

Ironworks

Engineering Plant



# Recommended Equipment for The Steel Industry



## Device Air Supply Section (Including safety control section)

### 1 Machine Safety Equipment p. 3

These SMC products are for use as safety components in the safety-related parts of machinery. They do not ensure safety on their own. Refer to the [Web Catalog](#) for more information.

#### Residual pressure release valve

For max. category 2

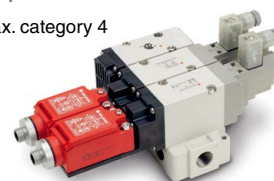


For max. category 4



#### Residual pressure relief valve with a soft start-up function

For max. category 4



### 2 ISO13849 Validation Recommended Product p. 3

These SMC products are for use as safety components in the safety-related parts of machinery. They do not ensure safety on their own. Refer to the [Web Catalog](#) for more information.

#### Regulator (with backflow function)



#### OSHA standard-compliant pressure relief 3-port valve with locking holes

Single action

Double action



#### Soft-start up valve



### 3 Air filter / Lubricator / Lubrication Equipment / Pressure Gauge, etc. p. 5

#### Air filter



#### Lubricator / Lubrication Equipment



#### Pressure gauge



### 4 Pressure Control Equipment Pinch Roll/Tension Controller p. 6

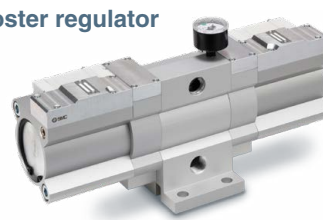
#### Precision regulator



#### Electro-pneumatic regulator



#### Booster regulator



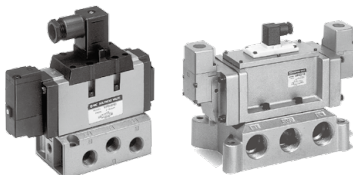
### 5 5-Port Solenoid Valve

Cylinders Directional Control p. 7

### 6 2-Port Valve

Air Blow p. 9

#### 5-port solenoid valve



#### 2-port valve



### 7 Compressed Air Preparation Equipment Air for Instrumentation Equipment / Non-lube Devices p. 10

#### Air dryer / Aftercooler



#### Air tank



#### Compressed air preparation filter



## Device Air Supply Section (Including safety control section)

### 8 Related Equipment for Residual Pressure Release p. 12

#### Valve / Speed controller



## Measures against High Temperatures and Dusty Environment p. 13 to 17

### 1 Measures against High Temperatures

#### Cylinder for Coke Oven



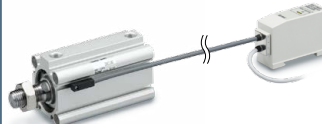
#### Heat Resistant Cylinder

-XB6 (-10 to 150°C)  
-XC5 (-10 to 110°C)

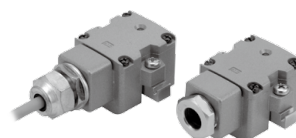


#### Cylinder with Heat-resistant Auto Switch

-XB14 (150°C)



#### Heat-resistant Reed Auto Switch



### 2 Dustproof Products

#### High Durability Series Dust-resistant Cylinder

-XC4 Max. 6 times more durable in dusty environments



#### Cylinder with Heavy Duty Scraper

-XC4



#### Cylinder with Coil Scraper

-XC35



#### Cylinder with Rod Boot



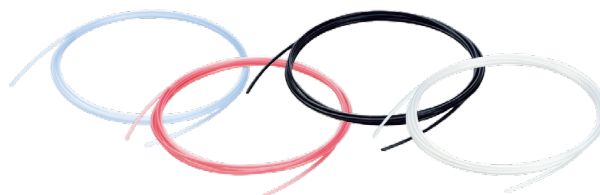
## Proposals to Reduce Piping Work p. 18

#### S coupler / Stainless steel type

Operating temperature range:  
-5 to 150°C



#### Fluoropolymer Tubing

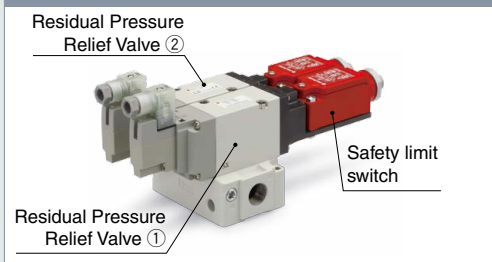


## Device Air Supply Section (Including safety control section)

### 1 Safety Parts

These SMC products are for use as safety components in the safety-related parts of machinery. They do not ensure safety on their own. Refer to the **Web Catalog** for more information.

ISO 13849 certified / With a main valve position detection function VP/VG



### 2 ISO 13849 Validation Recommended Products

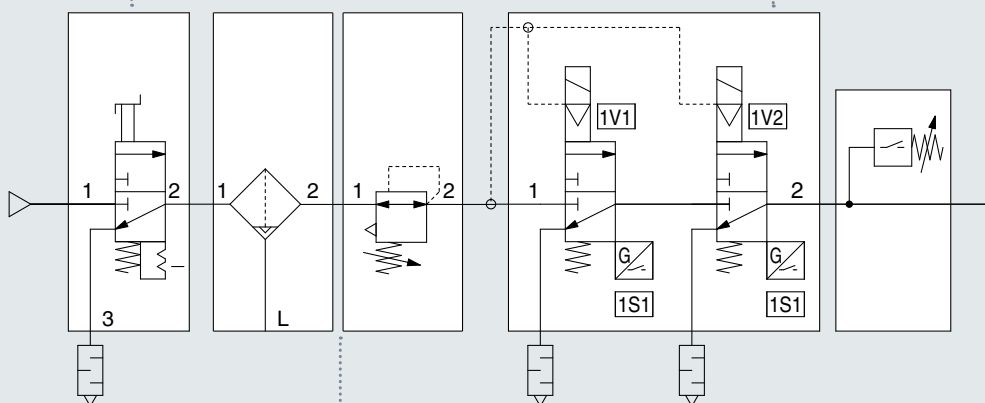
A validated SMC product can be provided for use within safety control systems.

SMC's recommended validated products are those validated based on ISO 13849-2:2012 annexes A, B, and D. Refer to the **Web Catalog** for more information.

Regulator (with backflow function)









OSHA standard-compliant pressure relief 3-port valve with locking holes















## Device Air Supply Section (Including safety control section)

Description	Model example	Port size	Safety parts	ISO 13849 validation recommended products
<b>* With check valve / Without check valve</b>  Solenoid valve master valve ISO13849-1	VP542R-5DZ1-03-MA-X536 VP742R-5DZ1-04-MA-X536 VP542-5DZ1-03-X536 VP742-5DZ1-04-X536	3/8 1/2 3/8 1/2	●	
<b>* With check valve / Without check valve</b>  Solenoid valve master valve ISO13849-1	VP544R-5DZ1-03-MA-X538 VP744R-5DZ1-04-MA-X538 VP544-5DZ1-03-M-X538 VP744-5DZ1-04-M-X538 VG342R-5DZ-06-MA-X87 VG342R-5DZ-10-MA-X87 VG342-5DZ-06-M-X87 VG342-5DZ-10-M-X87	3/8 1/2 3/8 1/2 3/4 1 3/4 1	●	
<b>Residual pressure relief 3-port valve with locking holes</b> • Single action  Manual master valve OSHA standard compliant	VHS20-02B-S VHS30-03B-S VHS40-04B-S VHS40-06B-S VHS50-10B-S	1/4 3/8 1/2 3/4 1	●	
<b>Residual pressure relief 3-port valve with locking holes</b> • Double action Push the knob and then turn, 2-step action prevents malfunction. Step1 Push down the knob. Step2 Turn the knob.  Manual master valve OSHA standard compliant	VHS2510-02B-S VHS3510-03B-S VHS4510-04B-S VHS5510-06B-S VHS5510-10B-S	1/4 3/8 1/2 3/4 1	●	
<b>Residual pressure relief 3-port valve with locking holes</b> <b>Lock-out type</b>  Manual master valve	AVA2000-02BS-A AVA3000-03BS-A AVA4000-04BS-A AVA5000-06BS-A AVA5000-10BS-A	1/4 3/8 1/2 3/4 1	●	
<b>AR20 (with backflow function)</b> 	AR20(K)-02G-B AR30(K)-03G-B AR40(K)-04G-B AR50(K)-06G-B AR60(K)-10G-B	1/4 3/8 1/2 3/4 1	●	

## Device Air Supply Section (Including safety control section)

### 3 Air filter / Lubricator / Lubrication Equipment / Pressure Gauge, etc.

Description	Model example	Port size
<b>Air filter</b> 	AF20-02C-D	1/4
	AF30-03D-D	3/8
	AF40-04D-D	1/2
	AF50-06D-D	3/4
	AF60-10D-D	1
<b>Air filter Large bore size</b> 	AF811-12	1 1/4
	AF811-14	1 1/2
	AF911-20	2
<b>Regulator Large bore size</b> 	AR825-12G	1 1/4
	AR825-14G	1 1/2
	AR925-20G	2
<b>Lubricator (Direct type)</b> 	AL20-02-D	1/4
	AL30-03-D	3/8
	AL40-04-D	1/2
	AL50-06-D	3/4
	AL60-10-D	1
<b>Lubricator (Direct type) Large bore size</b> 	AL800-12	1 1/4
	AL800-14	1 1/4
	AL900-20	2
<b>Centralized lubrication equipment (Indirect type) D.P. lube</b> 	ALD600-06	3/4
	ALD600-10	1
	ALD900-12	1 1/4
	ALD900-14	1 1/2
	ALD900-20	2
<b>Centralized lubrication equipment (Indirect type) Booster lube</b> 	ALB900-10-00	1
	ALB900-20-00	2
	ALB900-30-00	3
<b>ALD600</b>   G63-10-02	G36-10-01	1/8
	G46-10-02	1/4
	G53-10-01-L	1/8
	G53-10-02-L	1/4
	G63-10-01-L	1/8
	G63-10-02-L	1/4
<b>Digital pressure switch</b> 	ISE70-02-L2-MS	1/4
	ISE70G-02-L2-ML	

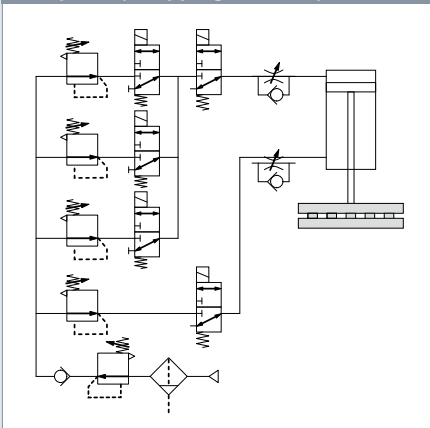


## Device Air Supply Section (Including safety control section)

### 4 Pressure Control Equipment Pinch Roll/Tension Controller

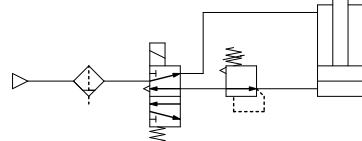
- Precision setting
- Remote setting
- Multi-stage pressure setting

Multistage control of pressing force for workpiece (Wrapping machine)



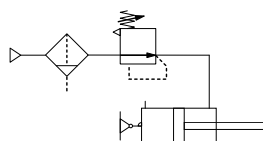
Installation between a cylinder and solenoid valve

Example) Between a cylinder and solenoid valve



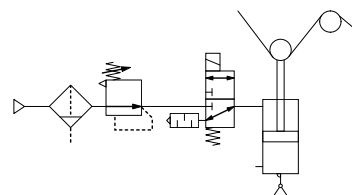
- It can be used between a cylinder and solenoid valve. (Refer to the Specific Product Precautions on the [Web Catalog](#).)

Contact pressure control

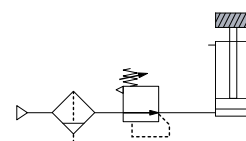


- Adapts to the cylinder's piston displacement, maintaining a constant pressure.

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



Balance and drive  
Accurate balance pressure setting






- Limits pressure fluctuation when driving a cylinder, maintaining excellent static and dynamic balance.

Description	Model example	Port size
<b>Precision regulator</b>  	IR2010-02BG-A	1/4
	IR3010-03BG-A	3/8
	IR3010-04BG-A	1/2
	IR1020-01BG-A	1/8
	IR2020-02BG-A	1/4
	IR3020-03BG-A	3/8
	IR3020-04BG-A	1/2
<b>Power valve precision regulator</b>  	VEX1533-06-GN	3/4
	VEX1533-10-GN	1
	VEX1733-12-GN	1 1/4
	VEX1933-14-GN	1 1/2
	VEX1933-20-GN	2
<b>Power valve (Air operated) Regulator function + 3-port valve function</b>  	VEX1300-03	3/8
	VEX1500-04	1/2
	VEX1500-06	3/4
	VEX1500-10	1
	VEX1700-12	1 1/4
	VEX1900-14	1 1/2
	VEX1900-20	2
<b>Electro-pneumatic regulator For Multi-stage pressure control</b>  <p>Port size: 1 1/2", 2"</p>	ITV2050-342BL	1/4
	ITV2050-343BL	3/8
	ITV3050-344BL	1/2
	VEX1500-04-34L-X345-Q	1/2
	VEX1500-06-34L-X345-Q	3/4
	VEX1500-10-34L-X345-Q	1
	VEX1700-12-34L-X345-Q	1 1/4
	VEX1900-14-34L-X345-Q	1 1/2
	VEX1900-20-34L-X345-Q	2
<b>Booster regulator</b>  	VBA10A-02	1/4
	VBA20A-03	3/8
	VBA43A-04	1/2
<b>Low air consumption Booster regulator</b>  	VBA10A-02-X3145	1/4
	VBA20A-04-X3145	1/2
<b>Tank for Booster regulator</b>  	VBAT10A1-RV	3/8 (IN), 1/2 (OUT)
	VBAT20A1-RV	1/2 (IN), 1/2 (OUT)
	VBAT38A1-RV	1/2 (IN), 3/4 (OUT)

\* It is not recommended to install the electro-pneumatic regulator between the cylinder and the solenoid valve, as this can affect the product life.






## Device Air Supply Section (Including safety control section)

### 4 Pressure Control Equipment Pinch Roll/Tension Controller

Description	Model example	Port size
<b>Hand valve VH series</b> 	VH202-02	1/4
	VH201-02	
	VH200-02	
	VH302-03	
	VH301-03	3/8
	VH300-03	
	VH402-04	
	VH401-04	
	VH400-04	1/2
	VH402-06	
	VH401-06	
	VH400-06	
	VH602-10	3/4
	VH601-10	
	VH600-10	
<b>Silencer AN series</b> 	AN10-01	1/8
	AN20-02	1/4
	AN30-03	3/8
	AN40-04	1/2
	AN500-06	3/4
	AN600-10	1
	AN700-12	1 1/4
	AN800-14	1 1/2
	AN900-20	2
<b>Silencer 25 series</b> 	2504-002	1/4
	2505-003	3/8
	2506-004	1/2
	2507-006	3/4
	2508-010	1

### 5 5-Port Solenoid Valve Cylinders Directional Control

General purpose/With DIN connector, Power consumption: 1 W, Compact, Max. operating pressure: 0.8 MPa


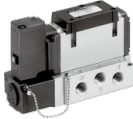

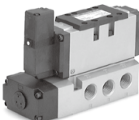

Description	Model		Port size P, A, B, EA, EB
<b>VFR2000 series</b> 	VFR2110-5DZ-02	2-position single	1/4B
	VFR2210-5DZ-02	2-position double	
	VFR2310-5DZ-02	3-position closed center	
	VFR2410-5DZ-02	3-position exhaust center	
	VFR2510-5DZ-02	3-position pressure center	
<b>VFR3000 series</b> 	VFR3110-5DZ-03	2-position single	3/8B
	VFR3210-5DZ-03	2-position double	
	VFR3310-5DZ-03	3-position closed center	
	VFR3410-5DZ-03	3-position exhaust center	
	VFR3510-5DZ-03	3-position pressure center	
<b>VFR4000 series</b> 	VFR4110-5DZ-04	2-position single	1/2B
	VFR4210-5DZ-04	2-position double	
	VFR4310-5DZ-04	3-position closed center	
	VFR4410-5DZ-04	3-position exhaust center	
	VFR4510-5DZ-04	3-position pressure center	
<b>VFR5000 series</b> 	VFR5110-5DZ-06	2-position single	3/4B
	VFR5210-5DZ-06	2-position double	
	VFR5310-5DZ-06	3-position closed center	
	VFR5410-5DZ-06	3-position exhaust center	
	VFR5510-5DZ-06	3-position pressure center	
<b>VFR6000 series</b> 	VFR6110-5DZ-10	2-position single	1B
	VFR6210-5DZ-10	2-position double	
	VFR6310-5DZ-10	3-position closed center	
	VFR6410-5DZ-10	3-position exhaust center	
	VFR6510-5DZ-10	3-position pressure center	



## Device Air Supply Section (Including safety control section)

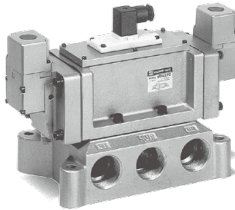
### 5 5-Port Solenoid Valve Cylinder Directional Control

General purpose type, Plug-in, Power consumption 1 W, Compact, Max. operating pressure: 0.8 MPa

Description	Model		Port size P, A, B, EA, EB
VFR2000 series 	VFR2100-5FZ-02	2-position single	1/4B
	VFR2200-5FZ-02	2-position double	
	VFR2300-5FZ-02	3-position closed center	
	VFR2400-5FZ-02	3-position exhaust center	
	VFR2500-5FZ-02	3-position pressure center	
VFR3000 series 	VFR3100-5FZ-03	2-position single	3/8B
	VFR3200-5FZ-03	2-position double	
	VFR3300-5FZ-03	3-position closed center	
	VFR3400-5FZ-03	3-position exhaust center	
	VFR3500-5FZ-03	3-position pressure center	
VFR4000 series 	VFR4100-5FZ-04	2-position single	1/2B
	VFR4200-5FZ-04	2-position double	
	VFR4300-5FZ-04	3-position closed center	
	VFR4400-5FZ-04	3-position exhaust center	
	VFR4500-5FZ-04	3-position pressure center	
VFR5000 series 	VFR5100-5FZ-06	2-position single	3/4B
	VFR5200-5FZ-06	2-position double	
	VFR5300-5FZ-06	3-position closed center	
	VFR5400-5FZ-06	3-position exhaust center	
	VFR5500-5FZ-06	3-position pressure center	
VFR6000 series 	VFR6100-5FZ-10	2-position single	1B
	VFR5200-5FZ-10	2-position double	
	VFR6300-5FZ-10	3-position closed center	
	VFR5400-5FZ-10	3-position exhaust center	
	VFR5500-5FZ-10	3-position pressure center	

Rugged type, With DIN connector, 0 to 60°C, Max. operating pressure: 0.9 MPa



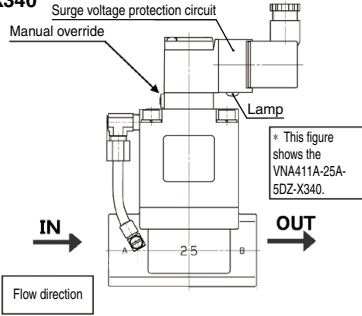
■ Main valve with poppet construction, Reliable operation resistant to condensate and debris, Recommended for upper process equipment

Description	Model		Port size P, A, B, EA, EB
VP4000 series With a surge suppressor: X23 Without a surge suppressor: Nil 	VP4150-035DL(-X23)	2-position single	3/8B
	VP4250-035DL(-X23)	2-position double	
	VP4350-035DL(-X23)	3-position closed center	
	VP4450-035DL(-X23)	3-position exhaust center	
	VP4150-045DL(-X23)	2-position single	1/2B
	VP4250-045DL(-X23)	2-position double	
	VP4350-045DL(-X23)	3-position closed center	
	VP4450-045DL(-X23)	3-position exhaust center	
	VP4150-065DL(-X23)	2-position single	3/4B
	VP4250-065DL(-X23)	2-position double	
	VP4350-065DL(-X23)	3-position closed center	
	VP4450-065DL(-X23)	3-position exhaust center	
	VP4150-105DL(-X23)	2-position single	1B
	VP4250-105DL(-X23)	2-position double	
	VP4350-105DL(-X23)	3-position closed center	
	VP4450-105DL(-X23)	3-position exhaust center	
	VP4170-125DL(-X23)	2-position single	1 1/4B
	VP4270-125DL(-X23)	2-position double	
	VP4170-145DL(-X23)	2-position single	1 1/2B
	VP4270-145DL(-X23)	2-position double	

\* Please contact SMC sales representatives for product's details.

## Device Air Supply Section (Including safety control section)

### 6 2-Port Valve Air Blow

Internal pilot type, External pilot type (with manual button), Internal pilot type (with manual button)			
Description	Model		Port size
<b>JSXD series</b> <b>Internal pilot type</b> 	JSXD31-□N02R-5DZ	Internal pilot type	1/4
	JSXD41-□N04R-5DZ		3/8
	JSXD41-□N04R-5DZ		1/2
	JSXD51-□N06R-5DZ		3/4
	JSXD61-□N10R-5DZ		1
	JSXD71-BN12R-5DZ		1 1/4
	JSXD81-BN14R-5DZ		1 1/2
	JSXD91-BN20R-5DZ		2
<b>VNA series</b> <b>External pilot type</b> 	VNA111A-8A-5DZ	External pilot type With manual override	1/4
	VNA211A-10A-5DZ		3/8
	VNA211A-15A-5DZ		1/2
	VNA311A-20A-5DZ		3/4
	VNA411A-25A-5DZ		1
	VNA511A-32A-5DZ		1 1/4
	VNA611A-40A-5DZ		1 1/2
	VNA711A-50A-5DZ		2
<b>VNA series</b> <b>Internal pilot type: X340</b>  <p>* This figure shows the VNA411A-25A-5DZ-X340.</p>	VNA111A-8A-5DZ-X340	Internal pilot type With manual override Operating pressure range: 0.2 to 0.7 MPa	1/4
	VNA211A-10A-5DZ-X340		3/8
	VNA211A-15A-5DZ-X340		1/2
	VNA311A-20A-5DZ-X340		3/4
	VNA411A-25A-5DZ-X340		1
	VNA511A-32A-5DZ-X340		1 1/4
	VNA611A-40A-5DZ-X340		1 1/2
	VNA711A-50A-5DZ-X340		2

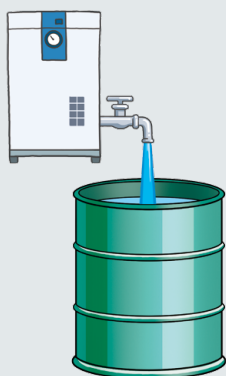
\* Please contact SMC sales representatives for product's details.



## 7 Compressed Air Purification Equipment Air for Instrumentation Equipment/Non-lube Devices

# Protect Pneumatic Equipment from Moisture!

An air dryer removes the vapor from the moist compressed air delivered by the compressor, and prevents it from causing the pneumatic equipment to fail.



This is how much moisture is actually contained in compressed air!

# 113 L = approx. 63 1.8 L bottles



<Conditions> • Air compressor output: 75 kW  
• Air at 30°C and a relative humidity of 80% compressed to 0.7 MPa  
• 8 hours of operation

### Standard inlet air temperature type *IDF□E/F/D Series*

#### • Tolerant of high temperature environment!

Top of its class in the industry for the large air-cooled type  
**Ambient temperature 45°C/Inlet air temperature 65°C (IDF60 to 90)**

#### • Air flow capacity increased by max. 41% compared with the existing model (IDF60 to 90)

Model	Rated inlet condition	Applicable air compressor [kW]	Port size
IDF1E	35°C 0.7 MPa	0.75	Rc3/8
IDF2E		1.5	
IDF3E		2.2	
IDF4E		3.7	Rc1/2
IDF6E		5.5	Rc3/4
IDF8E		7.5	
IDF11E		11	
IDF15E1		15	Rc1
IDF60	40°C 0.7 MPa	22	R1
IDF60 or IDF70		37	R1 or R1 1/2
IDF80		55	R2
IDF80 or IDF90		75	



#### • Large size series

#### • Tolerant of high temperature environment!

Top of its class in the industry for the large air-cooled type  
**Ambient temperature 45°C/Inlet air temperature 60°C (IDF100F to 150F)**

#### • Energy saving design

Exhaust heat amount is reduced 25% to suppress the ambient temperature rise (air-cooled type) and reduce the facility water amount (water-cooled type) (IDF100F to 150F).

Model	Rated inlet condition	Applicable air compressor [kW]	Port size
IDF100F	40°C 0.7 MPa	100	R2
IDF125F		125	65 (2 1/2B) Flange
IDF150F		150	
IDF190D		190	80 (3B) Flange
IDF240D		240	100 (4B) Flange
IDF370D	35°C 0.7 MPa	370	150 (6B) Flange

### High inlet air temperature type *IDU□E Series*

#### • Energy-saving design

The use of an aftercooler allows for the load on the compressor for refrigeration to be greatly reduced.  
(Power consumption: Reduced by up to 50%) Refer to page 35-1 for details.

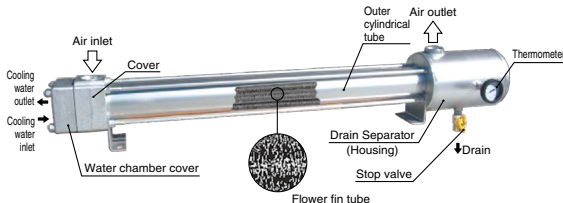









\* IDU8E to 75E

Model	Rated inlet condition	Applicable air compressor [kW]	Port size
IDU3E	55°C 0.7 MPa	2.2	Rc3/8
IDU4E		3.7	Rc1/2
IDU6E		5.5	Rc3/4
IDU8E		7.5	
IDU11E		11	
IDU15E1		15	Rc1
IDU22E		22	R1
IDU37E		37	R1 1/2
IDU55E		55	R2
IDU75E		75	



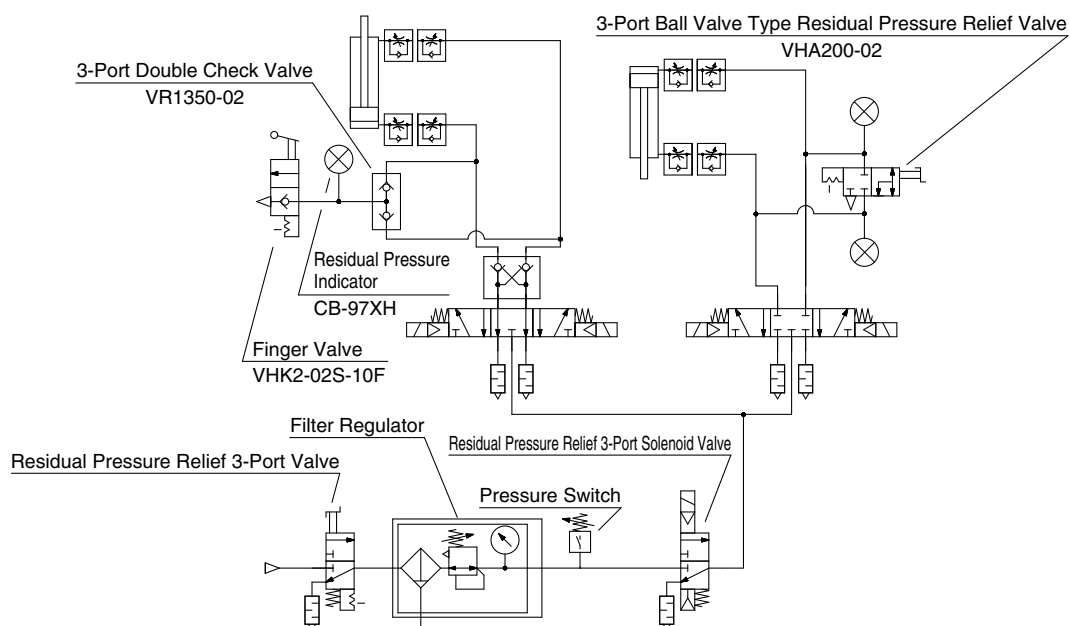
## Device Air Supply Section (Including safety control section)






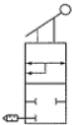

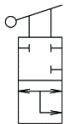
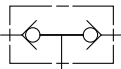

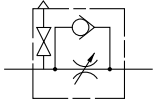

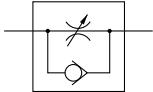
### 7 Compressed Air Purification Equipment Air for Instrumentation Equipment/Non-lube Devices

Description	Model	Port size	Remarks
<b>Aftercooler</b> 	HAW2-04D	1/2B	Water-cooled specifications
	HAW7-06D	3/4B	
	HAW22-14D	1 1/2B	
	HAW37-14D		
	HAW55-20D	2B	
	HAW75-20D		
	HAW110-30D	FG3B	
<b>Air tank</b> 	AT6C-04D	1/2B	With auto drain Class 2 pressure vessel
	AT11D-06D	3/4B	
	AT22D-14D	1 1/2B	
	AT37D-14D		
	AT55D-20D	FG2B	
	AT75D-20D		
	AT125D-30D	FG3B	
	AT150C-40D	FG4B	
AT220C-40D			
<b>Main line filter</b> <b>Large particles</b> <b>dust filtration</b> <b>Drain removal rate 99%</b> <b>Filtration degree: 1 μm</b> 	AFF20-02C-L-D	1/4B	· With auto drain · With drain indicator  Visible check (Green/Red)  Initial period (Green)  Indicator Good element status (No need to replace)  ▼ When clogged (Red)  Element replacement (Need to replace) 
	AFF30-03D-L-D	3/8B	
	AFF40-04D-L-D	1/2B	
	AFF50-06D-L-D	3/4B	
	AFF60-10D-L-D	1B	
	AFF70D-10	1B	
	AFF80D-14	1 1/2B	
	AFF90D-20	2B	
	<b>Mist separator</b> <b>Dust filtration</b> <b>Oil mist separation</b> <b>Filtration degree: 1 μm</b> 	AM20-02C-L-D	
AM30-03D-L-D		3/8B	
AM40-04D-L-D		1/2B	
AM50-06D-L-D		3/4B	
AM60-10D-L-D		1B	
AM70D-10		1B	
AM80D-14		1 1/2B	
AM90D-20		2B	
<b>Micro mist separator</b> <b>Dust filtration</b> <b>Oil mist separation</b> <b>Filtration degree: 0.01 μm</b> 		AMD20-02C-L-D	1/4B
	AMD30-03D-L-D	3/8B	
	AMD40-04D-L-D	1/2B	
	AMD50-06D-L-D	3/4B	
	AMD60-10D-L-D	1B	
	AMD70D-10	1B	
	AMD80D-14	1 1/2B	
	AMD90D-20	2B	
	<b>Active carbon filter</b> <b>Oil, steam, and odor removal</b> 	AMK20-02-D	1/4B
AMK30-03-D		3/8B	
AMK40-04-D		1/2B	
AMK50-06-D		3/4B	
AMK60-10-D		1B	
<b>Odor removal filter</b> <b>Odor removal</b> <b>Filtration degree: 0.01 μm</b> 	AMF650-10	1B	
	AMF850-14	1 1/2B	
	AMF850-20	2B	



## 8 Related Equipment against Residual Pressure



Description	Model	Port size	Remarks
<b>Residual pressure indicator</b>  * Please contact SMC sales representatives for product's details.	CB-97XH	ø12	Operating pressure: 0.01 MPa 
<b>Finger valve</b> <b>Red knob for residual pressure</b> 	VHK3-02S-08FR	ø8	Blue knob for releasing the brake VHK3-02S-08F 
<b>3-port ball valve type residual pressure relief valve</b>  * Please contact SMC sales representatives for product's details.	VHA200-02	1/4	Locking in a released state is possible. 
<b>3-port ball valve type residual pressure relief valve</b>  * Please contact SMC sales representatives for product's details.	VHA200-C06-X410	ø6	Locking in a released state is possible. 
<b>3-port double check valve</b> * Please contact SMC sales representatives for product's details.	VR1350-02	1/4	
<b>Residual pressure relief speed controller</b> 	AS2000E-02 AS3000E-03 AS4000E-04	1/4 3/8 1/2	
<b>Large volume speed controller</b> <b>In-line type</b> 	AS2000-01 AS2000-02 AS3000-03 AS4000-04 AS5000-04 AS500-06 AS600-10 AS800-12 AS900-14 AS900-20	1/8 1/4 3/8 1/2 1/2 3/4 1 1 1/4 1 1/2 2	

# Measures against High Temperatures and Dusty Environment

## 1 Measures against High Temperatures

### Air Cylinder for Coke Oven (Made to Order)

- Can be used under a high temperature
- Operating temperature: Max. 150°C, Seal: Fluororubber, Heat-resistant grease, With coil scraper

### Measures against High Temperatures

All seal parts are resistant to high temperatures. This includes the fluororubber seal material as well as the heat-resistant grease used as the lubricant.

### Measures against Dusty Environment

Three-layer structure that prevents dust from entering the cylinder.



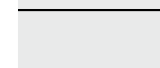
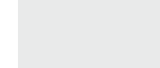


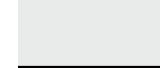
1. Coil scrapers are designed to remove large amounts of foreign matter from frost ice and weld spatter. It uses the developed one, and shows a strong scraping effect.
2. In a fixed area where fine dust comes out of the coil scraper in the dust pool designed to collect and provided with a hole for blowing dust by air blow structure to remove accumulated dust.
3. The grease reservoir is designed by utilizing the viscosity of the grease itself and considering the adsorption of dust.






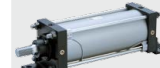


### Heat-resistant Cylinder (−10 to 150°C) (-XB6)

- The seal material and grease have been changed so that the product can be used in ambient temperatures of −10 to 150°C.

#### Applicable Series

	<b>CJP2</b>	Pin cylinder
	<b>CJ2-Z</b>	Air cylinder
	<b>CJ2W-Z</b>	
	<b>CM2-Z</b>	Air cylinder
	<b>CM2W-Z</b>	
	<b>CM2K-Z</b>	Non-rotating rod type
	<b>CM2KW-Z</b>	
	<b>CM2R-Z</b>	Direct mounting type
	<b>CM2RK-Z</b>	Direct mounting with non-rotating rod type
	<b>CBM2</b>	End lock cylinder
	<b>CG1-Z</b>	Air cylinder
	<b>CG1W-Z</b>	
	<b>CG1R-Z</b>	Direct mounting type

	<b>MB-Z</b>	Air cylinder
	<b>MBW-Z</b>	
	<b>MB1-Z</b>	Air cylinder
	<b>MB1W-Z</b>	
	<b>CA2-Z</b>	Air cylinder
	<b>CA2W-Z</b>	
	<b>CBA2</b>	End lock cylinder
	<b>CS1□N</b>	Air cylinder
	<b>CS1W□N</b>	
	<b>CS2*1</b>	Air cylinder
	<b>CS2W*1</b>	

Specifications/ Seal material: Fluororubber  
Grease: Heat-resistant grease

\*1 Ambient temperatures: 0°C to 150°C





# Measures against High Temperatures and Dust






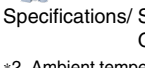


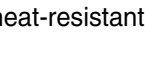
## 1 Measures against High Temperatures

### Heat-resistant Cylinder (−10 to 150°C) (-XB6)

- The seal material and grease have been changed so that the product can be used in ambient temperature of −10 to 150°C.

#### Applicable Series

	<b>CUJ</b>	Mini free mount cylinder
	<b>CU</b>	Free mount cylinder
	<b>CUK</b>	Non-rotating rod type
	<b>CU</b>	Long stroke
	<b>CUK</b>	Long stroke, Non-rotating rod type
	<b>CQS</b>	Compact cylinder
	<b>CQSW</b>	
	<b>CQ2-Z</b>	Compact cylinder
	<b>CQ2W-Z</b>	
	<b>CQP2</b>	Axial piping type (centralized piping type)
	<b>CQ2K-Z</b>	Non-rotating rod type
	<b>CQ2KW-Z</b>	

	<b>CG5</b>	Stainless steel cylinder
	<b>CY3B*2</b>	Magnetically coupled rodless cylinder
	<b>MGPM-Z</b>	Compact guide cylinder
	<b>MGQ</b>	Compact guide cylinder
	<b>MGG</b>	Guide cylinder
	<b>MGC</b>	Guide cylinder
	<b>CXSJ</b>	Dual rod cylinder
	<b>CXS</b>	
	<b>MK-Z</b>	Rotary clamp cylinder (ø20 to ø63)

Specifications/ Seal material: Fluororubber  
Grease: Heat-resistant grease

\*2 Ambient temperatures: 50°C to 150°C

### Cylinder with Heat-resistant Auto switches (Max. 150°C) (-XB14)

- Heat-resistant compact cylinder that can be mounted to heat-resistant solid state auto 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 display solid state auto switch (single unit)



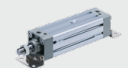
- Improved heat-resistant type
  - The optimum operating range is identified by the lamp color change.
- The seal material and grease have been changed so that the product can be used in ambient temperature of −10 to 150°C.



### Heat-resistant Cylinder (−10 to 110°C) (-XC5)





- The seal material has been changed to increase heat resistance (up to 110°C) so that the product can be used in severe ambient temperatures exceeding the −10°C to 70°C temperature range of the standard product (0°C to 70°C for the CS1 and CS2 series).

#### Applicable Series

	<b>CM2-Z</b>	Air cylinder
	<b>CM2W-Z</b>	
	<b>CM2R-Z</b>	Direct mounting type
	<b>MB-Z</b>	Air cylinder
	<b>MBW-Z</b>	
	<b>MB1-Z</b>	Air cylinder
	<b>MB1W-Z</b>	

Specifications/ Ambient temperature range: −10°C to 110°C (0°C to 110°C for the CS1 and CS2, −10°C to 100°C for the MXQ□)

Seal material: Fluororubber (For CS1 cylinders, cushion seal is NBR.)

	<b>CA2-Z</b>	Air cylinder
	<b>CA2W-Z</b>	
	<b>CS1</b>	Air cylinder
	<b>CS1W</b>	
	<b>CS2</b>	Air cylinder
	<b>CS2W</b>	
	<b>MXQ□A</b>	Air slide table
	<b>MXQ□B</b>	
	<b>MXQ□C</b>	
	<b>MXQ</b>	



# Measures against High Temperatures and Dust

## 2 Measures against Dust

### High Durability Series Dust-resistant Cylinder

- Up to 6 times more durable in dusty environments (-XC4A/-XC4B/-XC4C)

Applicable powder particle size: 20 to 100  $\mu\text{m}$

Suitable for environments with ceramic powder, toner powder, paper powder, and metallic powder

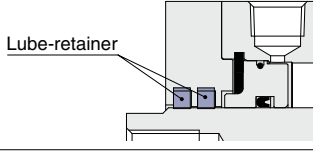

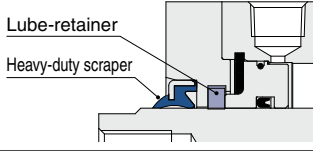

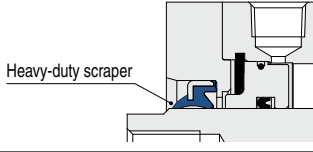

\* Excludes weld spatter

- Can be selected according to the application

A Lube-retainer (stable lubrication function) and a heavy-duty scraper can be mounted on the piston rod.

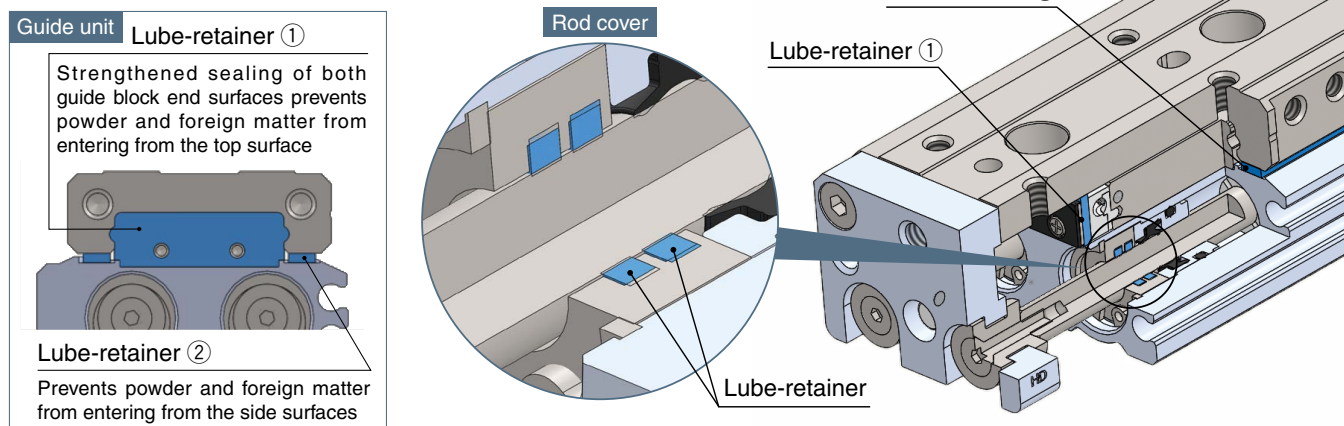
For the MGP series compact guide cylinder, they can also be mounted on the guide rod (one or both sides).

\* CM2, CG1, MB, CQ2, MGP-XC4□

Description	Applicable powder particle size	Structure (CQ2)	Durability
With 2 Lube-retainers <b>XC4A</b>	20 to 50 $\mu\text{m}$		 Standard model
With heavy-duty scraper + Lube-retainer <b>XC4B</b>	30 to 100 $\mu\text{m}$		 Standard model
With heavy-duty scraper <b>XC4C</b>	50 to 100 $\mu\text{m}$		 Standard model

### MXQ-XC4A

- Lube-retainers are installed on the guide unit and rod cover. This prevents the entry of dust and foreign matter.



#### Air Cylinder CM2-XC4□

Applicable bore size:  $\phi 20$  to  $\phi 40$



#### Air Cylinder CG1-XC4□

Applicable bore size:  $\phi 20$  to  $\phi 100$



#### Air Cylinder MB-XC4□

Applicable bore size:  $\phi 32$  to  $\phi 100$



#### Compact Cylinder CQ2-XC4□

Applicable bore size:  $\phi 20$  to  $\phi 63$



#### Compact Guide Cylinder MGP-XC4□

Applicable bore size:  $\phi 12$  to  $\phi 100$



#### Air Slide Table MXQ-XC4A

Applicable bore size:  $\phi 6$  to  $\phi 25$

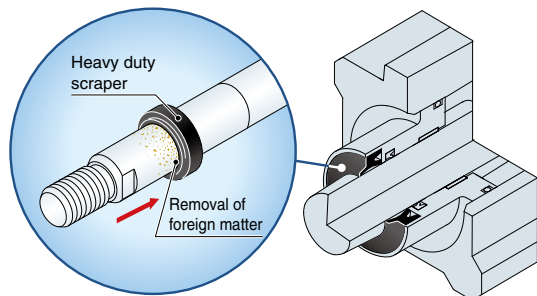


# Measures against High Temperatures and Dust









## 2 Measures against Dust

### Cylinder with Heavy Duty Scraper (-XC4)

- With the heavy duty scraper on the wiper ring, this cylinder is suitable for use in environments where die-cast equipment, construction machinery or industrial vehicles are exposed to dirt or sand, or in environments with significant amounts of dust.

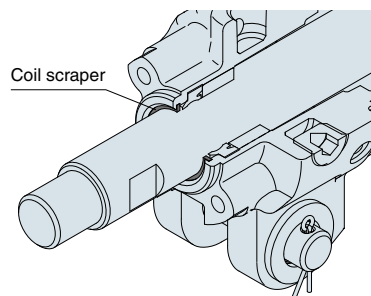













Removes foreign matter adhered to the rod

Applicable Series			XC4	XC35
	<b>CM2-Z</b>	Air cylinder	—	●
	<b>CM2W-Z</b>		—	●
	<b>CM2□□P</b>	Centralized piping type	—	—
	<b>CBM2</b>	End lock cylinder (Head side locking type only)	—	●
	<b>CG1-Z1</b>	Air cylinder	—	●
	<b>CG1-Z</b>		—	●
	<b>MB-Z</b>	Air cylinder	—	●
	<b>MBW-Z</b>		—	●
	<b>MB1-Z</b>	Air cylinder	●	●
	<b>MB1W-Z</b>		●	●
	<b>CA2-Z</b>	Air cylinder	●	●
	<b>CA2W-Z</b>		●	●
	<b>CBA2</b>	End lock cylinder	●	●
	<b>CS1</b>	Air cylinder	●	●
	<b>CS1W</b>		●	●
	<b>CS2</b>	Air cylinder	●	●
	<b>CS2W</b>		●	●
	<b>CQ2-Z</b>	Air cylinder	—	●
	<b>CQ2W-Z</b>		—	●
	<b>CQP2</b>	Axial piping type (Centralized piping type)	—	●
	<b>CQ2-Z</b>	Long stroke	—	●

### Cylinder with Coil Scraper (-XC35)

- Removes frost, ice, weld spatter, cutting chips, etc., adhered to the piston rod, protecting the seals



			XC4	XC35
	<b>RQ</b>	Compact cylinder with air cushion	●	●
	<b>MGPM-Z</b>	Compact guide cylinder	—	●
	<b>MGPL-Z</b>		—	●
	<b>MGPA-Z</b>		—	●
	<b>MGG</b>	Guide cylinder	●	●
	<b>MGC</b>	Guide cylinder	●	●
	<b>CNG</b>	Cylinder with lock	●	●
	<b>MWB</b>	Cylinder with lock	—	●
	<b>MWBW</b>		—	●
	<b>MWB-UT</b>	Lock unit	—	●
	<b>CNA2</b>	Cylinder with lock	●	●
	<b>CLS</b>	Cylinder with lock	—	●
	<b>CLQ</b>	Compact cylinder with lock	—	●
	<b>MK-Z</b>	Rotary clamp cylinder	●*1	—*2
	<b>CVM5</b>	Valve mounted air cylinder	●	—
	<b>CV3</b>		●	—
	<b>CVS1</b>		●	—

\*1 Applicable to ø16 to ø63

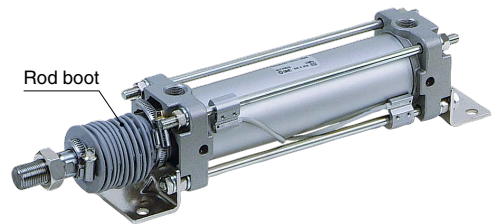
\*2 Standard equipment for ø20 to ø63

# Measures against High Temperatures and Dust







## 2 Measures against Dust


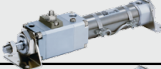
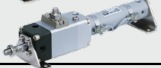



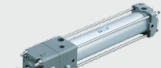

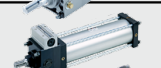



### Cylinder with Rod Boot

- The rod is protected by the rod boot.
- Prevents the adhesion of powder or dust to the rod
- Rod boot material: Nylon tarpaulin, Heat-resistant tarpaulin



Applicable Series (With Rod Boot)

	<b>CM2-Z</b>	Air cylinder
	<b>CM2K-Z</b>	Non-rotating rod type
	<b>CM2W-Z</b>	Air cylinder
	<b>CBM2</b>	With end lock
	<b>CG1-Z</b>	Air cylinder
	<b>CG1W-Z</b>	Air cylinder
	<b>CBG1</b>	With end lock
	<b>MB-Z</b>	Air cylinder
	<b>MBW-Z</b>	Air cylinder
	<b>MBK-Z</b>	Non-rotating rod type
	<b>MBKW-Z</b>	Non-rotating rod type
	<b>MBB</b>	With end lock
	<b>MB1-Z</b>	Air cylinder
	<b>MB1W-Z</b>	Air cylinder
	<b>MB1K-Z</b>	Non-rotating rod type
	<b>CA2-Z</b>	Air cylinder
	<b>CA2W-Z</b>	Air cylinder
	<b>CA2K</b>	Non-rotating rod type
	<b>CBA2</b>	With end lock
	<b>CA2□H</b>	Air-hydro
	<b>CS1</b>	Air cylinder
	<b>CS1W</b>	Air cylinder

	<b>CS2</b>	Air cylinder
	<b>CS2W</b>	Air cylinder
	<b>CLM2</b>	Fine lock cylinder
	<b>CLG1</b>	Fine lock cylinder
	<b>CL1</b>	Lock-up cylinder
	<b>CNG</b>	Cylinder with lock
	<b>MWB</b>	Cylinder with lock
	<b>MWBW</b>	Cylinder with lock
	<b>CNA2</b>	Cylinder with lock
	<b>CNA2W</b>	Cylinder with lock
	<b>CNS</b>	Cylinder with lock
	<b>CLS</b>	Cylinder with lock
	<b>CE2</b>	Stroke reading cylinder with brake
	<b>CVM5</b>	Valve mounted air cylinder
	<b>CVM5K</b>	
	<b>CV3</b>	
	<b>CV3K</b>	
	<b>CVS1</b>	
	<b>CH2E</b>	Hydraulic cylinder compliant with JIS standards
	<b>CH2F</b>	
	<b>CH2G</b>	
	<b>CH5H</b>	

# Proposals to Reduce Piping Work

## ■ S coupler / Stainless steel type

Proposal to change the screw-in connections of flexible hoses to S coupler connections

- Fluid: Water, Air
- Operating temperature range:  $-5$  to  $150^{\circ}\text{C}$ 
  - \* Cannot be used with steam
- Body material: Stainless steel 304  
Seal material: Using fluororubber (special FKM)



## ■ S coupler / Made to Order

- Ambient and fluid temperatures:  
 $5$  to  $150^{\circ}\text{C}$
- Seal, O-ring: FKM



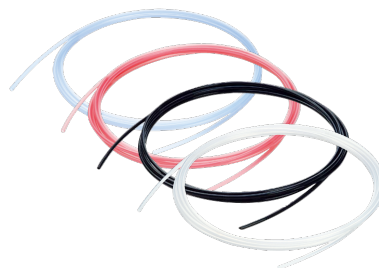
## ■ Fluoropolymer Tubing

Proposal to change steel pipes and flexible hoses to fluoropolymer tubing

### FEP tubing (Fluoropolymer) TH/TH

#### Advantage of changing to fluoropolymer tube

- Can be used where it is not exposed to flame
- Operating temperature range:  $-65$  to  $200^{\circ}\text{C}$   
(Air, Inert gas)
- Easy to change the length
- Lightweight
- Cheaper than steel pipe and flexible hose
- Reduced work labor when mounting the product



#### Piping example for solenoid valves



#### S coupler      Insert fittings



Consider using fluoropolymer tubing in the areas surrounding coke furnaces that are not exposed to flames.



# Recommended Equipment for The Steel Industry

Ironworks / Engineering Plant



## SMC Corporation

Akihabara UDX 15F,  
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN  
Phone: 03-5207-8249 Fax: 03-5298-5362  
<https://www.smcworld.com>  
© 2023 SMC Corporation All Rights Reserved

Specifications are subject to change without prior notice  
and any obligation on the part of the manufacturer.

D-G