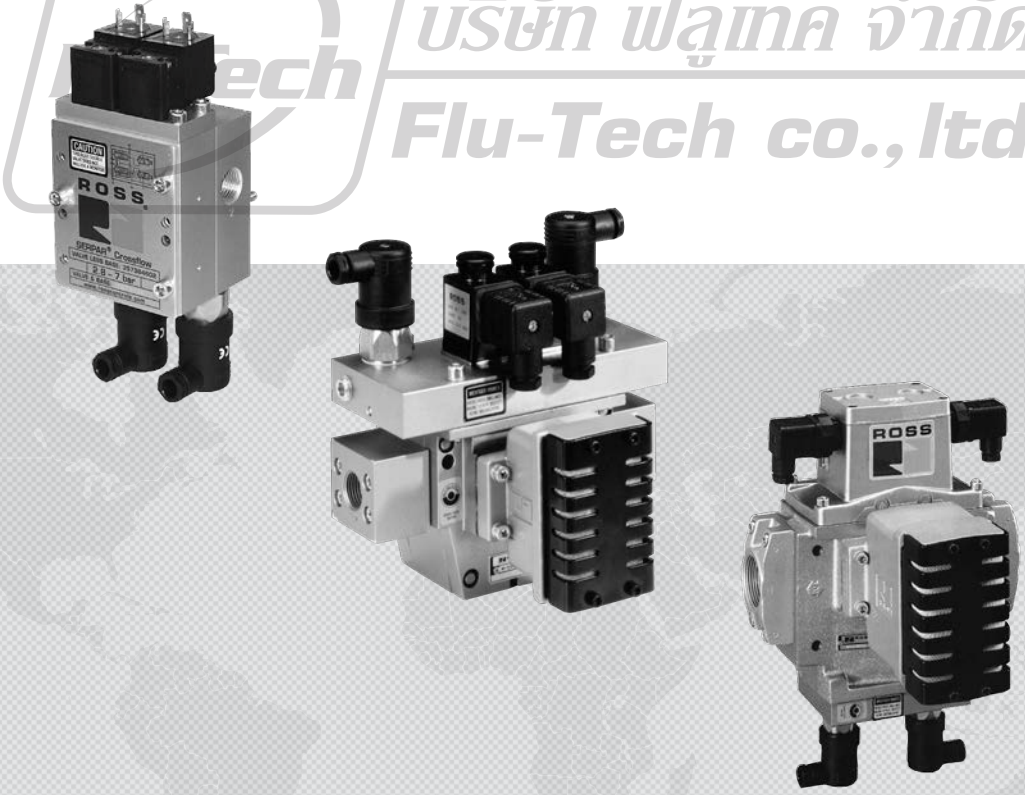
ROSS®

PRODUCT INFORMATION

CLUTCH/BRAKE CONTROL DOUBLE VALVES

CROSSFLOW™ 35 SERIES



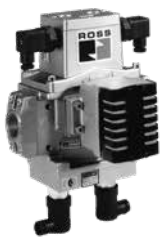
ROSS CONTROLS

CROSSFLOW™ DOUBLE VALVES 35 SERIES FOR EXTERNAL MONITORING WITH OR WITHOUT PRESSURE SWITCHES – KEY FEATURES

- Designed to enable users to comply with current safety regulations
- Can be integrated with external monitoring systems to provide for lockout and inhibiting further machine operation until the controls system is reset
- Default to de-energized position upon fault condition
- Built-in non-clogging silencers on Basic Sizes 4, 8, 12 and 30

Basic Size 1 and 2 Crossflow™ valves with pressure switches (designed for external monitoring) are available from ¼" to ¾" port sizes. Externally monitored double valves provide feedback signals (via the pressure switches), which allows the main press controls, or separate monitoring device,

The original application for these double valves was in the control of clutch/brake mechanisms on stamping presses, but they have found their way into many other critical applications such as alternative lockout systems for energy isolation, air cylinder press load-holding systems, as well as other Category-3 and -4 safety circuits. ROSS double valves are a vital part of any control-reliable fluid power control system.

DESCRIPTION		Page
Crossflow™ Double Valves for External Monitoring with or without Pressure Switches Basic Size 1		B3.3 - B3.4
Crossflow™ Double Valves with or without Pressure Switches Basic Size 2		B3.5 - B3.6
Crossflow™ Double Valves with Pressure Switches Basic Size 4		B3.7
Crossflow™ Double Valves with Pressure Switches Basic Size 8, 12, 30		B3.8 - B3.9

Basic Size 1

Port Sizes		Basic Size	Pressure Switches	Pressure Switch Provision	Valve & Base Model Number#		C_v		Avg. Response Constants			Weight lb (kg)
									M	F		
1, 2	3				NPT Threads	G Threads	1-2	2-3		1-2	2-3	
1/4	1/4	1	None	Yes	3573B2632W	D3573B2632W	0.9	1.4	28	4.6	3.4	2.1 (0.95)
			Two**	Yes	3573B2642W	D3573B2642W	0.9	1.4	28	4.6	3.4	2.5 (1.14)
3/8	3/8	1	None	Yes	3573B2645W	D3573B2645W	1.2	1.7	25	3.1	2.8	2.5 (1.14)
			Two**	Yes	3573B2644W	D3573B2644W	1.2	1.7	25	3.1	2.8	2.9 (1.32)

 # Voltage: W=24 VDC; Z=110-120 VAC, 50/60 Hz, e.g., 3573B2632Z. For other voltages consult ROSS.

Valve and base can be ordered separately, see next page.

**Valve includes pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.

Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

B

B3

** Pressure Switches & Monitoring:

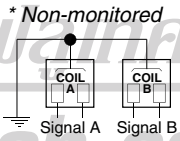
Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery. Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217). The valves on this page do not have a built-in monitor, and must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve in the event of a failure within the valve.

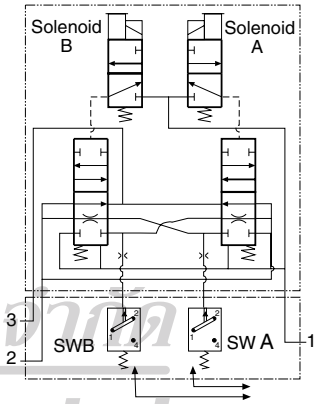
Valve Response Time

The constants above, designated M and F, can be used to determine the amount of time required to fill or exhaust a volume of any size using the formula on the right:

Vlv. Resp. Time (msec)= M + F *V
M = avg. time for parts movement
F = msec. per cubic inch of volume
V = volume in cubic inches

** Non-monitored*





To customer's external monitor

Accessories & Options

Electrical Connectors	Electrical Connector Form	Electrical Connector Type	Cord Length meters (feet)	Cord Diameter	Electrical Connector Model Number		
					Without Light	Lighted Connector	
						24 Volts DC	120 Volts AC
	EN 175301-803 Form B	Prewired Connector (18 gauge)	2 (6½)	10-mm	266K77	267K77-W	267K77-Z
		Connector Only	–	–	372K77	382K77-W	382K77-Z
	CAUTIONS: Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.						

Silencers	Port Size	Thread Type	Model Number		Avg. C_v	Dimensions inches (mm)		Weight lb (kg)	Specifications
			NPT Threads	R/Rp Threads		Length	Width		
	1/4	Male	5500A2003	D5500A2003	2.1	0.9 (21)	2.2 (55)	0.1 (0.1)	**Pressure Range:** 0 to 290 psig (0 to 20 bar) maximum. **Flow Media:** Filtered air.
	3/8	Male	5500A3013	D5500A3013	2.7	0.9 (21)	2.2 (55)	0.1 (0.1)	

STANDARD SPECIFICATIONS (for valves on this page):

Construction Design	Dual Poppet
Mounting Type	Inline
Solenoids	Two solenoids, rated for continuous duty
Voltage	24 volts DC; 110-120 volts AC, 50/60 Hz
Power Consumption (each solenoid)	7.5 watts nominal on DC; 12 VA maximum inrush, 9.8 VA maximum holding on 50 or 60 Hz
Enclosure Rating	IP65, IEC 60529
Electrical Connection	EN 175301-803 Form B connector; Uses two cord-grip connectors at solenoids
Temperature	Ambient: 40° to 120°F (4° to 50°C)
	Media: 40° to 175°F (4° to 80°C)

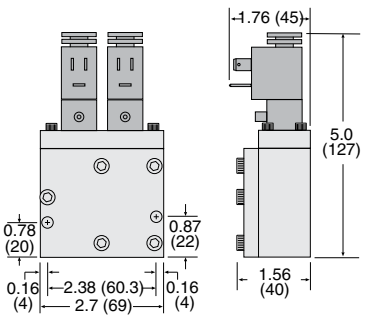
Flow Media	Filtered air
Operating Pressure	40 to 100 psig (2.8 to 7 bar)
Construction Material	**Valve Body:** Cast Aluminum **Poppet:** Acetal and Stainless Steel **Seals:** Buna-N
Functional Safety Data: Category 4, PL e; B_{10D}: 20,000,000; PFH_D: $7.71x10^{-9}$; $MTTF_D$: 301.9 (n_{op}: 662400) **Certifications:** CE Marked for applicable directives, DGUV, CSA/UL, TSSA for appropriately tested valves **Vibration/Impact Resistance:** Tested to BS EN 60068-2-27	

B

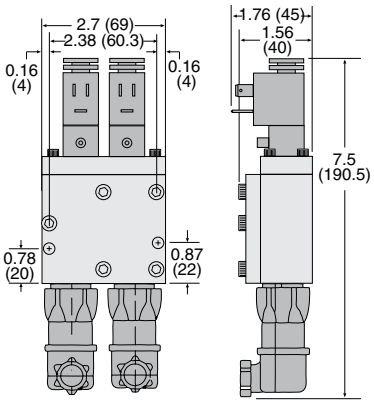
B3

Basic Size 1

Valve without Pressure Switches

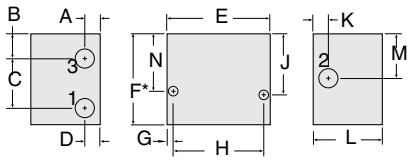


Valve with Pressure Switches



Valve Dimensions – inches (mm)

Base



Valve & Base Model Number	Base Model Number	BASE Dimensions – inches (mm)												
		A	B	C	D	E	F	G	H	J	K	L	M	N
3573B2632	1120C91	0.4 (11)	0.7 (17)	1.29 (32.8)	0.4 (11)	2.7 (69)	2.4 (61)	0.2 (5)	2.38 (60.5)	1.6 (41)	0.4 (11)	1.8 (46)	1.2 (30)	1.5 (38)
3573B2642	888C91	0.4 (11)	0.7 (17)	1.29 (32.8)	0.4 (11)	2.7 (69)	2.4 (61)	0.2 (5)	2.38 (60.5)	1.6 (41)	0.4 (11)	1.8 (46)	1.2 (30)	1.5 (38)
3573B2644	1171C91	0.5 (13)	0.6 (15)	1.47 (37.2)	0.5 (13)	2.7 (69)	2.5 (63)	0.2 (5)	2.38 (60.5)	1.6 (41)	0.8 (19)	1.8 (46)	1.1 (27)	1.5 (38)
3573B2645	1172C91	0.5 (13)	0.6 (15)	1.47 (37.2)	0.5 (13)	2.7 (69)	2.5 (63)	0.2 (5)	2.38 (60.5)	1.6 (41)	0.8 (19)	1.8 (46)	1.1 (27)	1.5 (38)

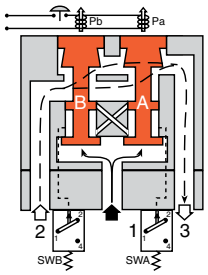
For replacement valve only (less base), order model number 3573B2602.

Valve Operation: Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

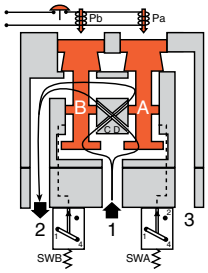
CAUTION: *If the monitor must be reset, electrical signals to both solenoids must be removed to prevent the machine controlled by the valve from immediately recycling and producing a potentially hazardous condition.*

VALVE OPERATION

Conditions at Start:
Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both switches SWA and SWB are exhausted. Contacts 1 and 2 of switches SWA and SWB are connected.

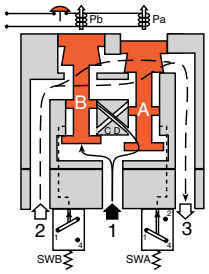


Normal Operation:
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure switch and become equal to inlet pressure. Both switches trip and now contacts 1 and 4 of switches SWA and SWB are connected instead of contacts 1 and 2.



Completion of Normal Cycle:
Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

Detecting a Malfunction:
A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below 2 % of inlet pressure. Full sensing air pressure from side A goes to switch SWA, and a reduced pressure goes to switch SWB. This full pressure signal causes switch SWA to trip. Switch SWB, with a reduced pressure signal, does not trip. An external monitoring system can detect the malfunction by monitoring the condition of the switches SWA and SWB. The external monitoring system may then react accordingly by shutting down the power to the valve solenoids and any other components deemed necessary to stop the machine.



Basic Size 2

Port Sizes		Basic Size	Inlet Orientation	Pressure Switches	Pressure Switch Provision	Valve & Base Model Number#		C_v		Avg. Response Constants			Weight lb (kg)
										M	F		
1, 2	3					NPT Threads	G Threads	1-2	2-3		1-2	2-3	
1/2	3/4	2	Left Hand	None	Yes	3573C4652W	D3573C4652W	3.7	9.0	25	1.2	0.9	4.7 (2.13)
				Two**	Yes	3573C4741W	D3573C4741W	3.7	9.0	25	1.2	0.9	5.2 (2.36)
			Right Hand	None	Yes	3573C4658W	D3573C4658W	3.7	9.0	25	1.2	0.9	4.7 (2.13)
				Two**	Yes	3573B4702W	D3573B4702W	3.7	9.0	25	1.2	0.9	5.2 (2.36)
1/2	1	2	Left Hand	None	Yes	3573A4735W	D3573A4735W	3.7	9.1	25	1.2	0.9	5.2 (2.36)
				Two	Yes	3573A4736W	D3573A4736W	3.7	9.1	25	1.2	0.9	5.7 (2.58)
			Right Hand	None	Yes	3573B4717W	D3573B4717W	3.7	9.1	25	1.2	0.9	5.2 (2.36)
				Two**	Yes	3573B4706W	D3573B4706W	3.7	9.1	25	1.2	0.9	5.7 (2.58)
3/4	3/4	2	Left Hand	None	Yes	3573C4645W	D3573C4645W	4.2	9.0	25	1.1	0.9	4.7 (2.13)
				Two**	Yes	3573C4644W	D3573C4644W	4.2	9.0	25	1.1	0.9	5.2 (2.36)
3/4	1	2	Left Hand	Two**	Yes	3573A4738W	D3573A4738W	4.2	9.3	25	1.1	0.8	5.7 (2.58)
			Right Hand	None	Yes	3573B4718W	D3573B4718W	4.2	9.3	25	1.1	0.8	5.2 (2.36)
				Two**	Yes	3573B4715W	D3573B4715W	4.2	9.3	25	1.1	0.8	5.7 (2.58)

 # Voltage: W=24 VDC; Z=110-120 VAC, 50/60 Hz, e.g., 3573C4652Z. For other voltages consult ROSS.
Valve and base can be ordered separately, see next page.

** Valve includes pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.

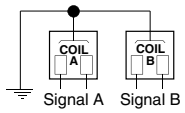
Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

SIL 3 Functional Safe
Cat. 4 PL e
DGUV Test MHHW 00172 Sicherheit geprüft tested safety
CE
CSA C US

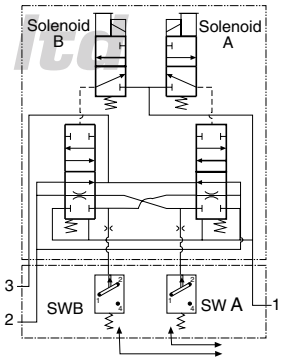
B

B3

* *Non-monitored*



**** Pressure Switches & Monitoring:**
Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery. Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217). The valves on this page do not have a built-in monitor, and must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve in the event of a failure within the valve.



To customer's external monitor

Valve Response Time

The constants above, designated M and F, can be used to determine the amount of time required to fill or exhaust a volume of any size using the formula on the right:

Vlv. Resp. Time (msec)= M + F *V
M = avg. time for parts movement
F = msec. per cubic inch of volume
V = volume in cubic inches

Valve Operation: Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

CAUTION: *If the monitor must be reset, electrical signals to both solenoids must be removed to prevent the machine controlled by the valve from immediately recycling and producing a potentially hazardous condition.*

STANDARD SPECIFICATIONS (for valves on this page):

Construction Design	Dual Poppet
Mounting Type	In-line
Solenoids	Two solenoids, rated for continuous duty
Voltage	24 volts DC; 110-120 volts AC, 50/60 Hz
Power Consumption (each solenoid)	6 watts nominal on DC; 8.5 VA maximum inrush, 8.5 VA maximum holding on 50 or 60 Hz
Enclosure Rating	IP65, IEC 60529
Electrical Connection	EN 175301-803 Form A connector; Uses two cord-grip connectors at solenoids
Temperature	Ambient: 40° to 120°F (4° to 50°C)
	Media: 40° to 175°F (4° to 80°C)

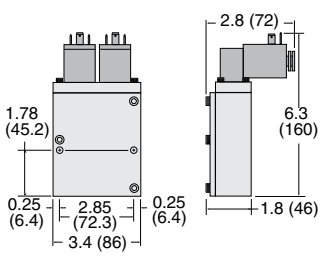
Flow Media	Filtered air
Operating Pressure	40 to 100 psig (2.8 to 7 bar)
Construction Material	**Valve Body:** Cast Aluminum **Poppet:** Acetal and Stainless Steel **Seals:** Buna-N
Functional Safety Data: Category 4, PL e; B_{10D}: 20,000,000; PFH_D: 7.71x10^{-9}; $MTTF_D$: 301.9 (n_{op}: 662400) **Certifications:** CE Marked for applicable directives, DGUV, CSA/UL, TSSA for appropriately tested valves **Vibration/Impact Resistance:** Tested to BS EN 60068-2-27	

B

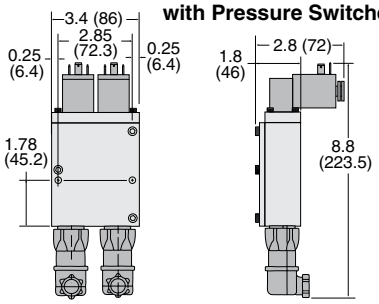
B3

Basic Size 2 Valves

without Pressure Switches

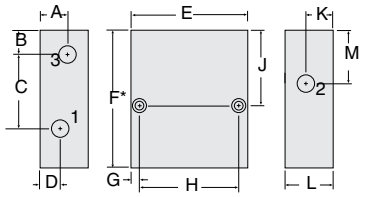


with Pressure Switches



Valve Dimensions – inches (mm)

Base



Valve & Base Model Number	Base Model Number	Replacement Valve Model Number	BASE Dimensions – inches (mm)											
			A	B	C	D	E	F	G	H	J	K	L	M
3573A4735	1633C01	3573B4605L	Consult ROSS.											
3573A4736	1633C01	3573B4605L												
3573A4738	1163C91	3573B4605L												
3573B4702	1132C91	3573C4602R												
3573B4706	1132C91	3573B4605R												
3573B4715	1784C91	3573B4605R												
3573B4717	1805F91	3573B4605R												
3573B4718	1806F91	3573B4605R												
3573B4741	1129C91	3573C4602L												
3573C4644	1163C91	3573C4602L	1.1 (27)	0.8 (19)	2.86 (72.7)	0.7 (17)	3.7 (94)	4.3 (110)	0.3 (7)	2.85 (72.4)	2.6 (64)	0.7 (17)	2.0 (50)	1.8 (46)
3573C4645	1163C91	3573C4602L	1.1 (27)	0.8 (19)	2.86 (72.7)	0.7 (17)	3.7 (94)	4.3 (110)	0.3 (7)	2.85 (72.4)	2.6 (64)	0.7 (17)	2.0 (50)	1.8 (46)
3573C4652	1129C91	3573C4602L	1.1 (27)	1.0 (24)	2.32 (58.9)	0.6 (15)	3.4 (86)	4.3 (110)	0.3 (7)	2.85 (72.4)	2.6 (64)	0.8 (19)	1.7 (44)	1.9 (48)
3573C4658	1132C91	3573C4602R	Consult ROSS.											

Accessories

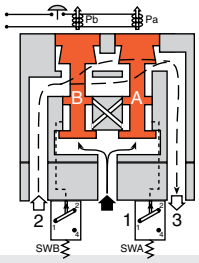
Electrical Connectors	Electrical Connector Form	Electrical Connector Type	Cord Length meters (feet)	Cord Diameter	Electrical Connector Model Number		
					Without Light	Lighted Connector	
						24 Volts DC	120 Volts AC
	EN 175301-803 Form A	Prewired Connector (18 gauge)	2 (6½)	6-mm	721K77	720K77-W	720K77-Z
				10-mm	371K77	383K77-W	383K77-Z
		Connector for threaded conduit (1/2 inch electrical conduit fittings)	–	–	723K77	724K77-W	724K77-Z
		Connector Only	–	–	937K87	936K87-W	936K87-Z

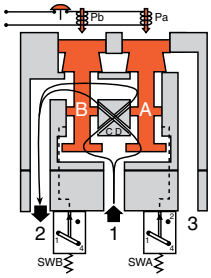
CAUTIONS: Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

Silencers	Port Size	Thread Type	Model Number		Avg. C_v	Dimensions inches (mm)		Weight lb (kg)	Specifications
			NPT Threads	R/Rp Threads		Length	Width		
	1/2	Male	5500A4003	D5500A4003	4.7	1.3 (32)	3.6 (91)	0.2 (0.1)	**Pressure Range:** 0 to 290 psig (0 to 20 bar) maximum. **Flow Media:** Filtered air.
	3/4	Male	5500A5013	D5500A5013	5.1	1.3 (32)	3.6 (92)	0.2 (0.1)	
			5500A5003	D5500A5003	11.5	2.0 (51)	5.3 (135)	0.6 (0.3)	
	1	Male	5500A6003	D5500A6003	14.6	2.0 (51)	5.4 (138)	0.6 (0.3)	

VALVE OPERATION

Conditions at Start:
Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both switches SWA and SWB are exhausted. Contacts 1 and 2 of switches SWA and SWB are connected.

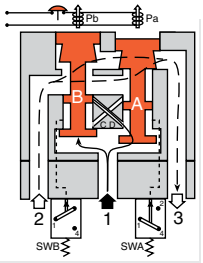




Normal Operation:
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure switch and become equal to inlet pressure. Both switches trip and now contacts 1 and 4 of switches SWA and SWB are connected instead of contacts 1 and 2.

Completion of Normal Cycle:
Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

Detecting a Malfunction:
A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below 2 % of inlet pressure. Full sensing air pressure from side A goes to switch SWA, and a reduced pressure goes to switch SWB. This full pressure signal causes switch SWA to trip. Switch SWB, with a reduced pressure signal, does not trip. An external monitoring system can detect the malfunction by monitoring the condition of the switches SWA and SWB. The external monitoring system may then react accordingly by shutting down the power to the valve solenoids and any other components deemed necessary to stop the machine.



Basic Size 4

Port Size	Basic Size	Flanged Ports				C_v		Weight lb (kg)
		Inlet Right		Inlet Left				
		Valve Model Number#**		Valve Model Number#**		1-2	2-3	
		NPT Threads	G Threads	NPT Threads	G Threads			
3/8	4	3573C3270W	D3573C3270W	3573C3276W	D3573C3276W	3	7	8.4 (3.8)
1/2	4	3573C4270W	D3573C4270W	3573C4276W	D3573C4276W	3	9	8.4 (3.8)
3/4	4	3573C5230W	D3573C5230W	3573C5236W	D3573C5236W	3	11	8.4 (3.8)

 # Voltage: W=24 VDC; Z=110-120 VAC, 50/60 Hz, e.g., 3573C3270Z.
For other voltages consult ROSS.

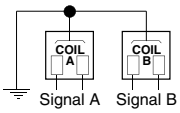
**Valve includes pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.

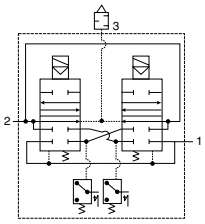
Pressure Switches & Monitoring:

Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

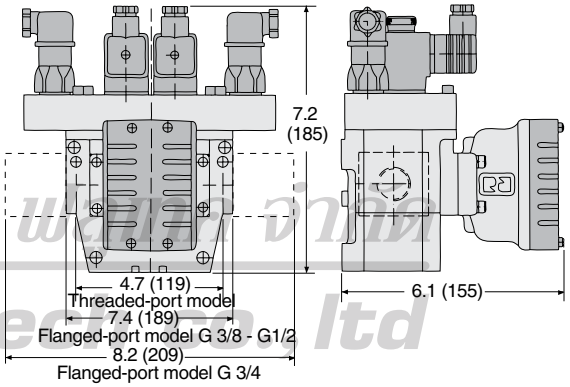
The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.

CAUTION: *If the system must be reset, electrical signals to both solenoids must be removed to prevent the machine from immediately recycling and producing a potentially hazardous condition.*





Valve Dimensions – inches (mm)



Accessories

Electrical Connectors	Electrical Connector Form	Electrical Connector Type	Cord Length meters (feet)	Cord Diameter	Electrical Connector Model Number		
					Without Light	Lighted Connector	
						24 Volts DC	120 Volts AC
	EN 175301-803 Form A	Prewired Connector (18 gauge)	2 (6½)	6-mm	721K77	720K77-W	720K77-Z
				10-mm	371K77	383K77-W	383K77-Z
		Connector for threaded conduit (1/2 inch electrical conduit fittings)	–	–	723K77	724K77-W	724K77-Z
		Connector Only	–	–	937K87	936K87-W	936K87-Z

CAUTIONS: Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

VALVE OPERATION

Refer to page G3.9.

STANDARD SPECIFICATIONS (for valves on this page):

Construction Design	Dual Poppet
Mounting Type	In-line
Solenoids	Two solenoids, rated for continuous duty
Voltage	24 volts DC; 110-120 volts AC, 50/60 Hz *Voltages at pressure switches must not exceed 250 volts.*
Power Consumption (each solenoid)	14 watts nominal on DC; 35 VA maximum in-rush, 22 VA holding on 50 or 60 Hz
Enclosure Rating	IP65, IEC 60529
Electrical Connection	EN 175301-803 Form A connector; Uses two cord-grip connectors at solenoids

Temperature	Ambient: 40° to 120°F (4° to 50°C)
	Media: 40° to 175°F (4° to 80°C)
Flow Media	Filtered air
Operating Pressure	40 to 150 psig (2.8 to 10 bar)
Construction Material	**Valve Body:** Cast Aluminum **Poppet:** Acetal and Stainless Steel **Seals:** Buna-N

Functional Safety Data: Category 4, PL e; B_{10D}: 20,000,000; PFH_D: $7.71x10^{-9}$; $MTTF_D$: 301.9 (n_{op}: 662400)
Certifications: CE Marked for applicable directives, DGUV, CSA/UL, TSSA for appropriately tested valves
Vibration/Impact Resistance: Tested to BS EN 60068-2-27

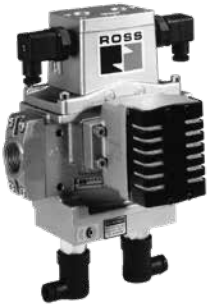
B

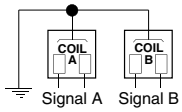
B3

Basic Size 8, 12, & 30

Port Size	Basic Size	Flanged Ports		C_v		Weight lb (kg)
		Valve Model Number#**		1-2	2-3	
		NPT Threads	G Threads			
1/2	8	3573B4638W	D3573B4638W	3.5	10	11.4 (5.2)
3/4	8	3573B5638W	D3573B5638W	4	14	11.4 (5.2)
	12	3573B5632W	D3573B5632W	8	15	15.4 (7.0)
1	8	3573B6638W	D3573B6638W	4	14	11.4 (5.2)
	12	3573B6632W	D3573B6632W	8.5	19	15.4 (7.0)
1¼	12	3573B7632W	D3573B7632W	9	21	15.4 (7.0)
	30	3573B7630W	D3573B7630W	20	42	33.9 (15.4)
1½	30	3573B8630W	D3573B8630W	21	43	33.9 (15.4)

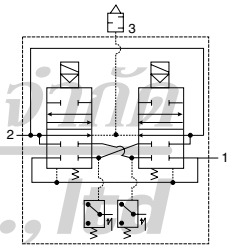
 # Voltage: W=24 VDC; Z=110-120 VAC, 50/60 Hz, e.g., 3573B4638Z.
For other voltages consult ROSS.
**Valve includes pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.
Valve and base can be ordered separately, consult ROSS.





Pressure Switches & Monitoring: Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

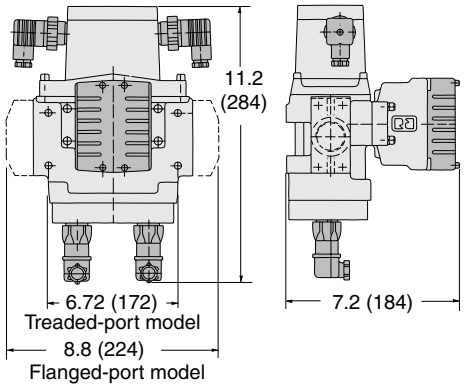
The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.



CAUTION: *If the system must be reset, electrical signals to both solenoids must be removed to prevent the machine from immediately recycling and producing a potentially hazardous condition.*

Valve Dimensions – inches (mm)

Basic Size 8



STANDARD SPECIFICATIONS (for valves on this page):

Construction Design	Dual Poppet
Mounting Type	In-line
Solenoids	Two solenoids, rated for continuous duty
Voltage	24 volts DC; 110-120 volts AC, 50/60 Hz *Voltages at pressure switches must not exceed 250 volts.*
Power Consumption (each solenoid)	14 watts nominal on DC; 35 VA maximum in-rush, 22 VA holding on 50 or 60 Hz
Enclosure Rating	IP 65 according to IEC-Publication 144 and DIN 40050, Sheet 1.
Electrical Connection	EN 175301-803 Form A connector; Uses two cord-grip connectors at solenoids

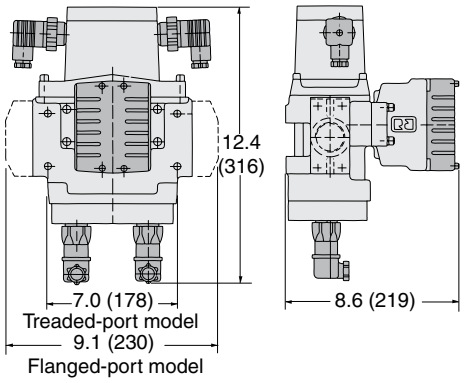
Temperature	Ambient: 40° to 120°F (4° to 50°C)
	Media: 40° to 175°F (4° to 80°C)
Flow Media	Filtered air
Operating Pressure	30 to 125 psig (2 to 8.5 bar)
Construction Material	**Valve Body:** Cast Aluminum **Poppet:** Acetal and Stainless Steel **Seals:** Buna-N

Functional Safety Data: Category 4, PL e; B_{10D}: 20,000,000; PFH_D: $7.71x10^{-9}$; $MTTF_D$: 301.9 (n_{op}: 662400)
Certifications: CE Marked for applicable directives, DGUV, CSA/UL, TSSA for appropriately tested valves
Vibration/Impact Resistance: Tested to BS EN 60068-2-27

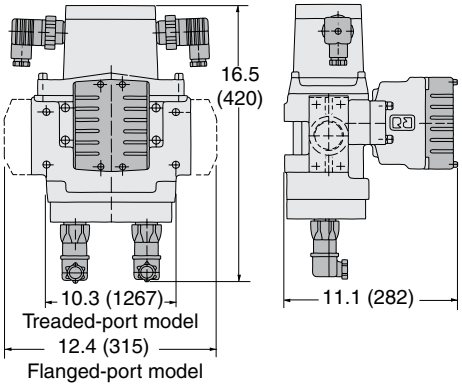
Basic Size 8, 12, & 30

Valve Dimensions – inches (mm)

Basic Size 12



Basic Size 30



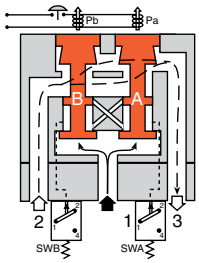
Accessories

Electrical Connectors	Electrical Connector Form	Electrical Connector Type	Cord Length meters (feet)	Cord Diameter	Electrical Connector Model Number		
					Without Light	Lighted Connector	
						24 Volts DC	120 Volts AC
	EN 175301-803 Form A	Prewired Connector (18 gauge)	2 (6½)	6-mm	721K77	720K77-W	720K77-Z
				10-mm	371K77	383K77-W	383K77-Z
		Connector for threaded conduit (1/2 inch electrical conduit fittings)	–	–	723K77	724K77-W	724K77-Z
		Connector Only	–	–	937K87	936K87-W	936K87-Z

CAUTIONS: Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

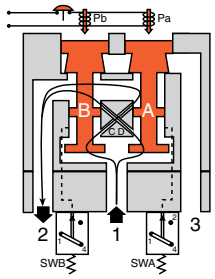
VALVE OPERATION

Conditions at Start:
Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both switches SWA and SWB are exhausted. Contacts 1 and 2 of switches SWA and SWB are connected.

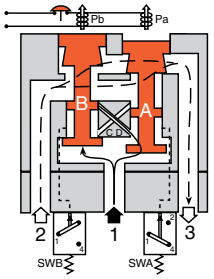


Completion of Normal Cycle:
Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

Normal Operation:
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure switch and become equal to inlet pressure. Both switches trip and now contacts 1 and 4 of switches SWA and SWB are connected instead of contacts 1 and 2.



Detecting a Malfunction:
A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below 2 % of inlet pressure. Full sensing air pressure from side A goes to switch SWA, and a reduced pressure goes to switch SWB. This full pressure signal causes switch SWA to trip. Switch SWB, with a reduced pressure signal, does not trip. An external monitoring system can detect the malfunction by monitoring the condition of the switches SWA and SWB. The external monitoring system may then react accordingly by shutting down the power to the valve solenoids and any other components deemed necessary to stop the machine.



CAUTIONS, WARNINGS And STANDARD WARRANTY

ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, and AUTOMATIC VALVE INDUSTRIAL, collectively the "ROSS Group".

PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure all sources of energy are turned off, the entire pneumatic system is shut down and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).

2. All ROSS Group Products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any product can be tampered with and/or need servicing after installation, persons responsible for the safety of others or the care of equipment must check ROSS Group Products on a regular basis and perform all necessary maintenance to ensure safe operating conditions.

3. All applicable instructions should be read and complied with before using any fluid power system to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use. If you have any questions, call your nearest ROSS Group location.

4. Each ROSS Group Product should be used within its specification limits. In addition, use only ROSS Group components to repair ROSS Group Products.

WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.

FILTRATION and LUBRICATION

1. Dirt, scale, moisture, etc., are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, best performance will be realized if a filter is installed to clean the air supply, thus preventing contaminants from interfering with the proper performance of the equipment. The ROSS Group recommends a filter with a 5-micron rating for normal applications.

2. All standard ROSS Group filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition and hazardous leakage. Immediately replace crazed, cracked, or deteriorated bowls.

3. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum base oils with oxidation inhibitors, an aniline point between 180°F (82°C) and 220°F (104°C), and an ISO 32, or lighter, viscosity. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks personal injury, and/or damage to property.

WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.

AVOID INTAKE/EXHAUST RESTRICTION

1. Do not restrict air flow in the supply line. To do so could reduce the pressure of the supply air below minimum requirements for the valve and thereby causing erratic action.

2. Do not restrict a valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and must have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.

SAFETY APPLICATIONS

1. Mechanical Power Presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.

2. Safety exhaust (dump) valves without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All safety exhaust valve installations should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.

3. Per specifications and regulations, the ROSS L-O-X® and L-O-X® with EEZ-ON®, N06 and N16 Series operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.

STANDARD WARRANTY

All products sold by the ROSS Group are warranted for a one-year period [with the exception of Filters, Regulators and Lubricators ("FRLs") which are warranted for a period of seven (7) years] from the date of purchase. All products are, during their respective warranty periods, warranted to be free of defects in material and workmanship. The ROSS Group's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Group has determined, in its sole discretion, are defective. All warranties become void if a product has been subject to misuse, misapplication, improper maintenance, modification or tampering. Products for which warranty protection is sought must be returned to the ROSS Group freight prepaid.

THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND THE ROSS GROUP EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE ROSS GROUP MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT IS THE ROSS GROUP LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF THE ROSS GROUP MAY EXTEND THE LIABILITY OF THE ROSS GROUP AS SET FORTH HEREIN.