 1/2$ | 100 | 30 |

In-line Air Filter ZFC



- Operating pressure range: -100 kPa to 1.0 MPa
Both positive pressure and vacuum pressure can be used with one unit.
- With lock mechanism
During positive pressure, it prevents components from being scattered when they are loosened.
- 2 types of transparent case materials are available:
Polycarbonate (Standard), Nylon (Made to order)

*1 Supply pressure 0.1 MPa, Differential pressure 30 kPa

*2 Made to order

| Series | Applicable tubing O.D. | | Flow rate [L/min (ANR)]* ¹ Positive pressure | Flow rate [L/min (ANR)] Vacuum pressure | Filtration [μ m] |
|--------|------------------------------------|------------------------------------|--|--|-----------------------|
| | Metric | Inch | | | |
| ZFC1□ | $\phi 2, \phi 3.2$ | $\phi 1/8"$ | 15/45 | 2/5 | $5, 10^{*2}$ |
| ZFC3□ | $\phi 3.2, \phi 4$ | $\phi 1/8", \phi 5/32"$ | 50/80 | 7/10 | $5, 10^{*2}$ |
| ZFC5□ | $\phi 4, \phi 6$ | $\phi 5/32", \phi 1/4"$ | 100/200 | 10/20 | $5, 10^{*2}$ |
| ZFC7□ | $\phi 6, \phi 8, \phi 10, \phi 12$ | $\phi 1/4", \phi 5/16", \phi 3/8"$ | 250/450/550/650 | 30/70/80/100 | $5, 10^{*2}$ |

Vacuum Filter AFJ



- Prevents problems with vacuum equipment!
- Nominal filtration rating: $5, 40, 80$ μ m
- Large flow capacity: Max. 660 L/min (ANR)
- Elements can be reused by washing them.
- Water droplets can be removed.
- The bowl is covered with a transparent bowl guard.

| Series | Port size | Recommended flow rate [L/min (ANR)] | Filtration |
|--------|--------------------|-------------------------------------|------------|
| AFJ | 1/8, 1/4, 3/8, 1/2 | 180, 380, 660 | 5, 40, 80 |

Suction Filter ZFC050



- Small suction filter which can be installed directly

| Series | Port size IN side | Port size OUT side | Filtration [μ m] |
|--------|-------------------------|-----------------------|-------------------------------------|
| ZFC050 | M5 x 0.8, $\phi 6$ barb | M5 x 0.8 | 3 μ m, 20 μ m (Nominal) |

Vacuum Equipment

Vacuum Pads

Vacuum Pad ZP3

- Pad diameter: $\phi 1.5$ to $\phi 16$
- Compact/Space saving: Overall length shortened
- One-touch fittings and barb fittings are available for $\phi 2$.



| Series | Type |
|--------|------------------|
| ZP3 | Flat |
| ZP3 | Flat with groove |
| ZP3 | Bellows |

Thin Flat/Flat Pad ZP2

- For sheets or vinyl
- Pad diameter: $\phi 5$ to $\phi 30$



| Series | Type |
|--------|-----------|
| ZP2 | Thin flat |
| ZP2 | Flat |

Vacuum Pad ZP3E

- Stable suction position, Improved ease of removal
The dents and bumps on the adsorption surface expand the area which is in contact with the workpiece. The ribs reduce inclinations during the transport of workpieces.

- Reduced number of mounting screws (4 pcs. \rightarrow 1 pc.)
- Pad and metal parts can be disposed of separately.
- Pad diameter: $\phi 32$ to $\phi 125$



| Series | Type |
|--------|--------------------------|
| ZP3E | Flat type with groove |
| ZP3E | Bellows type with groove |

Bellows Pad ZP2

- For spherical workpieces or workpieces with inclined surfaces
- Pad diameter: $\phi 2$ to $\phi 46$



Vacuum Pad ZP3P

- Good for film packaging applications where the shape of the workpiece changes easily when lifted
- Uses silicone rubber compliant with the FDA (USA Food and Drug Administration) 21CFR § 177.2600 elution test
- Blue colored pad
- Reduced leakage
- Reduction of wrinkles made on thin workpieces (film, vinyl, etc.) during adsorption



| Series | Type |
|--------|-----------------------|
| ZP3P | Flat type with groove |

4.5-Stage Bellows Pad ZP2

- For adsorbing workpieces moving at high speeds
- Follows various shapes of workpieces
- Pad material: Silicone rubber (Rubber hardness: A40, A50, A60)
- Pad diameter: $\phi 15$, $\phi 20$, $\phi 30$, $\phi 40$, $\phi 46$



Compact/Short-type/Nozzle Pad ZP2

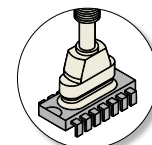
- Compact/Space saving
- Pad diameter: $\phi 0.8$ to $\phi 15$



| Series | Type |
|--------|------------|
| ZP2 | Compact |
| ZP2 | Short-type |
| ZP2 | Nozzle |

Oval Pad ZP2

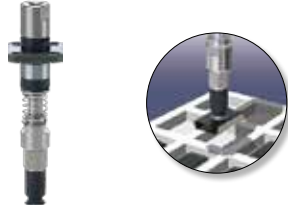
- For rectangular workpieces
- Pad diameter: 3.5 x 7 to 8 x 30



Vacuum Pads

Ball Spline Buffer Pad ZP2

- The ball spline guide is used for buffers.
- Pad diameter: $\phi 2$ to $\phi 8$



Special Configuration Pad ZP2

- For stage setting of disks (CD, DVD) or glass substrates



| Series | Type |
|--------|------------------------|
| ZP2 | For transferring disks |
| ZP2 | For fixing panels |

Mark-free Pad ZP2

- For use where adsorption marks must not be left on workpieces
- Pad diameter: $\phi 4$ to $\phi 125$



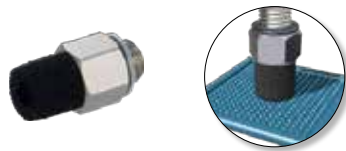
Vacuum Pad ZP

- The wide variety of available models can accommodate a wide range of applications.
- Pad shapes: Flat, Flat with ribs, Thin flat, Thin flat with ribs, Deep, and Bellows shape
- Pad diameter: $\phi 2$ to $\phi 50$



Sponge Pad ZP2

- For workpieces with bumps
- Pad diameter: $\phi 4$ to $\phi 15$



Vacuum Pad/Large/Heavy Duty Type ZPT/ZPX

- Ideal for heavy or large workpieces such as CRT tubes and automobile bodies
- Pad diameter: $\phi 40$ to $\phi 125$



Heavy-duty Pad ZP2

- For heavy or large workpieces
- Pad diameter: $\phi 32$ to $\phi 340$



Vacuum Pad/Large Size Bellows Type ZPT/ZPX

- Ideal for workpieces with a curved adsorption surface, heavy mass, or those that are large in size
- Pad diameter: $\phi 40$ to $\phi 125$



Vacuum Equipment

Vacuum Pads

Vacuum Pad/Ball Joint Type ZPT/ZPR

- Ideal for adsorption on slanted work surfaces
- Pad diameter: ø10 to ø50



Special Pads

Non-contact Gripper XT661

- Assists in non-contact workpiece transfer
- Max. workpiece suction distance: 10 mm
- 2 types are available:
 - Cyclone type: High lift: Max. 44 N
 - Bernoulli type: Amplitude of the workpiece during gripping: ±0.01 mm or less



Special Pads

Magnet Gripper MHM-X6400

- Steel plates can be transferred without a vacuum. Can support workpieces with holes and uneven surfaces when a vacuum pad cannot be used
- Holds workpieces even when the air is shut off
- High holding force: 80 N (Workpiece plate thickness: 0.6 mm), 120 N (Workpiece plate thickness: 1.4 mm)
- Residual holding force: 0.3 N or less (Reduces workpiece release time)



| Series | Holding force (Workpiece plate thickness: 0.6 mm) |
|----------------|--|
| MHM-32D1-X6400 | 80 N |
| MHM-32D2-X6400 | 50 N |
| MHM-32D3-X6400 | 30 N |

Vacuum Saving Valves

Vacuum Saving Valve ZP2V

- Can restrict the reduction of vacuum pressure even when there is no workpiece
- A switching operation is not required when changing workpieces.
- Built-in filter (40 µm)
- With One-touch fittings



Vacuum Flow

Vacuum Flow ZH□-□□-X185

- By supplying compressed air, large blow and vacuum flow rates are available.
- A blow flow rate 4 times the supply air
- A vacuum flow rate 3 times the supply air
- Large passage diameter available for the suction of machining chips, particles, etc.
- Maintenance-free
- Mounting brackets are available.
- Application examples:
 - Blow: Blowing away water droplets and machining chips
 - Vacuum: Vacuuming smoke during soldering, Transferring materials such as pellets or fine particles



Vacuum Regulators

Vacuum Regulator IRV

- Allows for the adjustment of vacuum line pressure
- Single-sided connection series
- Weight reduced by 20% (Compared with the existing IRV2000 with IRV20 fitting)
- Built-in One-touch fittings
- The pressure gauge and digital pressure switch can be easily attached/detached due to being attached by a clip.
- Mounting direction of the pressure gauge and digital pressure switch can be changed. (Standard connections only)
- Mounting angle of the pressure gauge and digital pressure switch can be changed easily (in 60 degree increments)



| Series | Port size | Set pressure range [kPa] |
|--------|--------------------------------|--------------------------|
| IRV10 | ø6, ø8, ø1/4, ø5/16 | -100 to -1.3 |
| IRV20 | ø6, ø8, ø10, ø1/4, ø5/16, ø3/8 | -100 to -1.3 |

Vacuum Equipment

Vacuum Regulators

Electronic Vacuum Regulator **ITV**



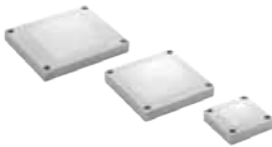
- Stepless control of vacuum pressure in proportion to electrical signals
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C

| Series | Port size | Set pressure range [kPa] |
|---------|-------------------------------|--------------------------|
| ITV009□ | ø4, ø5/32" One-touch fittings | -1 to -100 |
| ITV209□ | 1/4 | -1.3 to -80 |

■ **Trademark**
• DeviceNet™ is a trademark of ODVA.

Related Equipment for Vacuum Systems

Adsorption Plate **SP**



- Ideal for the adsorption and fixing in place of thin sheets, glass panels, and soft workpieces
Workpieces will not be deformed since they are adsorbed with multiple micro air vents on the adsorption surface.
- A high level of machining accuracy
- Strong adsorption force

| Series | Shape | Adsorption surface size | Sintered metallic element particle dia. | Suction port |
|--------|---------------------|--|---|--------------|
| SP | Rectangular, Square | □50 x 50 mm, □100 x 100 mm, □150 x 150 mm, □200 x 200 mm, □250 x 250 mm, □300 x 300 mm | ø0.3 (Sphere) | 1/8 |

Free Mount Cylinder for Vacuum **ZCUK**



- In the rectangular compact cylinder CU series, which has a high level of mounting precision, a vacuum passage is provided in the rod to facilitate the mounting of a vacuum pad and to save space.
- Standard vacuum pads (ø2 to ø50) can be mounted.

| Series | Bore size [mm] | Vacuum pad diameter | Stroke [mm] |
|--------|--------------------|---------------------|-------------|
| ZCUK | 10, 16, 20, 25, 30 | ø2 to ø50 | 5 to 50 |

Exhaust Cleaner for Vacuum Pump **AMV**



- Captures 99.5% of the greasy fumes exhausted from the vacuum pump
- Creates a comfortable working environment without oil mist
- Captures and separates 99.5% of even low-flow and highly concentrated greasy fumes
- Exhaust ducts from the vacuum pump are not required.

| Series | Port size | Max. air flow [L/min (ANR)] | Oil mist removal | Filtration [μm] |
|--------|--|-----------------------------|------------------|-------------------------------------|
| AMV | 1, 1 1/2, 2, 3BJIS 10K FF flange 4BJIS 10K FF flange | 360 to 16000 | 99.5% or more | 0.3 (Filtration efficiency: 95%) |

Related Equipment for Vacuum Systems



- Directional Control Valves
- Vacuum Pressure Switches
- Vacuum Pressure Gauges
- Flow Control Equipment
- Made to Order

Air Preparation Equipment

Air Dryers

Refrigerated Air Dryer **IDF**



- Can be used in high-temperature environments
- Ambient temperature: Max. 45°C
- Inlet air temperature: Max. 65°C
- Increased air flow capacity
- For Use in Southeast Asia (IDFC)
- For Use in Europe, Asia, and Oceania (IDFA)
- For Use in North, Central, and South America (IDFB)

| Series | Rated inlet condition | Air flow capacity [m³/min (ANR)] | | Refrigerant | Port size |
|--------|-----------------------|----------------------------------|-------|--------------------------|-----------|
| | | 50 Hz | 60 Hz | | |
| IDF60 | 35°C 0.7 MPa | 5.6 | 6.5 | R410A (HFC) GWP: 2088 | R1 |
| IDF70 | | 8 | 9.1 | | R1 1/2 |
| IDF80 | 40°C 0.7 MPa | 11.6 | 13.6 | | R2 |
| IDF90 | | 14.3 | 16.4 | | R2 |

Refrigerated Air Dryer **IDF□E/F/D**



| Series | Rated inlet condition | Air flow capacity [m³/min (ANR)] | | Applicable air compressor [kW] | Refrigerant | Port size |
|---------|-----------------------|----------------------------------|-------|--------------------------------|-------------|--------------------|
| | | 50 Hz | 60 Hz | | | |
| IDF1E | 35°C 0.7 MPa | 0.1 | 0.12 | 0.75 | R134a (HFC) | Rc3/8 |
| IDF2E | | 0.2 | 0.235 | 1.5 | | Rc3/8 |
| IDF3E | | 0.32 | 0.37 | 2.2 | | Rc3/8 |
| IDF4E | | 0.52 | 0.57 | 3.7 | | Rc1/2 |
| IDF6E | | 0.75 | 0.82 | 5.5 | | Rc3/4 |
| IDF8E | | 1.22 | 1.32 | 7.5 | | Rc3/4 |
| IDF11E | | 1.65 | 1.82 | 11 | | Rc3/4 |
| IDF15E1 | | 2.8 | 3.1 | 15 | | Rc1 |
| IDF22E | 40°C 0.7 MPa | 3.9 | 4.3 | 22 | R407C (HFC) | R1 |
| IDF37E | | 5.7 | 6.1 | 37 | | R1 1/2 |
| IDF55E | | 8.4 | 9.8 | 55 | | R2 |
| IDF75E | | 11.0 | 12.4 | 75 | | R2 |
| IDF100F | | 16.0 | 18.8 | 100 | | R2 |
| IDF125F | | 20.1 | 23.7 | 125 | | 65 (2 1/2B) flange |
| IDF150F | | 25.0 | 30.0 | 150 | | 80 (3B) flange |
| IDF190D | | 32.0 | 38.0 | 190 | | 80 (3B) flange |
| IDF240D | 35°C 0.7 MPa | 43.0 | 50.0 | 240 | | 100 (4B) flange |
| IDF370D | | 54.0 | 65.0 | 370 | | 150 (6B) flange |

Refrigerated Air Dryer **IDU□E**



| Series | Rated inlet condition | Air flow capacity [m³/min (ANR)] | | Applicable air compressor [kW] | Refrigerant | Port size |
|---------|-----------------------|----------------------------------|-------|--------------------------------|-------------|-----------|
| | | 50 Hz | 60 Hz | | | |
| IDU3E | 55°C 0.7 MPa | 0.32 | 0.37 | 2.2 | R134a (HFC) | Rc3/8 |
| IDU4E | | 0.52 | 0.57 | 3.7 | | Rc1/2 |
| IDU6E | | 0.75 | 0.82 | 5.5 | | Rc3/4 |
| IDU8E | | 1.1 | 1.2 | 7.5 | | Rc3/4 |
| IDU11E | | 1.5 | 1.7 | 11 | | Rc3/4 |
| IDU15E1 | | 2.6 | 2.8 | 15 | R407C (HFC) | Rc1 |
| IDU22E | | 3.9 | 4.3 | 22 | | R1 |
| IDU37E | | 5.7 | 6.1 | 37 | | R1 1/2 |
| IDU55E | 55°C 0.7 MPa | 8.4 | 9.8 | 55 | R407C (HFC) | R2 |
| IDU75E | | 11.0 | 12.5 | 75 | | R2 |

Air Preparation Equipment

Air Dryers

Refrigerated Air Dryer/Double Energy Saving Function Series **IDF100FS/125FS/150FS**



- Energy-saving design (Second re-heater + Digital scroll compressor)
- Power consumption: Reduced by up to 76%
- Exhaust heat: Reduced by up to 25%
- Tolerant of high temperature environments!
- Ambient temperature: Up to 45°C, Inlet air temperature: Up to 60°C

| Series | Applicable compressor [kW] | Air flow capacity [m³/min (ANR)] | |
|-----------------|----------------------------|----------------------------------|-------|
| | | 50 Hz | 60 Hz |
| IDF100FS | 100 | 16 | 18.8 |
| IDF125FS | 125 | 20.1 | 23.7 |
| IDF150FS | 150 | 25 | 27 |

Thermo-dryer with Air Temperature Adjustment Function **IDH□**



- Stable supply of temperature and pressure controlled dry clean air
It is possible to supply compressed air with the same conditions and quality regardless of the season.
- Application example: Supplying compressed air with constant conditions to the air bearings mounted on a tool
- Built-in filter
Nominal filtration: 0.01 μm (99.9% filtration efficiency)
Outlet oil mist concentration: Max. 0.01 mg/m³ (ANR)
Outlet cleanliness: Particles of 0.3 μm or more: 3.5 particles/L (ANR) or less
- Compatible with power supplies all over the world
Single-phase 100, 200, 230 VAC (50/60 Hz)

| Series | Air flow capacity [L/min (ANR)] | Outlet air temperature adjustment range | Outlet air set pressure range | Outlet air temperature stability | Temperature control method |
|--------------|---------------------------------|---|-------------------------------|----------------------------------|-------------------------------|
| IDH□4 | 100 to 500 | 15 to 30°C | 0.15 to 0.85 MPa | ±0.1 | Heater operation, PID control |
| IDH□6 | 200 to 800 | 15 to 30°C | 0.15 to 0.85 MPa | ±0.1 | Heater operation, PID control |

Membrane Air Dryer **IDG□A/IDG**



- It is possible to easily supply dry air using the hollow fiber membrane.
- Non-fluorocarbon
- Power supply not required
- Compatible with low dew points (−60°C)
- No vibration or heat discharge
- With a dew point indicator

| Series | Outlet flow [L/min (ANR)] | Standard dew point [°C] |
|------------------|---------------------------|-------------------------|
| IDG□A/IDG | 10 to 1000 | −15, −20, −40, −60 |

Moisture Control Tube **IDK**



- Prevents condensation in piping for small cylinders/air grippers
- Diffuses water vapor in the piping to the outside
- All you have to do is install the moisture control tube. Additional power supplies and works are not necessary.

| Series | O.D./I.D. [mm] | Effective length [mm] | Applicable fittings |
|-----------------------------------|----------------|-----------------------|---------------------|
| IDK02 Linear shape | 2/1.2 | 100 200 | KQ2 |
| IDK04 Linear shape | 4/2.5 | 100 200 | KQ2 |
| IDK06 Linear shape | 6/4 | 100 200 | KQ2 |
| IDK04-100-C1 Coil shape | 4/2.5 | 100 | KQ2 |

Air Preparation Equipment

Air Preparation Filters

Water Separator AMG



- Compressed air without water can be obtained.
- Water droplet removal ratio: 99%
- Easily connects to the air line to remove moisture!

| Series | Air flow capacity [L/min (ANR)] | Port size |
|--------|---------------------------------|-----------|
| AMG | 300 to 12000 | 1/8 to 2 |

Main Line Filter AFF

Mist Separator AM

Micro Mist Separator AMD



- Compressed air purity class: ISO 8573
- Increased air flow capacity due to lower pressure drop which contributes to energy saving
Flow capacity: 14.5 m³/min (ANR) (Increased by up to 20% compared with the existing model)
Pressure drop: 5 kPa or less

- Lightweight: Max. 52% lighter (10.5 kg → 5.0 kg)
Lighter body weight due to thinner stainless steel bowl

- Space-saving design, Reduced piping labor!

The AFF series main line filter removes both water droplets and solid particles.

A separate filter for removing water droplets (water separator, AMG series) is not necessary any more. Space and piping work are reduced.

- Easier replacement of the element
The stopper function prevents the bowl from falling.

| Type | Series | Filtration [μm] | Air flow [m ³ /min (ANR)] | Port size |
|----------------------|--------|-------------------------------------|--------------------------------------|-------------|
| Main line filter | AFF | 1.0 (Filtration efficiency: 99%) | 7 to 14.5 | 1, 1 1/2, 2 |
| Mist separator | AM | 0.1 (Filtration efficiency: 99.9%) | 7 to 14.5 | 1, 1 1/2, 2 |
| Micro mist separator | AMD | 0.01 (Filtration efficiency: 99.9%) | 7 to 14.5 | 1, 1 1/2, 2 |

Main Line Filter AFF



- Can remove impurities, such as oil, water, and foreign matter, in compressed air, improve the function of a downstream dryer, extend the life of precision filters, and prevent problems with the equipment

| Series | Filtration [μm] | Air flow [L/min (ANR)] | Port size |
|--------|--------------------------------|------------------------|------------------|
| AFF | 3 (Filtration efficiency: 99%) | 300 to 42000 | 1/8 to 4" flange |

Mist Separator AM



- Can separate and remove oil mist and remove solid particles, such as rust or carbon, of 0.3 μm or larger

| Series | Filtration [μm] | Air flow [L/min (ANR)] | Port size |
|--------|------------------------------------|------------------------|-----------|
| AM | 0.3 (Filtration efficiency: 99.9%) | 300 to 12000 | 1/8 to 2 |

Air Preparation Equipment

Air Preparation Filters

Micro Mist Separator **AMD**



- Can separate and remove aerosol state oil mist and remove carbon or dust of 0.01 μm or larger
- Should be used as a pre-filter for compressed air for precision instruments or clean rooms requiring high levels of clean air

| Series | Filtration [μm] | Air flow [L/min (ANR)] | Port size |
|--------|-------------------------------------|------------------------|-----------|
| AMD | 0.01 (Filtration efficiency: 99.9%) | 200 to 12000 | 1/8 to 2 |

Micro Mist Separator with Pre-filter **AMH**



- The integration of the AM series and AMD series achieves a reduction in installation space and reduced piping installation labor and costs.
- Can separate and remove aerosol state oil mist and remove carbon or dust of 0.01 μm or larger
- Should be used as a pre-filter for compressed air for precision instruments or clean rooms requiring high levels of clean air

| Series | Filtration [μm] | Air flow [L/min (ANR)] | Port size |
|--------|-------------------------------------|------------------------|-----------|
| AMH | 0.01 (Filtration efficiency: 99.9%) | 200 to 12000 | 1/8 to 2 |

Super Mist Separator **AME**



- Can separate and absorb aerosol state fine oil particles and change oil-lubricated compressed air to the equivalent of oilless air
- Should be applied for the filtration of compressed air that requires high-degree cleanliness, such as the compressed air used for coating lines, clean rooms, and equipment that must remain oil free

| Series | Filtration [μm] | Air flow [L/min (ANR)] | Port size |
|--------|-------------------------------------|------------------------|-----------|
| AME | 0.01 (Filtration efficiency: 99.9%) | 200 to 12000 | 1/8 to 2 |

Odor Removal Filter **AMF**



- Efficiently removes odors in compressed air with an activated carbon element
This unit is designed for removing odors from places, such as clean rooms, which must remain odorless
- Activated carbon element with large filtration area
- Easy element replacement and installation

| Series | Filtration [μm] | Air flow [L/min (ANR)] | Port size |
|--------|-------------------------------------|------------------------|-----------|
| AMF | 0.01 (Filtration efficiency: 99.9%) | 200 to 12000 | 1/8 to 2 |

In-line Air Filter **ZFC**



- Operating pressure range: -100 kPa to 1.0 MPa
Both positive pressure and vacuum pressure can be used with one unit.
- With lock mechanism
During positive pressure, it prevents components from being scattered when they are loosened.
- 2 types of transparent case materials are available:
Polycarbonate (Standard), Nylon (Made to order)

*1 Supply pressure: 0.1 MPa, Differential pressure: 30 kPa

*2 Made to order

| Series | Applicable tubing O.D. | | Flow rate [L/min (ANR)]*1 | | Filtration [μm] |
|--------|------------------------|----------------------|---------------------------|-----------------|------------------------------|
| | Metric | Inch | Positive pressure | Vacuum pressure | |
| ZFC1□ | ø2, ø3.2 | ø1/8" | 15/45 | 2/5 | 5, 10*2 |
| ZFC3□ | ø3.2, ø4 | ø1/8", ø5/32" | 50/80 | 7/10 | |
| ZFC5□ | ø4, ø6 | ø5/32", ø1/4" | 100/200 | 10/20 | |
| ZFC7□ | ø6, ø8, ø10, ø12 | ø1/4", ø5/16", ø3/8" | 250/450/550/650 | 30/70/80/100 | |

Air Preparation Equipment

Air Preparation Filters

Clean Gas Filter SF



- Cartridge type allows for element replacement (SFA100/200/300, SFB100)
- Compact, disposable type for the semiconductor industry (SFB300, SFC100)

| Type | Series | Operating pressure | Filtration [μm] |
|-------------------------------|----------------|---|---|
| Cartridge type disc | SFA100/200/300 | Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa) | 0.01 (Filtration efficiency: 99.99%) |
| Cartridge type straight | SFB100 | Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa) | 0.01 (Filtration efficiency: 99.99%) |
| Disposable type straight | SFB300 | Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa) | 0.01 (Filtration efficiency: 99.99%) |
| Disposable type multiple disc | SFC100 | Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa) | 0.01 (Filtration efficiency: 99.99%) |

Clean Gas Strainer SFB200



| Type | Series | Operating pressure | Filtration [μm] |
|-------------------------|--------|---|------------------------------|
| Cartridge type straight | SFB200 | Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa) | 120 |

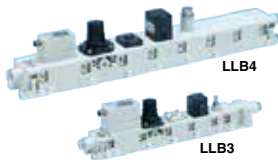
Clean Air Filter/Hollow Fiber Element SFD



- Built-in hollow fiber element
- Pressure drop: 0.03 MPa (Inlet pressure 0.7 MPa, Max. flow rate)
- Compliant with the RoHS Directives regulations regarding the reduction of environmentally detrimental chemicals

| Series | Type | Operating pressure | Filtration [μm] |
|--------|--|--------------------|---|
| SFD100 | Disposable type (Irreplaceable element) | Max. 1.0 MPa | 0.01 (Filtration efficiency: 99.99%) |
| SFD200 | Cartridge type (Replaceable element) | Max. 1.0 MPa | 0.01 (Filtration efficiency: 99.99%) |

Clean Air Module LLB



- Modularized clean equipment (Reduced piping labor/Space saving)
Makes clean air easily available
- Nominal filtration rating: 0.01 μm (Filtration efficiency: 99.99%)
- Wetted parts: Grease-free, Silicone-free
- Assembled in a clean room, Shipped and packed in double packaging
- 24 combinations are available.

*1 Inlet air conditions ISO 8573-1 Quality grade: Equivalent to 1.4.1 to 1.6.1

| Series | Fluid | Set pressure | Flow range [L/min (ANR)] |
|--------|---------------------------------|-----------------|--------------------------|
| LLB3 | Clean air, N ₂ gas*1 | 0.05 to 0.4 MPa | 5 to 100 |
| LLB4 | Clean air, N ₂ gas*1 | 0.05 to 0.4 MPa | 50 to 500 |

Modular F.R.L./Pressure Control Equipment

Modular F.R.L.

Modular F.R.L. Units **AC-A**



- Easy element replacement
The element and the bowl are integrated. Replacement can be done in hand.
- Energy-saving regulator Pressure drop: Max. 50% improvement
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & increased safety
The bowl is covered with a transparent bowl guard.
- Attachments:
Spacer: Y200-A, Y300-A, Y400-A, Y500-A
Spacer with bracket: Y200T-A, Y300T-A, Y400T-A, Y500T-A

| Combination equipment | Series | Port size | Set pressure [MPa] |
|---------------------------------------|----------------|--------------------------------|-----------------------------|
| Air filter, Regulator, Lubricator | AC10 to 40-A | M5, 1/8, 1/4, 3/8, 1/2, 3/4 | 0.05 to 0.7, 0.02 to 0.2 |
| Filter regulator, Lubricator | AC10A to 40A-A | | |
| Air filter, Regulator | AC10B to 40B-A | | |
| Air filter, Mist separator, Regulator | AC20C to 40C-A | 1/8, 1/4, 3/8, 1/2, 3/4 | |
| Filter regulator, Mist separator | AC20D to 40D-A | | |

Air Filter **AF-A**



- Easy element replacement
The element and the bowl are integrated. Replacement can be done in hand.
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & increased safety
The bowl is covered with a transparent bowl guard.

| Series | Port size | Filtration [μ m] |
|--------------|--------------------------------|-----------------------|
| AF10 to 60-A | M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 5 |

Mist Separator **AFM-A**



- Better visibility & increased safety
The bowl is covered with a transparent bowl guard.

| Series | Port size | Filtration [μ m] |
|---------------|-------------------------|-----------------------|
| AFM20 to 40-A | 1/8, 1/4, 3/8, 1/2, 3/4 | 0.3 |

Micro Mist Separator **AFD-A**



- Better visibility & increased safety
The bowl is covered with a transparent bowl guard.

| Series | Port size | Filtration [μ m] |
|---------------|-------------------------|-----------------------|
| AFD20 to 40-A | 1/8, 1/4, 3/8, 1/2, 3/4 | 0.01 |

Regulator **AR-A**



- Energy-saving regulator Pressure drop: Max. 50% improvement

| Series | Port size | Set pressure [MPa] |
|--------------|-----------------------------|--------------------------|
| AR10 to 40-A | M5, 1/8, 1/4, 3/8, 1/2, 3/4 | 0.05 to 0.7, 0.02 to 0.2 |

Modular F.R.L./Pressure Control Equipment

Modular F.R.L.

Lubricator AL-A



- Better visibility & increased safety
The bowl is covered with a transparent bowl guard.
- Semi-standard specifications: 1000 cm³ tank (AL30 to AL60)

| Series | Port size | Bowl capacity [cm ³] |
|--------------|--------------------------------|----------------------------------|
| AL10 to 60-A | M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 7 to 135 |

Filter Regulator AW-A



- Easy element replacement
The element and the bowl are integrated.
Replacement can be done in hand.
- Energy-saving regulator Pressure drop: Max. 50% improvement
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & increased safety
The bowl is covered with a transparent bowl guard.

| Series | Port size | Set pressure [MPa] | Filtration [μm] |
|--------------|-----------------------------|--------------------------|-----------------|
| AW10 to 40-A | M5, 1/8, 1/4, 3/8, 1/2, 3/4 | 0.05 to 0.7, 0.02 to 0.2 | 5 |

Modular F.R.L. Units AC-B



- Better visibility and environmental resistance
- Easy element replacement
The element and the bowl are integrated.
Replacement can be done in hand.
- Reduced required maintenance space: Max. 46% reduction
- Regulator: Set pressure 0.05 to 0.85 MPa, 0.02 to 0.2 MPa
- Choose from a selection of pressure gauges:
Square embedded type pressure gauge, Round type pressure gauge, Digital pressure switch

| Combination equipment | Series | Port size | Set pressure [MPa] |
|---------------------------------------|----------------|----------------------------|-----------------------------|
| Air filter, Regulator, Lubricator | AC20 to 60-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 |
| Filter regulator, Lubricator | AC20A to 60A-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 |
| Air filter, Regulator | AC20B to 60B-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 |
| Air filter, Mist separator, Regulator | AC20C to 40C-B | 1/8, 1/4, 3/8, 1/2, 3/4 | 0.05 to 0.85 0.02 to 0.2 |
| Filter regulator, Mist separator | AC20D to 40D-B | 1/8, 1/4, 3/8, 1/2, 3/4 | 0.05 to 0.85 0.02 to 0.2 |

Regulator AR-B



| Series | Port size | Set pressure [MPa] |
|--------------|----------------------------|-----------------------------|
| AR20 to 60-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 |

Regulator with Backflow Function AR□K-B



- The regulator with backflow function incorporates a mechanism that exhausts the air pressure in the outlet side quickly.

| Series | Port size | Set pressure [MPa] |
|----------------|----------------------------|-----------------------------|
| AR20K to 60K-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 |

Modular F.R.L./Pressure Control Equipment

Modular F.R.L.

High Pressure: Made to Order **AR20 to 60-B-X425**



Stronger materials are used for the manufacturing of regulators intended for high-pressure operation. The modified construction also allows for a wider set pressure range. Refer to the AR series made to order specifications in the AC series catalog for details.

| Series | Proof pressure [MPa] | Max. operating pressure [MPa] | Set pressure range [MPa] | Ambient and fluid temperatures [°C] |
|-------------------|----------------------|-------------------------------|--------------------------|-------------------------------------|
| AR20 to 60-B-X425 | 3.0 | 2.0 | 0.1 to 1.7 | -5 to 60 (No freezing) |

Filter Regulator **AW-B**



| Series | Port size | Set pressure [MPa] | Filtration [μm] |
|--------------|----------------------------|-----------------------------|-----------------|
| AW20 to 60-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 | 5 |

Filter Regulator with Backflow Function **AW□K-B**



- Integrated filter and regulator units save space and require less piping.
- The filter regulator with backflow function incorporates a mechanism that exhausts the air pressure in the outlet side quickly.

| Series | Port size | Set pressure [MPa] | Filtration [μm] |
|----------------|----------------------------|-----------------------------|-----------------|
| AW20K to 60K-B | 1/8, 1/4, 3/8, 1/2, 3/4, 1 | 0.05 to 0.85 0.02 to 0.2 | 5 |

Filter Regulator **AW30/40-X2622**



- Stainless steel 316 and special temperature environment (−40°C) specifications
- Material of external parts: Stainless steel 316
- Ambient and fluid temperatures: −40 to 80°C
- NACE International Standards compliant

| Series | Port size | Set pressure [MPa] | Filtration [μm] |
|---------------|--------------------|--------------------|-----------------|
| AW30/40-X2622 | 1/4, 3/8, 1/2, 3/4 | 0.05 to 0.85 | 5 |

Filter Regulator: Made to Order **AW30-B to AW60-B-X430/X440**



- Special temperature environment:
Special materials are used in the manufacturing of seals and resin parts to allow them to withstand various temperature conditions in cold or tropical (hot) climates.

| Series | Environment | Port size | Set pressure [MPa] | Filtration [μm] |
|-----------------------|--------------------------------|-----------|-----------------------------|-----------------|
| AW30-B to AW60-B-X430 | Low temperature −30 to 60°C | 1/4 to 1 | 0.05 to 0.85 0.02 to 0.2 | 5 |
| AW30-B to AW60-B-X440 | High temperature −5 to 80°C | | | |

Modular F.R.L./Pressure Control Equipment

Modular F.R.L.

Mist Separator Regulator **AWM**



| Series | Port size | Set pressure [MPa] | Filtration [μ m] |
|-------------|--------------------|--------------------|-----------------------|
| AWM20 to 40 | 1/8, 1/4, 3/8, 1/2 | 0.05 to 0.85 | 0.3 |

Micro Mist Separator Regulator **AWD**



| Series | Port size | Set pressure [MPa] | Filtration [μ m] |
|-------------|--------------------|--------------------|-----------------------|
| AWD20 to 40 | 1/8, 1/4, 3/8, 1/2 | 0.05 to 0.85 | 0.01 |

Regulators

Compact Manifold Regulator **ARM5**



- Width: 14 mm
- Select from 2 kinds of mounting methods: Direct mounting and DIN rail mounting
- Standard model comes equipped with backflow function.
- Select from a variety of One-touch fitting sizes.

| Series | Model | Features | Applicable tubing bore size | | Set pressure [MPa] |
|--------|----------------------------|-----------------------|-----------------------------|--------------------|--------------------|
| | | | Metric size | Inch size | |
| ARM5A | Manifold specifications | Common air supply | ø4, ø6, ø8 | ø5/32, ø1/4, ø5/16 | 0.05 to 0.7 |
| ARM5B | Manifold specifications | Individual air supply | ø4, ø6 | ø5/32, ø1/4 | 0.05 to 0.7 |
| ARM5S | Single unit specifications | Individual air supply | ø4, ø6 | ø5/32, ø1/4 | 0.05 to 0.7 |

Compact Manifold Regulator **ARM10/11**



- Free selection in response to positioning conditions
Knob positions: Top/Front/Bottom
Piping directions: Up/Down
One-touch fitting types: Straight/Elbow
- Types and sizes of One-touch fittings can be changed.
- Standard model comes equipped with backflow function.
- Compatible with digital pressure switches

| Series | Model | Features | Applicable tubing bore size | | Set pressure [MPa] |
|--------|----------------------------|-----------------------|-----------------------------|---------------|--------------------|
| | | | Metric size | Inch size | |
| ARM11A | Manifold specifications | Common air supply | ø4 to ø10 | ø5/32 to ø3/8 | 0.05 to 0.7 |
| ARM11B | Manifold specifications | Individual air supply | ø4, ø6 | ø5/32, ø1/4 | 0.05 to 0.7 |
| ARM10 | Single unit specifications | Standard | ø4, ø6 | ø5/32, ø1/4 | 0.05 to 0.7 |
| ARM10F | Single unit specifications | Knob front face | ø4, ø6 | ø5/32, ø1/4 | 0.05 to 0.7 |

Modular F.R.L./Pressure Control Equipment

Regulators

Regulator IR1200-A/2200-A/3200-A



- Air consumption: Bleed air "0"
- High flow rate: Up to approx. twice that of the existing SMC product
- Lightweight: Reduced by up to approx. 27% (Compared to the existing SMC product)
- Repeatability: $\pm 1\%$ (Full span)

| Series | Port size | Set pressure [MPa] |
|----------|---------------|--------------------|
| IR1200-A | 1/8 | 0.02 to 0.2 |
| | | 0.02 to 0.4 |
| | | 0.02 to 0.8 |
| IR2200-A | 1/4 | 0.02 to 0.2 |
| | | 0.02 to 0.4 |
| | | 0.02 to 0.8 |
| IR3200-A | 1/4, 3/8, 1/2 | 0.02 to 0.2 |
| | | 0.02 to 0.4 |
| | | 0.02 to 0.8 |

Precision Regulator IR1000-A/2000-A/3000-A



- Air consumption: Reduced by up to approx. 90% (Compared to the existing SMC product)
- High flow rate: Up to approx. twice that of the existing SMC product
- Lightweight: Reduced by up to approx. 27% (Compared to the existing SMC product)
- Sensitivity: 0.2% (Full span)
- Repeatability: $\pm 0.5\%$ (Full span)

| Series | Port size | Set pressure [MPa] |
|----------|---------------|--------------------|
| IR1000-A | 1/8 | 0.005 to 0.2 |
| | | 0.01 to 0.4 |
| | | 0.01 to 0.8 |
| IR2000-A | 1/4 | 0.005 to 0.2 |
| | | 0.01 to 0.4 |
| | | 0.01 to 0.8 |
| IR3000-A | 1/4, 3/8, 1/2 | 0.01 to 0.2 |
| | | 0.01 to 0.4 |
| | | 0.01 to 0.8 |

Precision Regulator IR



- Tension control
- Contact pressure control
- Setting sensitivity: Within 0.2% F.S.
- Repeatability: Within $\pm 0.5\%$ F.S.

| Series | Port size | Set pressure [MPa] |
|--------|---------------|--------------------|
| IR1000 | 1/8 | 0.005 to 0.2 |
| IR2000 | 1/4 | 0.01 to 0.4 |
| | | 0.01 to 0.8 |
| IR3000 | 1/4, 3/8, 1/2 | 0.01 to 0.2 |
| | | 0.01 to 0.4 |
| | | 0.01 to 0.8 |

Vacuum Regulator IRV



- Allows for the adjustment of vacuum line pressure
- Single-sided connection series
- Weight reduced by 20% (Compared with the existing IRV2000 with IRV20 fitting)
- Built-in One-touch fittings
- The pressure gauge and digital pressure switch can be easily attached/detached due to being attached by a clip.
- Mounting direction of the pressure gauge and digital pressure switch can be changed. (Standard connections only)
- Mounting angle of the pressure gauge and digital pressure switch can be changed easily (in 60 degree increments).

| Series | Port size | Set pressure range [kPa] |
|--------|---|--------------------------|
| IRV10 | $\phi 6$, $\phi 8$, $\phi 1/4$, $\phi 5/16$ | -100 to -1.3 |
| IRV20 | $\phi 6$, $\phi 8$, $\phi 10$, $\phi 1/4$, $\phi 5/16$, $\phi 3/8$ | -100 to -1.3 |

Modular F.R.L./Pressure Control Equipment

Regulators

Clean Regulator **SRH**



- Contamination-controlled stainless steel regulator
- Oil-free
- 2 types of diaphragm materials: PTFE, Fluororubber

| Series | Relief mechanism | Port size | Set pressure [MPa] |
|--------|------------------|---|---|
| SRH | Non-relief | Rc1/8, 1/4, 3/8, 1/2 9/16-18UNF, 7/8-14UNF | Low pressure type: 0.02 to 0.2 High pressure type: 0.05 to 0.7 |
| SRH | Relief | Rc1/8, 1/4, 3/8, 1/2 | |

Precision Clean Regulator **SRP**



- High-precision low flow consumption stainless steel regulator
- Bleed air flow of 0.5 L/min (ANR) or less (0.2 MPa at outlet pressure)
- Setting sensitivity: 0.3% F.S.
- Repeatability: 1% F.S.

| Series | Port size | Set pressure [MPa] |
|--------|-----------|--|
| SRP | M5, 1/8 | Low pressure type: 0.005 to 0.2 High pressure type: 0.01 to 0.4 |

Clean Regulator/Fluororesin Type **SRF**



- Wetted parts Body: New PFA, Diaphragm: PTFE
- Recommended maximum flow rate: 20 L/min (SRF50), (Inlet pressure: 0.3 MPa, Fluid: Water)

| Series | Type | Applicable tubing O.D. | | Set pressure [MPa] |
|--------|-------------------------|------------------------|---------------------------|--------------------|
| | | Metric size | Inch size | |
| SRF | Integrated with fitting | ø4 to ø19 | ø1/8 to ø3/4 | 0.02 to 0.4 |
| SRF | With nut | Fitting size: 2 to 6 | Fitting size: 2 to 6 | 0.02 to 0.4 |
| SRF | Tube extension | — | Tubing O.D.: ø1/4 to ø3/4 | 0.02 to 0.4 |

Direct Operated Regulator for 6.0 MPa (Relieving Type) **VCHR**



- Service life: 10 million times
- Improved durability in high-pressure environments using a polyurethane elastomer poppet
- Uses NSF-H1 approved grease on guide rings (sliding parts)
- Improved durability using a metal seal type relief valve
- Uses special fluororesin seals for sliding parts
- Stable unattached response, Not easily affected by pressure

| Series | Model | Type | Port size | Set pressure [MPa] |
|--------|-----------|---|----------------|--|
| VCHR | VCHR30/40 | Direct operated regulator (Relieving type) | G3/4, 1, 1 1/2 | 0.5 to 5.0 (Max. operating pressure: 6.0) |

Proportional Valves

Compact Proportional Solenoid Valve **PVQ**



- Stepless control of flow rate in proportion to current
- Repeatability: 3% or less
- Hysteresis: 10% or less

| Series | Flow control range [L/min] | Fluid |
|--------|----------------------------|----------------|
| PVQ | 0 to 5 | Air, inert gas |
| | 0 to 6 | |
| | 0 to 75 | |
| | 0 to 100 | |

Modular F.R.L./Pressure Control Equipment

Electro-Pneumatic Regulators

Electro-Pneumatic Regulator **ITV**



- Stepless control of air pressure in proportion to electrical signals
- Sensitivity: 0.2 kPa (100 kPa specification)
- Linearity: $\pm 1\%$ or less (F.S.)
- Hysteresis: 0.5% or less (F.S.)
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C

| Series | Port size | Set pressure [MPa] |
|---------|---|--|
| ITV0000 | Built-in One-touch fitting $\phi 4, \phi 5/32$ | 0.001 to 0.1 0.001 to 0.5 0.001 to 0.9 -1 to -100 kPa |
| ITV1000 | 1/8, 1/4 | 0.005 to 0.1 |
| ITV2000 | 1/4, 3/8 | 0.005 to 0.5 |
| ITV3000 | 1/4, 3/8, 1/2 | 0.005 to 0.9 |

Electronic Vacuum Regulator **ITV**



- Stepless control of vacuum pressure in proportion to electrical signals
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C

| Series | Port size | Set pressure [MPa] |
|---------|---------------------------------------|--------------------|
| ITV009□ | $\phi 4, \phi 5/32$ One-touch fitting | -1 to -100 |
| ITV209□ | 1/4 | -1.3 to -80 |

5.0 MPa Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator **ITVX**



- Stepless control of air pressure proportional to electrical signals
- Maximum supply pressure: 5.0 MPa
- Set pressure range: 0.01 to 3.0 MPa
- Maximum flow rate: 3000 L/min (ANR)
- Fluid: Air, N₂, O₂, Ar
- Wetted parts: Fluorine grease

| Series | Port size | Set pressure [MPa] |
|--------|-----------|--------------------|
| ITVX | 3/8 | 0.01 to 3.0 |

3.0 MPa Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator **ITVH**



- Maximum supply pressure: 3.0 MPa
- Set pressure range: 0.2 to 2.0 MPa
- Stepless control of air pressure up to 2.0 MPa
- Stability: $\pm 1\%$ F.S. or less
- Power consumption: 3 W or less
- Maximum flow rate: 3,000 L/min (ANR)
- Wetted parts: Fluorine grease

| Series | Port size | Set pressure [MPa] |
|--------|-----------|--------------------|
| ITVH | 1/4, 3/8 | 0.2 to 2.0 |

■ Trademark

- DeviceNet™ is a trademark of ODVA.

Fittings and Tubing

Fittings for General Purposes

One-touch Fittings **KQ2**

Applicable tubing: Metric size



Applicable tubing: Inch size



- Can be used in vacuum to -100 kPa
- Body types: Total of 51 models
- Thread material/Surface treatment (Treated or Non-treated): 2 types
- Selectable surface treatments: Brass (No plating), Brass + Electroless nickel plating
- Applicable tubing O.D.
 - Round Type
 - Metric: $\phi 2$, $\phi 3.2$, $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$, $\phi 16$
 - Inch: $\phi 1/8"$, $\phi 5/32"$, $\phi 3/16"$, $\phi 1/4"$, $\phi 5/16"$, $\phi 3/8"$, $\phi 1/2"$
 - Oval Type
 - Metric: $\phi 3.2$, $\phi 4$, $\phi 6$
 - Inch: $\phi 1/8"$, $\phi 5/32"$, $\phi 3/16"$
- Connection thread
 - Metric: M3, M5, M6
 - R, Rc: 1/8, 1/4, 3/8, 1/2
 - G: 1/8, 1/4, 3/8, 1/2
 - NPT: 10-32UNF, 1/16, 1/8, 1/4, 3/8, 1/2
 - Uni: 1/8, 1/4, 3/8, 1/2
- Seal method
 - Sealant/Gasket seal
 - Face seal
 - Gasket seal (Uni thread)

| Series | Release button shape | Size | Connection thread |
|--------|----------------------|--------------|-----------------------|
| KQ2 | Oval type | Metric, Inch | M, R, Rc, G, NPT, Uni |
| KQ2 | Round type | Metric, Inch | M, R, Rc, G, NPT, Uni |

Metal One-touch Fittings **KQB2**



- Compact and lightweight
- Fluid temperature: -5 to 150°C
- Brass parts: Electroless nickel-plated
- Grease-free

| Series | Size | Applicable tubing O.D. | Connection thread |
|--------|--------|---|-----------------------------------|
| KQB2 | Metric | $\phi 3.2$, $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$, $\phi 16$ | M5 R, Rc, G 1/8, 1/4, 3/8, 1/2 |
| KQB2 | Inch | $\phi 1/8"$, $\phi 5/32"$, $\phi 1/4"$, $\phi 5/16"$, $\phi 3/8"$, $\phi 1/2"$ | UNF10-32 NPT1/8, 1/4, 3/8, 1/2 |

Insert Fittings **KF**



- Vacuum -101.3 kPa applicable
- Piping can be done without removing the nut.
- Fluid temperature: -5 to 150°C (Brass sleeve)
-5 to 60°C (Resin sleeve)
- Steam can be used.
- Grease-free

| Series | Applicable tubing O.D. | Connection thread |
|--------|--|--------------------|
| KF | $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$ | 1/8, 1/4, 3/8, 1/2 |

Miniature Fittings **M**



- Compact and doesn't require tools for connection
- Compact piping space
- Hose nipple, Hose elbow, Barb

| Series | Applicable tubing O.D. | Connection thread |
|--------|----------------------------------|-------------------|
| M-□□-2 | $\phi 2$ | M3, M5 |
| M | $\phi 3.2$, $\phi 4$, $\phi 6$ | M3, M5, 1/8 |

Fittings and Tubing

Fittings for General Purposes

Self-align Fittings **H/DL/L/LL**



- Applicable for use on soft copper steel pipes
- Flared ridge metal ferrule

| Series | Applicable tubing O.D. | Connection thread |
|--------|------------------------|--------------------|
| H | ø4, ø6, ø8, ø10, ø12 | 1/8, 1/4, 3/8, 1/2 |
| DL | ø4, ø6, ø8, ø10, ø12 | 1/8, 1/4, 3/8, 1/2 |
| L | ø4, ø6, ø8, ø10, ø12 | 1/8, 1/4, 3/8, 1/2 |
| LL | ø4, ø6, ø8, ø10, ø12 | 1/8, 1/4, 3/8, 1/2 |

Fittings for General Purposes (S Couplers)

S Couplers **KK130**



- Cv factor: Increased by 34%*1
 - Plug insertion force: Reduced by 22% (20 N)*1
 - Lightweight: Weight reduced by 14% (12 g)*1
- *1 Compared to the existing model

| Series | Applicable tubing O.D. | Connection thread [R, NPT] |
|--------|---|----------------------------|
| KK130 | ø6, ø8, ø10, ø12 ø1/4", ø5/16", ø3/8", ø1/2" | 1/8, 1/4, 3/8, 1/2 |

Fittings for Special Environments

Stainless Steel 316 One-touch Fittings **KQG2**



- Compact and lightweight
 - Fluid temperature: -5 to 150°C
 - Materials: Metal parts stainless steel 316, seal parts special FKM
 - Grease-free/Can be used with steam
- Certified to meet current Food Sanitation Law standards

| Series | Size | Applicable tubing O.D. | Connection thread |
|--------|--------|--|-----------------------------------|
| KQG2 | Metric | ø3.2, ø4, ø6, ø8, ø10, ø12, ø16 | M5 R, Rc 1/8, 1/4, 3/8, 1/2 |
| KQG2 | Inch | ø1/8", ø5/32", ø1/4", ø5/16", ø3/8", ø1/2" | UNF10-32 NPT1/8, 1/4, 3/8, 1/2 |

Stainless Steel One-touch Fittings **KQ2-G**



- Metal material: Stainless steel 303
 - Improved tube insertion/removal: Insertion force reduced by up to 30%, Removal force reduced by up to 20%
 - Compact and lightweight
- Dimensions: Height 24% shorter, Length 23% shorter, Weight 57% lighter
- Body types: Total of 27 models

| Series | Size | Applicable tubing O.D. | Connection thread |
|--------|--------|---------------------------|--------------------------------|
| KQ2-G | Metric | ø4, ø6, ø8, ø10, ø12, ø16 | M5 R, Rc 1/8, 1/4, 3/8, 1/2 |

Stainless Steel One-touch Fittings **KG**



- Can be used in corrosive conditions
- Metal parts: Stainless steel 303

| Series | Applicable tubing O.D. | Connection thread |
|--------|---------------------------|--|
| KG | ø4, ø6, ø8, ø10, ø12, ø16 | M5 x 0.8, M6 x 1.0 1/8, 1/4, 3/8, 1/2 |

Fittings and Tubing

Fittings for Special Environments

Stainless Steel 316 Insert Fittings **KFG2**



- Compact and lightweight
- Fluid temperature: -65 to 260°C (Swivel elbow: -5 to 150°C)
- Material: Stainless steel 316
Rubber materials are not used. (Excluding the swivel elbow)
- Grease-free/Can be used with steam
Certified to meet current Food Sanitation Law standards

| Series | Size | Applicable tubing O.D. | Connection thread |
|--------|--------|--|--------------------------|
| KFG2 | Metric | ø4, ø6, ø8, ø10, ø12, ø16 | R, Rc 1/8, 1/4, 3/8, 1/2 |
| KFG2 | Inch | ø1/8", ø5/32", ø1/4", ø5/16" ø3/8", ø1/2" | NPT1/8, 1/4, 3/8, 1/2 |

Miniature Fittings Stainless Steel 316 **MS**



- Can be used in corrosive conditions
- Compact piping space
- Hose nipple, Hose elbow, Barb

| Series | Applicable tubing O.D. | Connection thread |
|--------|------------------------|-------------------|
| MS | ø3.2, ø4, ø6 | M5 |

S Couplers Stainless Steel Type **KKA**



- Body material: Stainless steel 304
- Seal material: Fluoropolymer (Special FKM) is employed.
- Grease-free
- Check valve built in to both plug and socket

| Series | Connection thread |
|--------|--|
| KKA | 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2 |

Fittings for Special Environments (Clean/Fluoropolymer)

Clean One-touch Fittings for Blowing **KP**



- One-touch fittings for clean room blowing systems
- Completely oil-free (Fluoro-coated rubber portions)
- Wetted parts are non-metallic.
- Parts washed and assembled in a clean room, Packed in double packaging.
- Can be used in a vacuum (-100 kPa)

| Series | Applicable tubing O.D. | Connection thread |
|--------|------------------------|--------------------|
| KP | ø4, ø6, ø8, ø10, ø12 | 1/8, 1/4, 3/8, 1/2 |

Clean One-touch Fittings for Driving Air Piping **KPQ/KPG**



- One-touch fittings suitable for driveline air systems in clean room environments
- Resin parts: Polypropylene
- All metal portions: Brass (Electroless nickel-plated) KPQ
Stainless steel (Stainless steel 304) KPG

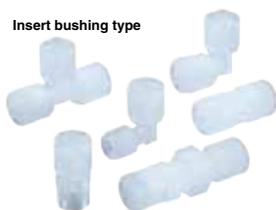
| Series | Applicable tubing O.D. | Connection thread |
|--------|------------------------|------------------------|
| KPQ | ø4, ø6, ø8, ø10, ø12 | M5, 1/8, 1/4, 3/8, 1/2 |
| KPG | ø4, ø6, ø8, ø10, ø12 | M5, 1/8, 1/4, 3/8, 1/2 |

Fittings and Tubing

Fittings for Special Environments (Clean/Fluoropolymer)

Fluoropolymer Fittings Hyper Fittings LQ1

Insert bushing type



- Material: New PFA
- Quadruple-seal construction
- The reducer method allows for tubing size changes without replacing the body

| Series | Max. operating pressure | Operating temperature |
|--------|-------------------------|-----------------------|
| LQ1 | 1.0 MPa | 0 to 200°C |

Fluoropolymer Fittings Hyper Fittings LQ3

Flare type



- Material: New PFA
- Triple-seal construction
- Easy installation

| Series | Max. operating pressure | Operating temperature |
|--------|-------------------------|---|
| LQ3 | 1.0 MPa | Nut material PVDF: 0 to 150°C Nut material PFA: 0 to 200°C |

Fluoropolymer Bore Through Connector LQHB



- It is possible to freely choose the tube positioning. As the tube runs through the fitting itself, a setting is available for any desired position.
- Can be used in the pressure feed of chemicals, etc., during the production process of semiconductors
- Applicable to chemicals such as acid, alkali, and deionized water
- Materials: New PFA (Body, nut), PTFE (Collet)

| Series | Applicable tubing O.D. | | Operating temperature [°C] |
|--------|------------------------|--------------|----------------------------|
| | Metric size | Inch size | |
| LQHB | ø3 to ø25 | ø1/8" to ø1" | 0 to 200 |

Tubing

Nylon Tubing T



- General pneumatic tubing
- Max. operating pressure: 3.0 MPa (T0604, at 20°C)

| Series | Tubing O.D. | | Color | Fluid |
|--------|-----------------------------|--------------------------------------|--|------------|
| | Metric size | Inch size | | |
| T/TIA | ø4, ø6, ø8, ø10 ø12, ø16 | ø1/8", ø3/16", ø1/4" ø3/8", ø1/2" | Black, White, Red, Blue, Yellow, Green | Air, Water |

Soft Nylon Tubing TS



- Max. operating pressure: 1.0 MPa (at 20°C)

| Series | Tubing O.D. | | Color | Fluid |
|---------|-----------------------------|--------------------------------------|--|------------|
| | Metric size | Inch size | | |
| TS/TISA | ø4, ø6, ø8, ø10 ø12, ø16 | ø1/8", ø3/16", ø1/4" ø3/8", ø1/2" | Black, White, Red, Blue, Yellow, Green | Air, Water |

Tubing

Polyurethane Tubing TU



- Max. operating pressure: 0.8 MPa (at 20°C)

| Series | Tubing O.D. | | Color | Fluid |
|---------|---------------------------------|--------------------------------------|--|------------|
| | Metric size | Inch size | | |
| TU/TIUB | ø2, ø4, ø6, ø8 ø10, ø12, ø16 | ø1/8", ø3/16", ø1/4" ø3/8", ø1/2" | Black, White, Red, Blue, Yellow, Green, Clear, Orange, and more (Total 29 colors) | Air, Water |

Soft Polyurethane Tubing TUS



- Max. operating pressure: 0.6 MPa (at 20°C)

| Series | Tubing O.D. | Color | Fluid |
|--------|----------------------|--|-------|
| TUS | ø4, ø6, ø8, ø10, ø12 | Black, White, Red, Blue, Yellow, Green, Translucent, Yellow-brown | Air |

Hard Polyurethane Tubing TUH



- Superior restoring force compared to the nylon tubing

| Series | Type | Max. operating pressure | Tubing O.D. | Color | Fluid |
|--------|--------------------|-------------------------|-------------|---------------------------------|-------|
| TUH | Standard type | 0.8 MPa (at 20°C) | ø4, ø6, ø8 | Black, White, Blue, Translucent | Air |
| TUH | High-pressure type | 1.0 MPa (at 20°C) | ø10, ø12 | Black, White, Blue, Translucent | Air |

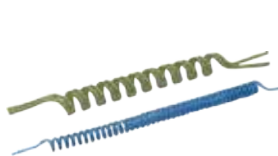
Wear Resistant Tubing TUZ



- Abrasion: Approx. 1/3 (Compared with SMC's TU series polyurethane tubing)

| Series | Tubing O.D. | Color | Fluid |
|--------|---------------------------------------|--|------------|
| | Metric size | | |
| TUZ | ø2, ø3.2, ø4, ø6, ø8 ø10, ø12, ø16 | Black, White, Red, Blue, Yellow, Green | Air, Water |

Polyurethane Coil Tubing TCU



- Flexible
- Max. operating pressure: 0.8 MPa (at 20°C)
- For moving applications
- * Colors other than black are available as made-to-order specifications.

| Series | Tubing O.D. | Color | Number of cores | Fluid |
|--------|-------------|-------|-----------------|-------|
| TCU | ø4, ø6, ø8 | Black | 1, 2, 3 | Air |

Fittings and Tubing

Tubing

Polyurethane Flat Tubing **TFU**



- Max. operating pressure: 0.8 MPa (at 20°C)
- Compact piping

| Series | Tubing O.D. | Color | Number of cores | Fluid |
|--------|-------------|-------|-----------------|-------|
| TFU | ø4, ø6, ø8 | Black | 2, 3 | Air |

Compatible with Food Sanitation Law: Polyurethane Tubing **TU-X217**



- In compliance with the Food Sanitation Law
Testing in compliance with Japan's Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959

| Series | Tubing O.D. | Color | Fluid |
|---------|----------------------|---------------------------|------------|
| TU-X217 | ø4, ø6, ø8, ø10, ø12 | Black, White, Blue, Clear | Air, Water |

Tubing (Fluoropolymer/Clean)

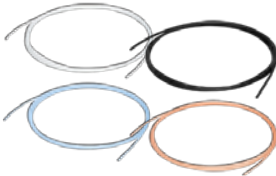
Fluoropolymer Tubing **TL/TIL**



- Max. operating pressure: 1.0 MPa (at 20°C)
- Max. operating temperature: 260°C (This may vary according to operating pressure.)

| Series | Tubing O.D. | | Color |
|--------|-------------------------------------|--|-------------|
| | Metric size | Inch size | |
| TL/TIL | ø2, ø3, ø4, ø6, ø8, ø10 ø12, ø19 | ø1/8", ø3/16", ø1/4" ø3/8", ø1/2", ø3/4", ø1" | Translucent |

Fluoropolymer Tubing (PFA) **TLM/TILM**



- Max. operating temperature: 260°C (This may vary according to operating pressure.)
- Food Sanitation Law compliant
- Complies with the FDA (Food and Drug Administration) § 177-1550 dissolution test

| Series | Tubing O.D. | | Color |
|----------|---|---|-------------------------------|
| | Metric size | Inch size | |
| TLM/TILM | ø2, ø3, ø4, ø6, ø8, ø10 ø12, ø16, ø19, ø25 | ø1/8", ø3/16", ø1/4", ø3/8" ø1/2", ø3/4", ø1", ø1 1/4" | Translucent, Black, Red, Blue |

FEP Tubing (Fluoropolymer) **TH/TH**



- Max. operating pressure: 2.3 MPa (at 20°C)*1
 - Food Sanitation Law compliant
 - Complies with the FDA (Food and Drug Administration) § 177-1550 dissolution test
 - Max. operating temperature: 200°C (This may vary according to operating pressure.)
- *1 This may vary according to size.

| Series | Tubing O.D. | | Color |
|--------|----------------------|---|-------------------------------|
| | Metric size | Inch size | |
| TH/TH | ø4, ø6, ø8, ø10, ø12 | ø1/8", ø3/16", ø1/4", ø3/8", ø1/2", ø3/4" | Translucent, Black, Red, Blue |

Tubing (Fluoropolymer/Clean)

Soft Fluoropolymer Tubing TD/TID



- Max. operating pressure: 1.6 MPa (at 20°C)*1
 - Food Sanitation Law compliant
 - Complies with the FDA (Food and Drug Administration) § 177-1550 dissolution test
 - Max. operating temperature: 260°C (This may vary according to operating pressure.)
- *1 This may vary according to size.

| Series | Tubing O.D. | | Color |
|--------|----------------------|------------------------------------|-------------|
| | Metric size | Inch size | |
| TD/TID | ø4, ø6, ø8, ø10, ø12 | ø1/8", ø3/16", ø1/4", ø3/8", ø1/2" | Translucent |

Clean Series Tubing 10-T□

Polyurethane Tubing 10-TU



- Flexible tubing 0.8 MPa max. (at 20°C)
- *1 Only black and blue are available for the inch size.

| Series | Tubing O.D. | | Color*1 |
|--------|----------------------|-----------|---|
| | Metric size | Inch size | |
| 10-TU | ø4, ø6, ø8, ø10, ø12 | ø1/8" | Black, White, Red, Blue, Yellow, Green, Clear, Orange |

Polyurethane Coil Tubing 10-TCU



- Flexible for moving applications

| Series | Tubing O.D. | Color | Number of cores |
|--------|-------------|-------|-----------------|
| 10-TCU | ø4, ø6, ø8 | Black | 1, 2, 3 |

Polyurethane Flat Tubing 10-TFU



- Flexible multi-core tubing

| Series | Tubing O.D. | Color | Number of cores |
|--------|-------------|-------|-----------------|
| 10-TFU | ø4, ø6, ø8 | Black | 2, 3 |

Polyolefin Tubing TPH



- Max. operating pressure (at 20°C): 1.0 MPa (ø4, ø6), 0.7 MPa (ø8, ø10, ø12)

| Series | Applicable tubing O.D. | Color | Fluid |
|--------|------------------------|--|------------------|
| TPH | ø4, ø6, ø8, ø10, ø12 | Black, White, Red, Blue, Yellow, Green | Air, Water, etc. |

Soft Polyolefin Tubing TPS



- Max. operating pressure (at 20°C): 0.7 MPa (ø4 to ø12)

| Series | Applicable tubing O.D. | Color | Fluid |
|--------|------------------------|--|------------------|
| TPS | ø4, ø6, ø8, ø10, ø12 | Black, White, Red, Blue, Yellow, Green | Air, Water, etc. |

Flow Control Equipment

Speed Controllers for General Purposes

Elbow Type/Universal Type/Push-lock Type AS



- Easy to lock push-lock type
 - Larger knob
 - Improved tube insertion/removal
Insertion force: Max. 30% (8 N) reduction
Removal force: Max. 20% (5 N) reduction*1
 - Electroless nickel plated type is standard.
 - 360° swivel piping is possible. (Universal type)
 - Available with a restrictor (Made to order: -X214, -X21)
- *1 Tube removal strength is ensured to be equivalent to the previous model.

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|----------------|------------------|---|------------------------|----------------|
| | | | Metric size | Inch size |
| Elbow type | AS12□1F to 42□1F | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø2 to ø16 | ø1/8" to ø1/2" |
| Universal type | AS13□1F to 43□1F | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø3.2 to ø12 | ø1/8" to ø1/2" |

Speed Controller with Indicator AS-FS



- The numerical indication of knob rotations for flow rate reduces flow setting time and setting errors. The value can be controlled with the indicator window.
- Improved reproducibility of flow rate
- Easier to insert and remove tubes
- Electroless nickel plated type is standard.
- Available with a restrictor (Made to order: -X214, -X21)

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|----------------|--------------------|---|------------------------|---------------|
| | | | Metric size | Inch size |
| Elbow type | AS12□1FS to 42□1FS | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø2 to ø16 | ø1/8" to 1/2" |
| Universal type | AS13□1FS to 43□1FS | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø3.2 to ø12 | ø1/8" to 1/2" |

In-line Type AS



- Reduces labor time
Easy to use push-lock type
Knob O.D.: Almost doubled
- Improved reproducibility of flow rate
- Lightweight: Weight reduced by approx. 27%
- Electroless nickel plated type is standard.

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--------------|--------------------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| In-line type | AS2002F to AS4002F | — | ø3.2 to ø12 | ø1/8" to ø1/2" |

Speed Controller with Indicator/In-line Type AS-FS



- The numerical indication of knob rotations for flow rate reduces flow setting time and setting errors.
Flow rate can be controlled numerically with the indicator window.
4 indicator window directions are available.
- Larger push-lock type knob
- Improved reproducibility of flow rate
- Electroless nickel plated type is standard.

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--------------|----------------------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| In-line type | AS1002FS to AS4002FS | — | ø3.2 to ø12 | ø1/8" to ø1/2" |

Flow Control Equipment

Speed Controllers for General Purposes

Uni Elbow Type/Universal Type/Push-lock Type **AS**



- Easy to lock push-lock type
- Larger knob
- Improved tube insertion/removal
- Electroless nickel plated type is standard.
- 360° swivel piping is possible. (Universal type)

Insertion force: Max. 30% (8 N) reduction
Removal force: Max. 20% (5 N) reduction*1

*1 Tube removal strength is ensured to be equivalent to the previous model.

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|------------------------------|------------------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| Elbow type Uni thread | AS22□1F to 42□1F | Uni 1/8 to 1/2 | ø3.2 to ø16 | ø1/8" to ø1/2" |
| Universal type Uni thread | AS23□1F to 43□1F | Uni 1/8 to 1/2 | ø3.2 to ø12 | ø1/8" to ø1/2" |

Speed Controller with Indicator/Uni Thread Type **AS-FS**



- The numerical indication of knob rotations for flow rate reduces flow setting time and setting errors. The value can be controlled with the indicator window.
- Improved reproducibility of flow rate
- Easier to insert and remove tubes
- Electroless nickel plated type is standard.
- Larger push-lock type knob

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--------------------------|--------------------|--------------------------------|------------------------|---------------|
| | | | Metric size | Inch size |
| Elbow type Uni thread | AS22□1FS to 42□1FS | Uni 1/8 to 1/2 | ø3.2 to ø16 | ø1/8" to 1/2" |

Dual Speed Controller **ASD**



- Enables bi-directional flow control with a speed controller (Meter-in and meter-out)
- Prevents cylinders from lurching
- Speed control of single acting cylinders

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|-----------------------|--------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| Dual speed controller | ASD | M5 to 1/2 | ø4 to ø12 | ø1/8" to ø3/8" |

Speed Controllers for Special Environments

Stainless Steel: Elbow Type/Universal Type/Push-lock Type

AS-FG



- Stainless steel type
 - Easy to lock push-lock type
 - Larger knob
 - Improved tube insertion/removal
Insertion force: Max. 30% (8 N) reduction
Removal force: Max. 20% (5 N) reduction*1
 - 360° swivel piping is possible. (Universal type)
 - Available with a restrictor (Made to order: -X214, -X21)
- *1 Tube removal strength is ensured to be equivalent to the previous model.

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--|--------------------|---|------------------------|----------------|
| | | | Metric size | Inch size |
| Elbow type Stainless steel type | AS12□1FG to 42□1FG | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø2 to ø16 | ø1/8" to ø1/2" |
| Universal type Stainless steel type | AS13□1FG to 43□1FG | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø3.2 to ø12 | ø1/8" to ø1/2" |

Stainless Steel Type Speed Controller with Indicator AS-FSG



- Stainless steel type
- The numerical indication of knob rotations for flow rate reduces flow setting time and setting errors. The value can be controlled with the indicator window.
- Larger push-lock type knob
- Improved reproducibility of flow rate
- Easier to insert and remove tubes
- Available with a restrictor (Made to order: -X214, -X21)

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--|----------------------|---|------------------------|---------------|
| | | | Metric size | Inch size |
| Elbow type Stainless steel type | AS12□1FSG to 42□1FSG | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø2 to ø16 | ø1/8" to 1/2" |
| Universal type Stainless steel type | AS13□1FSG to 43□1FSG | M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2 | ø3.2 to ø12 | ø1/8" to 1/2" |

Stainless Steel Type/In-line Type AS-FG



- Stainless steel type
- Reduces flow setting time
Easy to use push-lock type
Knob O.D.: Almost doubled
- Improved reproducibility of flow rate
- Lightweight: Weight reduced by approx. 27%

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--------------------------------------|----------------------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| In-line type Stainless steel type | AS2002FG to AS4002FG | — | ø3.2 to ø12 | ø1/8" to ø1/2" |

Stainless Steel Type Speed Controller with Indicator/In-line Type

AS-FSG



- Stainless steel type
- The numerical indication of knob rotations for flow rate reduces flow setting time and setting errors. Flow rate can be controlled numerically with the indicator window. 4 indicator window directions are available.
- Larger push-lock type knob
- Improved reproducibility of flow rate

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--------------------------------------|------------------------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| In-line type Stainless steel type | AS1002FSG to AS4002FSG | — | ø3.2 to ø12 | ø1/8" to ø1/2" |

Flow Control Equipment

Speed Controllers for Special Environments

Stainless Steel Speed Controller (Elbow Type) **ASG**



- Material: Stainless steel 316
- Seal: Special FKM
- Seat ring: Stainless steel 303

- Applicable tubing materials:
FEP, PFA, Nylon, Soft nylon, Polyurethane,
Polyolefin

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. |
|------------|--------|--------------------------------|------------------------|
| Elbow type | ASG | M5 to 1/2 | ø4 to ø12 |

Clean Speed Controller with One-touch Fitting **AS-FPQ/FPG**



- Low particle generation type speed controller suitable for use in clean rooms
- AS-FPQ: Electroless nickel-plated brass
- AS-FPG: Stainless steel 304
- AS-FPQ, AS-FPG: Polypropylene resin (Resin parts)

| Series | Port size | Applicable tubing O.D. |
|--------|-------------------------------|------------------------|
| AS-FPQ | M5 x 0.8, R1/8, 1/4, 3/8, 1/2 | ø4 to ø12 |
| AS-FPG | M5 x 0.8, R1/8, 1/4, 3/8, 1/2 | ø4 to ø12 |

Speed Controllers with Special Functions

Speed Controller with Pilot Check Valve **ASP**



- Integrated pilot check valve and speed controller
- Realizes momentary intermediate stoppage of a cylinder and is able to adjust its speed

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|---|--------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| Speed controller with pilot check valve | ASP | 1/8 to 1/2 | ø6 to ø12 | ø1/4" to ø1/2" |

Air Saving Speed Controllers

Air Saving Speed Controller **AS-R/AS-Q**



- Reduce air consumption just by mounting to an air cylinder.
- Air consumption reduced by 25%
- Mounting and operation are the same as regular speed controller.
- Equal response time
- No delay of response time with 2-pressure control

- Compact: 85% reduction
The functions of the regulator and speed controller have been integrated.

| Type | Series | Port size on the cylinder side | Applicable tubing O.D. | |
|--|----------------|--------------------------------|------------------------|----------------|
| | | | Metric size | Inch size |
| Elbow type With pressure reduction function | AS22R to AS42R | R, NPT, G 1/8 to 1/2 | ø6 to ø12 | ø1/4" to ø1/2" |
| Elbow type With rapid supply and exhaust function | AS22Q to AS42Q | R, NPT, G 1/4 to 1/2 | ø6 to ø12 | ø1/4" to ø1/2" |

Flow Control Equipment/Silencers

Related Equipment

Restrictor **AS-X214/AS-X21**



- Restrictor (Without check valve): -X214
- Grease-free (Seal: Fluorine-coated) + Restrictor (Without check valve): -X21
- Speed controller without check valve specifications
External dimensions, specifications, etc., are the same as those of each respective speed controller.

Check Valve **AK**



| Type | Series | Port size | Applicable tubing O.D. | |
|-----------------------------|---|------------|------------------------|-----------------|
| | | | Metric size | Inch size |
| In-line type | AK2000/AK4000 AK6000 | 1/8 to 1 | — | — |
| Straight type | AKH | — | ø4 to ø12 | ø5/32" to ø1/2" |
| Male connector type | AKH | M5 to 1/2 | ø4 to ø12 | ø5/32" to ø1/2" |
| Bushing type | AKB | 1/8 to 1/2 | — | — |
| Made to order for air/water | · Body materials: Brass, Stainless steel · Rubber materials: NBR, FKM, CR · High temperature, low temperature · Low cracking | | 1/8 to 1/2 | — |

725 psi (5.0 MPa) Check Valve **VCHC40**



- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet

| Type | Series | Port size | Operating pressure |
|-------------------|--------|-----------|-----------------------------------|
| 725 psi (5.0 MPa) | VCHC40 | 3/4, 1 | 7.25 to 725 psi (0.05 to 5.0 MPa) |

Silencers

Silencers **AN**



| Series | Features |
|--------------|---|
| AN05 to 40 | <ul style="list-style-type: none"> • Compact and lightweight • Noise reduction: 30 dB (A) |
| AN10 to 30-C | <ul style="list-style-type: none"> • Can connect with One-touch fitting directly • Noise reduction: 30 dB (A) |

Silencer/BC Sintered Body Type **AN**



| Series | Features |
|--------|---|
| AN | <ul style="list-style-type: none"> • BC sintered body type • Noise reduction: 13, 16, 18, 21 dB (A) |

5.0 MPa Silencer **VCHN**



- Reduces clogging with its double-layer structure
- Noise reduction: 35 dB (A)

Exhaust Cleaners/Blow Guns

Exhaust Cleaners

Exhaust Cleaner for Clean Room AMP



- An exhaust cleaner that can be used inside a clean room

| Series | Filtration [μm] | Maximum flow capacity [L/min (ANR)] | Port size |
|--------|-----------------------------------|-------------------------------------|--------------------|
| AMP | 0.01 (Filtration efficiency: 95%) | 200 to 1000 | 1/4, 3/8, 1/2, 3/4 |

Clean Exhaust Filter SFE



- This filter enables the direct exhaust of air in a clean room. (Cleanliness class 4: ISO14644-1)
Air can be directly exhausted in a clean room by simply mounting this product to the pneumatic equipment in the clean room.
- Piping for exhaust air and relief air is not required. Reduces piping installation work and space
- Noise reduction: 30 dB (A) or more
- One-touch fitting type is available.

| Series | Filtration [μm] | Maximum flow capacity [L/min (ANR)] | Port size |
|--------|---|-------------------------------------|--|
| SFE | 0.01 (Filtration efficiency: 99.99%) | 3, 30, 65, 130, 200 | M5 x 0.8, R1/8, R1/4 $\phi 4$, $\phi 6$, $\phi 8$, $\phi 10$ |

Blow Guns

Blow Gun VMG



- A 20% reduction in power consumption can be achieved with the SMC "Blow gun" + "S coupler" + "Coil tube."
- Pressure loss: 1% or less (Nozzle size: $\phi 2.5$)
- Available nozzles:
Male thread nozzle, High efficiency nozzle with male thread, Low noise nozzle with male thread, Copper extension nozzle

| Series | Port size | Operating pressure range [MPa] | Effective area [mm^2] | Nozzle port size |
|--------|------------------------|--------------------------------|----------------------------------|------------------|
| VMG | Rc, NPT, G 1/4, 3/8 | 0 to 1.0 | 30 | Rc1/4 |

Nozzles for Blowing KN



| Series | Type | Nozzle size |
|--------|-----------------------------------|---|
| KN | Nozzle with male thread | $\phi 1$ to $\phi 8$ |
| | High efficiency nozzle | $\phi 1$ to $\phi 2$ |
| | Low noise nozzle with male thread | $\phi 0.75 \times 4$ to $\phi 1.1 \times 8$ |
| | Copper extension nozzle | $\phi 1.5$ to $\phi 3$ |
| | Pivoting nozzle | $\phi 4$, $\phi 6$ |
| | Nozzle with self-align fitting | $\phi 1$ to $\phi 6$ |
| | Nozzle for One-touch fitting | $\phi 1$ to $\phi 3$ |

Electronic Pressure Switches/Sensors (Self-contained Type)

3-Screen Display High-Precision Digital Pressure Switch ZSE20□(F)/ISE20□



- Visualization of setting items
 - Simple 3-step setting
 - Easy screen switching
 - Delay time: Fastest 1.5 ms or less
 - Current consumption: 25 mA or less (ZSE20/ISE20), 35 mA or less (Others)
- Setting is possible while checking the measured value.

| Series | Output type | Type | Rated pressure range | Enclosure | Applicable fluid |
|------------------------|---|---|--|-----------|------------------|
| ZSE20(F) ISE20 | 1 output | Compound pressure Vacuum pressure Positive pressure | -100.0 to 100.0 kPa 0.0 to -101.0 kPa -0.100 to 1.000 MPa | IP40 | Air |
| ZSE20A(F) ISE20A | 2 outputs Analog output (Voltage/Current) | Compound pressure Vacuum pressure Positive pressure | -100.0 to 100.0 kPa 0.0 to -101.0 kPa -0.100 to 1.000 MPa | IP40 | Air |
| ZSE20B(F) ISE20B | 2 outputs Analog output (Voltage/Current) | Compound pressure Vacuum pressure Positive pressure | -100.0 to 100.0 kPa 0.0 to -101.0 kPa -0.100 to 1.000 MPa | IP65 | Air |
| ZSE20C(F) ISE20C(H) | 2 outputs Analog output (Voltage/Current) | Compound pressure Vacuum pressure Positive pressure | -100.0 to 100.0 kPa 0.0 to -101.0 kPa -0.100 to 1.000 MPa -0.100 to 2.000 MPa | IP65 | General fluids |

Compact Digital Pressure Switch ZSE10(F)/ISE10



- Low profile: 9.8 mm
- Vertical mounting space reduced to approx. 1/2 (Compared to the ZSE/ISE30A series)
- Simultaneous copying is possible for a maximum of 10 units.
- 3-step setting

| Series | Type | Rated pressure range |
|--------|-------------------|----------------------|
| ZSE10F | Compound pressure | -100.0 to 100 kPa |
| ZSE10 | Vacuum pressure | 0.0 to -101.0 kPa |
| ISE10 | Positive pressure | -0.100 to 1.000 MPa |

3-Screen Display High-Precision Digital Pressure Switch ISE7□/7□G



- It is possible to change the settings while checking the measured value.
- Rotating display
Display rotates 336 degrees after installation.
- IO-Link
- Angled display
Good visibility from various mounting positions
- Applicable fluids: Air, Non-corrosive gas, Non-flammable gas

| Series | Type | Rated pressure range |
|--------|--|----------------------|
| ISE70 | Positive pressure (For air) | 0 to 1 MPa |
| ISE71 | Positive pressure (For air) | 0 to 1.6 MPa |
| ISE70G | Positive pressure (For general fluids) | 0 to 1 MPa |
| ISE75G | Positive pressure (For general fluids) | 0 to 2 MPa |
| ISE76G | Positive pressure (For general fluids) | 0 to 5 MPa |
| ISE77G | Positive pressure (For general fluids) | 0 to 10 MPa |

3-Color Display Digital Gap Checker ISA3



- Check at a glance to see if a workpiece is placed or not.
- The clearance distance between the detection surface and the workpiece can be found intuitively.
- Simple setting: Change the settings while checking the displayed value.
- Energy saving: Air consumption reduced by 60%
- Improved drainage resistance: 10 times or more

| Series | Rated distance range | Piping specifications: Supply side | Piping specifications: Detection side |
|--------|----------------------|---------------------------------------|--|
| ISA3-F | 0.01 to 0.03 mm | Rc, G 1/8 | ø4, ø6 One-touch fitting, G 1/8 |
| ISA3-G | 0.02 to 0.15 mm | Rc, G 1/8 | ø4, ø6 One-touch fitting, G 1/8 |
| ISA3-H | 0.05 to 0.30 mm | Rc, G 1/8 | ø4, ø6 One-touch fitting, G 1/8 |

Electronic Pressure Switches/Sensors (Remote Type)

Compact Pneumatic Pressure Sensor PSE53□



- Connector type
- Analog output (Voltage)

| Series | Type | Rated pressure range |
|--------|-------------------|----------------------|
| PSE531 | Vacuum pressure | 0 to -101 kPa |
| PSE533 | Compound pressure | -101 to 101 kPa |
| PSE532 | Positive pressure | 0 to 101 kPa |
| PSE530 | Positive pressure | 0 to 1 MPa |

Compact Pneumatic Pressure Sensor PSE54□



- Analog output (Voltage)

| Series | Type | Rated pressure range |
|--------|-------------------|----------------------|
| PSE541 | Vacuum pressure | 0 to -101 kPa |
| PSE543 | Compound pressure | -100 to 100 kPa |
| PSE540 | Positive pressure | 0 to 1 MPa |

Low Differential Pressure Sensor PSE550



- Suitable for applications such as air current volume maintenance, filter blockage, and liquid surface detection.
- Analog output (Voltage/Current)

| Series | Type | Rated differential pressure range |
|--------|-----------------|-----------------------------------|
| PSE550 | Vacuum pressure | 0 to 2 kPa |

Pressure Sensor for General Fluids PSE56□



- Wetted parts: Stainless steel 316L
- IP65
- Suitable for a wide variety of fluids
- Analog output (Voltage/Current)
- Low leakage
- Select from a face seal or compression fitting.

| Series | Type | Rated pressure range |
|--------|-------------------|----------------------|
| PSE561 | Vacuum pressure | 0 to -101 kPa |
| PSE563 | Compound pressure | -100 to 100 kPa |
| PSE564 | Positive pressure | 0 to 500 kPa |
| PSE560 | Positive pressure | 0 to 1 MPa |

Pressure Sensor for General Fluids PSE57□



- Withstand voltage: 500 VAC
- Enclosure: IP65
- Materials of parts in contact with fluid
 - Piping port: C3604 + Nickel plating
 - Pressure sensor: Al₂O₃ (Alumina 96%)
 - O-ring: FKM + Grease (PSE570/573/574)
 - Square ring: FKM (PSE575/576/577)

| Series | Type | Rated pressure range | Proof pressure |
|--------|-------------------|----------------------|----------------|
| PSE570 | Positive pressure | 0 to 1 MPa | 3.0 MPa |
| PSE573 | Compound pressure | -100 to 100 kPa | 600 kPa |
| PSE574 | Positive pressure | 0 to 500 kPa | 1.5 MPa |
| PSE575 | Positive pressure | 0 to 2 MPa | 5.0 MPa |
| PSE576 | Positive pressure | 0 to 5 MPa | 12.5 MPa |
| PSE577 | Positive pressure | 0 to 10 MPa | 30 MPa |

Switches/Sensors/Controllers

Electronic Pressure Switches/Sensors (Remote Type)

Multi-Channel Digital Pressure Sensor Controller **PSE200**



- 4 sensors can be connected.
- Applicable sensors: PSE53□, 54□, 56□, 570, 573
- A single controller can be used to monitor various applications.
- 4 inputs, 5 outputs

| Series | Set pressure range |
|--------|--------------------|
| PSE200 | -101 to 101 kPa |
| | 10 to -101 kPa |
| | -10 to 101 kPa |
| | -0.1 to 1 MPa |

2-Color Display Digital Pressure Sensor Controller **PSE300**



- Applicable sensors: PSE53□, 54□, 550, 56□, 570, 573, 574
- Compatible with voltage input and current input
- Response time: 1 ms
- Space saving, Capable of vertical and horizontal contact mounting
- Panel mounting, Bracket mounting, DIN rail mounting

| Series | Set pressure range |
|--------|--------------------|
| PSE300 | -101 to 101 kPa |
| | 10 to -101 kPa |
| | -10 to 100 kPa |
| | -0.1 to 1 MPa |
| | -50 to 500 kPa |
| | -0.2 to 2 kPa |

3-Screen Display Sensor Monitor **PSE300AC**



- It is possible to change the settings while checking the measured value.
- Visualization of settings
- NPN/PNP switch function
- Input range selection (for pressure/flow rate)
- Simple 3-step setting

| Series | Set pressure range | Applicable pressure sensor |
|----------|--------------------|-----------------------------|
| PSE300AC | -0.2 to 2.1 kPa | PSE550 |
| | 10 to -105 kPa | PSE531/PSE541/PSE561 |
| | -105 to 105 kPa | PSE533/PSE543/PSE563/PSE573 |
| | -10 to 105 kPa | PSE532 |
| | -50 to 525 kPa | PSE564/PSE574 |
| | -0.105 to 1.05 MPa | PSE530/PSE540/PSE560/PSE570 |
| | -0.105 to 2.1 MPa | PSE575 |
| | -0.1 to 5.25 MPa | PSE576 |
| | -0.1 to 10.5 MPa | PSE577 |
| | | |

Electronic Flow Switches/Sensors

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



- Dry air, N₂, Ar, CO₂
- Grease-free
- Integrated flow adjustment valve
- Compact, Lightweight, Space saving

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PFM | 0.2 to 10 (0.2 to 5) |
| | 0.5 to 25 (0.5 to 12.5) |
| | 1 to 50 (1 to 25) |
| | 2 to 100 (2 to 50) |
| | (): For CO ₂ |

Electronic Flow Switches/Sensors

2-Color Display Digital Flow Switch **PFMB**



- Dry air, N₂
- Grease-free
- Integrated flow adjustment valve
- Compact, Space saving

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PFMB | 2 to 200 |
| | 5 to 500 |
| | 10 to 1000 |
| | 20 to 2000 |

2-Color Display Digital Flow Switch/Low Particle Generation **PFM7/PFMB7-X300**



- Low particle generation
Flow control of a clean air blow in clean room environments
- Metal material of parts in contact with fluid: Stainless steel 304

| Series | Rated flow range [L/min] |
|------------|--------------------------|
| PFM7-X300 | 0.2 to 10 (0.2 to 5) |
| | 0.5 to 25 (0.5 to 12.5) |
| | 1 to 50 (1 to 25) |
| | 2 to 100 (2 to 50) |
| | (): For CO ₂ |
| PFMB7-X300 | 2 to 200 |

3-Color Display Digital Flow Switch **PFMC**



- Dry air, N₂
- 3-color/2-screen display
- Expanded flow range: Wide range of flow measurement with one product
- Compact, Space saving

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PFMC | 5 to 500 |
| | 10 to 1000 |
| | 20 to 2000 |

3-Color Display Digital Flow Switch for Large Flow **PF3A7□H**



- Applicable fluid: Air, N₂
- Flow range: Max. 12000 L/min
- Flow ratio 100:1
Wide range of flow measurement with one product
- Improved drainage and resistance to foreign matter
- Pressure loss: 75% reduction (20 kPa → 5 kPa)
- Through bore construction

| Series | Rated flow range [L/min] |
|---------|--------------------------|
| PF3A7□H | 30 to 3000 |
| | 60 to 6000 |
| | 120 to 12000 |

3-Screen Display Digital Flow Monitor **PFG300**



- Can measure up to 12,000 L/min
- While checking the measured value, settings are possible.
- Current consumption: 25 mA or less
- NPN/PNP switch function
- Input range selection (for pressure/flow rate)
- Simple 3-step setting

| Series | Applicable flow switch |
|--------|------------------------|
| PFG300 | PFMB, PFMC, PF3A7□H |

Electronic Flow Switches/Sensors

Flow Sensor PFMV



- Suction verification of very small workpieces
- Repeatability: $\pm 2\%$ F.S.
- Response speed: 5 ms or less, Withstand pressure: 500 kPa
- Grease-free, RoHS compliant
- Only 1 voltage monitor is required to cover the complete range.
- Related equipment: Suction filter ZFC050 series

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PFMV | 0 to 0.5 |
| | 0 to 1 |
| | 0 to 3 |
| | -0.5 to 0.5 |
| | -1 to 1 |
| | -3 to 3 |

Digital Flow Switch for Air PF2A



- An integrated type and a separate monitor type are available.
- Switch output, Accumulated pulse output, Analog output
- Capable of switching back and forth between cumulative and instantaneous flow
- IP65
- 4-channel flow monitor
- 4 different flow ranges can be connected to 1 controller.

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PF2A | 1 to 10 |
| | 5 to 50 |
| | 10 to 100 |
| | 20 to 200 |
| | 50 to 500 |

3-Color Display Digital Flow Switch for Water PF3W



- 3-color/2-screen display
- Integrated temperature sensor
- 40% smaller than the existing product
- IP65 compliant, Non-grease type
- Fluid temperature: 0 to 90°C

| Series | Rated flow range [L/min] |
|---------------|--------------------------|
| PF3W | 0.5 to 4 |
| | 2 to 16 |
| | 5 to 40 |
| | 10 to 100 |
| | 50 to 250 |
| PF3W Manifold | up to 10 stations |

3-Color Display Digital Flow Switch for PVC Piping PF3W



- Applicable fluids: Deionized water, chemical liquids, etc.
- 3-color/2-screen display
- IP65 compliant, Non-grease type
- Fluid temperature: 0 to 70°C
- PVC pipe O.D.: 25A, 30A

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PF3W | 10 to 100 |
| | 30 to 250 |

Electronic Flow Switches/Sensors

3-Color Display Electromagnetic Type Digital Flow Switch LFE□



- Applicable fluids: Water, Water-soluble coolant
- Compact, Lightweight
56 mm x 40 mm x 90 mm (H x W x D)
Weight: 340 g (LFE1□3)
- Pressure loss: 0.02 MPa or less
- Close proximity setting allows for space saving.
- Reverse flow can be detected.
- Operating fluid temperature: 0 to 85°C
- Current consumption: 45 mA

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| LFE□ | 0.5 to 20 |
| | 2.5 to 100 |
| | 5 to 200 |

Digital Flow Switch for Deionized Water and Chemical Liquids PF2D



- Body sensor: New PFA, Tube: Super PFA
- Low particle generation, Excellent flow-through characteristics
- 4-channel flow monitor
4 different flow ranges can be connected to 1 controller.

| Series | Rated flow range [L/min] |
|--------|--------------------------|
| PF2D | 0.4 to 4 |
| | 1.8 to 20 |
| | 4.0 to 40 |

Controllers

Flow Controller for Water FC2W-X110



- Automatically adjusts the flow rate
- Flow rate control accuracy: $\pm 5\%$ F.S.
- Response time: 10 s or less
- Grease-free

| Series | Flow rate control range [L/min] | Set flow rate range [L/min] |
|-----------|---------------------------------|-----------------------------|
| FC2W-X110 | 0.5 to 4.0 | 0.4 to 4.2 |
| | 2.0 to 16.0 | 1.6 to 16.8 |

Ionizers/Static Neutralization Equipment

Ionizers/Static Neutralization Equipment

Ionizer/Bar Type IZS40/41/42



- Potential amplitude of 25 V or less with the dual AC type (At an installation height of 300 mm)
- Rapid neutralization of static electricity by a feedback sensor
- Reduction of adjustment and maintenance labor by an auto balance sensor
- Simple operation: Can be controlled by powering the ionizer ON (Standard type)
- Setting ionizer with remote controller
- Transition wiring may be used.
- High speed static neutralization cartridges and energy saving static neutralization cartridges are available.

| Series | Type | Ion generation method | Offset voltage (Ion balance) |
|--------|----------------------|-----------------------|------------------------------|
| IZS42 | Dual AC type | Corona discharge type | ±30 V |
| IZS41 | Feedback sensor type | Corona discharge type | ±30 V |
| IZS40 | Standard type | Corona discharge type | ±30 V |

Separate Controller Bar Type Ionizer IZT40/41/42



- The controller and high-voltage power supply module can be mounted separately.
- Space saving: Height 37 mm x Width 30 mm
- One controller can control a maximum of 4 ionizers.
- Potential amplitude: 25 V or less
- Rapid neutralization of static electricity: Max. speed of 0.1 s

| Series | Type | Ion generation method | Offset voltage (Ion balance) |
|--------|---------------|-----------------------|------------------------------|
| IZT42 | Dual AC type | Corona discharge type | Within ±30 V |
| IZT41 | AC type | Corona discharge type | Within ±30 V |
| IZT40 | Standard type | Corona discharge type | Within ±30 V |

Nozzle Type Ionizer IZN10E



- Slim: 16 mm (Thickness) x 100 mm (Width) x 46 mm (Height)
- Lightweight: 33% reduction (120 g → 80 g)
- Offset voltage: ±10 V
- Nozzle type can be selected according to the application.
Energy-saving static neutralization nozzle (Short range static neutralization)
High flow rate nozzle (Long range static neutralization)

| Series | Ion generation method | Offset voltage (Ion balance) |
|--------|-----------------------|---|
| IZN10E | Corona discharge type | Energy saving static neutralization nozzle: Within ±10 V High flow rate nozzle: Within ±15 V |

Fan Type Ionizer IZF



- Thinnest: 40 mm thick
- Fastest: Rapid static neutralization 0.5 seconds
- Offset voltage (Ion balance): ±5 V
- Stable static neutralization performance, Easier maintenance

| Series | Maximum air flow | Ion generation method | Offset voltage (Ion balance) |
|--------|---------------------------------------|-----------------------|------------------------------|
| IZF10 | 0.46 m³/min, 0.66 m³/min, 0.80 m³/min | Corona discharge type | ±13 V |
| IZF21 | 1.8 m³/min | Corona discharge type | ±5 V |
| IZF31 | 4.4 m³/min | Corona discharge type | ±5 V |

Ionizers/Static Neutralization Equipment

Ionizers/Static Neutralization Equipment

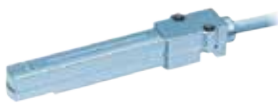
Desktop Duster Box ZVB



- Static neutralization, dust removal, and dust collection processes have been integrated into one box.
- Supports workpieces of various sizes:
Electronic components, lenses, smartphones, lamp covers, cosmetic cases, parts for home appliances
- Static neutralization and dust removal efficiency have been improved by separation from the ion blow and air blow structure.

| Series | Size | Ion generation method | Offset voltage |
|--------|------|-----------------------|--|
| ZVB20 | A4 | Corona discharge type | Within ± 10 V (Static neutralization distance: 100 mm from the nozzle) |
| ZVB40 | A3 | Corona discharge type | Within ± 10 V (Static neutralization distance: 100 mm from the nozzle) |

Electrostatic Sensor IZD10



- Detects the electrostatic potential and outputs in an analog voltage

| Series | Potential measurement | Output voltage | Effective detection distance |
|-----------|---|---|------------------------------|
| IZD10-110 | ± 0.4 kV (Detected at a 25 mm distance) | 1 to 5 V | 10 to 50 mm |
| IZD10-510 | ± 20 kV (Detected at a 50 mm distance) | (Output impedance: Approx. 100 Ω) | 25 to 75 mm |

Electrostatic Sensor Monitor IZE11



- Displays the electrostatic potential with the connected electrostatic sensor (IZD10), and is capable of switch output, analog output, or output of current

| Series | Rated measurement range | Minimum unit setting | Output |
|--------|--|---|---|
| IZE11 | -0.4 kV to +0.4 kV -20 kV to +20 kV | 0.001 kV (at ± 0.4 kV) 0.1 kV (at ± 20 kV) | Switch output x 2 + Analog output (1 to 5 V, 4 to 20 mA) |

Handheld Electrostatic Meter IZH10



- Easy-to-use handheld electrostatic meter

| Series | Rated charge amount range | Minimum display unit |
|--------|---------------------------|--|
| IZH10 | ± 20.0 kV | 0.1 kV (± 1.0 to ± 20.0 kV) 0.01 kV (0 to ± 0.99 kV) |

Process Valves

2-Port Solenoid Valves/Air Operated Valves

Direct Operated 2-Port Solenoid Valve **VX2**



- For air, medium vacuum, water, oil, steam (Can be used with heated water)
- Flow rate: 20% more flow*¹
- Height: 10% smaller*¹
- Weight: 30% lighter*¹
- Body materials: Aluminum, Resin, C37, Stainless steel
- Available with One-touch fittings (Resin body)
- *¹ Comparison made with SMC's existing model
- Manifold type no.: VVX21, VVX22, VVX23

| Series | Valve type | Port size | Orifice diameter [mmø] |
|------------|------------|-------------------------|------------------------|
| VX21/22/23 | N.C./N.O. | 1/8 to 1/2 ø6 to ø12 | 2 to 10 |

Pilot Operated 2-Port Solenoid Valve **VXD**



- For air, water, oil, heated water, high-temperature oil
- Body materials: Aluminum, Resin, C37, Stainless steel, CAC408
- A type with One-touch fittings (Resin body) is available.
- IP65

| Series | Valve type | Port size | Orifice diameter [mmø] |
|--------|------------|---|------------------------|
| VXD | N.C./N.O. | ø10, ø12, ø3/8" 1/4 to 1 32A to 50A | 10 to 50 |

Zero Differential Pressure Type Pilot Operated 2-Port Solenoid Valve **VXZ**



- For air, water, oil, heated water, high-temperature oil
- Body materials: Aluminum, Resin, C37, Stainless steel
- A type with One-touch fittings (Resin body) is available.
- IP65

| Series | Valve type | Port size | Orifice diameter [mmø] |
|--------|------------|-----------------------------|------------------------|
| VXZ | N.C./N.O. | ø10, ø12, ø3/8" 1/4 to 1 | 10 to 25 |

Zero Differential Pressure Type Pilot Operated 2-Port Solenoid Valve **VXS**



- For steam
- Long service life: 3 million cycles (Based on SMC's test conditions)
- Improved air filtration
- Reduced apparent power: 18 VA → 12 VA, 20 VA → 15 VA
- Reduced coil temperature rise: 120°C → 100°C
- IP65

| Series | Valve type | Port size | Orifice diameter [mmø] |
|--------|------------|-----------|------------------------|
| VXS | N.C. | 1/4 to 1 | 10 to 25 |

Angle Seat Valve/Air Operated Type **VXB**



- For steam (Can be used with air and water)
- Low pressure loss due to angle seat structure
- Reduced leakage with rubber seal
- Long service life: 3 million cycles (Steam), 5 million cycles (Air)
- Low leakage: 10 cm³/min or less
- Space saving: Height 100 mm
- Body materials: Stainless steel 316L equivalent, Bronze (CAC)

| Series | Valve type | Port size | Orifice diameter [mmø] |
|--------|------------|--------------------------------|------------------------|
| VXB | N.C. | 3/8, 1/2, 3/4 10A, 15A, 20A | 11, 14, 18 |

Process Valves

2-Port Solenoid Valves/Air Operated Valves

Energy Saving Type 2-Port Solenoid Valve **VXE**



- Power consumption reduced by 1/3 (SMC comparison)
- For air, water, oil

| Series | Valve type | Port size | Orifice diameter [mmø] |
|--------|------------|------------------------|------------------------|
| VXE2 | N.C. | 1/8 to 1/2 | 2 to 10 |
| VXED2 | N.C. | 1/4 to 1 32A to 50A | 10 to 50 |
| VXEZ2 | N.C. | 1/4 to 1 | 10 to 25 |

Compact 2/3-Port Solenoid Valves

Compact Direct Operated 2-Port Solenoid Valve **VDW**



- For air, medium vacuum, water
- Body materials: Aluminum, Resin (PPS), Brass, Stainless steel
- With One-touch fittings (Resin body)
- IP65

| Series | Valve type | Port size | Orifice diameter |
|----------|------------|-----------------------|------------------|
| VDW10/20 | N.C. | ø3.2, ø4, ø6, M5, 1/8 | ø1 to ø3.2 |

High Speed 2-Port Valve **SX10**



- High-speed response ON: 0.45 ms
OFF: 0.4 ms (±0.05 ms)
- Long service life: 5 billion cycles or more
- High frequency: 1200 Hz
- Width: 9 mm
- Low power consumption: 4 W

| Series | Flow rate [l/min] | Power consumption [W] | Max. operating frequency [Hz] |
|--------|-------------------|-----------------------|-------------------------------|
| SX10 | 50 | 80 | 1200 |
| | | 40 | 1000 |
| | | 10 | 550 |
| | | 4 | 350 |
| SX10 | 100 | 80 | 650 |
| | | 40 | 550 |
| | | 10 | 300 |
| | | 4 | 200 |
| SX10 | 150 | 80 | 600 |
| | | 40 | 500 |
| | | 10 | 250 |
| | | 4 | 150 |

Pilot Operated 2-Port Solenoid Valve for Dry Air **VQ**



- High-frequency operation is possible: High-speed response 7 ms or less (VQ20), 20 ms or less (VQ30)
- Easy piping with One-touch fittings
- The dust-tight, water-jet-proof enclosure (IP65) is compatible with the DIN terminal type.
- Applications: Air-blow, Blow-off of workpieces, etc.
- Manifold type no.: VV2Q22, VV2Q32

| Series | Valve type | Port size | Orifice diameter [mmø] |
|--------|------------|-----------|------------------------|
| VQ20 | N.C. | ø6 to ø12 | 3.4 |
| VQ30 | N.C. | ø6 to ø12 | 4.8 |

Compact 2/3-Port Solenoid Valves

Compact Direct Operated 2/3-Port Solenoid Valve for Chemical Liquids **LVM**



- Materials of wetted parts Body/plate: PEEK
Diaphragm: Choice of EPDM, FKM, Kalrez®
- Service life: 10 million cycles or more (Based on SMC's test conditions)

| Series | Valve structure | Valve type | Orifice diameter [mm] |
|-----------|---|---------------------|-----------------------|
| LVM09/090 | Diaphragm type direct operated poppet (Rocker type) | N.C./N.O./Universal | 1.1 |
| LVM11 | Diaphragm type direct operated poppet | N.C. | 1.5 |
| LVM10/100 | Diaphragm type direct operated poppet (Rocker type) | N.C./N.O./Universal | 1.4 |
| LVM15/150 | | | 1.6 |
| LVM20/200 | | | 2 |

Composite Manifold



- The unitization of devices allows for the whole unit to be made more compact. Expansion into a wide range of industries is now possible!
- Space saving
- Lightweight
- Reduced wiring

Normal Close High Vacuum Solenoid Valve **XSA**



- Minimum operating pressure: 1×10^{-6} Pa (abs)
- Leakage: Internal 1.3×10^{-9} Pa·m³/s, External 1.3×10^{-11} Pa·m³/s
- 2 types of fittings and female threads are available.
- Power consumption: Max. 25% reduction
- Weight: Max. 18% lighter (0.5 kg → 0.41 kg)

| Series | Valve type | Fluid | Piping | Port size |
|--------|-----------------|----------------|--|---------------|
| XSA | Normally closed | Air, Inert gas | Face seal fitting Compression fitting | 1/4, 3/8 |
| XSA | Normally closed | Air, Inert gas | Rc, NPT female thread | 1/8, 1/4, 3/8 |

■ Trademark

- Kalrez® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

5.0 MPa 2/3-Port Solenoid Valves

5.0 MPa Pilot Operated 2/3-Port Solenoid Valve & Check Valve VCH/VCHC



- Service life: 10 million cycles
- Uses a polyurethane elastomer poppet for valve parts
- Improves durability at high pressures

| Series | Type | Port size | Orifice diameter [mm] |
|--------|--------------------|-----------|-----------------------|
| VCH41 | 2-port valve, N.C. | G3/4, 1 | ø16 |
| VCH42 | 2-port valve, N.O. | G3/4, 1 | ø17.5 |
| VCH410 | 3-port valve | G1/2 to 1 | ø18 |
| VCHC40 | Check valve | G3/4, 1 | ø16 |

Direct Operated Regulator for 6.0 MPa (Relieving Type) VCHR



- Service life: 10 million cycles
- Improved durability in high-pressure environments through the use of a polyurethane elastomer poppet
- Uses NSF-H1 approved grease on guide rings (Sliding parts)
- Improved durability through the use of a metal seal type relief valve
- Uses a special fluororesin seal for sliding parts
- Stable unattached response, Not easily affected by pressure

| Series | Model | Type | Port size | Set pressure [MPa] |
|--------|-----------|--|----------------|--|
| VCHR | VCHR30/40 | Direct operated regulator (Relieving type) | G3/4, 1, 1 1/2 | 0.5 to 5.0 (Max. operating pressure: 6.0) |

725 psi (5.0 MPa) Silencer VCHN



- Reduces clogging with its double-layer structure
- Noise reduction: 35 dB (A)

Chemical Liquid Valves

Chemical Liquid Valves

High Purity Chemical Liquid Valve/Air Operated, Integrated Fitting Type **LVC**



- Body material: New PFA
- N.C./N.O./Double acting all feature the same configuration.
- Compatible with fluid temperatures of 100°C
- Manifold type no.: LLC2, LLC3, LLC4, LLC5

| Series | Type | Valve type | Applicable tubing O.D. | Orifice diameter [mmø] |
|--------|------------------------------------|-------------------------|-----------------------------------|------------------------|
| LVC | Air operated Integrated fitting | N.C./N.O./Double acting | Metric: 3 to 25 Inch: 1/8 to 1 | 4 to 22 |

High Purity Chemical Liquid Valve/Air Operated, Threaded Type **LVA**



- Body materials: New PFA/Stainless steel/PPS
- Diaphragm materials: PTFE, EPR, or NBR can be selected.
- Manifold type no.: LLA2, LLA3, LLA4, LLA5

| Series | Type | Valve type | Port size | Orifice diameter [mmø] |
|--------|-------------------------------|-------------------------|-----------|------------------------|
| LVA | Air operated Threaded type | N.C./N.O./Double acting | 1/8 to 1 | 2 to 22 |

Organic Solvents Compatible

- Body material: Stainless steel
- Actuator material: ADC
- Buffer materials: FKM/EPDM

| Series | Type | Valve type | Applicable tubing O.D. | Orifice diameter [mmø] |
|--------|---|-------------------------|-----------------------------------|------------------------|
| LVA | Air operated Organic solvents compatible | N.C./N.O./Double acting | Metric: 6 to 19 Inch: 1/4 to 1 | 4 to 22 |

High Purity Chemical Liquid Valve/Manually Operated (Integrated Fitting Type/Threaded Type) **LVH**



- Body materials: New PFA/Stainless steel/PPS
- Compatible with locking and non-locking types
- Manifold type no.: LLH2, LLH3, LLH4

| Series | Type | Valve type | Port size (Applicable tubing O.D.) | Orifice diameter [mmø] |
|--------|---|------------|--|------------------------|
| LVH | Manually operated (Integrated fitting/ Threaded type) | N.C. | Threaded type: 1/8 to 1/2 Integrated fitting: Metric: ø3 to ø12 Inch: 1/8 to 1/2 | 4 to 12 |

Organic Solvents Compatible

- Body material: Stainless steel
- Actuator material: ADC
- Buffer materials: FKM/EPDM

| Series | Type | Valve type | Applicable tubing O.D. | Orifice diameter [mmø] |
|--------|--|------------|-----------------------------------|------------------------|
| LVH | Manually operated Organic solvents compatible | N.C. | Metric: 6 to 19 Inch: 1/4 to 1 | 4 to 22 |

Chemical Liquid Valves

Chemical Liquid Valves

Compact Type High Purity Air Operated Chemical Liquid Valve **LVD**



- Space saving, compact model is available. Dimension across inlet/outlet ports: Reduced by up to 29%
- Body material: New PFA
- Diaphragm material: PTFE
- Actuator materials: PPS, PVDF (LVD-F/FN)

*1 Tubing O.D. for the tube extension type

| Series | Type | Valve type | Applicable tubing O.D.*1 | | Orifice diameter [mmø] |
|----------|-------------------------|-------------------------|--------------------------|------------|------------------------|
| | | | Metric | Inch | |
| LVD | Integrated fittings | N.C./N.O./Double acting | 3 to 19 | 1/8 to 3/4 | 2 to 16 |
| LVD | Tube extensions | N.C./N.O./Double acting | 6 to 19 | 1/4 to 3/4 | 4 to 16 |
| LVD-F/FN | LQ1 Integrated fittings | N.C./N.O./Double acting | 3 to 25 | 1/8 to 1 | 4 to 22 |
| LVD-F/FN | LQ3 Integrated fittings | N.C./N.O./Double acting | 6 to 25 | 1/4 to 1 | 4 to 22 |
| LVD-F/FN | Tube extensions | N.C./N.O./Double acting | 6 to 25 | 1/4 to 1 | 4 to 22 |

High Purity Chemical Liquid Valve/Air Operated, Non-Metallic Exterior **LVQ**



- Screwless construction, Non-metallic construction doesn't use metal screws to secure the body of the actuator
- Body material: New PFA
- Diaphragm material: PTFE
- Actuator material: PVDF

*1 Tubing size

| Series | Type | Valve type | Applicable tubing O.D. | | Orifice diameter [mmø] |
|--------|-------------------------|-------------------------|------------------------|----------------------|------------------------|
| | | | Metric | Inch | |
| LVQ | Integrated fitting type | N.C./N.O./Double acting | 3 to 25 | 1/8 to 1 | 4 to 22 |
| LVQ | Space saving type | N.C./N.O./Double acting | Fitting size: 2 to 6 | Fitting size: 2 to 6 | 4 to 22 |
| LVQ | Tube extension type | N.C./N.O./Double acting | 6 to 25*1 | 1/4 to 1*1 | 4 to 22 |

Vinyl Chloride Air Operated Valve **LVP**



- Applicable to rigid vinyl chloride tubes: Union type with PVC unfixed union
- Body material: CPVC, Diaphragm material: PTFE
- O-ring materials: FKM, EPDM (Selectable)
- Applicable fluids: Deionized water, Chemical liquids

| Series | Applicable tubing O.D. | Orifice diameter [mmø] | Valve type | Option |
|--------|-----------------------------|------------------------|-------------------------|---------------------------|
| LVP5□ | O.D. ø22 (Nominal dia. 16A) | 16 | N.C./N.O./Double acting | With flow rate adjustment |
| LVP6□ | O.D. ø26 (Nominal dia. 20A) | 22 | N.C./N.O./Double acting | With flow rate adjustment |
| LVP6□ | O.D. ø32 (Nominal dia. 25A) | 22 | N.C./N.O./Double acting | With flow rate adjustment |

PVC Quick Drain Valve **LVW**



- Compliant with JIS Standards for polyvinyl chloride piping (JIS K 6742)
- Applicable fluids: Deionized water, Chemical liquids
- Materials of wetted parts: PVC (Body)
PTFE (Poppet)
FKM (O-ring: Standard)
EPDM (O-ring: Option)
- Flow rate characteristics: Cv factor 10 to 198
- Easy piping with union connection

| Series | Applicable tubing O.D. | Orifice diameter | Valve type |
|--------|------------------------|------------------|---------------|
| LVW60 | ø32 (Nominal dia. 25A) | ø25 | Double acting |
| LVW80 | ø38 (Nominal dia. 32A) | ø40 | Double acting |
| LVW80 | ø48 (Nominal dia. 40A) | ø40 | Double acting |
| LVW90 | ø60 (Nominal dia. 50A) | ø65 | Double acting |
| LVW90 | ø75 (Nominal dia. 65A) | ø65 | Double acting |
| LVW90 | ø89 (Nominal dia. 80A) | ø80 | Double acting |

Process Pumps

Process Pump/Double Acting Pump **PA/PAP/PAX**



| Series | Actuation | Discharge rate [L/min] | Wetted parts material |
|---------|---|------------------------|---|
| PA3□□0 | Automatically operated type | 1 to 20 | ADC12 (Aluminum) SCS14 (Stainless steel) |
| PA3□□13 | Air operated type | 0.1 to 12 | ADC12 (Aluminum) SCS14 (Stainless steel) |
| PA5□□0 | Automatically operated type | 5 to 45 | ADC12 (Aluminum) SCS14 (Stainless steel) |
| PA5□□13 | Air operated type | 1 to 24 | ADC12 (Aluminum) SCS14 (Stainless steel) |
| PAP3310 | Automatically operated type | 1 to 13 | New PFA (Fluororesin) |
| PAP3313 | Air operated type | 0.1 to 9 | New PFA (Fluororesin) |
| PAX1□12 | Automatically operated type, Built-in pulsation attenuator | 0.5 to 10 | ADC12 (Aluminum) SCS14 (Stainless steel) |

Process Pump/Single Acting Pump **PB**



| Series | Actuation | Discharge rate [mL/min] | Wetted parts material |
|---------|-------------------------|-------------------------|--------------------------------------|
| PB1011A | Built-in solenoid valve | 8 to 2000 | Polypropylene Stainless steel 316 |
| PB1013A | Air operated type | 8 to 1000 | Polypropylene Stainless steel 316 |
| PB1313A | Air operated type | 8 to 1000 | New PFA (Fluororesin) |

Non-Metallic Pump/Double Acting Pump **PAF**



| Series | Actuation | Discharge rate [L/min] | Wetted parts material |
|---------------|-----------------------------|------------------------|-----------------------|
| PAF3410 | Automatically operated type | 1 to 20 | New PFA (Fluororesin) |
| PAF3413 | Air operated type | 1 to 15 | New PFA (Fluororesin) |
| PAF3410-X68*1 | Automatically operated type | 1 to 20 | New PFA (Fluororesin) |
| PAF5410 | Automatically operated type | 5 to 45 | New PFA (Fluororesin) |
| PAF5413 | Air operated type | 5 to 38 | New PFA (Fluororesin) |

*1 Tightening bolt, Air switching valve: Stainless steel

Use the PAF series standard products when a metal-free pump is necessary for hydrofluoric acid, etc.

Temperature Control Equipment

Thermo-chillers (Circulating Fluid Temperature Controllers)

Thermo-chiller/Standard Type **HRS**



- With this chiller, cooling water can be obtained anywhere it is necessary because of easy installation and easy operation.
- For a wide range of applications, such as laser machine tools, analytical equipment, LCD manufacturing equipment, mold temperature control, etc.
- Compact: W 377 x H 615 x D 500 mm, 40 kg (HRS012/018/024)
- Timer function, Low liquid level protection, Power failure auto-restart, Anti-freezing function, etc.
- Self diagnosis function
- Ideal for overseas models (Single-phase 200 to 230 VAC, Single-phase 100, 115 VAC)
- Compliant with UL Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|---------------|-----------------------|---|-----------------------|--|--|
| HRS012 to 060 | 5 to 40°C | 1.3 kW, 1.9 kW 2.4 kW, 3.2 kW 5.1 kW, 5.9 kW (60 Hz) | ±0.1°C | Air-cooled refrigeration Water-cooled refrigeration | Tap water Deionized water Ethylene glycol aqueous solution (15%) |

Thermo-chiller/Standard Type **HRS090**



- Lightweight and compact
- Cooling capacity: 9 kW
- Temperature stability: ±0.5°C
- Set temperature range: 5 to 35°C
- Max. ambient temperature: 45°C
- Power supply: 3-phase 200 to 230 VAC, 380 to 415 VAC

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|------------------|-----------------------|--|--|
| HRS090 | 5 to 35°C | 9 kW (60 Hz) | ±0.5°C | Air-cooled refrigeration Water-cooled refrigeration | Tap water Deionized water Ethylene glycol aqueous solution (15%) |

Thermo-chiller/Standard Type **HRS100/150**



- No heater is required, as the circulating fluid is heated using only the heat exhausted by the refrigerating circuit.
- Compatible with power supplies in Europe, Asia, Oceania, North, Central, and South America
- Low-noise design: 70 dB (A)
- Outdoor installation: IPX4
- Compact, Space saving

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|------------------|-----------------------|----------------------------|-----------------------|--|--|
| HRS100 HRS150 | 5 to 35°C | 9.5 kW, 14.5 kW (60 Hz) | ±1.0°C | Air-cooled refrigeration Water-cooled refrigeration | Tap water Deionized water Ethylene glycol aqueous solution (15%) |

Thermo-chiller/Inverter Type **HRSH090**



- Power consumption reduced by 53%
Complete with energy-saving triple inverter!
- Cooling capacity: 9.5 kW (Air-cooled), 11.0 kW (Water-cooled)
- Temperature stability: ±0.1°C
- Set temperature range: 5°C to 40°C

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|---------|-----------------------|------------------|-----------------------|--|--|
| HRSH090 | 5 to 40°C | 9.5 kW | ±0.1°C | Air-cooled refrigeration Water-cooled refrigeration | Tap water Deionized water Ethylene glycol aqueous solution (15%) |

Temperature Control Equipment

Thermo-chillers (Circulating Fluid Temperature Controllers)

Thermo-chiller/Inverter Type HRSH



- Complete with energy-saving triple inverter!
- Outdoor installation, Splashproof type (IPX4)
- Max. ambient temperature: 45°C
- Min. ambient temperature: -20°C (For the air-cooled type)
- Temperature stability: $\pm 0.1^{\circ}\text{C}$ (When a load is stable)
- Space saving and lightweight: 280 kg (25 kW type)
- Compliant with UL Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|---------------------------------------|---------------------------|--|--|
| HRSH | 5 to 35°C | 10 kW, 15 kW 20 kW, 25 kW 28 kW | $\pm 0.1^{\circ}\text{C}$ | Air-cooled refrigeration Water-cooled refrigeration | Tap water Deionized water Ethylene glycol aqueous solution (15%) |

Thermo-chiller/Basic Type HRSE



- Complete with energy-saving triple control!
Reduces power consumption by 33%
- Compact and lightweight: 32 kg (100 VAC)
- Maintenance-free: Magnet pump
- Low-noise design: 55 dB (A)

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|----------------------------------|---------------------------|--------------------------|---|
| HRSE | 10 to 30°C | 1.2 kW, 1.6 kW 2.2 kW (60 Hz) | $\pm 2.0^{\circ}\text{C}$ | Air-cooled refrigeration | Tap water Ethylene glycol aqueous solution (15%) |

Thermo-chiller/Rack Mount Type HRR



- Operable without the need to remove the unit from the rack
Front access: Simple to control, service and maintain with all filters and drainage via the front panel
- Space saving
Multiple chillers can be mounted to a 19-inch rack.
- Cooling capacity: 1.2/1.8/2.4/3.0 kW (60 Hz)
- Temperature stability: $\pm 0.1^{\circ}\text{C}$
- Global power supply: Single-phase 200 to 230 VAC (50/60 Hz)

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|----------------------------------|---------------------------|--|---|
| HRR | 10 to 35°C | 1.2 kW, 1.8 kW 2.4 kW, 3.0 kW | $\pm 0.1^{\circ}\text{C}$ | Air-cooled refrigeration Water-cooled refrigeration | Tap water Ethylene glycol aqueous solution (15%) |

Thermo-chiller/High-performance Type HRZ



- Suitable for semiconductor processing equipment with a wide variety of features, such as high-temperature stability, a wide temperature range, failure diagnosis, external communication, etc.
- Compliant with various safety standards
- Compliant with UL Standards, SEMI Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|--|--------------------------|---------------------------|----------------------------|---|
| HRZ | -20 to 40°C 20 to 90°C -20 to 90°C | 1 kW, 2 kW 4 kW, 8 kW | $\pm 0.1^{\circ}\text{C}$ | Water-cooled refrigeration | Fluorinated fluid Tap water Deionized water Ethylene glycol aqueous solution (60%) |

Thermo-chiller/High-performance Inverter Type HRZ



- In addition to the state-of-the-art functions of the HRZ series, these models employ a DC inverter compressor to achieve better energy efficiency.
- A wide temperature range and cooling capacity range are covered by one unit.
- Suited to the short innovation cycle of semiconductor equipment, Capable of responding flexibly to changes in the process conditions
- Compliant with UL Standards, SEMI Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|---------------------------|------------------|---------------------------|----------------------------|--|
| HRZ | -20 to 90°C 10 to 60°C | 10 kW | $\pm 0.1^{\circ}\text{C}$ | Water-cooled refrigeration | Fluorinated fluid, Tap water, Deionized water, Ethylene glycol aqueous solution (60%) |

Temperature Control Equipment

Thermo-chillers (Circulating Fluid Temperature Controllers)

Dual Thermo-chiller/High-performance Inverter Type **HRZD**



- Temperatures for 2 systems can be controlled separately by one chiller.
- Double inverter type: Substantially more energy is saved by using a DC inverter refrigerator and inverter pump.
- Space saving: Footprint reduced by 23%
- Reduced wiring, piping, and labor: Single power cable, Single facility-water piping system
- Compliant with SEMI Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|------------------|-----------------------|----------------------------|---|
| HRZD | -30 to 90°C | 9.5 kW x 2 | ±0.1°C | Water-cooled refrigeration | Fluorinated fluid Ethylene glycol aqueous solution (60%) |

Water-cooled Thermo-chiller/High-performance Type **HRW**



- Direct heat exchanger for in-plant circulating fluid
- Can control the temperature over a wide range since a compressor is not required.
- Suitable for semiconductor processing equipment with a wide variety of features, such as high-temperature stability, a wide temperature range, failure diagnosis, external communication, etc.
- Compliant with UL Standards, SEMI Standards, CE-marking
- It is possible to select the inverter type.

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|----------------------------|-----------------------|---|--|
| HRW | 20 to 90°C | 2 kW, 8 kW 15 kW, 30 kW | ±0.3°C | Water-cooled type (Without compressor) | Fluorinated fluid, Tap water, Deionized water, Ethylene glycol aqueous solution (60%) |

Thermo-cons/Thermoelectric Baths (Peltier-Type Temperature Control Equipment)

Peltier-Type Thermo-con/Rack Mount Type **HECR**



- Good space utilization: Mountable in a 19-inch rack
Saves space by allowing multiple pieces of equipment to be mounted together in a rack.
- Temperature stability: ±0.01°C to 0.03°C
- Set temperature range: 10°C to 60°C
- Cooling capacity: 200 W, 400 W, 510 W, 800 W, 1 kW, 1.2 kW
- Power consumption: 200 W, 300 W, 400 W

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method |
|-----------|-----------------------|------------------|-----------------------|---------------------------|
| HECR002-A | 10 to 60°C | 200 W | ±0.01 to 0.03°C | Peltier-type air-cooled |
| HECR004-A | 10 to 60°C | 400 W | ±0.01 to 0.03°C | Peltier-type air-cooled |
| HECR006-A | 10 to 60°C | 510 W | ±0.01 to 0.03°C | Peltier-type air-cooled |
| HECR008-A | 10 to 60°C | 800 W | ±0.01 to 0.03°C | Peltier-type air-cooled |
| HECR010-A | 10 to 60°C | 1 kW | ±0.01 to 0.03°C | Peltier-type air-cooled |
| HECR008-W | 10 to 60°C | 800 W | ±0.01 to 0.03°C | Peltier-type water-cooled |
| HECR012-W | 10 to 60°C | 1.2 kW | ±0.01 to 0.03°C | Peltier-type water-cooled |

Peltier-Type Thermo-con **HEC**

High-precision chiller



- For applications requiring high-precision temperature control
- High-precision, refrigerant-free temperature control equipment that uses a Peltier device
- Simple structure and high reliability
- Can easily be built into equipment due to its compact and low-vibration design
- Compatible with a wide range of power supply voltages
- Compliant with UL Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|------------------|-----------------------|---------------------------|---|
| HEC | 10 to 60°C | 230 W 600 W | ±0.01 to 0.03°C | Peltier-type air-cooled | Tap water |
| HEC | 10 to 60°C | 140 W 320 W | ±0.01 to 0.03°C | Peltier-type water-cooled | Tap water Ethylene glycol aqueous solution (20%) |
| HEC | 10 to 60°C | 600 W 1200 W | ±0.01 to 0.03°C | Peltier-type water-cooled | Tap water Fluorinated fluid |

Temperature Control Equipment

Thermo-cons/Thermoelectric Baths (Peltier-Type Temperature Control Equipment)

Peltier-Type Thermoelectric Bath **HEB**

High-precision thermoelectric bath



- High-precision temperature control bath that uses a Peltier device
- Compact and low noise
- Minimal up-down temperature distribution by a unique agitation method

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|------------------|-----------------------|--------------------------------------|------------------------------|
| HEB | -15 to 60°C | 140 W 280 W | 0.01°C | Round type Peltier-type water-cooled | Tap water, Fluorinated fluid |

Peltier-Type Thermoelectric Bath (Made to Order) **INR**



- High-precision temperature control bath that uses a Peltier device
- Compact and low noise
- Minimal up-down temperature distribution by a unique agitation method

| Series | Set temperature range | Max. cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------------|-----------------------|-----------------------|-----------------------|---------------------------|---|
| INR-244-696A | -15 to 60°C | 280 W | ±0.02°C | Peltier-type water-cooled | Tap water Ethylene glycol aqueous solution Fluorinated fluid (Square type can only be used at room temperature.) |
| INR-244-745 | 0 to 60°C | 140 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-733 | 0 to 60°C | 140 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-747 | 0 to 60°C | 320 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-736 | 0 to 60°C | 320 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-746 | 0 to 60°C | 320 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-734 | 0 to 60°C | 320 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-749 | 0 to 60°C | 320 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-748 | 0 to 60°C | 320 W | ±0.03°C | Peltier-type water-cooled | |
| INR-244-757 | 0 to 60°C | 220 W | ±0.03°C | Peltier-type air-cooled | |

Peltier-Type Chemical Thermo-con **HED**

Fluoropolymer temperature control equipment for chemical liquids



- Heat exchanger for direct temperature control that uses a Peltier device
- Compatible with a wide range of chemical liquids through the use of a fluororesin heat exchanger
- Compliant with UL Standards, CE-marking

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Circulating fluid |
|--------|-----------------------|-------------------------|-----------------------|---------------------------|--|
| HED | 10 to 60°C | 300 W 500 W 750 W | ±0.1°C | Peltier-type water-cooled | Deionized water, Fluorinated fluid, Ammonia hydrogen peroxide solution, etc. |

Temperature Control Equipment

Air Temperature Controllers

Peltier-Type Air-Thermo HEA



- High-precision, compact temperature control equipment that uses a Peltier device
- Compatible with localized and small-volume temperature control

| Series | Set temperature range | Cooling capacity | Temperature stability | Cooling method | Fluid |
|--------|-----------------------|------------------|-----------------------|-------------------------|-------|
| HEA | 0 to 50°C | 22 W | ±0.1°C | Peltier-type air-cooled | Air |

Thermo-dryer with Air Temperature Adjustment Function IDH□



- Stable supply of temperature and pressure controlled dry clean air
Can supply compressed air with the same conditions and quality regardless of the season
- Application example:
Supplying compressed air with constant conditions to air bearings mounted on a tool
- Built-in filter
Nominal filtration: 0.01 μm (99.9% filtration efficiency)
Outlet oil mist concentration: Max. 0.01 mg/m³ (ANR)
Outlet cleanliness: Particles of 0.3 μm or more: 3.5 particles/L (ANR) or less
- Compatible with power supplies from around the world
Single-phase 100, 200, 230 VAC (50/60 Hz)

| Series | Air flow capacity [L/min (ANR)] | Outlet air temperature adjustment range | Outlet air set pressure range | Outlet air temperature stability | Cooling method |
|--------|---------------------------------|---|-------------------------------|----------------------------------|---------------------------------|
| IDH□4 | 100 to 500 | 15 to 30°C | 0.15 to 0.85 MPa | ±0.1 | Heater operation PID control |
| IDH□6 | 200 to 800 | 15 to 30°C | 0.15 to 0.85 MPa | ±0.1 | |

Circulating Fluid Temperature Controller HRS-R



- Resistant to dust and water splashing
- Exterior surface is metal/stainless panel optional
- IP54 Protection of electrical unit
- 5 L tank capacity/12L tank capacity optional
- Self diagnosis function and check display
- Compatible with power supplies in Europe, Asia, Oceania, and North, Central, and South America

| Series | Set Temperature Range | Cooling Capacity (50/60 Hz) | Heating Capacity (50/60 Hz) | Temperature Stability | Cooling Method | Circulating Fluid |
|-------------|-----------------------|-----------------------------|-----------------------------|-----------------------|--------------------------|---|
| HRS018-A□-R | 5 to 40°C | 1.7kW/1.9kW | 430W/540kW | ±0.1°C | Air Cooled Refrigeration | Tap water, 14% ethylene glycol aqueous solution |
| HRS030-A□-R | | 2.5kW/2.9kW | | | | |
| HRS050-A□-R | | 4.5kW/5.0kW | 830W/1.2kW | | | |

High Vacuum Equipment

High Vacuum Valves

Stainless Steel High Vacuum Angle/In-line Valve **XM/XY**



- The precision casting, unified composition prevents the accumulation of gas.
- The XM series is interchangeable with the XL series aluminum high vacuum angle valve.

*1 Size 16 is not available for the in-line type.

| Series | Actuation | Shaft seal type | Valve type | Material | Flange size |
|---------|--------------|-----------------------------|----------------------|--|-------------|
| XMA/XYA | Air operated | Bellows seal | Single acting (N.C.) | Body: SCS13 (Equivalent to stainless steel 304) Bellows: Stainless steel 316L | 16 to 80*1 |
| XMC/XYC | | Bellows seal | Double acting | | 16 to 80*1 |
| XMD/XYD | | Bellows seal O-ring seal | Single acting (N.C.) | | 25 to 80 |
| XMH/XYH | Manual | Bellows seal | Manual | | 16 to 50*1 |

Normal Close High Vacuum Solenoid Valve **XSA**



- Minimum operating pressure: 1×10^{-6} Pa (abs)
- Leakage: Internal 1.3×10^{-9} Pa·m³/s, External 1.3×10^{-11} Pa·m³/s
- 2 types of fittings and female threads are available.
- Power consumption: Max. 25% reduction
- Weight: Max. 18% lighter (0.5 kg → 0.41 kg)

| Series | Valve type | Fluid | Piping | Port size |
|--------|-----------------|----------------|--|---------------|
| XSA | Normally closed | Air, Inert gas | Face seal fitting Compression fitting | 1/4, 3/8 |
| XSA | Normally closed | Air, Inert gas | Rc, NPT female thread | 1/8, 1/4, 3/8 |

Process Gas Equipment

Regulators for Ultra High Purity (UHP) AP/SL/AP/AZ



- For UHP gas delivery in semiconductor and other clean industries
- Body material: 316L SS secondary remelt or 316L SS
- Electropolished wetted parts
- External metal seal construction

| Series | Type | Application | Body material | Connection type | Connection size |
|--------|--------------|--------------------------|-----------------------------|------------------------|------------------------|
| AP/SL | Single stage | Distribution (Compact) | 316L SS | Face seal Tube weld | 1/4", 3/8" |
| AP/SL | Single stage | Distribution | secondary remelt | | 1/4", 3/8", 1/2", 3/4" |
| AP/SL | Single stage | Bulk gas | 316L SS | | 1/2", 3/4", 1" |
| AP/SL | Single stage | Source | 316L SS secondary remelt | | 1/4", 3/8", 1/2", 3/4" |
| AP/SL | Single stage | Sub-atmospheric pressure | | | 1/4", 3/8", 1/2", 3/4" |
| AP | Two stage | Source | | | 1/4", 3/8" |
| AZ | Single stage | Distribution | 316L SS | | 1/4", 3/8", 1/2" |
| AZ | Single stage | Source | | | 1/4", 3/8", 1/2" |
| AZ | Single stage | Sub-atmospheric pressure | | | 1/4", 3/8", 1/2" |

Regulator/Back Pressure Regulator for General Applications AK/BP



- For a wide variety of applications from semiconductor to general
- Body material of 316 SS or brass is available depending on the gas.

| Series | Type | Application | Body material | Connection type | Connection size |
|--------|-------------------------|--------------------------|-----------------|----------------------------|------------------|
| AK | Single stage | Distribution | 316 SS or Brass | NPT female, Compression | 1/4", 3/8", 1/2" |
| AK | Single stage | Source | | | 1/4", 3/8", 1/2" |
| AK | Single stage | Sub-atmospheric pressure | | | 1/4", 3/8", 1/2" |
| AK | Two stage | Source | | | 1/4" |
| BP | Back pressure regulator | — | | | 1/4" |

Diaphragm Valve for Ultra High Purity AP



- For UHP gas delivery in semiconductor and other clean industries
- Used as a gas shutoff valve
- No spring is used for the wetted parts and the drive part is also separated from the diaphragm. Dead space in the flow path is small in order to suppress particle generation.

| Series | Type | Body material | Connection type | Connection size |
|--------|------------------------|--------------------------|------------------------|------------------------|
| AP | Air operated type | 316L SS secondary remelt | Face seal Tube weld | 1/4", 3/8", 1/2", 3/4" |
| AP | Manually operated type | | | 1/4", 3/8", 1/2", 3/4" |

Diaphragm Valve for Ultra High Purity AZ

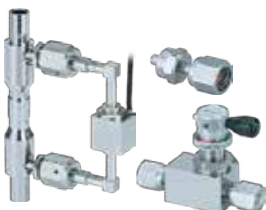


- Cleaned for high-purity semiconductor applications and clean room assembled
- Helium leak tested
- SEMI Standards-compliant
- User-friendly forged body

| Series | Type | Body material | Connection type | Connection size |
|--------|------------------------|---------------|------------------------|------------------|
| AZ | Air operated type | 316L SS | Face seal Tube weld | 1/4", 3/8", 1/2" |
| AZ | Manually operated type | | | 1/4", 3/8", 1/2" |

Process Gas Equipment

Check Valve/Vacuum Generator/Flow Switch **AP**



[Check valve]

- Fluid backflow is prevented by back pressure.
- Unique design with only one moving part in the gas stream, an O-ring
- Springless structure suppresses particle generation by vibration or chattering and pressure fluctuations on the downstream side

[Vacuum generator]

- Vacuum generation equipment
- Applicable to the exhaustion of unnecessary gas remaining inside the piping during gas cylinder replacement

[Flow switch]

- Detects excess flow above a given flow rate caused by pipe breakage, etc.

| Series | Type | Body material | Connection type | Connection size |
|--------|------------------|-----------------------------------|------------------------|-----------------|
| AP | Check valve | 316L SS secondary remelt | Face seal Tube weld | 1/4", 3/8" |
| AP | Vacuum generator | 316L SS | | 1/4", 3/8" |
| AP | Flow switch | 316L SS secondary remelt, 316L SS | | 1/2", 3/4" |

Diaphragm Valve for General Applications **AK**



- Rc, R, and NPT connections have been added to the series.
- For a wide variety of applications from semiconductor to general
- Cleaned for O₂ service
- Compact and lightweight due to the shortening of the actuator (AK3542/4542)
- M5 actuation port (AK3542/4542)
- Compact and lightweight due to the modifying of the knob design (AK3652/4652)
- The knob features a unique design that combines a scalloped round knob with a raised rectangular section to provide two choices of gripping. (AK3652/4652)

| Series | Type | Body material | Connection type | Connection size |
|--------|------------------------|---------------|---------------------------|-----------------|
| AK | Air operated type | 316 SS | Compression Rc, R, NPT | 1/4", 3/8" |
| AK | Manually operated type | | | 1/4", 3/8" |

Regulator for General Applications **AK1000T**



- For a wide variety of applications from semiconductor to general
- Compact and lightweight:
Weight: 0.52 kg, Height: 97.5 mm
- Minimum dead leg construction
- Various piping configurations are available:
Select from compression, NPT female, or Rc thread.

| Series | Type | Body material | Connection type | Connection size |
|---------|------------------------|---------------|------------------------|-----------------|
| AK1000T | Manually operated type | 316 SS | Compression Rc, NPT | 1/4", 3/8" |

Industrial Filters/Sintered Metal Elements

Industrial Filters

Industrial Filter/Vessel Series FGD



- Ideal for low-flow filtration (Max. 60 L/min)
- It is possible to select the antistatic specification (FGDE, FGDF).

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|-----------------|-------------------------|----------------------------|
| FGD | Rc3/8, 1/2, 3/4 | 0.7, 1 MPa | Max. 80 |

Industrial Filter/Vessel Series FGE



- Ideal for medium flow rate filtration (Max. 230 L/min)
- Easy element replacement for the V-band type (With cover anti-scattering mechanism)

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|-----------|-------------------------|----------------------------|
| FGE | R1, 2 | 0.7 MPa | Max. 80 |

Industrial Filter/Vessel Series FGG



- Ideal for high-flow filtration (Max. 350 L/min)
- Easy element replacement for the V-band type (With cover anti-scattering mechanism)

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|-----------|-------------------------|----------------------------|
| FGG | Rc2 | 0.7 MPa | Max. 80 |

Industrial Filter/Vessel Series FGA



- Ideal for high-flow filtration (Max. 3200 L/min)

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|-----------------------------------|-------------------------|----------------------------|
| FGA | 25 to 150 (1B to 6B) JIS 10KFF | 1 MPa | Max. 80 |

Industrial Filter/Vessel Series FGC



- Ideal for low-flow filtration (Max. 80 L/min)

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|------------------------------------|-------------------------|----------------------------|
| FGC | 15 to 25 (1/2B to 1B) JIS 10KFF | 1, 2, 4 MPa | Max. 80 |

Industrial Filters/Sintered Metal Elements

Industrial Filters

Bag Filter FGF



- Highly effective for the filtration of high-temperature and high-viscosity fluids
- Ideal for high-flow filtration (Max. 2000 L/min)
- Easy handling of filtered impurities

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|------------------------------|-------------------------|----------------------------|
| FGF | 100 (4B), 150 (6B) JIS 10KFF | 0.5 MPa | Max. 80 |

High Precision Filter for Liquids FGH



- Filtration efficiency: 99% or more

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|------------|-------------------------|----------------------------|
| FGH | Rc3/8 to 1 | 1 MPa | Max. 80 |

Filter for Cleaning Fluid/Quick Change Filter FQ1



- Ideal for low-flow filtration (Max. 30 L/min)
- No tools are required.
- Takes only 60 seconds for element replacement

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|---------------|-------------------------|----------------------------|
| FQ1 | Rc1/2, 3/4, 1 | 1 MPa | Max. 80 |

Low Maintenance Filter FN



- Element replacement is not required.
- System circuit allows for the automatic cleaning of the element when clogged

| Series | Port size | Max. operating pressure | Operating temperature [°C] |
|--------|-----------|-------------------------|----------------------------|
| FN1 | Rc1 | 1 MPa | Max. 80 |
| FN4 | Rc2 | 1 MPa | Max. 80 |

Sintered Metal Elements

Sintered Metal Element EB/ES



- Large mechanical strength and withstand pressure, Anti-corrosive
- Mechanical process, caulking, brazing, soldering, welding, and simultaneous sintering are possible.
- Can be cleaned and reused

| Series | Material | Nominal filtration accuracy |
|--------|-----------------|---|
| EB | Bronze | (1) 2, 5, 10, 20, 40, 70, 100, 120 μm (): Semi-standard |
| ES | Stainless steel | (1) 2, 5, 10, 20, 40, 70, 100, 120 μm (): Semi-standard |

Pneumatic Instrumentation Equipment

Positioners

Electro-Pneumatic Positioner/Smart Positioner IP8□00/IP8□01



IP8001 (Lever type)



IP8101 (Rotary type)

- Enclosure: JISF8007 IP65 (Compliant with IEC 60529)
- Monitoring function
- Explosion-proof construction
 - Electro-pneumatic positioner: TIS explosion-proof construction (Ex d IIB T5)
 - Smart positioner: ATEX intrinsically safe explosion-proof construction (II 2G Ex ib II C T5/T6 Gb)
 - Smart positioner: ATEX intrinsically safe explosion-proof construction (II 1G Ex ia II C T4/T5/T6 Ga)
- HART transmission function (Smart positioner)

| Description | Series | Type | Port size [Rc, NPT, G] | Supply air pressure [MPa] | Input current |
|------------------------------|--------|-------------|---------------------------|------------------------------|---------------|
| Electro-pneumatic positioner | IP8000 | Lever type | 1/4 | 0.14 to 0.7 | 4 to 20 mA DC |
| Electro-pneumatic positioner | IP8100 | Rotary type | 1/4 | 0.14 to 0.7 | 4 to 20 mA DC |
| Smart positioner | IP8001 | Lever type | 1/4 | 0.14 to 0.7 | 4 to 20 mA DC |
| Smart positioner | IP8101 | Rotary type | 1/4 | 0.3 to 0.7 | 4 to 20 mA DC |

Other Derived Series

Clean/Low Particle Generation 10-/11-/12-/13-/21-/22-



| Description | Model | Features/Specifications |
|--|--------------------|---|
| Clean series | 10-/11- 12-/13- | <ul style="list-style-type: none"> • Prevents particle generation in a clean room • Particle generation from the equipment is classified by ISO cleanliness class (ISO Class 3 to 6). Select based on the cleanliness class of the clean room. • Fluorine grease is used. • Products are sealed and shipped in anti-static double bags. |
| Copper, Fluorine, Silicone-free, Low particle generation | 21-/22- | <ul style="list-style-type: none"> • Suitable for environments where the presence of copper, fluorine, or silicone materials is restricted. • Lithium soap-based grease is used. • Construction is the same as the clean series. • Standard packaging (Double packaging is not used.) |

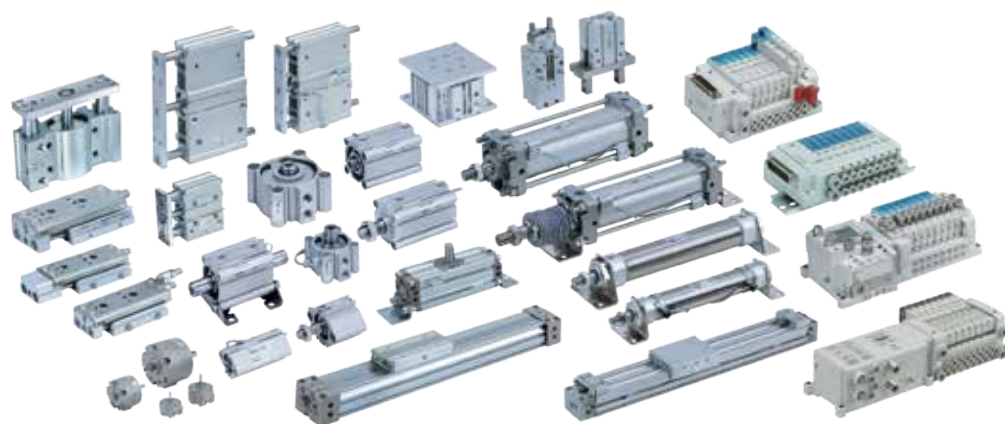
UNIT CONVERSIONS

| | unit | conversion | result |
|-------------|-----------------|------------------|-----------------|
| length | m | x 3.28 | ft |
| | mm | x 0.04 | in |
| mass | g | x 0.04 | oz |
| volume | cm ³ | ÷ 16.387 | in ³ |
| | L | x 61.024 | in ³ |
| speed | mm/s | ÷ 25.4 | in/s |
| pressure | MPa | x 145 | psi |
| | kPa | ÷ 6.895 | psi |
| temperature | °C | x1.8 then add 32 | °F |
| torque | N·m | x 0.738 | ft-lb |
| force | N | ÷ 4.448 | lbf |
| flow | L/min | ÷ 28.317 | cfm |



SMC: Continuing to pursue worldwide customer satisfaction and support automation with the latest pneumatic technologies

The 21st century—with increased globalization and the rapid evolution of information technology—has seen great changes in the way business is conducted. In these quickly developing, ever-changing times, customer satisfaction can only be achieved with a clear understanding of customer goals and objectives. This is the reason for SMC's dedication to building an organization that listens carefully to customers and responds quickly and specifically to their needs. SMC has established a wide-spread global network of locations in all major countries in the Americas, Europe, Asia, and Oceania as well as in emerging countries, showing our active commitment to the world market. SMC supports this global network with a stable supply chain of products, advanced technical services, and a solid communication network. It is our number one goal to meet the needs and expectations of all our customers.



Technical Development

We have over 1,500 engineers spread out over numerous technical centers in Japan, the U.S., Europe, and China.

Quick, clear, and detailed responses to customer requests are communicated through our sales group. And with ongoing information exchange between our technical centers, our engineers are constantly working together to find new industry trends that may lead to product improvement.

Production and Supply

Our product line offers 12,000 basic models with over 700,000 variations. With both domestic and overseas production facilities, we are able to provide a stable supply of products to customers around the world.

We are proud to offer a vast array of products that satisfy the needs of a wide range of applications. Our unique production system allows us to quickly deliver high-quality products at competitive prices, and by maximizing our local production capabilities, a stable supply of product is guaranteed.

Sales & Communication Network

With 500 sales offices in 83 countries and regions worldwide, our sales force of over 8,300 maintains close communication with our customers.

It is by establishing a strong base in each country and region with a large experienced sales force that SMC is able to provide the best possible service in the industry. Maintaining close communication with our customers throughout the world ensures our engineering teams and our products stay at the leading edge of the industry.



SMC's global engineering network: Featuring technical centers in the U.S., Europe, China, and Japan

Following the basic concept of developing products from the customer's standpoint, SMC dedicates a great deal of staff and financial resources to research and development. This is undertaken to promote research on basic technology with future potential and to produce products that meet the needs of the marketplace in a timely manner. To provide speedy solutions to all our customers' problems, technical centers have been established in the U.S., Europe, and China, creating a powerful global engineering network with Japan as its nucleus. All of our technical centers keep in close contact, constantly exchanging information in order to quickly respond to local demands and offer the same standard of technical service quality throughout the world.

The Japan Technical Center has been expanded, moving to a new twin-tower building from where it will oversee worldwide technical development.



JTC (Japan Technical Center) Japan

The JTC is staffed with 1,100 employees and is the center of SMC research and development. It produces new products for the global market based on customers' current and future needs.



CTC (China Technical Center) China

The CTC's 120 employees are reinforcing the system through product development and technical services in order to quickly respond to the Chinese market's wide range of needs and requirements.

SMC's Global Engineering Network

Europe and Africa

Asia and Oceania

Americas



UTC (U.S. Technical Center) **United States of America**

The UTC is enhancing engineering capabilities in order to more quickly respond to the needs of the North American market through product development and technical services. At present, there are approximately 140 employees tasked with dealing with the various needs of customers in the region.



ETC (European Technical Centre) **United Kingdom**

The ETC was established in the existing SMC UK factory site in Milton Keynes. Here, approximately 60 experienced staff members from a number of SMC European subsidiaries work together to handle projects from their respective countries. This has enabled improved communication, faster and more accurate information exchange, and a higher level of customer satisfaction in the region.



GTC (German Technical Centre) **Germany**

Situated in Germany, the industrial center of Europe, the GTC and its 80 employees develop products and provide technical services by quickly responding to the needs of the region's customers.



A global production network providing the world with a stable and continuous supply of high-quality products

SMC provides products to world markets from six domestic production facilities, including our Soka (Saitama Pref.) and Tsukuba (Ibaraki Pref.) factories, as well as from other key overseas production facilities in China, Singapore, and India. Additionally, in order to respond quickly and flexibly to the demands of local markets outside of Japan, overseas production facilities have been established in SMC subsidiaries around the world.

1 Domestic Production Facilities (Japan)



Soka Factory
(Saitama Pref.)



Kamaishi Factory
(Iwate Pref.)



Tsukuba Factory
(Ibaraki Pref.)



Tono Factory
(Iwate Pref.)



Shimotsuma Factory
(Ibaraki Pref.)



Yamatsuri Factory
(Fukushima Pref.)





2 Key Overseas Production Facilities



China Factory



Singapore Factory



India Factory

3 Overseas Local Production Facilities

Americas



United States of America



Brazil



Mexico

Argentina
Chile

Europe and Africa



Germany



United Kingdom



Italy

Austria
Finland
France
South Africa
Spain
Sweden
Switzerland
Turkey



Russia



Czech Republic

Asia and Oceania



Australia



Korea

China (Guangzhou)
Hong Kong
Malaysia
New Zealand
Philippines
Singapore
Taiwan
Thailand
Vietnam



One-to-one communication facilitated through a highly extensive network sharply focusing on SMC customers and an experienced sales support organization

In order to satisfy each individual customer, SMC believes it is essential to promote sales activities that emphasize personal contact. The function of our sales staff is not simply to take the customers' orders but to accurately gauge the customers' needs and desires. They play an important role in the development of new products and services by providing vital feedback to the technical and production departments. For this reason, we invest a great deal in our support network and sales organization with the aim of developing closer relationships with our customers and becoming more familiar with their needs. SMC's sales force of 1,200 in Japan and 7,100 internationally is continually striving to cultivate closer communication with our customers.

SMC's extensive domestic sales network 53 branch offices

West Region


Austin Branch

9233 Waterford Centre, Suite 200,
Austin, TX 78758
Phone: (800) 762-7621


Dallas Branch

520 E. Corporate Drive, Suite 600
Lewisville, TX 75057
Phone: (800) 762-7621


Los Angeles Branch

1590 Metro Drive, Suite 118
Costa Mesa, CA 92626
Phone: (714) 669-1701


Phoenix Branch

4050 E Cotton Center Blvd. Suite 74
Phoenix, AZ 85040
Phone: (800) 762-7621


Portland Branch

15055 Southwest Sequoia Parkway
Suite 180 Portland, OR 97224
Phone: (800) 762-7621


San Jose Branch

2841 Junction Avenue, Suite 110
San Jose, CA 95134
Phone: (408) 943-9600

Central Region


Chicago Branch

858 Meridian Lake Drive, Suite F
Aurora, IL 60504
Phone: (630) 449-0600


Cincinnati Branch

4900 Parkway Drive, Suite 130
Mason, OH 45040
Phone: (513) 445-6957


Cleveland Branch

4160 Highlander Parkway, Suite 200
Richfield, OH 44286
Phone: (330) 659-2006


Des Moines Branch

11384 Aurora Avenue
Urbandale, IA 50322
Phone: +1-515-805-2300


Detroit Branch

3895 West Hamlin Road
Rochester Hills, MI 48309
Phone: (800) 762-7621


Grand Rapids Branch

3940 Broadmoor Avenue SE
Grand Rapids, MI 49512
Phone: +1-616-552-1000


Indianapolis Branch

10100 SMC Boulevard
Noblesville, IN 46060
Phone: (317) 899-4440


Kansas City Branch

13261 W. 98th Street
Lenexa, KS 66215
Phone: +1-913-643-1798


Milwaukee Branch

W177 N9886 Rivercrest Road,
Suite 109 Germantown, WI 53022
Phone: (800) 762-7621


Minneapolis Branch

6541 City West Parkway
Eden Prairie, MN 55344
Phone: (800) 762-7621


St. Louis Branch

11489 Page Service Center Drive,
Saint Louis, MO 63146
Phone: (800) 762-7621

East Region


Albany Branch

286 Washington Avenue Extension
Suite 101 Albany, NY 12203
Phone: (518) 608-7200


Atlanta Branch

3090 Premiere Parkway Suite 350,
Duluth, GA 30097
Phone: (800) 762-7621


Birmingham Branch

177 Cahaba Valley Parkway
Pelham, AL 35124
Phone: (800) 762-7621


Boston Branch

99 Rosewood Drive, Suite 180
Danvers, MA 01923
Phone: (978) 767-2328


Charlotte Branch

9801 W. Kincay Avenue, Suite 150
Huntersville, NC 28078
Phone: (800) 762-7621


Knoxville Branch

1703 Schaeffer Road
Knoxville, TN 37932
Phone: (800) 762-7621

Nashville Branch


Nashville Branch

318 Seaboard Lane, Suite 401
Franklin, TN 37067
Phone: (800) 762-7621


Philadelphia Branch

2463 Baglyos Circle
Bethlehem, PA 18020
Phone: (800) 762-7621


Rochester Branch

7625 Ornithatch Place, Suite 7
Victor, NY 14564
Phone: (800) 762-7621


Tampa Branch

13958 Lynmar Blvd.
Tampa, FL 33626
Phone: (800) 762-7621

SMC Automation Canada, Ltd.


Toronto Branch

6700 Millcreek Drive, Unit #3
Mississauga, Ontario L5N 8B3
Phone: (905) 287-9700


Vancouver Branch

4300 N. Fraser Way, Unit 206
Burnaby, B.C. V5J 0B3
Phone: (604) 412-2100


Quebec City Branch

2800 Saint-Jean-Baptiste Avenue
Suite 100, Quebec City, QC G2E 6J5
Phone: (418) 478-4278


Montreal Branch

755 Saint-Jean Boulevard, Suite 12
Pointe-Claire, QC H9R 5M9
Phone: (514) 733-9595


Windsor Branch

3100 Temple Drive, Unit 500,
Windsor, ON N8W 5E6
Phone: (519) 944-0555



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SMC North American Headquarters, Manufacturing and Central Distribution Facility



Global Products / Local Support

The North American Manufacturing and Central Warehouse expansion has positioned SMC to support sales and growth in the U.S. and Canada.

- 2 million sq. ft. total manufacturing and warehouse space
- Additional investment in warehouse space to increase inventory levels
- Incorporating FTZ area within the expanded warehouse reducing overseas delivery time



Global Manufacturing, Distribution and Service Network

Worldwide Subsidiaries

EUROPE

AUSTRIA
SMC Pneumatik GmbH (Austria)

BELGIUM
SMC Pneumatics N.V./S.A.

BULGARIA
SMC Industrial Automation Bulgaria EOOD

CROATIA
SMC Industrijska Automatika d.o.o.

CZECH REPUBLIC
SMC Industrial Automation CZ s.r.o.

DENMARK
SMC Pneumatik A/S

ESTONIA
SMC Pneumatics Estonia

FINLAND
SMC Pneumatics Finland OY

FRANCE
SMC Pneumatique S.A.

GERMANY
SMC Pneumatik GmbH

GREECE
SMC Hellas EPE

HUNGARY
SMC Hungary Ipari Automatizálási Kft.

IRELAND
SMC Pneumatics (Ireland) Ltd.

ITALY
SMC Italia S.p.A.

KAZAKHSTAN
LLP "SMC Kazakhstan"

LATVIA
SMC Pneumatics Latvia SIA

LITHUANIA
UAB "SMC Pneumatics"

NETHERLANDS
SMC Pneumatics B.V.

NORWAY
SMC Pneumatics Norway AS

POLAND
SMC Industrial Automation Polska Sp. z o.o.

ROMANIA
SMC Romania S.r.l.

RUSSIA
SMC Pneumatik LLC.

SLOVAKIA
SMC Priemyselná Automatizácia, Spol s.r.o.

SLOVENIA
SMC Industrijska Avtomatika d.o.o.

SPAIN / PORTUGAL
SMC España, S.A.

SWEDEN
SMC Pneumatics Sweden AB

SWITZERLAND
SMC Pneumatik AG

TURKEY
SMC Pnömatik Sanayi Ticaret ve Servis A.Ş.

UK
SMC Pneumatics (U.K.) Ltd.

ASIA / OCEANIA

AUSTRALIA
SMC Pneumatics (Australia) Pty. Ltd.

CHINA
SMC (China) Co., Ltd.
SMC Pneumatics (Guangzhou) Ltd.

HONG KONG
SMC Pneumatics (Hong kong) Ltd.

INDIA
SMC Pneumatics (India) Pvt. Ltd.

INDONESIA
PT. SMC Pneumatics Indonesia

JAPAN
SMC Corporation

MALAYSIA
SMC Pneumatics (S.E.A.) Sdn. Bhd.

NEW ZEALAND
SMC Pneumatics (N.Z.) Ltd.

PHILIPPINES
Shoketsu SMC Corporation

SINGAPORE
SMC Pneumatics (S.E.A.) Pte. Ltd.

SOUTH KOREA
SMC Pneumatics Korea Co., Ltd.

TAIWAN
SMC Pneumatics (Taiwan) Co., Ltd.

THAILAND
SMC (Thailand) Ltd.

UNITED ARAB EMIRATES
SMC Pneumatics Middle East FZE

VIETNAM
SMC Pneumatics (VN) Co., Ltd.

AFRICA

SOUTH AFRICA
SMC Pneumatics (South Africa) Pty Ltd

NORTH, CENTRAL & SOUTH AMERICA

ARGENTINA
SMC Argentina S.A.

BOLIVIA
SMC Pneumatics Bolivia S.R.L.

BRAZIL
SMC Pneumáticos do Brasil Ltda.

CANADA
SMC Pneumatics (Canada) Ltd.

CHILE
SMC Pneumatics (Chile) S.A.

COLOMBIA
SMC Colombia Sucursal de SMC Chile, S.A.

MEXICO
SMC Corporation (Mexico) S.A. de C.V.

PERU
SMC Corporation Peru S.A.C.

USA
SMC Corporation of America

VENEZUELA
SMC Neumatica Venezuela S.A.

U.S. & Canadian Sales Offices

WEST

Austin
Dallas
Los Angeles
Phoenix
Portland
San Jose

CENTRAL

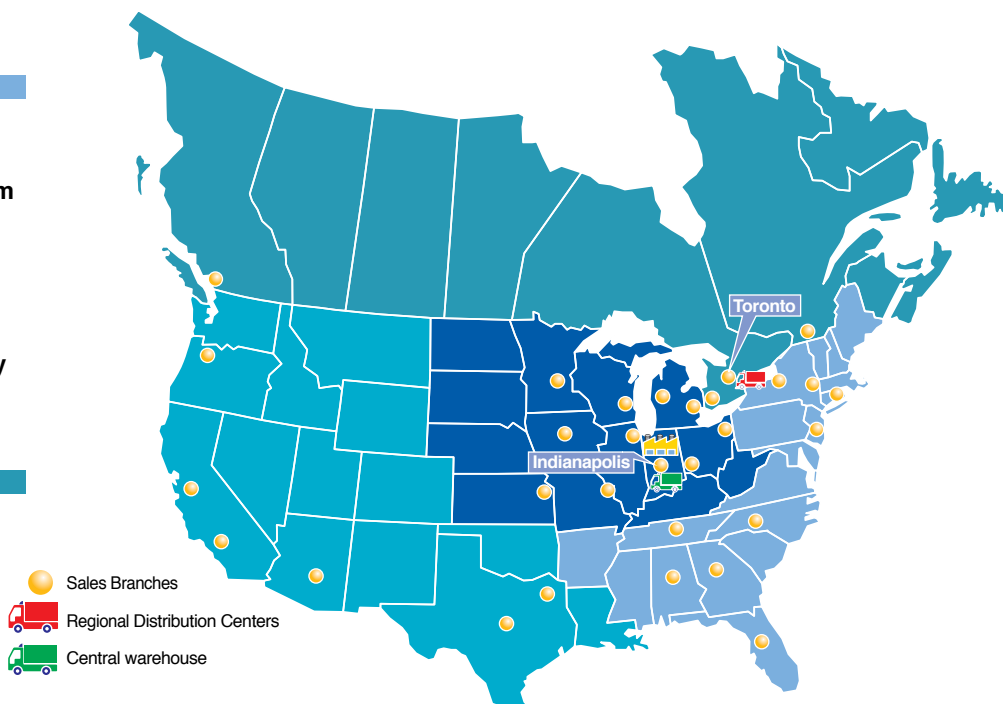
Chicago
Cincinnati
Cleveland
Detroit
Des Moines
Grand Rapids
Indianapolis
Kansas City
Milwaukee
Minneapolis
St. Louis

EAST

Albany
Atlanta
Birmingham
Boston
Charlotte
Knoxville
Nashville
New Jersey
Rochester
Tampa

CANADA

Vancouver
Toronto
Windsor
Montreal



SMC Corporation of America
10100 SMC Blvd., Noblesville, IN 46060
www.smcusa.com

SMC Automation (Canada) Ltd.
www.smcautomation.ca

(800) SMC.SMC1 (762-7621)
e-mail: sales@smcusa.com
International inquiries: www.smcworld.com

