Equipment for Machine Tools
SMC offers machine tool solutions to meet your automation and labor-saving needs.

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<td>P.48</td>
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<tr>
<td>Pilot Operated 2 Port Solenoid Valve/VXD</td>
<td>P.35</td>
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<tr>
<td>Zero Differential Pressure Type Pilot Operated 2 Port Solenoid Valve/VXZ</td>
<td>P.35</td>
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<tr>
<td>5.0 MPa Pilot Operated 2/3 Port Solenoid Valve &amp; Check Valve/VCH/VCHC</td>
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<td>Direct Operated Regulator for 6.0 MPa (Relieving Type)/VCHR</td>
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<td>Coolant Valve/SGC</td>
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<td>High Pressure Coolant Valve/SGH</td>
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<td>4 Port Coolant Valve</td>
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<td>Thermo-chiller: Standard Type/HRS</td>
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<td>P.50</td>
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<tr>
<td>Thermo-chiller: Standard Type/HRS090</td>
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<td>Thermo-chiller: Inverter Type/HRSH</td>
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<td>Thermo-chiller: Basic Type/HRSE</td>
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<td><strong>Process Pumps</strong></td>
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<td>Process Pump/Double Acting Pump/PA</td>
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<td>Process Pump/Single Acting Pump/PB</td>
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<td><strong>Industrial Filters</strong></td>
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<td>Vessel Series/FGD</td>
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<tr>
<td>Bag Filter/FGF</td>
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<td>Quick Change Filter/FQ1</td>
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<td><strong>Hydraulic Cylinders</strong></td>
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<td>Compact Hydraulic Cylinder/CHQ/CHDQ</td>
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<td>Small Bore Hydraulic Cylinder/CHN</td>
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<td>Compliant with JIS Standards: Hydraulic Cylinder/CH2E/CH2F/CH2G/CH2H</td>
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<tr>
<td>Air-Hydro Booster</td>
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<td>Made to Order</td>
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<td>P.33</td>
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<td>Line Filter/FH34/44/54/64</td>
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<td>P.24</td>
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<tr>
<td>Magnetic Separator/FHM</td>
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<td>P.24</td>
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</tbody>
</table>
Air Preparation Equipment
Air Cooled Aftercooler
HAA Series
- Applicable compressor: 7.5 to 37 kW
- Air flow capacity: 35.3 to 201.3 scfm [1000 to 5700 L/min (ANR)]

Water Cooled Aftercooler
HAW Series
- Applicable compressor: 2.2 to 110 kW
- Air flow capacity: 10.6 to 635.6 scfm [300 to 18000 L/min (ANR)]

Air Tank
AT Series
- Tank capacity: 26.4 to 792.5 gal [100 to 3000 L]
- Port size: 15A (1/2) to 4B flange

Main Line Filter
AFF Series
- Nominal filtration rating: 3 μm (Filtration efficiency: 99%)
- Rated flow: 10.6 to 1589 scfm [300 to 45000 L/min (ANR)]
- Port size: 6A (1/8) to 4B flange
- Modular connection (1/8 to 1)

Water Separator
AMG Series
- Water removal rate: 99%
- Rated flow: 10.6 to 423.7 scfm [300 to 12000 L/min (ANR)]
- Port size: 6A to 50A (1/8 to 2)
- Modular connection (1/8 to 1)

Refrigerated Air Dryer
IDF100FS/125FS/150FS Series
- Power consumption: Reduced by up to 76%
- Exhaust heat: Reduced by up to 25%
- Applicable compressor: 100, 125, 150 kW
- Air flow capacity: 18.8 to 27.0 m³/min (ANR)
- Refrigerant: R134a (HFC), R407C (HFC)
  Zero ozone depletion potential

Refrigerated Air Dryer
IDF1E to 370D Series
- Applicable compressor: 0.75 to 370 kW
- Air flow capacity: 0.10 to 65.0 m³/min (ANR)
- Refrigerant: R134a (HFC), R407C (HFC)
  Zero ozone depletion potential

Refrigerated Air Dryer
IDU3E to 75E Series
- Applicable compressor: 2.2 to 75 kW
- Air flow capacity: 0.32 to 12.4 m³/min (ANR)
- Refrigerant: R134a (HFC), R407C (HFC)
  Zero ozone depletion potential
Air Preparation Equipment

Thermo-dryer with Air Temperature Adjustment Function
IDH Series

• Provides a 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.
• Built-in filter
  Filter nominal filtration rating: 0.01μm (99.9% filtration efficiency)
  Outlet oil mist concentration: Max. 0.01 mg/m³ (ANR)
  Outlet cleanliness:
  Particles of 0.3μm or more: 3.5 particles/L (ANR) or less
• Compatible with power supplies all over the world
  Single-phase 100 VAC, 200 VAC, 230 VAC (50/60 Hz)

<Application Example>
Supplying compressed air with fixed conditions to air bearings mounted on a tool.

Mist Separator
AM Series

• Nominal filtration rating: 0.3μm (Filtration efficiency: 99.9%)
• Rated flow: 10.6 to 423.7 scfm [300 to 12000 L/min (ANR)]
• Port size: 6A to 50A (1/8 to 2)

Micro Mist Separator
AMD Series

• Nominal filtration rating: 0.01μm (Filtration efficiency: 99.9%)
• Rated flow: 7 to 1412 scfm [200 to 40000 L/min (ANR)]
• Port size: 6A (1/8) to 6B flange

Super Mist Separator
AME Series

• Nominal filtration rating: 0.01μm (Filtration efficiency: 99.9%)
• Rated flow: 7 to 423.7 scfm [200 to 12000 L/min (ANR)]
• Port size: 6A to 50A (1/8 to 2)

Odor Removal Filter
AMF Series

• Nominal filtration rating: 0.01μm (Filtration efficiency: 99.9%)
• Rated flow: 7 to 423.7 scfm [200 to 12000 L/min (ANR)]
• Port size: 6A to 50A (1/8 to 2)
Air Pressure Supply Equipment
Modular F.R.L.

Modular F.R.L. Units

**AC Series**

- Better visibility & environmental resistance
- Easy element replacement
  Integrated element and bowl.
  Replacement can be done by hand.
- Reduced required maintenance space: Max. 46% reduction
- Pressure gauge is selectable according to application.
  Square embedded type pressure gauge, Round type pressure gauge, Digital pressure switch

Modular Adapter

**E210/310/410 Series**

Connects easily to current products!
Example) Air filter + 3 port valve

Flexible mounting
- Can be connected to current products such as 3 port valves and F.R.L. Units.
- Can be freely rotated, thus allowing a wide selection of mounting directions.
- Can be connected to current products of different sizes.
  Example: AF30 + ARG20

Reduced space/piping maintenance cost
- Can be connected/disconnected without rotation.
- Fittings, tube, etc. are not required for connection.

Regulator with Built-in Pressure Gauge

**ARG Series**

Visibility of pressure gauge is improved in various installation locations.

Soft Start-up Valve

**AV Series**

- Start-up valve for low-speed air supply to gradually raise initial pressure in an air system and for quick exhaust by cutting off air supply

Mechanical Valves

Compliant with OSHA Standards: Pressure Relief

**VHS Series**

- Compliant with OSHA standards (Occupational Safety and Health Administration Department of Labor).
- Manually operated valve can be used to prevent accidents caused by residual pressure in pneumatic lines.
- It is possible to verify the supply and exhaust status of air flow at a glance.
- When in the exhaust position, the valve may be padlock secured.
  Prevents accidental start-ups while personnel are cleaning or servicing equipment.
- Push the handle and then turn.
  2-step action prevents malfunction.
Membrane Air Dryer

IDG/A/IDG Series

- It is possible to easily supply dry air using the hollow fiber membrane.
- Non-fluorocarbon
- Power supply not required.
- Compatible with low dew points –76°F [–60°C]
- No vibration or heat discharge.
- With dew point indicator

Water Separator

AMG Series

- Eliminates water droplets in the compressed air.
- Water removal rate: 99%
- Easy! Convenient! Eliminates water droplets just by connecting to air line!

<table>
<thead>
<tr>
<th>Series</th>
<th>AMG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air flow capacity</td>
<td>11 to 424 scfm [300 to 12000 L/min (ANR)]</td>
</tr>
<tr>
<td>Port size</td>
<td>1/8 to 2</td>
</tr>
</tbody>
</table>

Air Preparation Equipment

Air Preparation Filters

AFF/AM Series

Main Line Filter AFF Series

<table>
<thead>
<tr>
<th>Series</th>
<th>AFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal filtration rating [μm]</td>
<td>3 (Filtration efficiency: 99%)</td>
</tr>
<tr>
<td>Rated flow scfm [L/min (ANR)]</td>
<td>11 to 1589 [300 to 45000]</td>
</tr>
<tr>
<td>Port size</td>
<td>1/8 to 4(^{\circ}) flange</td>
</tr>
</tbody>
</table>

Micro Mist Separator AMD Series

<table>
<thead>
<tr>
<th>Series</th>
<th>AMD</th>
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</thead>
<tbody>
<tr>
<td>Nominal filtration rating [μm]</td>
<td>0.01 (Filtration efficiency: 99.9%)</td>
</tr>
<tr>
<td>Rated flow scfm [L/min (ANR)]</td>
<td>7 to 1412 [200 to 40000]</td>
</tr>
<tr>
<td>Port size</td>
<td>1/8 to 6(^{\circ}) flange</td>
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</tbody>
</table>

Super Mist Separator AME Series

<table>
<thead>
<tr>
<th>Series</th>
<th>AME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal filtration rating [μm]</td>
<td>0.01 (Filtration efficiency: 99.9%)</td>
</tr>
<tr>
<td>Rated flow scfm [L/min (ANR)]</td>
<td>7 to 242 [200 to 12000]</td>
</tr>
<tr>
<td>Port size</td>
<td>1/8 to 2</td>
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</tbody>
</table>

Micro Mist Separator with Pre-filter AMH Series

<table>
<thead>
<tr>
<th>Series</th>
<th>AMH</th>
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</thead>
<tbody>
<tr>
<td>Nominal filtration rating [μm]</td>
<td>0.01 (Filtration efficiency: 99.9%)</td>
</tr>
<tr>
<td>Rated flow scfm [L/min (ANR)]</td>
<td>7 to 242 [200 to 12000]</td>
</tr>
<tr>
<td>Port size</td>
<td>1/8 to 2</td>
</tr>
</tbody>
</table>

Odor Removal Filter AMF Series

<table>
<thead>
<tr>
<th>Series</th>
<th>AMF</th>
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</thead>
<tbody>
<tr>
<td>Nominal filtration rating [μm]</td>
<td>0.01 (Filtration efficiency: 99.9%)</td>
</tr>
<tr>
<td>Rated flow scfm [L/min (ANR)]</td>
<td>7 to 242 [200 to 12000]</td>
</tr>
<tr>
<td>Port size</td>
<td>1/8 to 2</td>
</tr>
</tbody>
</table>

ISO Quality Class

Select equipment according to the compressed air quality class in ISO 8573-1:2010 (JIS B 8392-1:2012). For details, refer to the Air Preparation Equipment Selection Guide in the Web Catalog of our website.

<Example of System>

Quality of the air class required by the application can be achieved.

- When using the IDG/A, a refrigerated air dryer should be installed on the primary side.
- This is an example. Please contact SMC for details.

- Membrane Air Dryer IDG/A Series
- Regulator AR Series
- Super Mist Separator AME Series
- Micro Mist Separator with Pre-filter AMH Series
Pneumatic Solenoid Valves

Plug-in Type

5 Port Solenoid Valve
SY Series

- 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)

Flow rate characteristics

<table>
<thead>
<tr>
<th>Series</th>
<th>Flow rate characteristics</th>
<th>Applicable cylinder size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SY3000</td>
<td>1.6 [dm³/(s·bar)] 0.19</td>
<td>ø50</td>
</tr>
<tr>
<td>SY5000</td>
<td>3.6 [dm³/(s·bar)] 0.17</td>
<td>ø63</td>
</tr>
<tr>
<td>SY7000</td>
<td>5.9 [dm³/(s·bar)] 0.20</td>
<td>ø80</td>
</tr>
</tbody>
</table>

*1 Use as a guide for selection. Please check the actual conditions with SMC Model Selection Software.

5 Port Solenoid Valve
SY Series

- Power consumption: 0.1 W (With power saving circuit)/0.35 W (Standard)
- Combined mounting of 3 port valve and 5 port valve is possible.
- A wide variety of manifold options, such as aluminum body manifold, DIN rail, and stacking type manifold, are available.
- UL Standards compliant product is available. (30-SY)

Flow rate characteristics

<table>
<thead>
<tr>
<th>Series</th>
<th>Flow rate characteristics</th>
<th>Applicable cylinder size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SY3000</td>
<td>1.1 [dm³/(s·bar)] 0.30</td>
<td>ø40</td>
</tr>
<tr>
<td>SY5000</td>
<td>2.8 [dm³/(s·bar)] 0.29</td>
<td>ø63</td>
</tr>
<tr>
<td>SY7000</td>
<td>4.5 [dm³/(s·bar)] 0.27</td>
<td>ø80</td>
</tr>
<tr>
<td>SY9000</td>
<td>10 [dm³/(s·bar)] 0.29</td>
<td>ø100</td>
</tr>
</tbody>
</table>

*1 Use as a guide for selection. Please check the actual conditions with SMC Model Selection Software.

Compliant with ISO13849-1 Categories: 3 Port Solenoid Valve/Residual Pressure Release Valve with Detection of Main Valve Position
VP/VG Series

With Detection of Main Valve Position Category 2

The detecting function of the main valve position detects inconsistencies between the input signal and valve operation.

Residual pressure release valve

Redundant system can be constructed easily Category 3, 4

When the dual residual pressure release valve is used, if one of the valves fails to operate, the other one releases residual pressure.

Dual Residual Pressure Release Valve
VP544-X538

With Soft Start-up Function
VP544-X555

A function to gradually increase the initial pressure of the pneumatic system has been added to the dual residual pressure release valve.

Dual Residual Pressure Release Valve
VG342-X87

Can be connected to modular type F.R.L. units.

Installation Example

Products do not come assembled. They should be ordered separately and assembled by the customer.
Modular Connection Type
Residual Pressure Relief 3 Port Solenoid Valve

VP500/700 Series

- Allows for space saving and reduced piping labor.
- Power consumption: 0.35 W (Without light)
- Can be connected to F.R.L. units.

<table>
<thead>
<tr>
<th>Series</th>
<th>Applicable combination</th>
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<tbody>
<tr>
<td></td>
<td>AC25-A</td>
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<tr>
<td>VP500</td>
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<tr>
<td>VP700</td>
<td></td>
</tr>
</tbody>
</table>

AC30C-A + VP500

2-Color Display
High-Precision Digital Pressure Switch

ISE40A Series

- Enclosure: IP65
- Can copy up to 10 switches simultaneously.
- 3-step setting
- With One-touch fitting

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE40A</td>
<td>Positive pressure</td>
<td>–14.5 to 145 psi [-0.100 to 1.000 MPa]</td>
</tr>
</tbody>
</table>

Fittings

S Couplers

KK130 Series

- Pressure loss reduction leads to energy saving.
- Cv factor: Increased by 34% *1
- Plug insertion force: Reduced by 22% (20 N) *1
- Lightweight: Reduced by 14% (12 g) *1

Pressure Switches

3-Screen Display
High-Precision Digital Pressure Switch

ISE20 Series

- Visualization of setting items
- Simple 3-step setting
- Easy screen switching:
  - Setting is possible while checking the measured value.
- Delay time: Fastest 1.5 ms or less
- Current consumption: 25 mA or less
- Enclosure: IP40

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE20</td>
<td>Positive pressure</td>
<td>–14.5 to 145 psi [-0.100 to 1.000 MPa]</td>
</tr>
</tbody>
</table>

Products do not come assembled. They should be ordered separately and assembled by the customer.
Sensing Equipment
### Pressure Switches

#### 3-Screen Display High-Precision Digital Pressure Switch
**ZSE20(F)/ISE20 Series**
- Visualization of setting items
- Simple 3-step setting
- Easy screen switching:
  - Setting is possible while checking the measured value.
- Delay time: Fastest 1.5 ms or less
- Current consumption: 25 mA or less
- Enclosure: IP40

#### 2-Color Display High-Precision Digital Pressure Switch
**ZSE40A(F)/ISE40A Series**
- Enclosure: IP65
- Can copy up to 10 switches simultaneously.
- 3-step setting
- With One-touch fitting

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE20F</td>
<td>Compound pressure</td>
<td>−14.5 to 14.5 psi [−100.0 to 100.0 kPa]</td>
</tr>
<tr>
<td>ZSE20</td>
<td>Vacuum pressure</td>
<td>0 to −14.6 psi [0.0 to −101.0 kPa]</td>
</tr>
<tr>
<td>ISE20</td>
<td>Positive pressure</td>
<td>−14.5 to 145 psi [−0.100 to 1.000 MPa]</td>
</tr>
<tr>
<td>ZSE40AF</td>
<td>Compound pressure</td>
<td>−14.5 to 14.5 psi [−100.0 to 100.0 kPa]</td>
</tr>
<tr>
<td>ZSE40A</td>
<td>Vacuum pressure</td>
<td>0 to −14.7 psi [0.0 to −101.3 kPa]</td>
</tr>
<tr>
<td>ISE40A</td>
<td>Positive pressure</td>
<td>−14.5 to 145 psi [−0.100 to 1.000 MPa]</td>
</tr>
</tbody>
</table>

#### Installation Example

#### 2-Color Display Digital Pressure Switch
**ISE70/75(H) Series**
- Metal body type (Die-cast aluminum)
- Enclosure: IP67
- With M12 connector

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE70</td>
<td>Positive pressure (for air)</td>
<td>0 to 145 psi [0 to 1 MPa]</td>
</tr>
<tr>
<td>ISE75</td>
<td>Positive pressure (for general fluids)</td>
<td>0 to 1450 psi [0 to 10 MPa]</td>
</tr>
<tr>
<td>ISE75H</td>
<td>Positive pressure (for general fluids)</td>
<td>0 to 2176 psi [0 to 15 MPa]</td>
</tr>
</tbody>
</table>

#### 2-Color Display Digital Pressure Switch
**ZSE80(F)/ISE80(H) Series**
- The stainless diaphragm makes it suitable for a wide variety of fluids.
- VCR® and Swagelok® fittings are available.
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE80F</td>
<td>Compound pressure</td>
<td>−14.5 to 14.5 psi [−100.0 to 100.0 kPa]</td>
</tr>
<tr>
<td>ZSE80</td>
<td>Vacuum pressure</td>
<td>0 to −14.6 psi [0.0 to −101.0 kPa]</td>
</tr>
<tr>
<td>ISE80</td>
<td>Positive pressure</td>
<td>−14.5 to 145 psi [−0.100 to 1.000 MPa]</td>
</tr>
<tr>
<td>ISE80H</td>
<td>Positive pressure</td>
<td>−14.5 to 290 psi [−0.100 to 2.000 MPa]</td>
</tr>
</tbody>
</table>

* VCR® and Swagelok® are registered trademarks of Swagelok Company.
Pressure Switches

3-Color Display Digital Gap Checker

ISA3 Series

- Check at a glance 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
- Enclosure: IP67 equivalent

Application Examples

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated distance range</th>
<th>Supply side piping specifications</th>
<th>Detection side piping specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISA3-F</td>
<td>0.01 to 0.03 mm</td>
<td>Rc, G 1/8</td>
<td>φ4, φ6 One-touch fitting, G 1/8</td>
</tr>
<tr>
<td>ISA3-G</td>
<td>0.02 to 0.15 mm</td>
<td>Rc, G 1/8</td>
<td>φ4, φ6 One-touch fitting, G 1/8</td>
</tr>
<tr>
<td>ISA3-H</td>
<td>0.05 to 0.30 mm</td>
<td>Rc, G 1/8</td>
<td>φ4, φ6 One-touch fitting, G 1/8</td>
</tr>
</tbody>
</table>

Compact Pneumatic Pressure Sensor

PSE54 Series

- Analog output (voltage)
- Enclosure: IP40

Low Differential Pressure Sensor

PSE550 Series

- Suitable for applications such as air current volume maintenance, filter blockage, and liquid surface detection.
- Analog output (voltage/current)
- Enclosure: IP40

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSE550</td>
<td>Vacuum pressure</td>
<td>0 to 0.29 psi [0 to 2 kPa]</td>
</tr>
</tbody>
</table>

Pressure Sensor for General Fluids

PSE57 Series

- Materials of parts in contact with fluid
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
<th>Proof pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSE570</td>
<td>Positive pressure</td>
<td>0 to 145 psi [0 to 1 MPa]</td>
<td>435 psi [3.0 MPa]</td>
</tr>
<tr>
<td>PSE573</td>
<td>Compound pressure</td>
<td>–14.5 to 14.5 psi [-100 to 100 kPa]</td>
<td>87 psi [600 kPa]</td>
</tr>
<tr>
<td>PSE574</td>
<td>Positive pressure</td>
<td>0 to 73 psi [0 to 500 kPa]</td>
<td>218 psi [1.5 MPa]</td>
</tr>
<tr>
<td>PSE575</td>
<td>Positive pressure</td>
<td>0 to 290 psi [0 to 2 MPa]</td>
<td>725 psi [5.0 MPa]</td>
</tr>
<tr>
<td>PSE576</td>
<td>Positive pressure</td>
<td>0 to 725 psi [0 to 5 MPa]</td>
<td>1813 psi [12.5 MPa]</td>
</tr>
<tr>
<td>PSE577</td>
<td>Positive pressure</td>
<td>0 to 1450 psi [0 to 10 MPa]</td>
<td>4351 psi [30 MPa]</td>
</tr>
</tbody>
</table>

Application Examples

- Liquid coolant pressure control

Pressure Switches
Multi-Channel Digital Pressure Sensor Controller

**PSE200 Series**
- 4 inputs, 5 outputs
- Applicable sensor: PSE53, 54, 56, 570/573
- Enclosure: IP65 (Front face), IP40 (Others)

<table>
<thead>
<tr>
<th>Series</th>
<th>Set pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSE200</td>
<td>–14.6 to 14.6 psi [−101 to 101 kPa]</td>
</tr>
<tr>
<td></td>
<td>1.45 to –14.6 psi [10 to –101 kPa]</td>
</tr>
<tr>
<td></td>
<td>–1.45 to 14.6 psi [−10 to 101 kPa]</td>
</tr>
<tr>
<td></td>
<td>–14.5 to 145 psi [−0.1 to 1 MPa]</td>
</tr>
</tbody>
</table>

2-Color Display Digital Pressure Sensor Controller

**PSE300 Series**
- 1 input, 2 outputs
- Applicable sensor: PSE53, 54, 55, 56, 570/573/574
- Enclosure: IP40

<table>
<thead>
<tr>
<th>Series</th>
<th>Set pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSE300</td>
<td>–14.6 to 14.6 psi [−101 to 101 kPa]</td>
</tr>
<tr>
<td></td>
<td>1.45 to –14.6 psi [10 to –101 kPa]</td>
</tr>
<tr>
<td></td>
<td>–1.45 to 14.6 psi [−10 to 100 kPa]</td>
</tr>
<tr>
<td></td>
<td>–14.5 to 145 psi [−0.1 to 1 MPa]</td>
</tr>
</tbody>
</table>

Pneumatic Pressure Switch

**IS3000 Series**
- Micro switch type
- Can be used for micro loads around 10 mA.
- With neon light

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Set pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS3000</td>
<td>Positive pressure</td>
<td>14.5 to 102 psi [0.1 to 0.7 MPa]</td>
</tr>
</tbody>
</table>

General Purpose Pressure Switch: Snap Switch Type

**ISG Series**
- For general fluids
- Equivalent to IP44 (Drip proof)
- With neon light

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Set pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISG11, 21</td>
<td>Positive pressure</td>
<td>2.9 to 44 psi [0.02 to 0.3 MPa]</td>
</tr>
<tr>
<td>ISG12, 22</td>
<td>Positive pressure</td>
<td>7.3 to 102 psi [0.05 to 0.7 MPa]</td>
</tr>
<tr>
<td>ISG13, 23</td>
<td>Positive pressure</td>
<td>14.5 to 145 psi [0.1 to 1.0 MPa]</td>
</tr>
<tr>
<td>IS2761</td>
<td>Positive pressure</td>
<td>14.5 to 145 psi [0.1 to 1.0 MPa]</td>
</tr>
<tr>
<td>ISG19, 29</td>
<td>Vacuum pressure</td>
<td>–1.45 to –14.5 psi [−10 to −100 kPa]</td>
</tr>
</tbody>
</table>

Flow Switches

2-Color Display Digital Flow Switch

**PFMB Series**
- Dry air, N2
- Grease-free
- Integrated flow adjustment valve
- Compact, Space saving
- Enclosure: IP40

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range cfm [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMB</td>
<td>0.07 to 7.06 [2 to 200]</td>
</tr>
<tr>
<td></td>
<td>0.18 to 17.7 [5 to 500]</td>
</tr>
<tr>
<td></td>
<td>0.35 to 353 [10 to 1000]</td>
</tr>
<tr>
<td></td>
<td>0.71 to 70.6 [20 to 2000]</td>
</tr>
</tbody>
</table>
Flow Switches

3-Color Display Digital Flow Switch
PFMC Series

- Dry air, N₂
- 3-color/2-screen display
- Expanded flow range: Wide range of flow measurement is possible with one product.
- Compact, Space saving
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range</th>
<th>cfm [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMC</td>
<td>0.18 to 17.7</td>
<td>[5 to 500]</td>
</tr>
<tr>
<td></td>
<td>0.35 to 35.3</td>
<td>[10 to 1000]</td>
</tr>
<tr>
<td></td>
<td>0.71 to 70.6</td>
<td>[20 to 2000]</td>
</tr>
</tbody>
</table>

Digital Flow Switch for Air
PF2A Series

- Integrated type and separate monitor type are available.
- Switch output, accumulated pulse output, analog output
- Capable of switching back and forth between cumulative and instantaneous flow
- Port size: 6A to 50A (1/8 to 2)
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range</th>
<th>cfm [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF2A</td>
<td>0.04 to 0.35</td>
<td>[1 to 10]</td>
</tr>
<tr>
<td></td>
<td>0.18 to 1.77</td>
<td>[5 to 50]</td>
</tr>
<tr>
<td></td>
<td>0.35 to 3.53</td>
<td>[10 to 100]</td>
</tr>
<tr>
<td></td>
<td>0.71 to 7.06</td>
<td>[20 to 200]</td>
</tr>
<tr>
<td></td>
<td>1.77 to 17.7</td>
<td>[50 to 500]</td>
</tr>
<tr>
<td></td>
<td>5.30 to 106</td>
<td>[150 to 3000]</td>
</tr>
<tr>
<td></td>
<td>10.6 to 212</td>
<td>[300 to 6000]</td>
</tr>
<tr>
<td></td>
<td>21.2 to 424</td>
<td>[800 to 12000]</td>
</tr>
</tbody>
</table>

Installation Example

3-Color Display Digital Flow Switch for Water
PF3W Series

- Flow sensor with 3-color/2-screen display
- Integrated temperature sensor
- 40% smaller (compared with PF2W)
- Grease-free
- Fluid temperature: 32 to 194°F [0 to 90°C]
- PVC piping type: Applicable to deionized water and chemical liquids
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range</th>
<th>gal/min [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF3W</td>
<td>0.11 to 0.88</td>
<td>[0.5 to 4]</td>
</tr>
<tr>
<td></td>
<td>0.44 to 3.52</td>
<td>[2 to 16]</td>
</tr>
<tr>
<td></td>
<td>1.1 to 8.8</td>
<td>[5 to 40]</td>
</tr>
<tr>
<td></td>
<td>2.2 to 22</td>
<td>[10 to 100]</td>
</tr>
<tr>
<td></td>
<td>11 to 55</td>
<td>[50 to 250]</td>
</tr>
</tbody>
</table>

3-Color Display
Electromagnetic Type Digital Flow Switch
LFE Series

- Pressure loss: 2.9 psi [0.02 MPa] or less
- Reverse flow can be detected.
- Operating fluid temperature: 32 to 185°F [0 to 85°C]
- Applicable fluid: Water, Water-soluble coolant
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range</th>
<th>cfm [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFE</td>
<td>0.11 to 4.4</td>
<td>[0.5 to 20]</td>
</tr>
<tr>
<td></td>
<td>0.55 to 22</td>
<td>[2.5 to 100]</td>
</tr>
<tr>
<td></td>
<td>1.1 to 44</td>
<td>[5 to 200]</td>
</tr>
</tbody>
</table>

Application Example
Flow control for water-soluble coolant

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range</th>
<th>gal/min [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFE</td>
<td>0.11 to 4.4</td>
<td>[0.5 to 20]</td>
</tr>
<tr>
<td></td>
<td>0.55 to 22</td>
<td>[2.5 to 100]</td>
</tr>
<tr>
<td></td>
<td>1.1 to 44</td>
<td>[5 to 200]</td>
</tr>
</tbody>
</table>
### Stroke Reading Cylinders

#### High Precision Stroke Reading Cylinder

**CEP1 Series**
- Can be used in an environment where the product is exposed to fluids (water, oil, coolant, etc.).
- Resolution: 0.01 mm (Accuracy ±0.02 mm)
- Standard with special scraper.

#### Stroke Reading Cylinder

**CE1 Series**
- Can be used in an environment where the product is exposed to fluids (water, oil, coolant, etc.). (Special order *)
- Resolution: 0.1 mm (Accuracy ±0.2 mm)

* The CE1 series does not come standard scraper. Please contact SMC to special order a cylinder with a scraper. (Exceptions: ø12, ø20)

#### Multi-counter

**CEU5 Series**
- Counter for connecting the CE1 series or CEP1 series

---

### Application Examples

#### Parts inspection

Measures the dimensions of parts, discriminates between good and defective articles, prevents the mixing of different parts, etc.

#### Length/width discrimination

Distinguishes between lengthwise or crosswise while correcting the position of a workpiece.

#### Inspection of machined holes

Can detect machined hole depth, burrs, foreign matter, etc.

#### Measurement of dimensions

Can measure dimensions of parts.

#### Measurement of machining dimensions

Performs adjustment of machining depth, etc. by measuring the part dimensions before machining.
Coolant Equipment
2/3 Port Valves for Fluid Control

Coolant Valve

SGC Series

- Low power consumption: 0.35 W (for 24 VDC/Y type)
- Max. operating pressure: 73 psi, 145 psi, 232 psi [0.5 MPa, 1 MPa, 1.6 MPa]
- Service life: 5 million cycles or more
  (Based on SMC’s test conditions)

<table>
<thead>
<tr>
<th>Series</th>
<th>Valve type</th>
<th>Port size</th>
<th>Orifice dia. [mmø]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC</td>
<td>N.C./N.O.</td>
<td>3/8 to 2</td>
<td>9 to 51</td>
</tr>
</tbody>
</table>

Installation Example

High Pressure Coolant Valve

SGH Series

- Max. operating pressure: 435 psi, 1015 psi [3 MPa, 7 MPa]
- Compatible with high-speed grinding and long drilling processes
- Coolant valve for high-pressure coolant liquid that is ideal for lubrication, dust blowing, and cooling
- Low power consumption: 0.35 W (for 24 VDC)
- Service life: 3 million cycles or more
  (Based on SMC’s test conditions)

<table>
<thead>
<tr>
<th>Series</th>
<th>Valve type</th>
<th>Port size</th>
<th>Orifice dia. [mmø]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGH</td>
<td>N.C./N.O.</td>
<td>3/8 to 1</td>
<td>6 to 15.4</td>
</tr>
</tbody>
</table>

4 Port Coolant Valve

Made to Order

- Can be used as a pressure relief valve when through coolant is used.
- Prevents malfunctions caused by residual pressure and improves cycle time.

Application Example

Symbol

DXT513H□□□□□□□□□ (1015 psi [7 MPa])
DXT544M□□□□□□□□□ (580 psi [4 MPa])

Air Cylinders

Water Resistant Cylinder

- Compatible with an operating environment using coolants
- Anti-coolant performance has been improved compared to the standard cylinders
- With water resistant 2-color indicator auto switch
# Industrial Filters

**Bag Filter**

**FGF Series**

- Ideal for high flow filtration. (Max. 528 gal/min [2000 L/min])
- Port size: Rc2, 100 (4") JIS10K FF, 150 (6") JIS10K FF

![Bag Filter FGF](image)

**Industrial Filter/Vessel Series**

**FGD Series**

- Ideal for low flow filtration. (Max. 15.9 gal/min [60 L/min])
- Port size: Rc3/8, 1/2, 3/4

![Industrial Filter/Vessel Series FGD](image)

**Filter for Cleaning Fluid/Quick Change Filter**

**FQ1 Series**

- No tools required, easy element replacement
- Ideal for low flow filtration. (Max. 7.9 gal/min [30 L/min])
- Port size: Rc1/2, 3/4, 1

![Filter for Cleaning Fluid/Quick Change Filter FQ1](image)

---

# Pressure Switches

**2-Color Display Digital Pressure Switch/For General Fluids**

**ISE75/75H Series**

- Rated pressure: 1450 psi/2176 psi [10 MPa/15 MPa]
- Metal body type (Die-cast aluminum)
- Enclosure: IP67
- With M12 connector

![2-Color Display Digital Pressure Switch ISE75/75H](image)

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE75</td>
<td>Positive pressure</td>
<td>0 to 1450 psi [0 to 10 MPa]</td>
</tr>
<tr>
<td>ISE75H</td>
<td>Positive pressure</td>
<td>0 to 2176 psi [0 to 15 MPa]</td>
</tr>
</tbody>
</table>

**2-Color Display Digital Pressure Switch**

**ISE80H Series**

- The stainless diaphragm makes it suitable for a wide variety of fluids.
- Enclosure: IP65
- Withstand pressure: 580 psi [4 MPa]
- VCR® and Swagelok® fittings are available.
- Applicable fluid: Water, Argon, Hydraulic fluid (JIS-K2213), Carbon dioxide, Silicone oil (JIS-K2213), Air-containing drainage, Lubricant (JIS-K6301), Nitrogen, Fluorocarbon

![2-Color Display Digital Pressure Switch ISE80H](image)

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE80H</td>
<td>Positive pressure</td>
<td>−14.5 to 290 psi [−0.100 to 2.000 MPa]</td>
</tr>
</tbody>
</table>

---

*VCR® and Swagelok® are registered trademarks of Swagelok Company.*
<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
<th>Proof pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSE570</td>
<td>Positive</td>
<td>0 to 145 psi [0 to 1 MPa]</td>
<td>435 psi [3.0 MPa]</td>
</tr>
<tr>
<td>PSE573</td>
<td>Compound</td>
<td>-14.5 to 14.5 psi [-100 to 100 kPa]</td>
<td>87 psi [600 kPa]</td>
</tr>
<tr>
<td>PSE574</td>
<td>Positive</td>
<td>0 to 73 psi [0 to 500 kPa]</td>
<td>218 psi [1.5 MPa]</td>
</tr>
<tr>
<td>PSE575</td>
<td>Positive</td>
<td>0 to 290 psi [0 to 2 MPa]</td>
<td>725 psi [5.0 MPa]</td>
</tr>
<tr>
<td>PSE576</td>
<td>Positive</td>
<td>0 to 725 psi [0 to 5 MPa]</td>
<td>1813 psi [12.5 MPa]</td>
</tr>
<tr>
<td>PSE577</td>
<td>Positive</td>
<td>0 to 1450 psi [0 to 10 MPa]</td>
<td>4351 psi [30 MPa]</td>
</tr>
</tbody>
</table>

## Flow Switches

### 3-Color Display

#### Electromagnetic Type Digital Flow Switch

**LFE Series**

- Applicable fluid: Water, Water-soluble coolant
- Pressure loss: 2.9 psi [0.02 MPa] or less
- Reverse flow can be detected.
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range</th>
<th>gal/min [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFE</td>
<td>0.13 to 5.28 [0.5 to 20]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.66 to 26.4 [2.5 to 100]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.32 to 52.8 [5 to 200]</td>
<td></td>
</tr>
</tbody>
</table>

## Hydraulic Equipment

### Line Filter

**FH34/44/54/64 Series**

- Operating pressure: 508, 1015, 2031, 3046 psi [3.5, 7.0, 14.0, 21.0 MPa]
- O-ring: Choice of NBR (petroleum, Water-glycol, Emulsion) or FKM (Phosphoric ester)
- Paper element and micromesh element are selectable.
- Option: Differential pressure indicator, Differential pressure indication switch

### Magnetic Separator

**FHM Series**

- Adsorbs and eliminates contaminants in the fluid by means of magnetism.
- There are no consumable parts and the running cost is basically zero.
- Fluid: Petroleum, Water-glycol, Cutting oil, Emulsion, Phosphoric ester
Automatic Doors/Transfer Equipment
Air Cylinders

Water Resistant Cylinder

Compatible with an operating environment using coolants

- Anti-coolant performance has been improved compared to standard cylinders.
- With water resistant 2-color indicator auto switch

Applicable Cylinders

Air Cylinders

CM2 Series ø20 to ø40 / CG1 Series ø32 to ø100 / Air Cylinder MB Series ø32 to ø100 / Square Tube Type Air Cylinder MB1 Series ø32 to ø100 / Compact Cylinder CQ2 Series ø20 to ø100 / CA2 Series ø40 to ø100 / Compact Guide Cylinder MGP Series ø20 to ø100 / Guide Cylinder MGG Series ø32 to ø100

Compact Guide Cylinder

MGP Series

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

Cylinder with Lock

CNA2 Series

- Locking cylinders are ideal for intermediate stops, emergency stops, and drop prevention. (Bi-directional lock)
- Bore size: 40, 50, 63, 80, 100

CNS Series

- Bore size: 125, 140, 160

Compact Cylinder with Air Cushion and Lock

RLQ Series

- Bore size: 32, 40, 50, 63

CLL Series

- Bore size: 125, 140, 160, 180, 200, 250

Compact Cylinder with Lock

MLU Series

- Bore size: 25, 32, 40, 50

MLGP Series

- Bore size: 20, 25, 32, 40, 50, 63, 80, 100

Hydraulic Cylinders

Compact Hydraulic Cylinder Compliant with JIS Standards (1450 psi [10 MPa])

CHKDB Series ø20 to ø100 / Hydraulic Cylinder Compliant with JIS Standards (1015 psi [7 MPa])

CH2F Series ø32 to ø100

Automatic Doors/Transfer Equipment
### Air Cylinders

**JMB Series**
- Intermediary bore sizes: ø45, ø56, ø67, ø85
- Air saving, Space saving
- Overall length shortened by 27 mm (Compared with MBB50-100)
- Weight reduced by up to 30% (1.45 kg → 1.00 kg) (Compared with MBB50-100)
- 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 non-adjustable air cushion.

**JCM Series**
- Overall length shortened by up to 97 mm (Compared with the current CM2B40)
- Weight reduced by up to 54% (0.69 kg → 0.32 kg) (Compared with the current CM2B40-50Z)
- Various cover types available
- Port size: M5 and Rc1/8 available
- Male and female rod end available

**JCQ Series**
- Compact: Reduced overall length 6.5 mm, width 6 mm, height 4 mm
- Weight reduced by up to 45% (150 g → 82 g)
- Volume reduced by up to 40% (Compared with the CDQS series)

**JMGP Series**
- Compact: Reduced overall length 30.5 mm, height 16 mm (Compared with the MGPM32-25Z)
- Weight reduced by up to 69% (0.32 kg → 0.1 kg; Compared with the MGPM16-10Z)
- 3 mounting options:
  - Top mounting
  - Underside mounting
  - Bottom mounting
  - Piping is possible in 4 directions.
  - The solid state auto switch D-M9m is mountable.
  - Suitable for pushing, lifting, or clamping on a transport line
  - Piping is possible in 4 directions.
  - The solid state auto switch D-M9m is mountable.

### High Power Cylinder

**RHC Series**
- For high-speed opening/closing of ATC doors
- Has the capacity to absorb 10 to 20 times more energy than general purpose cylinders (CG1 series)
- Smooth cushioning for high-speed operation (3000 mm/s) with light loads and low/medium-speed operation with heavy loads
- XC93: With improved water resistance + stable lubrication function
  - Equipped with an improved water resistant scraper (Fluororubber).
  - The Lube-retainer creates a grease coating around the piston rod, which improves lubrication. Stainless steel can be selected for the piston rod and rod end nut.

### Rotary Clamp Cylinder

**MK Series**
- Allowable moment of inertia 3 times higher (ø20 to ø63)
  (The same as the former heavy-duty MK2 series)
- It is possible to mount small auto switches on 4 surfaces.

### Rodless Cylinders

**MY1-W Series**
- Protective cover with improved water resistance and dust-proof construction. The side seal prevents water and dust from entering from the sides.
## Air Grippers

### Linear Guide Parallel Type Air Gripper
**MHZ**2 Series
- Linear guide improves rigidity and accuracy.
- Dust-proof and drip-proof construction
- Dust cover material is selectable.

<table>
<thead>
<tr>
<th>Type</th>
<th>Series</th>
<th>Cylinder bore size [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact</td>
<td>MHZA2-6</td>
<td>6</td>
</tr>
<tr>
<td>Compact, with dust cover</td>
<td>MHZAJ2-6</td>
<td>6</td>
</tr>
<tr>
<td>Standard</td>
<td>MHZ2</td>
<td>6, 10, 16, 20, 25, 32, 40</td>
</tr>
<tr>
<td>Long stroke</td>
<td>MHZL2</td>
<td>10, 16, 20, 25</td>
</tr>
<tr>
<td>With dust cover</td>
<td>MHZJ2</td>
<td>6, 10, 16, 20, 25</td>
</tr>
</tbody>
</table>

### Slide Guide Round Body Air Gripper: 2-Finger, 3-Finger, 4-Finger Type
**MHS** Series
- Vertically compact, lightweight due to the wedge-shaped cam construction
- Repeatability: ±0.01 mm
- Long stroke type: Strokes two times longer than the standard type
- Reliable workpiece removal with through-holes and a center pusher

### Air Gripper Reverse Unit (Made to Order)
- For workpiece transfer with gantry loaders
- For loading/unloading workpieces from equipment

## Electric Actuators

### Electric Actuator: Slider Type
**Ball Screw Drive**
**LEFS** Series
- Step Motor (Servo/24 VDC), Servo Motor (24 VDC)
  - Max. work load: 65 kg
  - Positioning repeatability: ±0.02 mm

**AC Servo Motor**
- High-output motor (100/200/400 W)
- Improved high-speed transfer ability
- Max. speed: 1,500 mm/s
- High acceleration/deceleration (20,000 mm/s²)
- Positioning repeatability: ±0.01 mm

### Electric Actuator: Slider Type
**Belt Drive**
**LEFB** Series
- Step Motor (Servo/24 VDC), Servo Motor (24 VDC)
  - Max. stroke: 2000 mm
  - Max. speed: 2000 mm/s

**AC Servo Motor**
- Max. stroke: 3000 mm
- Max. speed: 2000 mm/s
- Max. acceleration/deceleration: 20000 mm/s²

### Electric Actuator: High Rigidity Slider Type
**Ball Screw Drive**
**LEJS** Series
- Low profile/Low center of gravity: Height dimension reduced by approx. 36% (Reduced by 32 mm)
- Max. work load: 85 kg
- Positioning repeatability: ±0.01 mm
- Max. acceleration/deceleration: 20000 mm/s²
Electric Actuators

Electric Actuator: High Rigidity Slider Type, Belt Drive
**LEJB Series**
- Max. stroke: 3000 mm
- Max. speed: 3000 mm/s
- Max. acceleration/deceleration: 20000 mm/s²

Electric Actuator: Low Profile Slider Type
**LEM Series**
- Compact, Low profile
  - Table height: 28 mm
  (For LEMC/H/HT, size 25)
- Can be connected to various types of guides.

Electric Actuator: Guide Rod Slider, Belt Drive
**LEL Series**
- Low profile/Flat: Height 48 mm
- Profile reduced by side mounting of motor.
  - No interference with motor, even with large workpieces.
- Max. stroke: 1000 mm
- Transfer speed: 1000 mm/s

---

Electric Actuator: Rod Type
Motor Top/Parallel, In-line Motor Type
**LEY Series**

**LEY-X5/LEY63** (Option)
- Enclosure: IP65 equivalent
- Max. stroke: 500 mm
  + For size 32
- Groove for auto switch
- Lube-retainer (Except LEY6)
  - Retains grease oil film.
- Scraper
  - Prevents dust and water droplets from entering between the cable and motor cover.
- Aluminum cover
  - Protects the motor.
- Seal connector
  - Prevents dust and water droplets from entering the cable and motor cover.
- Vent hole
  - Reduces internal pressure fluctuation to prevent dust and water droplets from entering.

+ When mounting vertically and using the product facing upwards in an environment where water is present, take necessary measures to prevent water from splashing on the rod cover, because water will accumulate on the rod seal due to the structure of the product.

---

Electric Actuator: Guide Rod Type
Motor Top Mounting, In-line Motor Type
**LEYG Series**

**LEYG-X5/L50540/L50540/L50540**
- Step Motor (Servo/24 VDC), Servo Motor (24 VDC)
  - Long stroke: Max. 500 mm
  - Direct mounting: 3 directions
  - Bracket mounting: 3 types
  - Auto switch mountable
  - Speed control/Positioning: Max. 64 points
- AC Servo Motor
  - High-output motor (100/200 W)
  - Improved high-speed transfer ability
  - High-acceleration compatible (5,000 mm/s²)

---

When mounting vertically and using the product facing upwards in an environment where water is present, take necessary measures to prevent water from splashing on the rod cover, because water will accumulate on the rod seal due to the structure of the product.
Electric Slide Table
LES/LESH Series

- Max. pushing force: 40.5 lbf [180 N]
- Positioning repeatability: ±0.05 mm
- Cycle time can be reduced
  - Max. acceleration/deceleration: 5,000 mm/s²
  - Max. speed: 400 mm/s

<Compact Type>
- Compact: Workpiece mounting height reduced by up to 12% compared with the LESH
- Lightweight: Reduced by up to 29% (Compared with the LESH16D-100)

<High Rigidity Type>
- Deflection: 0.016 mm (LESH16-50 Load: 5.6 lbf [25 N])
- Integrated guide rail and table. Uses a recirculating linear guide for high rigidity and high precision.

Electric Rotary Table
LER Series

- Rotation angle: 360°, 320° (310°), 180°, 90°
  - The value indicated in brackets shows the value for the LER10.
- Low profile: Height dimension 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)

Electric Actuator: Miniature Type
LEP Series

- Max. pushing force: 11.2 lbf [50 N]
- Positioning repeatability: ±0.05 mm

<Rod Type>
- Compact and lightweight
  - W20.5 mm x H30 mm x L125.6 mm, Weight 240 g

<Slide Table Type>
- Compact and lightweight
  - W21 mm x H41 mm x L138.6 mm, Weight 290 g

Electric Gripper
LEH Series

- With drop prevention function (Self-lock mechanism is provided for all series.)
- Power consumption is reduced by self-lock mechanism.
- With gripping check function
- Position, speed, and force can be set. (64 points)

LEHZ Series
- Compact and lightweight
- Various gripping forces

LEHZJ Series
- With dust cover (Equivalent to IP50)
- 3 types of cover material (Finger portion only)

LEHF Series
- Can hold various types of workpieces with a long stroke.

LEHS Series
- Can hold round workpieces.
Electric Actuators
Controller/Driver

Step Motor (Servo/24 VDC)

Programless Type
LECP1 Series
- 14 points positioning
- Control panel setting (PC is not required.)

Programless Type (With Stroke Study)
LECP2 Series
- End to end operation similar to an air cylinder
- 2 stroke end points + 12 intermediate points positioning

Step Motor (24 VDC)

Step Data Input Type
LECP6 Series
LECA6 Series
- 64 points positioning
- Input using controller setting kit or teaching box

4 Axis Type

Fieldbus-compatible Network Controller/Gateway Unit

CC-Link Direct Input Type*
LECPMJ Series

EtherNet/IP™ Direct Input Type*
JXCP91 Series

DeviceNet™ Direct Input Type*
JXCD1 Series

PROFINET™ Direct Input Type*
JXCP1 Series

AC Servo Motor*

Pulse Input Type
LECSA Series
LECSB Series
- Absolute encoder (LECSB)
- Built-in positioning function (LECSA)

MECHATROLINK® Type
LECYM Series

MECHATROLINK® Type
LECYU Series

MECHATROLINK® Type
LECYM Series

MECHATROLINK® Type
LECYU Series

Motorless Type
LE Series

- Your motor and driver can be used together!
- Manufacturers of compatible motors: 15 companies
  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.

Trademark
EtherNet/IP™ is a trademark of ODVA. DeviceNet™ is a trademark of ODVA.
Vacuum Unit

ZK2 Series

- 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)
- Nozzle size: ø0.7, ø1.0, ø1.2, ø1.5

Body Ported Type Vacuum Ejector

ZH Series

- 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

Vacuum Pad

ZP3 Series

- Compact, Space saving, Overall shortened length.
- One-touch fitting and barb fitting for ø2 are available.
- Pad diameter: ø1.5 to ø16

Vacuum Pad

ZP3E Series

- Stability of suction position, improved ease of removal
  Dents and bumps on the adsorption surface expand the area which is in contact with the workpiece. Ribs reduce the inclinations during transport of workpiece.
- Reduced number of mounting screws (4 pcs. → 1 pc.)
- Pad and metal parts can be disposed of separately.
- Pad diameter: ø32 to ø125

Compact, Short, Nozzle Pad

ZP2 Series

- Compact, Space saving
- Pad diameter: ø0.8 to ø15

Hydraulic Cylinders

JIS Standard Hydraulic Cylinder

CH2/CHD2 Series

- Uses the cushion seal type cushion mechanism, reduces impact at the stroke end, improves durability
- Rod cover with block construction makes for easy disassembly and assembly.

CH2E
  Tube material: Aluminum

CH2F
  Tube material: Stainless steel

CH2G
  Tube material: Steel

CH2H
  Tube material: Stainless steel
### Hydraulic Cylinders

**Small Bore Hydraulic Cylinder**  
**CHN Series**
- Lightweight with a stainless steel tube and aluminum cover
- Uses the cushion seal system mechanism, reduces impact at the stroke end, improves durability
- Smaller cover section compared to tie-rod cylinders

**Compact Hydraulic Cylinder**  
**CHQ/CHDQ Series**
- Lightweight, compact aluminum body
- It is possible to mount auto switches.
- Same longitudinal dimensions for cylinders with/without auto switches

### Air-Hydro Booster  
**Made to Order**

Converts air pressure to hydraulic pressure for high-pressure hydraulic cylinder actuation.
- Generates 508 to 2031 psi [3.5 to 14 MPa] of hydraulic pressure with 73 psi [0.5 MPa] of air pressure.
- No hydraulic pump is required. High hydraulic pressure can easily be obtained.
- Hydraulic pressure can be steplessly controlled by only adjusting the air pressure using the regulator.
- No problems will occur due to temperature rise even under the condition of continuous pressurization.
- You can select from two types of pressurization methods (direct type and pre-load type) according to the application.
- No hydraulic unit is required.
Various Blow Equipment
2/3 Port Valves for Fluid Control

Direct Operated 2 Port Solenoid Valve
VX2 Series

- 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 material: Aluminum, Resin, C37, Stainless steel
- With One-touch fittings (resin body) type is available.
- Port size: 1/8 to 1/2, φ6 to φ12
*1 Compared with SMC current model

Pilot Operated 2 Port Solenoid Valve for Dry Air
VQ20/30 Series

- High-frequency operation possible: High-speed response 7 ms or less (VQ20), 20 ms or less (VQ30)
- Easy piping with One-touch fittings
- Dust-tight, water-jet-proof enclosure (IP65) compatible with DIN terminal type.
- Application: Air-blow, Blow-off of workpiece, etc.

Pilot Operated 2 Port Solenoid Valve
VXD Series

- For air, water, heated water, oil, high-temperature oil
- Body material: Aluminum, Resin, C37, Stainless steel, CAC408
- With One-touch fittings (resin body) type is available.
- Enclosure: IP65
*1 Electrical entry flat terminal type terminal is IP40.

Zero Differential Pressure Type
Pilot Operated 2 Port Solenoid Valve
VXZ Series

- For air, water, heated water, oil, high-temperature oil
- Body material: Aluminum, Resin, C37, Stainless steel
- With One-touch fittings (resin body) type is available.
- Enclosure: IP65
*1 Electrical entry flat terminal type terminal is IP40.

Blow Guns

VMG Series

- Reduction of 2000 m³ per annum is possible. (Energy saving)
- Pressure loss: 1% or less (Nozzle size: ø2.5)
- Available nozzle:
  - Male thread nozzle, High efficiency nozzle with male thread, Low noise nozzle with male thread, Copper extension nozzle

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

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

SMC “blow gun” + “S coupler” + “coil tube”

- Filter regulator
- Current regulator model
- Air gun nozzle ø2.5
- Current coil tube model
- Current coil tube model
- Current coil tube model
- Reduced power consumption

Energy-saving Circuit

<table>
<thead>
<tr>
<th>SMG Nozzle ø2.5</th>
<th>Current Circuit</th>
<th>Power consumption by compressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.07 scfm [257 L/min (ANR)]</td>
<td>Impact pressure: 1.6 psi [0.011 MPa] (Distance: 100 mm)</td>
<td>1.25 kW</td>
</tr>
<tr>
<td>Total working hours: 8300 hours</td>
<td>Blow time: 10 seconds (Frequency: 12 times/hour)</td>
<td>1.25 kW</td>
</tr>
<tr>
<td>Compressor pressure: 73 psi [0.505 MPa]</td>
<td>Working hours: 10 hours/day (250 days/year)</td>
<td>1.25 kW</td>
</tr>
<tr>
<td>Air consumption: 9.07 scfm [257 L/min (ANR)]</td>
<td>Total working hours: 8300 hours</td>
<td>1.25 kW</td>
</tr>
<tr>
<td>Air gun Nozzle ø2.5</td>
<td>Compressor pressure: 87 psi [0.6 MPa]</td>
<td>1.56 kW</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Air consumption: 10.13 scfm [287 L/min (ANR)]</td>
<td>1.56 kW</td>
</tr>
</tbody>
</table>

Corresponding value: Electricity unit $0.13/kWh
* For details, refer to the energy saving program and the Web Catalog.
**Nozzles for Blowing**

**KN Series**

<table>
<thead>
<tr>
<th>Type</th>
<th>Nozzle size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle with male thread</td>
<td>ø1 to ø8</td>
</tr>
<tr>
<td>High efficiency nozzle</td>
<td>ø1 to ø2</td>
</tr>
<tr>
<td>Low noise nozzle with male thread</td>
<td>ø0.75 x 4 to ø1.1 x 8</td>
</tr>
<tr>
<td>Copper extension nozzle</td>
<td>ø1.5 to ø3</td>
</tr>
<tr>
<td>Pivoting nozzle</td>
<td>ø4, ø6</td>
</tr>
<tr>
<td>Nozzle with self-align fitting</td>
<td>ø1 to ø6</td>
</tr>
<tr>
<td>Nozzle for One-touch fitting</td>
<td>ø1 to ø3</td>
</tr>
</tbody>
</table>

**Polyurethane Coil Tubing**

**TCU Series**

- Flexible
- Max. operating pressure: 116 psi 0.8 MPa (at 68°F [20°C])
- For moving applications

**Flow Switches**

**2-Color Display Digital Flow Switch**

**PFMB Series**

- Dry air, N₂
- Grease-free
- Integrated flow adjustment valve
- Compact, Space saving
- Enclosure: IP40

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range cfm [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.07 to 7.06 [2 to 200]</td>
</tr>
<tr>
<td></td>
<td>0.18 to 17.7 [5 to 500]</td>
</tr>
<tr>
<td></td>
<td>0.35 to 35.3 [10 to 1000]</td>
</tr>
<tr>
<td></td>
<td>0.71 to 70.6 [20 to 2000]</td>
</tr>
</tbody>
</table>

**3-Color Display Digital Flow Switch**

**PFMC Series**

- Dry air, N₂
- 3-color/2-screen display
- Expanded flow range: Wide range of flow measurement is possible with one product.
- Compact, Space saving
- Enclosure: IP65

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated flow range cfm [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.18 to 17.7 [5 to 500]</td>
</tr>
<tr>
<td></td>
<td>0.35 to 35.3 [10 to 1000]</td>
</tr>
<tr>
<td></td>
<td>0.71 to 70.6 [20 to 2000]</td>
</tr>
</tbody>
</table>
Other Equipment (Special)
Air Grippers

Air Gripper Reverse Unit Made to Order

- For workpiece transfer with gantry loaders
- For loading/unloading workpieces from equipment

Pressure Control Equipment

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

- Air consumption: Reduced by up to approx. 90% (Compared with the current model)
- High flow rate: Up to approx. twice (Compared with the current model)
- Lightweight: Reduced by up to approx. 27% (Compared with the current model)
- Sensitivity: 0.2% (Full span)
- Repeatability: ±0.5% (Full span)

Application Example

Accurate pressure setting
Sensitivity within 0.2% F.S. (Full Span)
Tension control *1

Balance and drive
Accurate balance pressure setting *1

Booster Regulator VBA Series

- Can increase factory air by a maximum of 200%. Power supply not required.
  It is possible to get a maximum of double pressure by connecting air with a factory line. (VBA11 A: maximum 4 times)

Air Tank VBAT Series

- Compact air tank that can be directly connected with a regulator
- Can be used as an independent tank.
- With a safety valve port (Option)

*1 The set pressure may vary depending on the elapsed time and change in ambient temperature after pressure setting. If the setting value varies, adjust the pressure with the knob.
**Lubrication Equipment**

Liquid Collector: Exhaust Pressure Type

**AEP100 Series**

- Collect and reuse the leaked lubricating oil or hydraulic fluid using exhaust pressure.
- Liquids are collected using only the exhausted air released from the switching valve. This leads to energy saving.
- Increase efficiency by eliminating the need to collect and wipe by hand.

**Application Example**

Liquid Collector: Ejector Type

**HEP500 Series**

- Collects the leakage of expensive cutting and grinding oil.
- No need to collect the leaked liquid by hand.
- As it is possible to use the equipped pump, special driving force is not required.

**Application Example**

Large Flow Lubricator

**AL Series**

- Individual lubrication
- Large flow type

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Bowl capacity [cm³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL800/900</td>
<td>1 1/4, 1 1/2, 2</td>
<td>440, 1000</td>
</tr>
</tbody>
</table>

Mist Spray Unit

**LMU Series**

- Intermittent spray to cutting and press gear chains, etc.

**Application Examples**

Liquid Collector: Exhaust Pressure Type

**AEP100 Series**

- Collect and reuse the leaked lubricating oil or hydraulic fluid using exhaust pressure.
- Liquids are collected using only the exhausted air released from the switching valve. This leads to energy saving.
- Increase efficiency by eliminating the need to collect and wipe by hand.

**Application Example**

Liquid Collector: Ejector Type

**HEP500 Series**

- Collects the leakage of expensive cutting and grinding oil.
- No need to collect the leaked liquid by hand.
- As it is possible to use the equipped pump, special driving force is not required.

**Application Example**

<Related Products>

Mixing Valve/**LMV Series**

- **LMV110**
- **LMV220**

Magnet Holder/**LMH Series**

- **LMH10**
- **LMH20**

Branch Pipe/**LMD Series**

- **LMD1**
- **LMD2**
Impulse Lubricator
ALIP Series

- Supplies a set volume of oil just before the lubrication point. It is possible to lubricate a constant volume of oil to circuits that are difficult for oil to reach, or places with little air consumption.

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Port size</th>
<th>Feeding volume/cycle [cm³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALIP</td>
<td>Pressure type</td>
<td>1/8</td>
<td>0 to 0.04</td>
</tr>
<tr>
<td>ALT10</td>
<td>Oil tank</td>
<td>Air: 1/8</td>
<td></td>
</tr>
<tr>
<td>ALT20</td>
<td>Oil tank</td>
<td>Oil: 1/4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tank capacity: 160 cm³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tank capacity: 1000 cm³</td>
</tr>
</tbody>
</table>

Process Pump/Double Acting Pump
PA Series

<table>
<thead>
<tr>
<th>Series</th>
<th>Actuation</th>
<th>Discharge [L/min]</th>
<th>Wetted part material</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA30</td>
<td>Automatically operated</td>
<td>1 to 20</td>
<td>ADC12 (Aluminum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SCS14 (Stainless steel)</td>
</tr>
<tr>
<td>PA313</td>
<td>Air operated</td>
<td>0.1 to 12</td>
<td>ADC12 (Aluminum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SCS14 (Stainless steel)</td>
</tr>
<tr>
<td>PA50</td>
<td>Automatically operated</td>
<td>5 to 45</td>
<td>ADC12 (Aluminum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SCS14 (Stainless steel)</td>
</tr>
<tr>
<td>PA513</td>
<td>Air operated</td>
<td>1 to 24</td>
<td>ADC12 (Aluminum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SCS14 (Stainless steel)</td>
</tr>
</tbody>
</table>

Process Pump/Single Acting Pump
PB Series

<table>
<thead>
<tr>
<th>Series</th>
<th>Actuation</th>
<th>Discharge [mL/min]</th>
<th>Wetted part material</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB1011A</td>
<td>Built-in solenoid</td>
<td>8 to 2000</td>
<td>Polypropylene</td>
</tr>
<tr>
<td></td>
<td>valve</td>
<td></td>
<td>Stainless steel 316</td>
</tr>
<tr>
<td>PB1013A</td>
<td>Air operated</td>
<td>8 to 1000</td>
<td>Polypropylene</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stainless steel 316</td>
</tr>
<tr>
<td>PB1313A</td>
<td>Air operated</td>
<td>8 to 1000</td>
<td>New PFA (Fluororesin)</td>
</tr>
</tbody>
</table>

Application Example

- Transferring and collecting liquid
- Transferring liquid by pressure
- Atomizing liquid
- Stirring liquid
Piping Equipment
Fittings

S Couplers
**KK Series**
- Fluid: Air, Water
- Applicable tubing O.D.: ø3.2 to ø16
- Applicable hose I.D./O.D.: 5/8 to 11/16
- Port size: M5, R1/8 to 3/4, Rc1/8 to 1/2

S Couplers
**KK130 Series**
- C factor: Increased by 34% (Thread R1/4 type, compared to the current model*)
- Plug insertion force: Reduced by 22% (4.5 lbf [20 N]) (Compared to the current model at 73 psi [0.5 MPa])
- Lightweight: Reduced by 14% (12 g) (Compared to the current model*)
- Fluid: Air
- Applicable tubing O.D.: ø6 to ø12, ø1/4" to ø1/2"
- Applicable hose I.D./O.D.: 5/8 to 11/16
- Hose nominal: 6 (1/4") to 12 (1/2")
- Port size: (R, Rc) 1/8 to 1/2
* Current model: KK13 series

S Couplers: Stainless steel 304
**KKA Series**
- Fluid: Air, Water
- Port size: (R, Rc) 1/8 to 11/2

One-touch Fittings
**KQ2 Series**
- Fluid: Air, Water
- Applicable tubing O.D.: ø2 to ø16, ø1/8" to ø1/2"

Metal One-touch Fittings
**KQB2 Series**
- Fluid: Air, Water
- Applicable tubing O.D.: ø3.2 to ø16, ø1/8" to ø1/2"

Insert Fittings
**KF Series**
- Fluid: Air, Steam (Brass sleeve)
- Fluid: Air, Water (Resin sleeve)
- Applicable tubing O.D.: ø4 to ø12

Self-align Fittings
**H/DL/L/LL Series**
- Fluid: Air
- Applicable tubing O.D.: ø4 to ø12

Stainless Steel 316 One-touch Fittings
**KQG2 Series**
- Fluid: Air, Water, Steam
- Applicable tubing O.D.: ø3.2 to ø16, ø1/8" to ø1/2"

Stainless Steel 316 Insert Fittings
**KFG2 Series**
- Fluid: Air, Water, Steam
- Applicable tubing O.D.: ø4 to ø12, ø1/8" to ø1/2"
### Polyurethane Tubing

**TU/TIUB Series**
- Fluid: Air, Water
- Tubing O.D.: ø2 to ø16, ø1/8" to ø1/2"

**Wear Resistant Tubing**

**TUZ Series**
- Fluid: Air, Water
- Tubing O.D.: ø2 to ø16
- Abrasion: Approx. 1/3 (Compared with SMC polyurethane tubing TU series)

**Flame Resistant (Equivalent to UL-94 Standard V-0)**

**TRS Series**
- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

**Flame Resistant**

**FR Double Layer Tubing**

**TRB Series**
- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

**FR Double Layer Polyurethane Tubing**

**TRBU Series**
- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

*Note that the tube colors are samples.*

**Color Variations**

- Black
- White
- Red
- Blue
- Yellow
- Green
- Clear
- Orange
- Solid blue
- Clear blue
- Medium blue
- Brown
- Solid green
- Clear green
- Neon green
- Dark green
- Gray
- Light gray
- Neon pink
- Solid purple
- Clear purple
- Solid red
- Clear red
- Silver
- Solid yellow
- Clear yellow
- Neon yellow
- Clear orange
- Neon orange

*1: Please contact SMC for the TIUB.
Flame Resistant (Equivalent to UL-94 Standard V-0) FR Three-layer Polyurethane Tubing
**TRTU Series**
- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

---

Fluoropolymer Tubing (Super PFA) **TL/TIL Series**
- Applicable tubing O.D.
  - Metric size: ø4, ø6, ø8, ø10, ø12, ø19
- Max. operating pressure: 145 psi [1.0 MPa] (at 68°F [20°C])
- Max. operating temperature: 500°F [260°C] (This may vary according to operating pressure.)
  
  *1 This may vary according to size.

---

Flow Control Equipment

- Speed Controller with Indicator
  **AS-FS Series**
  - Applicable tubing O.D.: ø2 to ø16 (Metric), ø1/8" to ø1/2" (Inch)
  - Numerical indication of knob rotation for flow rate reduces flow setting time and setting errors! The value can be controlled via the indicator window.

- Dual Speed Controller
  **ASD Series**
  - Applicable tubing O.D.: ø4 to ø12 (Metric), ø1/8" to ø3/8" (Inch)
  - Enables bi-directional flow control with a speed controller (Meter-in and meter-out)
  - Prevents cylinders from lurching

- Speed Controller with Pilot Check Valve
  **ASP Series**
  - Applicable tubing O.D.: ø6 to ø12 (Metric), ø1/4" to ø1/2" (Inch)
  - Integrated pilot check valve and speed controller.
  - Realizes momentary intermediate stoppage of a cylinder and is able to adjust the speed control of it.

---

Flow Control Equipment

- Push-lock Type
  **AS Series**
  - Easy to lock push-lock type
  - Larger knob
  - Improved tube insertion/removal
    - Insertion force: Max. 30% (1.8 lb [8 N]) reduction
    - Removal force: Max. 20% (1.1 lb [5 N]) reduction
  - Tube pull-out strength is ensured to be equivalent to current model.
Temperature Control Equipment

Thermo-chiller: Standard Type

**HRS Series**
- 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, etc.
- Compact: W377 x H615 x D500 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)

**HRS090 Series**
- Compact and lightweight: 136 kg (Air-cooled type)
- Cooling capacity: 9 kW
- Temperature stability: ±0.9°F [±0.5°C]
- Set temperature range: 41 to 95°F [5 to 35°C]
- Max. ambient temperature: 113°F [45°C]
- Power supply: 3-phase 200 to 230 VAC, 380 to 415 VAC

**HRS100/150 Series**
- No heater required, as circulating fluid is heated using heat exhausted by 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

Application Examples

- **Cooling of built-in motors**
  The use of water with a high efficiency ratio increases the cooling effect.

Thermo-chiller: Inverter Type

**HRSH090 Series**
- 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: ±0.18°F [±0.1°C]
- Set temperature range: 41 to 104°F [5 to 40°C]

**HRSH Series**
- Complete with energy-saving triple inverter!
- Outdoor installation, Splashproof type (IPX4)
- Max. ambient temperature: 113°F [45°C]
- Temperature stability: ±0.18°F [±0.1°C] (when a load is stable)
- Space saving and lightweight: 280 kg (25 kW type)

**HRSE Series**
- 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)

Cooling of ball screws
The cooling efficiency of hollow ball screws can be increased.
2/3 Port Valves for Fluid Control

Direct Operated 2 Port Solenoid Valve

**VX2 Series**
- For air, medium vacuum, water, oil, steam (Can be used with heated water.)
- Flow rate: 20% more flow
- Height: 10% smaller
- Weight: 30% lighter
- Body material: Aluminum, Resin, C37, Stainless steel
- With One-touch fittings (resin body) type is available.
- Port size: 1/8 to 1/2, ø6 to ø12
  - *1 Compared with SMC current model

Please contact SMC in regards to the use of special fluids (O₂, N₂) in laser beam machines, etc.

725 psi [5.0 MPa] Pilot Operated 2/3 Port Solenoid Valve & Check Valve

**VCH/VCHC Series**
- Service life: 10 million cycles
- Uses a polyurethane elastomer poppet in the valve seat
- Improved durability under high-pressure environments

Direct Operated Regulator for 870 psi [6.0 MPa]
(Relieving Type)

**VCHR Series**
- Service life: 10 million times
- Improved durability in high-pressure environments using a polyurethane elastomer poppet
- Improved durability using a metal seal type relief valve
- Uses special fluororesin seals for sliding parts
- Stable unattached response, not easily affected by pressure

<table>
<thead>
<tr>
<th>Series</th>
<th>VCHR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>VCHR30/40</td>
</tr>
<tr>
<td>Type</td>
<td>Direct operated regulator (Relieving type)</td>
</tr>
<tr>
<td>Port size</td>
<td>G3/4, 1, 1 1/2</td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>870 psi [6.0 MPa]</td>
</tr>
<tr>
<td>Set pressure range</td>
<td>73 to 725 psi [0.5 to 5.0 MPa]</td>
</tr>
</tbody>
</table>

Pressure Control Equipment

725 psi [5.0 MPa] Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator

**ITVX Series**
- Stepless control of air pressure proportional to an electrical signal
- Max. supply pressure: 725 psi [5.0 MPa]
- Set pressure range: 1.45 to 435 psi [0.01 to 3.0 MPa]
- Max. flow rate: 10.6 scfm [3000 L/min (ANR)]
- Fluid: Air, N₂, O₂, Ar
- Wetted parts: Fluorine grease

Application Example

**O₂**
Air

Laser Beam Machine Equipment
### Flow Control Equipment/Related Equipment

**Check Valve**

**AK Series**

- Oil-free compatible (Please contact SMC separately.)

<table>
<thead>
<tr>
<th>Type</th>
<th>Series</th>
<th>Port size</th>
<th>Applicable tubing O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-line type</td>
<td>AK2000/AK4000 AK6000</td>
<td>1/8 to 1</td>
<td>—</td>
</tr>
<tr>
<td>Straight type</td>
<td>AKH</td>
<td>—</td>
<td>ø4 to ø12, ø5/32&quot; to ø1/2&quot;</td>
</tr>
<tr>
<td>Male connector type</td>
<td>AKH</td>
<td>M5 to 1/2</td>
<td>ø4 to ø12, ø5/32&quot; to ø1/2&quot;</td>
</tr>
<tr>
<td>Bushing type</td>
<td>AKB</td>
<td>1/8 to 1/2</td>
<td>—</td>
</tr>
</tbody>
</table>

Made to order for air/water
- Body material: Brass INA-14-290, XTO-674-
- Body material: Stainless steel INA-14-
- Rubber material: NBR/FKM/CR
- High temperature, low temperature
- Low cracking

Also compatible with O₂ (Available as special order). Please contact SMC separately.

### Fittings & Tubing

**Fluoropolymer Tubing (Super PFA)**

**TL/TIL Series**

- Applicable tubing O.D.
  - Metric size: ø4, ø6, ø8, ø10, ø12, ø19
- Max. operating pressure: 145 psi [1.0 MPa] (at 68°F [20°C]) +1
- Max. operating temperature: 500°F [260°C] (This may vary according to operating pressure.)
  +1 This may vary according to size.

**FR Soft Nylon Tubing**

**TRS Series**

- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

**Color Variations**

- Black
- White
- Red
- Blue
- Green

**FR Double Layer Tubing**

**TRB Series**

- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

**FR Three-layer Polyurethane Tubing**

**TRBU Series**

- Fluid: Air, Water
- Tubing O.D.: ø6 to ø12

**Color Variations**

- Black
- White
- Red
- Blue
- Yellow
- Green

Also, Flame resistant polyolefin
- Middle layer: Aluminum laminated film
- Inner tube: Polyurethane

+ Note that the tube colors are samples.
**Temperature Control Equipment**

Thermo-chiller: Standard Type

<table>
<thead>
<tr>
<th>HRS Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set temperature range</td>
</tr>
<tr>
<td>Max. cooling capacity</td>
</tr>
<tr>
<td>Temperature stability</td>
</tr>
</tbody>
</table>

Air-cooled refrigeration, Water-cooled refrigeration

Circulating fluid

Tap water, Ethylene glycol aqueous solution

Thermo-chiller: Inverter Type

<table>
<thead>
<tr>
<th>HRSH Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set temperature range</td>
</tr>
<tr>
<td>Max. cooling capacity</td>
</tr>
<tr>
<td>Temperature stability</td>
</tr>
</tbody>
</table>

Air-cooled refrigeration, Water-cooled refrigeration

Circulating fluid

Tap water, Deionized water, Ethylene glycol aqueous solution

**Air Preparation Equipment**

Membrane Air Dryer

IDG

IDG Series

- It is possible to easily supply dry air using the hollow fiber membrane.
- Non-fluorocarbon
- Power supply not required.
- Compatible with low dew points (–76°F [–60°C])
- No vibration or heat discharge.
- With a dew point indicator

<Example of System>

Air purge applied continuously where laser beam passes through (light path)

Differential pressure switch

Laser Beam Machine Equipment

Thermo-chiller: Standard Type

HRS Series

- 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, etc.
- Compact: W377 x H615 x D500, 40 kg
- 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)

Thermo-chiller: Inverter Type

HRSH Series

- Complete with energy-saving triple inverter!
- Outdoor installation, Splashproof type (IPX4)
- Max. ambient temperature: 113°F [45°C]
- Temperature stability: ±0.18°F [±0.1°C] (when a load is stable)
- Space saving and lightweight: 280 kg (25 kW type)
Global Service Network

SMC has established a wide spread global network of locations in all major countries of the Americas, Europe, and Asia/Oceania as well as emerging countries such as Brazil, Russia, India, and China, showing our active commitment to the world market. SMC supports this global network with a stable supply chain of global products, a high level of technical service, and a solid communication network to meet our customers’ needs and expectations.

With 400 sales offices in 83 countries worldwide, our sales force of over 7,951 maintains close communication with customers.
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With 400 sales offices in 83 countries worldwide, our sales force of over 7,951 maintains close communication with customers.

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Our product line offers 12,000 basic models with over 700,000 variations. Global production facilities provide a stable supply of products to customers in all markets.
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- **India**
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    - A-4, Sector-88, Noida-201 305 India
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- **Israel**
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- **Pakistan**
  - Jubilee Corporation
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- **Sri Lanka**
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- **Venezuela**
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- **Peru**
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