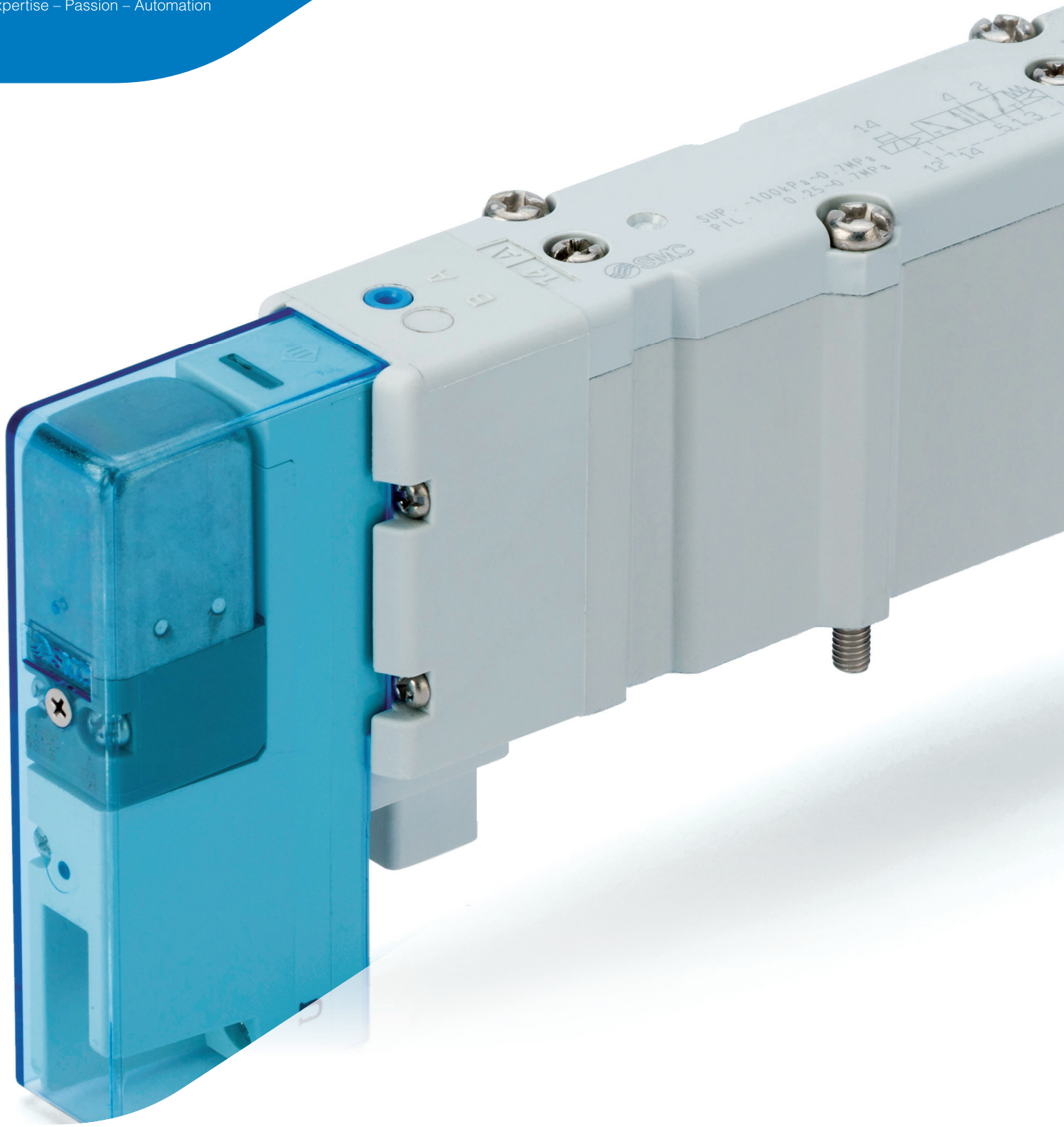
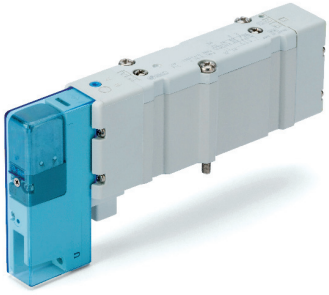
SMC

Expertise – Passion – Automation



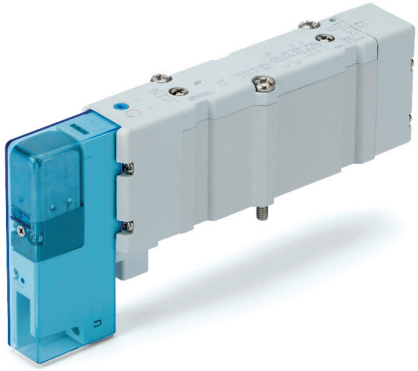


Your safety in our focus

Safety-related products
5 port solenoid valve with spring return spool
SY-X350 Series

5 port solenoid valve with spring return spool
SY-X350 Series

We focus on machinery safety as a key part of our product development strategy. This version will help satisfy your machine safety system requirements.



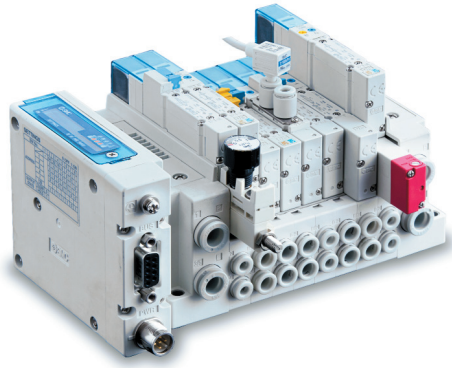
Main features

Spring return spool - the concept
The SY-X350 versions contain a mechanical spring return spool. In the case of a system and pilot pressure loss, the spool moves to its de-energised position irrespective of the applied electrical control signal. When used as a safety related part of a control system, it thereby satisfies the de-energisation principle.

Validated according to ISO 13849-2
This product is capable of meeting the relevant basic and well-tried safety principles.
Please download our reliability data for the details.

SISTEMA library is available
SY safety-related valves data are additionally integrated into the SISTEMA software tool.
Download the library file from our website and be ready to build your safety function.

SY series valves
Benefit from the high versatility this series gives you and create your own configuration, tailored to your needs.



Applications

Because it has a spring to return the spool, it can be used to implement safety related control systems where the valve spool must always return to the de-energised position on loss of system and pilot pressure, irrespective of the applied electrical control signal.

For dimensions and other details refer to SY catalogue at www.smc.eu

How to order

Base mounted SY □□0□□□□□-□□□1 -□-X350

Top ported SY □□3□□□□□-□□□1-□□-□-X350

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

① Valve series

3	3000
5	5000
7	7000

② Type of actuation

1	2-position single
A	4-position dual 3-port N.C./N.C.
B	4-position dual 3-port N.O./N.O.
C	4-position dual 3-port N.C./N.O.

1) A, B, C option is not available for metal seal type.

③ Seal type

0	Rubber seal
1	Metal seal (only for SY3000)

④ Pilot type

—	Internal pilot
R [1)]	External pilot

1) SY3000 and SY7000 4-position dual 3-port valves are not available with external pilot option.

⑤ Back pressure check valve

—	None
H [1)]	Built-in

1) SY3000 and SY7000 4-position dual 3-port valves are not available with this option.

⑥ Pilot valve option

—	Standard (0.7 MPa)
B	Quick response type (0.7 MPa)
K [1)]	High pressure type (1.0 MPa)

1) Only SY3000 metal seal type is available for the high pressure type.

⑦ Coil type

—	Standard
T	With power saving circuit (continuous duty type)

1) Be sure to select the power saving circuit type when the valve is continuously energized for long periods of time.
2) Be careful of the energizing time, as quick response and high pressure types will become operational when the energizing time is over 40 ms.

⑧ Rated voltage

5	24 VDC
6	12 VDC

⑨ Light/surge voltage suppressor and common specification

—	W/o indicator light & surge suppressor (non-polar)
R	W/surge suppressor (non-polar)
U	W/indicator light & surge suppressor (non-polar)
S	W/surge suppressor (positive common)
Z	W/indicator light & surge suppressor (positive common)
NS	W/surge suppressor (negative common)
NZ	W/indicator light & surge suppressor (negative common)

1) Only "Z" and "NZ" type is available for the product with power saving circuit.

⑩ Manual override

—	Non-locking push type

⑪ A, B port size

Thread piping

Symbol	Port size	Applicable series
M5	M5 x 0.8	SY3000
01	1/8"	SY5000
02	1/4"	SY7000

One-touch fitting (Metric)

Symbol	A, B port	SY3000	SY5000	SY7000
C2	Ø 2	●	—	—
C3	Ø 3.2	●	—	—
C4	Ø 4	●	●	—
C6	Ø 6	●	●	●
C8	Ø 8	—	●	●
C10	Ø 10	—	—	●
C12	Ø 12	—	—	●

One-touch fitting (Inch)

Symbol	A, B port	SY3000	SY5000	SY7000
N1	Ø 1/8"	●	—	—
N3	Ø 5/32"	●	●	—
N7	Ø 1/4"	●	●	●
N9	Ø 5/16"	—	●	●
N11	Ø 3/8"	—	—	●

⑫ Thread type

—	Rc
F	G
N	NPT
T	NPTF

1) Only "—" is available for M5.

⑬ Type of mounting screw

—	Round head combination screw
B	Hexagon socket head cap screw
K	Round head combination screw (falling-out -prevention type)
H	Hexagon socket head cap screw (falling-out -prevention type)

Note 1) The SY with external pilot type has a maximum operating pressure of 0.5 MPa and the pilot pressure shall be 0.2 MPa higher than the operating pressure. If a 0.7 MPa operating pressure is needed, please order SY5000-X67 or SY7000-X323 versions.
Note 2) Individually wired with M8 connector. Independent of parallel wiring or serial communication also available using the SY5000-X49 version.
Note 3) Refer to the respective "Reliability data" for the latest "How to order".

Best selling part numbers

Part number			
SY3100-5U1-X350	**SY3A00-5U1-X350**	**SY5100R-5U1-X350**	**SY7100-5U1-X350**
SY3100R-5U1-X350	**SY5100-5U1-X350**	**SY5A00-5U1-X350**	**SY7100R-5U1-X350**

Valve specifications

Valve type			Rubber seal	Metal seal
Fluid			Air	
Internal pilot operating pressure range [MPa]	**2-position single**		0.15 to 0.7	0.1 to 0.7 (High pressure type: 0.1 to 1)
	4-position dual 3-port valve			—
External pilot operating pressure range [MPa]	**Operating pressure range**		-100 kPa to 0.7 (4-position: -100 kPa to 0.6)	-100 kPa to 0.7 (High pressure type: -100 kPa to 1)
	Pilot pressure range	**2-position single**	0.25 to 0.7	0.1 to 0.7 (High pressure type: 0.1 to 1)
		4-position dual 3-port valve	Operating pressure + 0.1 or more (Min. 0.25) to 0.7	—
Ambient and fluid temperature [°C]			-10 to 50 (No freezing)	
Max. operating frequency [Hz]	**SY3000 SY5000**	**2-position single**	5	20 [1]
		4-position dual 3-port valve		
	SY7000	**2-position single**	5	10 [1]
		4-position dual 3-port valve	3	—
Min. operating frequency			1 cycle every 30 days	
Manual override			Non-locking push type	
Pilot exhaust type	**Internal pilot**		Main/Pilot valve common exhaust	Main/Pilot valve individual exhaust
	External pilot		Pilot valve individual exhaust	
Lubrication			Not required	
Mounting orientation [2]			Unrestricted	
Impact/Vibration resistance [1] [m/s²]			150/30	
Enclosure			IP67 (Based on IEC60529) [3]	
Coil rated voltage [VDC]			24, 12	
Allowable voltage fluctuation [V]			±10 % of rated voltage [4]	
Power consumption [W]	**Standard**		0.35 (With indicator light: 0.4)	
	Quick response type		0.9 (With indicator light: 0.95)	
	With power saving circuit		Standard: 0.1 [5] (With indicator light only) [Inrush 0.4, Holding 0.1], High pressure type: 0.4 [5] (With indicator light only) [Inrush 0.95, Holding 0.4]	
Surge voltage suppressor			Diode (Varistor for non-polar type)	
Indicator light			LED	

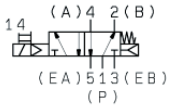
1) Use below 5 Hz for with the power saving circuit.
2) Impact resistance: No malfunction occurred when it is tested in the axial direction and at the right angles to the main valve and armature in both energised and de-energised states every time in each condition. (Values at the initial period)
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energised and de-energised states in the axial direction and at right angles to the main valve and armature. (Values at the initial period)
3) In the case of a metal seal, there are restrictions in the operating environment.
4) Due to voltage drops by the internal circuit in S/Z type and T type (with power saving circuit), use within the allowable voltage fluctuation as follows.

S/Z type { 24 VDC: -7 % to +10 %, 12 VDC: -4 % to +10 %
T type { 24 VDC: -8 % to +10 %, 12 VDC: -6 % to +10 %

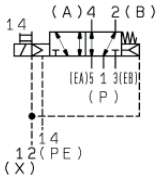
5) For technical data which are not shown in this document, please see the instruction manual or the standard catalogue at www.smc.eu.

Symbols

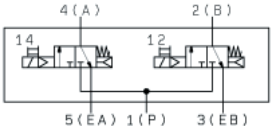
SY□1□□



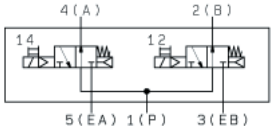
SY□1□□R



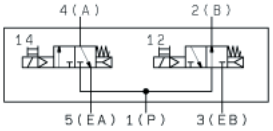
SY□A□0



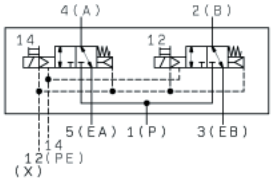
SY□B□0



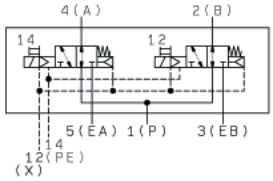
SY□C□0



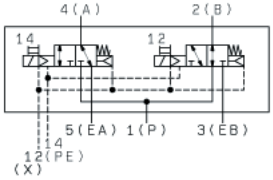
SY□A□0R



SY□B□0R



SY□C□0R



Note) Not all options are available for all valve sizes. Refer to “Reliability data”.

For dimensions and other details refer to SY catalogue at www.smc.eu

Manifold flow characteristics [1) 2)]

Plug-in metal base

Series	Piping option	Port size		Valve flow-rate characteristics					
				1→4/2 (P→A/B)			4/2→5/3 (A/B→E)		
		1, 5, 3 (P, EA, EB)	4, 2 (A, B)	C [dm³/(s·bar)]	b	Q [l/min] (ANR) [3)]	C [dm³/(s·bar)]	b	Q [l/min] (ANR) [3)]
SY3000	**SS5Y3-50 (Side ported)**	1/8	C6	1.1	0.19	262	1.1	0.15	256
	SS5Y3-51 (Bottom ported)	1/8	C6	1.2	0.31	307	1.2	0.14	278
	SS5Y3-52 (Top ported)	1/8	C6	1.1	0.29	278	1.2	0.20	287
SY5000	**SS5Y5-50 (Side ported)**	1/4	C8	2.6	0.28	653	2.6	0.14	603
	SS5Y5-51 (Bottom ported)	1/4	C8	2.7	0.35	709	2.8	0.20	671
	SS5Y5-52 (Top ported)	1/4	C8	2.6	0.26	645	3.1	0.13	715
SY7000	**SS5Y7-50 (Side ported)**	3/8	C10	3.8	0.27	948	4.0	0.20	958
	SS5Y7-51 (Bottom ported)	3/8	C10	4.1	0.34	1070	4.8	0.20	1150
	SS5Y7-52 (Top ported)	3/8	C10	4.5	0.27	1123	4.9	0.24	1201

Resin base

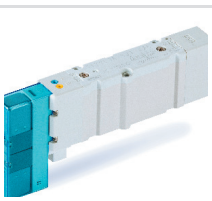
Series	Piping option	Port size		Valve flow-rate characteristics					
				1→4/2 (P→A/B)			4/2→5/3 (A/B→E)		
		1, 5, 3 (P, EA, EB)	4, 2 (A, B)	C [dm³/(s·bar)]	b	Q [l/min] (ANR) [3)]	C [dm³/(s·bar)]	b	Q [l/min] (ANR) [3)]
SY3000	**SS5Y3-10 (Side ported)**	C8	C6	1.4	0.30	356	1.6	0.19	381
	SS5Y3-12 (Top ported)	C8	C6	1.2	0.29	303	1.3	0.19	310
SY5000	**SS5Y5-10 (Side ported)**	C10	C8	3.3	0.30	839	3.6	0.17	848
	SS5Y5-11 (Bottom ported)	C10	C8		0.29	834	4.2	0.26	1042
	SS5Y5-12 (Top ported)	C10	C8	2.8	0.27	699	3.8	0.23	926
SY7000	**SS5Y7-10 (Side ported)**	C12	C12	6.2	0.23	1511	5.9	0.20	1413
	SS5Y7-11 (Bottom ported)	C12	C12		0.25	1529	6.6	0.21	1590
	SS5Y7-12 (Top ported)	C12	C12	5.6	0.31	1433	5.7	0.24	1397

1) The value is for manifold base with 5 stations and individually operated 2-position type.
2) These values are applicable to rubber seal type valves.
3) These values have been calculated according to ISO 6358 and indicate the flow rate under standard conditions with an inlet pressure of 0.6 MPa (relative pressure) and a pressure drop of 0.1 MPa.

Note

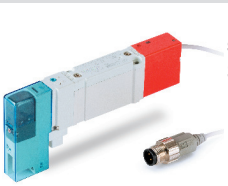
For confirmation of detailed specifications and dimensions, refer to product drawings, instruction manual, reliability data and catalogue at www.smc.eu.

Other related SY products

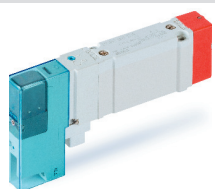


5 port solenoid valve with detent
SY-X25 Series

5 port solenoid valve with spool position detection
SY-X30 Series



Pilot air control valve with spool detection
SY-X31 Series



External pilot air control valve
SY-X310 Series

Expertise – Passion – Automation

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Printing ZU 00 Printed in Spain
LEAF-SY-X350-A-UK

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