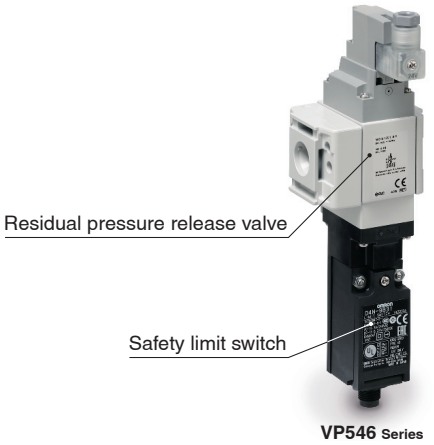
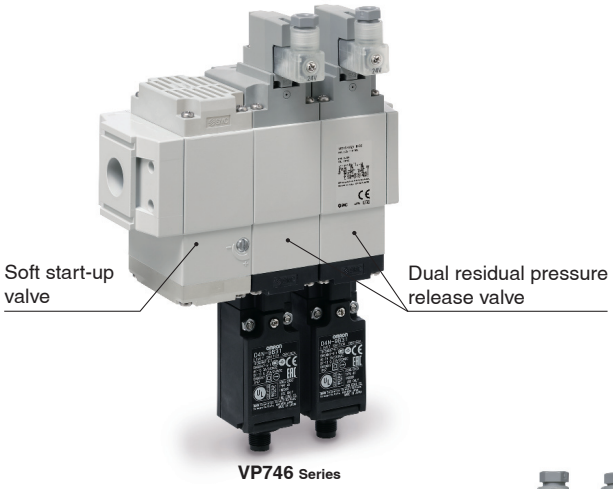
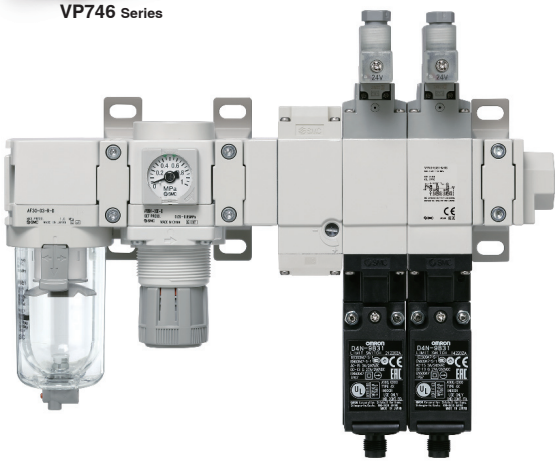
3-Port Solenoid Valve Modular Type/
Residual Pressure Release Valve with Detection of Main Valve Position



VP546 Series



VP746 Series



- **Can be connected to modular type F.R.L. units (AC-D series)**
- **With main valve position detection function**
  The main valve position detection function is used to detect inconsistencies between input signals and valve operations.
- **A model with a soft start-up function is also available.**

- **Variations**

Residual Pressure Release Valve		Dual Residual Pressure Release Valve If one of the valves fails to operate, the other one releases the residual pressure.	
	With soft start-up function		With soft start-up function
			

- **A variety of safety limit switches (Made by OMRON or Rockwell Automation) are available.**
- **Features a check valve built into the pilot flow path (Supports pilot pressure drops caused by pressure fluctuations on the inlet side)**

VP546/746 Series

EMC-SP201X-004E-UK

How to Order

Modular Type VP 5 46 R K – 5 DZ 1 – M R – S S F

Series

5	VP500
7	VP700

Pilot

—	Internal pilot
R	External pilot

Pressure specifications

—	Standard (0.7 MPa)
K	High pressure (1.0 MPa)

Rated voltage

5	24 VDC

Electrical entry

DZ	DIN terminal (With connector), With light/surge voltage suppressor
YZ	DIN (EN 175301-803C) terminal (With connector), With light/surge voltage suppressor

Safety limit switch/Wiring

—	G1/2 (Made by OMRON)
M	M12 connector (Made by OMRON)
S1	M12 connector (Made by Rockwell Automation)

Flow direction

—	Left to right
R	Right to left

No. of residual pressure exhaust valves

S	Single
D	Dual

Soft start-up function

—	None
S	With soft start-up function

Thread (External pilot only)

—	Rc
F	G
N	NPT

∗ Thread type of the external pilot port

⚠ Caution

Connection threads are not available for the 3-port solenoid valve/residual pressure release valve with detection of main valve position. Order a piping adapter and spacer with bracket separately.

Simple Specials System

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

Simple Specials System

Short lead times

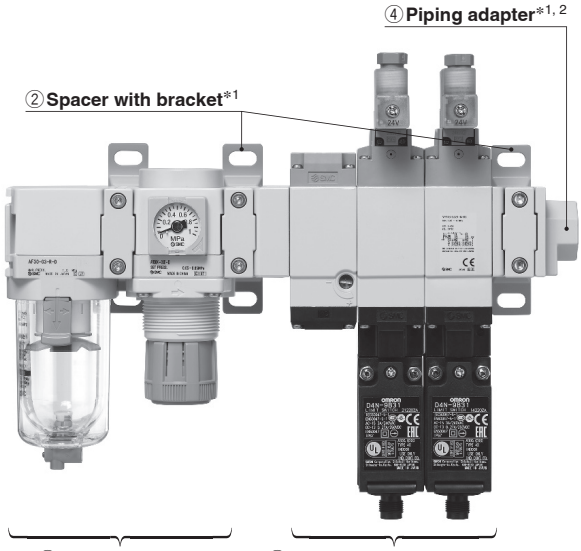
This system enables us to respond to your special needs (accessory assembly or the designing of a modular unit) as quickly as standard products.

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



Assembly Example

- ① Air combination AC30B-03E-D ····· 1 pc.
- ② Spacer with bracket Y300T-D ····· 2 pcs.
- ③ 3-port solenoid valve/Residual pressure release valve with detection of main valve position VP546-5DZ1-M-DS ·· 1 pc.
- ④ Piping adapter E300-03-D ····· 1 pc.

Applicable Combinations/ Attachment Combinations (Refer to the next page.)

∗1 Connection threads are not available for the 3-port solenoid valve/residual pressure release valve with detection of main valve position. Select a piping adapter.

∗2 Refer to the next page for details on the spacer with bracket and piping adapter.

Valve Specifications

Valve specifications	**Fluid**			Air	
	Type of actuation			N.C. (Spring return)	
	Pressure specifications			Standard	High pressure
	Internal pilot operating pressure range			0.25 to 0.7 MPa	0.25 to 1.0 MPa
	External pilot operating pressure range	**Operating pressure range**	**Without soft start-up function**	0.05 to 0.7 MPa	0.05 to 1.0 MPa
			With soft start-up function	0.25 to 0.7 MPa	0.25 to 1.0 MPa
		Pilot pressure range		Same as the operating pressure (Min. 0.25 MPa)	
	Max. operating frequency			30 cycles/min	
	Min. operating frequency			1 cycle/week	
	Ambient and fluid temperatures			–10 to 50 °C (No freezing)	
	Ambient humidity			20 to 90%RH (No condensation)	
	Manual override			None	
	Pilot exhaust			Individual exhaust	
	Lubrication			Not required	
	Mounting orientation			Unrestricted	
	Impact/Vibration resistance			150/30 m/s	
	Enclosure			IP65	
	Operating environment			Indoors	
Coil specifications	**Coil rated voltage**			24 VDC	
	Allowable voltage fluctuation			±10% of the rated voltage	
	Power consumption			0.45 W	
	Surge voltage suppressor			Varistor	
	Indicator light			LED	
Safety limit switch specifications	**Manufacturer**			Made by OMRON	Made by Rockwell Automation
	Electrical entry			G1/2, M12 connector	M12 connector
	Contact resistance			25 mΩ or less	50 mΩ or less
	Min. applicable load (Load resistance)			5 VDC, 1 mA	5 VDC, 5 mA
	Max. voltage			24 VDC	
	Max. load current			50 mA	
	Max. load inductance			0.5 H	
	Insulation voltage			300 V	600 V
	Protection against electric shock			Class II (EN60947-5-1:2004)	

∗ This valve is a large flow rate pilot-operated solenoid valve. If the operating pressure falls below 0.25 MPa due to a pressure drop caused by insufficient air supply, it may not be able to switch properly.

Flow Rate Characteristics/Weight

Model	Flow rate characteristics								Weight [g]		
	1 → 2 (P → A)				2 → 3 (A → R)				Safety limit switch specifications		
	C [dm³/(s·bar)]	b	Cv	Q [l/min (ANR)] *1	C [dm³/(s·bar)]	b	Cv	Q [l/min (ANR)] *1	—: G1/2 (OMRON)	**M**: M12 connector (OMRON)	**S1**: M12 connector (Rockwell Automation)
VP546(K)-S	8.8	0.18	2.1	2084	8.3	0.18	2.0	1966	459	466	485
VP546(K)-SS	6.6	0.13	1.5	1522					671	678	697
VP546(K)-D	6.6	0.13	1.5	1522					803	817	855
VP546(K)-DS	5.6	0.06	1.3	1246					1,015	1,030	1,067
VP746(K)-S	14.2	0.22	3.4	3440	12.3	0.25	3.0	3033	808	815	834
VP746(K)-SS	10.6	0.11	2.4	2419					1,274	1,281	1,300
VP746(K)-D	10.8	0.13	2.5	2490					1,395	1,409	1,447
VP746(K)-DS	8.9	0.08	2.0	2001					1,861	1,876	1,914

∗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.

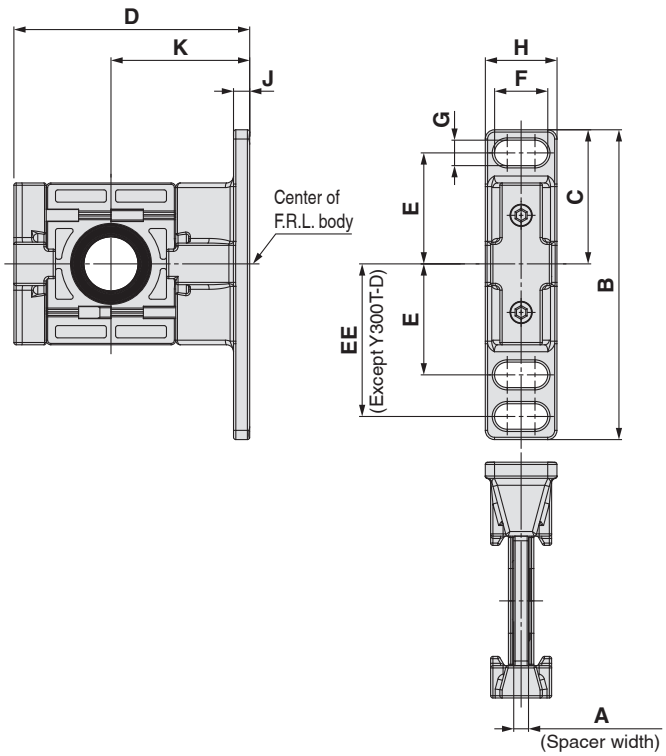
Spacer with Bracket

Y 300 □ – D
❶ ❷

Spacer with bracket (Y□T-D)

	Symbol	Description	❶ Body size [Applicable AC size] 300 [AC30]	400 [AC40]
❷ Bracket	T	Spacer with bracket	●	●

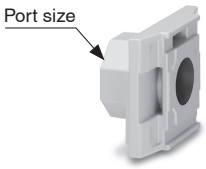
Dimensions



Part no.	A	B	C	D	E	EE	F	G	H	J	K	Applicable size
Y300T-D	4.2	85	42.5	67.5	35	—	14	7	20	6	41	**AC30-D**
Y400T-D	5.2	115	50	85.5	40	55	18	9	26	7	50	**AC40-D**

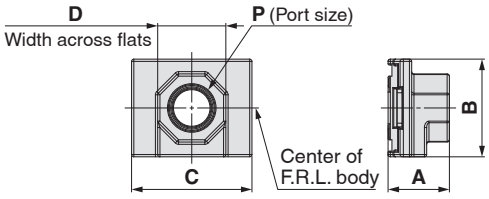
Piping Adapter

E 300 – □ 03 – D
❶ ❷ ❸



	Symbol	Description	❶ Body size [Applicable AC size] 300 [AC30]	400 [AC40]
❷ Pipe thread type	—	Rc	●	●
	N	NPT	●	●
	F	G	●	●
	+			
❸ Port size	02	1/4	●	●
	03	3/8	●	●
	04	1/2	●	●
	06	3/4	—	●

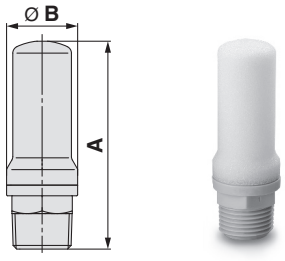
Dimensions



Model	P	A	B	C	D	Applicable AC size
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**

Silencer

Compact resin type



[mm]

Model	Port size R	A	B
AN30-03	3/8	58.5	20

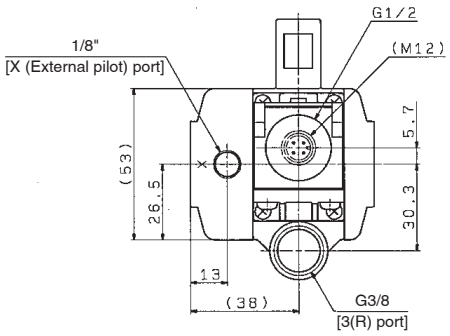
Applicable Combinations/Attachment Combinations

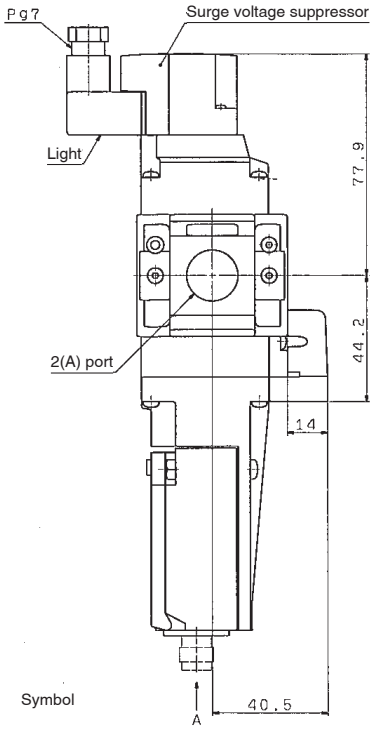
Residual pressure relief 3-port solenoid valve	Air combination	Spacer with bracket	Piping adapter	Silencer
VP546	AC30□-D	Y300T-D	E300-□03-D	AN30-03
VP746	AC40□-D	Y400T-D	E400-□04-D	AN30-03

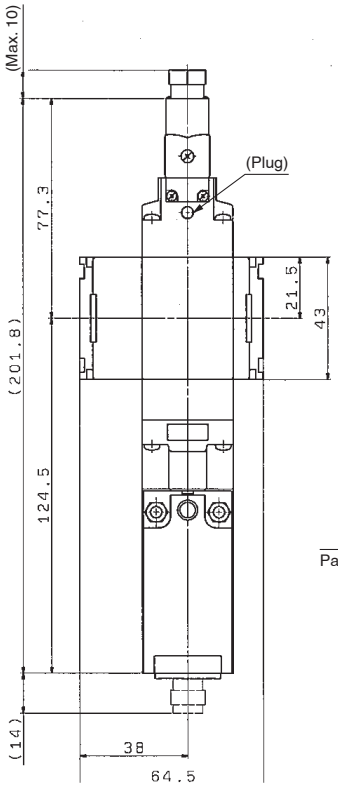
Dimensions

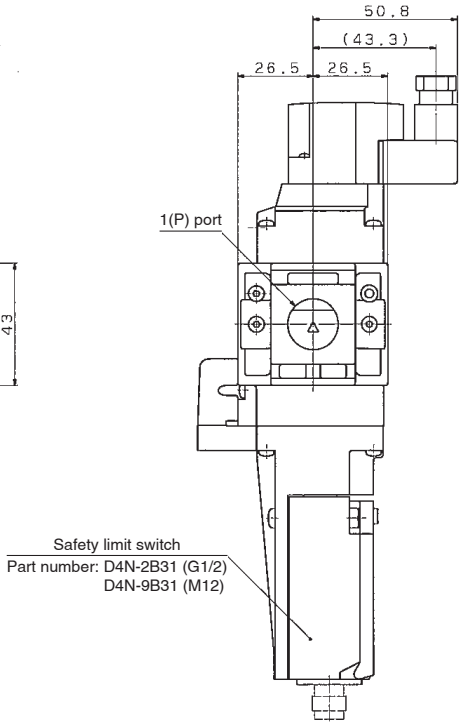
VP546□□-5□1-□□-S□

Safety limit switch
Made by OMRON

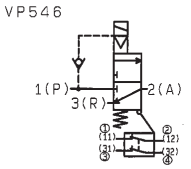


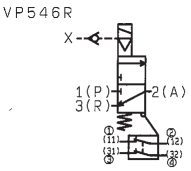


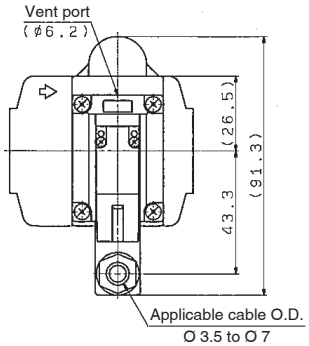




Symbol

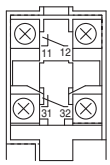






Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

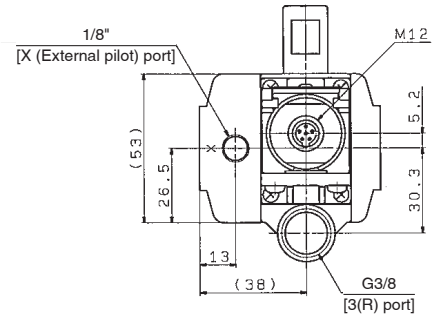
Crimped Terminals

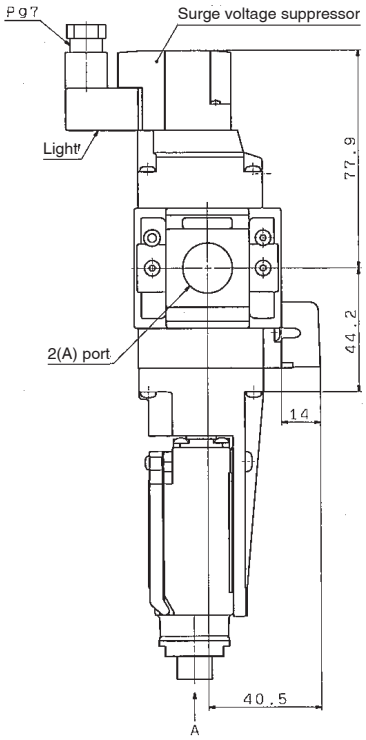
Wiring size
AWG20 (0.5 mm²)

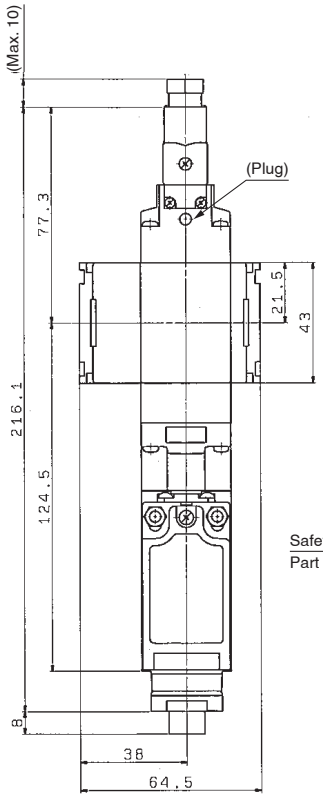
Dimensions

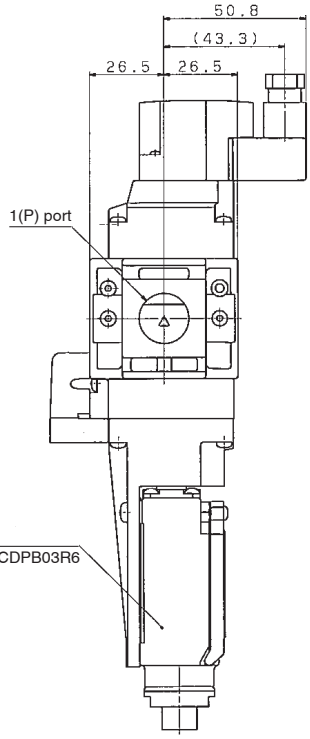
VP546□□-5□1-S1□-S□

Safety limit switch
Made by Rockwell Automation









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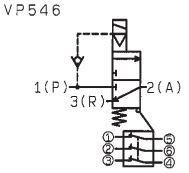
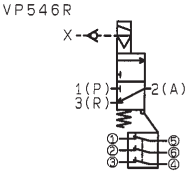
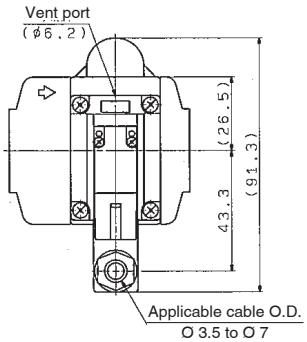






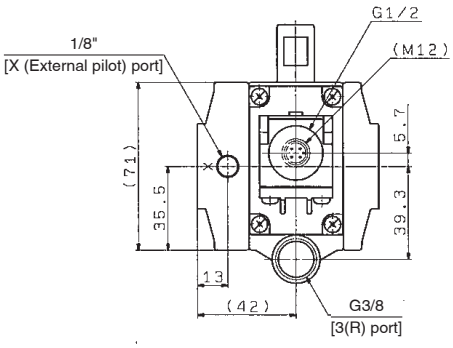
Pin Numbers (Built-in switch 3 N.C.)

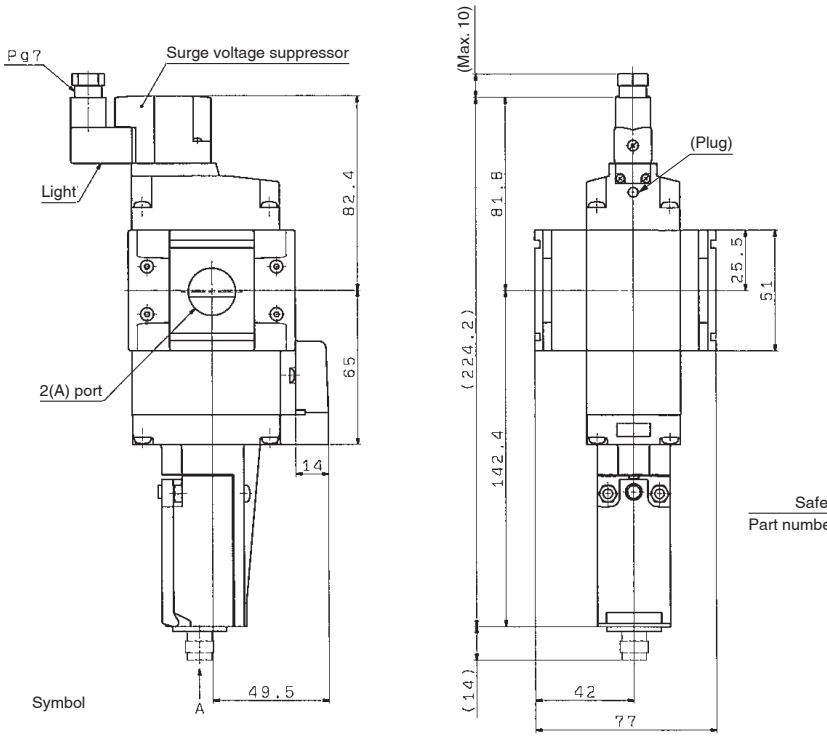
M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

Dimensions

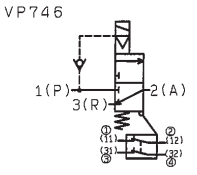
VP746□□-5□1-□□-S□

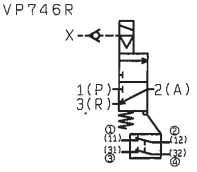
Safety limit switch
Made by OMRON

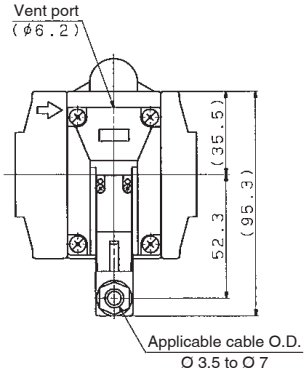




Symbol

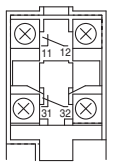






Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

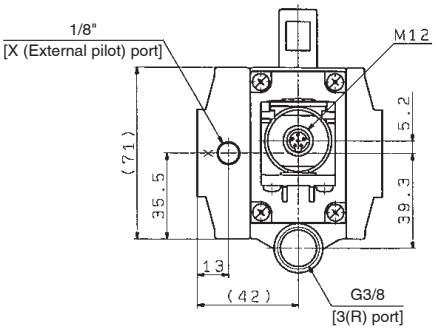
Crimped Terminals

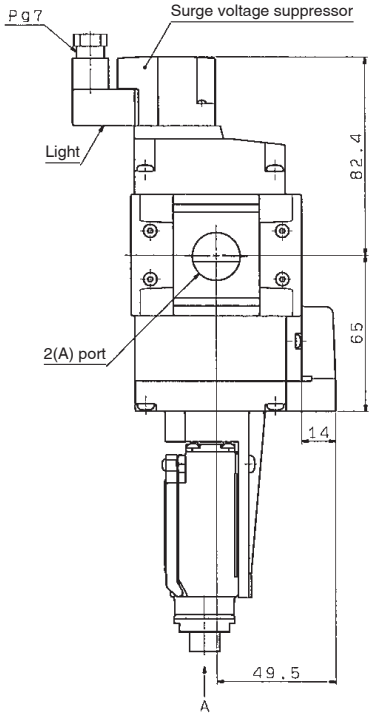
Wiring size
AWG20 (0.5 mm²)

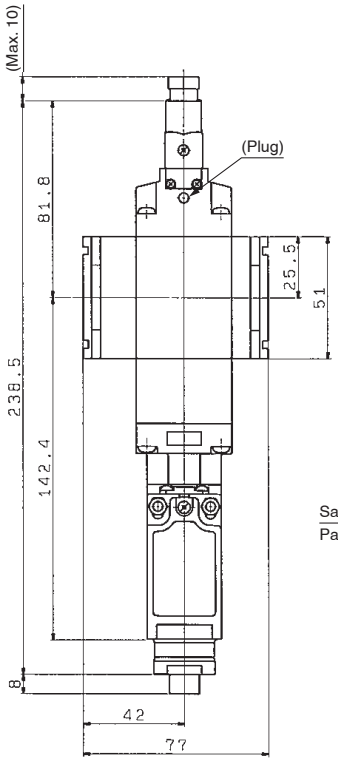
Dimensions

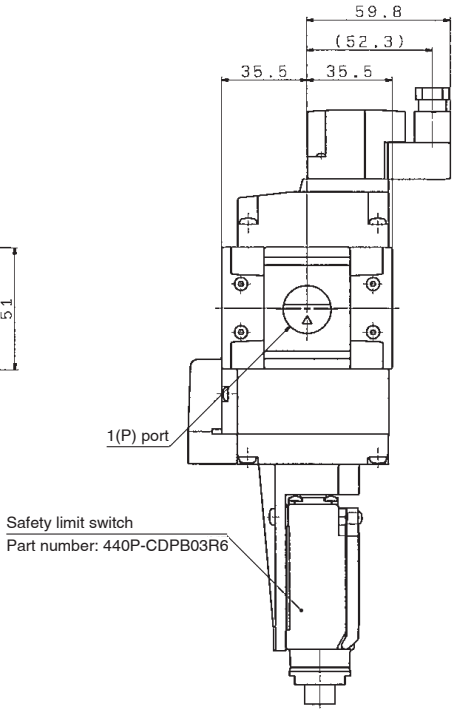
VP746□□-5□1-S1□-S□

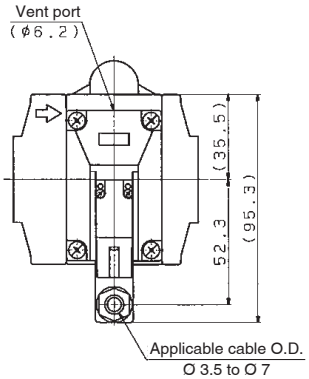
Safety limit switch
Made by Rockwell Automation



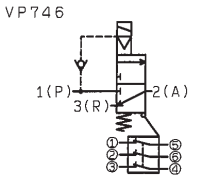


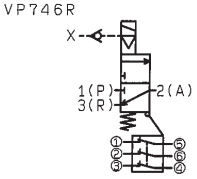






Symbol





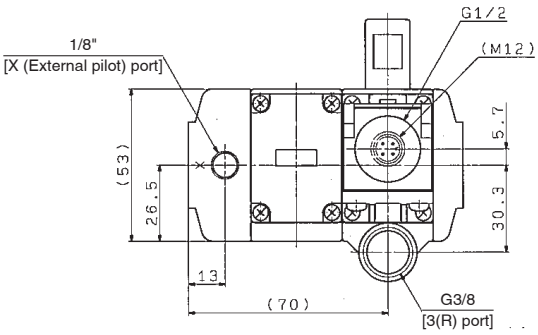
Pin Numbers (Built-in switch 3 N.C.)

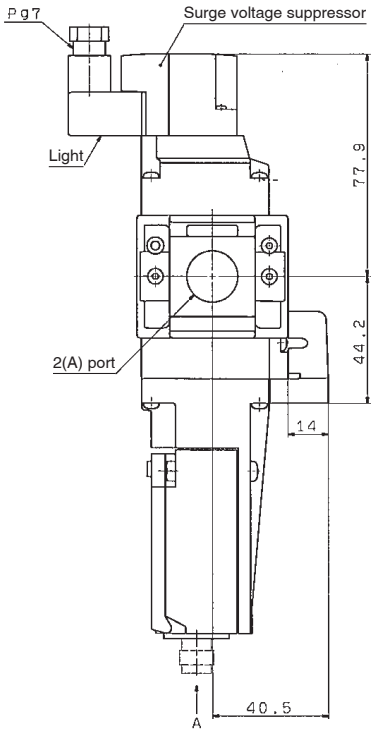
M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

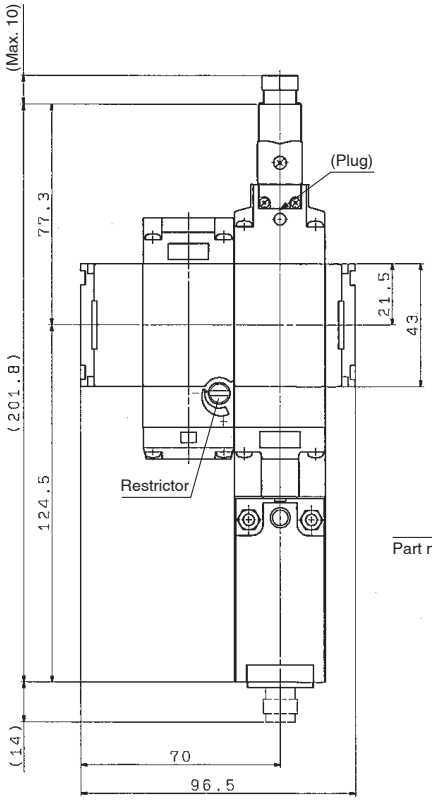
Dimensions

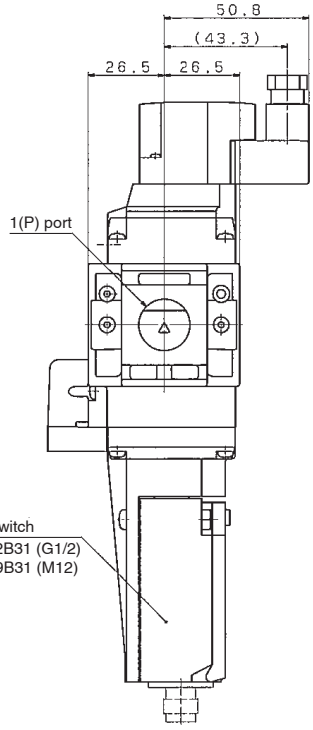
VP546□□-5□1-□□-SS□

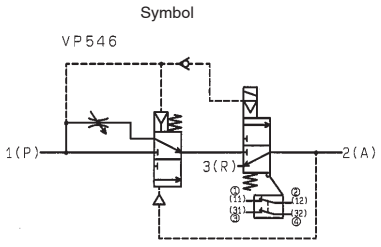
Safety limit switch
Made by OMRON

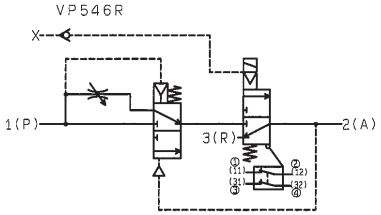


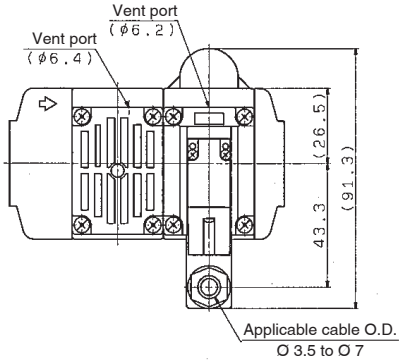






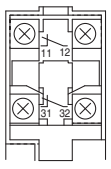






Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

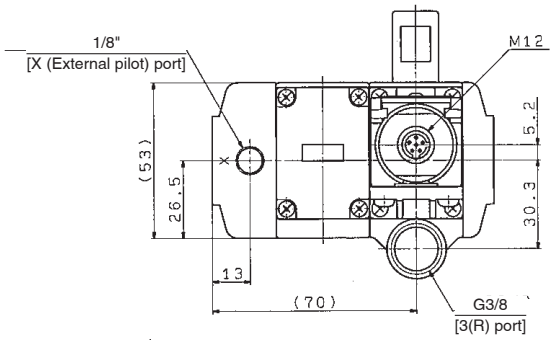
Crimped Terminals

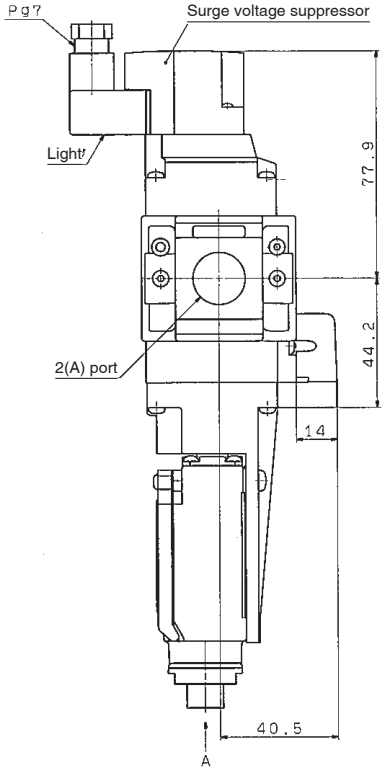
Wiring size
AWG20 (0.5 mm²)

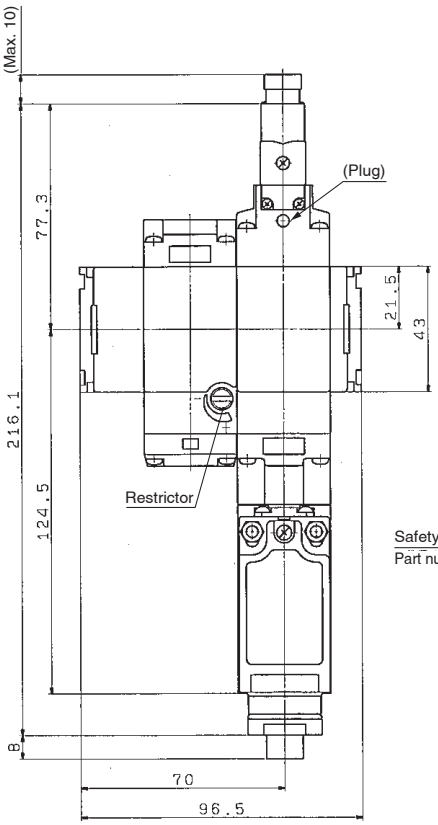
Dimensions

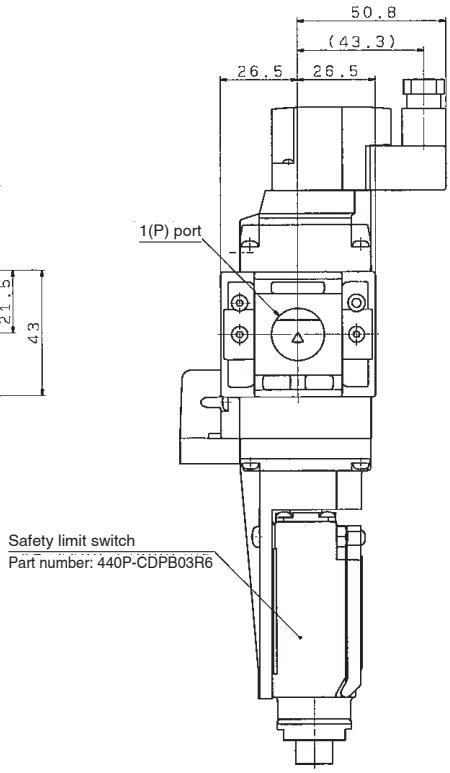
VP546□□-5□1-S1□-SS□

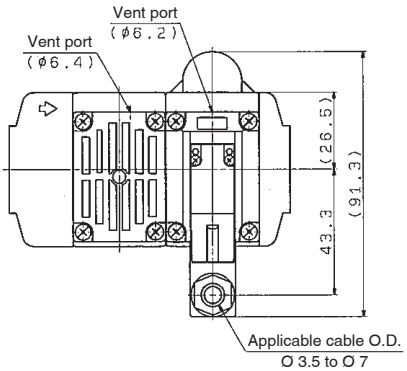
Safety limit switch
Made by Rockwell Automation



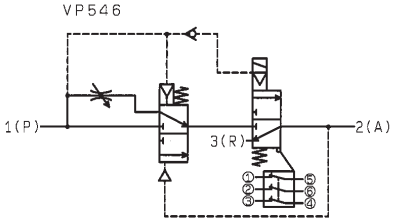


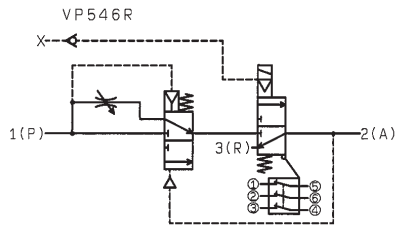






Symbol





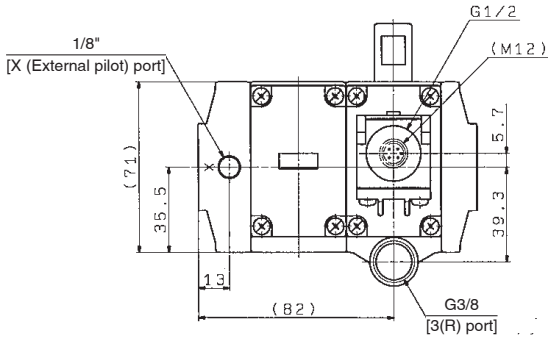
Pin Numbers (Built-in switch 3 N.C.)

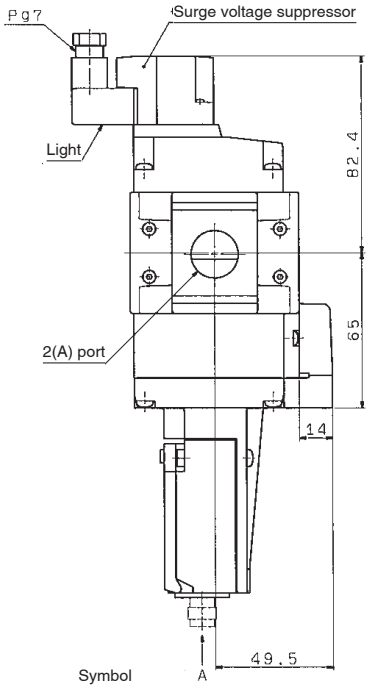
M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

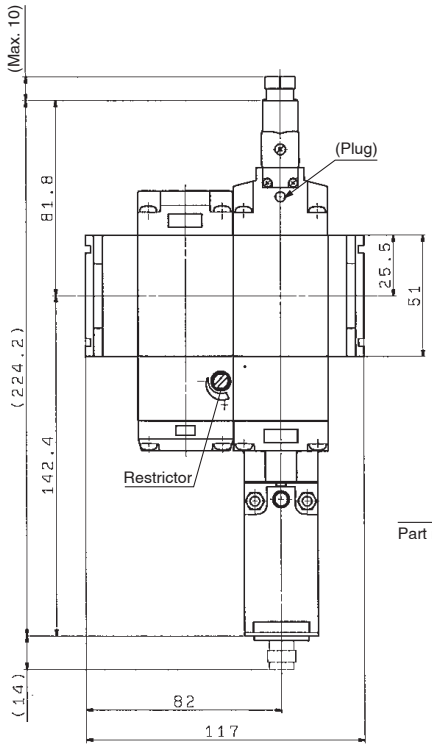
Dimensions

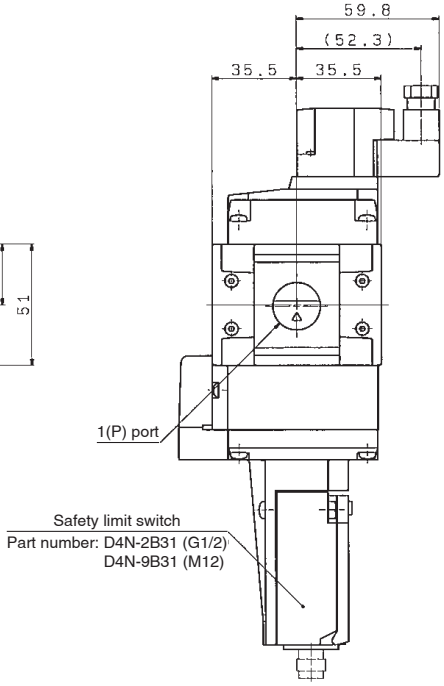
VP746□□-5□1-□□-SS□

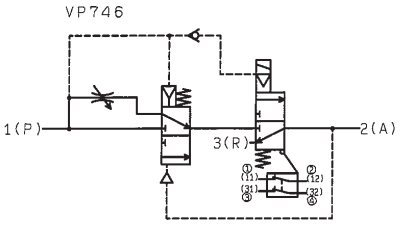
Safety limit switch
Made by OMRON

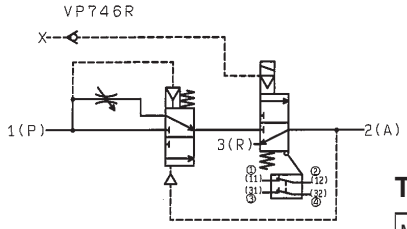


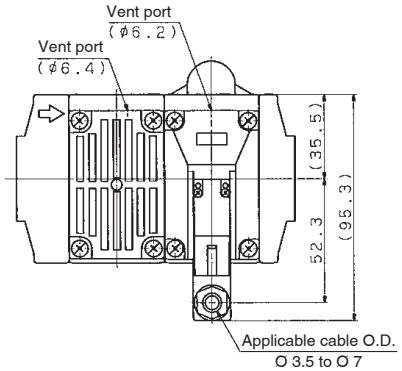






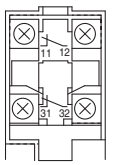






Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

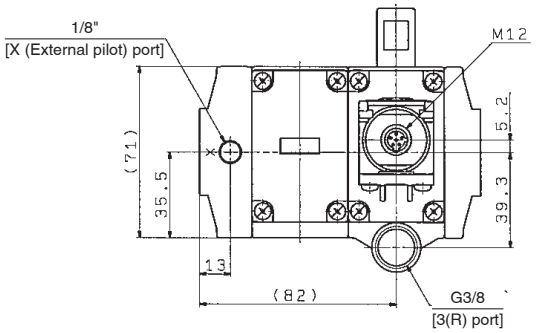
Crimped Terminals

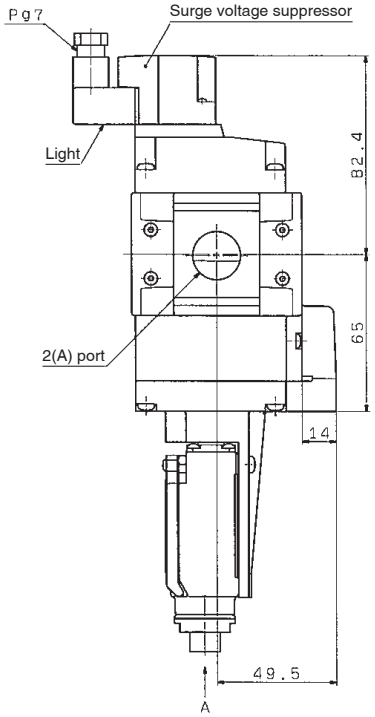
Wiring size
AWG20 (0.5 mm²)

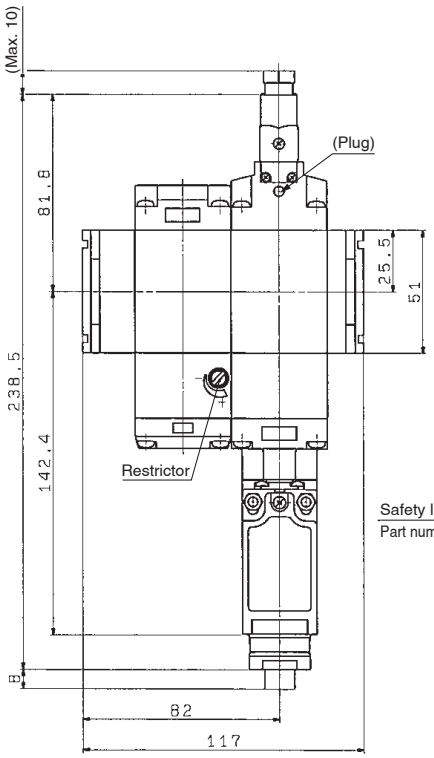
Dimensions

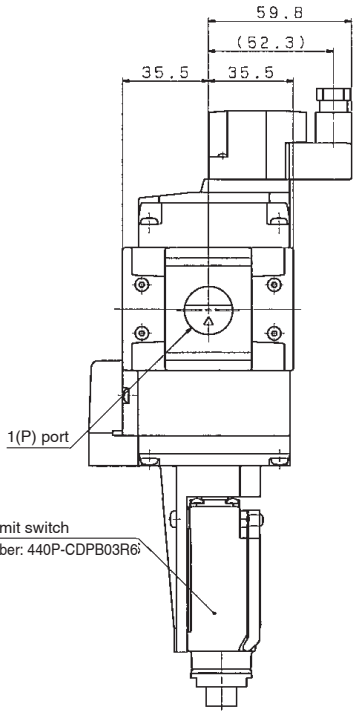
VP746□□-5□1-S1□-SS□

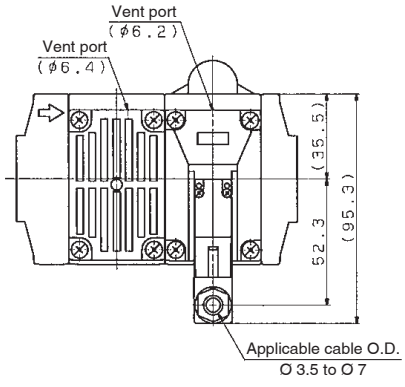
Safety limit switch
Made by Rockwell Automation









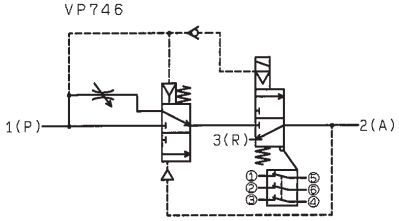


Pin Numbers (Built-in switch 3 N.C.)

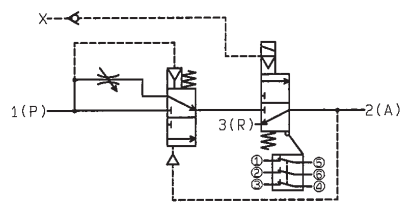
M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

Symbol

VP746



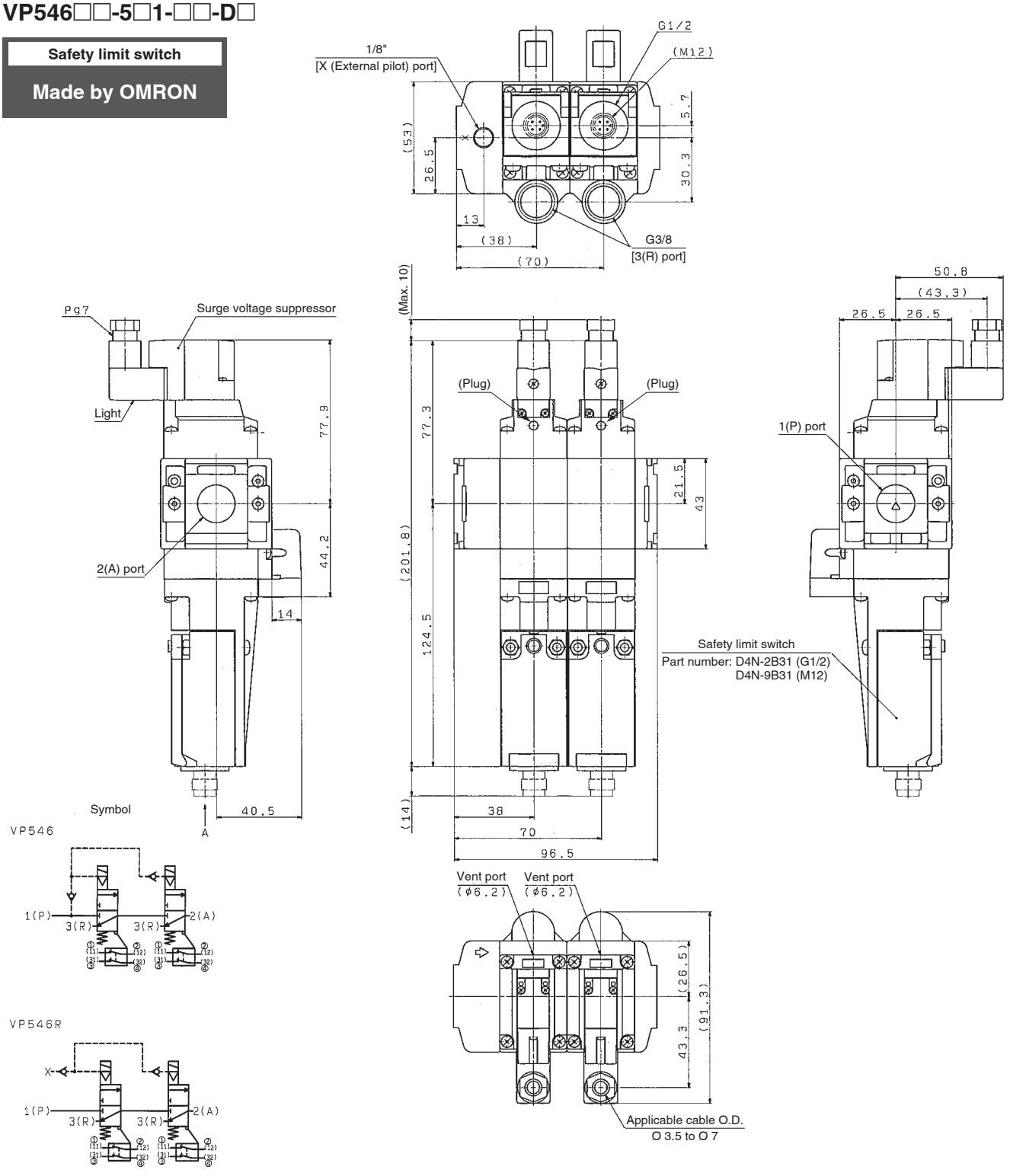
VP746R



Dimensions

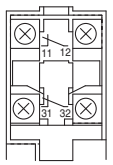
VP546□□-5□1-□□-D□

Safety limit switch
Made by OMRON



Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

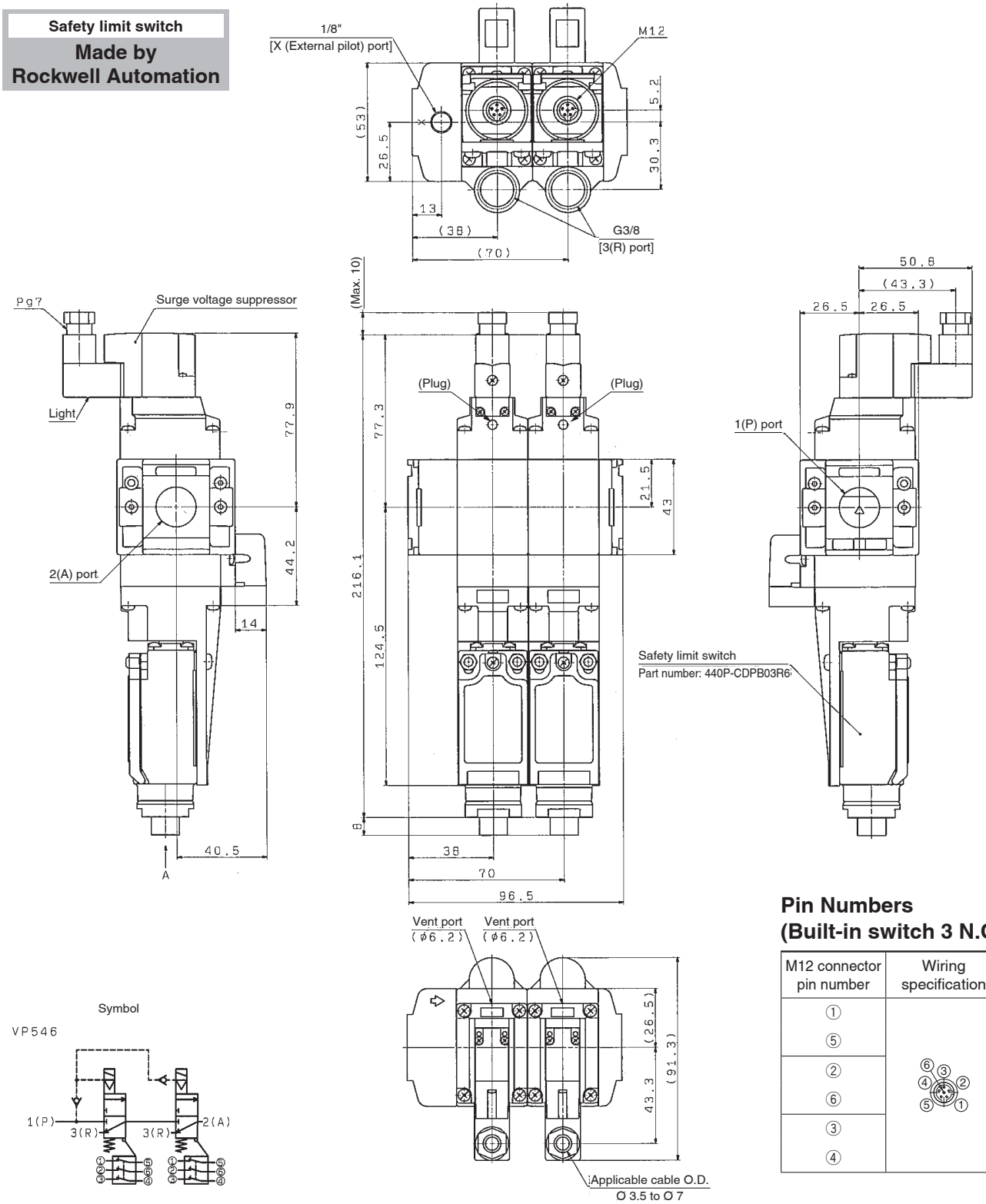
Crimped Terminals

Wiring size
AWG20 (0.5 mm²)

Dimensions

VP546□□-5□1-S1□-D□

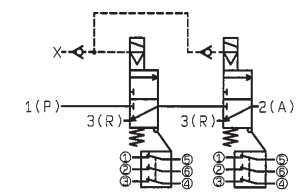
Safety limit switch
Made by Rockwell Automation



Symbol

VP546

VP546R



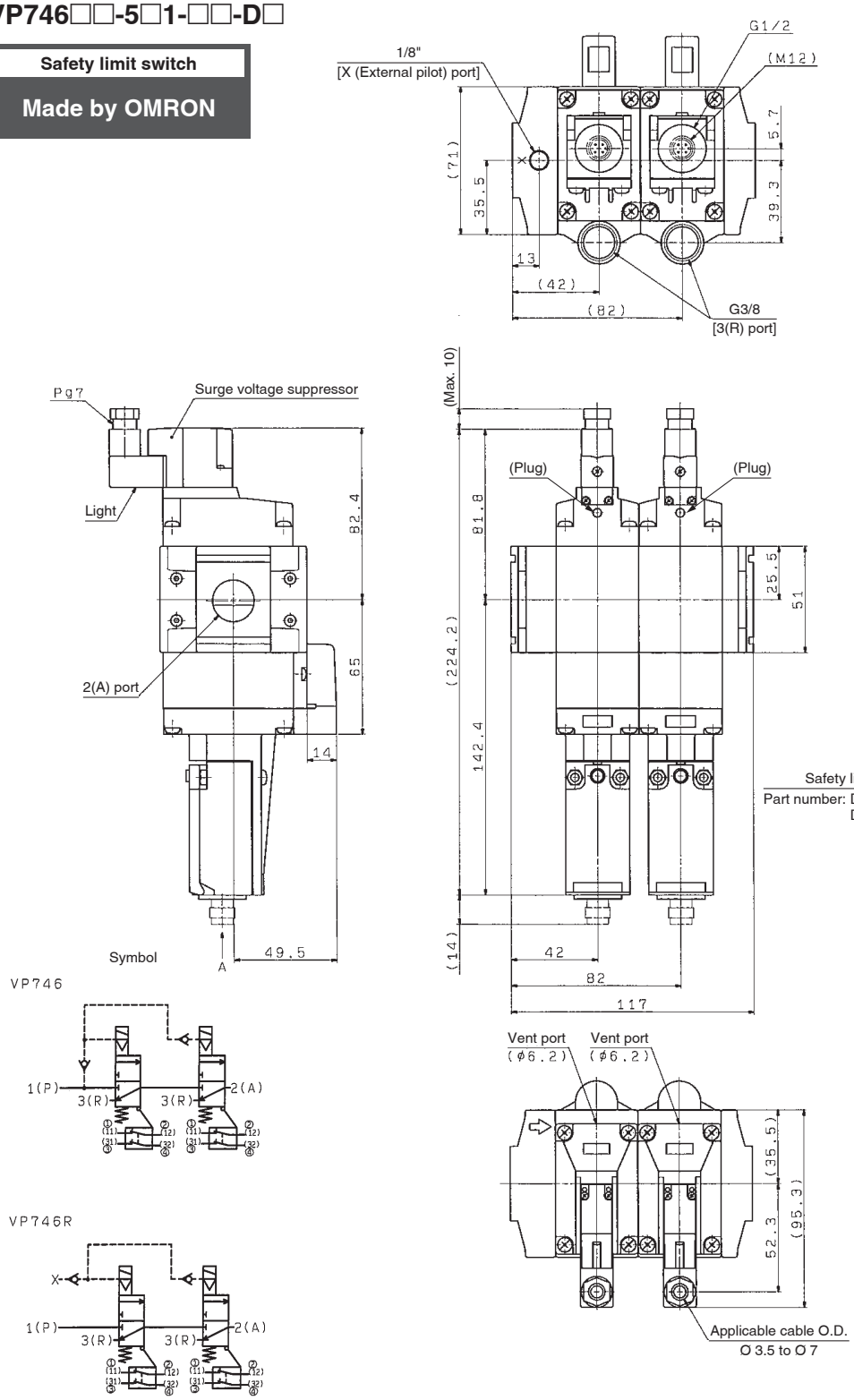
Pin Numbers (Built-in switch 3 N.C.)

M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

Dimensions

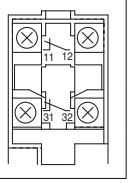
VP746□□-5□1-□□-D□

Safety limit switch
Made by OMRON



Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

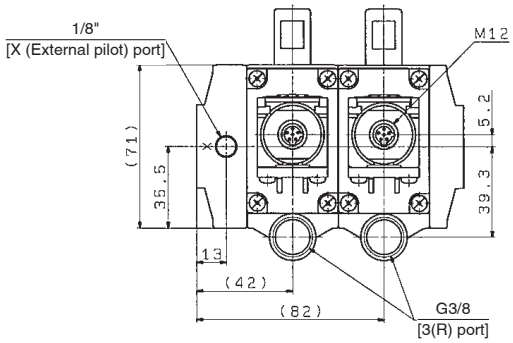
Crimped Terminals

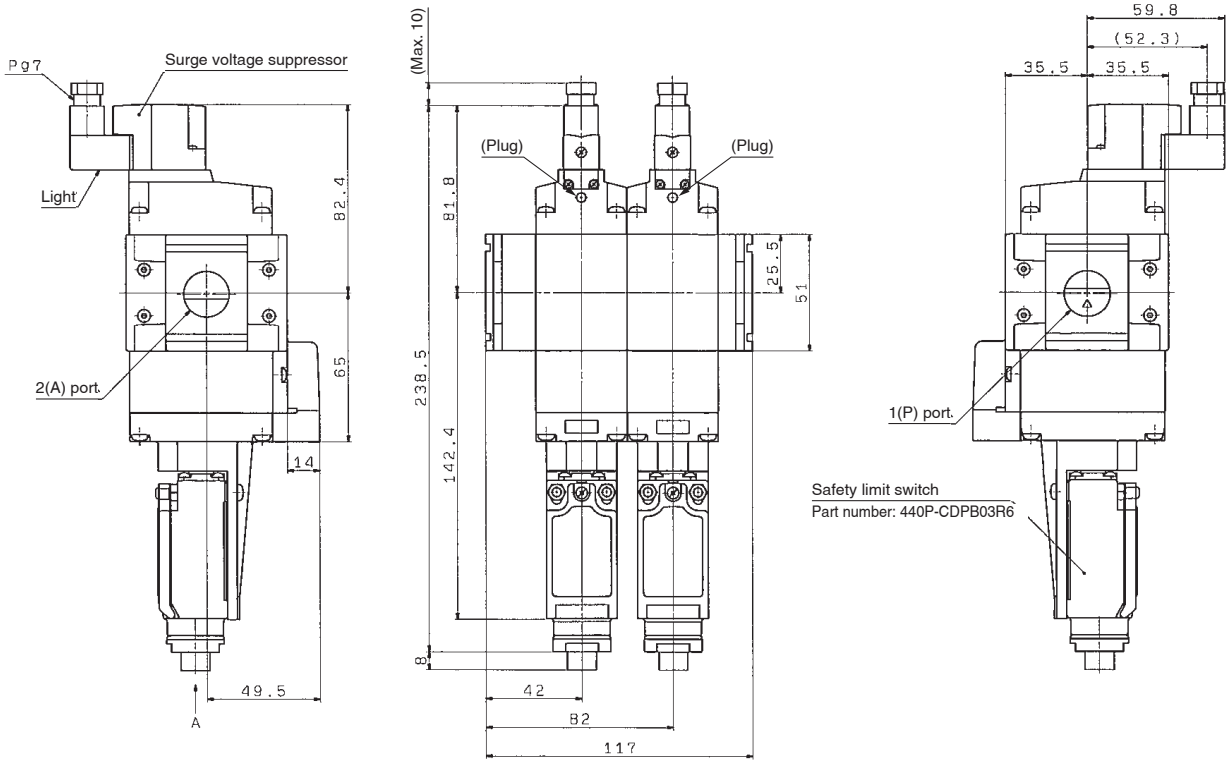
Wiring size
AWG20 (0.5 mm²)

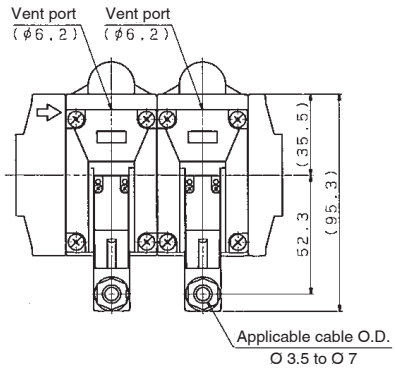
Dimensions

VP746□□-5□1-S1□-D□

Safety limit switch
Made by Rockwell Automation

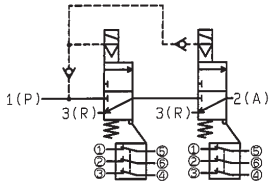




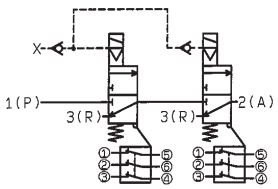


Symbol

VP746



VP746R



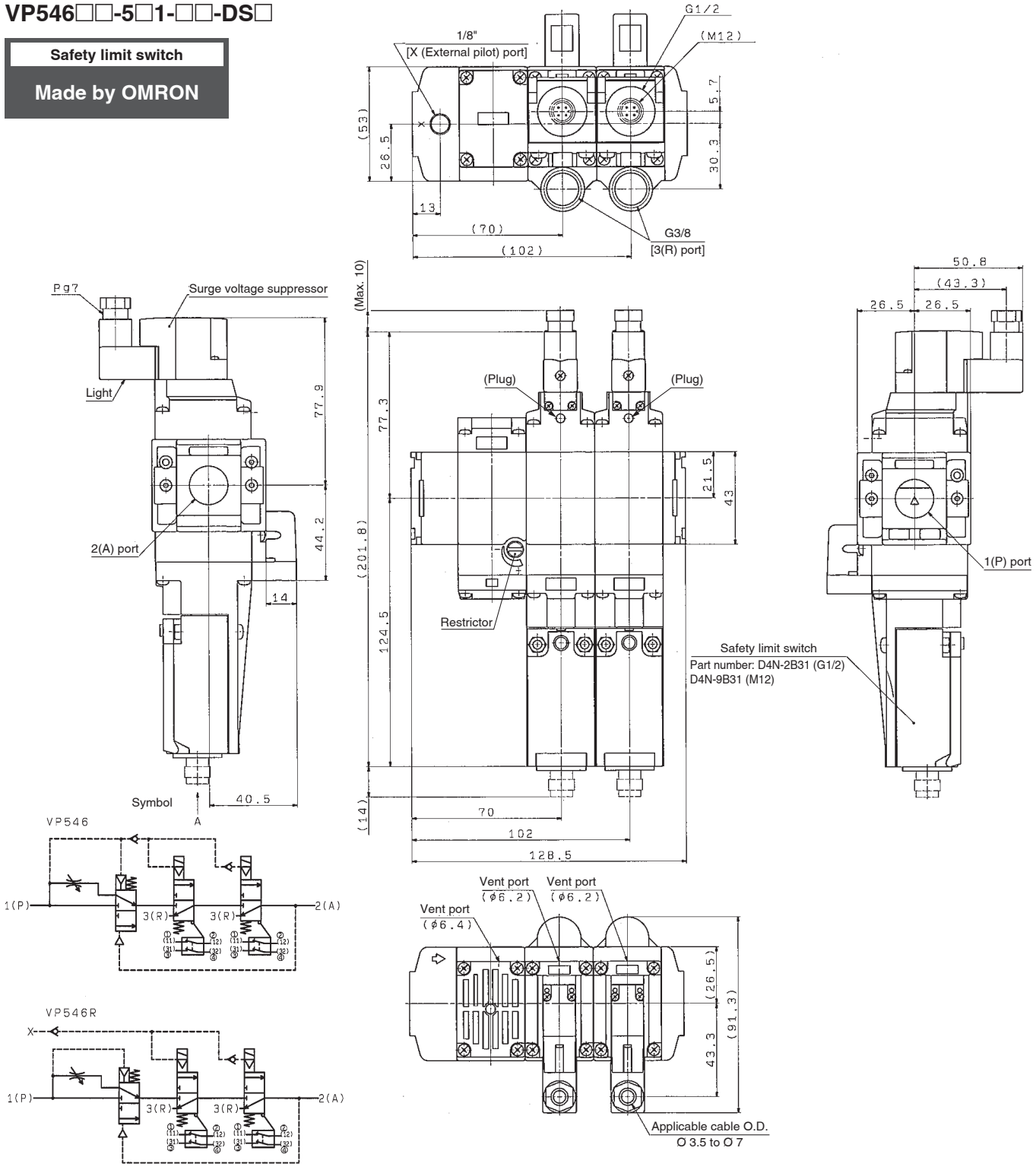
Pin Numbers (Built-in switch 3 N.C.)

M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

Dimensions

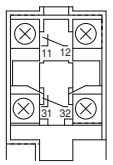
VP546□□-5□1-□□-DS□

Safety limit switch
Made by OMRON



Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

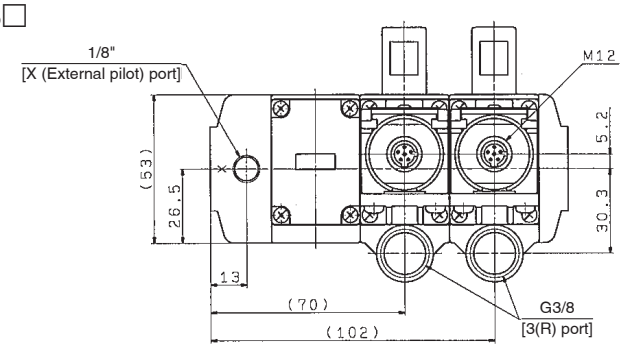
Crimped Terminals

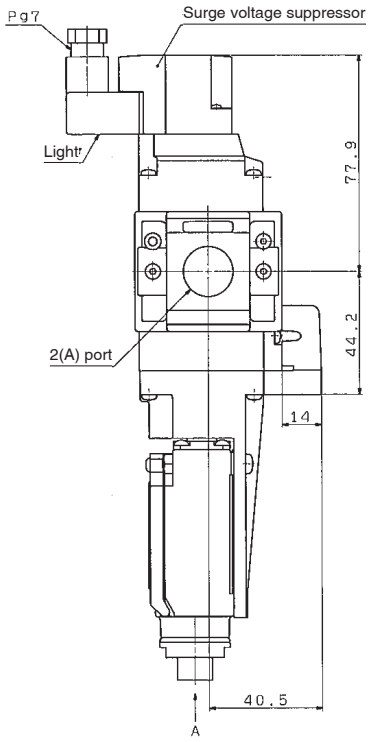
Wiring size
AWG20 (0.5 mm²)

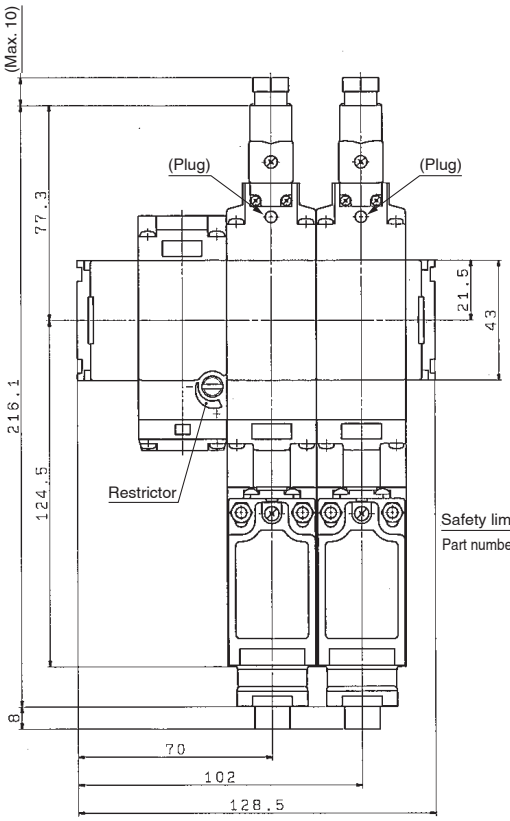
Dimensions

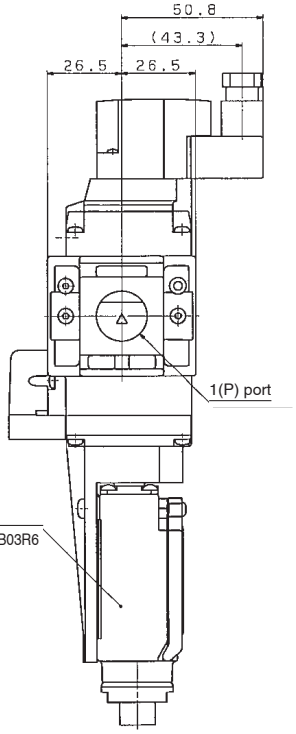
VP546□□-5□1-S1□-DS□

Safety limit switch
Made by Rockwell Automation

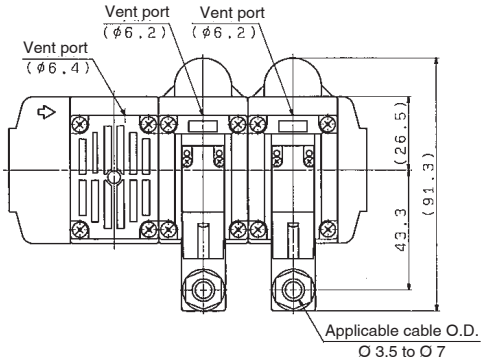




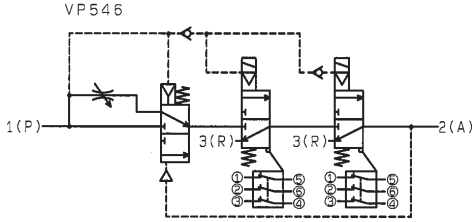


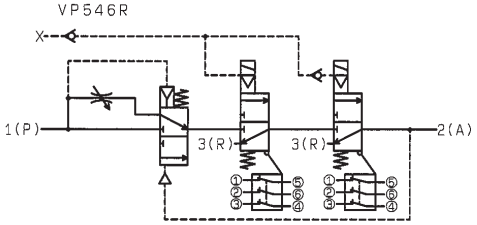


Safety limit switch
Part number: 440P-CDPB03R6



Symbol





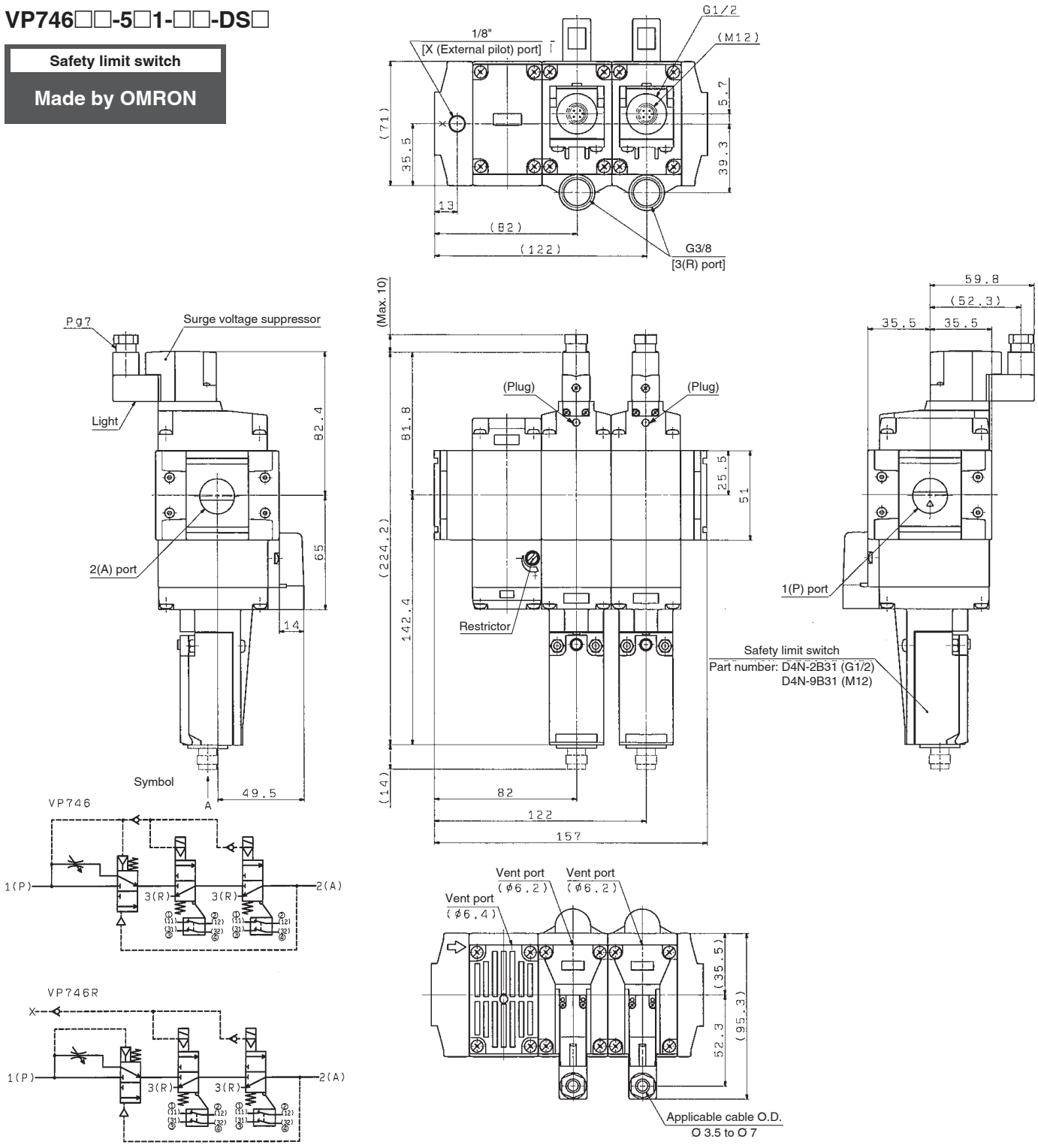
Pin Numbers (Built-in switch 3 N.C.)

M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

Dimensions

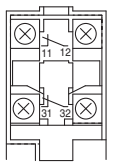
VP746□□-5□1-□□-DS□

Safety limit switch
Made by OMRON



Terminal/Pin Numbers (Built-in switch 2 N.C.)

M12 connector pin number	Wiring specification
①	
②	
③	
④	

G1/2 terminal number	Wiring specification
(11)	
(12)	
(31)	
(32)	

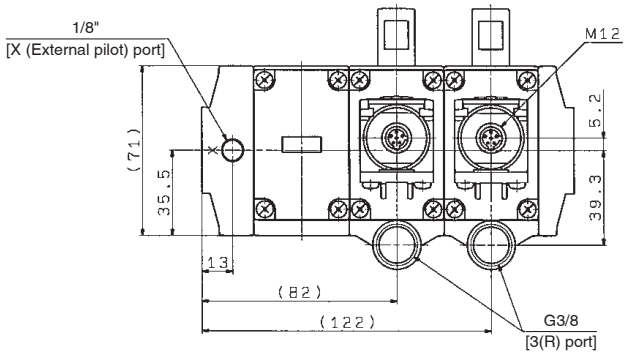
Crimped Terminals

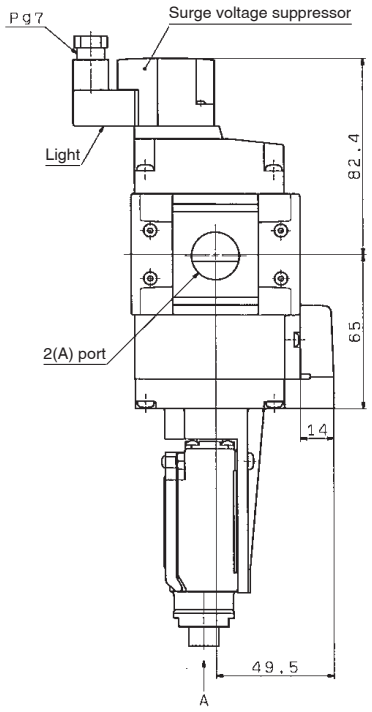
Wiring size
AWG20 (0.5 mm²)

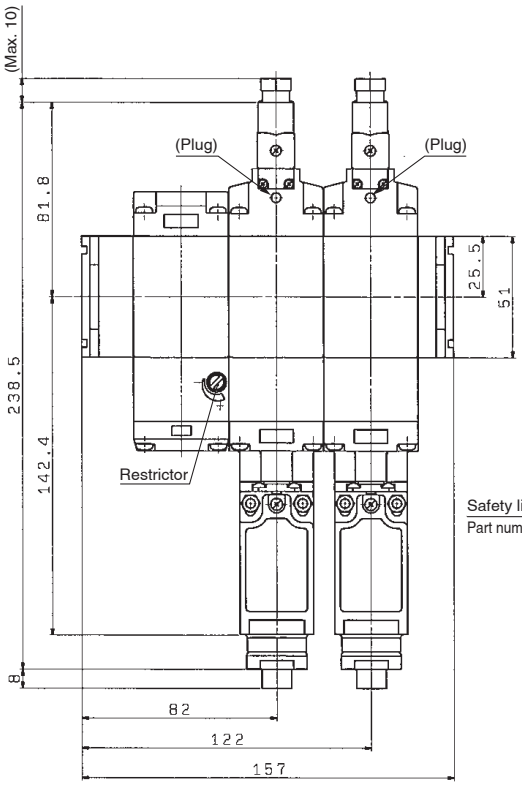
Dimensions

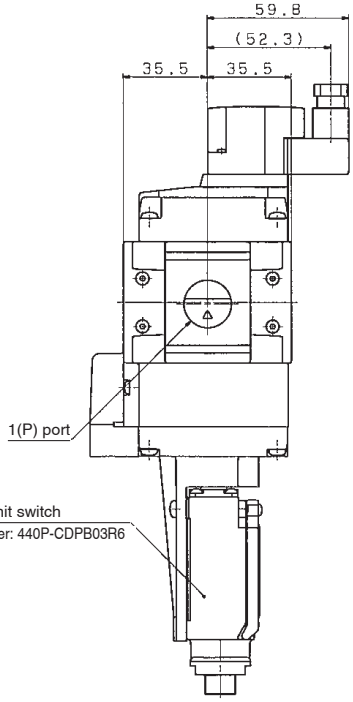
VP746□□-5□1-S1□-DS□

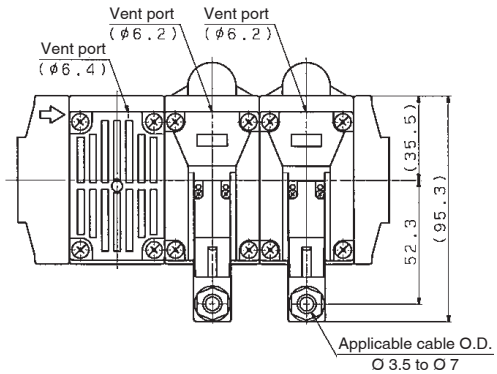
Safety limit switch
Made by Rockwell Automation











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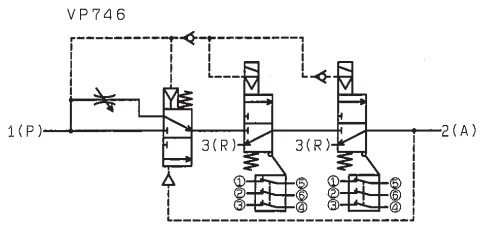

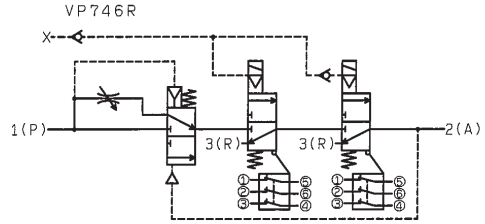

Pin Numbers (Built-in switch 3 N.C.)

M12 connector pin number	Wiring specification
① ⑤	
② ⑥	
③ ④	

⚠ 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.

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

1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
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. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

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.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.
Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

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