

Intrinsically Safe Explosion-proof System

5 Port Solenoid Valve

Series 51-SY5000/7000/9000

Base Mounted

Single Unit

How to Order

51-SY 5 2 40 - A LL - - -

Series

5	51-SY5000
7	51-SY7000
9	51-SY9000

Explosion-proof

51	Intrinsically safe explosion-proof structure
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Type of actuation

1	2-position single (A)4 2(B) (EA)5 1 3(EB) (P)
2	2-position double (A)4 2(B) (EA)5 1 3(EB) (P)
3 Note)	3-position closed center (A)4 2(B) (EA)5 1 3(EB) (P)
4 Note)	3-position exhaust center (A)4 2(B) (EA)5 1 3(EB) (P)
5 Note)	3-position pressure center (A)4 2(B) (EA)5 1 3(EB) (P)

Note) 3-position type is not available for the 51-SY9000 series.

Pilot type

Nil	Internal pilot
R	External pilot

System Note 1) Note 2) Note 3)

A	Z728.H (51-SYE100-A) Model certificate number: TC14452
B	MTL728P + (51-SYE100-B) Model certificate number: TC14453
F	KFD0-SD2-Ex1.1065 (51-SYE100-F) Model certificate number: TC19711

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Port size

Symbol	Port size	Applicable series
Nil	Without sub-plate	
02	1/4 With sub-plate	51-SY5000 51-SY7000
03	3/8 With sub-plate	51-SY7000 51-SY9000
04	1/2 With sub-plate	51-SY9000

Manual override

Nil: Non-locking push type 	D: Push-turn locking slotted type 	E: Push-turn locking lever type
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Lead wire length

Symbol	Lead wire length	Note
3	300 mm	—
6	600 mm	Maximum length for L-type
10	1000 mm	—
15	1500 mm	—
20	2000 mm	—
30	3000 mm	—
100	10000 mm	Semi-standard

Electrical entry

Symbol	Electrical entry
L	L-type plug connector
LL	L-type plug connector with cover
TT Note)	With IP65 compliant cable

Note) TT-type is connected to the terminal block.
Cables other than the connected one cannot be used.

Note 1) Attached barrier type

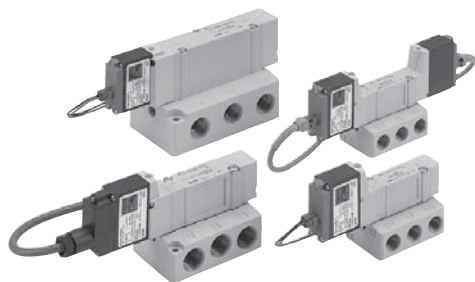
The numbers in (), 51-SYE100-□ represents SMC's control number.

Note 2) If the barrier is not necessary due to valve replacement etc, enter O after the system symbol.
Example) 51-SY5140-AQLL3

Note 3) For this product, the barrier and the valve as a set are certified as a system, so please be aware of the following.

- For this product, both the barrier and the valve have an SMC model certification label with a model certification number listed on it. Be sure to use only a barrier and a valve whose numbers match.
- If an SMC model certification label has not been stuck on the product, or if the model certification numbers do not match, the product cannot be said to be an intrinsically safe explosion-proof system. Therefore, be sure to use only a barrier purchased from SMC.

Series 51-SY5000/7000/9000



Specifications

Series			51-SY5000	51-SY7000	51-SY9000
Fluid			Air		
Internal pilot operating pressure range (MPa)		2-position single	0.15 to 0.7		
		2-position double	0.1 to 0.7		
		3-position	0.2 to 0.7		
External pilot operating pressure range (MPa)	Operating pressure range	-100 kPa to 0.7			
		Pilot pressure range	2-position single	0.25 to 0.7	
			2-position double	0.25 to 0.7	
			3-position	0.25 to 0.7	
Ambient and fluid temperature (°C)			-10 to 50 (No freezing)		
Max. operating frequency (Hz)		2-position single, double	1		
		3-position			
Manual override (Manual operation)			Non-locking push type, Push-turn locking slotted type, Push-turn locking lever type		
Pilot exhaust method		Internal pilot	Main/Pilot valve common exhaust		
		External pilot	Pilot valve individual exhaust		
Lubrication			Not required		
Mounting orientation			Unrestricted		
Impact/Vibration resistance (m/s ²) ^{Note)}			150/30		
Enclosure			IP30 (L-type). IP40 (LL-type). IP65 (TT-type)		



* Based on IEC60529

Note) 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 energized and de-energized states every once for 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 energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)

Solenoid Specifications

Electrical entry	L-type plug connector (L), L-type plug connector with cover (LL), Terminal type (TT)
Coil rated voltage	12 VDC
Allowable voltage fluctuation	-10% to +10% of rated voltage
Coil insulation type	Class B
Power consumption	0.52 W (at rated voltage)

Intrinsically Safe Explosion-proof System Specifications

Type of explosion-proof structure	Intrinsically safe explosion-proof structure (ia) ^{Note 1)}
Applicable gas or ignition temperature of steam and explosion class	IIBT4
Voltage to barrier	24 VDC (rated voltage of system) ^{Note 2) Note 3)}
Tolerant voltage fluctuation	Refer to the barrier dimensions on page 41 and 42.

Note 1) **Warning** Can not be used in a class-0 environment. Use in a class-2 or class-1 environment.

Note 2) **Caution** The valve and barrier have polarity. If voltage is supplied with wrong polarity, the barrier can not be used.

Note 3) **Caution** Voltage to the valve should be 10.8 VDC (minimum value).

Response Time



Note) Based on dynamic performance test, JIS B 8375-1981.
(Coil temperature: 20°C, system A, B, F at 24 VDC)

Type of actuation	Response time (ms) (at 0.5 MPa)		
	51-SY5000	51-SY7000	51-SY9000
2-position single	26 or less	38 or less	50 or less
2-position double	22 or less	30 or less	50 or less
3-position	38 or less	56 or less	—

Flow-rate Characteristics

Series 51-SY5000

Valve model	Type of actuation		Port size	Flow-rate characteristics Note)					
				1→4/2 (P→A/B)			4/2→5/3 (A/B→EA/EB)		
				C(dm³/(s·bar))	b	Cv	C(dm³/(s·bar))	b	Cv
51-SY5□40-□ -02	2-position	Single	1/4	2.4	0.41	0.64	2.8	0.29	0.66
		Double							
	3-position	Closed center		1.8	0.47	0.50	1.8	0.40	0.47
		Exhaust center		1.4	0.55	0.44	3.0 [1.2]	0.33 [0.48]	0.72 [0.37]
		Pressure center		3.3 [0.84]	0.36 [0.60]	0.85 [0.28]	1.8	0.40	0.48



Note) []: Normal position

Series 51-SY7000

Valve model	Type of actuation		Port size	Flow-rate characteristics Note)					
				1→4/2 (P→A/B)			4/2→5/3 (A/B→EA/EB)		
				C(dm³/(s·bar))	b	Cv	C(dm³/(s·bar))	b	Cv
51-SY7□40-□ -02	2-position	Single	1/4	4.1	0.41	1.1	4.1	0.29	1.0
		Double							
	3-position	Closed center		3.0	0.43	0.80	2.6	0.41	0.72
		Exhaust center		2.6	0.42	0.71	4.7 [1.7]	0.35 [0.48]	1.1 [0.49]
		Pressure center		5.3 [2.3]	0.39 [0.49]	1.3 [0.65]	2.2	0.49	0.63
51-SY7□40-□ -03	2-position	Single	3/8	4.9	0.29	1.2	4.5	0.27	1.1
		Double							
	3-position	Closed center		3.0	0.40	0.80	2.6	0.45	0.73
		Exhaust center		2.6	0.42	0.71	4.8 [1.7]	0.35 [0.48]	1.1 [0.49]
		Pressure center		5.3 [2.3]	0.31 [0.51]	1.3 [0.64]	2.3	0.45	0.66



Note) []: Normal position

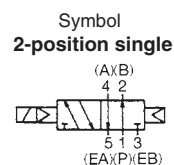
Series 51-SY9000

Valve model	Type of actuation		Port size	Flow-rate characteristics					
				1→4/2 (P→A/B)			4/2→5/3 (A/B→EA/EB)		
				C(dm³/(s·bar))	b	Cv	C(dm³/(s·bar))	b	Cv
51-SY9□40-□ -03	2-position	Single	3/8	7.9	0.34	2.0	9.6	0.43	2.6
		Double							
51-SY9□40-□ -04	2-position	Single	1/2	8.0	0.48	2.2	10	0.29	2.5
		Double							

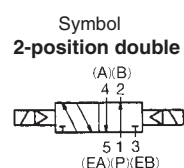
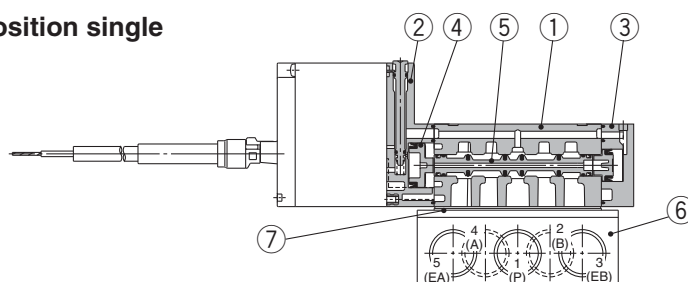
Series 51-SY5000/7000/9000

Construction

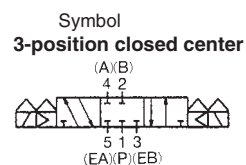
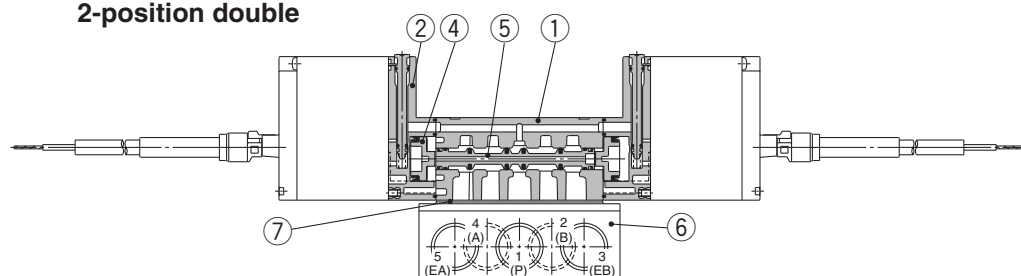
Series SY



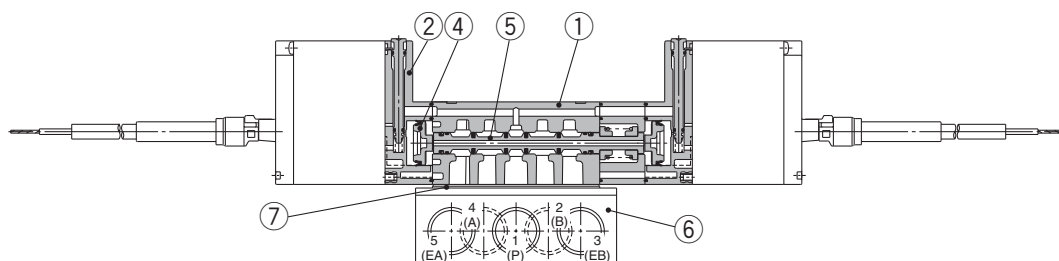
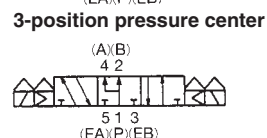
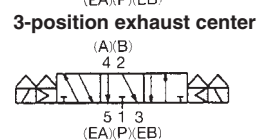
2-position single



2-position double



3-position closed center/exhaust center/pressure center



(This figure shows a closed center type.)

Component Parts

No.	Description	Material	Note
1	Body	Aluminum die-casted	White
2	Adapter plate	Resin	White (51-SY9000: Gray)
3	End plate	Resin	White
4	Piston	Resin	—
5	Spool valve assembly	Aluminum, HNBR	—

Replacement Parts

No.	Description	Part no.			Note
		51-SY5□40	51-SY7□40	51-SY9□40	
6	Sub-plate	SY5000-27-1*	1/4: SY7000-27-1* 3/8: SY7000-27-2*	3/8: SY9000-27-1* 1/2: SY9000-27-2*	Aluminum die-casted
7	Gasket	SY5000-11-15	SY7000-11-11	SY9000-11-2	HNBR
—	Round head combination screw	M3 x 26	M4 x 31	SY9000-18-2 (M3 x 42)	For valve mounting (Flat nickel plated)

* Thread type

Caution

Mounting screw
tightening torques

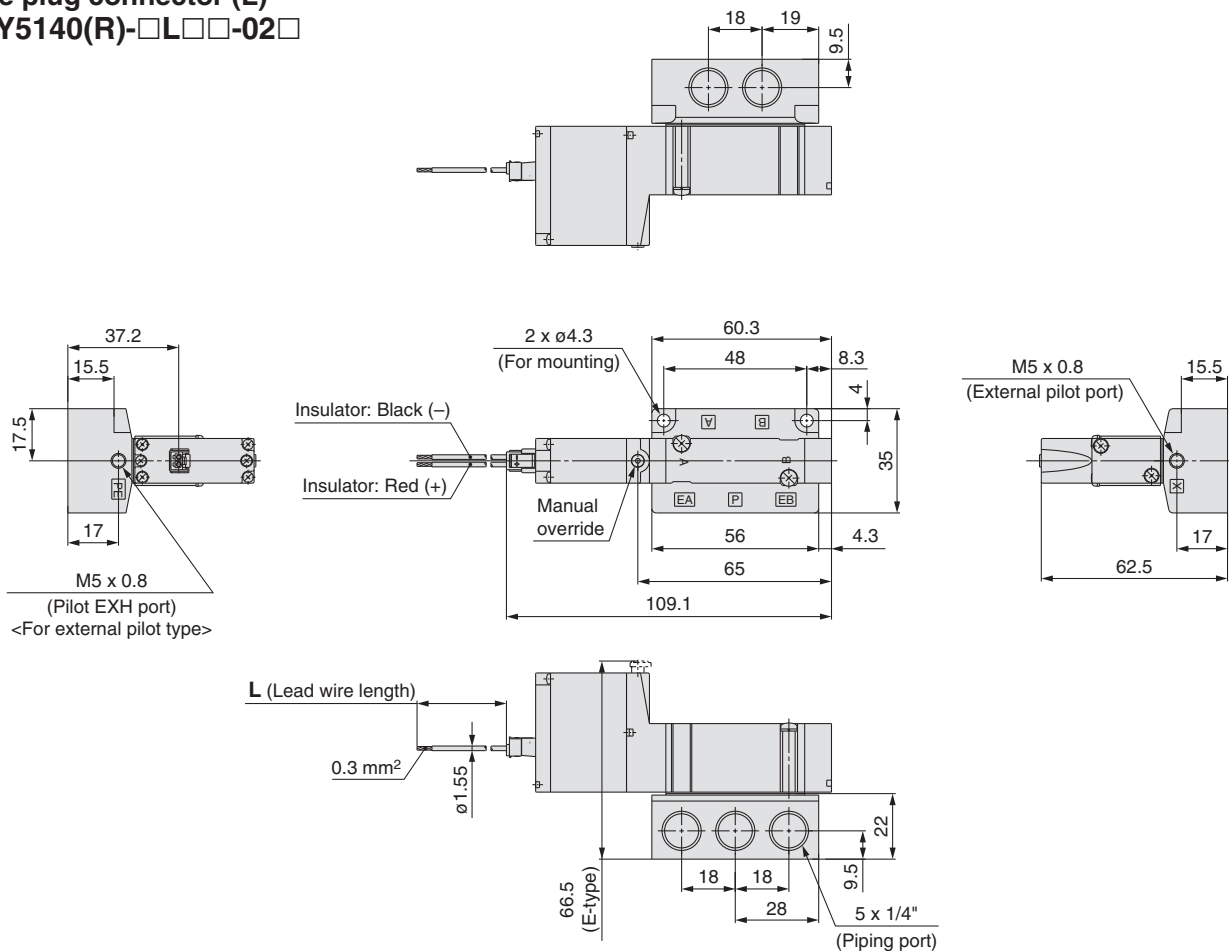
M3: 0.8 N·m
M4: 1.4 N·m

Dimensions: 51-SY5000

2-position single

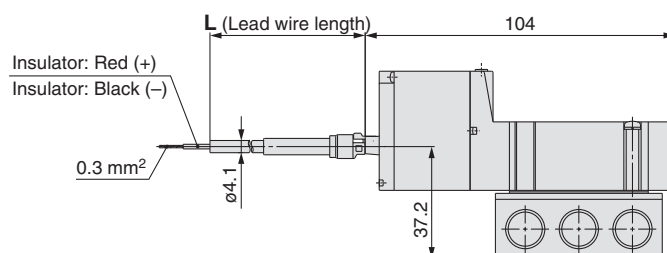
L-type plug connector (L)

51-SY5140(R)-□L□□-02□



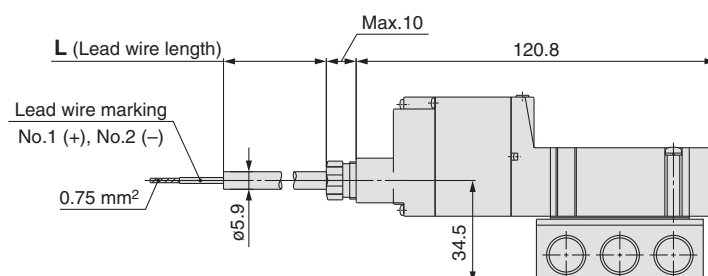
L-type plug connector with cover (LL)

51-SY5140(R)-□LL□□-02□



With IP65 compliant cable (TT)

51-SY5140(R)-□TT□□-02□



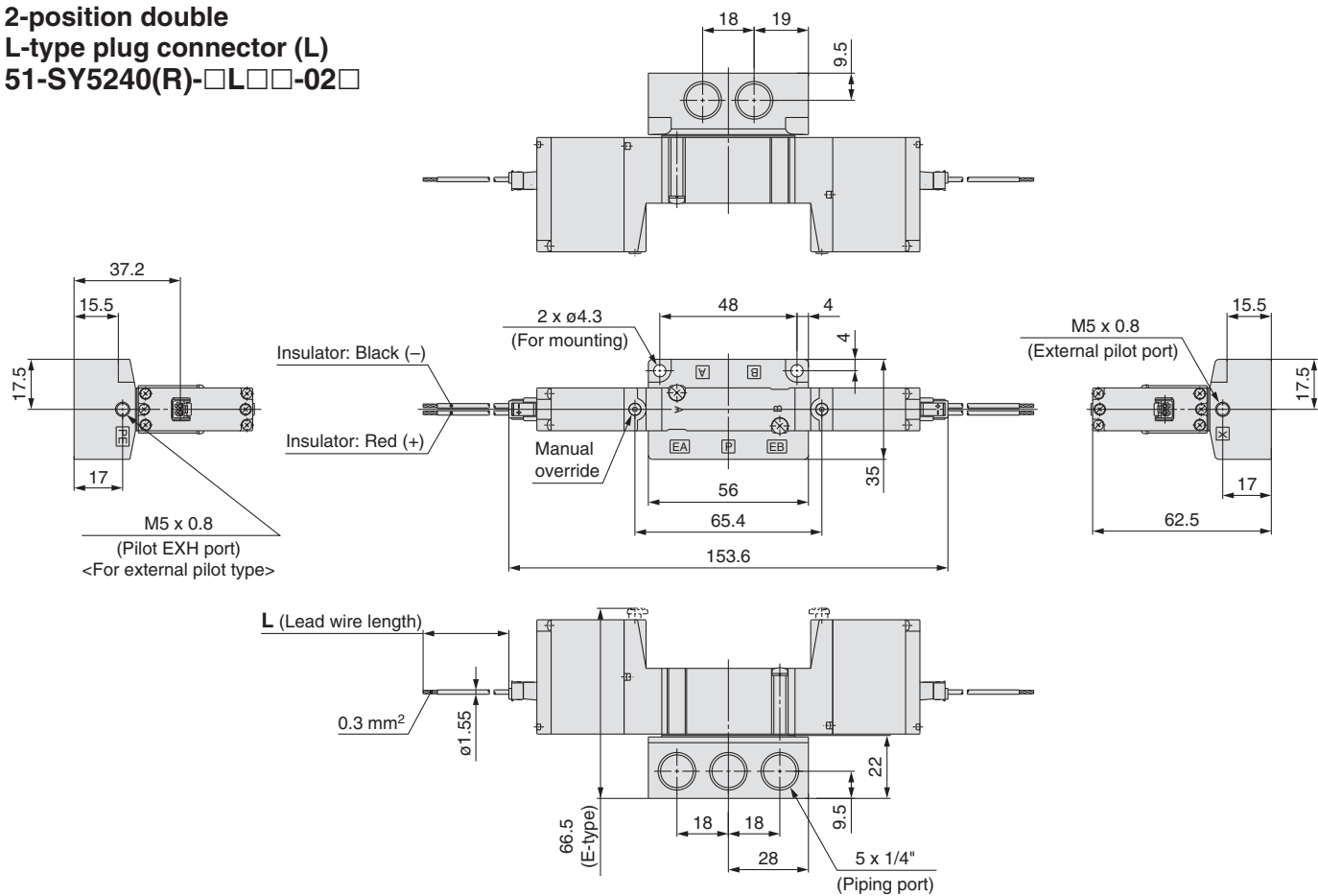
Series 51-SY5000/7000/9000

Dimensions: 51-SY5000

2-position double

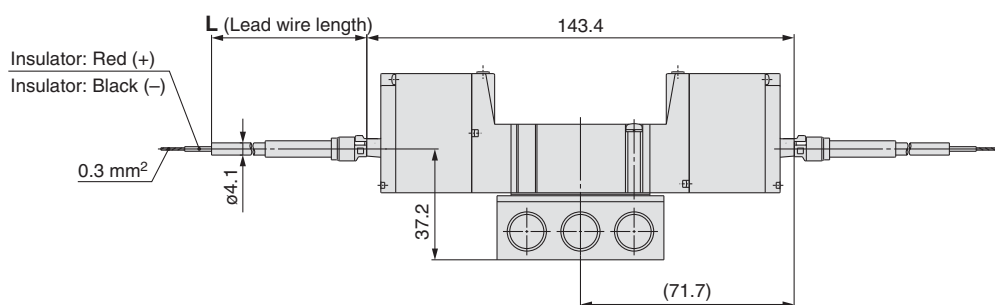
L-type plug connector (L)

51-SY5240(R)-□L□□-02□



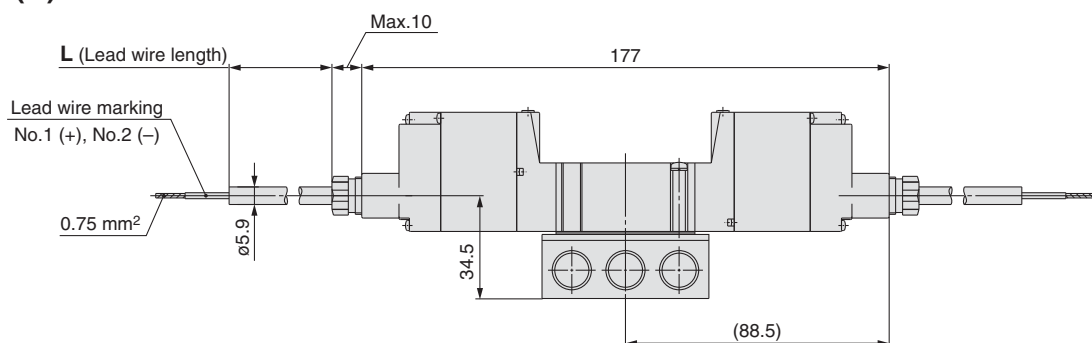
L-type plug connector with cover (LL)

51-SY5240(R)-□LL□□-02□



With IP65 compliant cable (TT)

51-SY5240(R)-□TT□□-02□

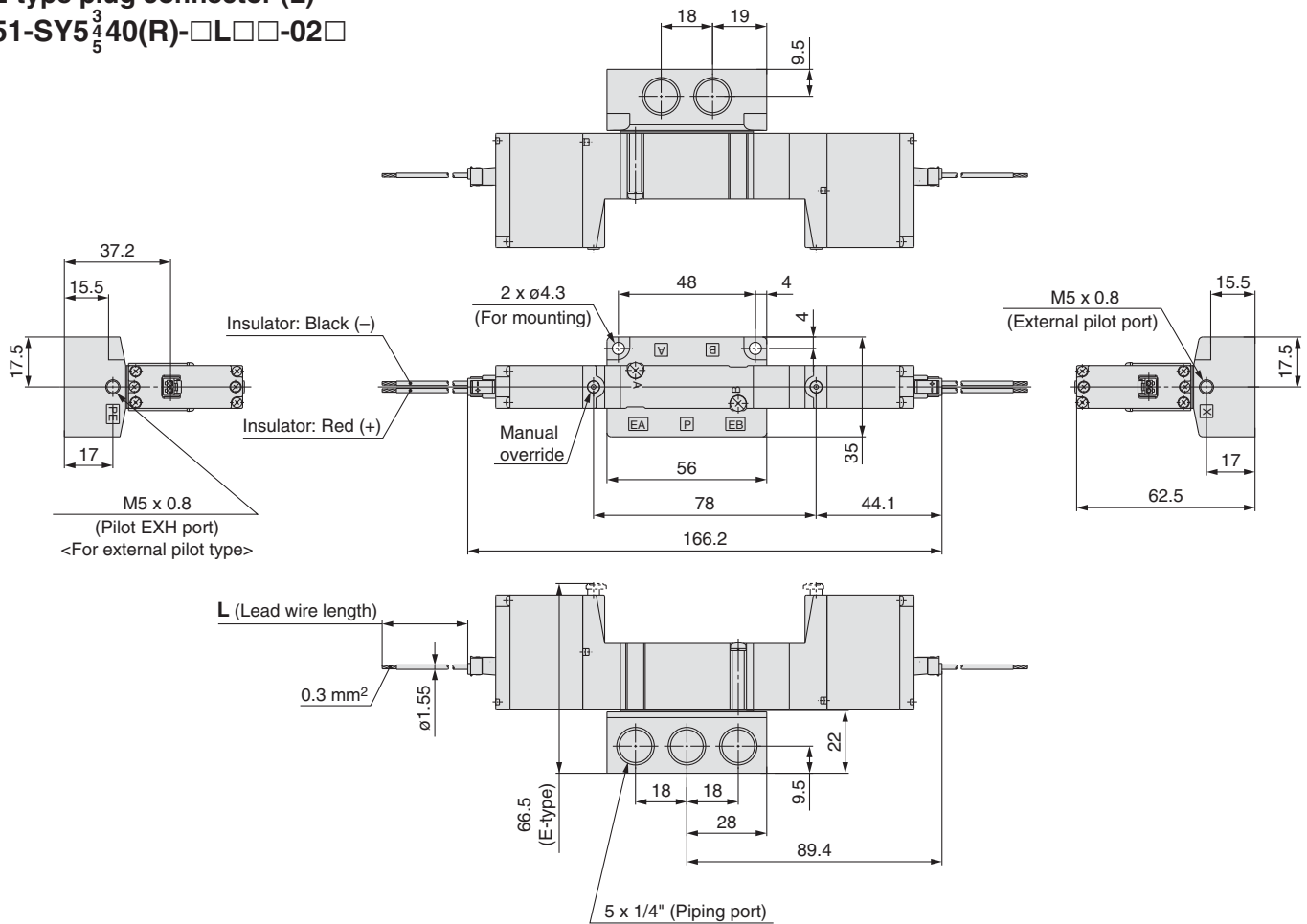


Dimensions: 51-SY5000

3-position closed center/exhaust center/pressure center

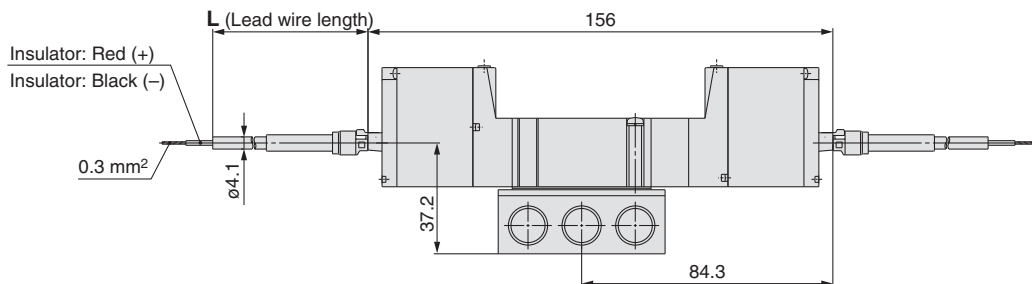
L-type plug connector (L)

51-SY5³/₄40(R)-□L□□-02□



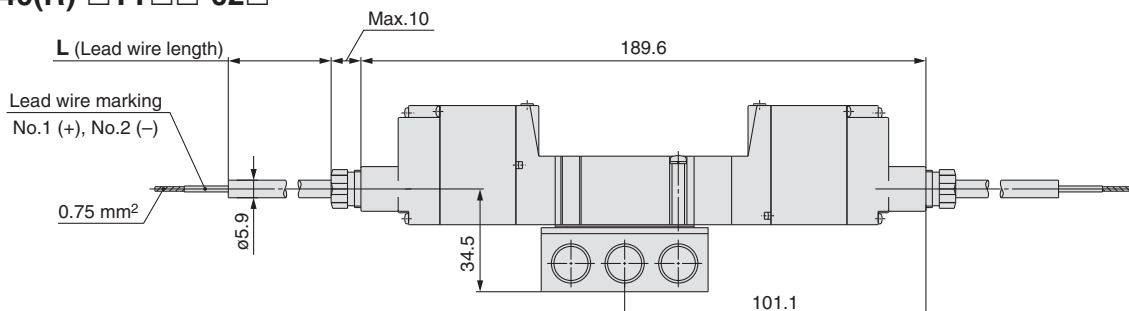
L-type plug connector with cover (LL)

51-SY5³/₄40(R)-□LL□□-02□



With IP65 compliant cable (TT)

51-SY5³/₄40(R)-□TT□□-02□



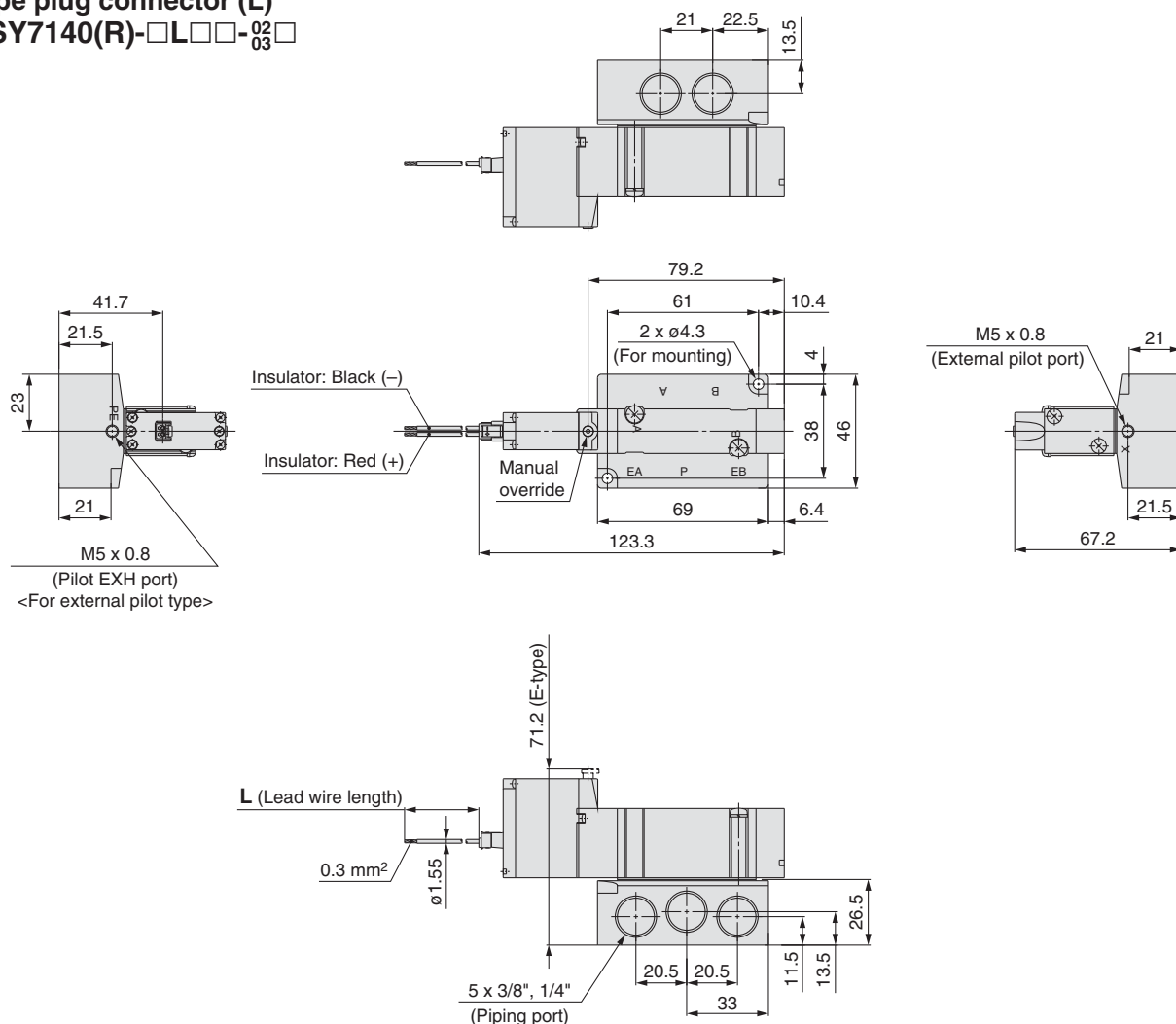
Series 51-SY5000/7000/9000

Dimensions: 51-SY7000

2-position single

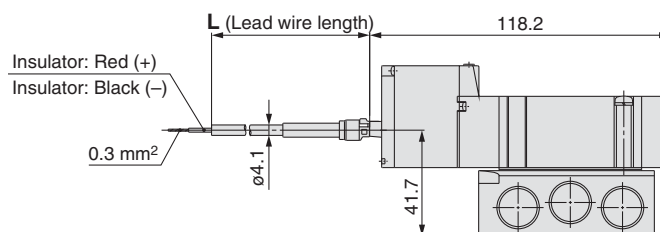
L-type plug connector (L)

51-SY7140(R)-□L□□- $\frac{02}{03}$ □



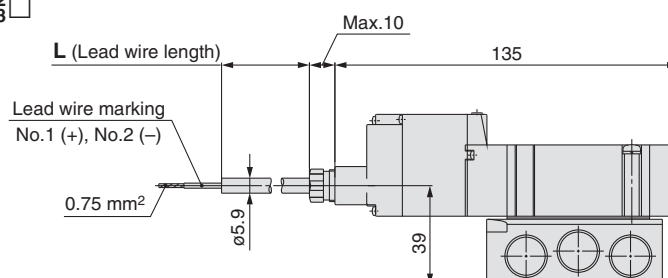
L-type plug connector with cover (LL)

51-SY7140(R)-□LL□□- $\frac{02}{03}$ □



With IP65 compliant cable (TT)

51-SY7140(R)-□TT□□- $\frac{02}{03}$ □

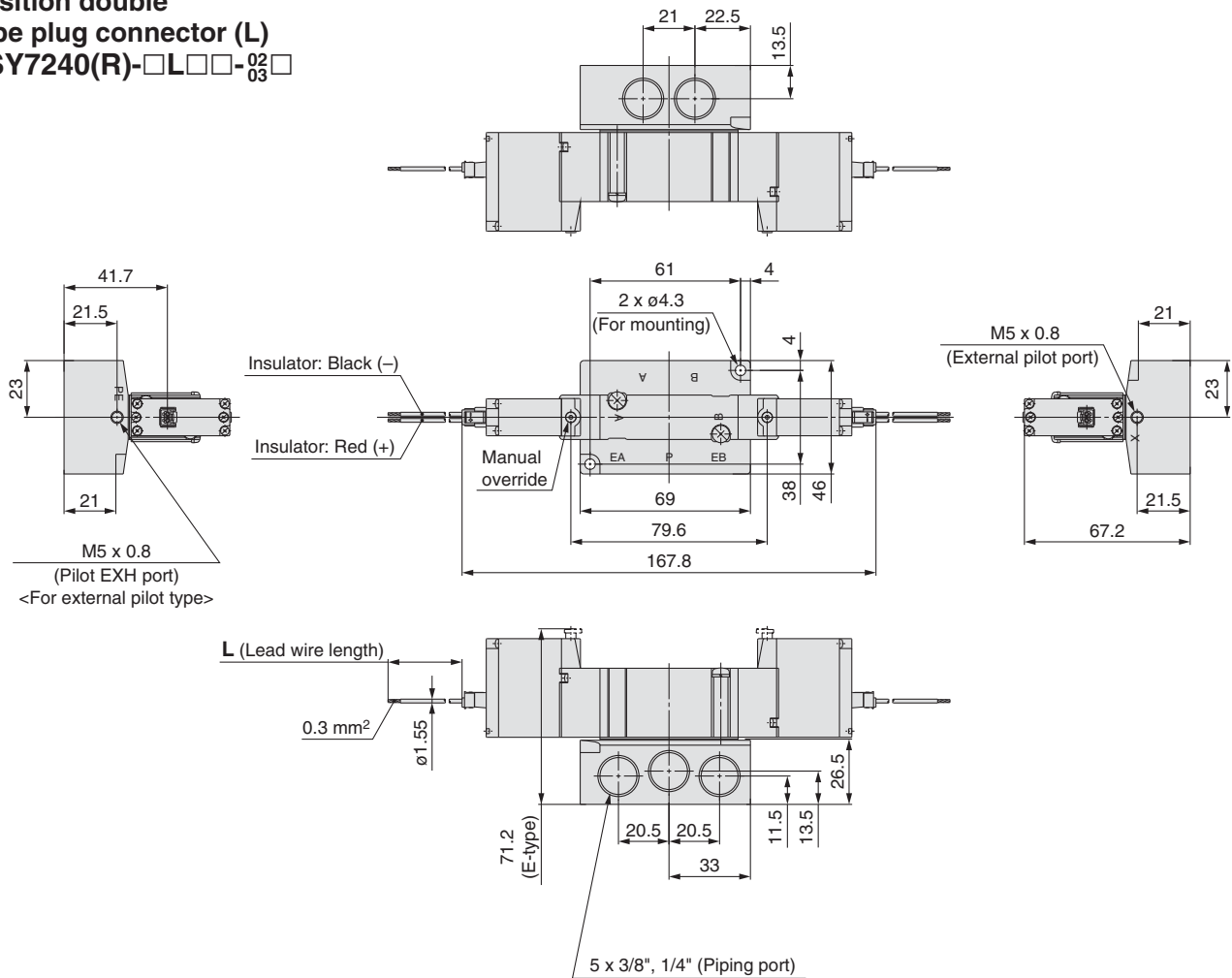


Dimensions: 51-SY7000

2-position double

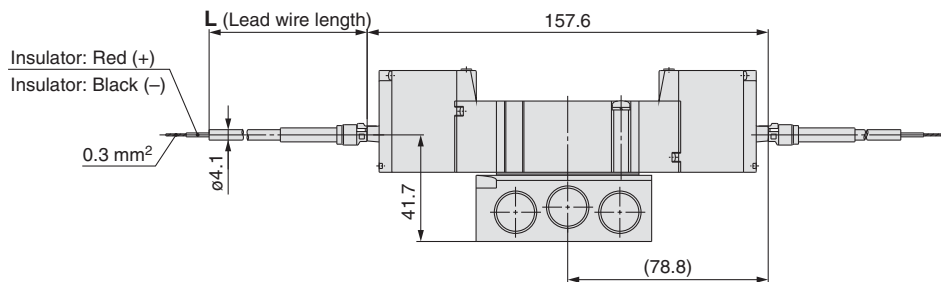
L-type plug connector (L)

51-SY7240(R)-□L□□□-02□



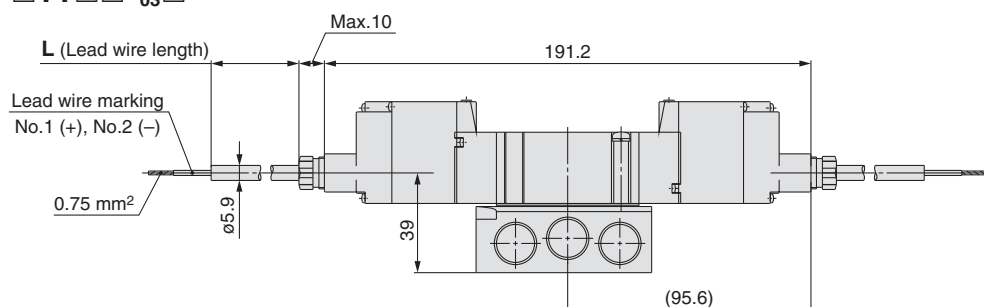
L-type plug connector with cover (LL)

51-SY7240(R)-□LL□□□-02□



With IP65 compliant cable (TT)

51-SY7240(R)-□TT□□□-02□



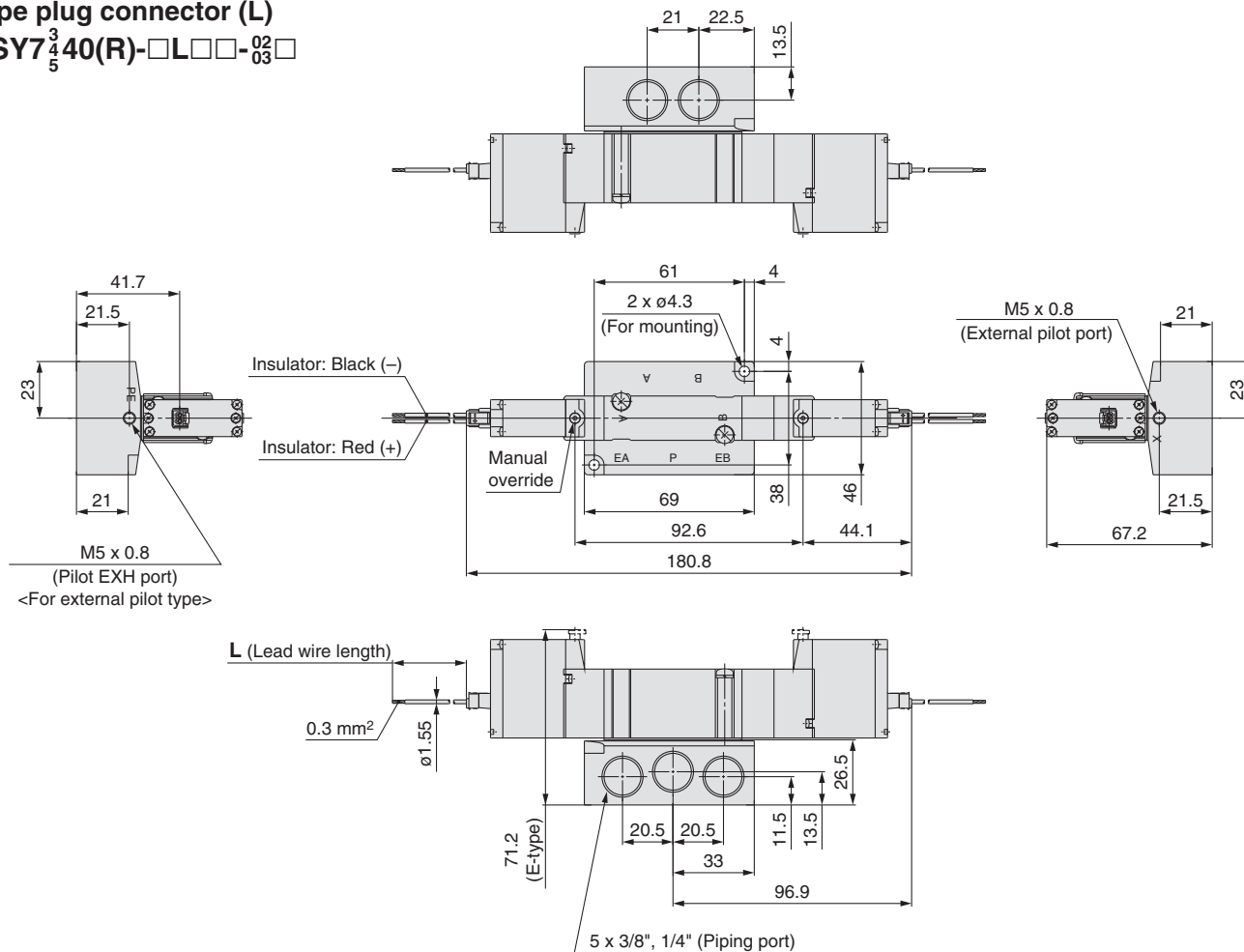
Series 51-SY5000/7000/9000

Dimensions: 51-SY7000

3-position closed center/exhaust center/pressure center

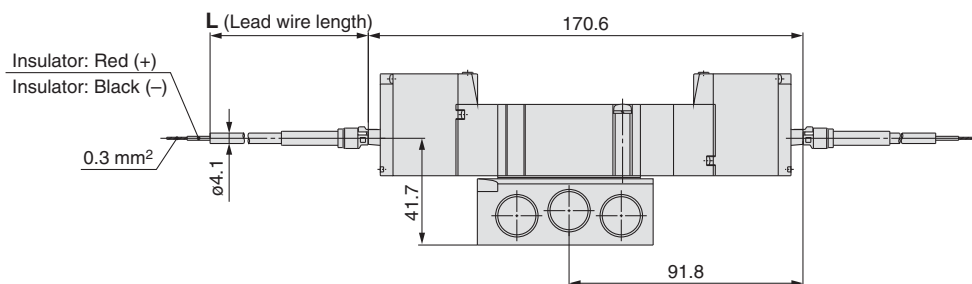
L-type plug connector (L)

51-SY7³/₄40(R)-□L□□-⁰²/₀₃□



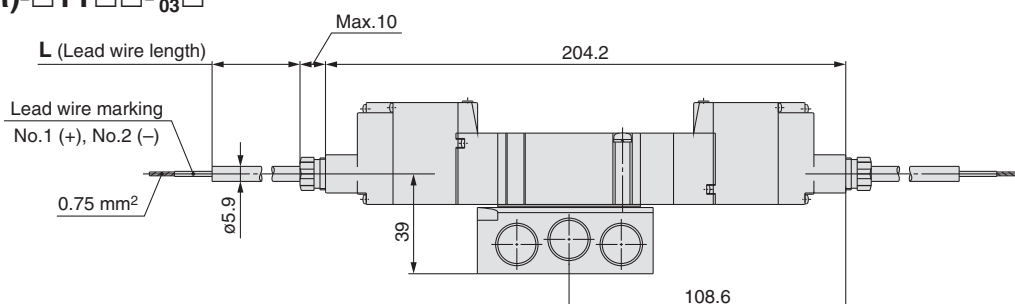
L-type plug connector with cover (LL)

51-SY7³/₄40(R)-□LL□□-⁰²/₀₃□



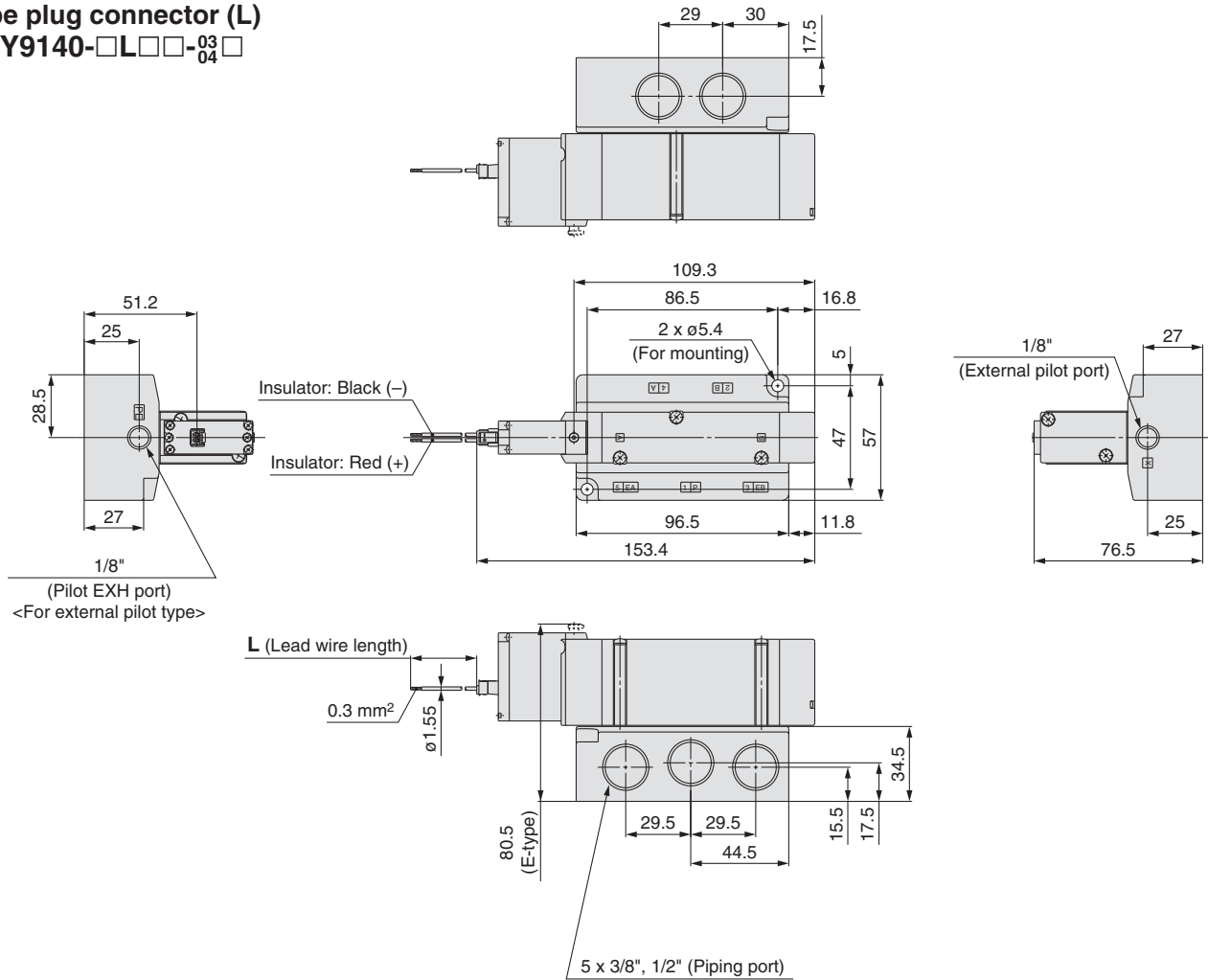
With IP65 compliant cable (TT)

51-SY7³/₄40(R)-□TT□□-⁰²/₀₃□

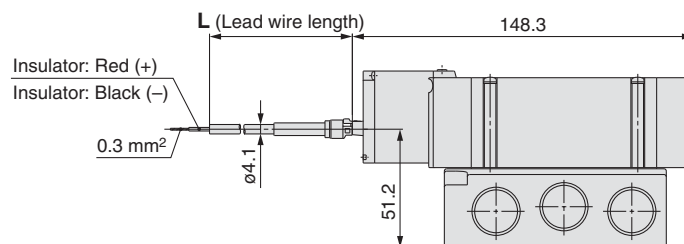


Dimensions: 51-SY9000

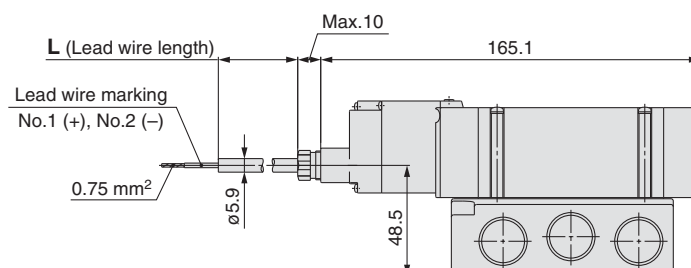
2-position single
L-type plug connector (L)
51-SY9140-□L□□-03□



L-type plug connector with cover (LL)
51-SY9140-□LL□□-03□



With IP65 compliant cable (TT)
51-SY9140-□TT□□-03□



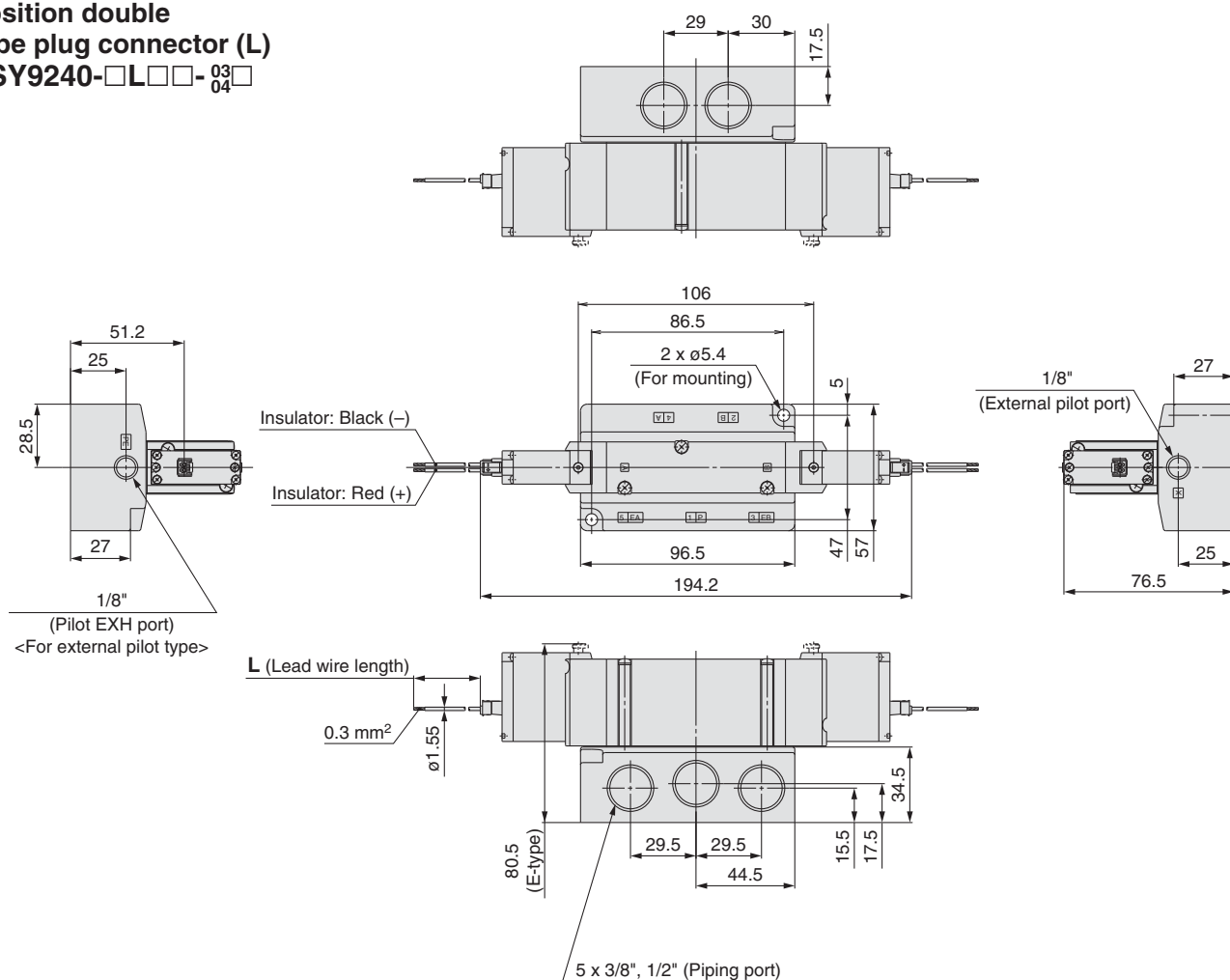
Series 51-SY5000/7000/9000

Dimensions: 51-SY9000

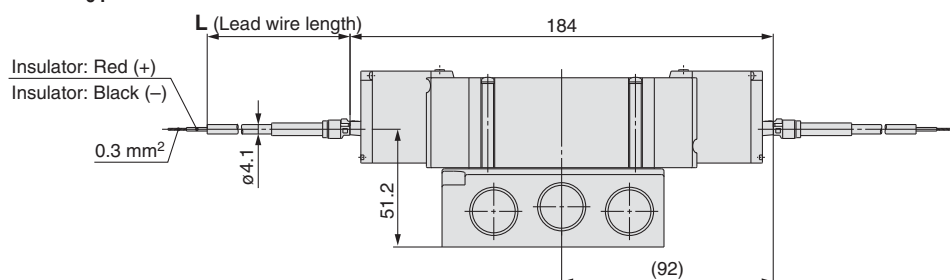
2-position double

L-type plug connector (L)

51-SY9240-□L□□-03□
04□

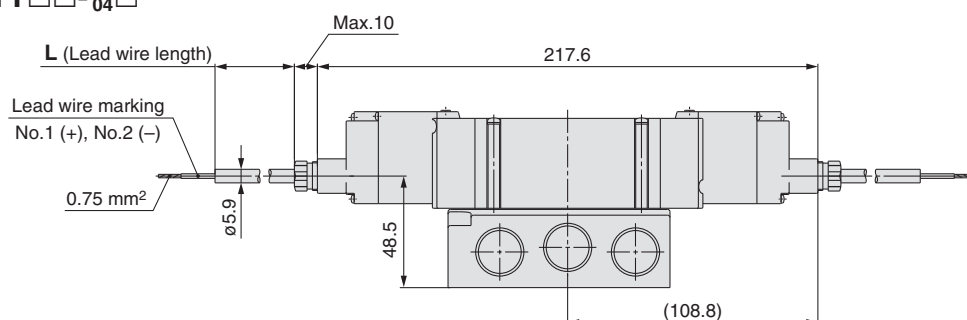


L-type plug connector with cover (LL)

51-SY9240-□LL□□-⁰³₀₄□

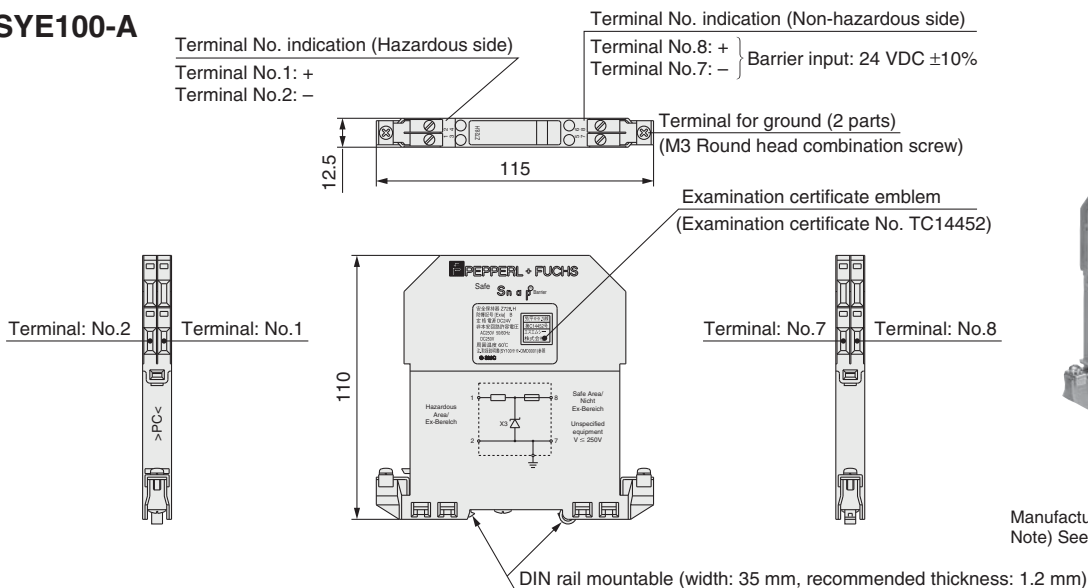
With IP65 compliant cable (TT)

51-SY9240-□TT□□-⁰³₀₄□



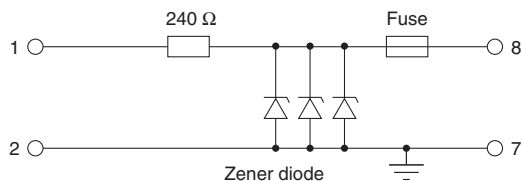
Zener Diode Barrier Dimensions

51-SYE100-A



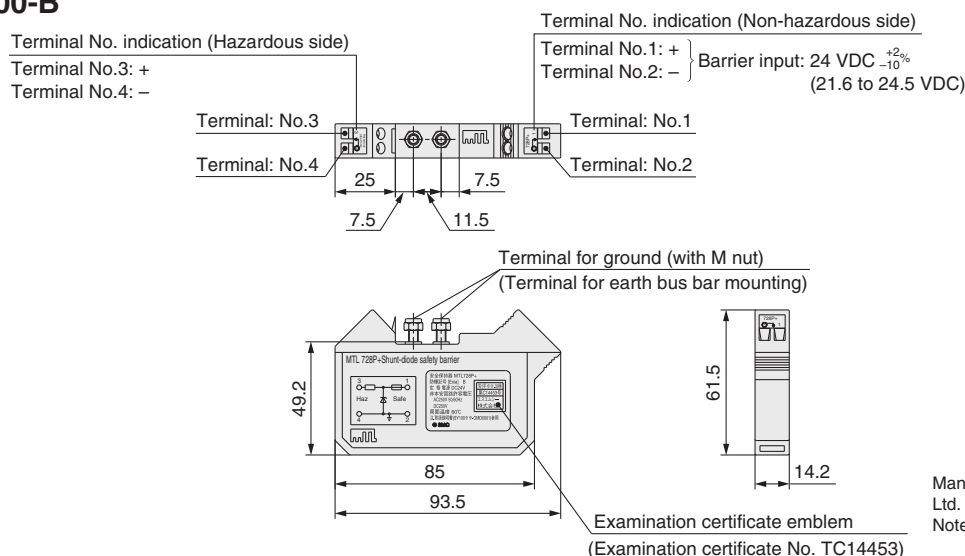
Caution

Terminal No. 2, No. 7 and the DIN rail mounting bracket on the bottom part of the barrier or terminal for grounding are short circuit connected.



Internal circuit diagram

51-SYE100-B



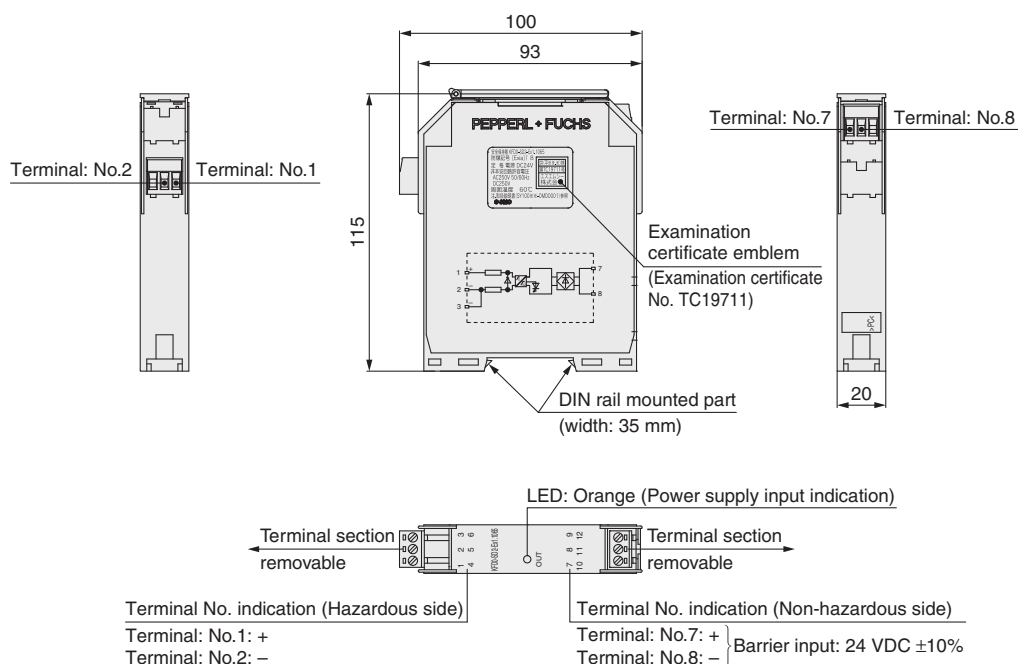
Caution

For this product, the barrier and the valve as a set are certified as a system, so please be aware of the following.

- For this product, both the barrier and the valve have an SMC model certification label with a model certification number listed on it. Be sure to use only a barrier and a valve whose numbers match.
- If an SMC model certification label has not been stuck on the product, or if the model certification numbers do not match, the product cannot be said to be an intrinsically safe explosion-proof system. Therefore, be sure to use only a barrier purchased from SMC.

Insulating Barrier Dimensions

51-SYE100-F



Manufacturer: Pepperl+Fuchs
Note) See P+F's catalog for options.

⚠ Caution

For this product, the barrier and the valve as a set are certified as a system, so please be aware of the following.

- For this product, both the barrier and the valve have an SMC model certification label with a model certification number listed on it. Be sure to use only a barrier and a valve whose numbers match.
- If an SMC model certification label has not been stuck on the product, or if the model certification numbers do not match, the product cannot be said to be an intrinsically safe explosion-proof system. Therefore, be sure to use only a barrier purchased from SMC.

Series 51-SY

Insulating Barrier Dimensions

51-SYE100-F

