3-Port Solenoid Valve Modular Type/ Residual Pressure Release Valve

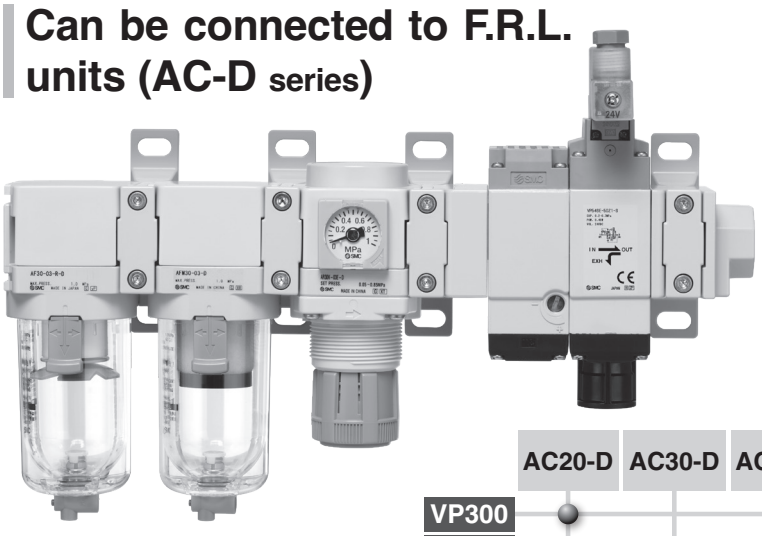
c UL us
* Excludes the high-pressure (K) type

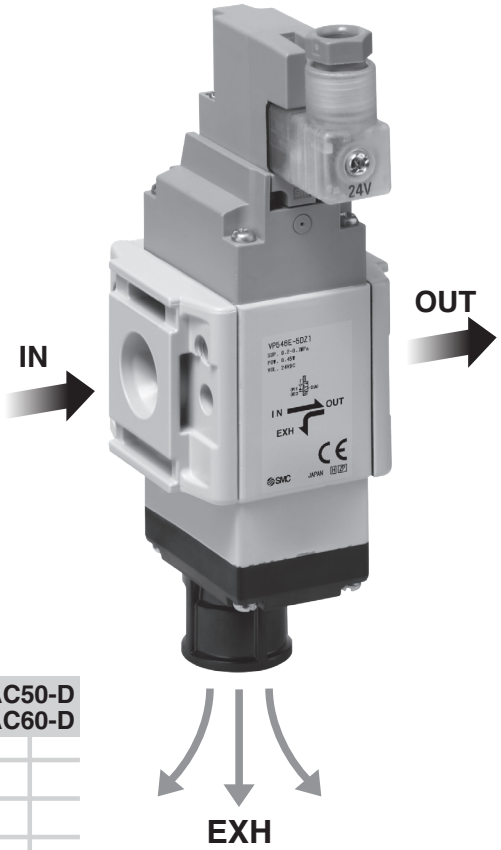
RoHS

Flow rate characteristics Q [l/min (ANR)]

VP346E: 1000
VP546E: 1729
VP746E: 2985
VP946E: 12739

Can be connected to F.R.L. units (AC-D series)



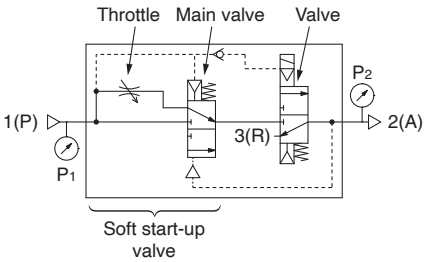


	AC20-D	AC30-D	AC40-D	AC50-D AC60-D
VP300				
VP500				
VP700				
VP900				

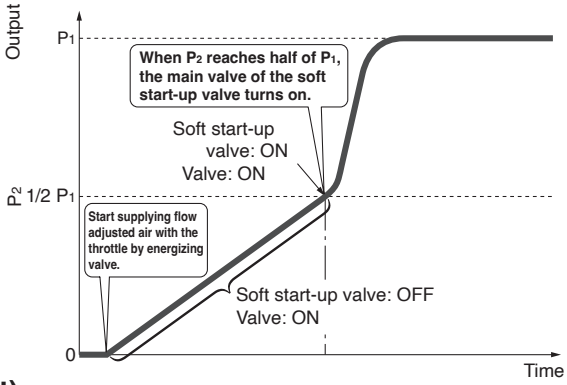
Allows for space saving and reduced piping labour.

A model with a soft start-up function is also available.

VP700 Series



Output Pressure (P_2) vs Time Graph



Power consumption: 0.35 W (Without light)

Features a check valve built into the pilot flow path

(Supports pilot pressure drops caused by pressure fluctuations on the inlet side)

VP346E/546E/746E/946E Series

SMC

VP346E/546E/746E/946E Series

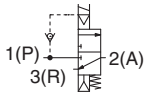
∗ Excludes the high-pressure (K) type

How to Order

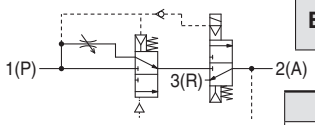
Modular Type VP [5] 46E [ ] – 5 [DZ] [ ] 1 – [R] – [ ]

Symbol

Residual pressure relief 3-port solenoid valve



With soft start-up function



Series

3	VP300
5	VP500
7	VP700
9	VP900

Solenoid valve type

E	Residual pressure relief 3-port solenoid valve

Pressure specifications

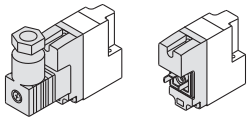
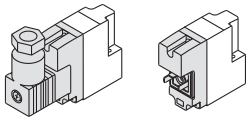
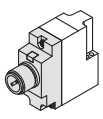
		Series			
		VP300	VP500	VP700	VP900
—	Standard (0.7 MPa)	●	●	●	●
K	High pressure (1.0 MPa)	–	●	●	–

Rated voltage

DC

5	24 VDC

Electrical entry

DIN terminal	DIN (EN 175301-803C) terminal	M12 connector
		
D: With connector **DO**: Without connector **DZ**: With connector/ With light/surge voltage suppressor	**Y**: With connector **YO**: Without connector **YZ**: With connector/ With light/surge voltage suppressor	**KOZ**: Without connector

Soft start-up function

—	None
S	With soft start-up function

Flow direction

—	Left to right
R	Right to left

Manual override

			Series			
			VP300	VP500	VP700	VP900
—	Non-locking push type		●	●	●	●
A	Non-locking push type (Manual)∗1		–	●	●	–
E	Push-turn locking type (Manual)		●	●	●	●

∗1 Type A is only available for the VP500 and VP700.

⚠ Caution

1. When using the surge voltage suppressor type, residual voltage will remain. For details, refer to the **catalogue on https://www.smc.eu** (VP300/500 Low wattage specification).
2. Connection threads are not available for the residual pressure relief 3-port solenoid valve. Order a piping adapter and spacer with bracket separately.

∗ Refer to the **catalogue on https://www.smc.eu** (VP300/500 Low wattage specification) for details of the DIN terminal.
∗ DIN terminal type "Y" which conforms to EN-175301-803C (former DIN4365C) is also available. For details, refer to the **Web Catalogue**.

Simple Specials System

For modular connection units (shipped assembled), the simple specials system can be used.

Simple Specials System

Short lead times

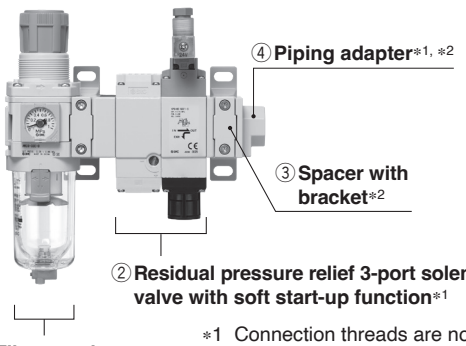
This system enables us to respond to your special needs (accessory assembly or the designing of a modular unit) as quickly as standard products.

Please contact your local sales representative for more details.

Repeat orders

Once we receive a simple special part number from one of your previous orders, we will process the order, manufacture the product, and deliver it to you as quickly as possible.

Simple Specials Combination Example



① **Filter regulator AW30-03E-D** ····· **1 pc.**
② **Residual pressure relief 3-port solenoid valve with soft start-up function VP546E-5DZ1-S** ····· **1 pc.**
③ **Spacer with bracket Y300T-D** ····· **2 pcs.**
④ **Piping adapter E300-03-D** ····· **1 pc.**

Applicable Combinations/ Attachment Combinations **(Refer to page 1098.)**

∗1 Connection threads are not available for the residual pressure relief 3-port solenoid valve. Select a piping adapter.
∗2 Refer to page 1098 for details on the spacer with bracket and piping adapter.

Specifications

Fluid	Air	
Type of actuation	N.C.	
Pressure specifications	Standard	High pressure
Internal pilot operating pressure range [MPa]	0.2 to 0.7	0.2 to 1.0 (VP546EK/VP746EK)
Operating and ambient temperatures [°C]	–10 to 50 (No freezing)	
Max. operating frequency∗1 **[Hz]**	5 Hz: VP346E, VP546E, VP746E 1 Hz: VP946E	
Manual override∗2	Non-locking push type Non-locking push type (Manual) Push-turn locking type (Manual)	
Pilot exhaust	Individual exhaust	
Lubrication	Not required	
Mounting orientation	Unrestricted	
Impact/Vibration resistance∗3 **[m/s²]**	150/30	
Enclosure	IP65	

∗1 Excludes the type with a soft start-up function
∗2 The non-locking push type (manual) is only compatible with the VP546E and VP746E.
∗3 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 once for each condition. (Values at the initial period)
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. The test was performed at both energised and de-energised states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)
∗ This valve is a large flow rate pilot-operated solenoid valve. If the operating pressure falls below 0.2 MPa due to a pressure drop caused by insufficient air supply, it may not be able to switch properly.

Solenoid Specifications

Electrical entry		DIN terminal (D) DIN terminal (Y) (EN175301-803C)	M12 connector
		D, Y	K
Coil rated voltage [V]	**DC**	24	
Allowable voltage fluctuation		±10 % of the rated voltage	
Power consumption [W]		0.35 (With light: 0.45)	With light: 0.4
Surge voltage suppressor		Varistor	Diode
Indicator light		LED	

Response Time/Weight

Model	Pressure specifications	Response time [ms] (at 0.5 MPa)∗1			Weight [g]
		DIN terminal		M12 connector	
		Without light/surge voltage suppressor	With light/surge voltage suppressor	With light/surge voltage suppressor	
VP346E	Standard (0.2 to 0.7 MPa)	23	23	32	210 (With soft start-up function: 310)
VP546E	Standard (0.2 to 0.7 MPa)	38	38	43	340 (With soft start-up function: 590)
	High pressure (0.2 to 1.0 MPa)	56	56	62	
VP746E	Standard (0.2 to 0.7 MPa)	56	56	60	680 (With soft start-up function: 1,200)
	High pressure (0.2 to 1.0 MPa)	80	80	86	
VP946E	Standard (0.2 to 0.7 MPa)	154	154	164	1,410 (With soft start-up function: 2,300)

∗1 Based on dynamic performance test, JIS B 8419-2010 (Coil temperature: 20 °C, at rated voltage)

Flow Rate Characteristics

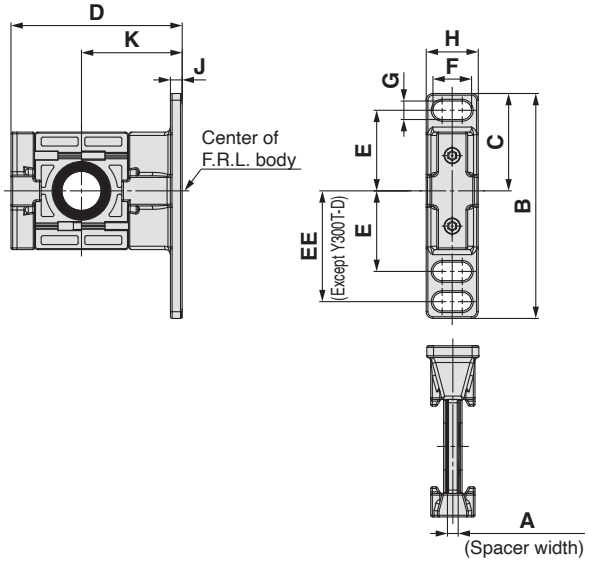
Model	Port size EXH.	Flow rate characteristics									
		1 → 2 (P → A)					2 → 3 (A → R)				
		C [dm³/(s·bar)]	b	Cv	Q [l/min (ANR)]∗1	Effective area [mm²]	C [dm³/(s·bar)]	b	Cv	Q [l/min (ANR)]∗1	Effective area [mm²]
VP346E	G1/4	4.3	0.23	1.1	1048	–	4.2	0.19	1.0	1000	–
VP346E–S	G1/4	3.2	0.18	0.8	758	–	4.2	0.19	1.0	1000	–
VP546E(K)	G3/8	8.8	0.14	2	2040	–	7.5	0.13	1.7	1729	–
VP546E(K)–S	G3/8	6.6	0.07	1.5	1476	–	7.5	0.13	1.7	1729	–
VP746E(K)	G1/2	13.8	0.11	2.9	3149	–	12.6	0.18	2.9	2985	–
VP746E(K)–S	G1/2	10.5	0.12	2.3	2409	–	12.6	0.18	2.9	2985	–
VP946E	G1	–	–	–	15352	282	–	–	–	12739	234
VP946E–S	G1	–	–	–	11541	212	–	–	–	12739	234

∗1 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.

Spacer with Bracket

Y 300 T – D
❶ ❷

Spacer with bracket (Y□T-D)

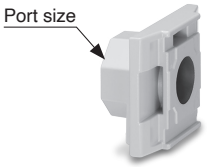


		Symbol	Description	❶ Body size [Applicable AC size] 200 [AC20]	300 [AC30]	400 [AC40]	600 [AC50/AC60]
❷	Bracket	T	Spacer with bracket	●	●	●	●

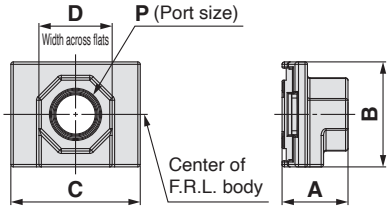
Model	A	B	C	D	E	EE	F	G	H	J	K	L	Applicable size
Y200T-D	3.2	67	29	51	24	33	11.5	5.5	15.5	3.5	30	2	**AC20-D**
Y300T-D	4.2	85	42.5	67.5	35	—	14	7	20	6	41	3	**AC30-D**
Y400T-D	5.2	115	50	85.5	40	55	18	9	26	7	50	3	**AC40-D**
Y600T-D	6.2	140	60	115	50	70	20	11	31.2	8	70	4	**AC50-D AC60-D**

Piping Adapter: 3/8, 1/2

E 300 – □ 03 – D
❶ ❷ ❸



		Symbol	Description	❶ Body size [Applicable AC size] 200 [AC20]	300 [AC30]	400 [AC40]	600 [AC50, AC60]
❷	Pipe thread type	—	Rc	●	●	●	●
		N	NPT	●	●	●	●
		F	G	●	●	●	●
		+					
❸	Port size	01	1/8	●	—	—	—
		02	1/4	●	●	●	—
		03	3/8	●	●	●	—
		04	1/2	—	●	●	—
		06	3/4	—	—	●	●
		10	1	—	—	—	●
		12	1 1/4	—	—	—	●
		14	1 1/2	—	—	—	●

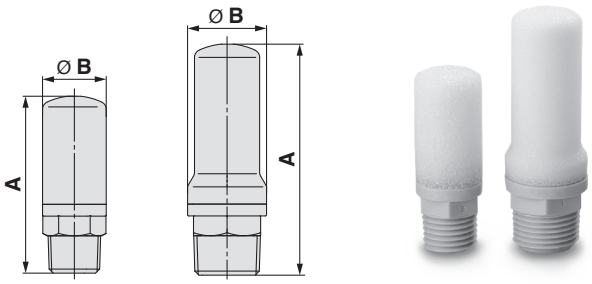


Model	P	A	B	C	D	Applicable AC size
E200-D	1/8, 1/4, 3/8	24	35	42	24	**AC20-D**
E300-D	1/4, 3/8, 1/2	27	43	53	30	**AC30-D**
E400-D	1/4, 3/8, 1/2, 3/4	30	51	71	36	**AC40-D**
E600-D	1 1/4, 1 1/2	42	64	90	63	**AC50-D AC60-D**

Silencer

Compact Resin Type

AN20 **AN30, AN40**

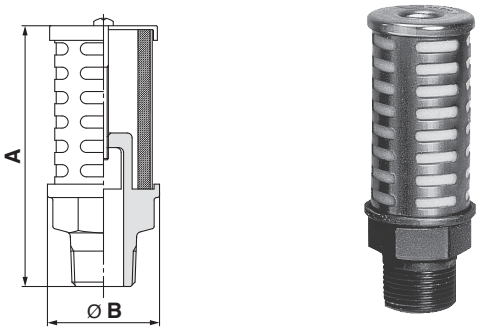


Dimensions [mm]

Model	Port size R	A	B
AN20-02	1/4	45	16.5
AN30-03	3/8	58.5	20
AN40-04	1/2	68	24

Metal Body Type

AN600

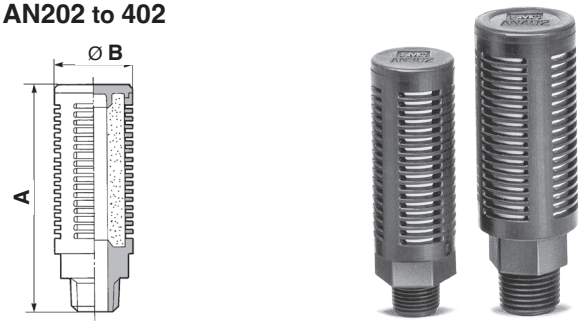


Dimensions [mm]

Model	Port size R	A	B
AN600-10	1	127	50

High Noise Reduction Type

AN202 to 402

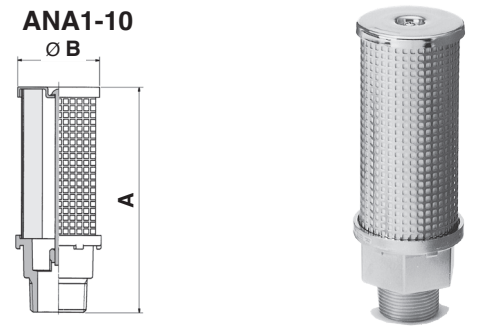


Dimensions [mm]

Model	Port size R	A	B
AN202-02	1/4	64	22
AN302-03	3/8	84	28
AN402-04	1/2	95	34

High Noise Reduction Type

ANA1-10



Dimensions [mm]

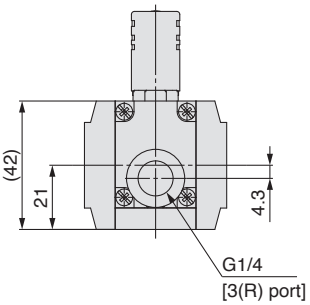
Model	Port size R	A	B
ANA1-10	1	132	50

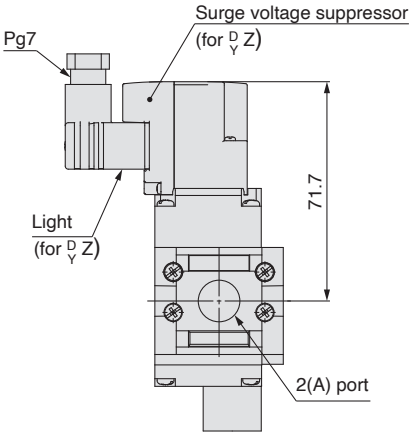
Compatibility Chart for Residual Pressure Relief Valve and Silencers

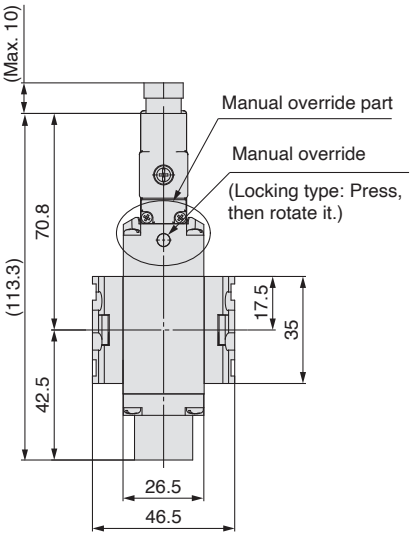
Residual pressure release valve	Silencer	Compact resin type			Metal type	High noise reduction type			
	Model	**AN20-02**	**AN30-03**	**AN40-04**	**AN600-10**	**AN202-02**	**AN302-03**	**AN402-04**	**ANA1-10**
	Port size	1/4	3/8	1/2	1	1/4	3/8	1/2	1
VP346E		○	–	–	–	○	–	–	–
VP546E		–	○	–	–	–	○	–	–
VP746E		–	–	○	–	–	–	○	–
VP946E		–	–	–	○	–	–	–	○

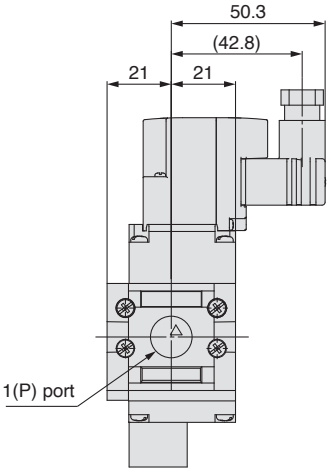
Dimensions

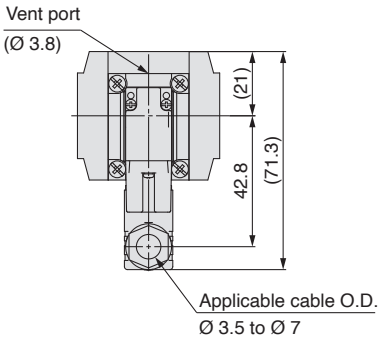
VP346E-5□□□1-□





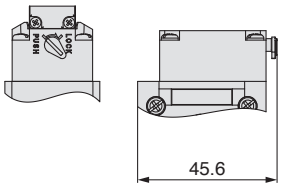






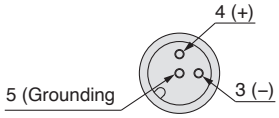
Details of manual override part (for manual operation)

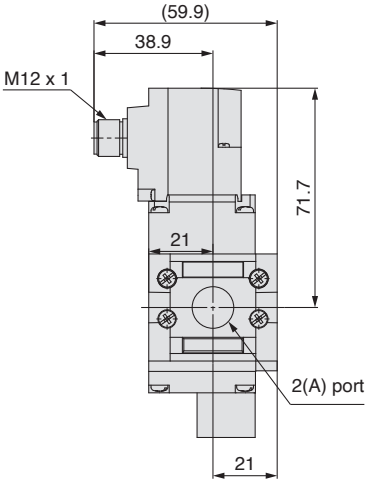
Type E

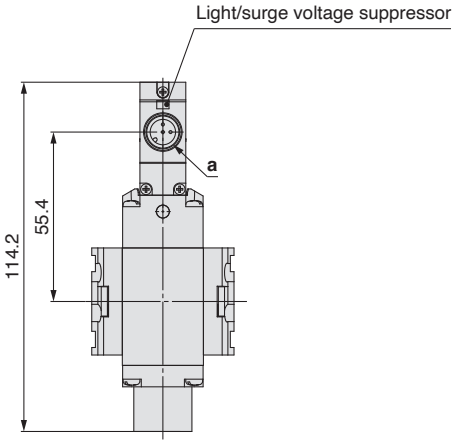


VP346E-5KOZ1-□

Detailed figure of a section M12 connector

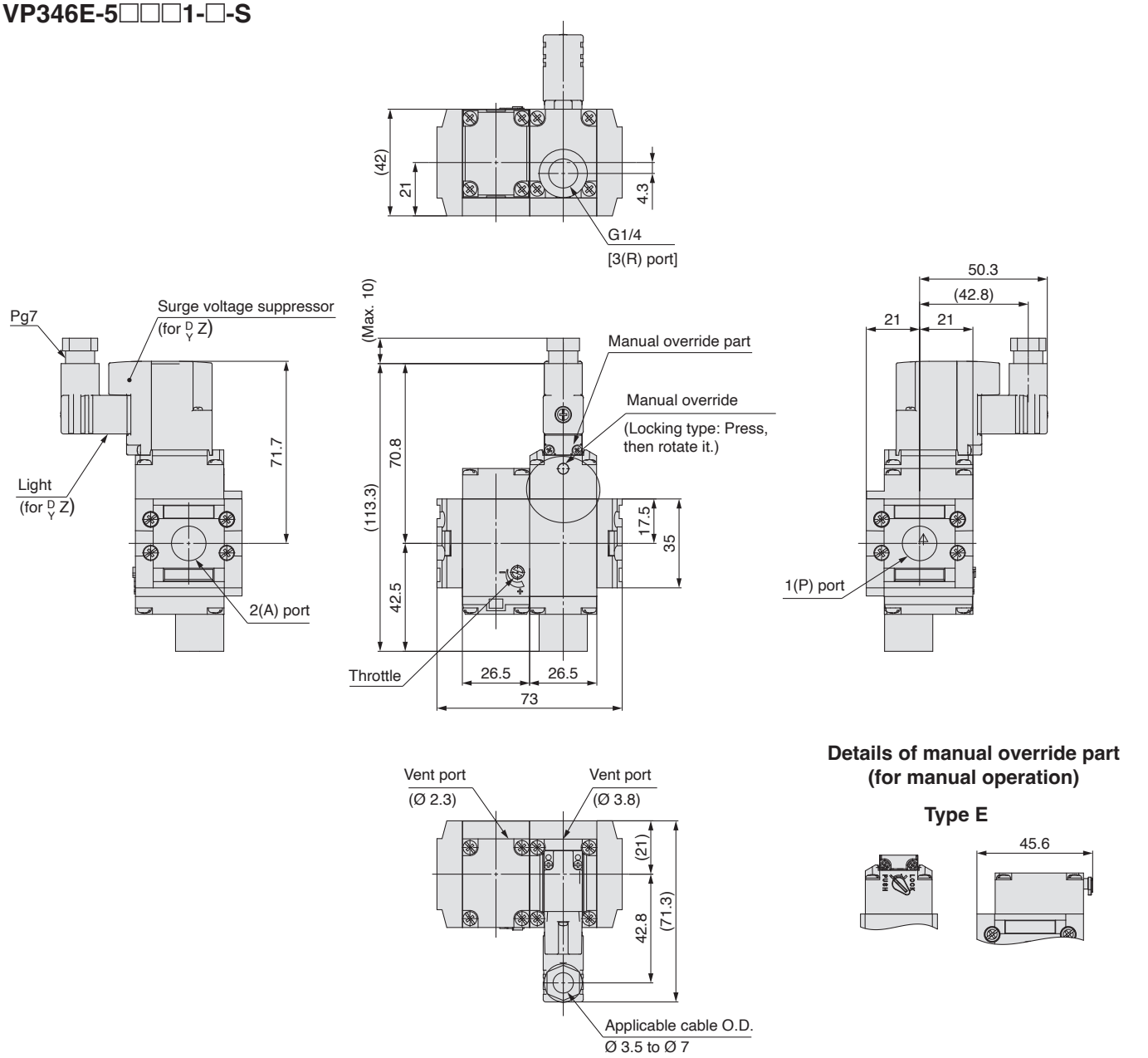






Dimensions

VP346E-5□□□1-□-S

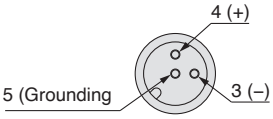


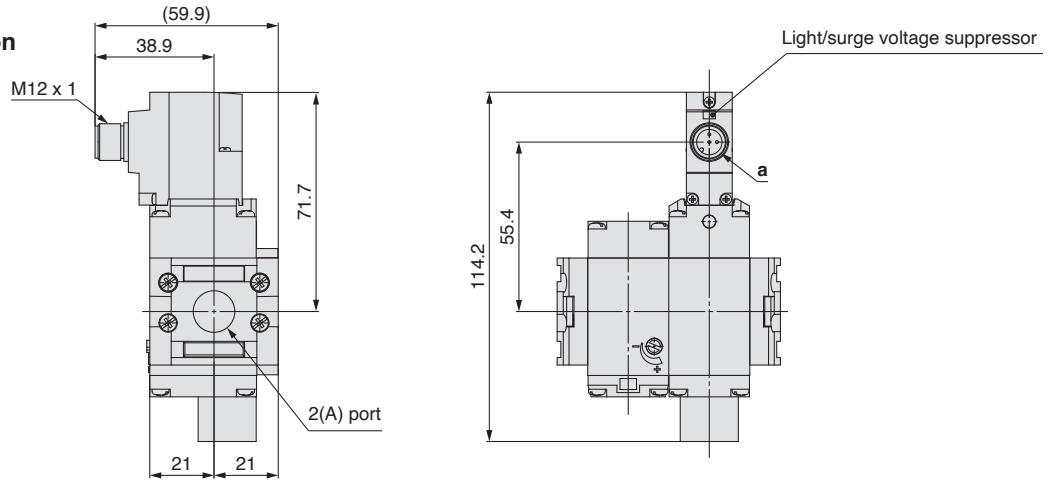
Details of manual override part (for manual operation)

Type E

VP346E-5KOZ1-□-S

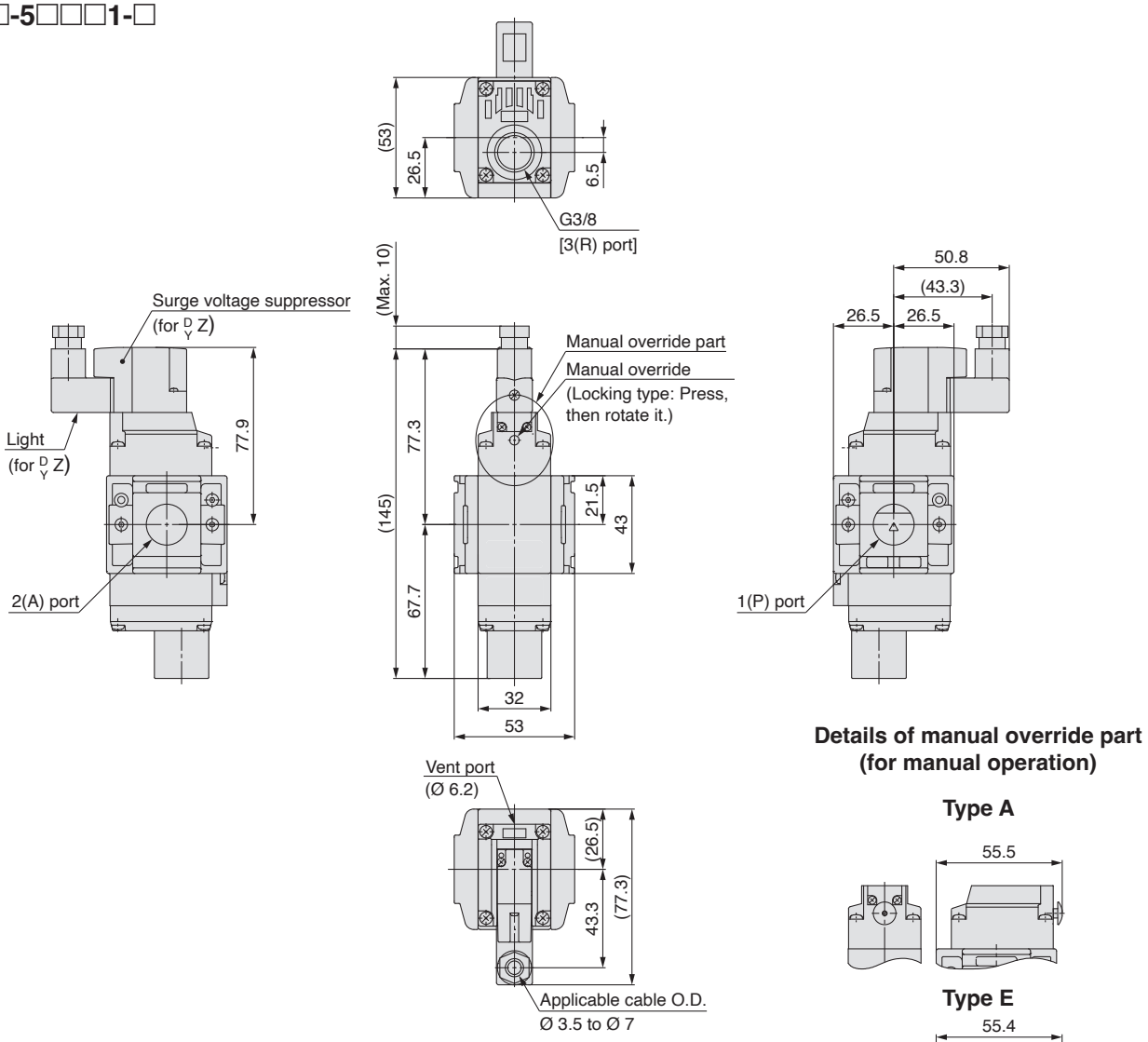
Detailed figure of a section
M12 connector





Dimensions

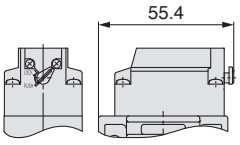
VP546E□-5□□□1-□



Details of manual override part (for manual operation)

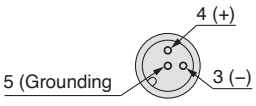
Type A

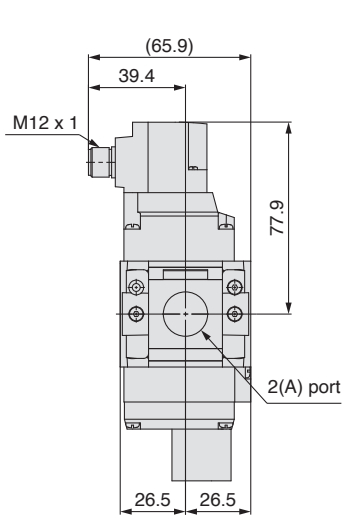
Type E

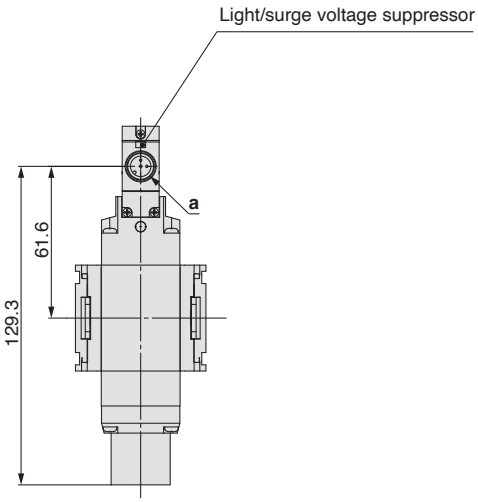


VP546E-5KOZ1-□

Detailed figure of a section M12 connector

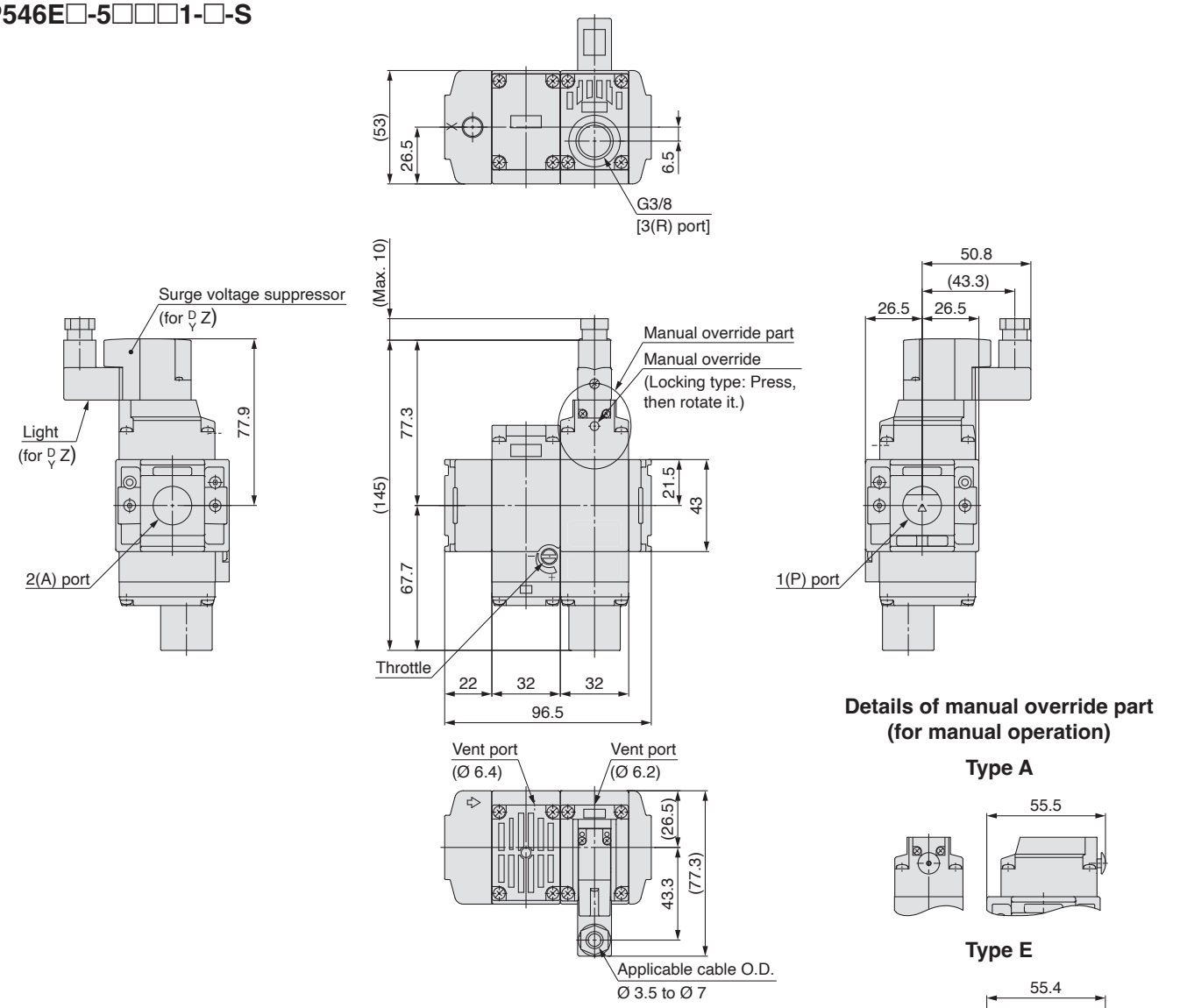






Dimensions

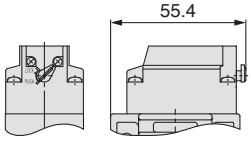
VP546E□-5□□□1-□-S



Details of manual override part (for manual operation)

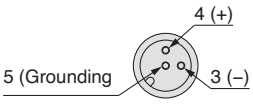
Type A

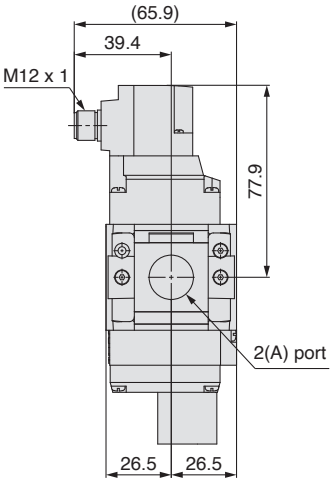
Type E

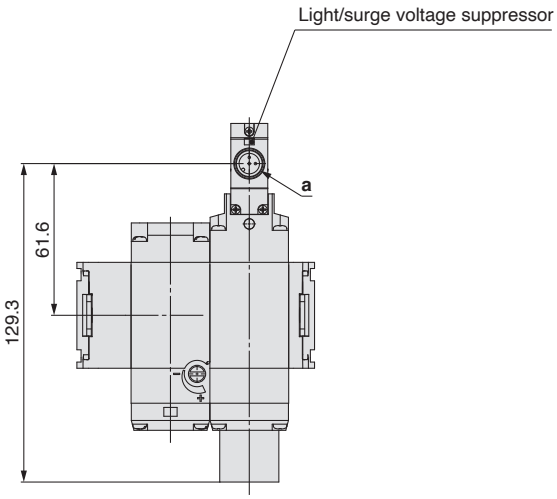


VP546E-5KOZ1-□-S

Detailed figure of a section M12 connector

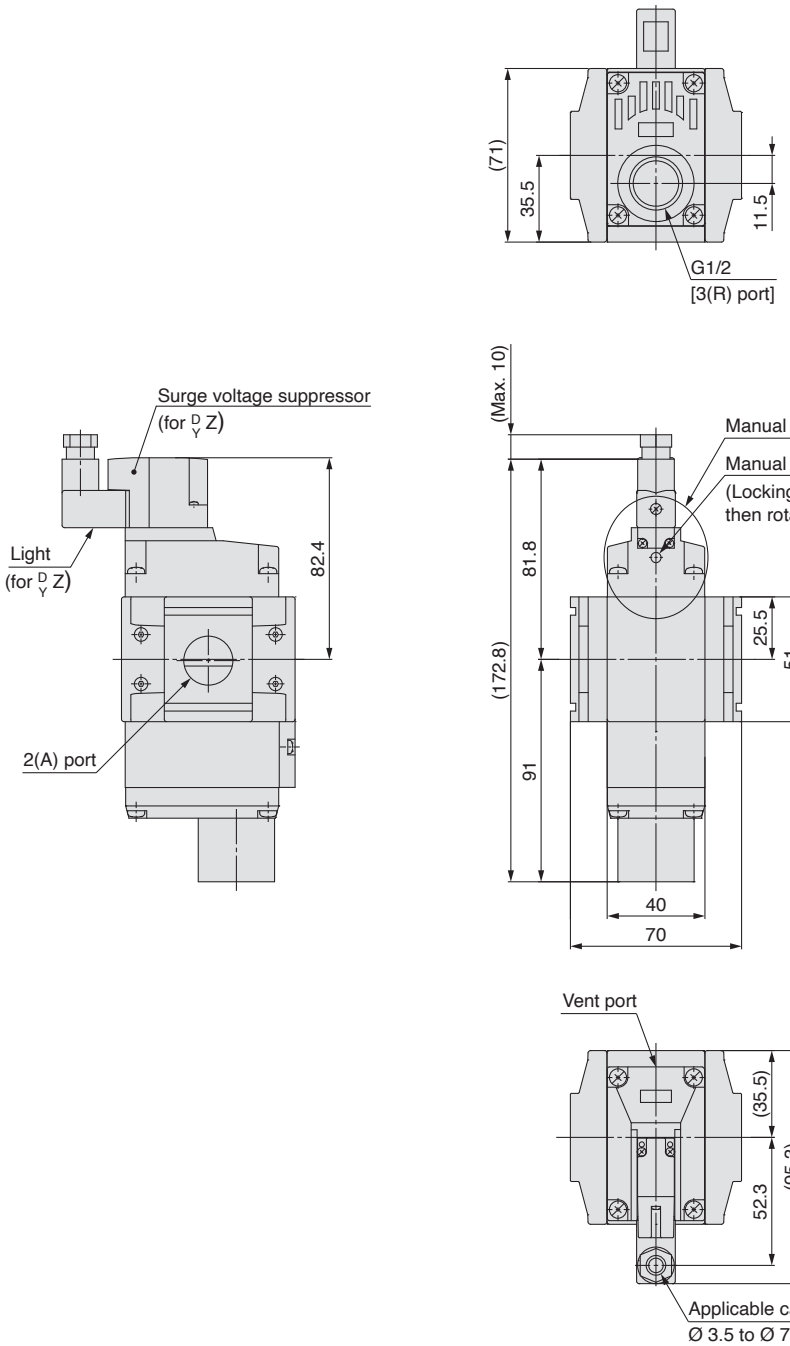






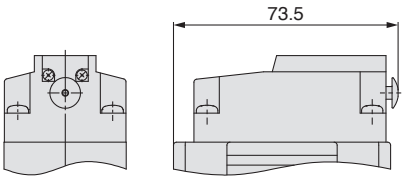
Dimensions

VP746E□-5□□□1-□

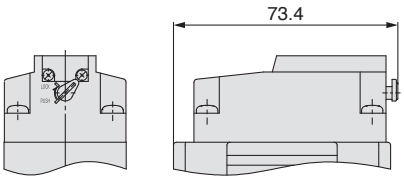


Details of manual override part (for manual operation)

Type A



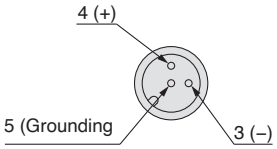
Type E

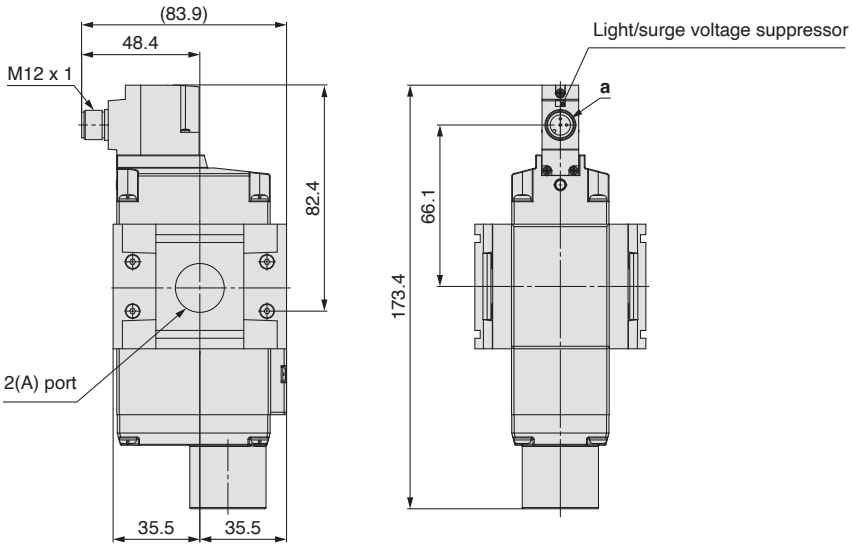


Dimensions

VP746E-5KOZ1-□

Detailed figure of a section
M12 connector



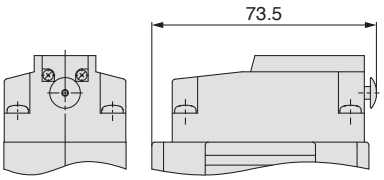


Dimensions

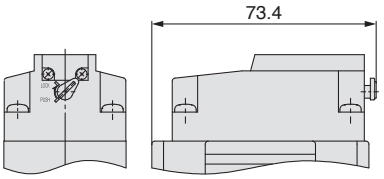
VP746E□-5□□□1-□-S

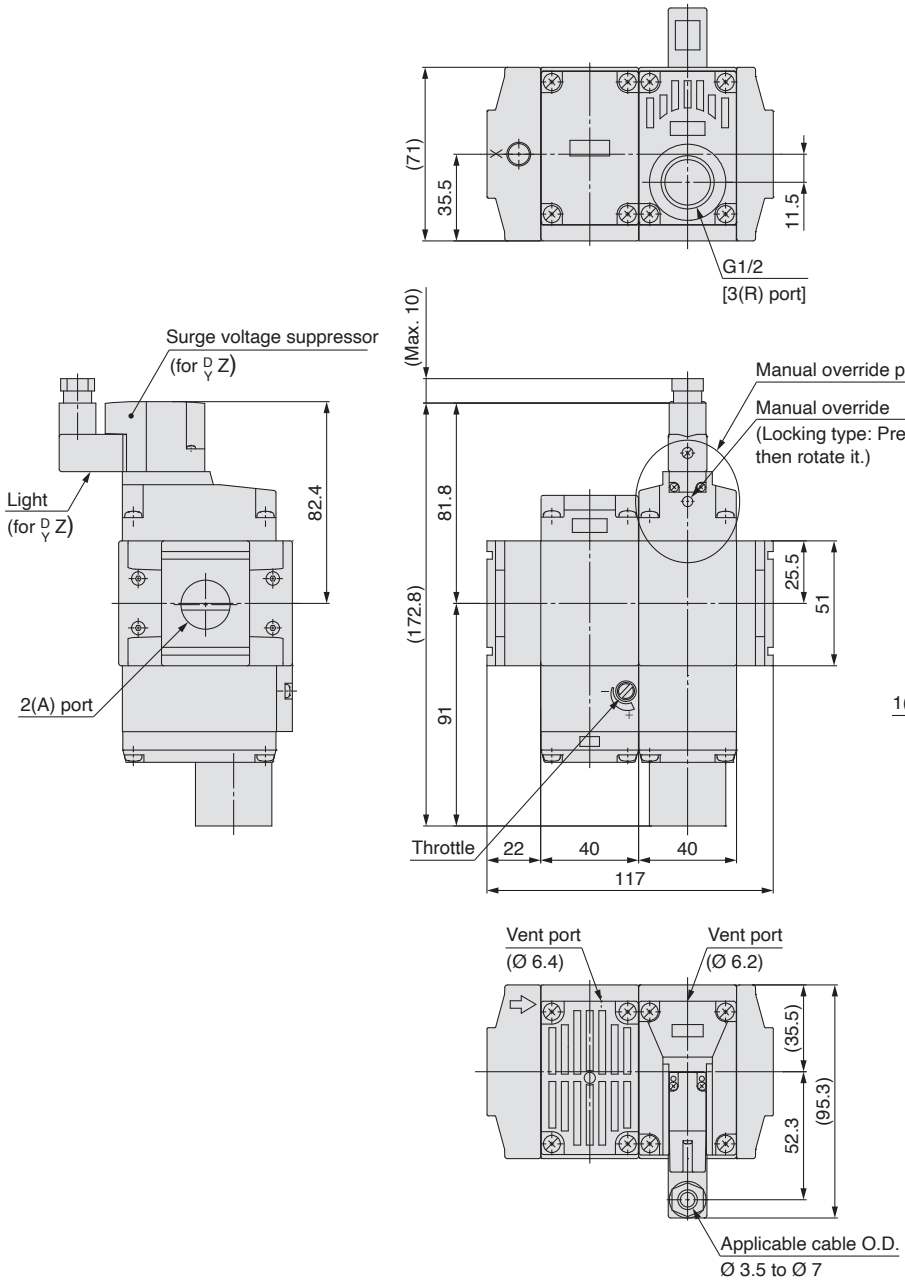
Details of manual override part (for manual operation)

Type A



Type E

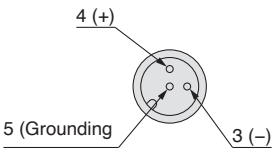


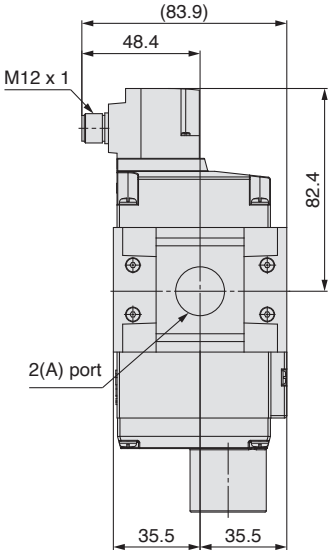


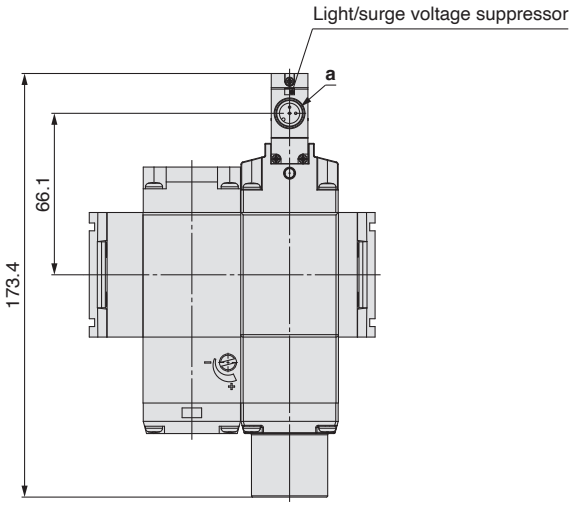
Dimensions

VP746E-5KOZ1-□-S

Detailed figure of a section
M12 connector

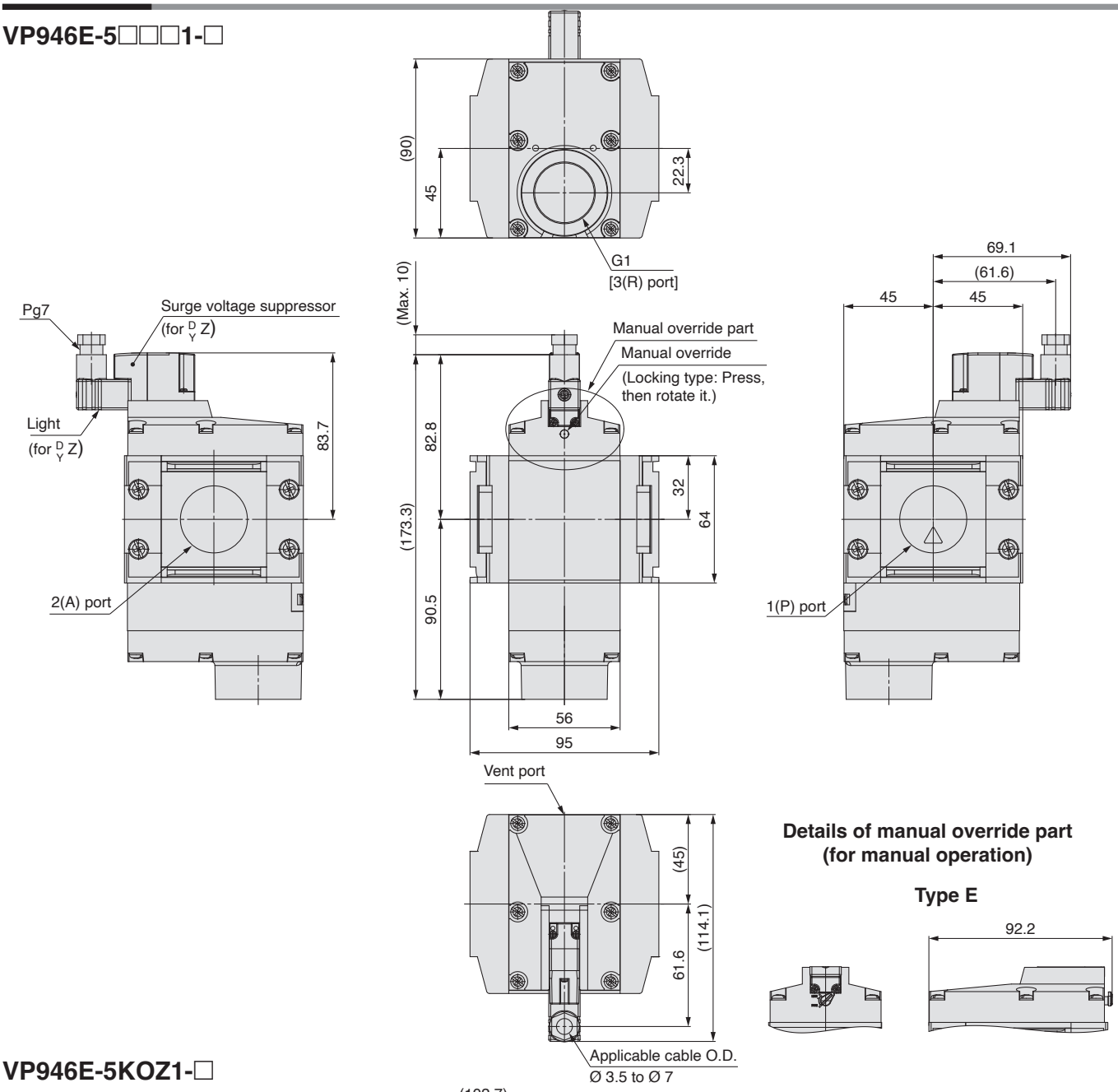






Dimensions

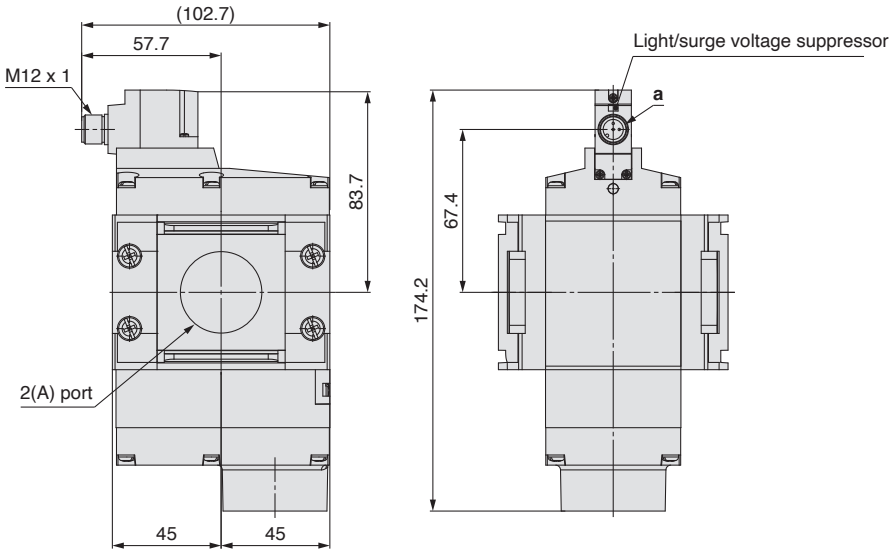
VP946E-5□□□1-□



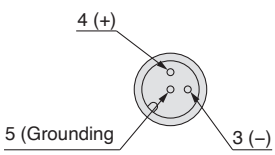
Details of manual override part (for manual operation)

Type E

VP946E-5KOZ1-□

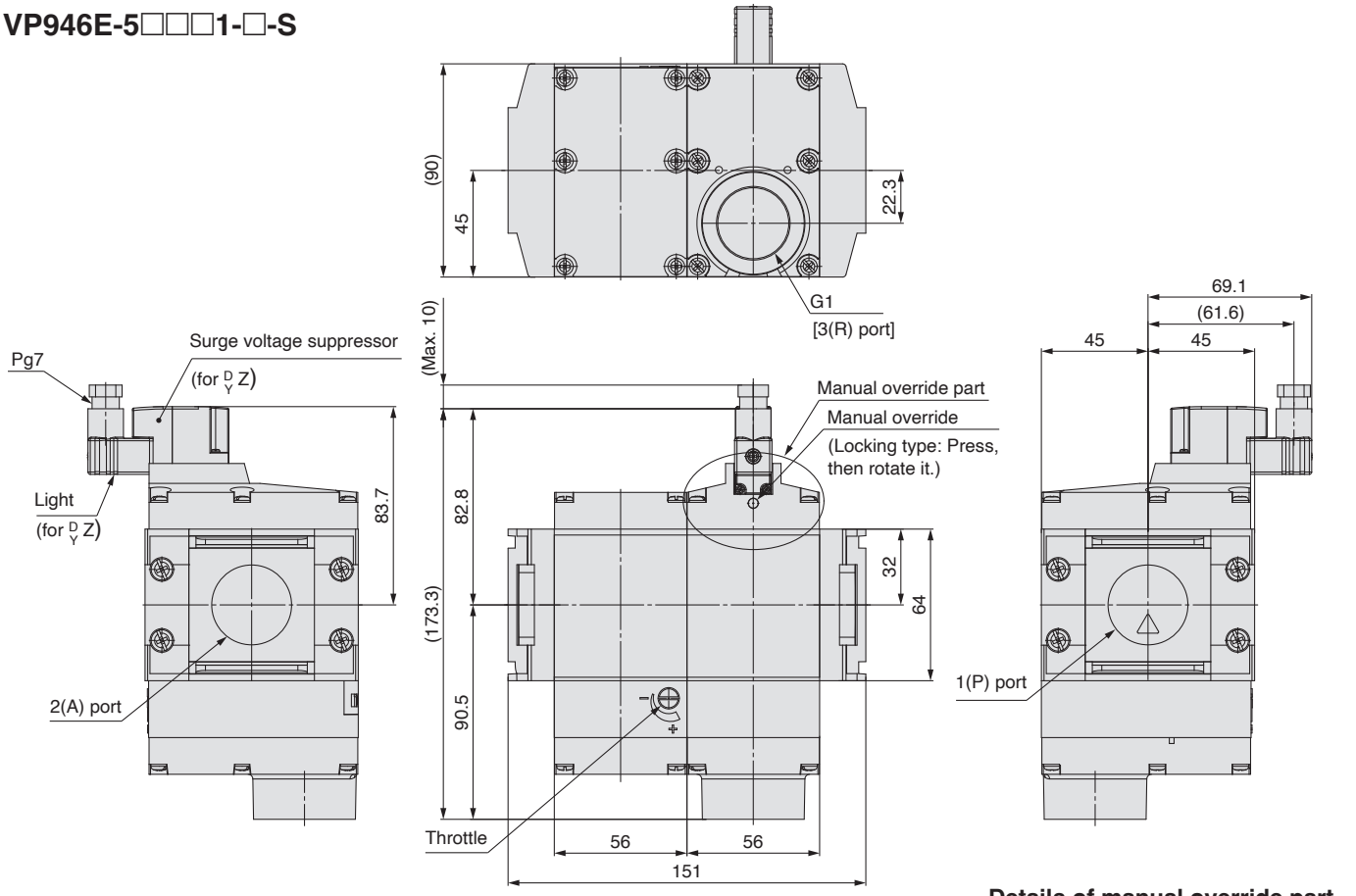


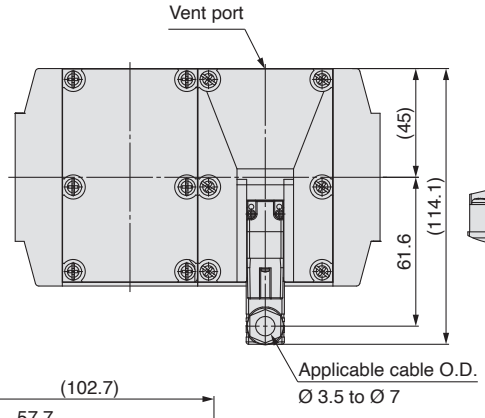
Detailed figure of a section M12 connector



Dimensions

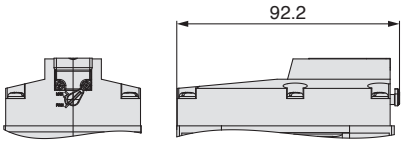
VP946E-5□□□1-□-S



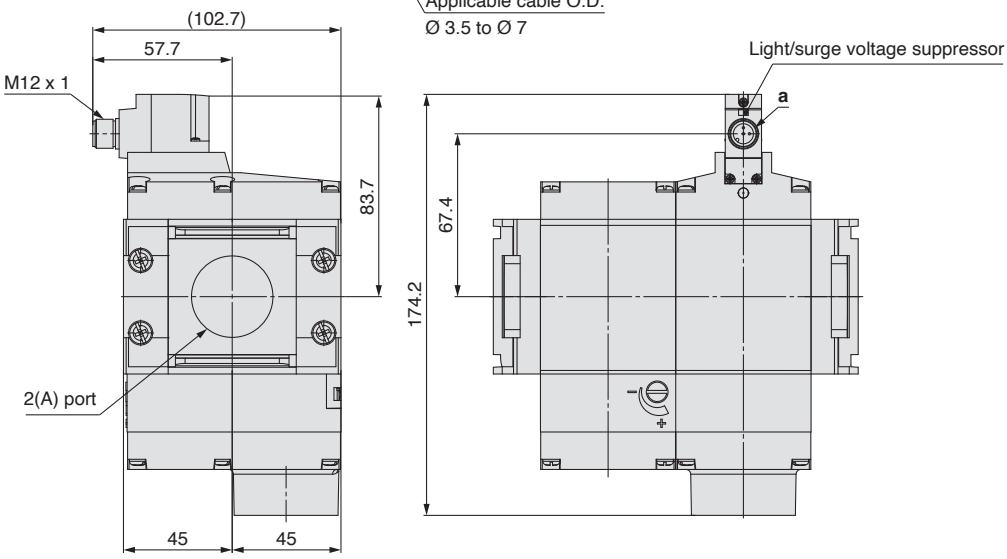


Details of manual override part (for manual operation)

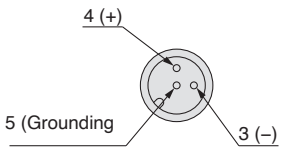
Type E



VP946E-5KOZ1-□-S



Detailed figure of a section M12 connector



⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [1], and other safety regulations.

⚠ **Danger:**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning:**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution:**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

1) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications.
Our products are not developed, designed, and manufactured to be used under the following conditions or environments.
Use under such conditions or environments is not covered.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. [2] Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

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