2 Search by product series

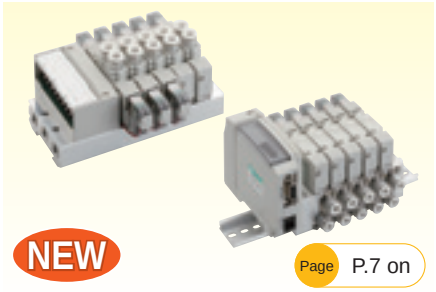
Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

3, 4, 5-port valve (pilot operated)

▶▶▶ P.1 to

Small/medium valve (10/15/18 mm)
Cylinders up to ø100 ■ Power consumption: 0.6 W



NEW

Page P.7 on

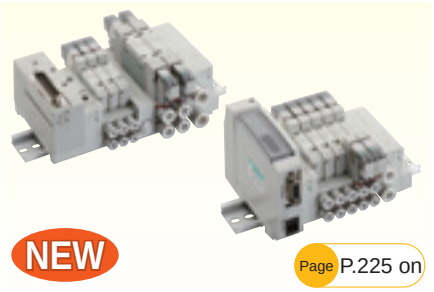
3, 5-port valve equipped with safety function

4GA/4GB

Model No.	No. of Ports	Specifications/port size	Page
Discrete valve			
3GA1 to 3 4GA1 to 3	3 5	Body piping ø4 to ø10, M5, Rc1/8, 1/4	12
3GB1 to 2 4GB1 to 3	3 5	Base piping Rc1/8 to Rc3/8	60
Manifold/metal base (individual wiring/reduced wiring)			
M3GA1 to 3 M4GA1 to 3	3 5	Body piping ø4 to ø10, M5, Rc1/8, 1/4	Individual wiring 96 Reduced wiring 136
M3GB1 to 2 M4GB1 to 3	3 5	Base piping ø4 to Rc1/4	Individual wiring 112 Reduced wiring 158

* G threads and NPT threads are also compatible.

Small/medium valve (10/15/18 mm)
Cylinders up to ø100 ■ Power consumption: 0.6 W



NEW

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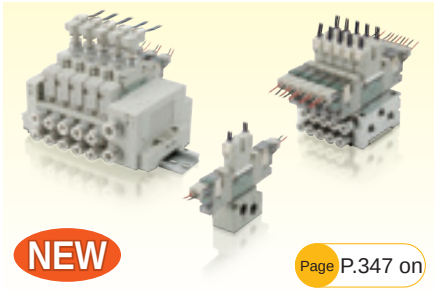
3, 5-port valve equipped with safety function

MN4GA/MN4GB

Model No.	No. of Ports	Specifications/port size	Page
Manifold/block (individual wiring/reduced wiring)			
MN3GA MN4GA	3 5	Body piping ø4 to Rc1/8	Individual wiring 230 Reduced wiring 246
MN3GB MN4GB	3 5	Base piping ø4 to ø8	Individual wiring 238 Reduced wiring 262

* G screws and NPT screws are also compatible.

Small/medium valve (10/15/18 mm)
Cylinders up to ø100 ■ Power consumption: 0.6 W



NEW

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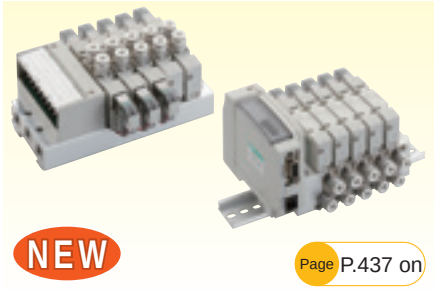
3, 5 port valve with integrated pressure sensor

4GB/M4GB/MN4GB

Model No.	No. of Ports	Specifications/port size	Page
Discrete valve			
3GB1 to 2 4GB1 to 3	3 5	Base piping Rc1/8 to Rc3/8	350
Manifold/metal base (individual wiring/reduced wiring)			
M3GB1 to 2 M4GB1 to 3	3 5	Base piping ø4 to ø10, M5, Rc1/8, 1/4	Individual wiring 356 Reduced wiring 366
Manifold/block (individual wiring/reduced wiring)			
MN3GB1 to 2 MN4GB1 to 3	3 5	Base piping ø4 to ø8	Individual wiring 380 Reduced wiring 386

* G threads and NPT threads are also compatible.

Small/medium valve (10/15/18 mm)
Cylinders up to ø100 ■ Power consumption: 0.6 W



NEW

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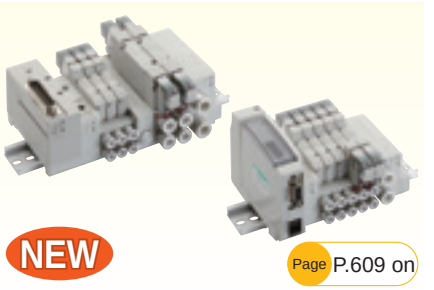
3, 5-port valve equipped with safety function

4GD/4GE

Model No.	No. of Ports	Specifications/port size	Page
Discrete valve			
3GD1 to 3 4GD1 to 3	3 5	Body piping ø4 to ø10, M5, Rc1/8, 1/4	442
3GE1 to 2 4GE1 to 3	3 5	Base piping Rc1/8 to Rc3/8	482
Manifold/metal base (individual wiring/reduced wiring)			
M3GD1 to 3 M4GD1 to 3	3 5	Body piping ø4 to ø10, M5, Rc1/8, 1/4	Individual wiring 508 Reduced wiring 534
M3GE1 to 2 M4GE1 to 3	3 5	Base piping ø4 to Rc1/4	Individual wiring 520 Reduced wiring 554

Small/medium valve (10/15/18 mm)
Cylinders up to ø100 ■ Power consumption: 0.6 W



NEW

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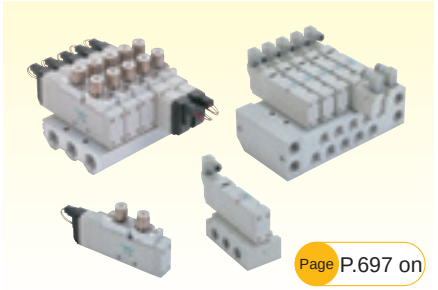
3, 5-port valve equipped with safety function

MN4GD/MN4GE

Model No.	No. of Ports	Specifications/port size	Page
Manifold/block (individual wiring/reduced wiring)			
MN3GD MN4GD	3 5	Body piping ø4 to Rc1/8	Individual wiring 614 Reduced wiring 630
MN3GE MN4GE	3 5	Base piping ø4 to ø8	Individual wiring 622 Reduced wiring 646

Large valve (24 mm)
Cylinders up to ø160 ■ Power consumption: 1.0 W



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Large flow rate 5-port valve

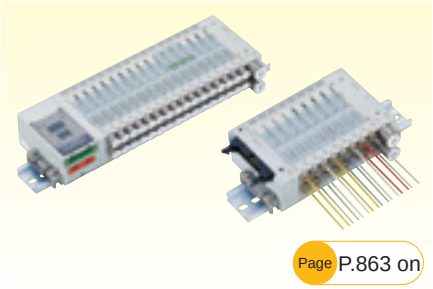
4GA4/4GB4

Model No.	No. of Ports	Specifications/port size	Page
Discrete valve			
4GA4	5	Body piping ø8 to ø12, Rc3/8	704
4GB4	5	Base piping Rc3/8, Rc1/2	716
Manifold/metal base (individual wiring/reduced wiring)			
M4GA4	5	Body piping ø8 to ø12, Rc3/8	Individual wiring 728 Reduced wiring 760
M4GB4	5	Base piping ø8 to ø12, Rc1/4 to Rc1/2	Individual wiring 742 Reduced wiring 776

* G threads and NPT threads are also compatible.

Small valve (7.0/10 mm)

Cylinders up to ø32 ■ Power consumption: 0.4 W and up



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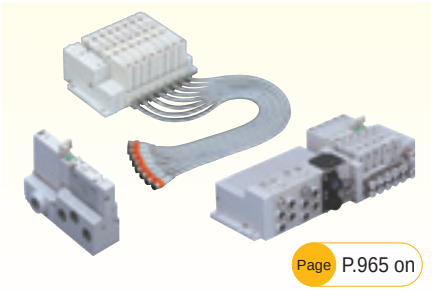
3, 4-port valve with valve height of 40 mm or less

MN3E/MN4E

Model No.	No. of Ports	Specifications/port size	Page
Block manifold (reduced wiring)			
MN3E00 MN4E00	3 4	M3 to ø4	872
Block manifold (individual wiring/reduced wiring)			
MN3E0 MN4E0	3 4	M5 to ø6	896

Medium valve (manifold pitch 16 mm)

Cylinders up to ø80 ■ Power consumption: 0.6 W



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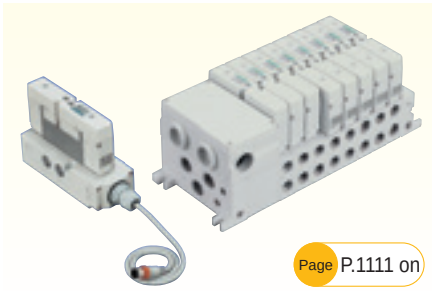
IP65 compatible plug-in block manifold 3, 5-port valve

W4G2

Model No.	No. of Ports	Specifications/port size	Page
Discrete valve			
W4GB2	5	Base piping Rc1/4	972
Individual wiring manifold			
MW3GA2-R1 MW4GA2-R1	3 5	Body piping Rc1/8, ø4 to ø8	976
MW4GB2-R1	5	Base side piping ø4 to ø8	980
MW4GZ2-R1	5	Base bottom piping ø4 to ø8	980
Reduced wiring manifold			
MW3GA2-T* MW4GA2-T*	3 5	Body piping Rc1/8, ø4 to ø8	988
MW4GB2-T*	5	Base side piping ø4 to ø8	1010
MW4GZ2-T*	5	Base bottom piping ø4 to ø8	1010

Large valve (manifold pitch 25 mm)

Cylinders up to ø125 ■ Power consumption: 1.2 W



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IP65 equivalent plug-in manifold 5-port valve

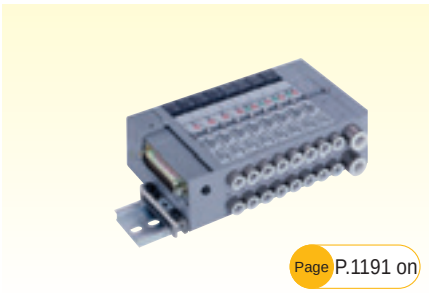
W4G4

Model No.	Specifications/port size	Page
Discrete valve		
W4GB4	Base piping Rc1/4, Rc3/8	1118
W4GZ4	Base piping Rc1/4, Rc3/8	1118
Individual wiring manifold		
MW4GB4-R1	Base side piping ø8 to ø12, Rc1/4 , Rc3/8	1124
MW4GZ4-R1	Base bottom piping Rc1/4, Rc3/8	1124
Reduced wiring manifold		
MW4GB4-T*	Base side piping ø8 to ø12, Rc1/4, Rc3/8	1128
MW4GZ4-T*	Base bottom piping Rc1/4, Rc3/8	1128

* G screws and NPT screws are also compatible.

One-sided solenoid/reduced wiring valve

Cylinders up to ø40 ■ Power consumption: 0.6 W



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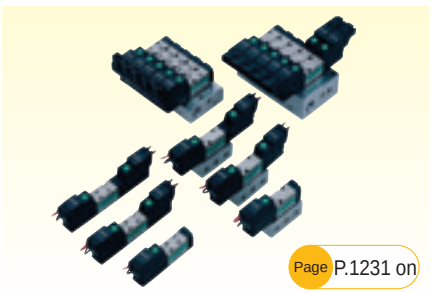
Block manifold 3, 4-port valve

MN3S0/MN4S0 (pneumatic Valve)

Model No.	No. of Ports	Specifications/port size	Page
Block manifold (individual wiring/reduced wiring)			
MN3S0 MN4S0	3 4	DIN rail M5 to ø6	1196
MT3S0 MT4S0	3 4	Direct mounting M5 to ø6	

Small (valve width 10 mm)

Cylinders up to ø25 ■ Power consumption: 0.6 W



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Miniature/space saving 5-port valve

4SA0/4SB0 (small pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
4SA0	Body piping M3, ø4	1236
4SB0	Sub-plate piping M5	
Manifold (individual wiring/reduced wiring)		
M4SA0	Body piping M3, ø4	Individual wiring 1244
M4SB0	Sub-plate piping M5, ø4 to ø6	Individual wiring 1244 Reduced wiring 1248

2 Search by product series

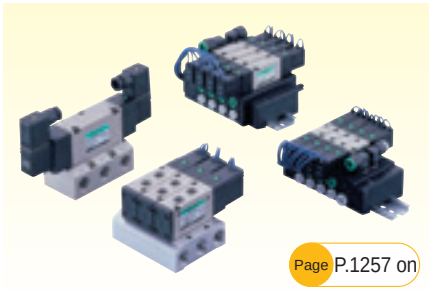
Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

3, 4, 5-port valve (pilot operated)

P.1 to

Small/medium/large valve (valve width 15/18/23/29 mm)
Cylinders up to ø160 ■ Power consumption 1.8 W



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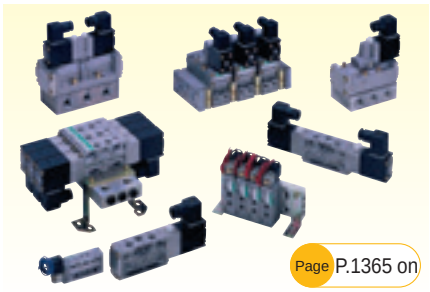
Compact 3, 4, 5-port valve

4KA/4KB (pneumatic valve)

Model No.	No. of Ports	Specifications/port size	Page
Discrete valve			
3KA1 4KA	3 5	Body piping M5 to ø12	1264
4KB	5	Sub-plate piping Rc1/8 to Rc1/2	1282
Individual wiring manifold/metal base			
M3KA1 M4KA	3 5	Body piping M5 to ø12	1298
M4KB	4 5	Sub-plate piping M5 to ø12	1310
Individual wiring manifold/block			
MN4KB	5	Sub-block piping ø4 to ø10	1330

Small/medium/large valve
Cylinders up to ø250 ■ Power consumption: 1.8 to 6 W



Page P.1365 on

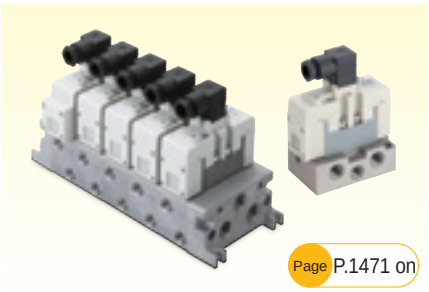
8 series lined-up / 5-port valve

4F (pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
4F0 to 3	Body piping M5, Rp1/8 to Rp3/8	1372
4F4 to 7	Sub-plate piping Rc1/4 to Rc1	1386
Individual wiring manifold		
M4F0 to 3	Body piping M5, Rp1/8 to Rp3/8	1410
M4F4 to 7	Sub-plate piping Rc1/4 to Rc3/4	1438

* A4F0 . . . Model No. for the 4F0 single type.

ISO Standards compliant valve
Cylinders up to ø160 ■ Power consumption: 1.0, 1.2 W



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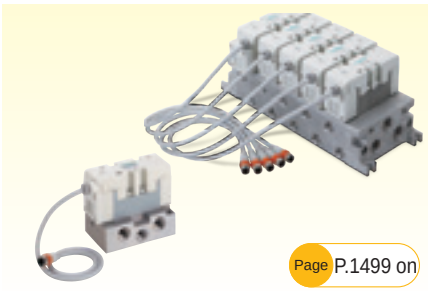
Valve width 38 to 50 mm / 5-port valve

PV5G/GMF (DIN terminal box)

Model No.	Specifications/port size	Page
Discrete valve (sub-plate piping)		
PV5G-6	ISO size 1 Rc1/4, Rc3/8	1472
PV5G-8	ISO size 2 Rc3/8 to Rc3/4	1478
Individual wiring manifold		
GMF1	ISO size 1 Rc1/4, Rc3/8	1484
GMF2	ISO size 2 Rc3/8, Rc1/2	1488
Mix manifold		
GMFZ	ISO sizes 1/2 Mix manifold	1492

ISO Standards compliant valve
Cylinders up to ø160 ■ Power consumption: 1.2 W



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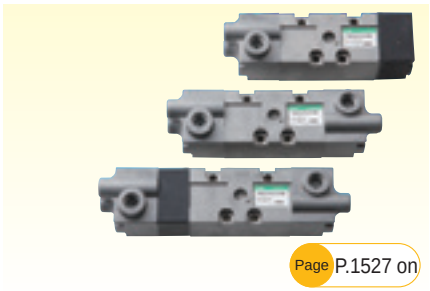
Valve width 38 to 50 mm / 5-port valve

PV5/GMF (I/O connector)

Model No.	Specifications/port size	Page
Discrete valve (sub-plate piping)		
PV5-6R	ISO size 1 Rc1/4, Rc3/8	1500
PV5-8R	ISO size 2 Rc3/8 to Rc3/4	1506
Individual wiring manifold		
GMF1	ISO size 1 Rc1/4, Rc3/8	1512
GMF2	ISO size 2 Rc3/8, Rc1/2	1516
Mix manifold		
GMFZ	ISO sizes 1/2 Mix manifold	1520

ISO compliant master valve
Cylinders up to ø160



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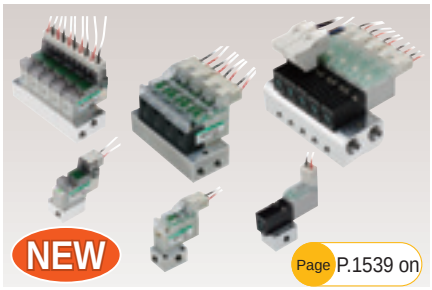
Valve width 38 to 50 mm / 5-port valve

PV5S-0 (ISO compliant master valve)

Model No.	Specifications/port size	Page
PV5S-6-0	Rc1/4, Rc3/8	1528
PV5S-8-0	Rc3/8, Rc1/2, Rc3/4	

3-port valve (direct acting) P.1539 on

Small valve (valve width 10mm)
Cylinders up to ø25 ■ Power consumption: 2.0 to 2.4 W



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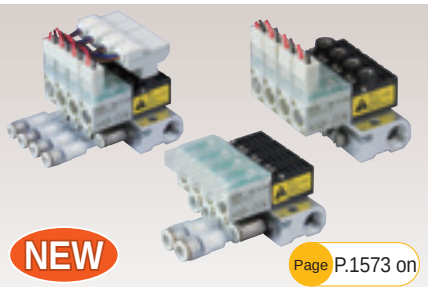
Poppet type 3-port valve

3Q

Model No.	Specifications/port size	Page
■ 3QE		
Discrete valve		
3QE1	Sub-plate piping M5	1546
Individual wiring manifold		
M3QE1	Sub-plate side piping M5	1546
M3QZ1	Sub-plate rear piping M5	
■ 3QB		
Discrete valve		
3QB1	Sub-plate piping M5	1552
Individual wiring manifold		
M3QB1	Sub-plate piping M5	1552
■ 3QRA/3QRB		
Discrete valve		
3QRA1	Body piping M5	1558
3QRB1	Sub-plate piping M5	
Individual wiring manifold		
M3QRA1	Body piping M5 to Rc1/8	1558
M3QRB1	Sub-plate piping M5 to Rc1/8	

Small valve (valve width 10mm)
Cylinders up to ø25 ■ Power consumption: 2.0 to 2.4 W



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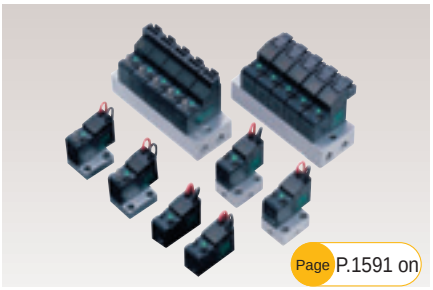
Poppet type 3-port valve

MV3QRA/MV3QRB

Model No.	Specifications/port size	Page
MV3QRA1	Body piping M5Nø6	1576
MV3QRB1	Sub-plate piping M5Nø6	

Small valve (valve width 10mm)
Cylinders up to ø16 ■ Power consumption: 0.6 W



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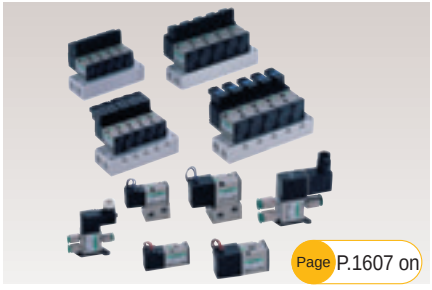
Poppet type 3-port valve

3MA0/3MB0 (small pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
3MA0	Body piping ø4	1594
3MB0	Sub-plate piping M3	
Individual wiring manifold		
M3MA0	Body piping ø4	1596
M3MB0	Sub-plate piping ø4, ø6, M3, M5	

2, 3-port valve (pilot operated) P.1633 on

Small valve (valve width 15/22 mm)
Cylinders up to ø40 ■ Power consumption: 1.8 W



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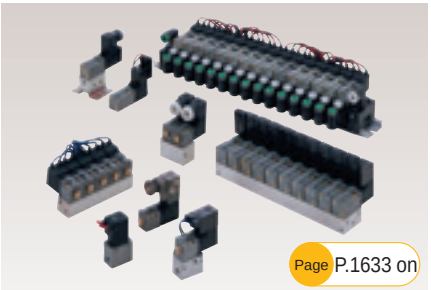
Pressure balance poppet valve

3PA/3PB (pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
3PA	Body piping M5 to Rc1/8	1612
3PB	Sub-plate piping Rc1/8 to Rc1/4	
Individual wiring manifold		
M3PA	Body piping M5 to Rc1/4	1620
M3PB	Sub-plate piping Rc1/8 to Rc1/4	

Small valve (valve width 15 mm)
Port size M5, Rc1/8, ø4 ■ Power consumption 1.8 W



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Poppet type 2, 3, 5-port valve

P/M/B (miniature pneumatic valve)

Model No.	Specifications/port size	Page
W2P513	Two 3-port valves integrated M5	1638
P512* P513* P5142	No sub-base	
M512* M513*	Sub-base M5	
B512* B513* B5142	Sub-base M5	
Individual wiring manifold		
B*P51**	Sub-base M5, Rc1/8	1654
Block manifold		
N*P51**	Sub-block ø4	1660

Large flow rate
Port size Rc3/8 to Rc2 ■ Power consumption 4 to 8 W / DC

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3-port pneumatic/low-vacuum valve

NP/NAP/NVP

Model No.	Specifications/port size	Page
NP13/14	Internal pilot solenoid valve Rc3/8 to Rc2	1676
NAP11	Internal pilot air operated Rc3/8 to Rc2	1682
NVP11	External pilot solenoid valve Rc3/8 to Rc2	1686

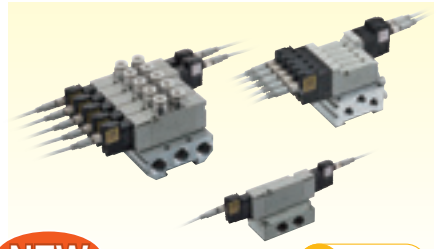
2 Search by product series

Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

Explosion-proof P.1697 on

Small/medium/large valve (10/15/18/24 mm)
Cylinders up to ø160 ■ Power consumption: 0.6 W



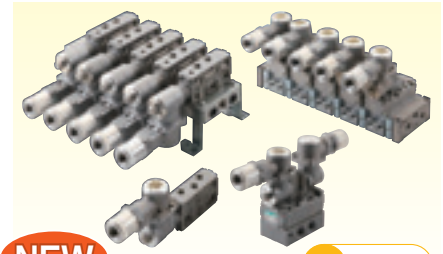
NEW Page P.1697 on

Intrinsically safe explosion-proof performance Ex ib II C T4 Gb

4GD/4GE*0EJ

Model No.	No. of ports	Specifications/port size	Page
Discrete valve			
3GD1 to 2*0EJ 4GD1 to 4*0EJ	3 5	Body piping ø1.8 to ø12, M5, Rc1/8 to Rc3/8	1700
3GE1 to 2*0EJ 4GE1 to 4*0EJ	3 5	Base piping Rc1/8 to Rc1/2	1720
Individual wiring manifold			
M3GD1 to 2*0EJ M4GD1 to 4*0EJ	3 5	Body piping ø1.8 to ø12, M5, Rc1/8 to Rc3/8	1740
MN3GE1 to 2*0EJ MN4GE1 to 3*0EJ	3 5	Base piping ø1.8 to ø12, M5, Rc1/8 to Rc1/2	1748

Pilot operated 5-port valve
Cylinders up to ø250 ■ Power consumption: 4 to 4.5 W



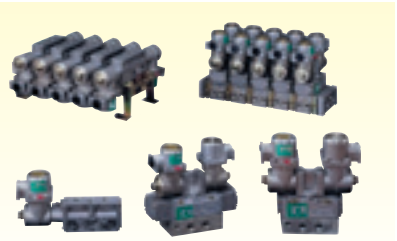
NEW Page P.1779 on

Pressure and explosion-proof performance Exd II BT4

4F**0EX (pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
4F3*0EX	Body piping Rp1/4 to Rp3/8	1782
4F$^{4}_{7}$*0EX	Sub-plate piping Rc1/4 to Rc1	1782
Manifold		
M4F3*0EX	Body piping Rp1/4 to Rp3/8	1794
M4F$^{4}_{7}$*0EX	Sub-plate piping Rc1/4 to Rc3/4	1794

Pilot operated 5-port valve
Cylinders up to ø250 ■ Power consumption: 4 to 4.5 W



Page P.1807 on

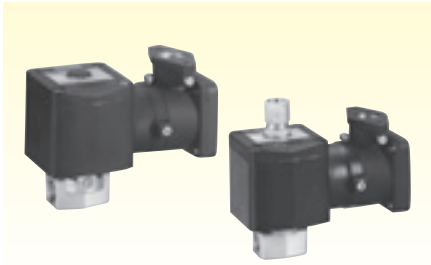
Pressure and explosion proof enclosure d2G4 type

4F**0E (pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
4F3*0E	Body piping Rp1/4 to Rp3/8	1810
4F$^{4}_{7}$*0E	Sub-plate piping Rc1/4 to Rc1	1810
Manifold		
M4F3*0E	Body piping Rp1/4 to Rp3/8	1824
M4F$^{4}_{7}$*0E	Sub-plate piping Rc1/4 to Rc3/4	1824

Explosion-proof 2, 3-port valve General Purpose Valves

Direct acting poppet type 2, 3-port valve
■ Power consumption: 6.7 to 17 W (60 Hz)

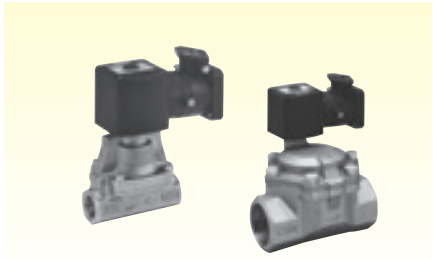


Pressure and explosion proof enclosure d2G4/d2G2 type

AB/AG (general purpose valve)

Model No.	Port size	Page
2-port valve		
AB4*E4	Rc1/4, Rc3/8	General Purpose Valves
AB41E2	Rc1/4, Rc3/8	
AB41E4-Z	Rc1/4, Rc3/8	
3-port valve		
AG4*E4	Rc1/4, Rc3/8	General Purpose Valves
AG4*E4-Z	Rc1/4, Rc3/8	

Pilot operated poppet type 2-port valve
■ Power consumption: 6.7 to 17 W (60 Hz)

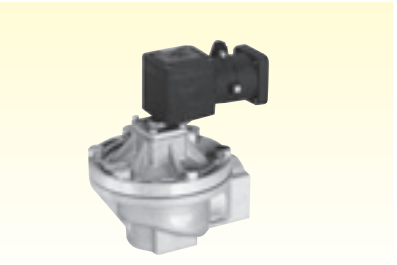


Pressure and explosion proof enclosure d2G4/d2G2 type

AD/AP (general purpose valve)

Model No.	Port size	Page
AP**E4	Rc 1/2 to 50 flange	General Purpose Valves
AD**E4	Rc 1/2 to 50 flange	
ADK**E4	Rc1/2 to Rc1	
AP**E2	Rc 1/2 to 50 flange	

Poppet type 2-port valve
■ Power consumption: 7 W (60 Hz)



Pressure and explosion proof enclosure d2G4 type for air blow

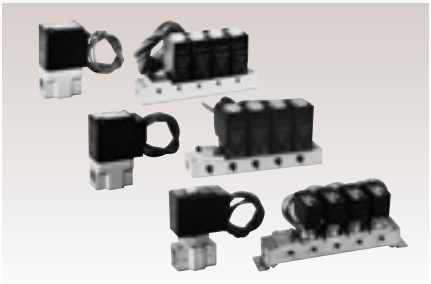
PDVE4 (pulse-jet valve)

Model No.	Port size	Page
PDVE4	Rc3/4 to Rc2	General Purpose Valves

2, 3-port valve (air blow type) ▶▶▶ General Purpose Valves

Compact poppet valve

■ Power consumption: 3 to 11.5 W/DC



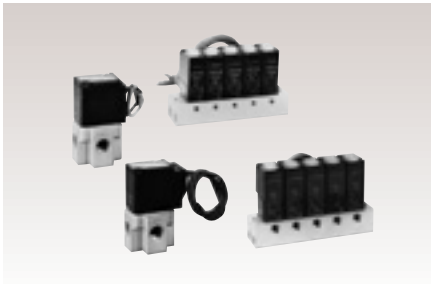
Direct acting 2-port valve by target fluid

FA/FG/FV (special purpose valve)

Model No.	Working fluid/port size	Page
Discrete valve		
FAB	For compressed air M5 to Rc1/2	General Purpose Valves
FGB	For dry air Rc1/8 to 1/2	
FVB	For medium vacuum Rc1/8 to 1/2	
Manifold		
GFAB	For compressed air M5 to Rc3/8	General Purpose Valves
GFGB	For dry air M5 to Rc3/8	
GFVB	For medium vacuum M5 to Rc3/8	

Compact poppet valve

■ Power consumption: 3 to 11.5 W/DC



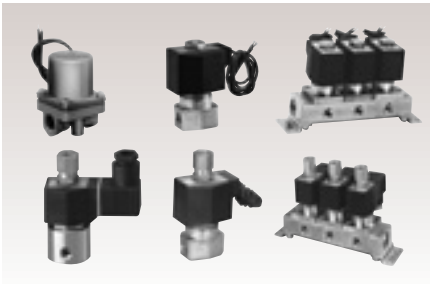
Direct acting 3-port valve by target fluid

FA/FG (special purpose valve)

Model No.	Working fluid/port size	Page
Discrete valve		
FAG	For compressed air M5 to Rc3/8	General Purpose Valves
FGG	For dry air Rc1/8 to 3/8	
Manifold		
GFAG	For compressed air M5 to Rc1/4	General Purpose Valves
GFGG	For dry air Rc1/8 to 1/4	

Compact poppet valve

■ Power consumption: 3.8 to 11 W (60 Hz)



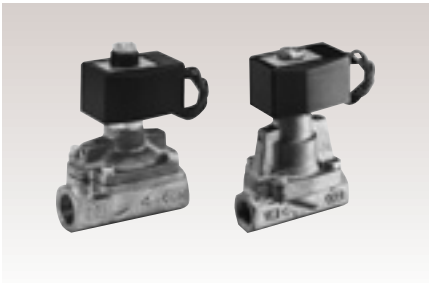
General purpose direct acting 2, 3-port valve

AB/AG (general purpose valve)

Model No.	Port size	Page
Discrete valve/2-port valve		
AB	Rc1/8 to Rc1/2	General Purpose Valves
Manifold/2-port valve		
GAB	Rc1/4	
Discrete valve/large bore size 2-port valve		
AB71	Rc1/2 to Rc1	
Discrete valve/3-port valve		
AG	Rc1/8 to Rc3/8	
Manifold/3-port valve		
GAG	Rc1/8 to Rc3/8	

Large poppet type

■ Power consumption: 3.8 to 48W (60 Hz)



General purpose pilot operated 2-port valve

AD/AP (general purpose valve)

Model No.	Port size	Page
Piston drive		
AP11/12	8A to 25 A	General Purpose Valves
AP21/22	Rc1 1/4 to 50 flange	
Diaphragm drive		
AD11/12	8 A to 25 A	
AD21/22	Rc1 1/4 to 50 flange	
Pilot kick piston drive		
APK11/21	Rc 1/4 to 50 flange	
Pilot kick diaphragm drive		
ADK11/12/21	Rc 1/4 to 50 flange	

Miniature poppet valve

■ Power consumption 0.6 W (DC)

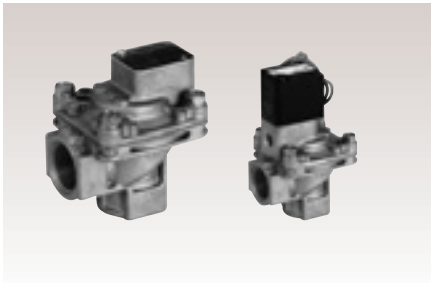
2-port valve for air blow

EXA

Model No.	Port size	Page
Pilot operated		
EXA	ø6 to ø12	General Purpose Valves

Medium poppet type

■ Power consumption: 3.4 to 10W (60 Hz)



Pilot operated 2-port valve for large flow rate air blow

PD/PDV (pulse-jet valve)

Model No.	Port size	Page
Air operated valve		
PD3	Rc3/4 to Rc3	General Purpose Valves
PD2	Rc2	
Solenoid valve		
PDV3	Rc3/4 to Rc3	
PDV2	Rc2	
Multiple-series solenoid valve for PD3 operation (direct acting)		
PJVB	Rc1/8, Rc1/4	
Controller for pulsejet valve		
OMC2	Output step No.: 6, 10	

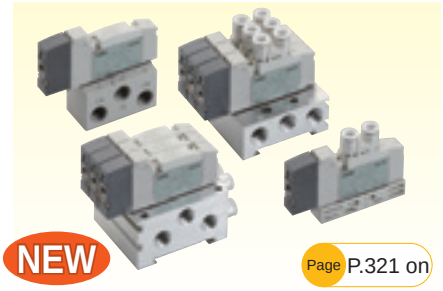
2 Search by product series

Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

Master valve

3, 5-port valve
Cylinders of ø20 to ø100



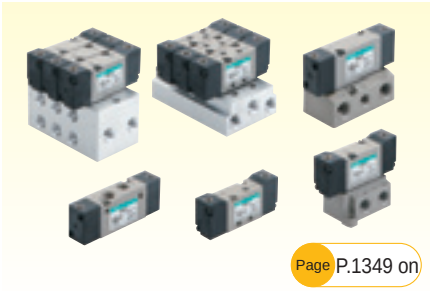
NEW

Page P.321 on

4G

Model No.	Specifications/port size	Page
Discrete valve		
3GA 4GA	Body piping ø4 to Rc1/4	324
4GB	Base piping Rc1/8 to Rc3/8	334
Manifold		
M3GA M4GA	Body piping ø4 to Rc1/4	324
M4GB	Base piping ø4 to Rc1/4	334

3, 5-port valve
Cylinders of ø20 to ø160

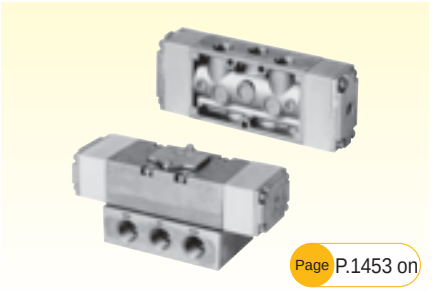


Page P.1349 on

4K (pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
3KA1 4KA	Body piping M5 to ø12	1350
4KB	Sub-plate piping Rc1/8 to Rc1/2	1356
Manifold		
M3KA1 M4KA	Body piping M5 to ø12	1350
M4KB	Sub-plate piping M5 to ø12	1356

5-port valve
Cylinders of ø10 to ø250



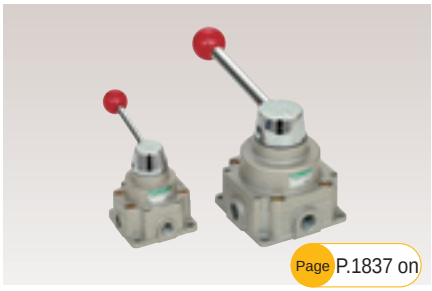
Page P.1453 on

4F (pneumatic valve)

Model No.	Specifications/port size	Page
Discrete valve		
4F0 to 3	Body piping	1454
4F4 to 7	Sub-plate piping	
Manifold		
(A)M4F0 to 3	Body piping	1454
M4F4 to 7	Sub-plate piping	

Manual selector valve

Manual override switching 4-port valve
Cylinders of ø20 to ø160



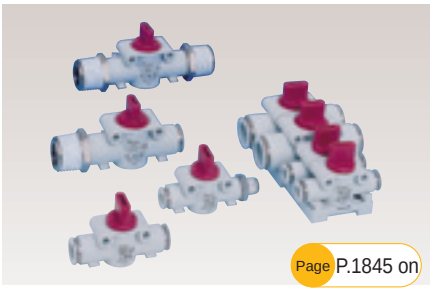
Page P.1837 on

Slide valve, manual switching valve

HMV/HSV

Model No.	Port size	Page
HMV	Miniature Rc1/4	1840
HSV	Standard Rc1/4 to 3/4	1840

With push-in fitting



Page P.1845 on

Quick valve

2QV/3QV

Model No.	Port size	Page
2QV	2-way valve	1846
3QV	3-way valve	

Related products

ø25 to ø125 cylinder

Page P.1855 on

Shock absorbing valve

SKH

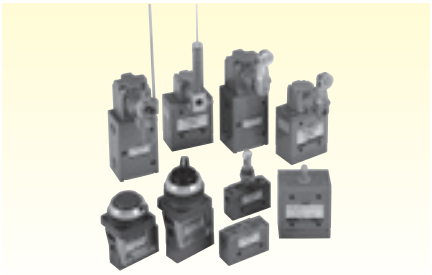
Model No.	Specifications	Page
SKH	Variable speed unit	1858
SKH	Deceleration unit	
SKH	Single-side deceleration unit	

Related products

Page P.1875 on

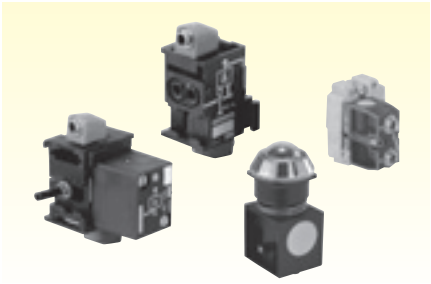
Silencer

Series	Piping bore size	Page
Metering valve with silencer		
SMW2	R1/8, 1/4	1878
FMS	M5	1880
SMW	R3/8, 1/2	
Small bore size		
SL	M5	1882
Resin body		
SLW	R1/8, 1/4, 3/8, 1/2	1882
SLW-*A-H	R1/4, 3/8, 1/2	1884
Large flow rate/small bore size/resin body		
SLW-*L	R1/4, 3/8	1885
High noise reduction/compact		
SLW-*S	R1/8, 1/4	1886
	R3/4	1887
Push-in		
SLW-H	R1/4, 3/8, 1/2	1888
Miniature		
SLM	M3, M5	1889
Aluminum body		
SL	R1/4 to 2	1890
Outdoor Series NEW		
SL-W	Rc1/4, 3/8, 1/2	1892
Exhaust cleaner		
FA*31	Rc3/8 to 2	1896



Total air systems
[Total air systems]

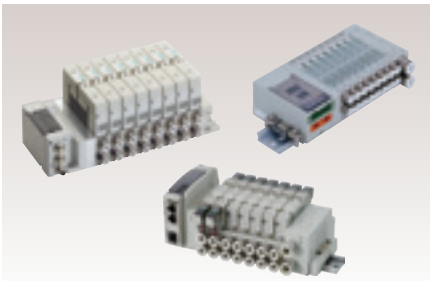
Model No.	Specifications/port size	Page
Detector (mechanical valve)		1901
MS	Small Rc1/8, ø4	
MM	Medium Rc1/8, ø4	
MAVL	Large Rc1/4	
Circuit device (logic valve)		
ø4		



Total air systems
[Gamma system]

	Page
PLC components	1943
Signal control components	

Serial transmission system



Model No.	Specifications	Page
OPP2	Degree of protection (IP64)	Intro Page 31
OPP3	Flat cable compatible device unit	
OPP4	Thin shape	
OPP5	Degree of protection (IP65) I/O block compatible	
OPP6	Miniature 32 point compatible	
NEW OPP7	Thin 32 point compatible	
NEW OPP8	Thin 32 point compatible (IP65)	

Recommended alternative products

Production of the series below has been discontinued.
Select recommended alternative products instead.

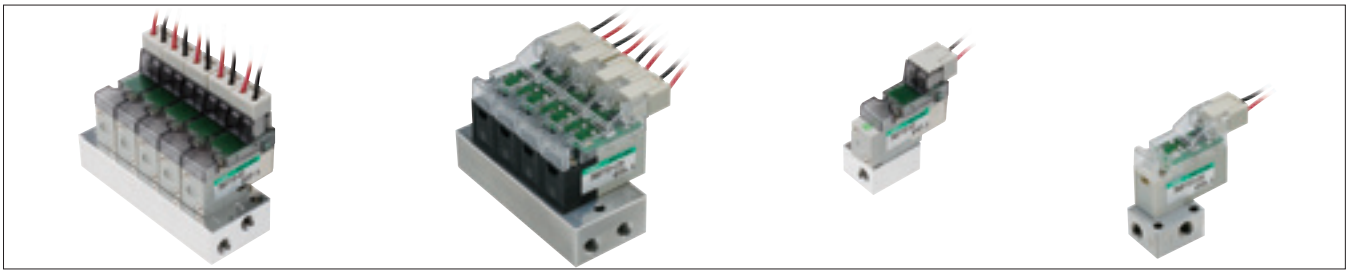
Discontinued	Recommended alternative product
■ 3, 5-port pilot operated valve (small pneumatic valve) **4SA1/4SB1** Series	■ Pilot operated 3, 5-port valve **4G R** Series
■ Direct acting 3, 5-port valve **FS/FD** Series	■ Pilot operated 5-port valve **4F** Series
■ Pilot operated 5-port valve (ISO valve) **CMF** Series	■ Pilot operated 5-port valve (ISO valve) **GMF** Series
■ Pilot operated 3, 5-port valve **4G** Series	■ Pilot operated 3, 5-port valve **4G R** Series
■ Pilot operated 4, 5-port valve **4TB** Series	■ Pilot operated 3, 5-port valve (plug-in manifold) **W4G** Series
■ Pilot operated 5-port valve **4L2** Series	■ Pilot operated 3, 5-port valve (plug-in manifold) **W4G** Series

New products

The new series below are now available.

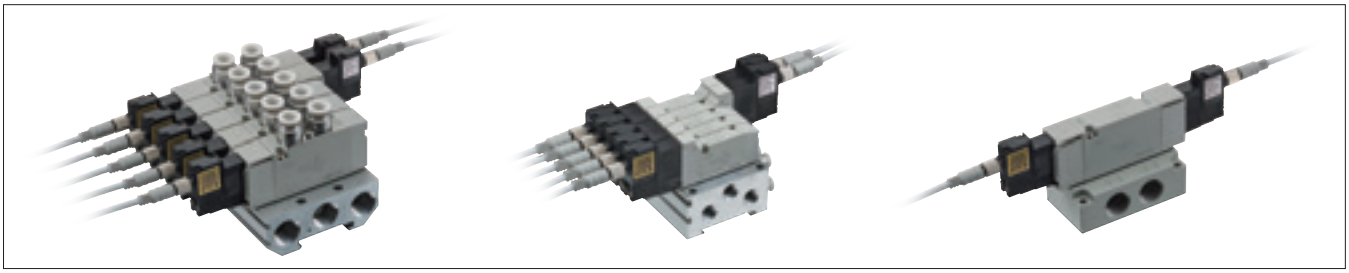
■ Poppet 3-port valve

3QE/3QB Series



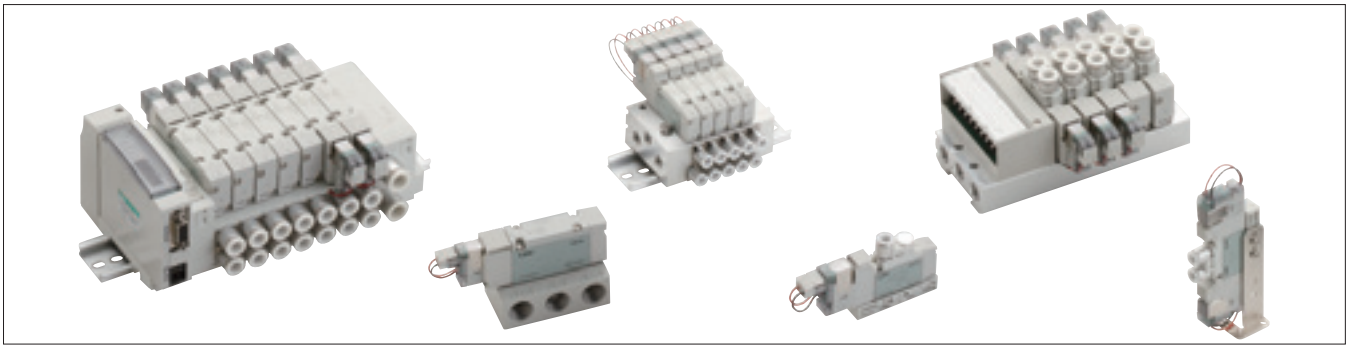
■ Intrinsically safe explosion-proof pilot operated 3, 5-port valve

4GD/4GE Series



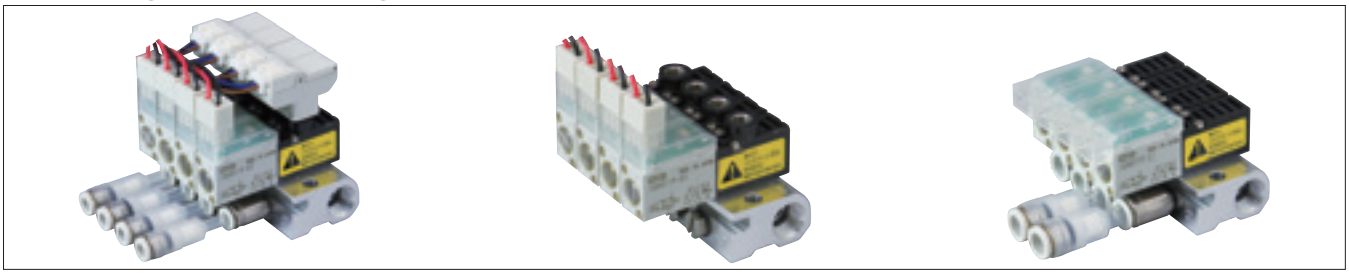
■ Pilot operated 3, 5-port valve

4GA/B/4GD/ER Series



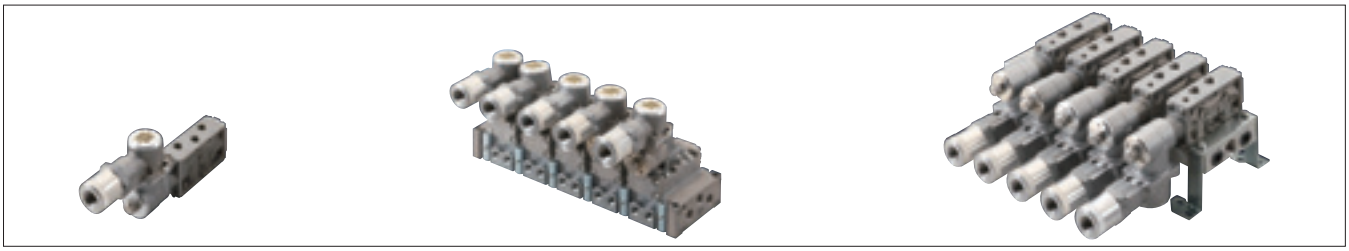
■ 3QR negative pressure switching unit

MV3QRA1/MV3QRB1 Series



■ Pilot operated explosion-proof 5-port valve

4F0EX** Series



Guide to CKD's CAD data

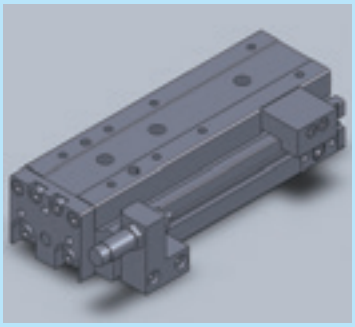
How to use CKD's CAD data

CKD's CAD data is provided as follows for your use in CAD design.

2D CAD data

Types of compatible CAD
- DXF
- Dedicated CAD types

3D CAD data



Types of compatible CAD
- DXF
- IGES
- SAT
- Parasolid
- Dedicated CAD types

Homepage

Catalog PDFs and CAD data of CKD products are available for download.

https://www.ckd.co.jp/en/

For PDF and DXF data of the general catalogs

CKD Website Component Products > Materials: Download digital catalogs/catalog PDFs

For PDF and DXF data of new products

CKD Website Component Products > Search for a product from the product list

For 2D/3D CAD data

CKD Website Component Products > Materials: Download 2D CAD data/3D CAD data

Guide to the model selection system

How to use the model selection system

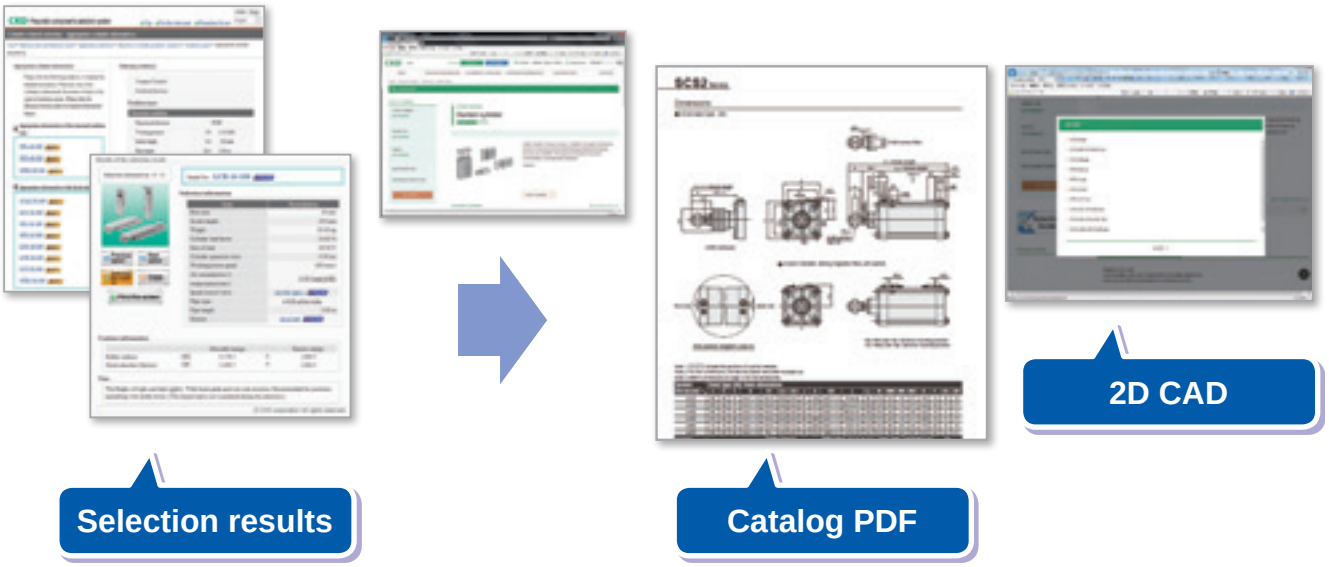
The CKD system supports selection of the following items. For your use during model selection and design.

Available on our website

This system is used to select products according to your application and working conditions.

*Downloading Software may not be possible due to your security settings. If that is the case, contact CKD.

Selection results are linked with catalog PDFs and CAD data!



Registration not required - available at any time!

A variety of services such as CKD product catalogs, PDFs, CAD data, and model selection are available. Feel free to try them.

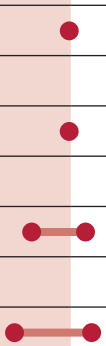
https://www.ckd.co.jp/en/

3 Search by flow characteristics C

Ideal model with flow characteristics C can be selected.

Port	Series	Wiring method: Single unit	Wiring method: Manifold: Individual wiring	Wiring method: Manifold: Reduced wiring	Model No.	Port size	Flow characteristics C [dm³/(bar)] 0 0.2 0.4 0.6 / Eff. X-sectional area (mm²) 0 1 2 3
2-port	Pilot operated 2-port miniature pneumatic valve P512* B512* M512* B*P512* N*P512*	●			P512*	-	
		●			B512*	M5, Rc1/8	
		●			M512*	M5	
			●		B*P512*	M5, Rc1/8	
			●		N*P512*	ø4 Push-in fitting	
3-port	Direct acting 3-port small pneumatic valve 3M Series	●			3MA0	ø4 Barbed fitting (M3)	
		●			3MB0	M3	
			●		M3MA0	ø4 Barbed fitting (M5)	
			●		M3MB0	M3, M5 ø4 Push-in fitting ø4, ø6 Barbed fitting	
	Pilot operated 3-port miniature pneumatic valve P513* B513* M513* B*P513* N*P513*	●			P513*	-	
		●			B513*	M5x0.8, Rc1/8	
		●			M513*	M5	
			●		B*P513*	M5, Rc1/8	
			●		N*P513*	ø4 Push-in fitting	
	Direct acting 3-port valve 3QE Series	●			3QE1	M5	
			●		M3QE1	M5	
			●		M3QZ1	M5	
	Direct acting 3-port valve 3QB Series	●			3QB1	M5	
			●		M3QB1	M5	
	Direct acting 3-port valve 3QR Series	●			3QRA1	M5	
		●			3QRB1	M5	
			●		M3QRA1	M5, Rc1/8	
			●		M3QRB1	M5, Rc1/8	
	Direct acting 3-port valve MV3QR Series		●		MV3QRA1	M5 ø4, ø6 Push-in fitting	
			●		MV3QRB1	M5 ø4, ø6 Push-in fitting	
	Direct acting 3-port pneumatic valve 3P Series	●			3PA1	M5 ø4, ø6 Push-in fitting	
		●			3PA2	Rc1/8 ø6, ø8 Push-in fitting	
		●			3PB1	Rc1/8	
		●			3PB2	Rc1/8, Rc1/4	
			●		M3PA1	M5 ø4, ø6 Push-in fitting	
			●		M3PA2	Rc1/8 ø6, ø8 Push-in fitting	
			●		M3PB1	Rc1/8, ø4, ø6 Push-in fitting	
			●		M3PB2	Rc1/8, ø6, ø8 Push-in fitting	

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: The port sizes listed are representative examples.

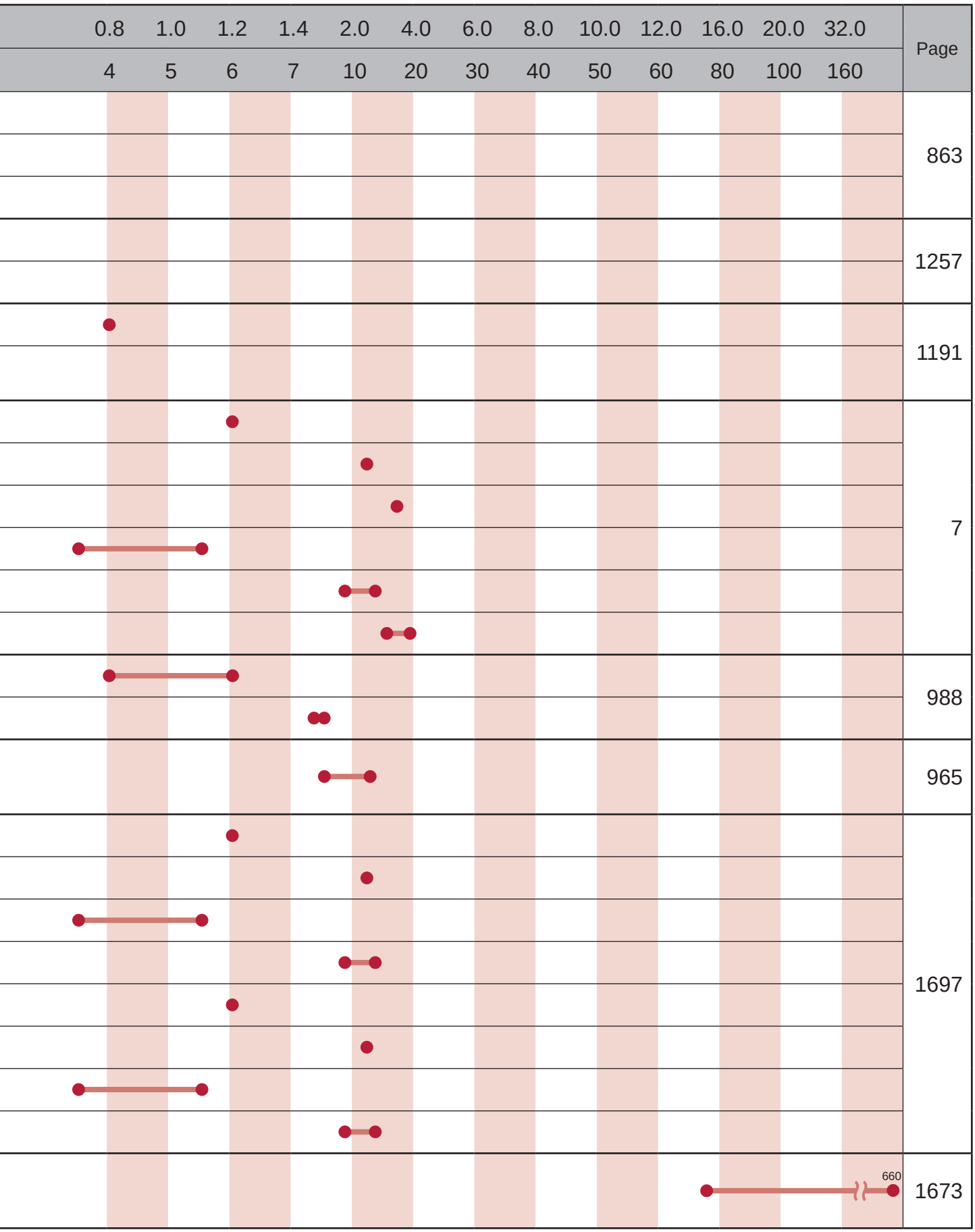
0.8	1.0	1.2	1.4	2.0	4.0	6.0	8.0	10.0	12.0	16.0	20.0	32.0	Page
4	5	6	7	10	20	30	40	50	60	80	100	160	
													1633
													1591
													1633
													1546
													1552
													1558
													1576
													1607

3 Search by flow characteristics C

Ideal model with flow characteristics C can be selected.

Port	Series	Wiring method: Single unit	Wiring method: Manifold: Individual wiring	Wiring method: Manifold: Reduced wiring	Model No.	Port size	Flow characteristics C [dm³/(bar)] 0 0.2 0.4 0.6 / Eff. X-sectional area (mm²) 0 1 2 3
3-port	Pilot operated 3-port valve MN3E Series			●	MN3E00	M3 ø1.8, ø3, ø4	
			●	●	MN3E0	M5 ø1.8, ø4, ø6 Push-in fitting	
			●	●	Two 3-port valves integrated MN3E0	M5 ø1.8, ø4, ø6 Push-in fitting	
	Pilot operated 3-port pneumatic valve 4K Series	●			3KA1	M5 ø4, ø6 Push-in fitting	
			●		M3KA1	M5 ø4, ø6 Push-in fitting	
	Pilot operated 3-port pneumatic valve MN4S0 Series		●	●	MN3S0 MT3S0	M5 ø4, ø6 Push-in fitting	
			●	●	Two 3-port valves integrated MN3SO MT3SO	M5 ø4, ø6 Push-in fitting	
	Pilot operated 3-port valve 4G Series	●			3G$^{A}_{D}$1	M5 ø1.8, ø4, ø6 Push-in fitting	
		●			3G$^{A}_{D}$2	Rc1/8,1/8NPT,G1/8 ø4, ø6, ø8 Push-in fitting	
		●			3G$^{A}_{D}$3	Rc1/4, 1/4NPT, G1/4 ø6, ø8, ø10 Push-in fitting	
			●	●	M3G$^{A}_{D}$1	M5 ø1.8, ø4, ø6 Push-in fitting	
			●	●	M3G$^{A}_{D}$2	Rc1/8, 1/8NPT, G1/8 ø4, ø6, ø8 Push-in fitting	
			●	●	M3G$^{A}_{D}$3	Rc1/4, 1/4NPT, G1/4 ø6, ø8, ø10 Push-in fitting	
			●	●	MN3G$^{A}_{D}$1	M5 ø1.8, ø4, ø6 Push-in fitting	
			●	●	MN3G$^{A}_{D}$2	Rc1/8, 1/8NPT, G1/8 ø4, ø6, ø8 Push-in fitting	
	Pilot operated 3-port valve W4G2 Series			●	MW3GA2	Rc1/8 ø4, ø6, ø8 Push-in fitting	
	Intrinsically safe explosion-proof pilot operated 3-port valve 3GD/E EJ Series	●			3GD1	M5 ø1.8, ø4, ø6 Push-in fitting	
		●			3GD2	Rc1/8 ø4, ø6, ø8 Push-in fitting	
			●		M3GD1	M5 ø1.8, ø4, ø6 Push-in fitting	
			●		M3GD2	Rc1/8 ø4, ø6, ø8 Push-in fitting	
		●			3GE1	Rc1/8	
		●			3GE2	Rc1/4	
			●		M3GE1	M5 ø1.8, ø4, ø6 Push-in fitting	
			●		M3GE2	Rc1/8 ø4, ø6, ø8 Push-in fitting	
	Large flow rate 3-port valve NP Series	●			NP13 NP14 NAP11 NVP11	Rc3/8 to Rc2	

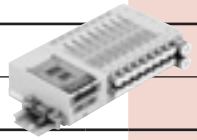
*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: The port sizes listed are representative examples.

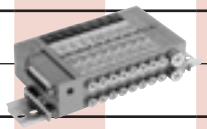


3 Search by flow characteristics C

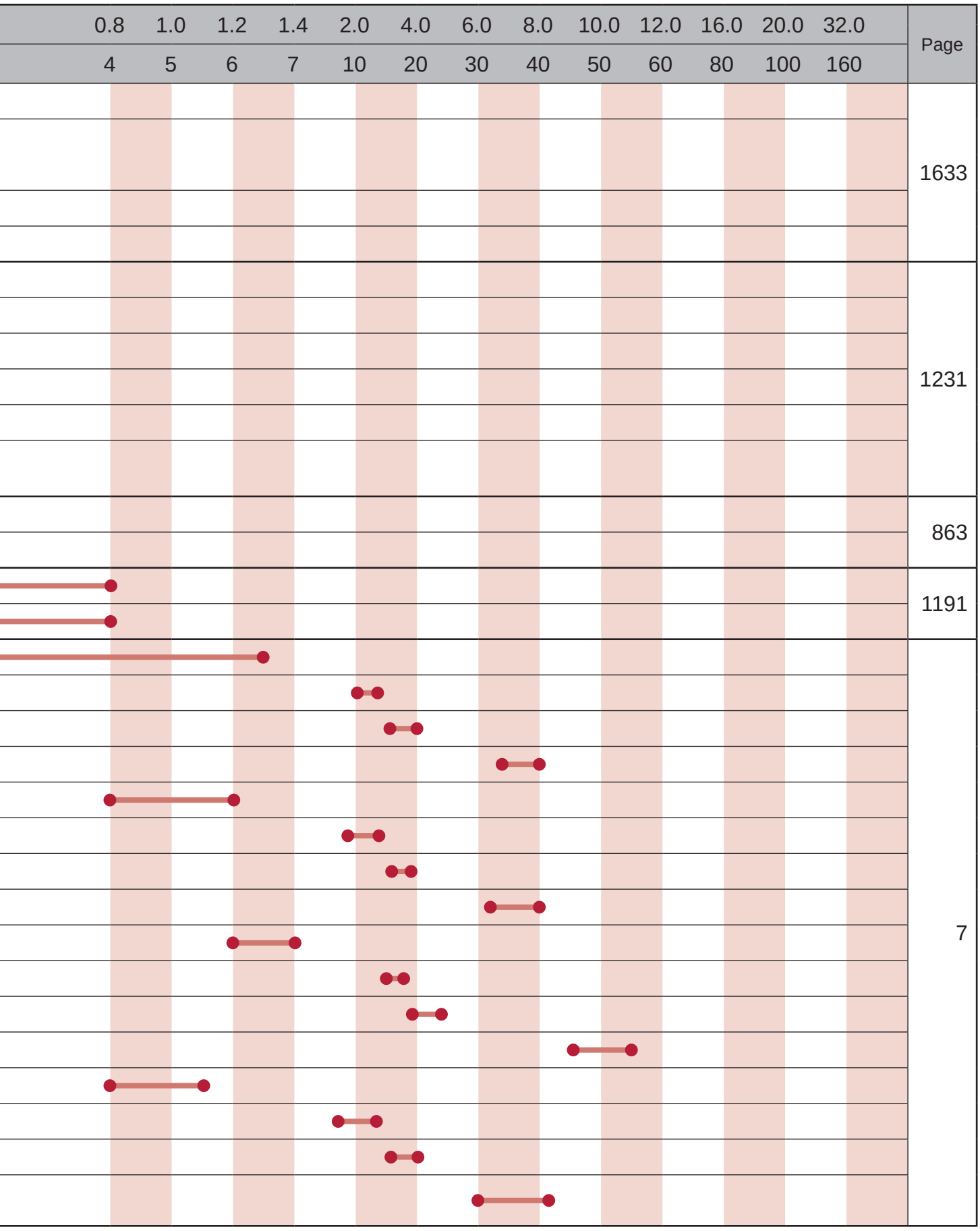
Ideal model with flow characteristics C can be selected.

Port	Series	Wiring method: Single unit	Wiring method: Manifold: Individual wiring	Wiring method: Manifold: Reduced wiring	Model No.	Port size
4, 5-port valve	Pilot operated 5-port miniature pneumatic valve P514* B514* W2P513* B*P514* N*P514*	●			W2P513*	M5
		●			P5142	_
		●			B5142	M5
			●		B*P5142	M5 Rc1/8
			●		N*P5142	ø4 Push-in fitting
	Pilot operated 5-port small pneumatic valve 4S0 Series	●			4SA0	M3
						ø4 Barbed fitting
		●			4SB0	M5
			●		M4SA0	M3
						ø4 Barbed fitting
			●	●	M4SB0	M5 ø4 Push-in fitting ø4, ø6 Barbed fitting
	Pilot operated 4-port valve MN4E Series			●	MN4E00	M3 ø1.8, ø3, ø4
			●	●	MN4E0	M5 ø1.8, ø4, ø6 Push-in fitting
	Pilot operated 4-port pneumatic valve MN4S0 Series		●	●	MN4S0	M5 ø4, ø6 Push-in fitting
			●	●	MT4S0	
	Pilot operated 5-port valve 4G Series	●			$4G^{A}_{D}1$	M5 ø1.8, ø4, ø6 Push-in fitting
		●			$4G^{A}_{D}2$	Rc1/8, 1/8NPT, G1/8 ø4, ø6, ø8 Push-in fitting
		●			$4G^{A}_{D}3$	Rc1/4, 1/4NPT, G1/4 ø6, ø8, ø10 Push-in fitting
		●			$4G^{A}_{D}4$	Rc3/8, 3/8NPT, G3/8 ø8, ø10, ø12 Push-in fitting
			●	●	$M4G^{A}_{D}1$	M5 ø1.8, ø4, ø6 Push-in fitting
			●	●	$M4G^{A}_{D}2$	Rc1/8, 1/8NPT, G1/8 ø4, ø6, ø8 Push-in fitting
			●	●	$M4G^{A}_{D}3$	Rc1/4, 1/4NPT, G1/4 ø6, ø8, ø10 Push-in fitting
			●	●	M4GA4	Rc3/8, 3/8NPT, G3/8 ø8, ø10, ø12 Push-in fitting
		●			$4G^{B}_{E}1$	Rc1/8, 1/8NPT, G1/8
		●			$4G^{B}_{E}2$	Rc1/4, 1/4NPT, G1/4
		●			$4G^{B}_{E}3$	Rc1/4, 1/4NPT, G1/4 Rc3/8, 3/8NPT, G3/8
			●	●	4GB4	Rc3/8, 3/8NPT, G3/8 Rc1/2, 1/2NPT, G1/2
			●	●	$M4G^{B}_{E}1$	M5 ø1.8, ø4, ø6 Push-in fitting
			●	●	$M4G^{B}_{E}2$	Rc1/8, 1/8NPT, G1/8 ø4, ø6, ø8 Push-in fitting
			●	●	$M4G^{B}_{E}3$	Rc1/4, 1/4NPT, G1/4 ø6, ø8, ø10 Push-in fitting
			●	●	M4GB4	1/4(RC, NPT, G), 3/8(RC, NPT, G), 1/2(RC, NPT, G) ø8, ø10, ø12 push-in fitting



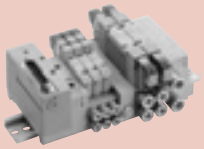
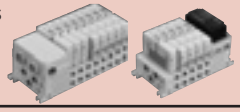
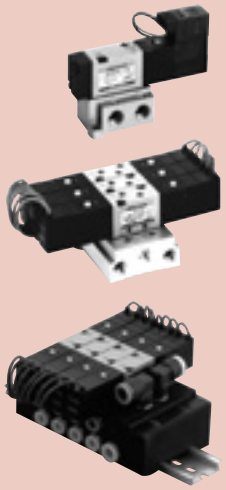


*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: The port sizes listed are representative examples.

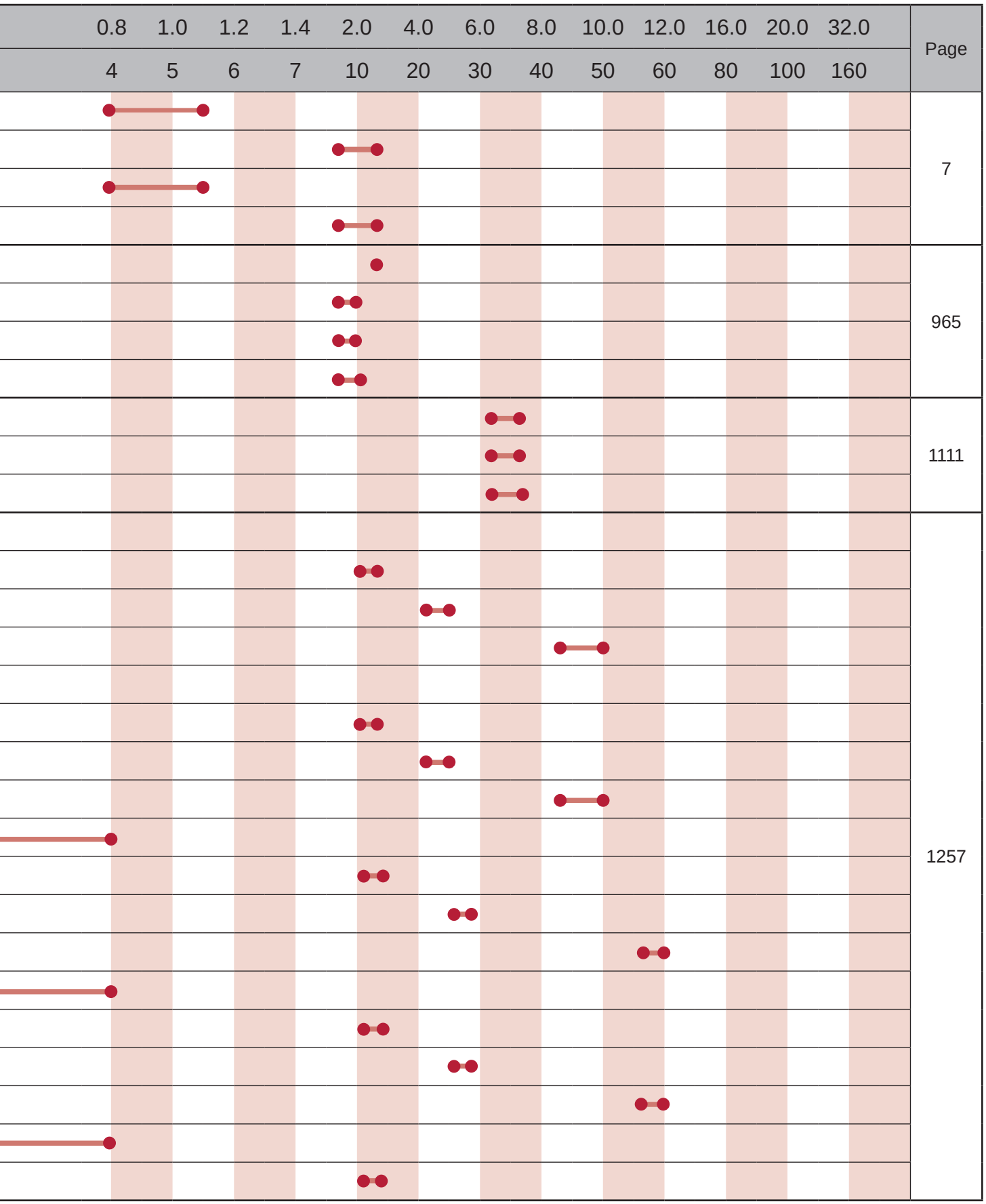


3 Search by flow characteristics C

Ideal model with flow characteristics C can be selected.

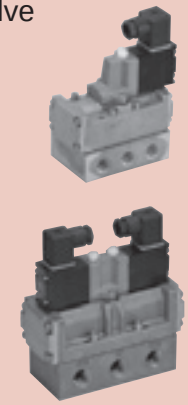
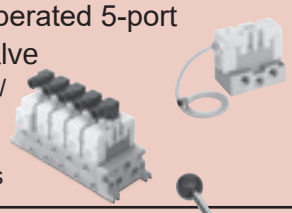
Port	Series	Wiring method: Single unit	Wiring method: Manifold: Individual wiring	Wiring method: Manifold: Reduced wiring	Model No.	Port size	Flow characteristics C [dm³/(bar)] 0 0.2 0.4 0.6 / Eff. X-sectional area (mm²) 0 1 2 3
4, 5-port valve	Pilot operated 5-port valve 4G Series 		●	●	MN4G$^{A}_{D}$1	M5 ø4, ø6 Push-in fitting	
			●	●	MN4G$^{A}_{D}$2	Rc1/8, 1/8NPT, G1/8 ø4, ø6, ø8 Push-in fitting	
			●	●	MN4G$^{B}_{E}$1	ø4, ø6 Push-in fitting	
			●	●	MN4G$^{B}_{E}$2	ø4, ø6, ø8 Push-in fitting	
	Pilot operated 5-port valve W4G2 Series 	●			W4GB2	Rc1/4	
			●	●	MW4GA2	Rc1/8 ø4, ø6, ø8 Push-in fitting	
			●	●	MW4GB2	ø4, ø6, ø8 Push-in fitting	
			●	●	MW4GZ2	ø4, ø6, ø8 Push-in fitting	
	Pilot operated 5-port valve W4G4 Series 	●			W4GB4	Rc1/4, Rc3/8 *3	
		●			W4GZ4	Rc1/4, Rc3/8 *3	
			●	●	MW4GB4	Rc1/4, Rc3/8 ø8, ø10, ø12 push-in *3	
	Pilot operated 5-port pneumatic valve 4K Series 	●			4KA1	M5 ø4, ø6 Push-in fitting	
		●			4KA2	Rc1/8 ø6, ø8 Push-in fitting	
		●			4KA3	Rc1/4 ø8, ø10 Push-in fitting	
		●			4KA4	Rc3/8 ø10, ø12 Push-in fitting	
			●		M4KA1	M5 ø4, ø6 Push-in fitting	
			●		M4KA2	Rc1/8 ø6, ø8 Push-in fitting	
			●		M4KA3	Rc1/4 ø8, ø10 Push-in fitting	
			●		M4KA4	Rc3/8 ø10, ø12 Push-in fitting	
		●			4KB1	Rc1/8	
		●			4KB2	Rc1/8, Rc1/4	
		●			4KB3	Rc1/4, Rc3/8	
		●			4KB4	Rc3/8, Rc1/2	
			●		M4KB1	M5, Rc1/8 ø6 Push-in fitting	
			●		M4KB2	Rc1/8, Rc1/4 ø6, ø8 Push-in fitting	
			●		M4KB3	Rc1/4, Rc3/8 ø8, ø10 Push-in fitting	
			●		M4KB4	Rc3/8, Rc1/2 ø10, ø12 Push-in fitting	
			●		MN4KB1	ø4, ø6, ø8 Push-in fitting	
			●		MN4KB2	ø6, ø8, ø10 Push-in fitting	

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: The port sizes listed are representative examples.
*3: G threads and NPT threads are also compatible.

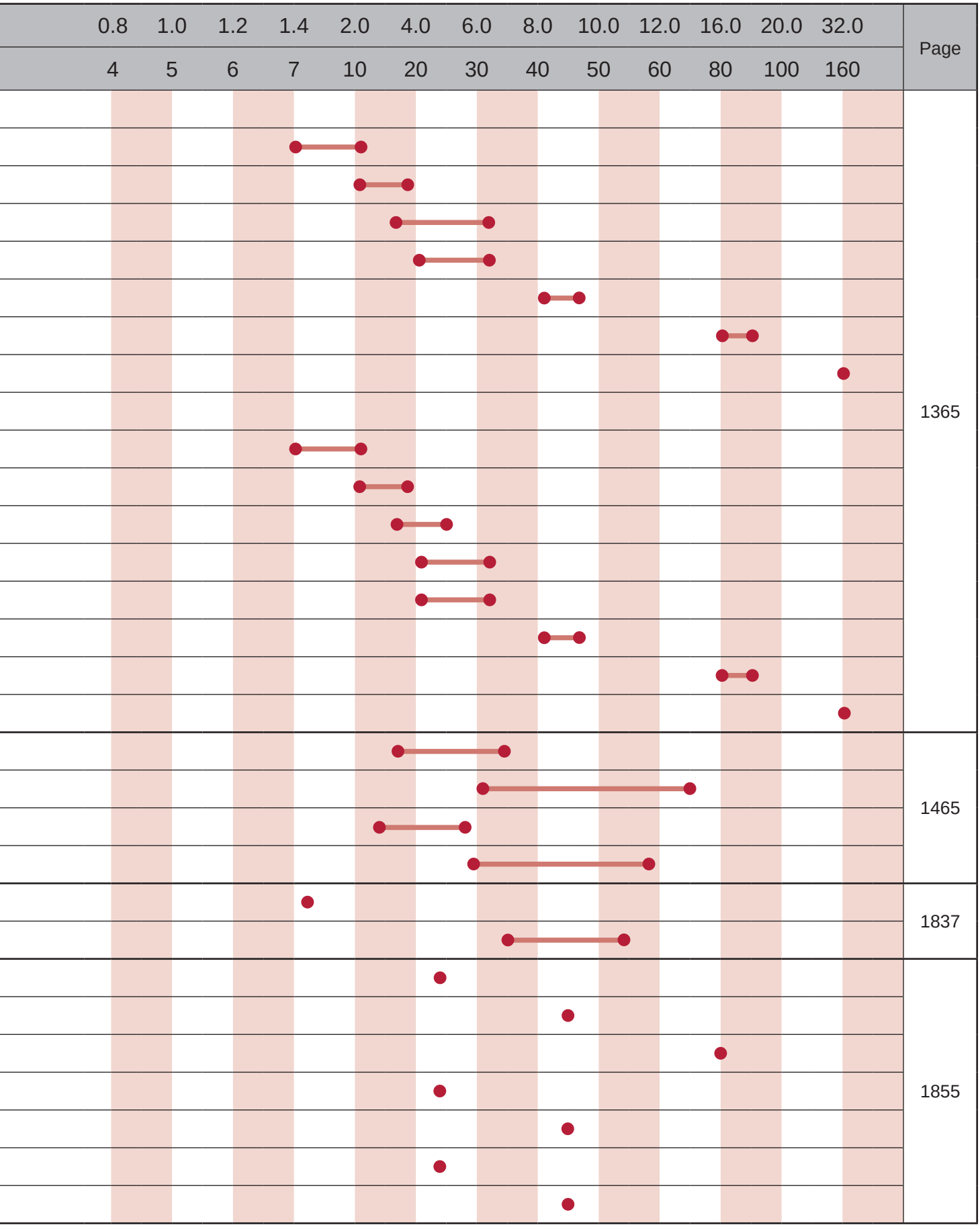


3 Search by flow characteristics C

Ideal model with flow characteristics C can be selected.

Port	Series	Wiring method: Single unit	Wiring method: Manifold: Individual wiring	Wiring method: Manifold: Reduced wiring	Model No.	Port size	Flow characteristics C [dm³/(bar)] / Eff. X-sectional area (mm²)
							0 / 0 — 0.2 / 1 — 0.4 / 2 — 0.6 / 3
4, 5-port valve	Pilot operated 5-port pneumatic valve 4F Series 	●			4F0	M5, Rp1/8	
		●			4F1	Rp1/8, Rp1/4	
		●			4F2	Rp1/4	
		●			4F3	Rp1/4, Rp3/8	
		●			4F4	Rc1/4, Rc3/8	
		●			4F5	Rc3/8, Rc1/2	
		●			4F6	Rc1/2, Rc3/4	
		●			4F7	Rc3/4, Rc1	
			●		M4F0	M5, Rp1/8	
			●		M4F1	Rp1/8, Rp1/4	
			●		M4F2	Rp1/4	
			●		M4F3	Rp1/4	
						Rp3/8	
			●		M4F4	Rc1/4	
			●		M4F5	Rc3/8	
			●		M4F6	Rc1/2	
			●		M4F7	Rc3/4	
	Pilot operated 5-port ISO valve PV5G/ PV5/ GMF Series 	●			PV5G-6, PV5-6	Rc1/4, Rc3/8	
		●			PV5G-8, PV5-8	Rc3/8 to Rc3/4	
			●		GMF1	Rc1/4, Rc3/8	
			●		GMF2	Rc3/8, Rc1/2	
	Manual override switching 4-port valve HMV/HSV Series 	●			HMV	Rc1/4	
		●			HSV	Rc1/4 to Rc3/4	
Related products	Shock absorbing valve SKH Series 	●			SKH3$\frac{2}{5}$0	Rc3/8 / Rc1/2	
		●			SKH4$\frac{2}{5}$0	Rc3/8 / Rc1/2	
		●			SKH5$\frac{2}{5}$0	Rc3/8 / Rc1/2	
		●			SKH3$\frac{2}{5}$8	Rc1/4 / Rc3/8 / Rc1/2	
		●			SKH4$\frac{2}{5}$8	Rc1/4 / Rc3/8 / Rc1/2	
		●			SKH318	Rc1/4 / Rc3/8 / Rc1/2	
		●			SKH418	Rc1/4 / Rc3/8 / Rc1/2	

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: The port sizes listed are representative examples.

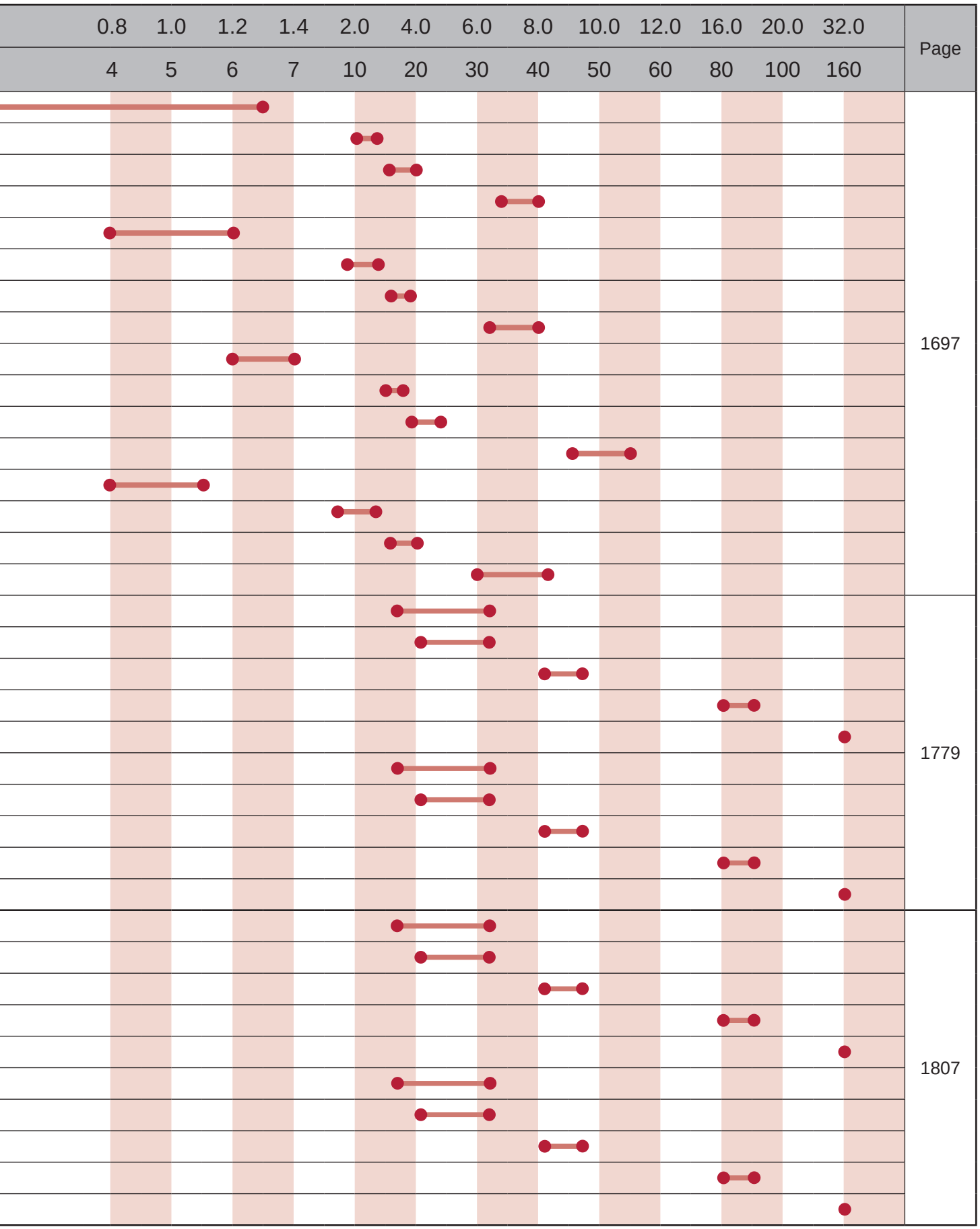


3 Search by flow characteristics C

Ideal model with flow characteristics C can be selected.

Port	Series	Wiring method: Single unit	Wiring method: Manifold: Individual wiring	Wiring method: Manifold: Reduced wiring	Model No.	Port size	Flow characteristics C [dm³/(bar)] 0 / 0.2 / 0.4 / 0.6 — Effective cross-sectional area (mm²) 0 / 1 / 2 / 3
4, 5-port	Intrinsically safe explosion-proof pilot operated 5-port valve 4GD/E EJ Series	●			4GD1	M5 ø1.8, ø4, ø6 push-in fitting	
		●			4GD2	Rc1/8 ø4, ø6, ø8 push-in fitting	
		●			4GD3	Rc1/4 ø6, ø8, ø10 push-in fitting	
		●			4GD4	Rc3/8 ø8, ø10, ø12 push-in fitting	
			●		M4GD1	M5 ø1.8, ø4, ø6 push-in fitting	
			●		M4GD2	Rc1/8 ø4, ø6, ø8 push-in fitting	
			●		M4GD3	Rc1/4 ø6, ø8, ø10 push-in fitting	
			●		M4GD4	Rc3/8 ø8, ø10, ø12 push-in fitting	
		●			4GE1	Rc1/8	
		●			4GE2	Rc1/4	
		●			4GE3	Rc1/4, Rc3/8	
		●			4GE4	Rc3/8, Rc1/2	
			●		M4GE1	M5 ø1.8, ø4, ø6 push-in fitting	
			●		M4GE2	Rc1/8 ø4, ø6, ø8 push-in fitting	
			●		M4GE3	Rc1/4 ø6, ø8, ø10 push-in fitting	
			●		M4GE4	Rc1/4, Rc3/8, Rc1/2 ø8, ø10, ø12 push-in fitting	
	Pressure and explosion-proof 5-port pneumatic valve 4F**0EX Series	●			4F3*0EX	Rp1/4, Rp3/8	
		●			4F4*0EX	Rc1/4, Rc2/8	
		●			4F5*0EX	Rc3/8, Rc1/2	
		●			4F6*0EX	Rc1/2, Rc3/4	
		●			4F7*0EX	Rc3/4, Rc1	
			●		M4F3*0EX	Rp1/4, Rp3/8	
			●		M4F4*0EX	Rc1/4	
			●		M4F5*0EX	Rc3/8	
			●		M4F6*0EX	Rc1/2	
			●		M4F7*0EX	Rc3/4	
	Pressure and explosion-proof 5-port pneumatic valve 4F**0E Series	●			4F3*0E	Rp1/4, Rp3/8	
		●			4F4*0E	Rc1/4, Rc2/8	
		●			4F5*0E	Rc3/8, Rc1/2	
		●			4F6*0E	Rc1/2, Rc3/4	
		●			4F7*0E	Rc3/4, Rc1	
			●		M4F3*0E	Rp1/4, Rp3/8	
			●		M4F4*0E	Rc1/4	
			●		M4F5*0E	Rc3/8	
			●		M4F6*0E	Rc1/2	
			●		M4F7*0E	Rc3/4	

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: The port sizes listed are representative examples.



4 Search by specifications and variation

Individual wiring manifold

Series name		Manifold model No.	Flow characteristic C [dm³/(s·bar)]	Effective cross-sectional area (mm²)	Remarks	Page
4, 5-port valve						
Pilot operated soft spool valve	MN4E0 Series	MN4E0	0.5 to 0.54	-	One-sided solenoid type	896
	4S0 Series (small pneumatic valve)	M4SA0	-	0.9		1244
		M4SB0	0.29 to 0.32	-		
	4G Series	M4G$^{A}_{D}$	0.70 to 8.0	-		96/508
		M4G$^{B}_{E}$				112/520
		MN4G$^{A}_{D}$	0.71 to 2.3			230/614
		MN4G$^{B}_{E}$				238/622
	W4G2 Series	MW4GA2	1.7 to 2.3	-	One-sided solenoid/ plug-in type	976
		MW4GB2				980
		MW4GZ2				980
	W4G4 Series	MW4GB4	6.4 to 7.4	-	Plug-in type	1118
	MN4S0 Series (pneumatic valve)	MN4S0 MT4S0	0.57 to 0.80	-	One-sided solenoid type	1196
	4K Series (pneumatic valve)	M4KA	0.60 to 11	-		1298
		M4KB				1310
		MN4KB				1330
	4F Series (pneumatic valve)	(A)M4F0 M4F1 to M4F3	0.6 to 18	160 (4F7)		1410
		M4F4 to 7				1438
		M4F**E			Explosion-proof	1824
	PV5G/PV5/CMF Series (ISO valve)	GMF1	2.8 to 11.6	-		1484
		GMF2				1488
	4GD/E EJ Series (Intrinsically safe explosion-proof)	M4GD	0.70 to 8.4	-		1697
		M4GE	1.1 to 13.9			
2, 3-port valve						
Pilot operated soft spool valve	MN3E0 Series	MN3E0	0.54	-	One-sided	896
	3G Series	M3GA	0.70 to 2.5	-		96
		MN3GA	0.71 to 1.7			230
	MN3S0 Series (pneumatic valve)	MN3S0 MT3S0	0.80	-	One-sided solenoid type	1196
	3K Series (pneumatic valve)	M3KA	0.69	-		1298
Direct acting poppet valve	3M Series (small pneumatic valve)	M3MA0 M3MB0	-	0.1 to 0.5		1596
	3QE Series	M3QE1 M3QZ1	0.04 to 0.06	-		1546
	3QB Series	M3QB1	0.11 to 0.18	-		1552
	3QR Series	M3QRA M3QRB	0.30 to 0.40	-		1558
	3P Series (pneumatic valve)	M3PA M3PB	0.31 to 1.1	-		1620
Pilot operated poppet valve	P/M/B Series (Miniature pneumatic valve)	B*P51	0.09 to 0.15	-		1638
		N*P512/3/4				1660
Two 3-port valves integrated						
Pilot operated soft spool valve	MN3E0 Series	MN3E0	0.5	-	One-sided	896
	3G Series	M3G$^{A}_{D}$	0.66 to 1.7	-		96/508
		M3G$^{B}_{E}$				112/520
		MN3G$^{A}_{D}$				230/614
		MN3G$^{B}_{E}$				238/622
	MN3S0 Series (pneumatic valve)	MN3S0 MT3S0	0.50	-	One-sided solenoid type	1196

Note: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Reduced wiring manifolds

Series name		Manifold model No.	Flow characteristic C [dm³/(s·bar)]	Remarks	Page
4, 5-port valve					
Pilot operated soft spool valve	MN4E Series	MN4E00	0.32	One-sided solenoid type	872
		MN4E0	0.50 to 0.54		896
	4S0 Series (small pneumatic valve)	M4SB0	0.29 to 0.32		1248
	4G Series	M4G A/D	0.70 to 8.0		136/534
		M4G B/E			158/554
		MN4G A/D	0.71 to 2.3		246/630
		MN4G B/E			262/646
	W4G2 Series	MW4GA2	1.7 to 2.3	One-sided solenoid/ plug-in type	988
		MW4GB2			1010
		MW4GZ2			1010
	W4G4 Series	MW4GB4	6.4 to 7.4	Plug-in type	1128
	MN4S0 Series (pneumatic valve)	MN4S0 MT4S0	0.57 to 0.80	One-sided solenoid type	1196
3-port valve					
Pilot operated soft spool valve	MN3E Series	MN3E00	0.32	One-sided solenoid type	872
		MN3E0	0.54		896
	3G Series	M3G A/D	0.70 to 2.5		136/534
		MN3G A/D	0.71 to 1.7		246/630
	W3G2 Series	MW3GA2	1.7	One-sided solenoid type	988
	MN3S0 Series (pneumatic valve)	MN3S0 MT3S0	0.80	One-sided solenoid type	1196
Two 3-port valves integrated					
Pilot operated soft spool valve	MN3E Series	MN3E00	0.32	One-sided solenoid type	872
		MN3E0	0.50		896
	3G Series	M3G A/D	0.66 to 1.7		136/534
		M3G B/E			158/554
		MN3G A/D			246/630
		MN3G B/E			262/646
	MN3S0 Series (pneumatic valve)	MN3S0 MT3S0	0.50	One-sided solenoid type	1196

Note: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

4 Search by specifications and variation

Reduced wiring device unit

PLC manufacturer	Communication protocol	Wiring block model No.	Device unit series	Incorporated valve
CC-Link Partner Association Mitsubishi Electric	CC-Link (ver1.10)	T6G1	OPP3 Series	MN4S0, MN4E, MN4G, M4G
		T7G1	OPP4 Series	MN4G
		T8G1/2/7	OPP5 Series	MW4G2
		T7G1/2	OPP6 Series	MN4E
		T8G1/2	OPP7 Series	M4G,MN4G
		T8GP1/2		
	CC-Link IEF Basic	T8EB1/2	OPP7 Series	M4G, MN4G
		T8EBP1/2		
ODVA OMRON Corporation	DeviceNet	T7D1	OPP4 Series	MN4G
		T8D1/2/7	OPP5 Series	MW4G2
		T7D1/2	OPP6 Series	MN4E
		T8D1/2	OPP7 Series	MN4G
		T7D1/2/7	OPP8 Series	MW4G
Japan Profibus Association SIEMENS Corporation	PROFIBUS-DP	T8P1/2	OPP7 Series	M4G, MN4G
		T8PP1/2		
	PROFINET	T8EP1/2 T8EPP1/2	OPP7 Series	M4G, MN4G
OMRON Corporation Beckhoff Automation	EtherCAT	T7EC1/2	OPP6 Series	MN4E
		T7ECT1/2		
		T8EC1/2	OPP7 Series	M4G, MN4G
		T8ECP1/2		
		T7EC1/2	OPP8 Series	MW4G
		T7ECP1/2		
ODVA TAG JAPAN	EtherNet/IP	T8EN1/2	OPP7 Series	M4G, MN4G
		T8ENP1/2		
SUNX	S-LINK V	T7N1/2	OPP6 Series	MN4E
Ontec	SAVENET	T7L1	OPP4 Series	MN4G

● For compatibility with other networks, contact CKD for details.

*1 When ordering a reduced wiring manifold, the wiring block model No. is indicated as follows.

(Example)MN4GA210- (Port size) - T7D1 (Option) - (Station No.) - (Voltage)

- Port size: M: Manifold, MN: Block manifold
- T7D1: Wiring block model No.

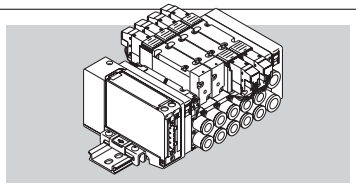
*2 The shape of the device unit is as follows.

OPP2	Degree of protection(IP65)

OPP3	Flat cable compatible device unit
OPP4	Thin shape

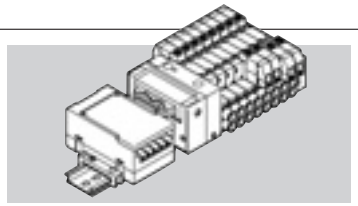
OPP5	Degree of protection(IP65), connector wiring
OPP6	Miniature 32 point compatible

Reduced wiring device unit (serial transmission)



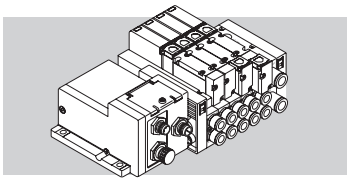
Serial transmission (OPP4)

- Thin device unit
- Easily connected/detached with the slot-in system.



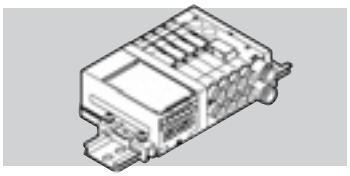
Serial transmission (OPP3)

- The valve and device unit can be easily connected with connectors.
- Low-profile device unit with height kept low. (At assembly)



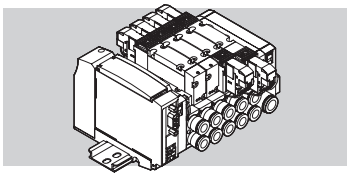
Serial transmission (OPP5)

- Dust-proof/jet-proof protective structure (IP65).
- Power supply wires and communication wires can be easily connected with connectors.



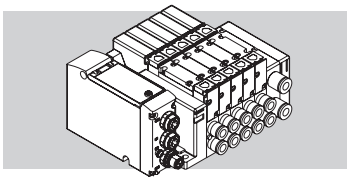
Serial transmission (OPP6)

- Compact close contact type
- Low-profile device unit with height kept the lowest in the series, compatible with up to 32 points.



Serial transmission (OPP7)

- Thin device unit
- Easily connected/detached with the slot-in system.



Serial transmission (OPP8)

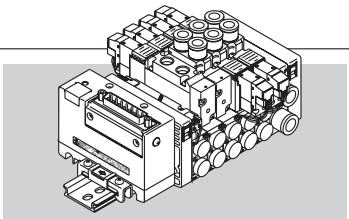
- High speed EtherCAT communication supported
- A protective structure equivalent to IP65 rating has been prepared.

4 Search by specifications and variation

Reduced wiring block

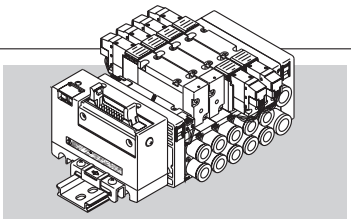
Wiring method	Wiring block model No.	Incorporated valve model No.	Remarks	Incorporated valve Page
D sub-connector	T30/R (24-pin)	MN4E	*1) MW4G2 is not compatible with T50 and T52. *2) MN4SO is not compatible with T51 and T52.	863
Flat cable connector	T50/R (with power supply terminal 16 points)	MN4G, M4G		1
	T51/R (18-pin)	MW4G2 (*1)		965
	T52/R (8-pin)	MN4SO (*2)		1191
Multi-connector	T20 (16-pin)	MW4G2		965
Common terminal	T10/R (M3 screw system) T11/R (clamping system)	MN4G, M4G	*2) MW4G2 and MW4G4 are not compatible with T11.	1
		MW4G2 (*2)		965
		MW4G4 (*2)		1111
		MN4SO		1191
Intermediate wiring block	TM1A (10-pin) TM1C (5-pin) TM52 (8-pin)	MN4E	TM**: RITS connector TM52: Flat cable connector	863

Reduced wiring block



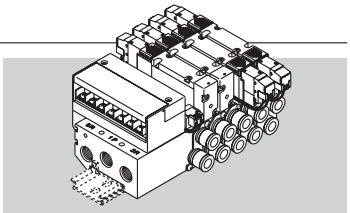
D sub-connector (T3*)

- Quick connections using cables with connectors
- Processing of relay terminal block and common wiring is not required



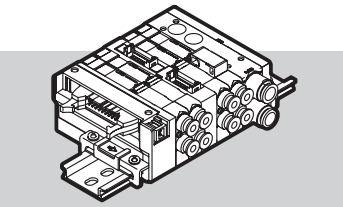
Flat cable connector (T5*)

- Quick connections using cables with connectors
- Processing of relay terminal block and common wiring is not required
- An amplification circuit embedded is also available



Common terminal block (T1*)

- Valve wiring only requires signal wires and a single common wire
- A relay terminal block is not required



Intermediate wiring block (TM*)

- Reduced wiring connection to the center of the manifold is possible.
- 10P flat cable connector and 6P RITS connectors are available.
- No more trouble with insufficient control points.

Copper and PTFE free

Copper-based materials are not used.

Series name		Variation model No.	Flow characteristics C [dm³/(s·bar)]	Effective cross-sectional area (mm²)	Remarks	Page
4, 5-port valve						
Pilot operated poppet valve	P/M/B Series (Miniature pneumatic valve)	W2P513*-*-P6	0.12 to 0.15	-		1633
		P5142-*-P6	0.09			
		B5142-*-P6	0.09			
		B*P5142-*-P6	0.09			
		N*P5142-*-P6	0.09			
Pilot operated soft spool valve	4K Series (pneumatic valve)	4KA*-*-P6	0.60 to 11	-		1257
		4KB*-*-P6	063 to 13			
		M4KA*-*-P6	0.69 to 11			
		M4KB*-*-P6	0.60 to 9.4			
		MN4KB*-*-P6	0.60 to 3.1			
	4F Series (pneumatic valve)	4F*-*-P6	1.5 to 18	160(4F7)	(M)4F0 is not supported.	1365
		M4F*-*-P6				
Shock absorbing valve	SKH Series	SKH*-*-P6	4.1 to 16.3	-		1855
2, 3-port valve						
Pilot operated soft spool valve	3K Series (pneumatic valve)	3KA1*-*-P6	0.65	-		1257
		M3KA1*-*-P6	0.69			
Pilot operated poppet valve	P/M/B Series (Miniature pneumatic valve)	P512/3*-*-P6	0.1	-		1633
		M512/3*-*-P6	0.1			
		B512/3*-*-P6	0.1			
		B*P512/3*-*-P6	0.11 to 0.15			
		N*P512/3-*-P6	0.11 to 0.15			

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

*2: Other series are compatible as well. Contact CKD separately.

4 Search by specifications and variation

Main rubber parts used are ozone proof items

Ozone-proof specification product

Series name		Variation model No.	Flow characteristics C [dm³/(s·bar)]	Effective cross-sectional area (mm²)	Remarks	Page
4, 5-port valve						
Pilot operated soft spool valve	MN4E0 Series	MN4E0*-*-A-*	0.50 to 0.54	-	One-sided solenoid	863
	4S0 Series (small pneumatic valve)	4SA0*-*-P11	-	0.90		1231
		4SB0*-*-P11	0.29 to 0.33	-		
		M4SA0*-*-P11	-	0.90		
		M4SB0*-*-P11	0.29 to 0.32	-		
	4G Series	4G$^{A}_{D}$*-*-A-*	0.70 to 8.0	-		1
		4G$^{B}_{E}$*-*-A-*	1.1 to 11			
		M4G$^{A}_{D}$*-*-A-*	0.70 to 8.0			
		M4G$^{B}_{E}$*-*-A-*	0.70 to 8.3			
		MN4G$^{A}_{D}$*-*-A-*	0.71 to 2.3			
		MN4G$^{B}_{E}$*-*-A-*	0.71 to 2.2			
	W4G2 Series	W4GB2*-*-A-*	2.1 to 2.5	-	One-sided solenoid	965
		MW4GA2*-*-A-*	1.7 to 2.3			
		MW4GB2*-*-A-*	1.7 to 2.3			
		MW4GZ2*-*-A-*	1.7 to 2.3			
	W4G4 Series	W4GB4*-*-A-*	6.4 to 7.3	-		1111
		W4GZ4*-*-A-*				
		MW4GB4*-*-A-*	6.4 to 7.4			
	MN4S0 Series (pneumatic valve)	MN4S0*-*-P11 MT4S0*-*-P11	0.57 to 0.80	-	One-sided solenoid	1191
	4K Series (pneumatic valve)	4KA*-*-P11	0.60 to 11	-		1257
		4KB*-*-P11	0.63 to 13			
		M4KA*-*-P11	0.69 to 11			
		M4KB*-*-P11	0.60 to 9.4			
		MN4KB*-*-P11	0.60 to 3.1			

● Ozone-proof components are available as a custom order. (However, the MN4E0 series, 4G series, W4G2 series, and W4G4 series are available as options.)
Note: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Main rubber parts used are ozone proof items

Ozone-proof specification product

Series name		Variation model No.	Flow characteristics C [dm³/(s·bar)]	Effective cross-sectional area (mm²)	Remarks	Page
3-port valve						
Pilot operated soft spool valve	MN3E0 Series	MN3E0*-*-A-*	0.54		One-sided solenoid	863
	3G Series	3G$^{A}_{D}$*-*-A-*	0.70 to 3.9	-		1
		M3G$^{A}_{D}$*-*-A-*	0.66 to 3.3			
		MN3G$^{A}_{D}$*-*-A-*	0.68 to 2.3			
	W3G2 Series	MW3GA2*-*-A-*	1.7 to 2.3	-	One-sided solenoid	965
	MN3S0 Series (pneumatic valve)	MN3S0-*-*-P11	0.80	-	One-sided solenoid	1191
		MT3S0-*-*-P11				
	3K Series (pneumatic valve)	3KA*-*-P11	0.65	-		1257
		M3KA*-*-P11	0.69			
Direct acting poppet valve	3M Series (small pneumatic valve)	3MA0*-*-P11	-	0.1 to 0.15		1591
		3MB0*-*-P11				
		M3MA0*-*-P11				
		M3MB0*-*-P11				
	3P Series (pneumatic valve)	3PA*-*-P11	0.34 to 1.1	-		1607
		3PB*-*-P11	0.33 to 1.0			
		M3PA*-*-P11	0.37 to 1.1			
		M3PB*-*-P11	0.32 to 0.93			
Two 3-port valves integrated						
Pilot operated soft spool valve	MN3E0 Series	MN3E0*-*-A-*	0.50	-	One-sided solenoid	863
	3G Series	3G$^{A}_{D}$*-*-A-*	0.66 to 1.8	-		1
		3G$^{B}_{E}$*-*-A-*	0.92 to 1.7			
		M3G$^{A}_{D}$*-*-A-*	0.66 to 1.7			
		M3G$^{B}_{E}$*-*-A-*	0.67 to 1.6			
		MN3G$^{A}_{D}$*-*-A-*	0.68 to 1.6			
		MN3G$^{B}_{E}$*-*-A-*	0.66 to 1.6			

● Ozone-proof components are available as a custom order. (However, the MN4E0 series, 4G series, and W4G2 series are available as options.)

Note: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

4 Search by specifications and variation

Specifications for rechargeable battery

Pneumatic components exclusively for materials which can be used in the rechargeable battery manufacturing process.

Series name		Variation model No.	Flow characteristics C [dm³/(s·bar)]	Remarks	Page
4, 5-port valve					
Pilot operated soft spool valve	4G Series	4G$^{A}_{D}$*-*-P4	0.66 to 4.0		CC-1226A
		4G$^{B}_{E}$*-*-P4	1.0 to 4.2		
		M4G$^{A}_{D}$*-*-P4	0.66 to 3.3		
		M4G$^{B}_{E}$*-*-P4	0.67 to 3.3		
		MN4G$^{A}_{D}$*-*-P4	0.68 to 2.3		
		MN4G$^{B}_{E}$*-*-P4	0.66 to 2.2		
	W4G2 Series	W4GB2*-*-P40	2.1 to 2.5	One-sided solenoid plug-in	CC-1226A
		MW4GA2*-*-P40	1.7 to 2.3		
		MW4GB2*-*-P40	1.7 to 2.3		
		MW4GZ2*-*-P40	1.7 to 2.3		
	W4G4 Series	W4GB4*-*-P40	6.4 to 7.7	Plug-in	CC-1226A
		MW4GB4*-*-P40	6.4 to 8.3		
		MW4GZ4*-*-P40	6.4 to 8.3		
3-port valve					
Pilot operated soft spool valve	3G Series	3G$^{A}_{D}$*-*-P4	0.70 to 3.9		CC-1226A
		M3G$^{A}_{D}$*-*-P4	0.66 to 3.3		
		MN3G$^{A}_{D}$*-*-P4	0.68 to 2.3		
	W3G2 Series	MW3GAZ*-*-P40	1.7	One-sided solenoid	
Two 3-port valves integrated					
Pilot operated soft spool valve	3G Series	3G$^{A}_{D}$*-*-P4	0.66 to 2.2		CC-1226A
		3G$^{B}_{E}$*-*-P4	1.0 to 2.1		
		M3G$^{A}_{D}$*-*-P4	0.66 to 1.7		
		M3G$^{B}_{E}$*-*-P4	0.67 to 1.6		
		MN3G$^{A}_{D}$*-*-P4	0.68 to 1.6		
		MN3G$^{B}_{E}$*-*-P4	0.66 to 1.6		

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 × C.
2: Refer to Catalog No. CC-947 “Components for rechargeable battery production P4 Series”.

Clean-room specifications

Anti-dust generation pneumatic components usable in clean rooms.

Series name		Variation model No.	Flow characteristics C [dm³/(s·bar)]	Remarks	Page
4, 5-port valve					
Pilot operated soft spool valve	MN4E Series	MN4E*-*-P70	0.30 to 0.54	One-sided solenoid	863
	4G Series	4G$^{A}_{D}$*-*-P7*	0.66 to 4.0		1
		M4G$^{A}_{D}$*-*-P7*	0.66 to 3.3		
		4G$^{B}_{E}$*-*-P7*	1.0 to 4.2		
		M4G$^{B}_{E}$*-*-P7*	0.67 to 3.3		
3-port valve					
Pilot operated soft spool valve	MN3E Series	MN3E*-*-P70	0.30 to 0.54	One-sided solenoid	863
	3G Series	3G$^{A}_{D}$*-*-P7*	0.70 to 3.9		1
		M3G$^{A}_{D}$*-*-P7*	0.66 to 3.3		
Two 3-port valves integrated					
Pilot operated soft spool valve	MN3E Series	MN3E*-*-P70	0.30 to ,0.50	One-sided solenoid	863
	3G Series	3G$^{A}_{D}$*-*-P7*	0.66 to 2.2		1
		3G$^{B}_{E}$*-*-P7*	1.0 to 2.1		
		M3G$^{A}_{D}$*-*-P7*	0.66 to 1.7		
		M3G$^{B}_{E}$*-*-P7*	0.67 to 1.6		
		MN3G$^{A}_{D}$*-*-P7*	0.68 to 1.6		
		MN3G$^{B}_{E}$*-*-P7*	0.66 to 1.6		

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 × C.
*2: Refer to Catalog No. CB-033SA “Pneumatic components for clean room specifications.”

Coolant proof product

Pneumatic components using valve materials with excellent oil resistance and water resistance.

Series name		Variation model No.	Flow characteristics C [dm³/(s·bar)]	Remarks	Page
4, 5-port valve					
Pilot operated soft spool valve	4G Series	4G $^{A}_{D}$*-*-A-*	0.70 to 8.0		1
		4G $^{B}_{E}$*-*-A-*	1.1 to 11		
		M4G $^{A}_{D}$*-*-A-*	0.70 to 8.0		
		M4G $^{B}_{E}$*-*-A-*	0.70 to 8.3		
		MN4G $^{A}_{D}$*-*-A-*	0.71 to 2.3		
		MN4G $^{B}_{E}$*-*-A-*	0.71 to 2.2		
	W4G2 Series	W4GB2*-*-A-*	2.1 to 2.5	One-sided solenoid/ Plug-in	965
		MW4GA2*-*-A-*	1.7 to 2.3		
		MW4GB2*-*-A-*	1.7 to 2.3		
		MW4GZ2*-*-A-*	1.7 to 2.3		
	W4G4 Series	W4GB4*-*-A-*	6.4 to 7.3	Plug-in	1111
		MW4GB4*-*-A-*	6.4 to 7.4		
	4K Series (pneumatic valve)	4KA*-*-A	0.60 to 11		
		4KB*-*-A	0.63 to 13		
	PV5G/PV5 Series (ISO valve)	PV5G-*-*-*-A-*	2.8 to 6.9		1465
		PV5-*-*-A-*-TC			
3-port valve					
Pilot operated soft spool valve	3G Series	3G $^{A}_{D}$*-*-A-*	0.70 to 3.9		1
		M3G $^{A}_{D}$*-*-A-*	0.66 to 3.3		
		MN3G $^{A}_{D}$*-*-A-*	0.68 to 2.3		
	W3G2 Series	MW3GA2*-*-A-*	1.7	One-sided solenoid	965
	3K Series (pneumatic valve)	3KA1*-*-A	0.65		
Two 3-port valves integrated					
Pilot operated soft spool valve	3G Series	3G $^{A}_{D}$*-*-A-*	0.66 to 1.8		1
		3G $^{B}_{E}$*-*-A-*	0.92 to 1.7		
		M3G $^{A}_{D}$*-*-A-*	0.66 to 1.7		
		M3G $^{B}_{E}$*-*-A-*	0.67 to 1.6		
		MN3G $^{A}_{D}$*-*-A-*	0.68 to 1.6		
		MN3G $^{B}_{E}$*-*-A-*	0.66 to 1.6		

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 × C.

Manual selector valve

Series name	Model No.	Flow characteristic C[dm³/(s·bar)]	Eff. X-sectional area (mm²)	Remarks	Page
4-port valve					
Miniature	HMV	1.5 to 1.6	-		1837
Standard	HSV	7.2 to 10.3	-		
3-port valve					
Compact mechanical valve	MS	-	1.6 to 2.5	Detector total air system	1901
Medium mechanical valve	MM	-	1.6 to 2.5		
Large mechanical valve	MAVL	-	31		
Quick valve	3QV	-	-	ø4 to ø12	1845
2-port valve					
Quick valve	2QV	-	-	ø4 to ø12	1845

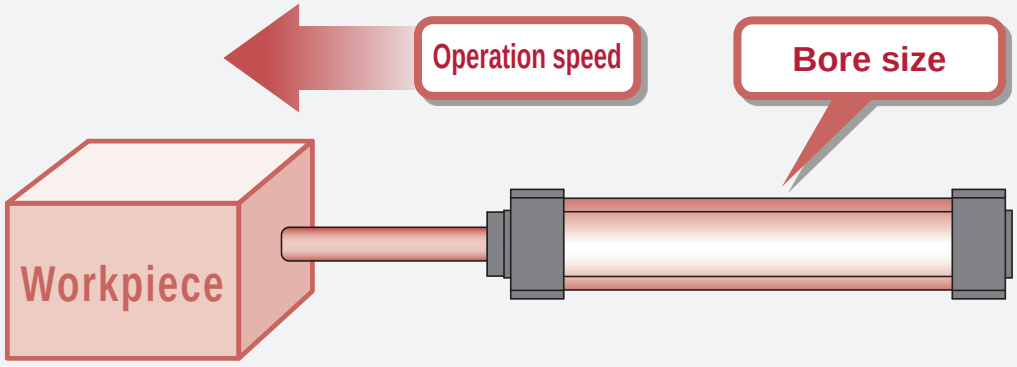
System selection

Even beginners can easily make a model selection.

How to make a system selection

An overview of the selection is available
with the following two conditions.

1 When selecting peripheral pneumatic components, having determined cylinder bore size and operation speed



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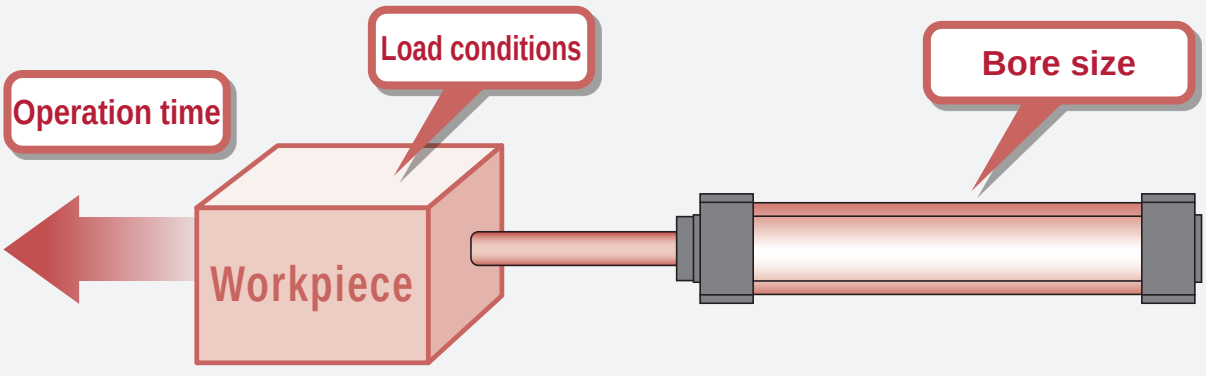
2 When selecting peripheral pneumatic components, having determined bore size from cylinder load and operating time



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1 Selecting from cylinder bore size and operation speed

STEP 1

[Confirming conditions]
Check cylinder tube bore size and cylinder operation speed

Select the theoretical reference speed

From Table 1

Whether the cylinder bore size and cylinder being used are driven with relative high or low speed is determined as a condition.

Using Table 1 as a reference, select the theoretical reference speed of the cylinder.

(1) Bore size ø□
(2) Operation speed Low speed/medium speed/ high speed/ultra-high speed

STEP 2

Select appropriate fluid control components from bore size and theoretical reference speed, and select [required flow rate]

From to Table 2

Refer to Table 2 and select appropriate fluid control components (valve, speed controller, silencer, piping) and [required flow rate] for corresponding cylinder bore size and theoretical reference speed.

STEP 3

Select the clean air system components

From to Table 3

Refer to Table 3, and select a component with a [max. flow rate] higher than the [Required flow rate] value.
When controlling multiple cylinders with a set of clean air system components, select the clean air system component having a [max. flow rate] higher than the [total of required flow rates].

* The relationship of the cylinder bore size and speed for the valve (4G Series/4K Series) is shown in a graph.
"A combination of the valve and the cylinder's standard system" (Example) Intro Pages 49 to 50

(1) The cylinder average speed is obtained from the combination of the valve and piping system. It is expressed as the cylinder's piston speed calculated by dividing the stroke length by the time that the piston rod takes from start to end of movement with the cylinder rod installed facing upward. When the load factor is 50%, the average speed should be approximately the cylinder's piston speed multiplied by 0.5. (Refer to Intro Page 53 for the relation of load factor and theoretical reference speed.)
(2) The cylinder theoretical reference speed is the value of when one cylinder moves independently.
(3) The valve's effective cross-sectional area used in the calculation for Table 2 is the 2-position value.
(4) This selection guide is for reference. With the CKD sizing program, confirm conditions to be actually used.

System selection

STEP1 Conditions confirmation/theoretical reference speed selection

As a condition, it is predetermined whether bore size and cylinder are to be operated at a relatively high speed or at a relatively low speed.

Table 1

Degree of cylinder speed	Low speed	Medium speed	High speed	Ultra high speed
Theoretical reference speed (mm/s)	250	500	750	1,000

STEP2 Fluid control components selection

Select appropriate fluid control components (valve, speed controller, silencer, piping) and [required flow rate] for bore size and theoretical reference speed selected from Table 1.

Table 2

Bore size (mm)	Theoretical reference speed (mm/s) Note)	Required flow rate (ℓ/min) (ANR)	Required composite effective cross-sectional area (mm^2)	Valve
				Single solenoid
ø6	500	5	0.1	MN4E010 4SA010/4SB010
ø10	500	14	0.2	MN4E010 4SA010/4SB010
ø16	500	36	0.5	MN4E010 4SA010/4SB010
ø20	250	29	0.5	4KA110/4KB110 4GA110R/4GB110R
	500	56	0.9	4KA110/4KB110
	750	84	1.4	4GA110R/4GB110R
	1,000	112	1.8	
ø25	250	44	0.8	4KA110/4KB110
	500	88	1.4	4GA110R/4GB110R
	750	132	2.1	4KB110/4GB110R
	1,000	175	2.8	4KB210/4GB210R
ø32	250	73	1.3	4KA110/4KB110 4GA110R/4GB110R
	500	143	2.9	4KA210/4KB210
	750	215	3.5	4GA210R/4GB210R
	1,000	286	4.6	

Note) The above table indicates theoretical reference speed at cylinder bore size.
Refer to the individual specifications of each model for the working piston speed range.

*1: Refer to Intro Page 57 for piping specifications.

Suitable control components				
		Pneumatic auxiliary components		Piping *1
	Double solenoid	Speed controller	Silencer	Piping (between valve and cylinder)
	MN4E020 4SA020/4SB020	SC3W-M5-4	SLM-M5,SLM-M3	ø4 x ø2.5 nylon tube
	MN4E020 4SA020/4SB020	SC3W-M5-4	SLM-M5,SLM-M3	ø4 x ø2.5 nylon tube
	MN4E020 4SA020/4SB020	SC3W-M5-4	SLM-M5,SLM-M3	ø4 x ø2.5 nylon tube
	4KA120/4KB120 4GA120R/4GB120R	SC3W-6-6 SCL2-06-H66	SLM-M5,SLW-6A	ø6 x ø4 nylon tube
	4KA120/4KB120 4GA120R/4GB120R	SC3W-6-6 SCL2-06-H66	SLM-M5,SLW-6A	ø6 x ø4 nylon tube
	4KA120/4KB120 4GA120R/4GB120R	SC3W-6-6 SCL2-06-H66	SLM-M5,SLW-6A	ø6 x ø4 nylon tube
	4KB120/4GB120R	SC1-6	SLW-6A,SL-M5	ø8 x ø5.7 nylon tube
	4KB220/4GB220R	SCL2-08-H88	SLW-6S,SLW-6A	ø8 x ø5.7 nylon tube
	4KA120/4KB120 4GA120R/4GB120R	SC3W-6-6 SCL2-06-H66	SLM-M5,SLW-6A	ø6 x ø4 nylon tube
	4KA220/4KB220 4GA220R/4GB220R	SC1-6 SCL2-08-H88	SLW-6S,SLW-6A	ø8 x ø5.7 nylon tube

System selection

Bore size (mm)	Theoretical reference speed (mm/s) Note)	Required flow rate (ℓ/min) (ANR)	Required composite effective cross-sectional area (mm^2)	Valve Single solenoid
ø40	250	110	1.7	
	500	230	3.3	4KA210/4KB210 4GA210R/4GB210R
	750	340	5.0	
	1,000	450	6.6	
ø50	250	180	2.6	4KA210/4KB210 4GA210R/4GB210R
	500	350	5.2	
	750	530	7.7	4GA310R/4GB310R
	1,000	710	10.4	4GA310R/4GB310R 4F310/4F410
ø63	250	280	4.1	4KA210/4KB210 4GA310R/4GB310R
	500	560	8.2	4GA310R/4GB310R
	750	840	12.3	4KA310/4KB310 4F310/4F410
	1,000	1,100	16.4	4F510
ø80	250	450	6.6	4KB210/4F210-08
	500	910	13.2	4F410-10/4F310-10 4KB310-10
	750	1,400	19.8	4KB410-15
	1,000	1,800	26.4	4F510-15
ø100	250	710	10.3	4GA410-10/4GB410-10 4F410-10/4F310-10 4KB310-10
	500	1,400	20.6	4GB410-15
	750	2,100	30.9	4KB410-15/4F510-15
	1,000	2,800	41.2	4F610-20

Note) The above table indicates theoretical reference speed at cylinder bore size.
Refer to the individual specifications of each model for the working piston speed range.

*1: Refer to Intro Page 57 for piping specifications.

Suitable control components				
		Pneumatic auxiliary components		Piping *1
	Double solenoid	Speed controller	Silencer	Piping (between valve and cylinder)
		SC3W-6-6 SCL2-06-H66	SLM-M5,SLW-6A	ø6 x ø4 nylon tube
	4KA220/4KB220 4GA220R/4GB220R	SC1-6 SCL2-08-H88	SLW-6S,SLW-6A	ø8 x ø5.7 nylon tube
		SC1-8	SLW-8A,SLW-6A	ø10 x ø7.2 nylon tube
		SC1-8	SLW-8A,SLW-8S	ø10 x ø7.2 nylon tube
	4KA220/4KB220 4GA220R/4GB220R	SC1-6 SCL2-08-H88	SLW-6A,SLW-6S	ø8 x ø5.7 nylon tube
		SC1-8	SLW-8A,SLW-6A	ø10 x ø7.2 nylon tube
	4GA320R/4GB320R	SCL2-10-H1010	SLW-8A,SLW-8S	ø10 x ø7.2 nylon tube
	4GA320R/4GB320R 4F320/4F420	SC1-10	SLW-10A	ø15 x ø11.5 nylon tube or Rc3/8 steel pipe
	4KA220/4KB220 4GA320R/4GB320R	SC1-6 SCL2-08-H88	SLW-6S,SLW-6A	ø8 x ø5.7 nylon tube
	4GA320R/4GB320R	SC1-8 SCL2-10-H1010	SLW-8A,SLW-8S	ø10 x ø7.2 nylon tube
	4KA320/4KB320 4F320/4F420	SC1-10	SLW-10A	ø15 x ø11.5 nylon tube or Rc3/8 steel pipe
	4F520	SC1-15	SLW-15A	Rc1/2 steel pipe
	4KB220/4F220-08	SC1-8 SCL2-10-H1010	SLW-8A,SLW-8S	ø10 x ø7.2 nylon tube
	4F420-10/4F320-10 4KB320-10	SC1-10	SLW-10A	ø15 x ø11.5 nylon tube or Rc3/8 steel pipe
	4KB420-15 4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
		SC-20A	SLW-15A	Rc1/2 steel pipe
	4GA420-10/4GB420-10 4F420-10/4F320-10 4KB320-10	SC1-10	SLW-10A	ø15 x ø11.5 nylon tube or Rc3/8 steel pipe
	4GB420-15 4KB420-15/4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
		SC-20A	SLW-15A	Rc1/2 steel pipe
	4F620-20	SC-20A	SL-20A,SLW-20S	Rc3/4 steel pipe

System selection

Bore size (mm)	Theoretical reference speed (mm/s) Note)	Required flow rate (ℓ/min) (ANR)	Required composite effective cross-sectional area (mm^2)	Valve
				Single solenoid
ø125	250	1,100	16.1	4GB410-15 4KB410-15/4F510-15
	500	2,200	32.2	
	750	3,300	48.2	4F610-20
	1,000	4,400	64.4	
ø140	250	1,400	20.2	4GB410-15 4KB410-15/4F510-15
	500	2,800	40.4	4F610-20
	750	4,200	60.5	
	1,000	5,500	80.8	4F710-25
ø160	250	1,800	26.3	4GB410-15 4KB410-15/4F510-15
	500	3,600	52.6	4F610-20
	750	5,400	79.0	4F710-20
	1,000	7,200	104.7	-
ø180	250	2,300	33.3	4KB410-15 4F510-15
	500	4,600	66.6	4F710-20
	750	6,900	100.0	4F710-25
	1,000	9,200	132.5	-
ø200	250	2,800	41.2	4F610-20
	500	5,600	82.4	4F710-25
	750	8,400	122.7	-
	1,000	11,200	163.6	-
ø250	250	4,400	64.3	4F710-20
	400	7,000	103.0	4F710-25
	750	13,200	191.7	-
	1,000	17,600	255.6	-

*1: Refer to Intro Page 57 for piping specifications.

Suitable control components				
		Pneumatic auxiliary components		Piping *1
	Double solenoid	Speed controller	Silencer	Piping (between valve and cylinder)
	4GB420-15 4KB420-15/4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
		SC-20A	SLW-15A	Rc1/2 steel pipe
	4F620-20	SC-20A	SL-20A,SLW-20S	Rc3/4 steel pipe
		SC-20A	SL-20A	Rc3/4 steel pipe
	4GB420-15 4KB420-15/4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
	4F620-20	SC-20A	SL-20A,SLW-20S	Rc3/4 steel pipe
			SL-20A	Rc3/4 steel pipe
	4F720-25	SC-20A	SL-25A	Rc1 steel pipe
	4GB420-15 4KB420-15/4F520-15	SC-20A	SLW-15A	Rc1/2 steel pipe
	4F620-20	SC-20A	SL-20A	Rc3/4 steel pipe
	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe
	-	-	-	-
	4KB420-15 4F520-15	SC-20A	SLW-15A	Rc1/2 steel pipe
	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe
	4F720-25	SC-25A	SL-25A	Rc1 steel pipe
	-	-	-	-
	4F620-20	SC-20A	SL-20A,SLW-20S	Rc3/4 steel pipe
	4F720-25	SC-25A	SL-25A	Rc1 steel pipe
	-	-	-	-
	-	-	-	-
	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe
	4F720-25	SC-25A	SL-25A	Rc1 steel pipe
	-	-	-	-
	-	-	-	-

STEP 3 Clean air system components selection

Select a component with a max. flow rate equal to or higher than the [required flow rate] value in Table 2.
When controlling multiple cylinders with a single set of clean air system components, select the clean air system component with [max. flow rate] higher than [total required flow rates].

Table 3

F.R.L kit			F.R. unit		
Model No.	Port size	Max flow ℓ/min (Atm press conv value)	Model No.	Port size	Max flow ℓ/min (Atm press conv value)
C1000-6-W	Rc1/8	450	W1000-6-W	Rc1/8	800
C1000-8-W	Rc1/4	630	W1000-8-W	Rc1/4	1,150
C2000-8-W	Rc1/4	1,200	W2000-8-W	Rc1/4	1,500
C2000-10-W	Rc3/8	1,700	W2000-10-W	Rc3/8	2,000
C2500-8-W	Rc1/4	1,200	W3000-8-W	Rc1/4	2,150
C2500-10-W	Rc3/8	1,700	W3000-10-W	Rc3/8	2,430
C3000-8-W	Rc1/4	1,280	W4000-8-W	Rc1/4	2,500
C3000-10-W	Rc3/8	1,750	W4000-10-W	Rc3/8	4,350
C4000-8-W	Rc1/4	1,430	W4000-15-W	Rc1/2	4,750
C4000-10-W	Rc3/8	2,400	W8000-20-W	Rc3/4	10,000
C4000-15-W	Rc1/2	3,000	W8000-25-W	Rc1	10,000
C6500-20-W	Rc3/4	4,500	B7019-1C	Rc1/8	500
C6500-25-W	Rc1	5,000	B7019-2C	Rc1/4	900
C8000-20-W	Rc3/4	7,000			
C8000-25-W	Rc1	7,500			
K60570-1C-GB	Rc1/8	200			
K60570-2C-GB	Rc1/4	300			

Explanation of technical terms

[Theoretical reference speed]: indicates degree of cylinder speed, expressed as the following formula.
(This value coincides with speed at no load. When load is applied, speed drops considerably.)

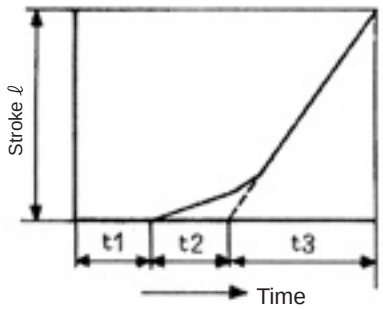
$$VO=1920 \times \frac{S}{A}=2445 \times \frac{S}{D^2} \quad (1)$$

VO: Theoretical reference speed (mm/s)
A: Cylinder sectional area (cm^2)
S: Composite effective cross-sectional area of circuit (exhaust air side) (mm^2)
D: Cylinder bore size (cm)

When expressed as a graph, the theoretical reference speed is the speed within the range where the cylinder moves at a uniform speed

$$VO=\frac{\ell}{t3} \text{ (mm/s)}$$

t1: Time until movement starts
t2: Time of primary delay
t3: Operating time with constant velocity
ℓ: Stroke length



* Note/t1 and t2 differ depending on load. At no load, this can be ignored to no ill effect.

■ F.R.L. kit, unit, regulator
Primary pressure 0.7 MPa, set pressure 0.5 MPa, pressure drop 0.1 MPa

■ Air filter
Primary pressure 0.7 MPa, pressure drop 0.02 MPa

■ Lubricator
Primary pressure 0.5 MPa, pressure drop 0.03 MPa

Air filter (F)			Regulator (R)			Lubricator (L)		
Model No.	Port size	Max flow ℓ/min (Atm press conv)	Model No.	Port size	Max flow ℓ/min (Atm press conv)	Model No.	Port size	Max flow ℓ/min (Atm press conv)
F1000-6-W	Rc1/8	460	R1000-6-W	Rc1/8	770	L1000-6-W	Rc1/8	550
F1000-8-W	Rc1/4	610	R1000-8-W	Rc1/4	1,350	L1000-8-W	Rc1/4	700
F2000-8-W	Rc1/4	1,300	R2000-8-W	Rc1/4	1,750	L3000-8-W	Rc1/4	1,100
F2000-10-W	Rc3/8	1,700	R2000-10-W	Rc3/8	2,500	L3000-10-W	Rc3/8	2,250
F3000-8-W	Rc1/4	1,230	R3000-8-W	Rc1/4	2,000	L4000-8-W	Rc1/4	1,000
F3000-10-W	Rc3/8	1,500	R3000-10-W	Rc3/8	2,600	L4000-10-W	Rc3/8	1,700
F4000-8-W	Rc1/4	1,320	R4000-8-W	Rc1/4	2,500	L4000-15-W	Rc1/2	2,700
F4000-10-W	Rc3/8	2,140	R4000-10-W	Rc3/8	4,400	L8000-20-W	Rc3/4	6,300
F4000-15-W	Rc1/2	3,000	R4000-15-W	Rc1/2	5,000	L8000-25-W	Rc1	10,000
F6000-20-W	Rc3/4	5,600	R6000-20-W	Rc3/4	7,000	A3019-1C	Rc1/8	100
F6000-25-W	Rc1	6,200	R6000-25-W	Rc1	7,700	A3019-2C	Rc1/4	400
F8000-20-W	Rc3/4	6,400	R8000-20-W	Rc3/4	14,000	3003E-6C	Rc3/4	3,500
F8000-25-W	Rc1	6,800	R8000-25-W	Rc1	11,000	3003E-8C	Rc1	4,000
A1019-1C	Rc1/8	550	B2019-1C	Rc1/8	500			
A1019-2C	Rc1/4	700	B2019-2C	Rc1/4	500			
1138-6C-E	Rc3/8	5,500	2215-6C	Rc3/4	14,000			
1138-8C-E	Rc1	7,000	2215-8C	Rc1	14,000			
			2215-10C	Rc1 1/4	14,000			

[Required flow rate]: indicates instantaneous flow rate for operating a cylinder with velocity *vo*, expressed with the following formula. Values in the table are when P = 0.5 MPa. The required flow rate is a value necessary to select clean air system components.

$$Q \approx \frac{Avo(P+0.101)\times 60}{0.101\times 10^4} \quad -(2)$$

Q: Required flow rate (ℓ/min) (ANR)
P: Supply pressure (MPa)

[Required effective sectional area]: indicates composite effective cross-sectional area for the exhaust circuit required for moving the cylinder at speed *vo*.
(Composite effective cross-sectional area of valve, speed controller, silencer or piping)

[Proper standard system]: indicates the most appropriate combination of valve, speed controller, silencer and bore size for operating a cylinder with velocity *vo*. The combination in the table is for a pipe length of 1 m.

System selection

A combination of the valve and the cylinder's standard system (example)

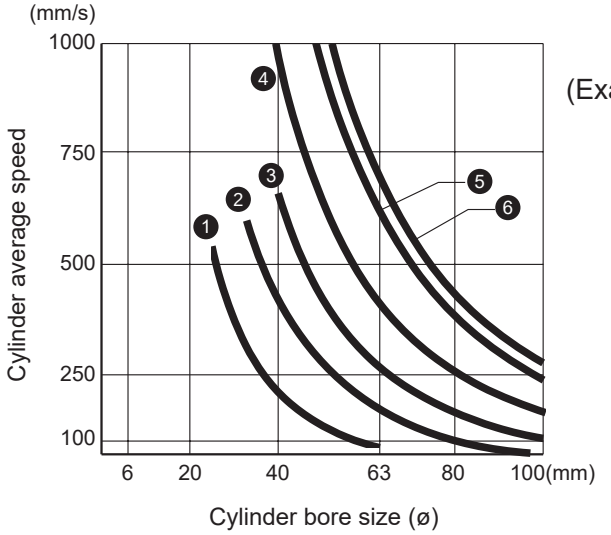
(1) The cylinder average speed is obtained from the combination of the valve and piping system. It is expressed as the cylinder's piston speed calculated by dividing the stroke length by the time that the piston rod takes from start to end of movement with the cylinder rod installed facing upward. When the load factor is 50%, the average speed should be approximately the cylinder's piston speed multiplied by 0.5. (Refer to Intro Page 53 for the relation of load factor and theoretical reference speed.)
(2) The cylinder's average speed is that when one cylinder is operated independently.
(3) The effective cross-sectional area of the solenoid valve used for the calculation below is the 2-position value.
(4) This selection guide is for reference. Check the selection with actual conditions using a sizing program.
(5) Graph for the 4G and 4K Series valve (2-position single, base piping) is shown as an example.

4G Series (With internal exhaust check valve)

(Example) The connection component system No. is ❷ for the 4G1 with a C6 port size.

Series	Base piping						System No.
	Model No.	Solenoid valve port size	Speed controller	Silencer	Piping (1 m)	Composite effective cross-sectional area (mm^2) Pipe length (1 m)	
4G1	M4GB110R	C4	SC3W-6-4	SLW-6S	ø4xø2.5	1.4	❶
	M4GB110R	C6	SC1-6	SLW-6S	ø6xø4	2.8	❷
4G2	M4GB210R	C6	SC1-8	SLW-8S	ø6xø4	4.5	❸
	M4GB210R	C8	SC1-10	SLW-8S	ø8xø5.7	6.7	❹
4G3	M4GB310R	C10	SC1-10	SLW-10L	ø10xø7.2	10.1	❺
	M4GB310R	C10	SC1-15	SLW-10L	ø12xø8.9	11.5	❻

* The system No. is indicated in the following graph.



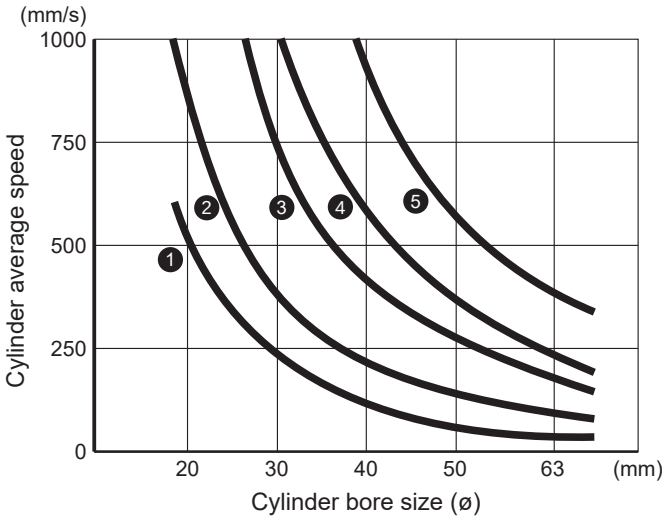
(Example) When using system ❷ with ø40 cylinder diameter, the cylinder's average speed is about 450 mm/s. (Note that this differs with working conditions.)

MN4G Series

(With internal exhaust check valve)

Series	Solenoid valve port size	Speed controller	Piping (1 m)	Common exhaust piping	Composite effective X-sectional area (mm^2)	System No.
MN4G1	C4	SC3W-M5-4	ø4xø2.5	ø6xø4x3 m	0.9	❶
	C4	SC3W-6-4	ø4xø2.5	ø6xø4x3 m	1.4	❷
	C6	SC1-6	ø6xø4	ø8xø5.7x3 m	2.8	❸
MN4G2	C6	SC1-6	ø6xø4	ø8xø5.7x3 m	3.8	❹
	C8	SC1-8	ø8xø5.7	ø10xø7.2x3 m	6.0	❺

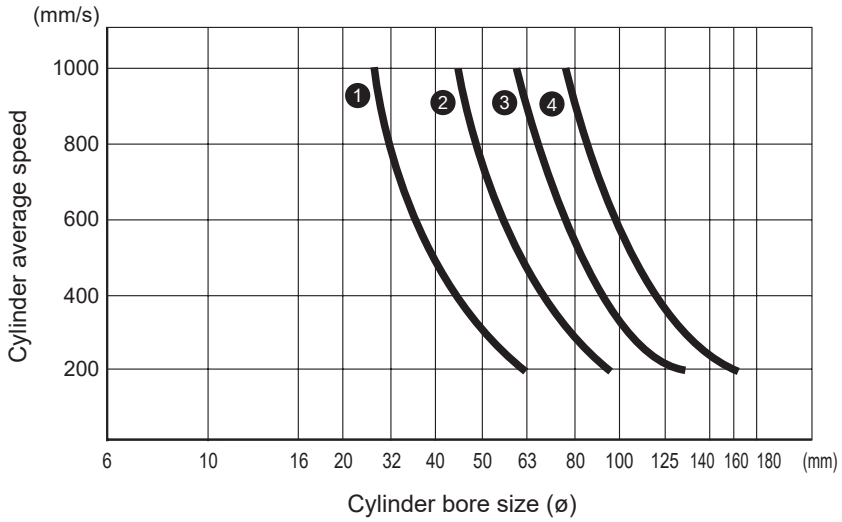
* The system No. is indicated in the following graph.
* This graph applies to common exhaust.



4K Series

Series	Solenoid valve port size	Speed controller	Silencer	Piping (1 m)	Composite effective X-sectional area (mm^2)	System No.
4KB110	C6	SC1-6	SLW-6S	ø6xø4	3.2	❶
4KB210	C8	SC1-8	SLW-8S	ø8xø5.7	7.7	❷
4KB310	C10	SC1-10	SLW-10L	ø10xø7.2	14.1	❸
4KB410	C15	SC1-15	SLW-15A	ø12xø8.9	23.6	❹

* The system No. is indicated in the following graph.



System selection

2 Selecting from the load value and operation time

How to select

When load (N) and cylinder required operation time (S) are already decided, use [System selection 2] to select an appropriate model. Follow the following procedures.

STEP 1

[Confirming conditions]
Load value (N),
Required operation time (S)

↓

STEP 2

Selecting cylinder bore size

From Graph 1

↓

STEP 3

Selecting theoretical reference speed

From Graph 2

↓

STEP 4

Selecting a suitable system

From Graph 3

↓

STEP 5

Selecting suitable components

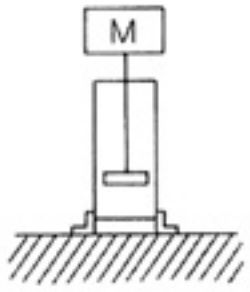
From Table 1

STEP 1 Confirming conditions

(1) Load	F=□(N)
(2) Required operation time	t =□(s)
(3) Stroke	L=□(mm)
(4) Pressure	P=□(MPa)

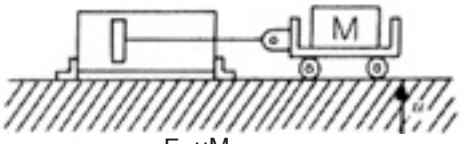
M: Weight of body (kg)
μ : Friction coefficient (normally μ≈ 0.3)
F : Load (N)
g : 9.8 m/s²

● Vertical



F=Mg

● Horizontal



F=μMg

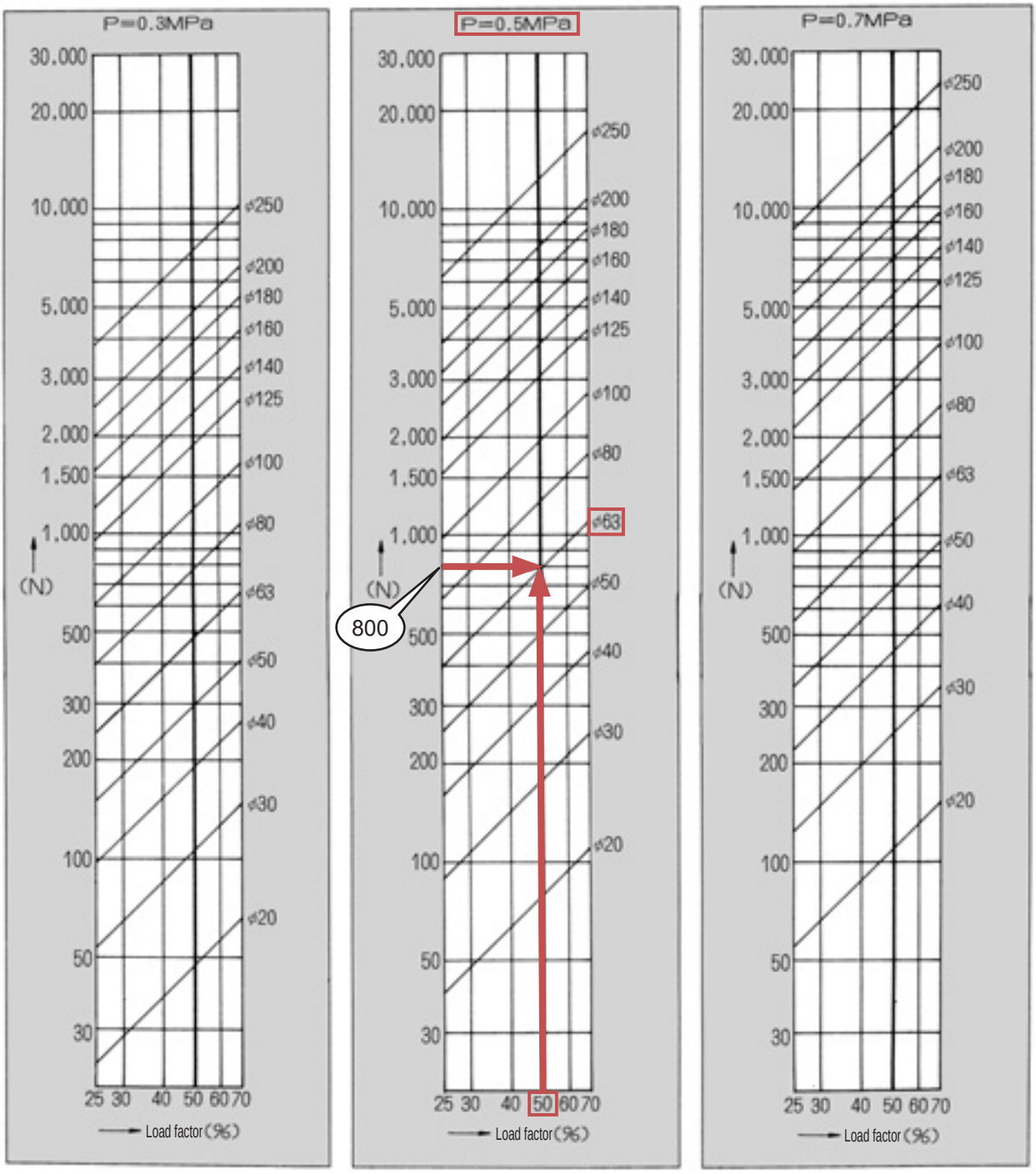
STEP 2 Selecting cylinder bore size

According to the nomogram for cylinder bore size, select the cylinder bore size and read the load factor at the same time. (Normally, for value F of “Step 1 Confirming conditions”, read the cylinder bore size whose load factor is close to 50%)

Cylinder bore size D = ø□

(Example) When F = 800N, P = 0.5 MPa, cylinder bore size is ø63 at Load factor 50% .

Graph 1 Nomogram to find cylinder bore size



STEP 3 Selecting theoretical reference speed

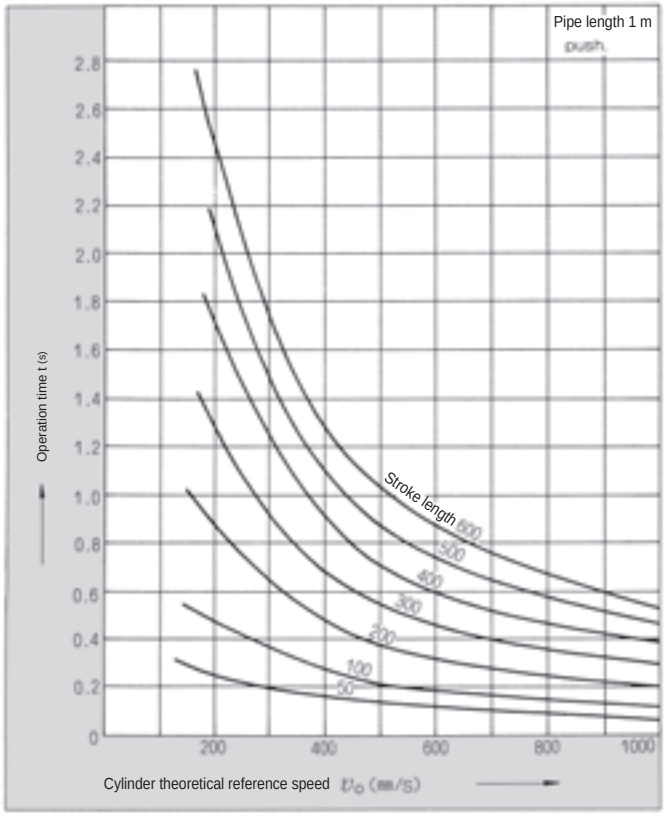
According to t-*vo* graph, read *vo* value to obtain the required operation time t (sec).

vo=□

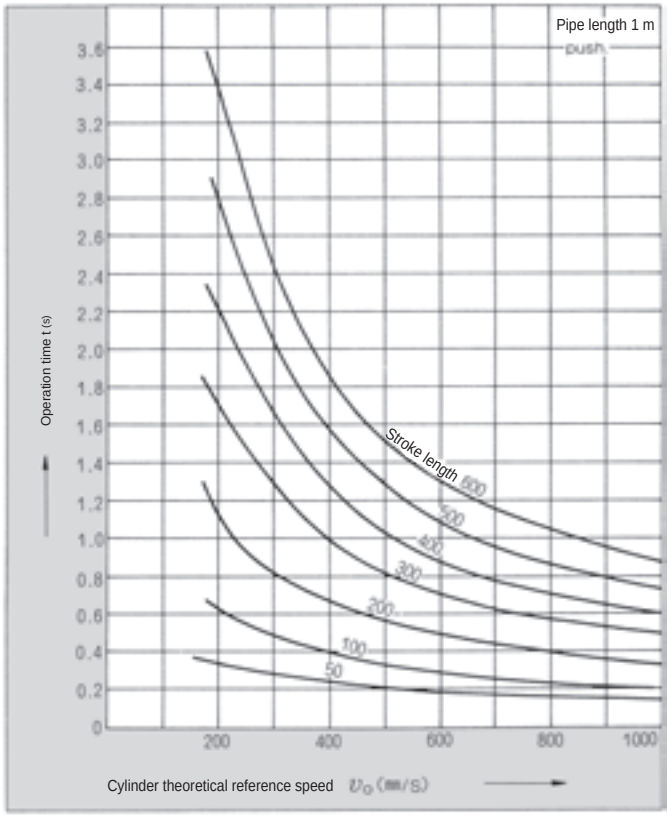
(Example) When Load factor 50% and Stroke length of 200mm cylinder operate with 1.0sec, theoretical reference speed is 450 mm/s.

Graph 2 t-*vo* graph

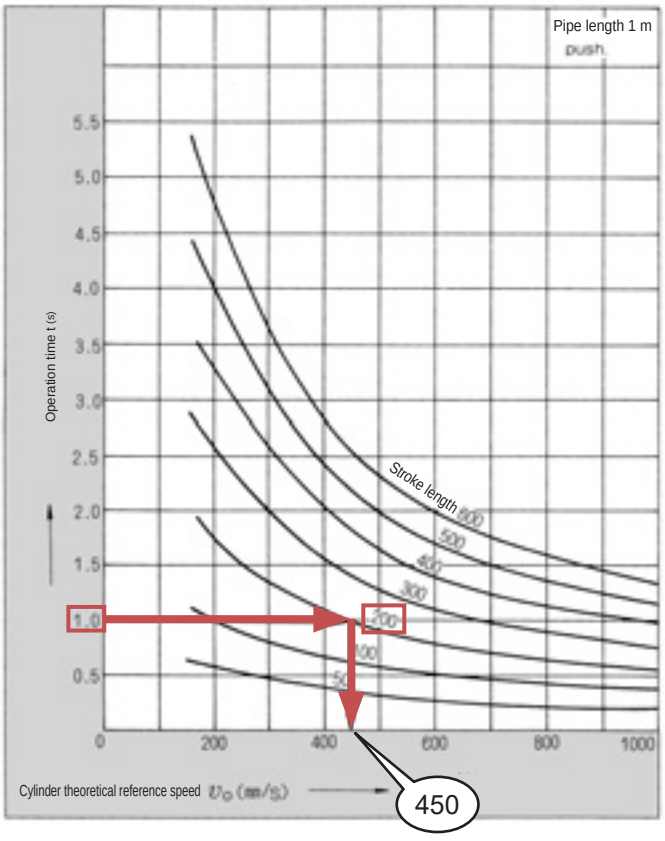
Load factor 0%



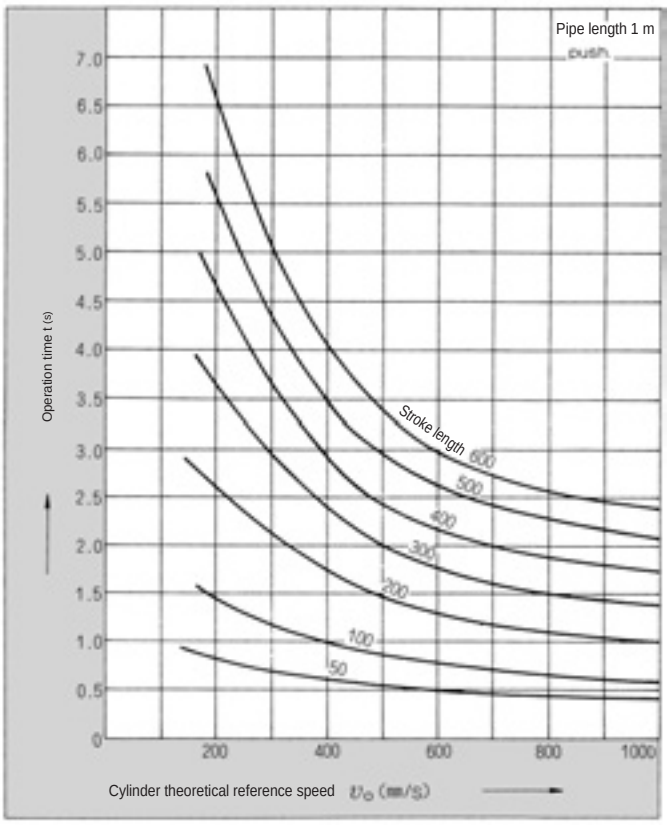
Load factor 25%



Load factor 50%



Load factor 70%



System selection

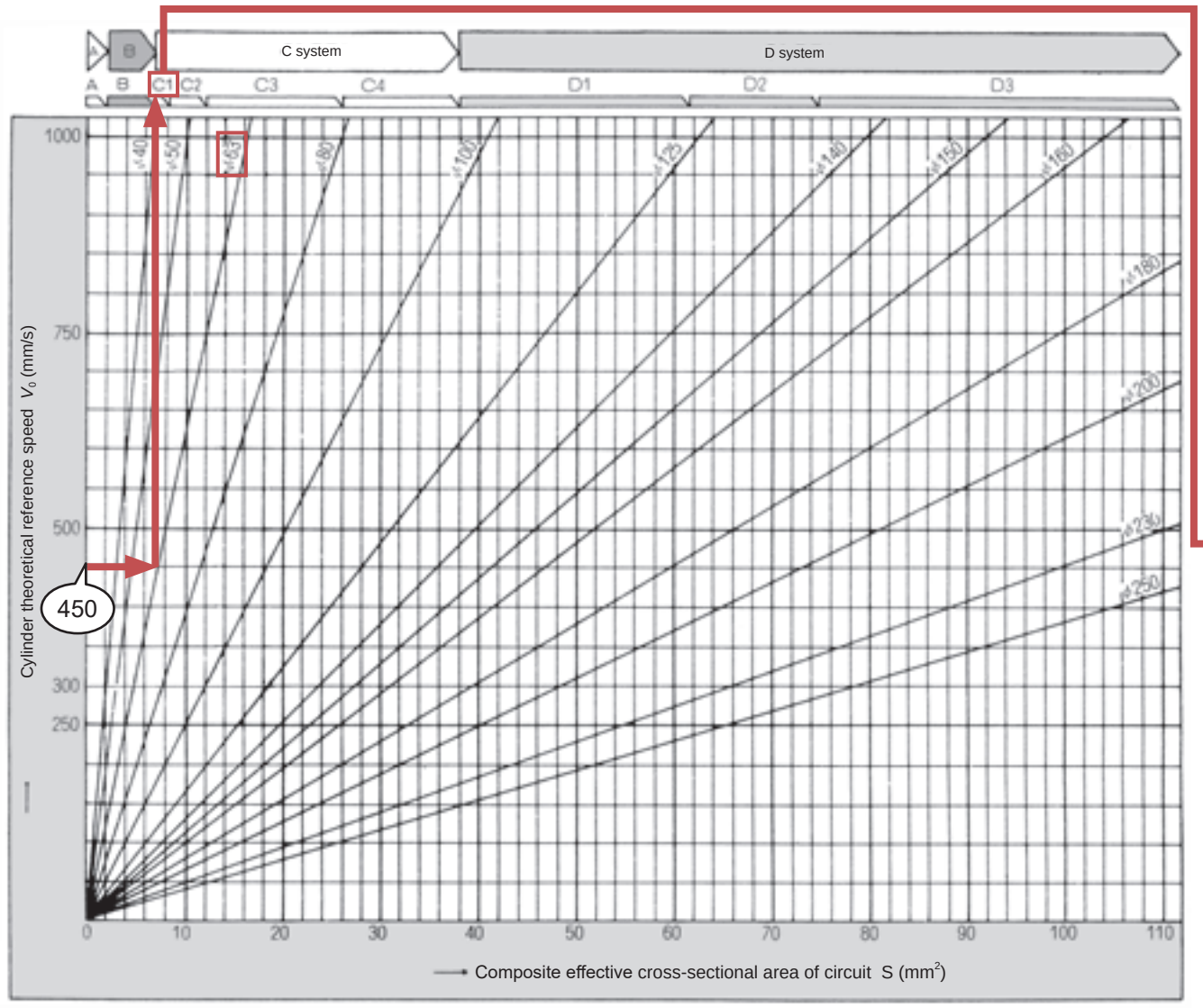
STEP 4 Selecting a suitable system

In the system selection table, find the cross point of *VO* obtained in [STEP 3 Selecting theoretical reference speed] and øD obtained in [STEP 2 Selecting cylinder bore size], and from the cross point, trace a line extended straight up to read the system code.

System code ▭

(Example) In order to operate ø63 cylinder at theoretical reference speed 450 mm/s, C1 system is ideal.

Graph 3 System selection table



STEP 5 Selecting suitable components

According to the standard system table, confirm the model No. of proper system components with the code found in [STEP 4 Selecting a suitable system].

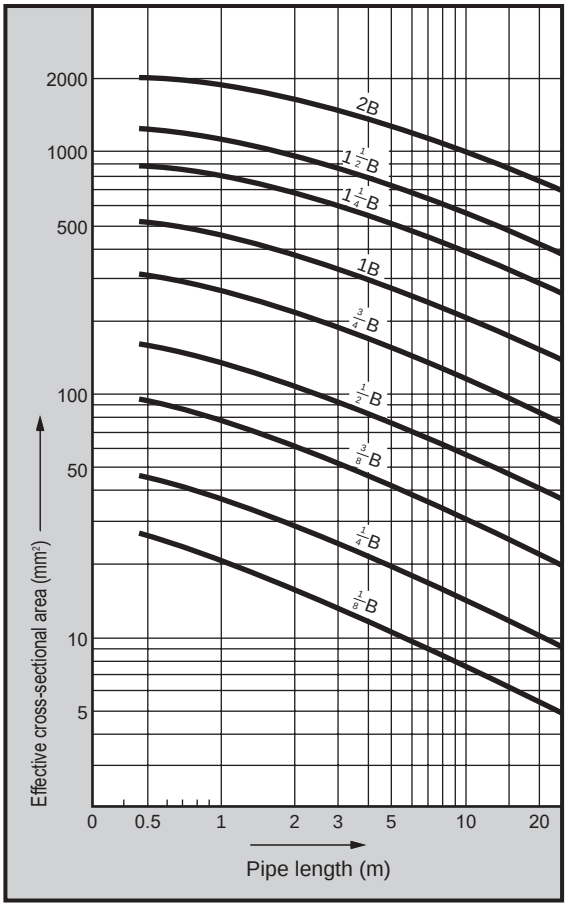
	(Example) CI system
Valve ☐	Valve: Single 4KB210-08 or 4GB310R-08 Double 4KB220-08 or 4GB320R-08
Speed controller ☐	Speed controller: SCI-8
Silencer ☐	Silencer: SLW-8A
Piping ☐	Piping: ø10 x ø7.2 nylon tube 1 m

Table 1 Standard system table

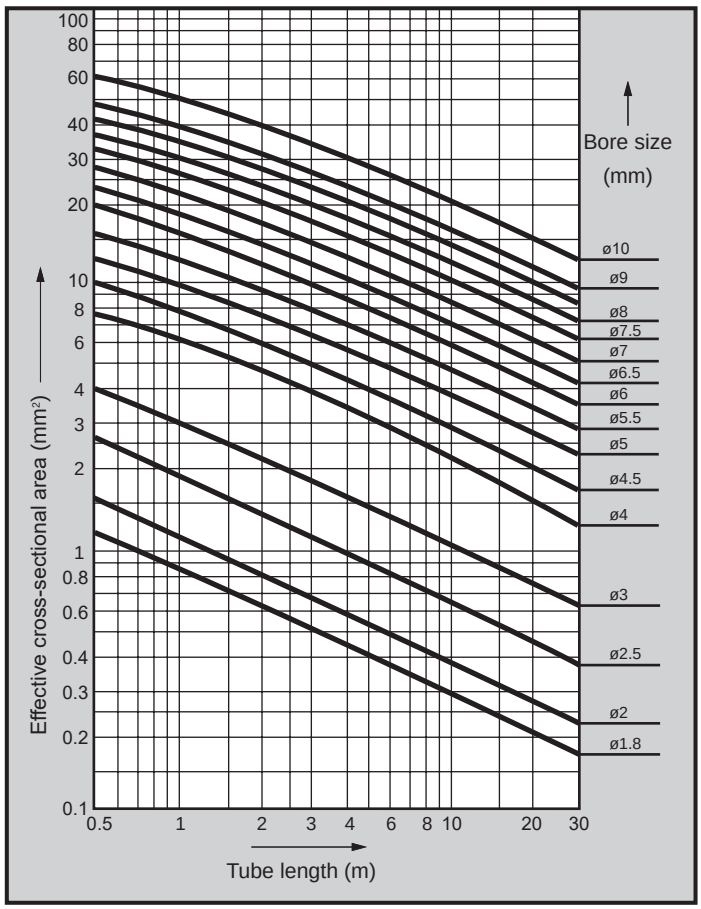
Standard system No.	Valve		Speed controller	Silencer	Piping	Composite eff X-sect area (mm^2) pipe 1 m
	Single solenoid	Double solenoid				
A	4SB010-M5 4KA110-GS4	4SB020-M5 4KA120-GS4	SC3W-M5-4 (SC-M5)	SLM-M5	ø4×ø2.5 Nylon tube	0.9
B1	4KA110-GS6 4KB110-06	4KA120-GS6 4KB120-06	SC3W-6-6 SCL2-06-H66	SLM-M5 SLW-6A	ø6×ø4 Nylon tube	2.0
B2	4KB110-06 4GB110R-06	4KB120-06	SC1-6 SCL2-08-H88	SL-M5 SLW-6A	ø8×ø5.7 Nylon tube	3.0
B3	4GB210R-06 4KB210-06	4KB220-06	SC1-6 SCL2-08-H88	SLW-6A SLW-6S	ø8×ø5.7 Nylon tube	5.2
B4	4GB210R-08 4KB210-08	4GB220R-08 4KB220-08	SC1-8 SCL2-10-H1010	SLW-6A SLW-8A	ø10×ø7.2 Nylon tube	6.4
C1	4GB210R-08 4KB210-08 4F210-08	4GB220R-08 4KB220-08 4F220-08	SC1-8 SCL2-10-H1010	SLW-8A SLW-8S	ø10×ø7.2 Nylon tube	7.8
C2	4GB310R-10 4F310-10 4KB310-10	4GB320R-10 4F320-10 4KB320-10	SC1-10	SLW-10A	ø10×ø7.2 Nylon tube or Rc3/8 steel pipe	12
C3	4GB410-15 4F510-15 4KB410-15	4GB420-15 4F520-15 4KB420-15	SC1-15	SLW-15A	Rc1/2 steel pipe	27
C4	4GB410-15 4F510-15 4KB410-15	4GB420-15 4F520-15 4KB420-15	SC-20A	SLW-15A	Rc1/2 steel pipe	38
D1	4F610-20	4F620-20	SC-20A	SL-20A	Rc3/4 steel pipe	64
D2	4F710-20	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe	80
D3	4F710-25	4F720-25	SC-25A	SL-25A	Rc1 steel pipe	112

Effective cross-sectional area for steel pipes and nylon tubes, and recommended max. flow rate for gas pipes

Effective cross-sectional area of steel pipe



Effective cross-sectional area of nylon tube



Recommended max. flow rate table of gas tube

Nominal size	1/8B	1/4B	3/8B	1/2B	3/4B	1B	1 1/4B	1 1/2B
Pressure drop MPa (*1)	0.124	0.0707	0.0576	0.0425	0.0276	0.0209	0.0133	0.0105
Inlet pressure MPa	Recommended max. flow rate (ℓ/min)							
0.05	127	244	518	838	1,465	2,460	3,870	5,150
0.1	146	282	598	965	1,690	2,828	4,460	5,950
0.15	163	314	668	1,076	1,885	3,150	4,960	6,630
0.2	179	344	730	1,180	2,060	3,450	5,430	7,280
0.3	206	395	840	1,360	2,375	3,900	6,300	8,400
0.4	230	442	940	1,520	2,660	4,450	7,000	9,360
0.5	252	485	1,030	1,660	2,920	4,875	7,700	10,250
0.6	272	523	1,110	1,800	3,140	5,250	8,300	11,050
0.7	292	558	1,185	1,920	3,350	5,620	8,870	11,800
0.8	308	592	1,260	2,035	3,560	5,970	9,430	12,570
0.9	324	623	1,325	2,140	3,745	6,290	9,900	13,220
1.0	340	654	1,395	2,250	3,930	6,600	10,400	13,880
1.2	370	717	1,510	2,450	4,280	7,150	11,250	15,040
1.4	398	763	1,625	2,624	4,590	7,700	12,100	16,200
1.5	410	790	1,680	2,710	4,740	7,930	12,550	16,780

(*1: Inlet pressure = 0.5 MPa
Gas pipe length: 10 m)

(Remarks)

In the main line where the piping distance tends to increase, it is necessary to consider a pressure drop occurring at the end of the main line when air passes.

The recommended max. flow rate refers to the max. flow rate that can be recommended in the range of allowable pressure drop with respect to piping length, determined from actual use.

This does not mean that a higher flow is not possible, but rather that the pressure will further decrease if the flow exceeds this value.

Flow characteristics display method

1. Flow characteristics display

The catalog specifications indicate the flow rate as follows.

Applicable components	Display	Code	Standards
Pneumatic components	JIS compliant display	C, b	ISO 6358:1989 "Pneumatic fluid Components -Flow characteristics test method"JIS B 8390:2000 (ISO 6358 translation)
	Conventional indication	S	JIS B 8379:1995 "Pneumatic noise reduction device"
		Cv	ANSI(NFPA)T3. 21. 3 R1-2008

2. Explanation

Pneumatic componentsflow characteristics are, Conventionally, effective cross-sectional area S are shown in, JIS revised (JIS B 8390:2000), sonic conductance# C and critical pressure ratio b Now it is displayed by the pair of.

- Sonic conductance C :Value obtained by dividing the passage mass flow of the choked flow Component by the product of the upper limit absolute pressure and standard condition density. (sonic conductance) S≈5.0C (C enables sizing as before.)
- Critical pressure ratio b:Pressure at which choked flow results if smaller than this value (Downstream pressure/Upstream pressure) (critical pressure ratio)
- Effective cross-sectional area S (mm^2):The value of the ideal restricted cross-sectional area without friction or compressed flow, calculated from the pressure changes inside the air tank when the choked flow is released from the components mounted on the air tank.

*Choked flow: Flow in which upstream pressure is higher than downstream pressure, and speeds at Components sections reach acoustic velocity. The fluid's mass flow rate is proportional to the upstream pressure, and is not dependent on downstream pressure.(Choked flow)

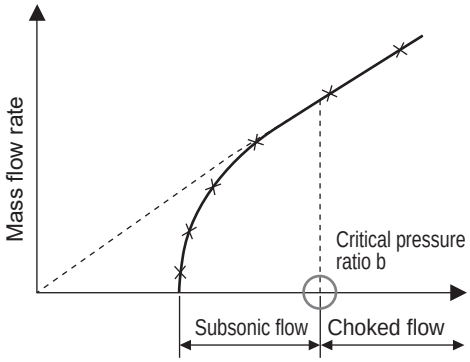


Fig. 1 Mass flow characteristics for upstream pressure

Flow rate formula

Depending on the actual unit, they are shown as follows.

- Choked flow when $\frac{P_2}{P_1} \leq b$

$$Q=600\times C\times P_1 \times \sqrt{\frac{293}{273+T}} \quad \text{.....(1)}$$

- Subsonic flow when $\frac{P_2}{P_1} > b$

$$Q=600\times C\times P_1 \times \sqrt{1-\left[\frac{\frac{P_2}{P_1}-b}{1-b}\right]^2} \times \sqrt{\frac{293}{273+T}} \quad \text{.....(2)}$$

Q : Flow rate in standard condition L/min(ANR)
C : Sonic conductance [$dm^3/(s\cdot bar)$]
b : Critical pressure ratio
S : Effective cross-sectional area mm^2
P_1 : Primary side absolute pressure MPa(abs)
P_2 : Secondary side absolute pressure MPa(abs)
T : Air temperature °C

To calculate effective cross-sectional area S, substitute the value C obtained with C = S/5 above in the above formula.
For subsonic flow, Substitute b=0.5 in the formula.