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Origa Valves

Catalog 0952



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Warning, Offer of Sale

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Parker Hannifin Corporation
Pneumatic Division
Wadsworth, OH
www.parkeroriga.com

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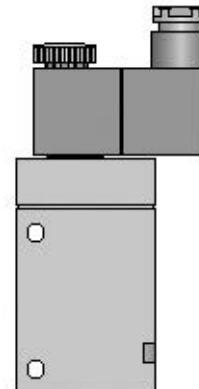
3/2-Way Valve 1/8

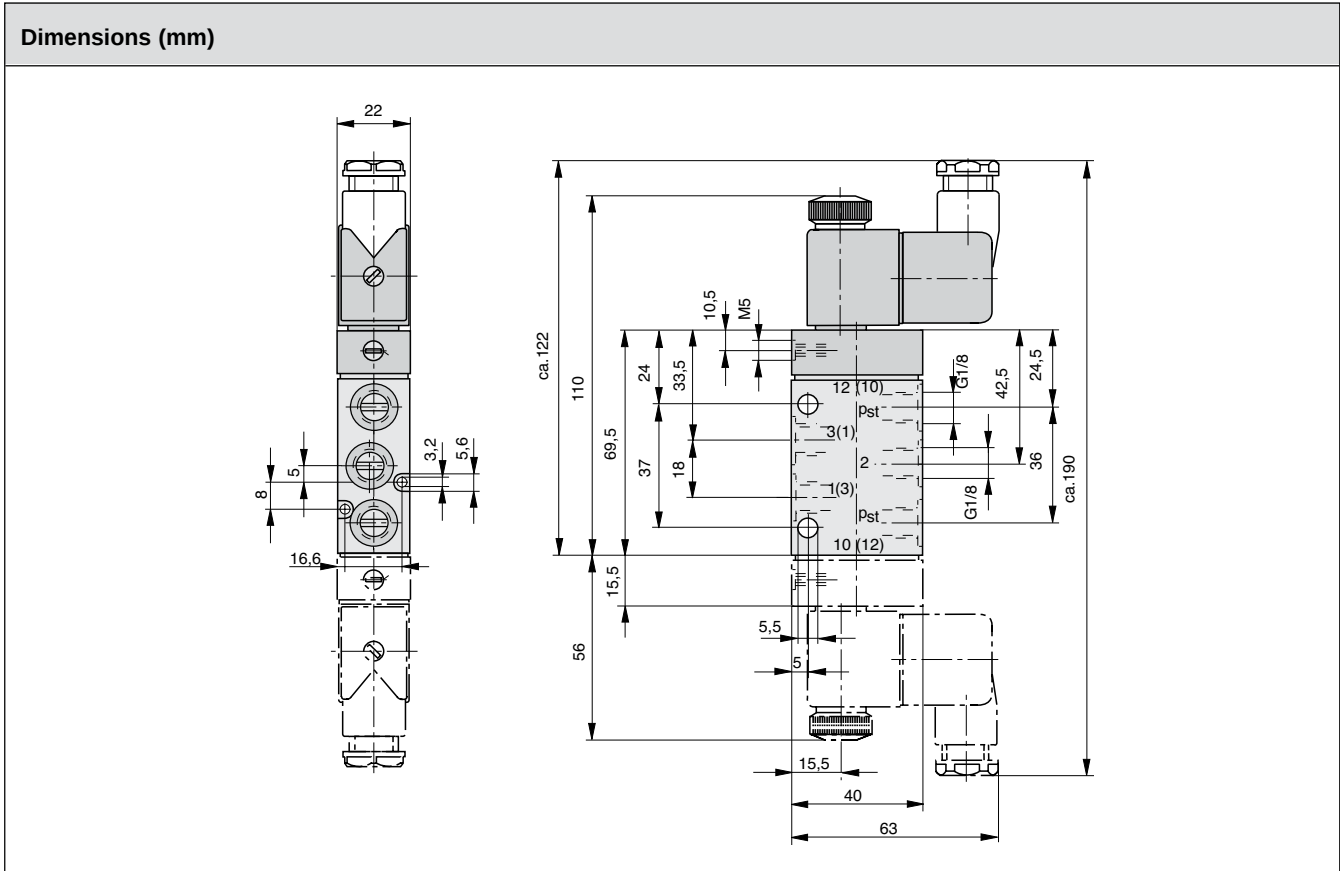
Actuation: Solenoid

- Single Solenoid
- Double Solenoid

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6 (M3)			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	.54 (0.247) Single solenoid .84 (0.382) Double solenoid			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	Single solenoid 29 (2) 145 (10)			
	p _{min} p _{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	.45 (450)			
Actuation						
Electrical			Pilot operated			
Voltage			AC	DC		
Nominal voltage* Standard version	U _n	V	220	24		
Initial power consumption Standard version		VA (W)	8.5	2.5		
Continuous consumption Standard version		VA (W)	6.0	2.5		
Duty cycle	ED	%	Continuous Duty			
Electrical protection			IP65 to DIN 40050 (with plug)			
Insulating material			VDE 0580			
Connection			Plug to DIN 43650 form B			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448





Version 1/8		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
3/2 Single Solenoid/Spring Return		S9 381RF-1/8-NG-..	PA 10297-..33	S9 381RF-1/8U-NG-..	PD 43295-..33
3/2 Single Solenoid/Spring Return		S9 381RF-1/8-NO-..	PA 10298-..33	S9 381RF-1/8U-NO-..	PD 45459-..33
3/2 Double Solenoid		S9 381-1/8-..	PA 10299-..33	S9 381-1/8U-..	PD 45460-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3674	01
24 vDC	60 50/60Hz	KZ 3673	02
110 50/60Hz	48 vDC	KZ 3669	57
220 50/60Hz	110 vDC	KZ 3672	61
24 50/60Hz	--	KZ 3675	51



- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

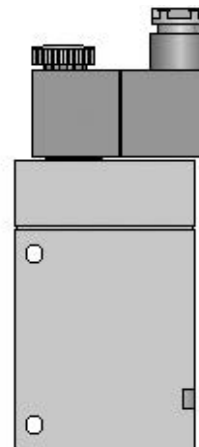
3/2-Way Valve 1/4

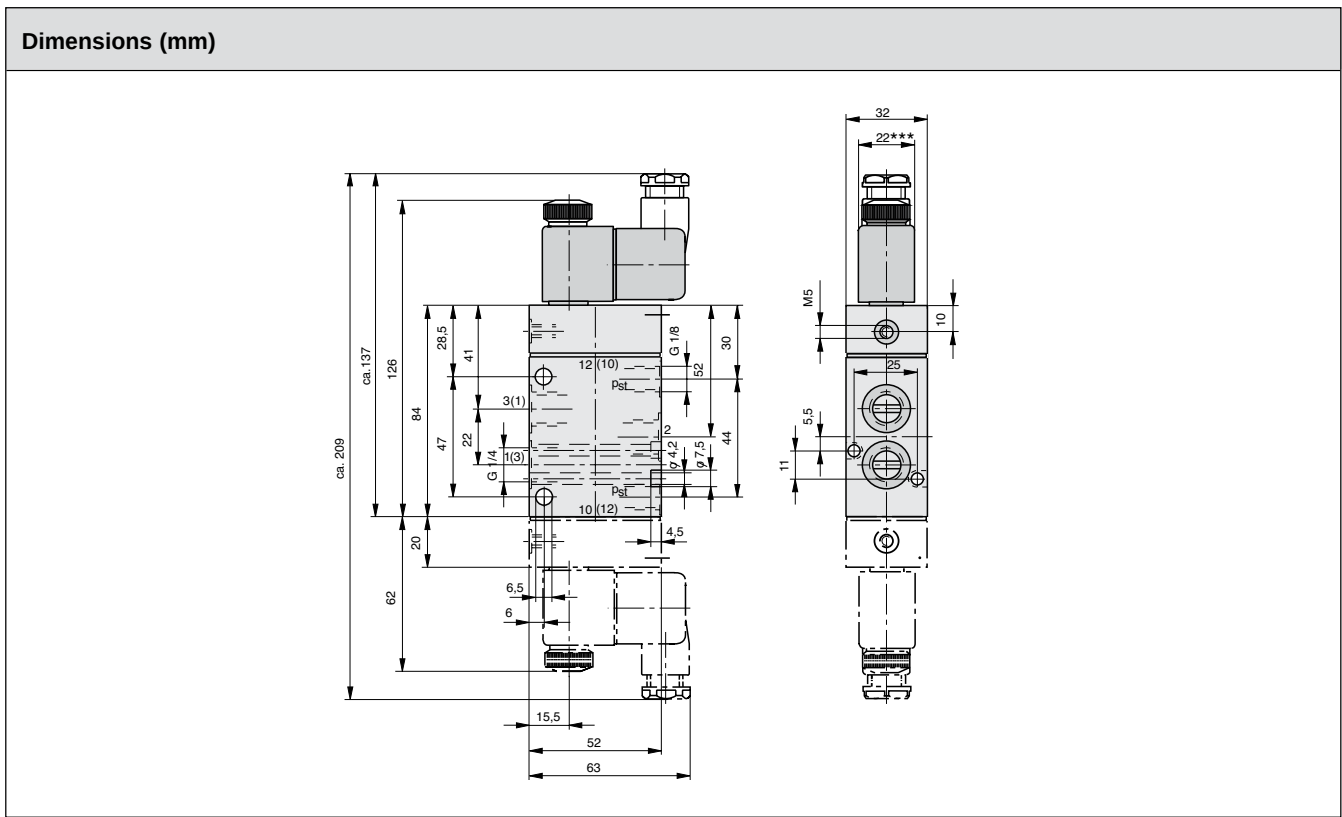
Actuation: Solenoid

- Single Solenoid
- Double Solenoid

Characteristics to VDI 3290		Pressures quoted as gauge pressure		
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6 (M4)	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.1 (0.5) Single solenoid 1.32 (0.6) Double solenoid	
Installation			In any position	
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication ¹⁾	
Pneumatic Characteristics				
Nominal pressure	p _n	psi (bar)	87 (6)	
Operating pressure range	p _{min} p _{max}	psi (bar)	Single solenoid 29 (2) 145 (10)	
	p _{min} p _{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)	
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)	
Actuation				
Electrical			Pilot operated	
Voltage			AC	DC
Nominal voltage* Standard version	U _n	V	220	24
Initial power consumption Standard version		VA (W)	8.5	2.5
Continuous consumption Standard version		VA (W)	6.0	2.5
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448





Version 1/4		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
3/2 Single Solenoid/Spring Return		S9 381RF-1/4-NG-..	PA 12716-..33	S9 381RF-1/4U-NG-..	PD 45461-..33
3/2 Single Solenoid/Spring Return		S9 381RF-1/4-NO-..	PA 12717-..33	S9 381RF-1/4U-NO-..	PD 45462-..33
3/2 Double Solenoid		S9 381-1/4-..	PA 12718-..33	S9 381-1/4U-..	PD 45463-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3674	01
24 vDC	60 50/60Hz	KZ 3673	02
110 50/60Hz	48 vDC	KZ 3669	57
220 50/60Hz	110 vDC	KZ 3672	61
24 50/60Hz	--	KZ 3675	51



- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

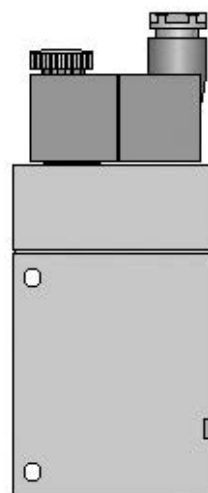
3/2-Way Valve 1/2

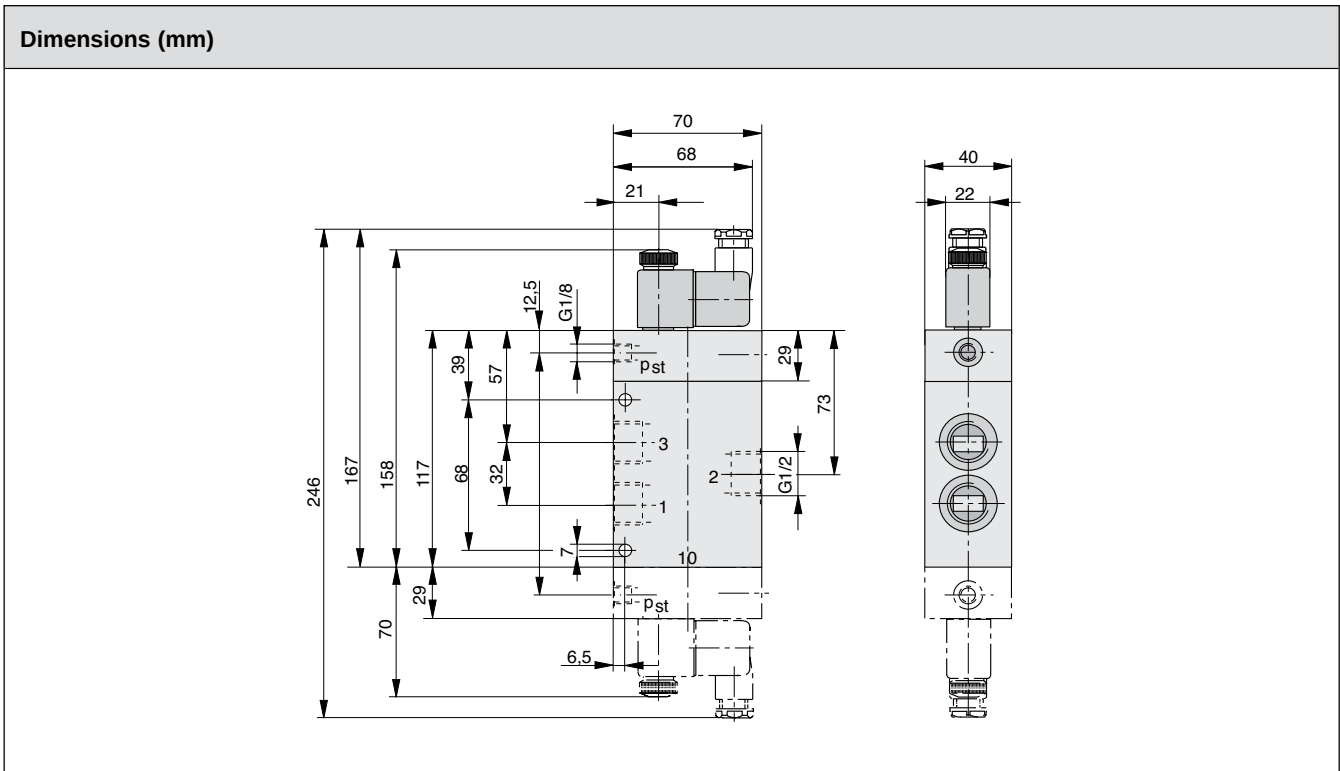
Actuation: Solenoid

- Single Solenoid
- Double Solenoid

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/2			
Weight (mass)		lbs. (kg)	1.69 (0.77) Single solenoid 1.32 (0.60) Double solenoid			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	Single solenoid 29 (2) 145 (10)			
		psi (bar)	Double solenoid 22 (1.5) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	3.5 (3500)			
Actuation						
Electrical			Pilot operated			
Voltage			AC	DC		
Nominal voltage* Standard version	U _n	V	220	24		
Initial power consumption Standard version		VA (W)	11	4.8		
Continuous consumption Standard version		VA (W)	8.5	4.8		
Duty cycle	ED	%	Continuous Duty			
Electrical protection			IP65 to DIN 40050 (with plug)			
Insulating material			VDE 0580			
Connection			Plug to DIN 43650 form B			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448





Version 1/2		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
3/2 Single Solenoid/Spring Return		S9 381RF-1/2-NG-..	PA 16412-..33	S9 381RF-1/2U-NG-..	PD 45464-..33
3/2 Single Solenoid/Spring Return		S9 381RF-1/2-NO-..	PA 16413-..33	S9 381RF-1/2U-NO-..	PD 45465-..33
3/2 Double Solenoid		S9 381-1/2-..	PA 16414-..33	S9 381-1/2U-..	PD 45466-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3518	01
24 vDC	60 50/60Hz	KZ 3519	02
110 50/60Hz	48 vDC	KZ 3521	57
220 50/60Hz	110 vDC	KZ 3522	61



- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

Characteristics

5/2-Way & 5/3-Way Valve, 1/8, 1/4, 1/2 Inch

Features					
Type			Spool Valve		
Mounting			2 Screws		
Port connection			Threaded		
Port size		G/NPT	1/8 • 1/4 • 1/2		
Installation			In Any Position		
Ambient temperature range	min max		14°F (-10°C) 140°F (+60°C)	Note: When using below freezing point it is necessary to consult factory.	
Medium temperature range	min max		14°F (-10°C) 158°F (+70°C)		
Medium			Filtered Compressed Air		
Lubrication			With or Without Oil Mist Lubrication ¹⁾		
Pneumatic Characteristics					
Body Size			5/2 Position Single Double		5/3 Position Double
1/8	Minimum Pressure psi (bar) Maximum Pressure psi (bar) Flow Cv (l/min) Weight lbs. (kg)		29 (2) 145 (10) 0.5 (500) 0.62 (0.28)	22 (1.5) 145 (10) 0.5 (500) 0.91 (0.415)	29 (2) 145 (10) 0.6 (600) 0.94 (0.425)
1/4	Minimum Pressure psi (bar) Maximum Pressure psi (bar) Flow Cv (l/min) Weight lbs. (kg)		29 (2) 145 (10) 1.3 (1300) 1.32 (0.6)	22 (1.5) 145 (10) 1.3 (1300) 1.54 (0.7)	29 (2) 145 (10) RFG,RFB:1.3(1300) RFE:1.0 (1000) 1.54 (0.7)
1/2	Minimum Pressure psi (bar) Maximum Pressure psi (bar) Flow Cv (l/min) Weight lbs. (kg)		32 (2.2) 145 (10) 3.5 (3500) 2.2 (1.0)	22 (1.5) 145 (10) 3.5 (3500) 2.43 (1.1)	36 (2.5) 145 (10) RFE:3.3 (3300) RFG:3.5 (3500) RFB:3.6 (3600) 2.43 (1.1)
Voltage			AC		DC
Nominal Voltage	Standard Version		V	24, 110, 220	12, 24
				Others Contact Factory	
Power Consumption					
Inrush	Body Size: 1/8 • 1/4			Body Size: 1/2	
	AC		DC	AC	
	50 HZ	60 HZ		50 HZ	60 HZ
12 24 110 220	— 8.5VA 8.5VA 8.5VA	— 8.5VA 8.5VA 8.5VA	2.8 W 2.5 W 2.7 W 3.5 W	10.4VA 10.4VA 10.4VA 10.4VA	10.4VA 10.4VA 10.4VA 10.4VA
Holding	Body Size: 1/8 • 1/4			Body Size: 1/2	
	AC		DC	AC	
	50 HZ	60 HZ		50 HZ	60 HZ
12 24 110 220	— 6.0VA 6.0VA 6.0VA	— 6.0VA 4.9VA 4.9VA	2.8 W 2.5 W 2.7 W 3.5 W	8.5VA 8.5VA 8.2VA 8.5VA	8.5VA 8.5VA 6.6VA 6.9VA
Duty cycle		ED	%	Continuous Duty	
Electrical protection				IP65 to DIN 40050 (with plug)	
Installing material				VDE 0580	
Connection				Plug to DIN 43650 Form B	

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

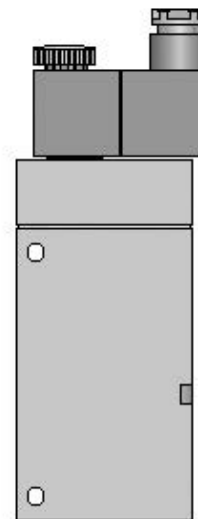
5/2-Way Valve

5/3-Way Valve

1/8 • 1/4 • 1/2

Actuation: Solenoid

- Single Solenoid
- Double Solenoid



VERSION 1/8		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/2 Single Solenoid/Spring Return		S9 581RF-1/8-..	PA 10312-..33	S9 581RF-1/8 U-..	PD 40663-..33
5/2 Double Solenoid		S9 581-1/8-..	PA 10313-..33	S9 581-1/8 U-..	PD 40664-..33
5/3 Double Solenoid/Center Blocked		S9 581RFG-1/8-..	PA 10333-..33	S9 581RFG-1/8 U-..	PD 40736-..33
5/3 Double Solenoid/Center Exhaust		S9 581RFE-1/8-..	PA 10334-..33	S9 581RFE-1/8 U-..	PD 40737-..33
5/3 Double Solenoid/Dual Center		S9 581RFB-1/8-..	PA 10335-..33	S9 581RFB-1/8 U-..	PD 40738-..33
VERSION 1/4		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/2 Single Solenoid/Spring Return		S9 581RF-1/4-..	PA 12679-..33	S9 581RF-1/4 U-..	PD 40665-..33
5/2 Double Solenoid		S9 581-1/4-..	PA 12680-..33	S9 581-1/4 U-..	PD 40666-..33
5/3 Double Solenoid/Center Blocked		S9 581RFG-1/4-..	PA 12705-..33	S9 581RFG-1/4 U-..	PD 40739-..33
5/3 Double Solenoid/Center Exhaust		S9 581RFE-1/4-..	PA 12706-..33	S9 581RFE-1/4 U-..	PD 40740-..33
5/3 Double Solenoid/Dual Center		S9 581RFB-1/4-..	PA 12707-..33	S9 581RFB-1/4 U-..	PD 40741-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3674	01
24 vDC	60 50/60Hz	KZ 3673	02
110 50/60Hz	48 vDC	KZ 3669	57
220 50/60Hz	110 vDC	KZ 3672	61
24 50/60Hz	--	KZ 3675	51

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



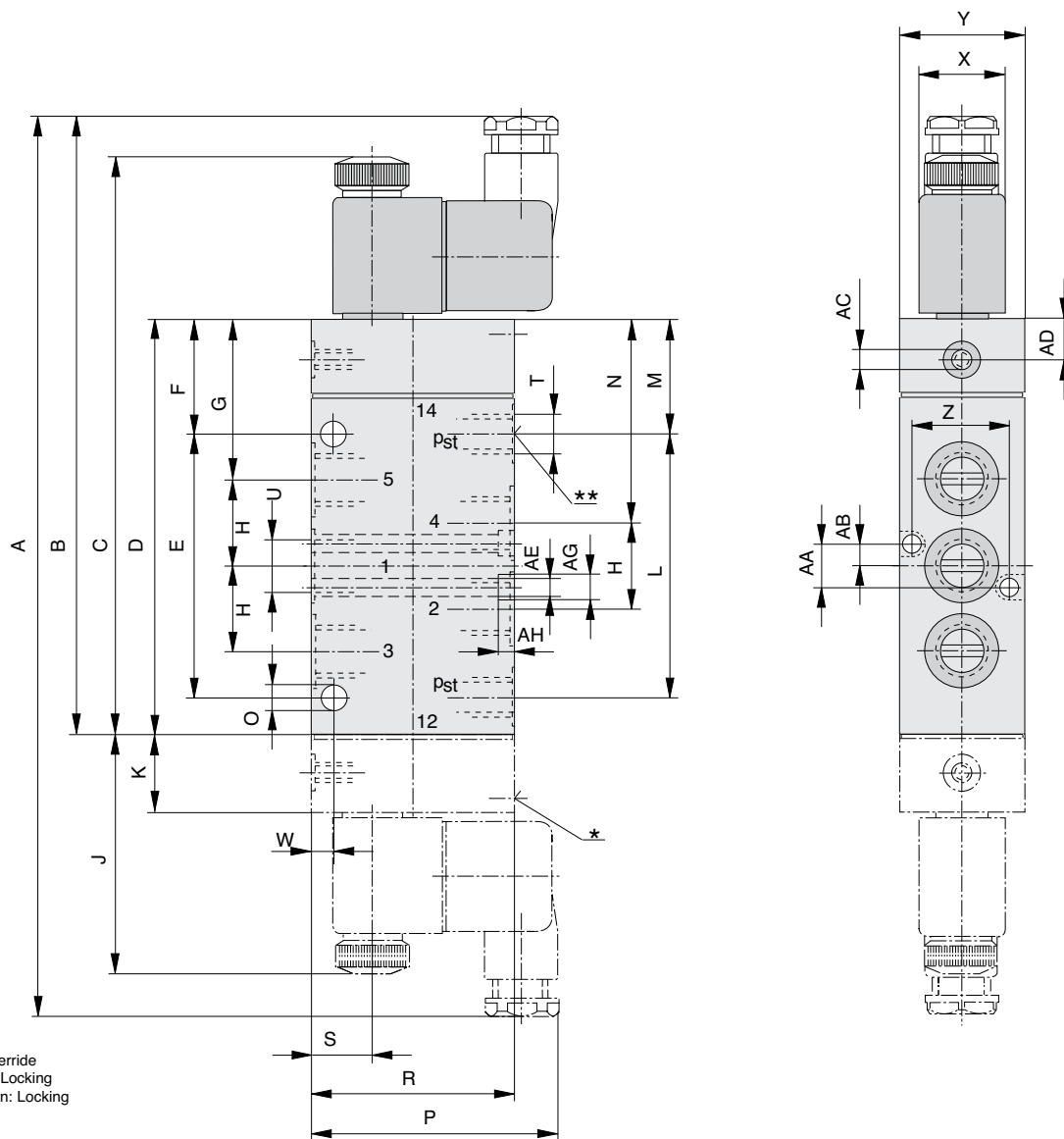
VERSION 1/2		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/2 Single Solenoid/Spring Return		S9 581RF-1/2-..	PA 16171-..33	S9 581RF-1/2U-..	PD 37950-..33
5/2 Double Solenoid		S9 581-1/2-..	PA 16172-..33	S9 581-1/2U-..	PD 37951-..33
5/3 Double Solenoid/Center Blocked		S9 581RFG-1/2-..	PA 16176-..33	S9 581RFG-1/2U-..	PD 37971-..33
5/3 Double Solenoid/Center Exhaust		S9 581RFE-1/2-..	PA 16177-..33	S9 581RFE-1/2U-..	PD 37972-..33
5/3 Double Solenoid/Dual Center		S9 581RFB-1/2-..	PA 16178-..33	S9 581RFB-1/2U-..	PD 37973-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3518	01
24 vDC	60 50/60Hz	KZ 3519	02
110 50/60Hz	48 vDC	KZ 3521	57
220 50/60Hz	110 vDC	KZ 3522	61

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



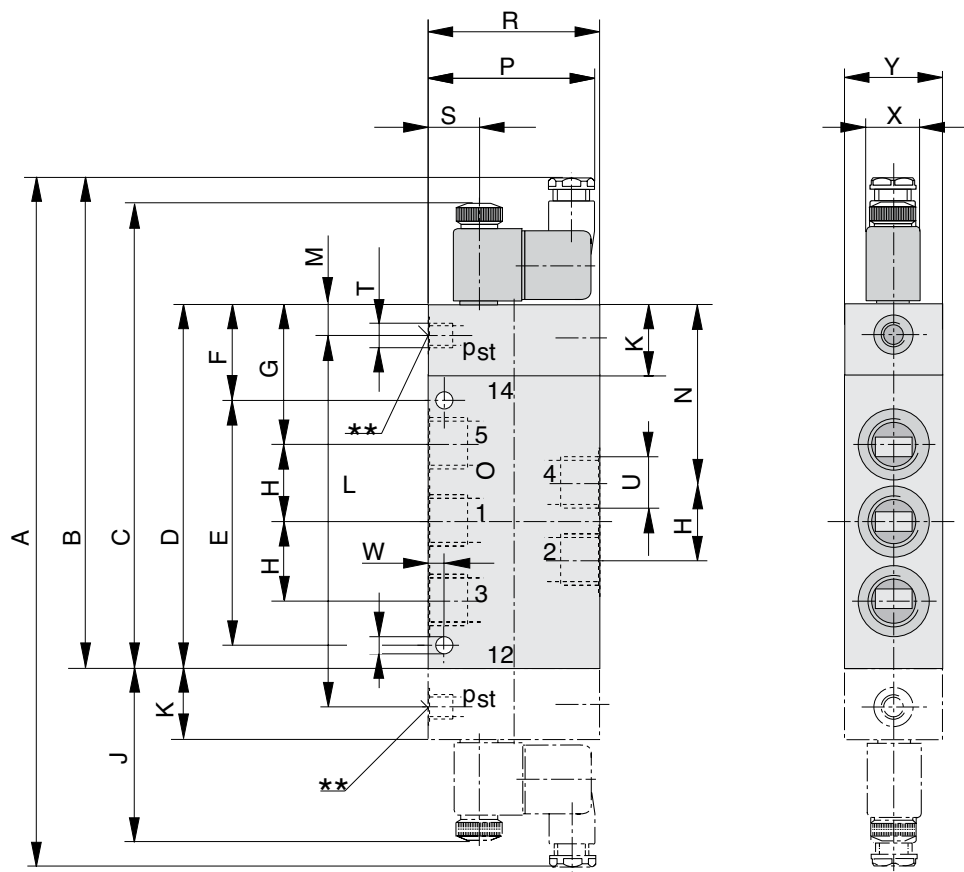
Sizes: 1/8 & 1/4



	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
1/8	8.19 208	5.51 140	5.04 128	3.44 87.5	2.19 55.5	0.94 24	1.32 33.5	0.71 18	2.20 56	0.61 15.5	2.13 54	0.96 24.5	1.67 42.5	0.22 5.5	2.48 63
1/4	9.09 231	6.26 159	5.83 148	4.17 106	2.64 67	1.16 29.5	1.61 41	0.87 22	2.44 62	0.79 20	2.60 66	1.18 30	2.05 52	0.26 6.5	2.48 63
	R	S	T	U	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1/8	1.57 40	0.61 15.5	1/8 npt G 1/8	1/8 npt G 1/8	0.20 5	--	0.87 22	0.65 16.6	0.31 8	0.20 5	M5 M5	0.41 10.5	--	0.13 3.2	0.22 5.6
1/4	2.05 52	0.61 15.5	1/8 npt G 1/8	1/4 npt G 1/4	0.24 6	0.87 22	1.26 32	0.98 25	0.43 11	0.22 5.5	M5 M5	0.39 10	--	--	--

Dimensions: BOLD= Inches; STANDARD= mm

Size: 1/2



*- Manual Override
Push: Non-Locking
Push & Turn: Locking

	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
1/2	11.14 283	7.93 201.5	7.48 190	5.87 149	3.94 100	1.54 39	2.24 57	1.26 32	2.76 70	1.14 29	-- --	0.49 12.5	2.87 73	0.28 7	2.68 68
	R	S	T	U	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1/2	2.76 70	0.83 21	1/8 npt G 1/8	1/2 npt G 1/2	0.26 6.5	0.87 22	1.57 40	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --

Dimensions: BOLD= Inches; STANDARD= mm

5/2-Way Valve 1/8

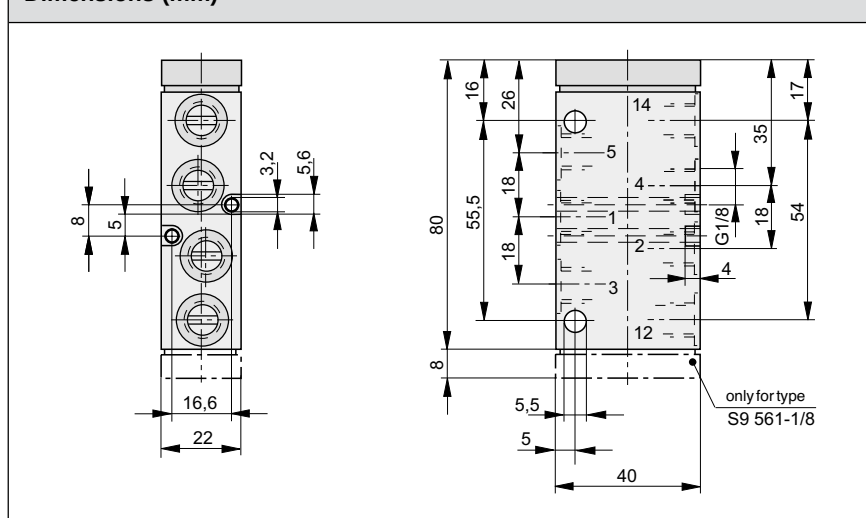
Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	.35 (.160) Single Air Pilot .37 (.170) Double Air Pilot			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	.5 (500)			
Actuation						
Air Pilot			Direct			
Actuation Pressure Range	p _{min} p _{max}	psi (bar)	30 (2) 145 (10)	Single Air Pilot		
	p _{min} p _{max}	psi (bar)	22 (1.5) 145 (10)	Double Air Pilot		

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)



Version 1/8	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
5/2 Single Air Pilot/Spring Return	S9 561RF-1/8	PA 10310	S9 561RF-1/8U	PD 47240
5/2 Double Air Pilot	S9 561-1/8	PA 10311	S9 561-1/8U	PD 47239

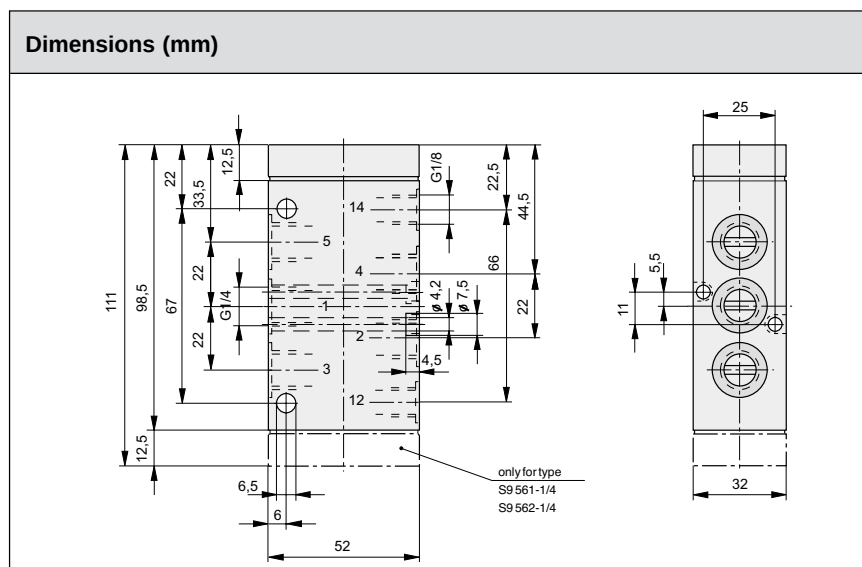
5/2-Way Valve 1/4

Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	1.08 (.49) Single Air Pilot 1.12 (.51) Double Air Pilot			
Installation			In any position			
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)			
Actuation						
Air Pilot			Direct			
Actuation Pressure Range	p _{min} p _{max}	psi (bar)	30 (2) 145 (10)	Single Air Pilot		
	p _{min} p _{max}	psi (bar)	22 (1.5) 145 (10)	Double Air Pilot		

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/4	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
5/2 Single Air Pilot/Spring Return	S9 561RF-1/4	PA 12676	S9 561RF-1/4U	PD 47242
5/2 Double Air Pilot	S9 561-1/4	PA 12677	S9 561-1/4U	PD 47241

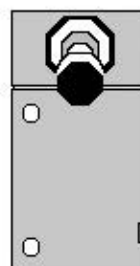
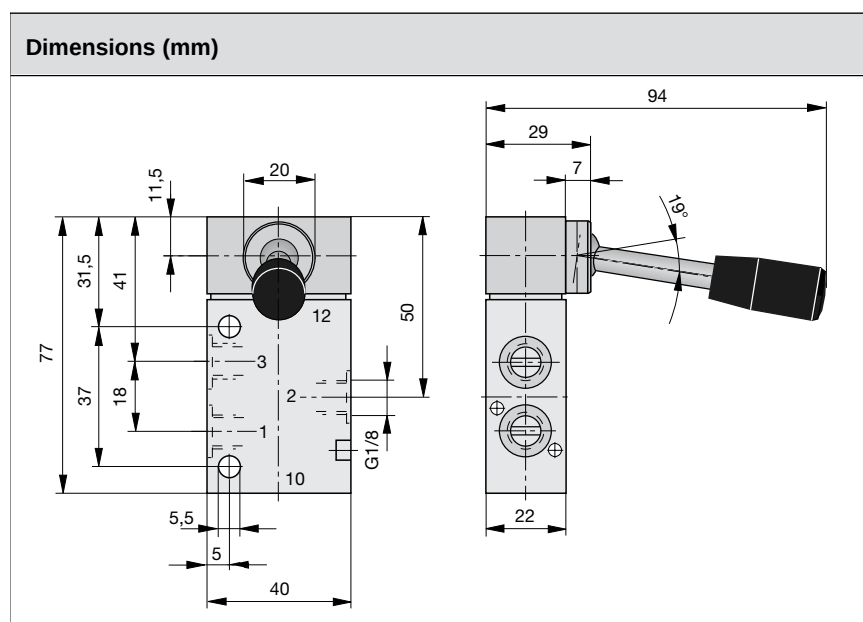
3/2-Way Valve 1/8

Actuation: Hand lever

- Detent
- Spring Return

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	.356 (.162)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	131 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	4.5 (450)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.177 (4.5)			
Actuation force	F _b	lbf (N)	1.57 (7) detent 2.25 (10) spring			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/8	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
3/2 Hand Lever/Detent	S9 311-1/8	PA 10293	S9 311-1/8U	PD 45467
3/2 Hand Lever/Spring Return	S9 311RF-1/8	PA 10294	S9 311RF-1/8U	PD 45468

5/2-Way Valve 1/8

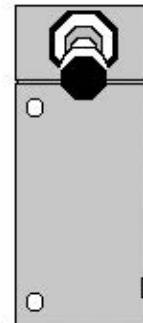
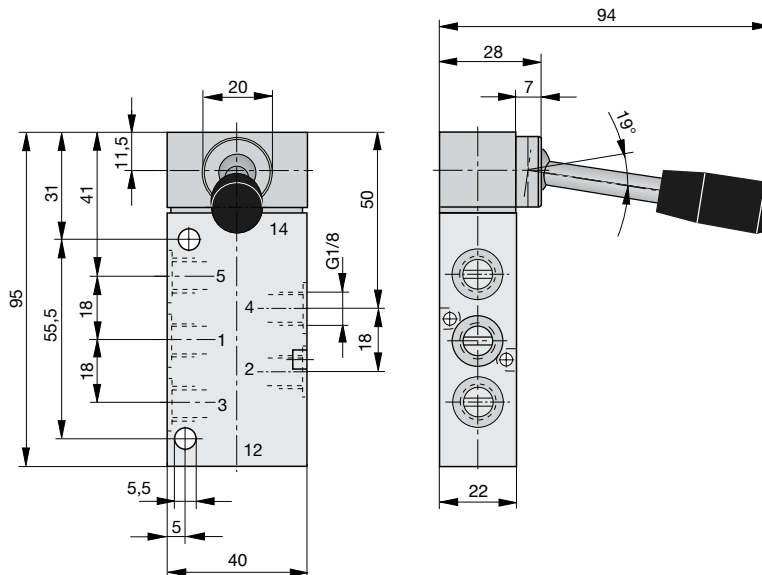
Actuation: Hand lever

- Detent
- Spring Return

Characteristics to VDI 3290		Pressures quoted as gauge pressure		
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.429 (.195)	
Installation			In any position	
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication ¹⁾	
Pneumatic Characteristics				
Nominal pressure	p _n	psi (bar)	87 (6)	
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q _N	Cv (l/min)	.5 (500)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.177 (4.5)	
Actuation force	F _b	lbf (N)	1.57 (7) detent 2.25 (10) spring	

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)



Version 1/8	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
5/2 Hand Lever/Detent	S9 511-1/8	PA 10308	S9 511-1/8U	PD 45469
5/2 Hand Lever/Spring Return	S9 511RF-1/8	PA 10309	S9 511RF-1/8U	PD 45470

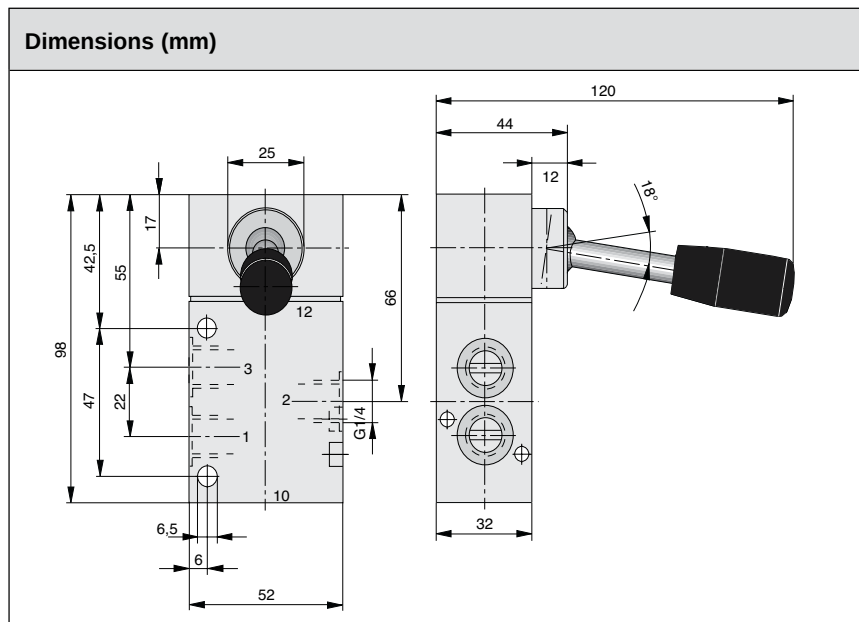
3/2-Way Valve 1/4

Actuation: Hand lever

- Detent
- Spring Return
- Safety Detent

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/4			
Weight (mass)		lbs. (kg)	.81 (.37)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.256 (6.5)			
Actuation force	F _b	lbf (N)	2.25 (10) detent & safety detent 3.37 (15) spring			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/4	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
3/2 Hand Lever/Detent	S9 311-1/4	PA 12708	S9 311-1/4U	PD 45477
3/2 Hand Lever/Spring Return	S9 311RF-1/4	PA 12709	S9 311RF-1/4U	PD 45478
3/2 Hand Lever/Detent (safety)	S9 311S-1/4	PA 12710	S9 311RF-1/4U	PD 45479

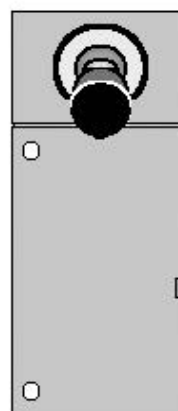
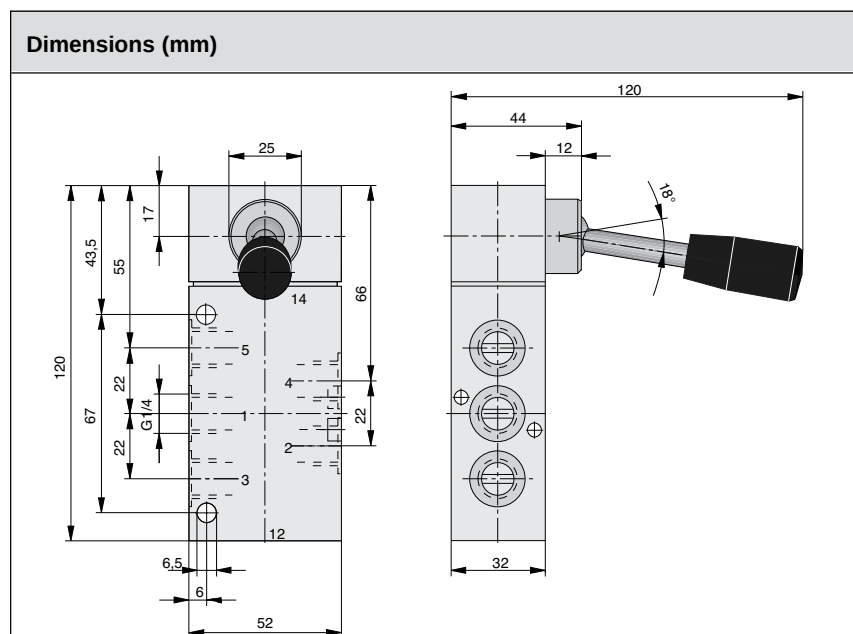
5/2-Way Valve 1/4

Actuation: Hand lever

- Detent
- Spring Return
- Safety Detent

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/4			
Weight (mass)		lbs. (kg)	1.14 (.52)			
Installation			In any position			
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.256 (6.5)			
Actuation force	F _b	lbf (N)	2.25 (10) detent 3.37 (15) spring			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/4	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
5/2 Hand Lever/Detent	S9 511-1/4	PA 12671	S9 511-1/4U	PD 45480
5/2 Hand Lever/Spring Return	S9 511RF-1/4	PA 12672	S9 511RF-1/4U	PD 45481
5/2 Hand Lever/Detent (safety)	S9 511S-1/4	PA 12673	S9 511S-1/4U	PD 45482

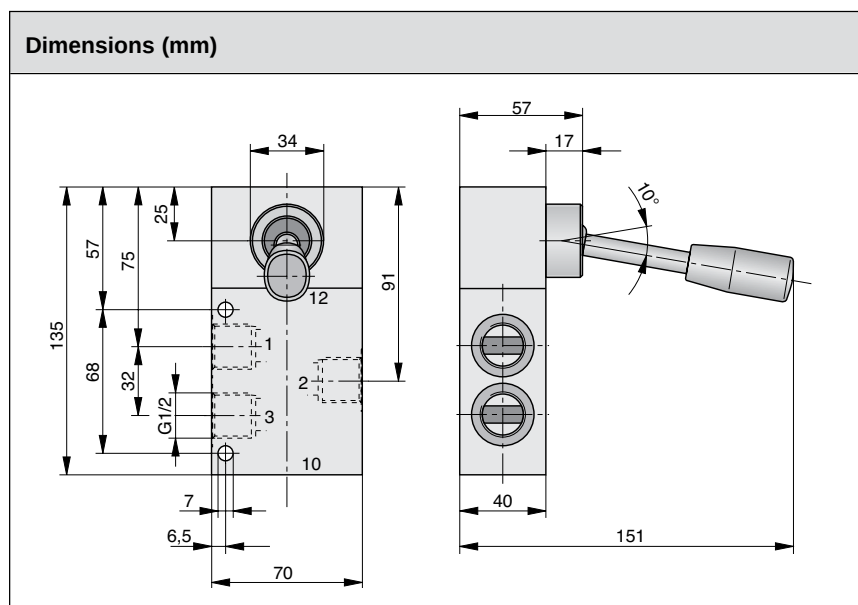
3/2-Way Valve 1/2

Actuation: Hand lever

- Detent
- Spring Return

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/2			
Weight (mass)		lbs. (kg)	1.98 (.9)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	3.5 (3500)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.370 (9.4)			
Actuation force	F _b	lbf (N)	3.37 (15) detent 8.99 (40) spring			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/2	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
3/2 Hand Lever/Detent	S9 311-1/2	PA 16404	S9 311-1/2U	PD 45492
3/2 Hand Lever/Spring Return	S9 311RF-1/2	PA 16405	S9 311RF-1/2U	PD 45493

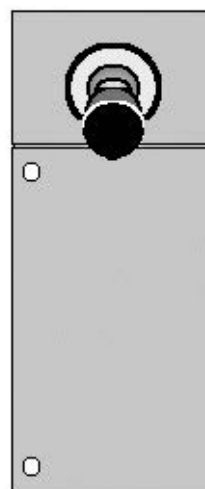
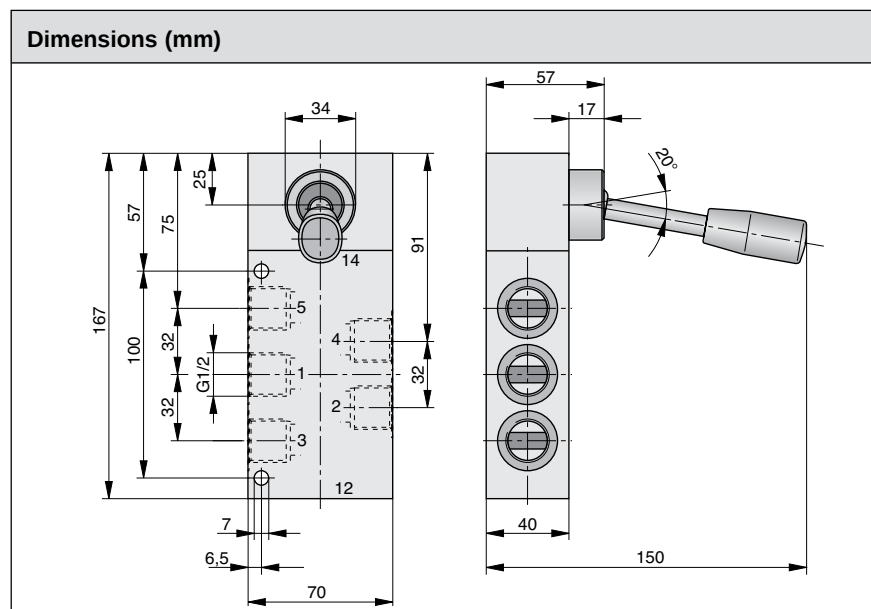
5/2-Way Valve 1/2

Actuation: Hand lever

- Detent
- Spring Return

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/2			
Weight (mass)		lbs. (kg)	2.64 (1.20)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	3.5 (3500)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.370 (9.4)			
Actuation force	F _b	lbf (N)	3.37 (15) detent 8.99 (40) spring			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/2	Metric Version		NPT Version	
Actuation	Type Number	Order Number	Type Number	Order Number
5/2 Hand Lever/Detent	S9 511-1/2	PA 16367	S9 511-1/2U	PD 45495
5/2 Hand Lever/Spring Return	S9 511RF-1/2	PA 16366	S9 511RF-1/2U	PD 45494

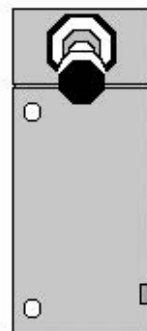
5/3-Way Valve 1/8

Actuation: Hand lever

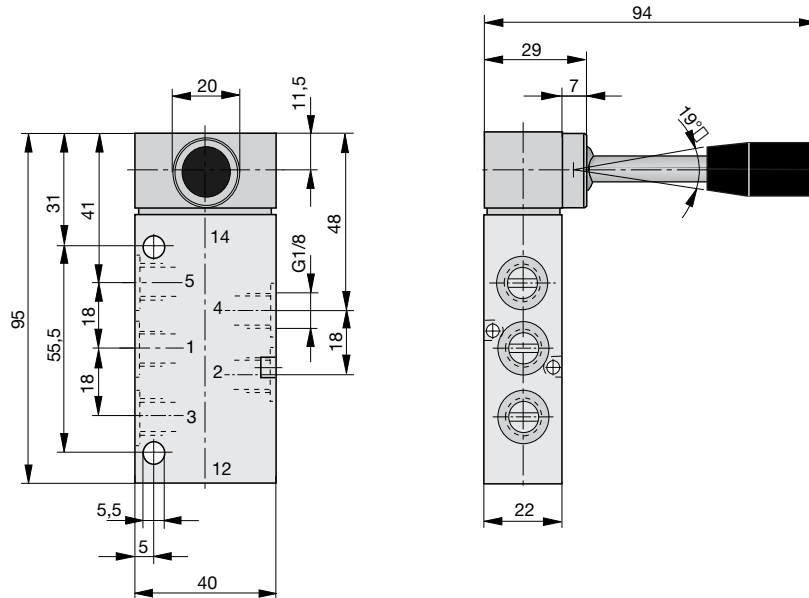
- Detent
- Spring Center

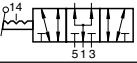
Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	.429 (.195)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	.5 (500)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.177 (4.5)			
Actuating force	F _b	lbf (N)	G,E,B: 1.57 (7) RFG, RFE, RFB: 2.25 (10)			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Dimensions (mm)



Version 1/8		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/3-way Hand Lever/Detent; Blocked		S9 511G-1/8	PA 10321	S9 511G-1/8U	PD 45471
5/3-way Hand Lever/Detent; Exhausted		S9 511E-1/8	PA 10322	S9 511E-1/8U	PD 45472
5/3-way Hand Lever/Detent; Dual		S9 511B-1/8	PA 10323	S9 511B-1/8U	PD 45473
5/3-way Hand Lever/Spring; Blocked		S9 511RFG-1/8	PA 10324	S9 511RFG-1/8U	PD 45474
5/3-way Hand Lever/Spring; Exhausted		S9 511RFE-1/8	PA 10325	S9 511RFE-1/8U	PD 45475
5/3-way Hand Lever/Spring; Dual		S9 511RFB-1/8	PA 10326	S9 511RFB-1/8U	PD 45476

5/3-Way Valve

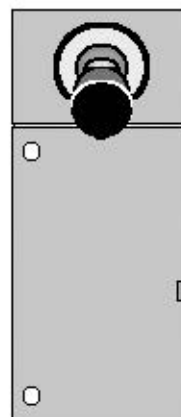
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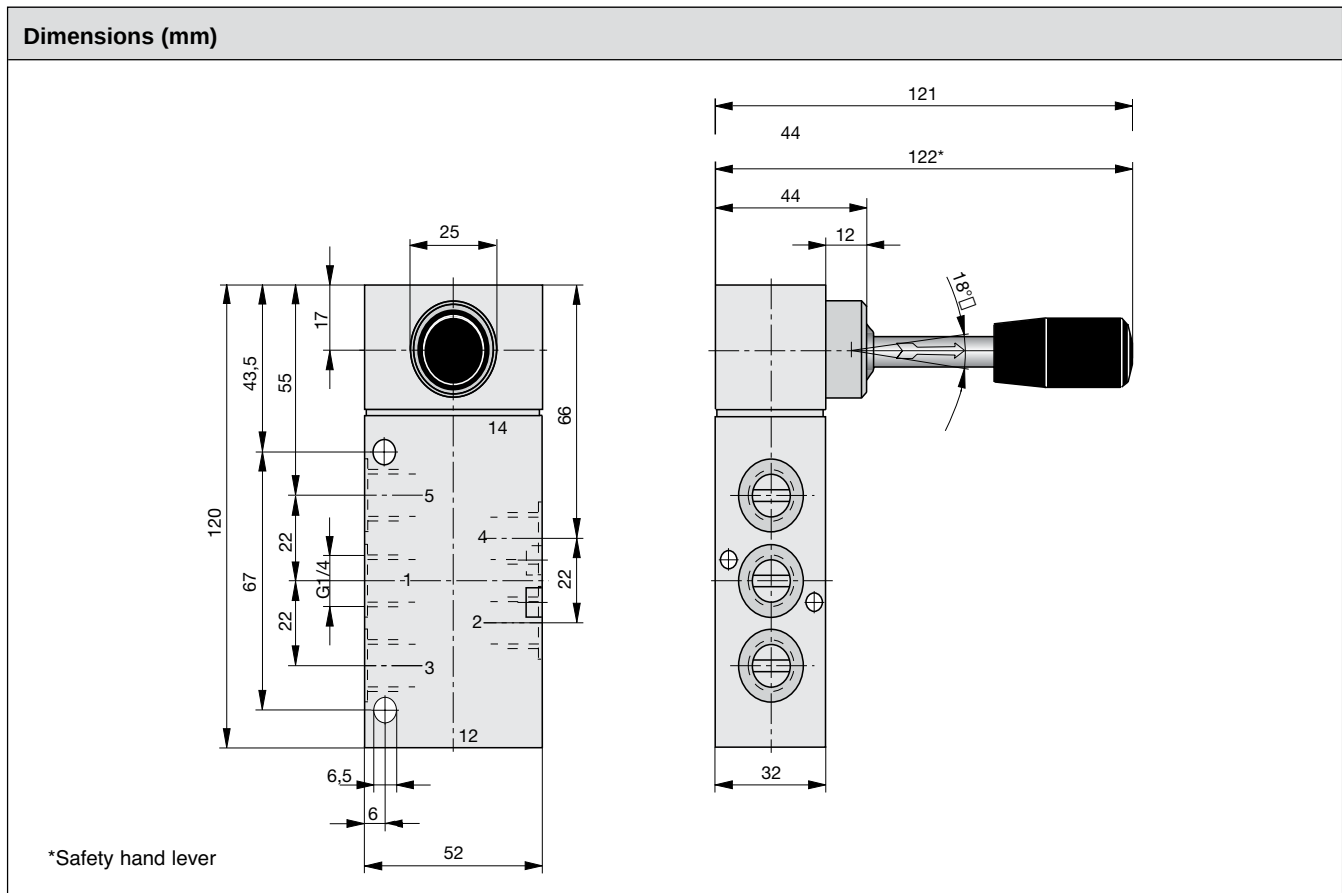
Actuation: Hand lever

- Detent
- Spring Center
- Safety Detent

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/4			
Weight (mass)		lbs. (kg)	1.14 (.52)			
Installation			In any position			
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	RFG, RFB:	1.3 (1300)		
			RFE:	1.0 (1000)		
Actuation						
Manual control			Direct			
Stroke		in (mm)	.256 (6.5)			
Actuating force	F _b	lbf (N)	G,E,B:	2.25 (10)		
			RFG, RFE, RFB:	3.37 (15)		

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448





Version 1/4		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/3-way Hand Lever/Detent; Blocked		S9 511G-1/4	PA 12687	S9 511G-1/4U	PD 45483
5/3-way Hand Lever/Detent; Exhausted		S9 511E-1/4	PA 12688	S9 511E-1/4U	PD 45484
5/3-way Hand Lever/Detent; Dual		S9 511B-1/4	PA 12689	S9 511B-1/4U	PD 45485
5/3-way Hand Lever/Spring; Blocked		S9 511RFG-1/4	PA 12690	S9 511RFG-1/4U	PD 45486
5/3-way Hand Lever/Spring; Exhausted		S9 511RFE-1/4	PA 12691	S9 511RFE-1/4U	PD 45487
5/3-way Hand Lever/Spring; Dual		S9 511RFB-1/4	PA 12692	S9 511RFB-1/4U	PD 45488
5/3-way Hand Lever/Detent; Blocked (safety)		S9 511SG-1/4	PA 12693	S9 511SG-1/4U	PD 45489
5/3-way Hand Lever/Detent; Exhausted (safety)		S9 511SE-1/4	PA 12694	S9 511SE-1/4U	PD 45490
5/3-way Hand Lever/Detent; Dual (safety)		S9 511SB-1/4	PA 12695	S9 511SB-1/4U	PD 45491

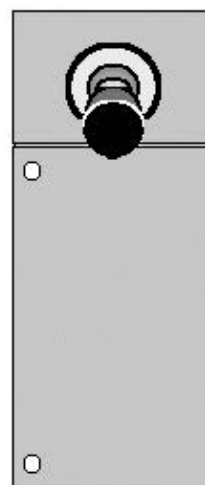
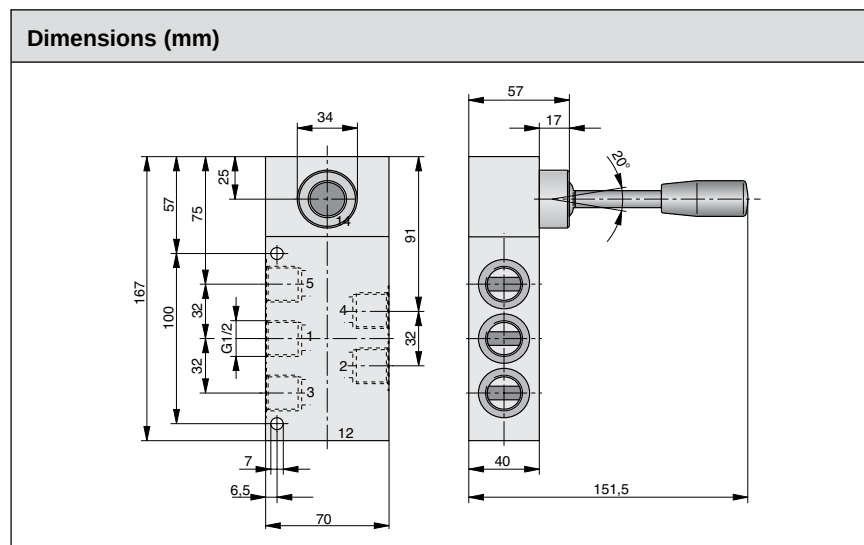
5/3-Way Valve 1/2

Actuation: Hand lever

- Detent

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M6			
Tube connection			Thread			
Port size		NPT (G)	1/2			
Weight (mass)		lbs. (kg)	2.64 (1.20)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	3.5 (3500)			
Actuation						
Manual control			Direct			
Stroke		in (mm)	.370 (9.4)			
Actuating force	F _b	lbf (N)	3.37 (15)			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/2		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/3-way Hand Lever/Detent; Blocked		S9 511G-1/2	PA 16369	S9 511G-1/2U	PD 45496

5/2-Way Valve 1/4

Interference Sensing Module

The interference sensing module was designed to automatically reverse the direction of a pneumatic cylinder, when it detects an obstruction. Loss of back pressure, caused by an obstruction, triggers the built-in pressure switch to shift the valve and retract the cylinder.

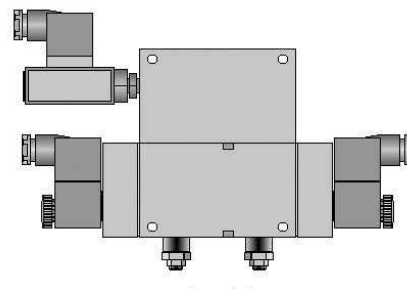
Applications:

- Doors
- Machine Guards
- Conveyor Transfer
- Pallet Handling
- Feed Systems
- Elevator Systems
- Variable Height Pick & Place

Pressures quoted as gauge pressure		
Characteristics	Unit	Description
General Features		
Type		Body ported valve
Style		Spool valve
Port size	G	1/4
Weight (mass)	lbs. (kg)	1.43 (0.65)
Installation		In any position
Ambient temperature minimum maximum	°F (°C)	14 (-10) 140 (+60)
Medium temperature minimum maximum	°F (°C)	14 (-10) 158 (+70)
Pneumatic Characteristics		
Medium		Air
Nominal pressure	psi (bar)	87 (6)
Operating pressure minimum maximum	psi (bar)	22 (1.5) 116 (8)
Nominal flow	Cv (l/min)	1.3 (1300)
Filtration		40 micron recommended
Lubrication		With or without lubrication ¹⁾
Electrical Characteristics		
Voltage AC DC	V	110, 220 12, 24
Duty cycle		Continuous duty
Electric protection		IP65 to DIN 40050
Insulating Material		VDE 0580
Connection		Plug to DIN 43650 form B

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

Version 1/4			
Order Number	Description	Ports	Voltage
IS0250-0133	5/2-way IS-module	G1/4	12vDC
IS0250-0233	5/2-way IS-module	G1/4	24vDC
IS0250-5733	5/2-way IS-module	G1/4	110vAC
IS0250-6133	5/2-way IS-module	G1/4	220vAC



Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Ceramic spool valve			
Mounting			On base plate, to ISO 5599			
Tube connection			Base plate			
Port size			G1/4 (base plate)			
Weight (mass)		lbs. (kg)	1.01 (0.46) signal solenoid 1.30 (0.59) double solenoid			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min}	psi (bar)	29 (2)			
			-1 (Version S)			
	p _{max}	psi (bar)	174 (12)			
Nominal flow	Q _N	Cv (l/min)	5/2-way valve	5/3-way valve		
			1.7 (1680)	1.7 (1680)		
Actuation						
Electrical			Pilot operated Pilot operated with external pilot air			
Actuation pressure range	p _{at min}	psi (bar)	29 (2)			
	p _{at max}	psi (bar)	145 (10)			
Voltage type			AC	DC		
Nominal Voltage Standard version Low watt. version	U _n	V	220	24		
	U _n	V	220	24		
			Further voltages available on request			
Initial Power Consumption Standard version Low watt. version		VA (W)	11	4.8		
		VA (W)	7.8	2.7		
Continuous Power Consumption Standard version Low watt. version		VA (W)	8.5	4.8		
		VA (W)	4.9	2.7		
Duty cycle	ED	%	Continuous Duty			
Electrical protection			IP65 to DIN 40050 (with plug)			
Insulating material			VDE 0580			
Connection			Plug to DIN 43650 form B			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve

5/3-Way Valve

ISO 5599

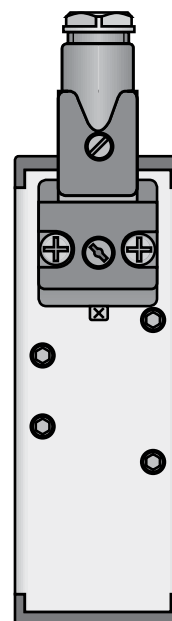
Size 1

Actuation: Solenoid

- Single Solenoid
- Double Solenoid
- Spring Center

Delivery Includes:

valve
mounting screws
gasket
solenoid coil(s)



Characteristics to VDI 3290 Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description
General Features			
Type			Ceramic spool valve
Mounting			On base plate, to ISO 5599
Tube connection			Base plate
Port size			G1/4 (base plate)
Weight (mass)		lbs. (kg)	.70 (0.32)
Installation			In any position
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)
Medium			Filtered compressed air
Lubrication			With or without oil mist lubrication ¹⁾
Pneumatic Characteristics			
Nominal pressure	p_n	psi (bar)	87 (6)
Operating pressure range	$p_{\min}$ $p_{\max}$	psi (bar)	-13 (-0.9) 174 (12)
Nominal flow	Q_N	Cv (l/min)	5/2-way valve
			5/3-way valve
			1.7 (1680) 1.7 (1680)
Actuation			
Pneumatic			Direct
Actuation pressure range	$p_{st \min}$	psi (bar)	29 (2)
	$p_{st \max}$	psi (bar)	145 (10)

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

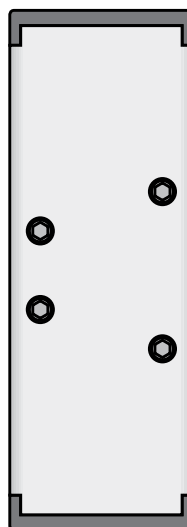
5/2-Way Valve 5/3-Way Valve

ISO 5599
Size 1

Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot
- Spring Center

Delivery Includes:
valve
mounting screws
gasket



Characteristics to VDI 3290		Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description
General Features			
Type			Ceramic spool valve
Mounting			On base plate, to ISO 5599
Tube connection			Base plate
Port size			G3/8 (base plate)
Weight (mass)		lbs. (kg)	1.54 (0.70) single solenoid 1.83 (0.83) double solenoid
Installation			In any position
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)
Medium			Filtered compressed air
Lubrication			With or without oil mist lubrication ¹⁾
Pneumatic Characteristics			
Nominal pressure	p_n	psi (bar)	87 (6)
Operating pressure range	$p_{\min}$	psi (bar)	29 (2)
	$p_{\max}$	psi (bar)	-1 (Version S) 174 (12)
Nominal flow	Q_N	Cv (l/min)	5/2-way valve
			5/3-way valve
			4.3 (4320)
			4.3 (4320)
Actuation			
Electrical			Pilot operated Pilot operated with external pilot air
Actuation pressure range	$p_{st \min}$	bar	2
	$p_{st \max}$	bar	12
Voltage type			AC
Nominal Voltage			
Standard version	U_n	V	220
Low watt. version	U_n	V	24
			Further voltages available on request
Initial Power Consumption		VA (W)	11
		VA (W)	4.8
Continuous Power Consumption		VA (W)	8.5
		VA (W)	4.9
Duty cycle	ED	%	Continuous Duty
Electrical protection			IP65 to DIN 40050 (with plug)
Insulating material			VDE 0580
Connection			Plug to DIN 43650 form B

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve 5/3-Way Valve

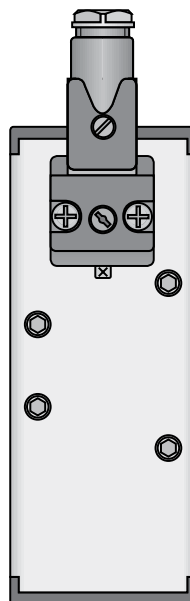
ISO 5599
Size 2

Actuation: Solenoid

- Single Solenoid
- Double Solenoid
- Spring Center

Delivery Includes:

valve
mounting screws
gasket
solenoid coil(s)



Characteristics to VDI 3290		Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description
General Features			
Type			Ceramic spool valve
Mounting			On base plate, to ISO 5599
Tube connection			Base plate
Port size			G3/8 (base plate)
Weight (mass)		lbs. (kg)	1.23 (0.56)
Installation			In any position
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)
Medium			Filtered compressed air
Lubrication			With or without oil mist lubrication ¹⁾
Pneumatic Characteristics			
Nominal pressure	p_n	psi (bar)	87 (6)
Operating pressure range	p_{min} p_{max}	psi (bar)	-13 (-0.9) 174 (12)
Nominal flow	Q_N	Cv (l/min)	5/2-way valve
			5/3-way valve
			4.3 (4320) 4.3 (4320)
Actuation			
Pneumatic			Direct
Actuation pressure range	$p_{st min}$	psi (bar)	29 (2)
	$p_{st max}$	psi (bar)	174 (12)

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

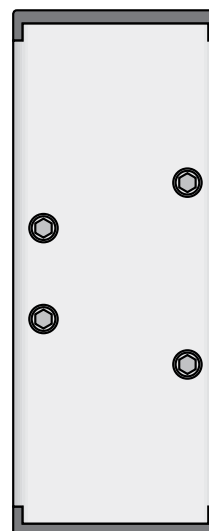
5/2-Way Valve 5/3-Way Valve

ISO 5599
Size 2

Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot
- Spring Center

Delivery Includes:
valve
mounting screws
gasket



Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Ceramic spool valve			
Mounting			On base plate, to ISO 5599			
Tube connection			Base plate			
Port size			G1/2 (base plate)			
Weight (mass)		lbs. (kg)	2.71 (1.23) single solenoid 3.01 (1.37) double solenoid			
Installation			In any position			
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min}	psi (bar)	29 (2)			
			-1 (Version S)			
	p _{max}	psi (bar)	174 (12)			
Nominal flow			5/2-way valve	5/3-way valve		
	Q _N	Cv (l/min)	6.5 (6540)	6.5 (6540)		
Actuation						
Electrical			Pilot operated Pilot operated with external pilot air			
Actuation pressure range	p _{st min}	psi (bar)	29 (2)			
	p _{st max}	psi (bar)	145 (10)			
Voltage type			AC	DC		
Nominal Voltage						
Standard version	U _n	V	220	24		
Low watt. version	U _n	V	220	24		
			Further voltages available on request			
Initial Power Consumption						
Standard version		VA (W)	11	4.8		
Low watt. version		VA (W)	7.8	2.7		
Continuous Power Consumption						
Standard version		VA (W)	8.5	4.8		
Low watt. version		VA (W)	4.9	2.7		
Duty cycle	ED	%	Continuous Duty			
Electrical protection			IP65 to DIN 40050 (with plug)			
Insulating material			VDE 0580			
Connection			Plug to DIN 43650 form B			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

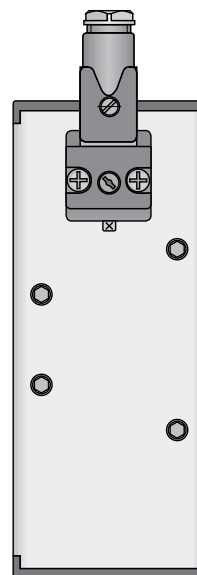
5/2-Way Valve 5/3-Way Valve

ISO 5599
Size 3

Actuation: Solenoid

- Single Solenoid
- Double Solenoid
- Spring Center

Delivery Includes:
valve
mounting screws
gasket
solenoid coil(s)



Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Ceramic spool valve			
Mounting			On base plate, to ISO 5599			
Tube connection			Base plate			
Port size			G1/2 (base plate)			
Weight (mass)		lbs. (kg)	2.42 (1.1)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	-13 (-0.9) 174 (12)			
Nominal flow	Q _N	1/min	5/2-way valve	5/3-way valve		
			6.5 (6540)	6.5 (6540)		
Actuation						
Pneumatic			Direct			
Actuation pressure range	p _{st min}	psi (bar)	29 (2)			
	p _{st max}	psi (bar)	174 (12)			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

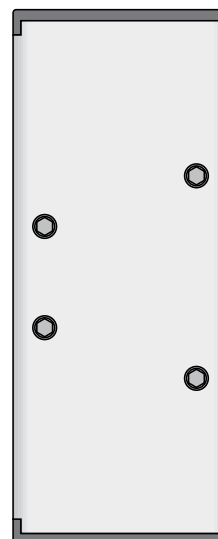
5/2-Way Valve 5/3-Way Valve

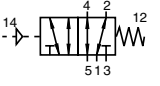
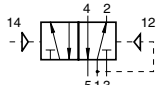
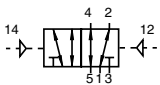
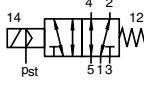
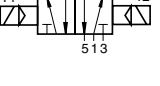
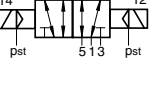
ISO 5599
Size 3

Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot
- Spring Center

Delivery Includes:
valve
mounting screws
gasket



ORDER INSTRUCTIONS: 5/2-Way Valves				
Actuation	Symbol	Type Number	Order Number	Size
5/2 Single Air Pilot Spring Return		S20561RF-01	PA 12891	VDMA 01
		S20561RF-1	PA 12869	Size 1
		S20561RF-2	PA 16425	Size 2
		S20561RF-3	PA 16426	Size 3
5/2 Single Air Pilot Air Spring Return		S20561R-01	PA 12892	VDMA 01
		S20561R-1	PA 12870	Size 1
		S20561R-2	PA 16428	Size 2
		S20561R-3	PA 16429	Size 3
5/2 Double Air Pilot		S20561-01	PA 12893	VDMA 01
		S20561-1	PA 12868	Size 1
		S20561-2	PA 16422	Size 2
		S20561-3	PA 16423	Size 3
5/2 Single Solenoid Spring Return		S20581RF-01-..	PA 12886-..33	VDMA 01
		S20581RF-1-..	PA 12875-..33	Size 1
		S20581RF-2-..	PA 16441-..33	Size 2
		S20581RF-3-..	PA 16442-..33	Size 3
5/2 Single Solenoid Spring Return with external pilot air		S20581S-RF-01-..	PA 12896-..33	VDMA 01
		S20581S-RF-1-..	PA 12882-..33	Size 1
		S20581S-RF-2-..	PA 16456-..33	Size 2
		S20581S-RF-3-..	PA 16462-..33	Size 3
5/2 Single Solenoid Air Spring Return		S20581R-01-..	PA 12887-..33	VDMA 01
		S20581R-1-..	PA 12876-..33	Size 1
		S20581R-2-..	PA 16444-..33	Size 2
		S20581R-3-..	PA 16445-..33	Size 3
5/2 Double Solenoid		S20581-01-..	PA 12888-..33	VDMA 01
		S20581-1-..	PA 12874-..33	Size 1
		S20581-2-..	PA 16438-..33	Size 2
		S20581-3-..	PA 16439-..33	Size 3
5/2 Double Solenoid with external pilot air		S20581S-01-..	PA 12898-..33	VDMA 01
		S20581S-1-..	PA 12880-..33	Size 1
		S20581S-2-..	PA 16454-..33	Size 2
		S20581S-3-..	PA 16460-..33	Size 3

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3518	01
24 vDC	60 50/60Hz	KZ 3519	02
110 50/60Hz	48 vDC	KZ 3521	57
220 50/60Hz	110 vDC	KZ 3522	61



• Other voltages available. Contact factory.

ORDER INSTRUCTIONS: 5/3-Way Valves				
Actuation	Symbol	Type Number	Order Number	Size
5/3 Double Air Pilot Closed Center		S20561RFG-01	PA 12894	VDMA 01
		S20561RFG-1	PA 12871	Size 1
		S20561RFG-2	PA 16431	Size 2
		S20561RFG-3	PA 16432	Size 3
		S20561RFB-1	PA 12873	Size 1
		S20561RFB-2	PA 16437	Size 2
		S20561RFE-01	PA 12895	VDMA 01
		S20561RFE-1	PA 12872	Size 1
		S20561RFE-2	PA 16434	Size 2
5/3 Double Solenoid Closed Center		S20581RFG-01	PA 12889-..33	VDMA 01
		S20581RFG-1-..	PA 12877-..33	Size 1
		S20581RFG-2-..	PA 16447-..33	Size 2
		S20581RFG-3-..	PA 16448-..33	Size 3
		S20581RFB-1-..	PA 12879-..33	Size 1
		S20581RFB-2-..	PA 16453-..33	Size 2
		S20581RFE-01	PA 12890-..33	VDMA 01
		S20581RFE-1-..	PA 12878-..33	Size 1
		S20581RFE-2-..	PA 16450-..33	Size 2
5/3 Double Solenoid with external air pilot Closed Center		S20581S-RFG-01-..	PA 12900-..33	VDMA 01
		S20581S-RFG-1-..	PA 12883-..33	Size 1
		S20581S-RFG-2-..	PA 16457-..33	Size 2
		S20581S-RFG-3-..	PA 16463-..33	Size 3
		S20581S-RFB-1-..	PA 12885-..33	Size 1
		S20581S-RFB-2-..	PA 16459-..33	Size 2
		S20581S-RFE-01-..	PA 12899-..33	VDMA 01
		S20581S-RFE-1-..	PA 12884-..33	Size 1
		S20581S-RFE-2-..	PA 16458-..33	Size 2
Open Center		S20581S-RFE-3-..	PA 16464-..33	Size 3

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3518	01
24 vDC	60 50/60Hz	KZ 3519	02
110 50/60Hz	48 vDC	KZ 3521	57
220 50/60Hz	110 vDC	KZ 3522	61



• Other voltages available. Contact factory.

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	.616 (0.280) Single solenoid .913 (0.415) Double solenoid			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	Single solenoid 29 (2) 145 (10)			
	p _{min} p _{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	.5 (500)			
Actuation						
Electrical			Pilot operated			
Voltage			AC	DC		
Nominal voltage* Standard version	U _n	V	220	24		
Initial power consumption Standard version		VA (W)	8.5	2.5		
Continuous consumption Standard version		VA (W)	6.0	2.5		
Duty cycle	ED	%	Continuous Duty			
Electrical protection			IP65 to DIN 40050 (with plug)			
Insulating material			VDE 0580			
Connection			Plug to DIN 43650 form B			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

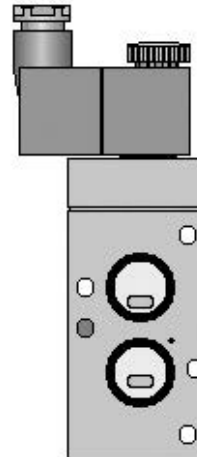
5/2-Way Valve 1/8

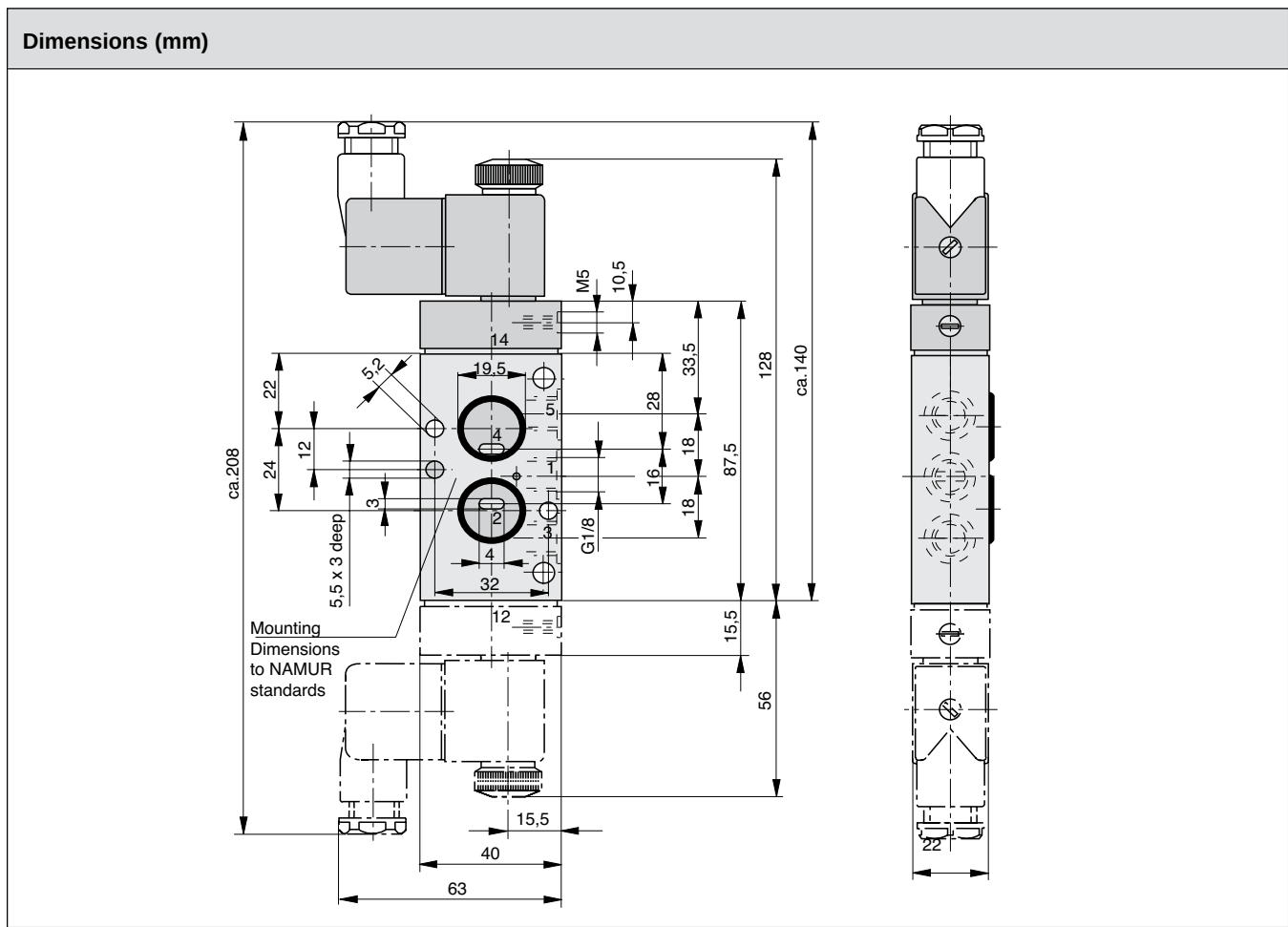
with NAMUR connection

Actuation: Solenoid

- Single Solenoid
- Double Solenoid

Delivery Includes:
valve
mounting screws
coding pin
o-rings





Version 1/8		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/2 Single Solenoid/Spring Return		S9 581RF-1/8-SO	PD 34143-..33	S9 581RF-1/8U-SO	PD 45502-..33
5/2 Double Solenoid		S9 581-1/8-SO	PD 34984-..33	S9 581-1/8U-SO	PD 45503-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3674	01
24 vDC	60 50/60Hz	KZ 3673	02
110 50/60Hz	48 vDC	KZ 3669	57
220 50/60Hz	110 vDC	KZ 3672	61
24 50/60Hz	--	KZ 3675	51

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



Accessory:

Order #	Description
NAMURPLATE-1/8	Converts the 5/2-way valve to a 3/2-way valve

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5			
Tube connection			Thread			
Port size		NPT (G)	1/4			
Weight (mass)		lbs. (kg)	1.32 (0.6) Single solenoid 1.54 (0.7) Double solenoid			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	Single solenoid 29 (2) 145 (10)			
		psi (bar)	Double solenoid 22 (1.5) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)			
Actuation						
Electrical			Pilot operated			
Voltage			AC		DC	
Nominal voltage* Standard version	U _n	V	220		24	
Initial power consumption Standard version		VA (W)	8.5		2.5	
Continuous consumption Standard version		VA (W)	6.0		2.5	
Duty cycle	ED	%	Continuous Duty			
Electrical protection			IP65 to DIN 40050 (with plug)			
Insulating material			VDE 0580			
Connection			Plug to DIN 43650 form B			

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve

1/4

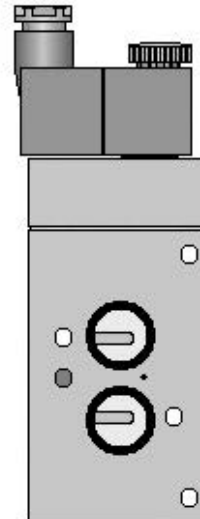
with NAMUR connection

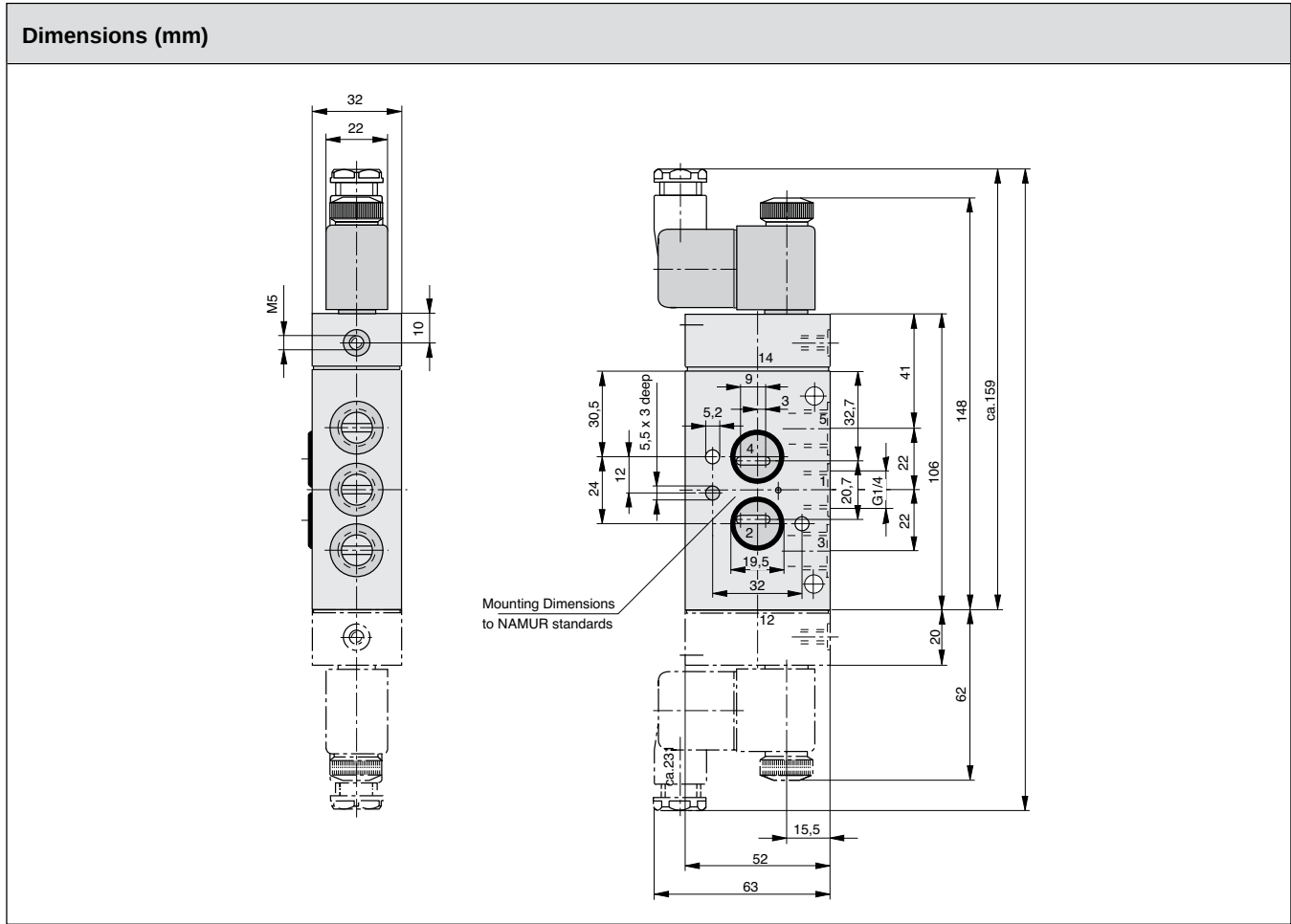
Actuation: Solenoid

- Single Solenoid
- Double Solenoid

Delivery Includes:

valve
mounting screws
coding pin
o-rings





Version 1/4		Metric Version		NPT Version	
Actuation	Symbol	Type Number	Order Number	Type Number	Order Number
5/2 Single Solenoid/Spring Return		S9 581RF-1/4-SO	PD 34985-..33	S9 581RF-1/4U-SO	PD 45504-..33
5/2 Double Solenoid		S9 581-1/4-SO	PD 34986-..33	S9 581-1/4U-SO	PD 45505-..33

Voltage Range		Coil Number	Order Code
Nominal	Secondary		
12 vDC	--	KZ 3674	01
24 vDC	60 50/60Hz	KZ 3673	02
110 50/60Hz	48 vDC	KZ 3669	57
220 50/60Hz	110 vDC	KZ 3672	61
24 50/60Hz	--	KZ 3675	51

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



Accessory:

Order #
NAMURPLATE-1/4

Description
Converts the 5/2-way valve to a 3/2-way valve

Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
Type			Spool valve			
Mounting			2 screws M5 (M3)			
Tube connection			Thread			
Port size		NPT (G)	1/8			
Weight (mass)		lbs. (kg)	.594 (.27)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)			
Medium			Filtered compressed air			
Lubrication			With or without oil mist lubrication ¹⁾			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	.5 (500)			
Actuation						
Pneumatic			Direct			
Actuating pressure range	p _{st min} p _{st max}	psi (bar)	29 (2) 145 (10)			

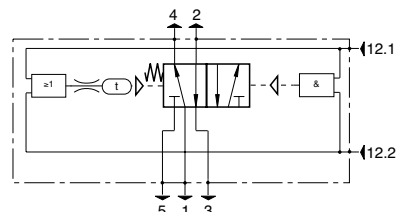
¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve

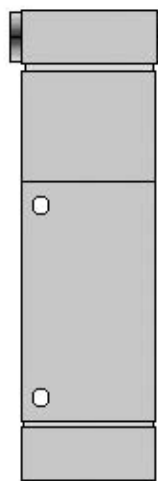
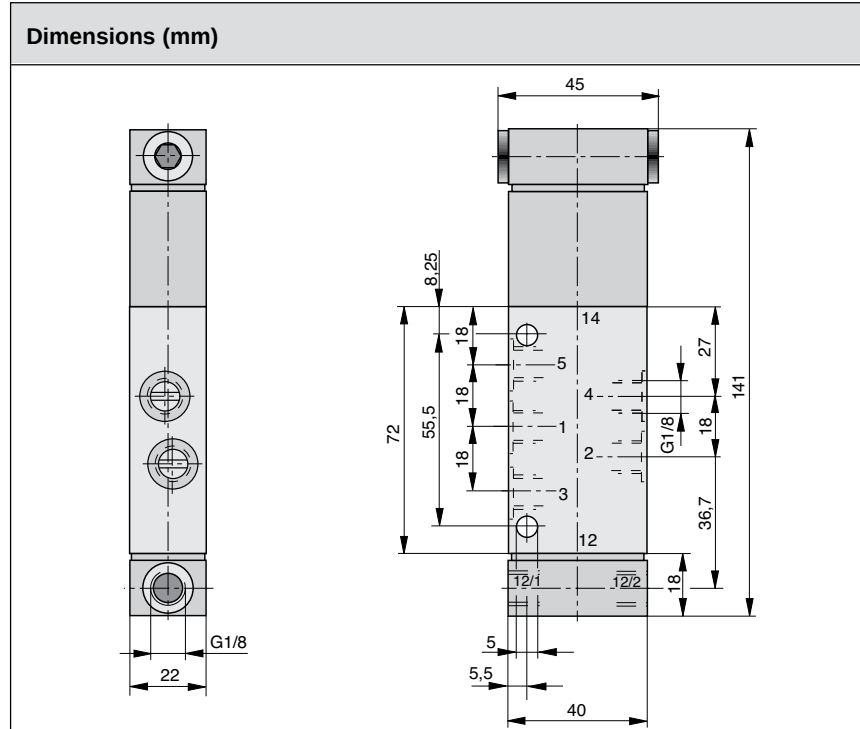
1/8

for two-hand safety operation

Actuation: Pneumatic



- The valve switches from outlet 4 to outlet 2 only if both signal inputs are actuated simultaneously or within 0.5 seconds.
- The valve will not switch again until both signal inputs are stopped.
- For the safety of operating personnel in manufacturing processes such as pressing, bending, stamping, deburring etc.
- Not suitable for control systems of eccentric or similar presses.



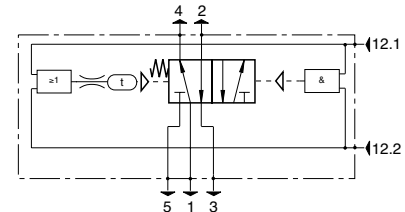
Version 1/8	Metric Version		NPT Version	
Description	Type Number	Order Number	Type Number	Order Number
Two-hand safety valve	S9 563/65RF-1/8-SO	PD 37673	S9 563/65RF-1/8U-SO	PD 45506

Characteristics to VDI 3290		Pressures quoted as gauge pressure		
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.41 (.64)	
Installation			In any position	
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication ¹⁾	
Pneumatic Characteristics				
Nominal pressure	p _n	psi (bar)	87 (6)	
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)	
Actuation				
Pneumatic			Directly	
Control pressure range	p _{st min} p _{st max}	psi (bar)	44 (3) 145 (10)	

5/2-Way Valve 1/4

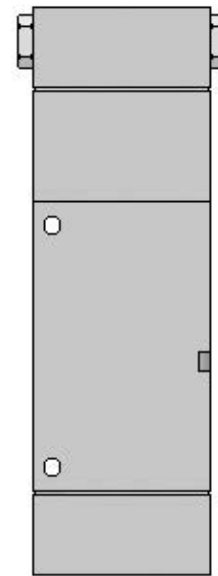
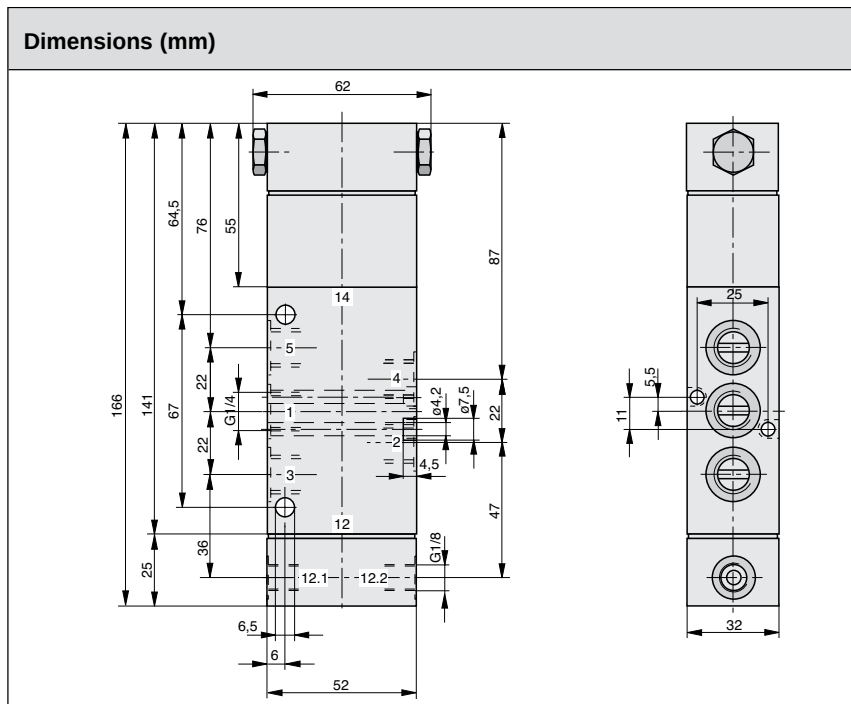
for two-hand safety operation

Actuation: Pneumatic



- The valve switches from outlet 4 to outlet 2 only if both signal inputs are actuated simultaneously or within 0.5 seconds.
- The valve will not switch again until both signal inputs are stopped.
- For the safety of operating personnel in manufacturing processes such as pressing, bending, stamping, deburring etc.
- Not suitable for control systems of eccentric or similar presses.

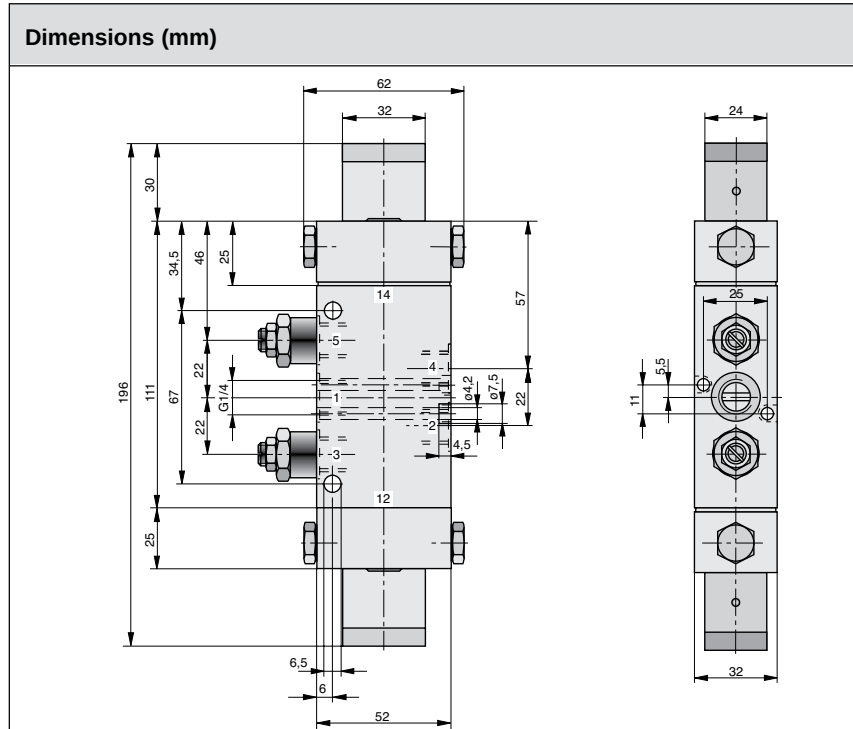
¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448



Version 1/4	Metric Version		NPT Version	
Description	Type Number	Order Number	Type Number	Order Number
Two-hand safety valve	S9 563/65RF-1/4-SO	PD 37173	S9 563/65RF-1/4U-SO	PD 45507

Characteristics to VDI 3290		Pressures quoted as gauge pressure		
Characteristics	Symbol	Unit	Description	
General Features				
System			Spool valve	
Mounting			2 screws M6 (M4)	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.43 (0.65)	
Installation			In any position	
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication ¹⁾	
Pneumatic Characteristics				
Nominal pressure	p _n	psi (bar)	87 (6)	
Operating pressure range	p _{min} p _{max}	psi (bar)	36 (3) 118 (8)	
Nominal flow	Q _N	Cv (l/min)	1.3 (1300)	
Actuation				
Pneumatic			Direct	
Actuating pressure range	p _{st min} p _{st max}	psi (bar)	36 (3) 118 (8)	

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

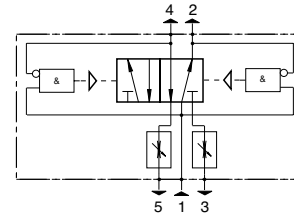


5/2-Way Valve

1/4

oscillating valve

Actuation: Pneumatic

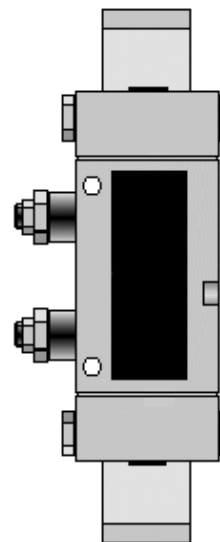


The oscillating valve automatically generates reciprocating movements, for applications such as shaking, feeding, hammering, plunging, scraping, wiping, winding, tensioning, raking, diverting, spraying, cleaning, and dipping.

The oscillating valve is supplied with two built-in flow control valves. This makes it easy to adjust the stroke frequency of the actuator.

Pneumatic Version:

If compressed air is introduced into inlet port 1, the outlet ports 4 and 2 are alternately supplied with air.



Version 1/4	Metric Version		NPT Version	
Description	Type Number	Order Number	Type Number	Order Number
Oscillating valve	S9 568/68-1/4-SO	PD 34796	S9 568/68-1/4U-SO	PD 45508

Characteristics to VDI 3290 Pressures quoted as gauge pressure		
Characteristics	Unit	Description
General Features		
Type		Body ported valve
Style		Spool valve
Mounting		2 screws M6 (M4)
Tube connection		Thread
Port size	NPT (G)	1/4
Weight (mass)	lbs. (kg)	1.70 (.77)
Installation		In any position
Ambient temperature minimum maximum	°F (°C)	14 (-10) 140 (+60)
Medium temperature minimum maximum	°F (°C)	14 (-10) 158 (+70)
Pneumatic Characteristics		
Medium		Air
Nominal pressure	psi (bar)	131 (6)
Operating pressure minimum maximum	psi (bar)	36 (3) 118 (8)
Nominal flow	Cv (l/min)	1.3 (1300)
Filtration		40 micron recommended
Lubrication		With or without lubrication ¹⁾
Electrical Characteristics		
Voltage AC DC	V	110, 220 12, 24
Duty cycle		Continuous Duty
Electric protection		IP65 to DIN 40050
Insulating Material		VDE 0580
Connection		Plug to DIN 43650 form B
Actuation		
Electric manual override		(Internal) pilot operated yes

¹⁾ We recommend the use of mineral oil type VG32 to ISO 3448

Version 1/4			
Order Number	Description	Ports	Voltage
PD 47166-0133	5/2-way oscillating valve	1/4" NPT	12vDC
PD 47166-0233	5/2-way oscillating valve	1/4" NPT	24vDC
PD 47166-5733	5/2-way oscillating valve	1/4" NPT	110vAC

5/2-Way Valve

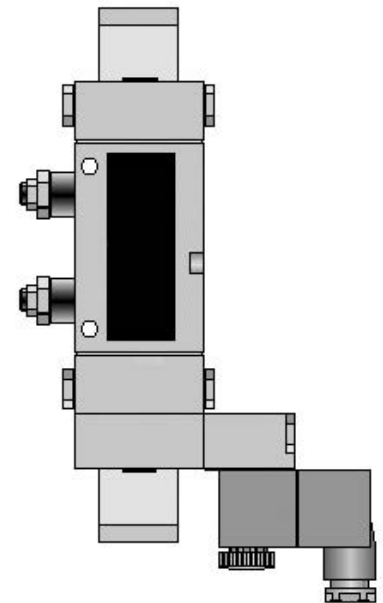
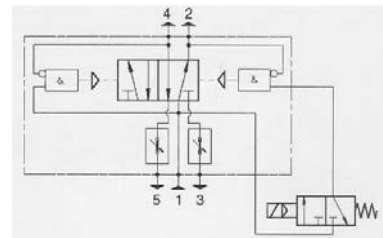
1/4

Oscillating Valve

Actuation: Electric

Electric Version:

Compressed air is introduced into inlet port 1. The outlet ports 4 and 2 are alternately supplied with air, for as long as an electrical signal is present at the solenoid coil.



Characteristics to VDI 3290					Pressures quoted as gauge pressure	
Characteristics	Symbol	Unit	Description			
General Features						
System			Poppet valve			
Mounting			After removing the rubber footing 4 screws M8			
Tube connection			Thread			
Port size			G1/4			
Weight (mass)		lbs. (kg)	3.08 (1.5)			
Installation			In any position			
Ambient temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 131 (+55)	Note: When using below freezing point it is necessary to consult factory.		
Medium temperature range	$\vartheta_{\min}$ $\vartheta_{\max}$	°F (°C)	14 (-10) 140 (+60)			
Medium			Filtered compressed air			
Lubrication			Oil mist lubrication compatible with Buna N			
Pneumatic Characteristics						
Nominal pressure	p _n	psi (bar)	87 (6)			
Operating pressure range	p _{min} p _{max}	psi (bar)	0 (0) 145 (10)			
Nominal flow	Q _N	Cv (l/min)	1.4 (1400)			
Actuation						
Manual control			Direct			
Stroke		mm	2			
Actuating force	F _b	lbf (N)	6.74 (30)			

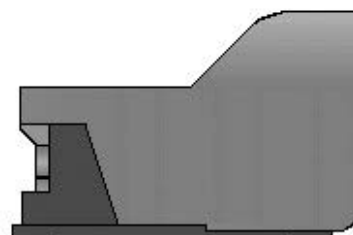
3/2-Way Valve 1/4

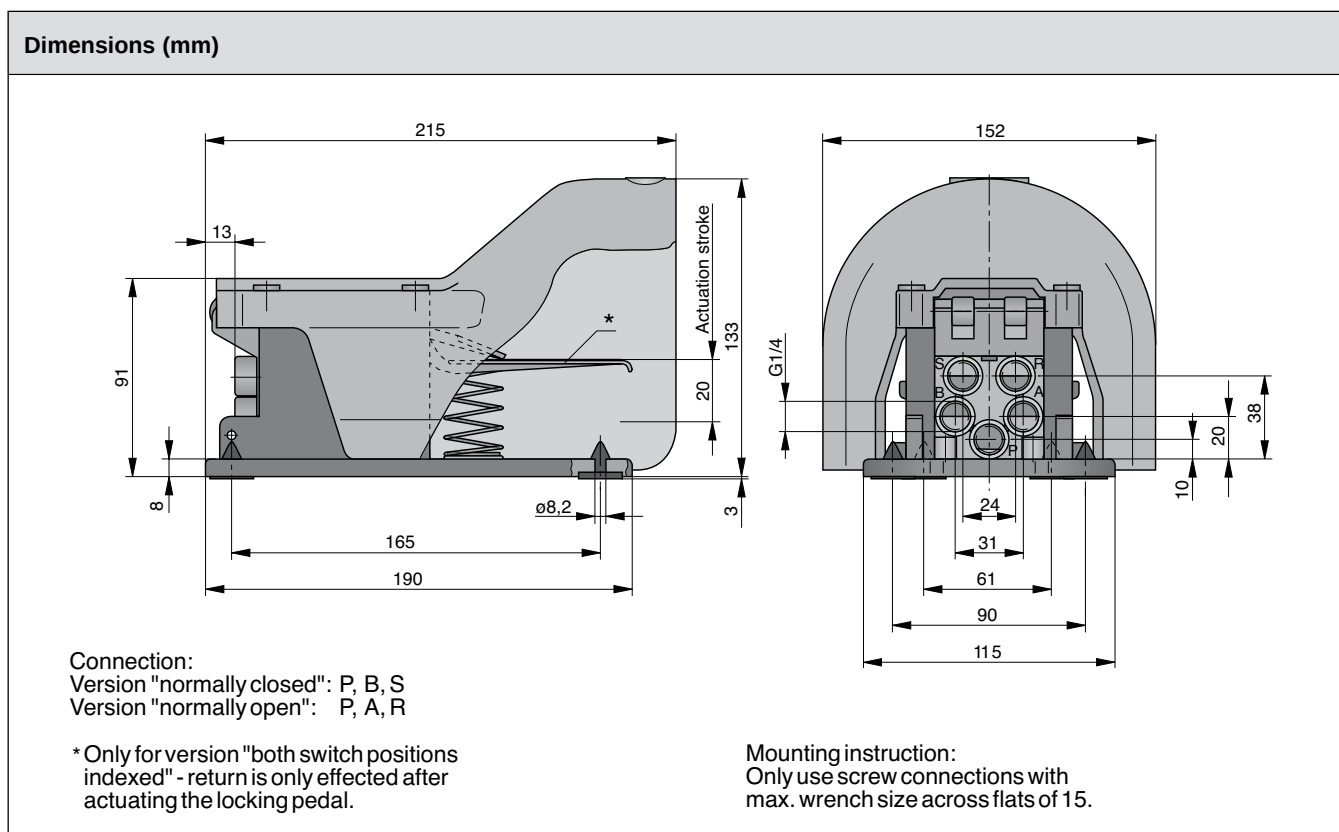
Actuation: Foot Pedal

- Detent
- Spring Return

Delivery Includes:

valve
toe guard





METRIC ONLY

Version G1/4				
Actuation	Return	Symbol	Type Number	Order Number
Pedal	Spring return		F331RF-08NG*	KZ 4410
			F331RF-08NO*	KZ 4411
Pedal	Detent		F331-08NG*	KZ 4408
			F331-08NO*	KZ 4409

*NG = normally closed, NO = normally open

Characteristics to VDI 3290 Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description
General Features			
System			Poppet valve
Mounting			After removing the rubber footing 4 screws M8
Tube connection			Thread
Port size			G1/4
Weight (mass)		lbs. (kg)	3.08 (1.5)
Installation			In any position
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 131 (+55)
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)
Medium			Filtered compressed air
Lubrication			Oil mist lubrication compatible with Buna N
Pneumatic Characteristics			
Nominal pressure	p_n	psi (bar)	87 (6)
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)
Nominal flow	Q_N	Cv (l/min)	1.4 (1400)
Actuation			
Manual control			Direct
Stroke		mm	2
Actuating force	Fb	lbf (N)	6.74 (30)

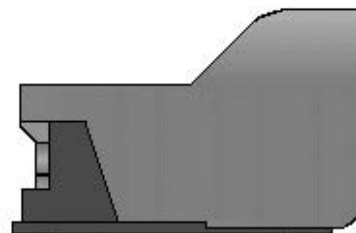
5/2-Way Valve 1/4

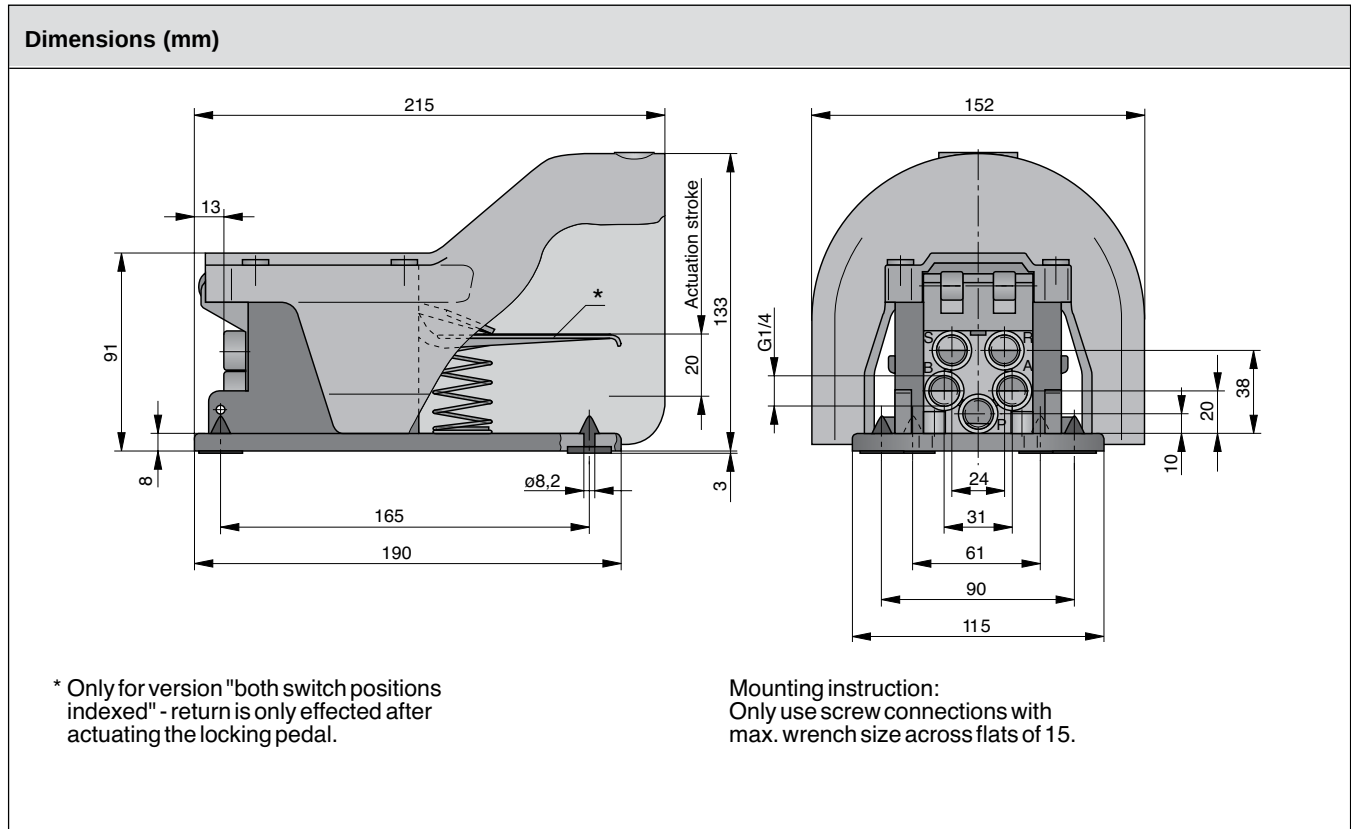
Actuation: Foot Pedal

- Detent
- Spring Return

Delivery Includes:

valve
toe guard



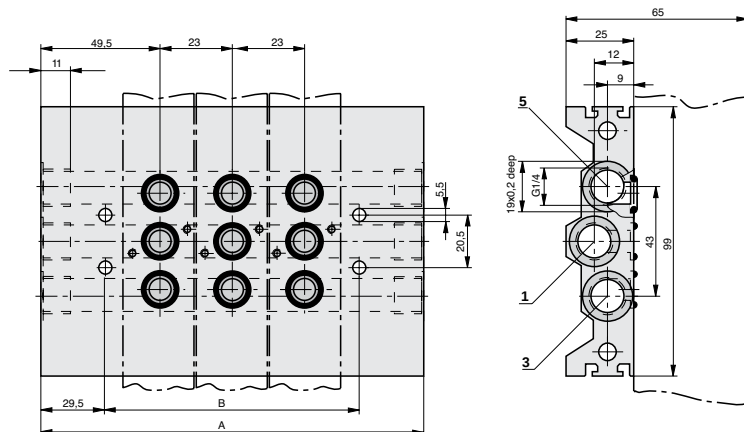


METRIC ONLY

Version G1/4				
Actuation	Return	Symbol	Type Number	Order Number
Pedal	Spring return		F531RF-08	KZ 4413
Pedal	Detent		F531-08	KZ 4412

Dimensions (mm)

For dimensions A and B see table



Drawing shows: RPSL-S9-1/8-3

RPS-Supply Manifolds

for directional valves of the
S9-1/8 Series

Metric Only

Body Ported Valves

Dimension Table (mm)

Type #	# of valves	A	B
RPSL-S9-1/8-2	2	74	63
RPSL-S9-1/8-3	3	96	86
RPSL-S9-1/8-4	4	118	109
RPSL-S9-1/8-5	5	140	132
RPSL-S9-1/8-6	6	162	155
RPSL-S9-1/8-7	7	184	178
RPSL-S9-1/8-8	8	206	201
RPSL-S9-1/8-9	9	228	224
RPSL-S9-1/8-10	10	250	247

Material

Description	Material
RPS-supply mani.	Al, anodized
Screws	Galvanized steel
O-ring	Oil-resist. rubber

Accessories

Description	Order No.
Complete cover strip	PD 32956
Flow divider	PD 42483

Versions:

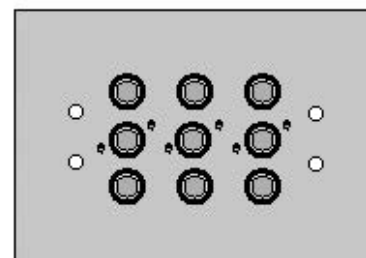
5/2-way valves
 5/3-way valves

Delivery Includes:

RPS-supply manifold
 mounting screws
 o-rings

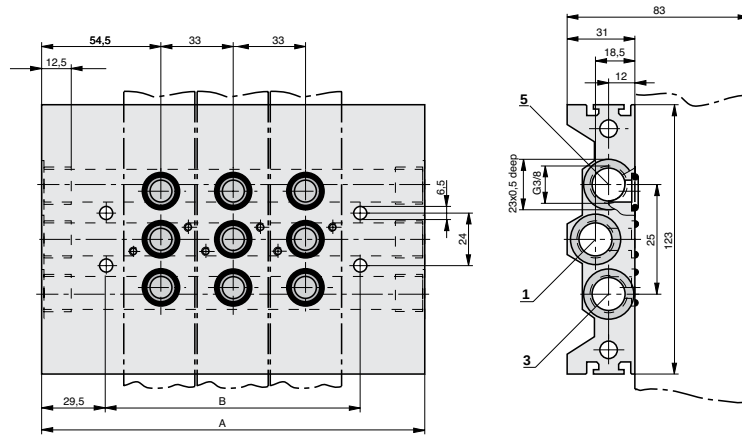
Order Instructions

Type #	Order #	Manifold	Quantity Screws	O-rings	Weight (kg)
RPSL-S9-1/8-2	PD 44813-0002	1	4	6	0.47
RPSL-S9-1/8-3	PD 44813-0003	1	6	9	0.57
RPSL-S9-1/8-4	PD 44813-0004	1	8	12	0.67
RPSL-S9-1/8-5	PD 44813-0005	1	10	15	0.77
RPSL-S9-1/8-6	PD 44813-0006	1	12	18	0.87
RPSL-S9-1/8-7	PD 44813-0007	1	14	21	0.97
RPSL-S9-1/8-8	PD 44813-0008	1	16	24	1.07
RPSL-S9-1/8-9	PD 44813-0009	1	18	27	1.17
RPSL-S9-1/8-10	PD 44813-0010	1	20	30	1.27



Dimensions (mm)

For dimensions A and B see table



Drawing shows: RPSL-S9-1/4-3

RPS-Supply Manifolds

for directional valves of the S9-1/4 Series

Metric Only

Body Ported Valves

Dimension Table (mm)

Type #	# of valves	A	B
RPSL-S9-1/4-2	2	96	83
RPSL-S9-1/4-3	3	129	116
RPSL-S9-1/4-4	4	162	149
RPSL-S9-1/4-5	5	195	182
RPSL-S9-1/4-6	6	228	215
RPSL-S9-1/4-7	7	261	248
RPSL-S9-1/4-8	8	294	281
RPSL-S9-1/4-9	9	327	314
RPSL-S9-1/4-10	10	360	347

Material

Description	Material
RPS-supply mani.	Anodized alum.
Screws	Galvanized steel
O-ring	Oil-resist. rubber

Accessories

Description	Order No.
Cover strip kit	PD 32957
Flow divider	PD 42516

Versions:

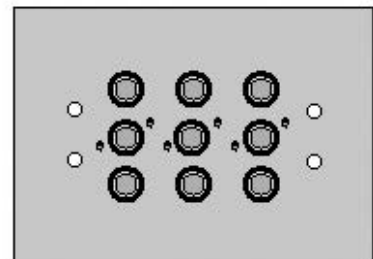
5/2-way valves
5/3-way valves

Delivery Includes:

RPS-supply manifold
mounting screws
o-rings

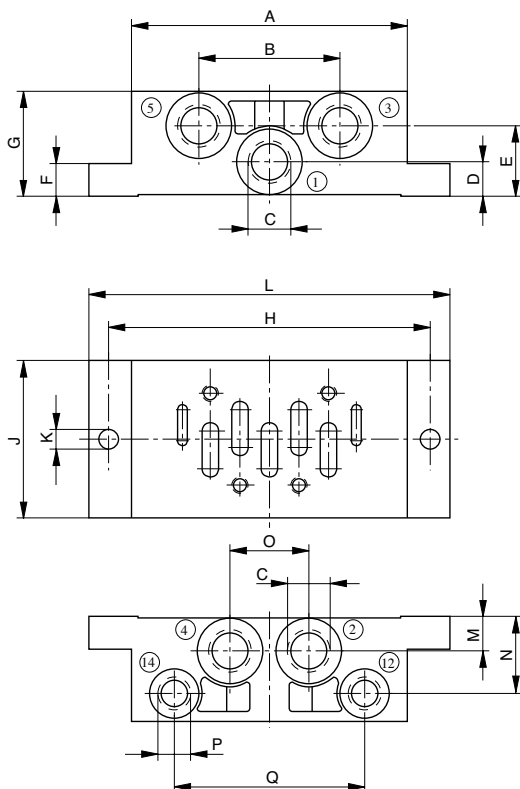
Order Instructions

Type #	Order #	Manifold	Quantity Screws	O-rings	Weight (kg)
RPSL-S9-1/4-2	PD 44814-0002	1	4	6	0.845
RPSL-S9-1/4-3	PD 44814-0003	1	6	9	1.045
RPSL-S9-1/4-4	PD 44814-0004	1	8	12	1.245
RPSL-S9-1/4-5	PD 44814-0005	1	10	15	1.445
RPSL-S9-1/4-6	PD 44814-0006	1	12	18	1.645
RPSL-S9-1/4-7	PD 44814-0007	1	14	21	1.845
RPSL-S9-1/4-8	PD 44814-0008	1	16	24	2.045
RPSL-S9-1/4-9	PD 44814-0009	1	18	27	2.245
RPSL-S9-1/4-10	PD 44814-0010	1	20	30	2.445



Dimensions (mm)
Single Base Plate, Form A

Side Ported



Base Plates

ISO 5599
Size: 1, 2, 3
Single Base Plates

- To VDMA 24345 Form A
Side Ported
- To VDMA 24345 Form B
Bottom Ported

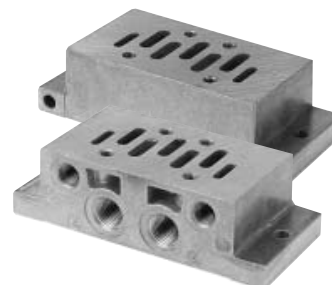
Dimension Table (mm)

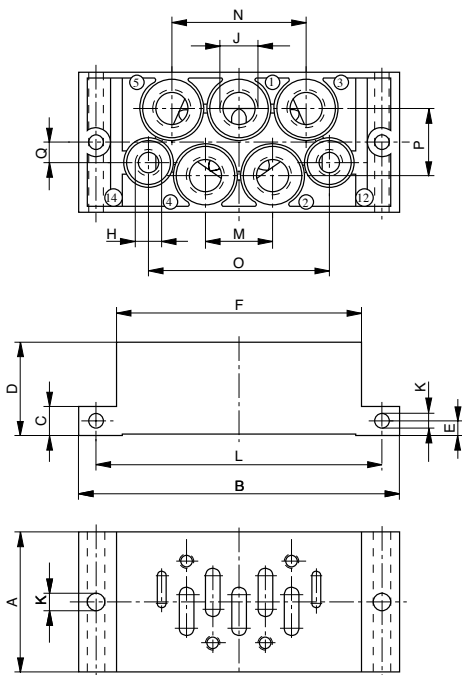
ISO Size	A	B	C	D	E	F	G	H
1	84	43	1/4	10.5	21.5	10	32	98
2	95	56	3/8	14	26	13	40	112
3	119	68	1/2	17	17	18	32	136

ISO Size	J	K	L	M	N	O	P	Q
1	48	5.5	110	10.5	23.5	24	1/8	58
2	57	6.6	124	14	30	30	1/8	74
3	71	6.6	149	17	22	32	1/8	90

Order Instructions

ISO Size	Ports	Order Number	
		Metric Version	NPT Version
1	1/4 3/8	KX 9076	600C01 642K91
2	3/8 1/2	KX 9433	601C01 643K91
3	1/2 3/4	KX 9434	602C01 644K91



Dimensions (mm)
Single Base Plate, Form B
Bottom Ported
Intermediate Plate
Form C

End Plate Set, Form D
for Intermediate Plate
**Dimension Table (mm)**

ISO Size	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q
1	46	110	10	30	5	84	G1/8	G1/4	5.5	98	23	46	62	23	7.5
2	56	124	13	35	6.5	95	G1/8	G3/8	6.6	112	28	56	73	27	7.5
3	71	149	18	32	9	119	G1/8	G1/2	6.6	136	34	68	90	35	10

Order Instructions

ISO Size	Ports	Order Number
1	G1/4	KX 9077
2	G3/8	KX 9436
3	G1/2	KX 9437

Order Instructions

ISO Size	Description	Order Number
1	manifold subbase, G1/4, Form C	KX 9079
2	manifold subbase, G3/8, Form C	KX 9419
3	manifold subbase, G1/2, Form C	KX 9420
1	end plate set, G3/8, Form D	KX 9078
2	end plate set, G1/2, Form D	KX 9421
3	end plate set, G1, Form D	KX 9422
	adapter plate to combine size 1 to size 2	KX 9430
	adapter plate to combine size 1 to size 3	KX 9432
	adapter plate to combine size 2 to size 3	KX 9431
1	cover strip kit	KX 9082
2	cover strip kit	KX 9423
3	cover strip kit	KX 9424
1	intermediate plate, with built-in flow control valves	701B77
2	intermediate plate, with built-in flow control valves	702B77
3	intermediate plate, with built-in flow control valves	722K77
1	intermediate plate, with ONE built-in pressure regulator	620C91
2	intermediate plate, with ONE built-in pressure regulator	624C91
3	intermediate plate, with ONE built-in pressure regulator	628C91
1	intermediate plate, with TWO built-in pressure regulators	621C91
2	intermediate plate, with TWO built-in pressure regulators	625C91
3	intermediate plate, with TWO built-in pressure regulators	629C91

Accessories

Exhaust Mufflers	
Order Number	Port Size
KY 2010	G1/8
KY 2011	G1/4
KY 2012	G3/8
KY 2013	G1/2
KY-U2010	1/8" NPT
KY-U2011	1/4" NPT
KY-U2013	1/2" NPT

Metric Conversion Fittings	
Order Number	Port Size
2521-1/8-02	G1/8 to 1/8" NPT
2521-1/4-04	G1/4 to 1/4" NPT
2521-3/8-06	G3/8 to 3/8" NPT
2521-1/2-08	G1/2 to 1/2" NPT

Exhaust Flow Controls	
Order Number	Port Size
KY 6952	G1/8
KY 6953	G1/4
KY 6954	G1/2
ASP-1SC	1/8" NPT
ASP-2SC	1/4" NPT

Port Plugs	
Order Number	Port Size
0205-1000	G1/8
0205-1300	G1/4
0205-1600	G3/8
0205-2000	G1/2
0205-1100	1/8" NPT
0205-1400	1/4" NPT
0205-1800	3/8" NPT
0205-2200	1/2" NPT

Spare Parts

Replacement Solenoid Coils: 1/8" & 1/4" Body Ported Valves	
Order Number	Voltage
KZ 3674	12vDC
KZ 3673	24vDC
KZ 3669	110vAC
KZ 3672	220vAC
KZ 3675	24vAC

Replacement Solenoid Coils: 1/2" Body Ported Valves & ISO Valves	
Order Number	Voltage
KZ 3518	12vDC
KZ 3519	24vDC
KZ 3521	110vAC
KZ 3522	220vAC
KZ 3518	24vAC

Replacement DIN Connector Plugs	
Order Number	Description
KY 9393	Replacement DIN connector plug
C12213N21	DIN connector plug w/1/2" NPTF conduit entry
PD 34991	Solenoid retaining nut
KW 0766	Lighted wafer seal, for DIN connector plug, 24vDC
KZ 3759	DIN connector plug w/surge suppression, 12 & 24vDC
KX 5368	DIN connector plu w/surge suppression, 110 & 220vAC
KY 3018	DIN connector plug w/surge suppression, LED, 12 & 24vDC
KW 0718	DIN connector plug w/surge suppression, LED, 110 & 220vAC

Seal Kits: S9 Solenoid Valves			
Actuation	1/8"	1/4"	1/2"
5/2 Single	PD 35534	PD 35536	PD 35578
5/2 Double	PD 35520	PD 35526	PD 35577
5/3 Blocked	PD 35525	PD 35531	PD 35579
5/3 Exhaust	PD 35524	PD 35530	PD 35581
5/3 Dual	PD 35523	PD 35529	PD 35580

RPS Supply Manifolds: 1/8 PD 44813-....	
Order Number	Description
88-37H643-75	O-ring (10x2)
ZP 3986	Screws (M3x40)

RPS Supply Manifolds: 1/4 PD 44814-....	
Order Number	Description
88-52H643-75	O-ring (13x2)
ZP 3988	Screws (M4x55)

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- 1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- 1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- 1.3. Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution:** Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices:** Safety devices should not be removed, or defeated.
- 1.7. Warning Labels:** Warning labels should not be removed, painted over or otherwise obscured.
- 1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- 2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating:** Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating:** Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover:** Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses:** To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, ketones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

- 2.8. Product Rupture:** Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- 3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- 3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures:** Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)
- 4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

- 4.5. Routine Maintenance Issues:**
- Remove excessive dirt, grime and clutter from work areas.
 - Make sure all required guards and shields are in place.
- 4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals:** It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- 4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- 4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

Offer of Sale

Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and Divisions ("Company") and its authorized distributors, are hereby offered for sale at prices to be established by the Company, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such item, when communicated to the Company, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from the Company. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.**

NOTWITHSTANDING THE FOREGOING, THERE ARE NOWARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGN OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter,

discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter "Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgements resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

Parker Hannifin Corporation
Parker-Origa
100 West Lake Drive
Glendale Heights, IL 60139 USA

Phone 630-871-8300
fax 630-871-1515
toll free 800-695-5984
email: info-hous-market@parker.com
website www.parkeroriga.com

