

V10

Features and Strengths

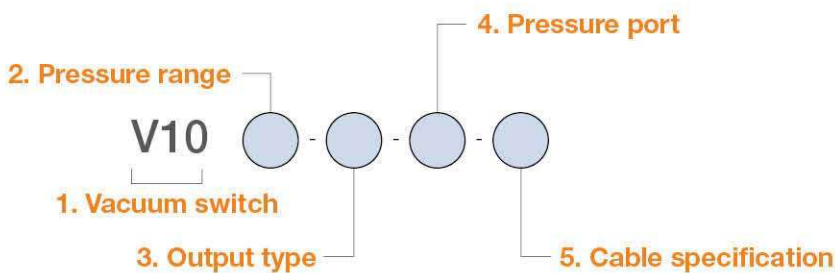
Converts an adjusted vacuum level to a digital output signal for pressure or vacuum
 NC in vacuum range 0 ~ -100 kPa
 NO in pressure range 0 ~ 300 kPa



Specifications

Model	V10	V10P
Setting pressure range	0.0 ~ -101.3 kPa	0 ~ 0.6 MPa
Withstand pressure	0.6 MPa	1.5 MPa
Fluid	Air, Non-corrosive / Non-flammable gas	
Power supply voltage	10.8 to 30V DC (include ripple voltage)	
Load current	80 mA max.	
Internal voltage drop	NPN / 0.8V, PNP / 0.8V	
Current consumption	10 mA max.	
Sensor type	NPN or PNP	
Output short circuit protection	Yes	
Setting method	Adjusting by VR	
Response time	Approx. 1 ms	
Repeatability	≤±1% F.S.	
Hysteresis	3% F.S. max.	
Indicator	Red LED turns ON	
Enclosure	IP 40	
Temperature characteristic	±3% F.S. of detected pressure (25°C) at temp. Range of 0 ~ 50°C (32 ~ 122°F)	
Ambient temp. range	Operation : 0 ~ 60°C (30 ~ 140°F), No condensation or freezing	
Ambient humidity. range	Operation / Storage : 35 ~ 85% RH (No condensation)	
Vibration	Total amplitude 1.5mm, 10Hz- 55Hz- 10Hz scan for 1minute, two hours each direction of X, Y and Z	
Piping method	Push-in tube or thread-in	
Lead wire	Oil-resistance cable, 3wires (0.18mm ²), 2.6mm, 3M	
Weight	Approx. *50g (with 3 meter lead wire)	

Build an Ordering No.



1. Vacuum switch	Description	Ordering No.
	Vacuum switch V10	V10
2. Pressure range	Description	Ordering No.
	Negative pressure (0 ~ -101.3 kPa)	Blank
	Positive pressure (0 ~ 0.6 MPa)	P
3. Output type	Description	Ordering No.
	NPN	01
	PNP	02
4. Pressure port	Description	Ordering No.
	1/8" PT, M5	F1
	1/8" NPT, M5	F2
	M5	F3
	Ø4mm tube	F4
	Ø6mm tube	F5
5. Cable specification	Description	Ordering No.
	Lead wire type (3m)	Blank
	M8-3pin male connector	C

VACUUM SWITCHES

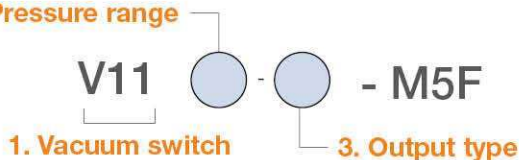
V11

I Specifications

Model		V11P	V11V	V11C
Rated pressure range		0.000 ~ 1.000 MPa	0.0 ~ 101.3 kPa	-100.0 ~ 100.0 kPa
Setting pressure range		-0.100 ~ 1.000 MPa	10.0 ~ 101.3 kPa	-101.0 ~ 101.0 kPa
Withstand pressure		1.5 MPa	500 kPa	500 kPa
Fluid		Filtered air, Non-corrosive / Non-flammable gas		
Set pressure resolution	kPa	-	0.1	0.1
	MPa	0.001	-	-
	Kgf/cm ²	0.01	0.001	0.001
	bar	0.01	0.001	0.001
	psi	0.1	0.01	0.01
	inHg	-	0.1	0.1
	mmHg	-	1	1
Power supply voltage		12 to 24V DC±10%, Ripple (P-P) 10% or less		
Current consumption		≤ 40mA (With no load)		
Switch output	Output type	2 NPN or 2 PNP open collector		
	Max. load current	125 mA		
	Max. supply voltage	30V DC (at NPN output), 24V DC (at PNP output)		
	Residual voltage	≤ 1.5V		
	Response time	≤ 2.5ms (chattering-proof function : 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selections)		
	Output short circuit protection	Yes		
Analog output	Voltage output	Voltage Impedance	1 ~ 5V (±2.5%) About 1Ω	
	Linearity	±1% F.S.		
Display	LED display	4 digit, 7 segment (red)		
	Switch ON indicator	OUT 1 red / OUT 2 green		
	Updates time	About 0.2s		
	Indicator accuracy	±2% F.S. ±1 digit (ambient temperature : 25±3°C)		
Repeatability (Switch output)		±0.2% F.S. ±1 digit		
Environment	Enclosure	IP40		
	Operation ambient temp. range	0 ~ 50°C		
	Storage ambient temp. range	-10 ~ 60°C (No condensation or freezing)		
	Ambient humidity range	35 ~ 85% RH (No condensation)		
	Withstand voltage	1000V AC in -1min (between case and lead wire)		
	Insulation resistance	500MΩ (at 500V DC, between case and lead wire)		
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-55Hz-10Hz scan for 1minute, two hours each direction of X, Y and Z		
	Shock	980m/s ² (10G), 3 times each in direction of X, Y and Z		
Temperature characteristic		±2% F.S. of detected pressure (25°C) at temp. Range of 0 ~ 50°C		
Port size		M5		
Lead wire		26AWG, UL AWM 20276, 1000mm		
Weight		34.5g (with 1 meter lead wire)		

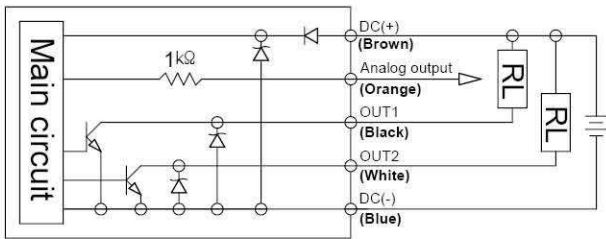
I Build an Ordering No.

2. Pressure range

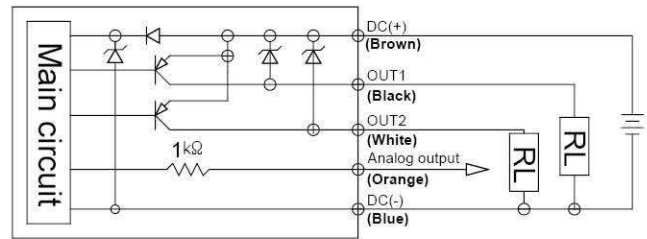


1. Vacuum switch	Description	Ordering No.
	Vacuum switch V11, Digital switch	V11
2. Pressure range	Description	Ordering No.
	Positive pressure	P
	Negative pressure	V
	Compound pressure	C
3. Output type	Description	Ordering No.
	2 NPN + Analog (voltage) output (1~5V)	010
	2 PNP + Analog (voltage) output (1~5V)	030

Circuit diagram



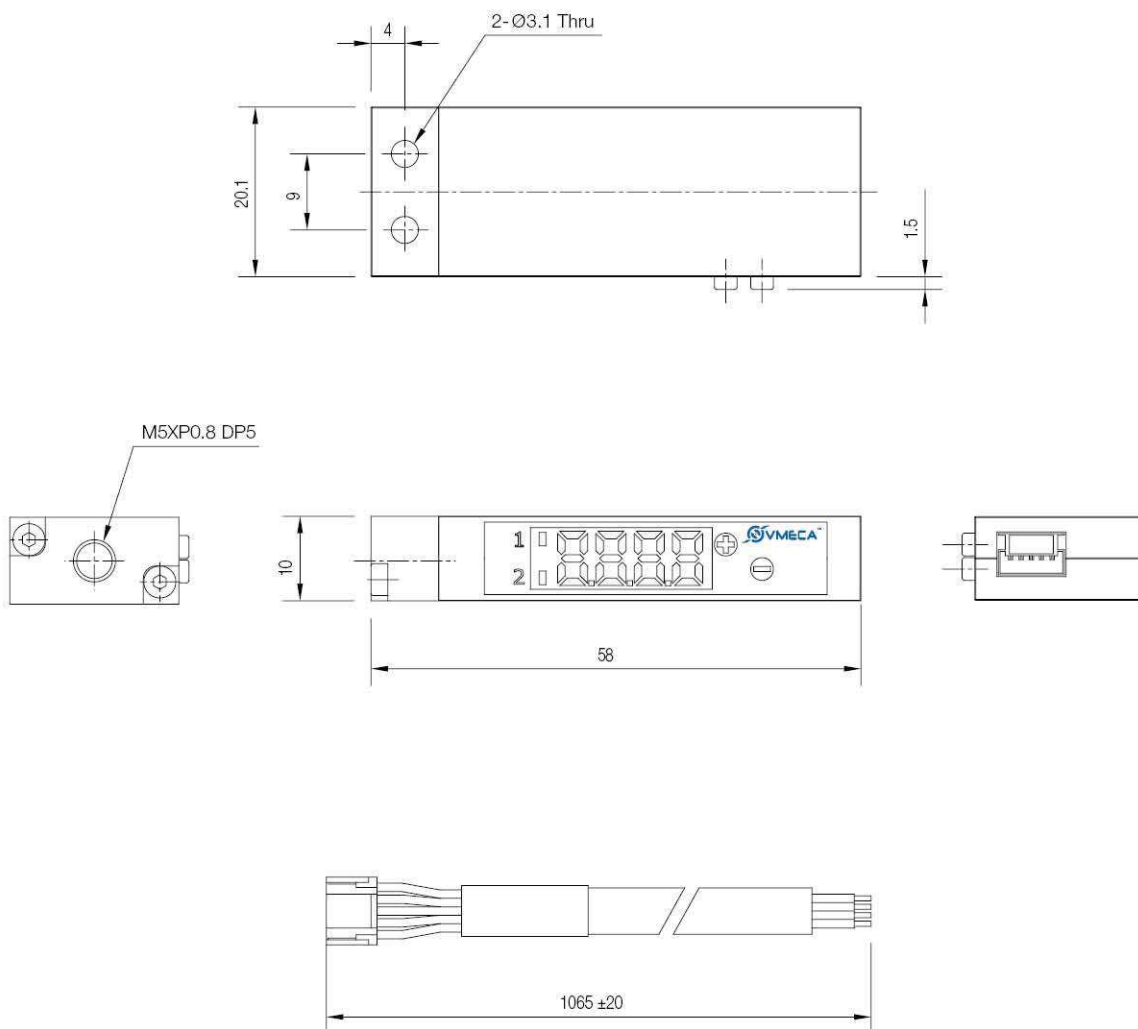
[NPN output + Analog output (1~5V)]



[PNP output + Analog output (1~5V)]

Dimensions

[Unit : mm]




VACUUM SWITCHES

V16

I Specifications

Model	V16 - PNP open collector	V16 - NPN open collector
Applicable fluid	Air, Non corrosive gases, Incombustible gases	Air, Non corrosive gases, Incombustible gases
Pressure range	-101.0 ~ 0 kPa	-101.0 ~ 0 kPa
Withstand pressure	300 kPa	300 kPa
Pressure port	1/8" PT, M5 female	1/8" PT, M5 female
Power supply voltage	12 ~ 24 VDC ±10%, Ripple (P-P) 10% or less	12 ~ 24 VDC ±10%, Ripple (P-P) 10% or less
Power consumption	Max. 21mA	Max. 25mA
Output	PNP : open collector 1output Max. load current : 80mA	NPN : open collector 2 output Max. load current : 80mA Max. supply voltage : 30VDC
Environment	Repeatability (switch output)	≤±1% F.S
	Response time	≤5ms
	Protection structure	IP40
	Operating ambient temp.(°C)	Operation : 0°C ~ 50°C (No condensation or freezing) Storage : -20°C ~ 60°C (No condensation or freezing)
	Operating humidity	Operation / Storage : 35 ~ 85% RH (No condensation)
	Vibration resistance	Total amplitude 1.5mm 10Hz scan for 1minute Two hours each direction of X, Y and Z
	Shock resistance	980 m/s ² (100G), 3 times each in direction of X, Y and Z
Temperature characteristic	≤±3% F.S. at temp. (25°C)	≤±3% F.S. at temp. (25°C)
Hysteresis mode	1 ~ 10% of setting pressure (Adjustable)	3% F.S. or less (Fixed)
Indicator	Light at ON(Red)	Light at ON (output 1 : Red, Output2 2 : Green)
Cable	Oil-resistance 3-core 1m lead wire	Oil-resistance 4-core 1m lead wire
Weight	50g (Including 1m lead wire)	

I Build an Ordering No.

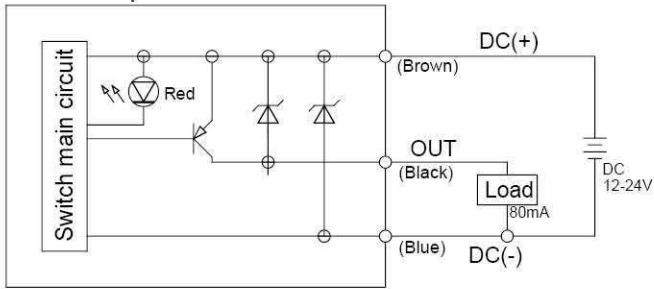
V16 - 1 - 

1. Vacuum switch 2. Output type

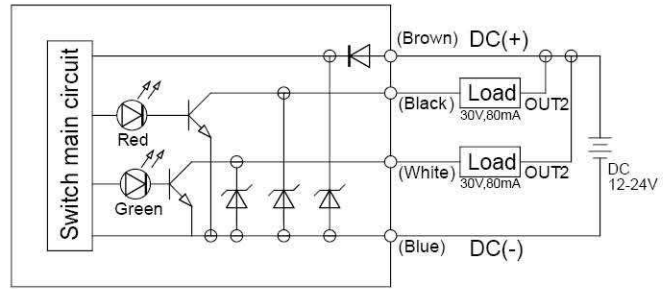


1. Vacuum switch	Description	Ordering No.
	Vacuum switch V16, Non-display	V16-1
2. Output type	Description	Ordering No.
	PNP open collector	02
	NPN open collector	03

Circuit diagram



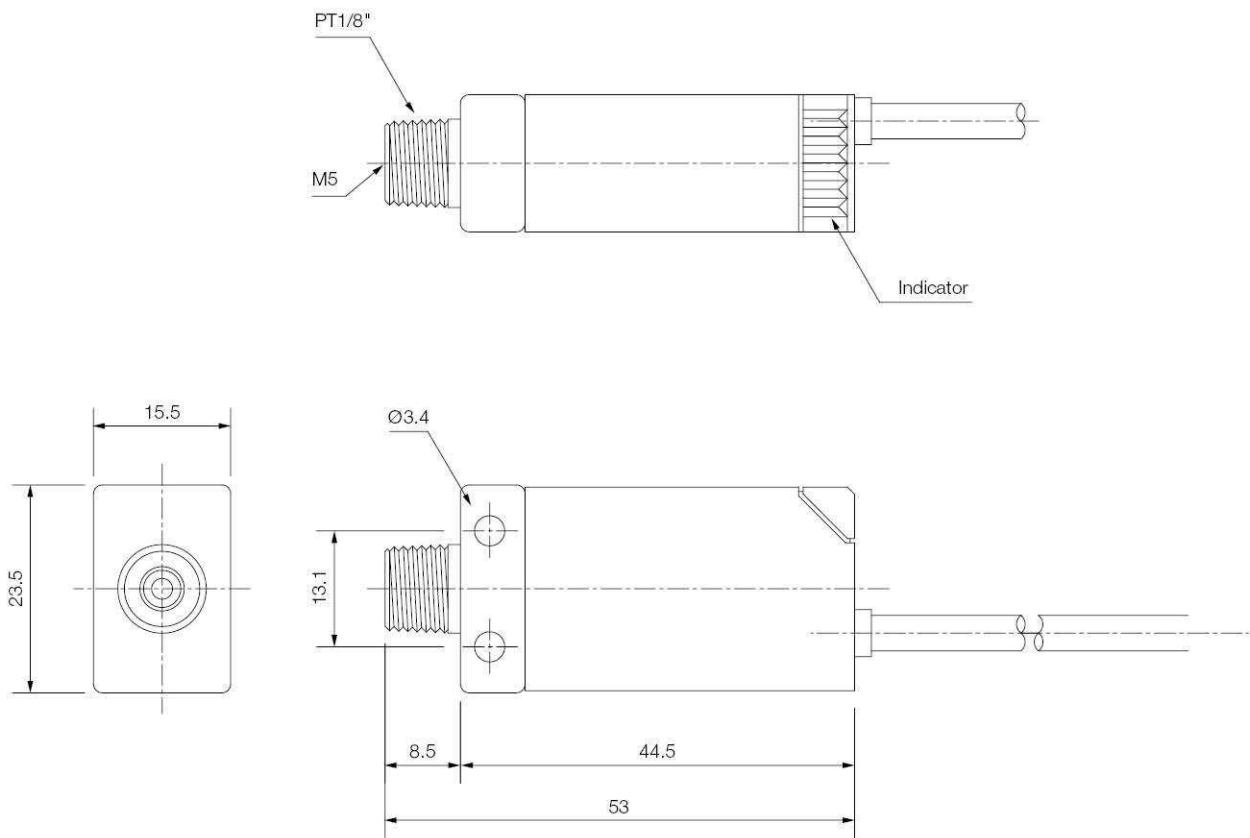
[V16 - 1 - 02 / PNP output]



[V16 - 1 - 03 / NPN output]

Dimensions

[Unit : mm]



VACUUM SWITCHES

V17

Features and Strengths

Converts adjusted vacuum levels to 2 separate digital outputs
 Digital vacuum level display
 Integrated cable with M8 connector included



Specifications

Model	V17 - PNP open collector	V17 - NPN open collector
Applicable fluid	Air, Non corrosive gases, Incombustible gases	Air, Non corrosive gases, Incombustible gases
Pressure range	-101.3 ~ 0 kPa	-101.3 ~ 0 kPa
Withstand pressure		
Pressure port	M5 female (Nylon material)	M5 female (Nylon material)
Power supply voltage	12 ~ 24 VDC $\pm 10\%$, Ripple (P-P) 10% or less	12 ~ 24 VDC $\pm 10\%$, Ripple (P-P) 10% or less
Power consumption	≤ 55 m A	≤ 55 m A
Output	PNP : open collector 2output Max. load current : 80mA Max. supply voltage : 24VDC Residual voltage : ≤ 1 V(load current 80mA)	NPN : open collector 2 output Max. load current : 80mA Max. supply voltage : 30VDC Residual voltage : ≤ 1 V(load current 80mA)
Analog output	Output voltage : $1 \sim 5$ V $\leq 2.5\%$ F.S (Within rated pressure range) Linearity : $\leq \pm 1\%$ F.S.	
Environment	Repeatability (switch output) Response time	$\leq \pm 0.2\%$ F.S. ± 1 digit ≤ 25 ms - Chattering-proof function : 24ms - 192 and 768ms selections
	Protection structure	IP40
	Operating ambient temp.($^{\circ}$ C)	Operation : 0° C ~ 50° C (No condensation or freezing) Storage : -20° C ~ 60° C (No condensation or freezing)
	Operating humidity	Operation / Storage : 35 ~ 85% RH (No condensation)
	Vibration resistance	Total amplitude 1.5mm 10Hz-55Hz-10Hz scan for 1minute Two hours each direction of X, Y and Z
	Shock resistance	980 m/s ² (100G), 3 times each in direction of X, Y and Z
Temperature characteristic	$\leq \pm 2\%$ F.S. of detected pressure (25° C) at temp. Range	
Hysteresis mode	Adjustable	Adjustable
Window comparator mode	Fixed (3digit)	Fixed (3digit)
Indicator accuracy	$\leq \pm 2\%$ F.S. ± 1 digi (ambient temp. : $25 \pm 3^{\circ}$ C)	
Cable	Oil-resistance cable (0.15mm ²)	

Build an Ordering No.

2. Output type

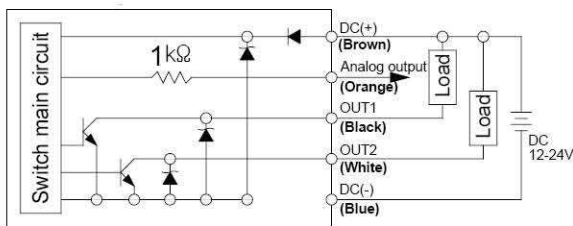


3. Analog output & Cable

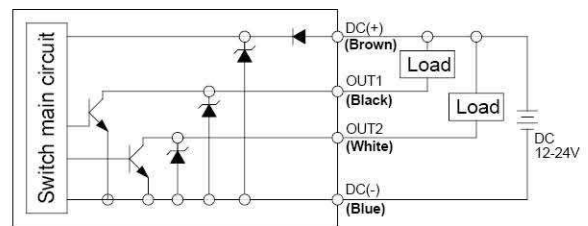
1. Vacuum switch

1. Vacuum switch	Description	Ordering No.
	Vacuum switch V17, LED-display	V17
2. Output type	Description	Ordering No.
	NPN open collector	Blank
	PNP open collector	P
3. Analog output & Cable	Description	Ordering No.
	No analog supply, M8 4-Pin male connector	C
	No analog supply, Grommet type 4-Core 2m lead wire	G
	Analog supply, Grommet type 5-Core 2m lead wire	GA

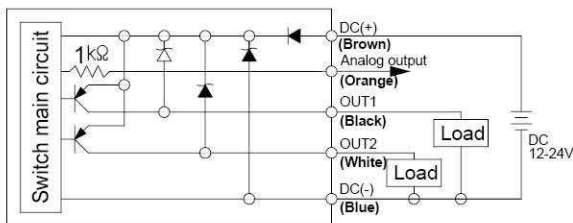
Circuit diagram



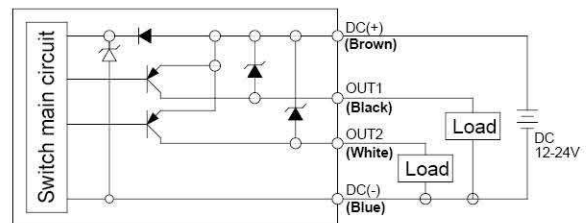
[V17-C & V17-G / NPN output]



[V17-GA / NPN output]



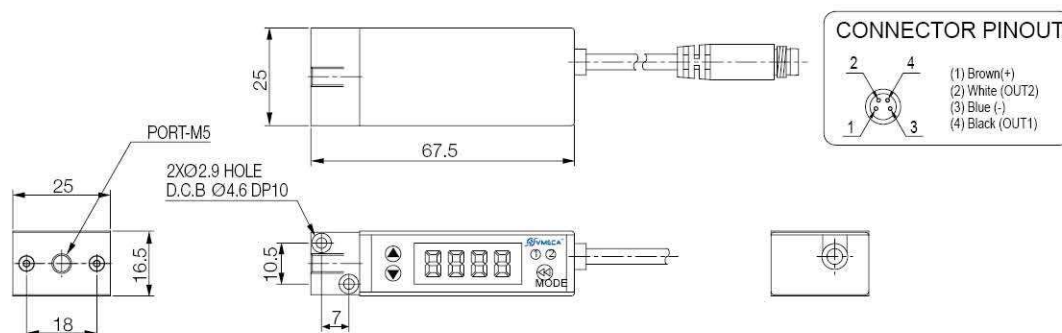
[V17-PG / PNP output]



[V17-PGA / PNP output]

Dimensions

[Unit : mm]



VACUUM SWITCHES

VP20

Features and Strengths

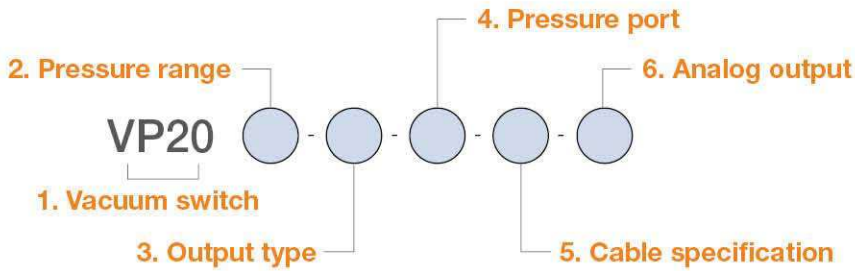
7 programmable vacuum units, for example kPa, inHg, mmHg, etc.
 Dual display allows actual and set value to be displayed at the same time
 Selectable "Key-Lock mode" with display indicator to avoid unauthorized changes
 Selectable "Power-Save mode" with display indicator
 Mounting brackets included



Specifications

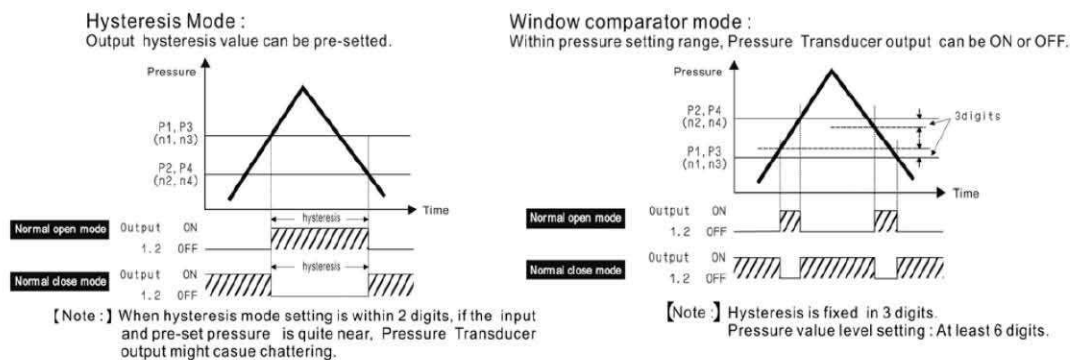
Model	VP20C	VP20V	VP20P
Applicable fluid	Non corrosive gases		
Pressure range	-100.0 ~ 100.0 kPa	0.0 ~ -101.3 kPa	0.000 ~ 1.000 MPa
Pressure proof force	3 time of rate pressure range		
Indicator resolution	0.1 kPa	0.1 kPa	0.01 MPa
Weight	135 g (with 2m lead wire)		
Material of pressure port	Zn die casting		
Power supply voltage	12 ~ 24 VDC $\pm 10\%$, Ripple (P-P) 10% or less		
Power consumption	55 mA or less		
Output	NPN or PNP open collector 2 outputs, Max. 80 mA		
Analog output (*Only for analog type)	Output voltage : 1 ~ 5V $\leq \pm 5\%$ (Within rated pressure range) Linearity : $\leq \pm 1\%$ F.S	Output voltage : 1 ~ 5V $\leq \pm 2.5\%$ (Within rated pressure range) Linearity : $\leq \pm 1\%$ F.S	
Repeatability	$\leq \pm 2\%$ F.S ± 1 digit		
Response time	≤ 2.5 ms (chattering-proof function : 24ms, 192ms and 768ms selections)		
Protection structure	IP 65		
Operating ambient temperature (°C)	Operation : 0°C ~ 50°C, Storage : -20°C ~ 60°C (No condensation freezing)		
Operating humidity	35 ~ 85% RH		
Temperature characteristic	$\leq \pm 2\%$ F.S of detected pressure (25°C) at temp. Range of 0°C ~ 50°C		
Vibration resistance	Total amplitude 1.5mm, 10Hz ~ 55Hz, -10Hz scan for 1 minute, two hours each direction of X, Y and Z		
Shock resistance	980m/s ² (100G), 3times each in direction of X, Y and Z		
Hysteresis	Hysteresis mode Window comparator	Adjustable Fixed (3digits)	
Indicator accuracy	$\leq \pm 2\%$ F.S ± 1 digit (ambient temperature : 25 ± 3 °C)		
Cable	Oil-resistance cable (0.15mm ²)		

Build an Ordering No.



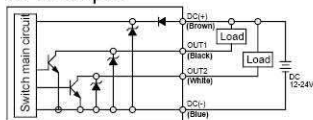
Ordering No.	Description	Ordering No.
1. Vacuum switch	Vacuum Switch, LED-Display	VP20
2. Pressure range	Compound pressure (-100.0 ~ 100.0 kPa)	C
	Negative pressure (-101.3 ~ 0 kPa)	V
	Positive pressure (0.00 ~ 1.00 MPa)	P
3. Output type	2 NPN output	01
	2 PNP output	03
4. Pressure port	1/8 PT	F1
5. Cable specification	2m Lead wire type	Blank
	M8-4 pin male connector	C
6. Analog output	No analog output	Blank
	Analog output : Only for wire type	A

Operating mode



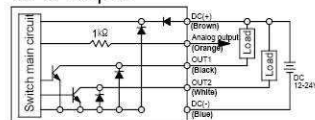
Circuit diagram and examples of connection

VP20□-01-□-□
NPN output



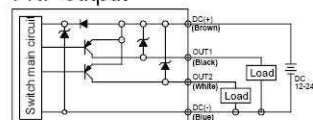
[NPN output]

VP20□-01-□-□-A
NPN output



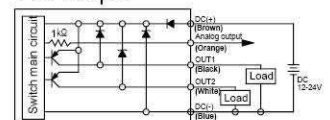
[NPN output with analog supply]

VP20□-03-□-□
PNP output



[PNP output]

VP20□-03-□-□-A
PNP output

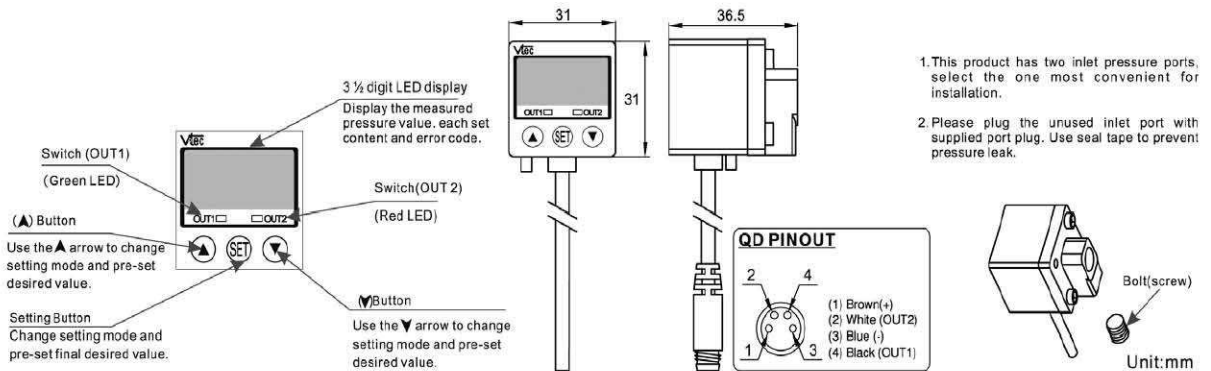


[PNP output with analog supply]

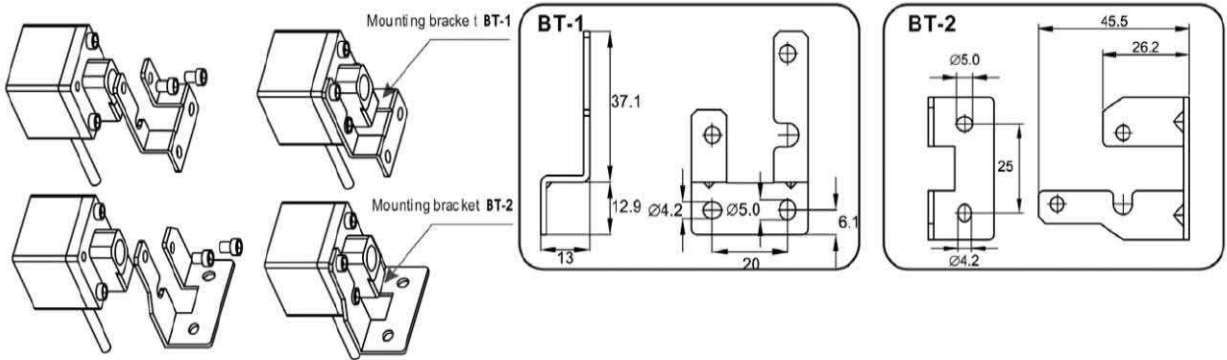
VACUUM SWITCHES

I Dimension

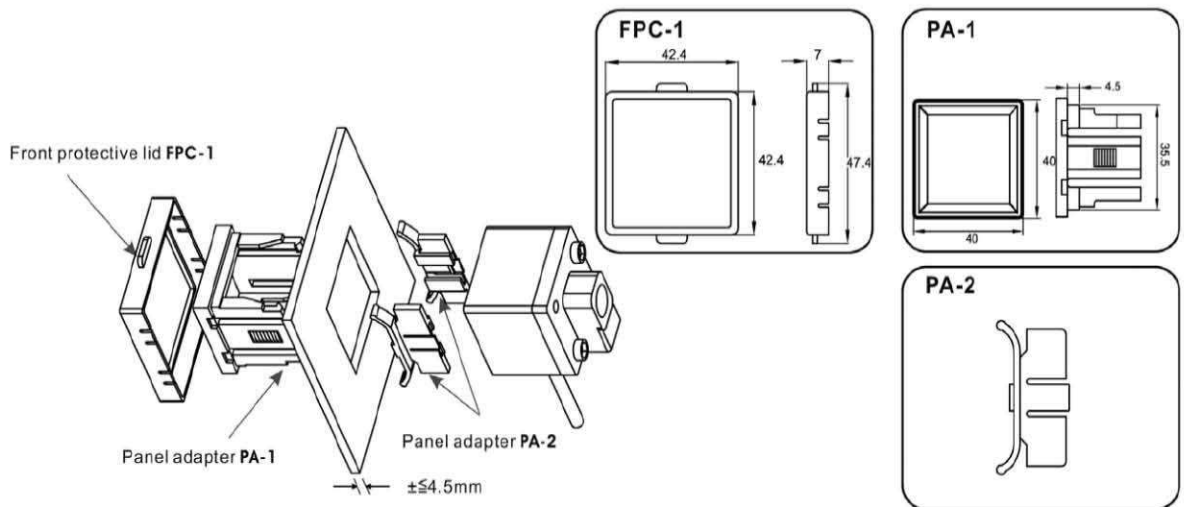
[Unit : mm]



[Body]



[Mounting bracket]



[Panel type]

VP30

Features and Strengths

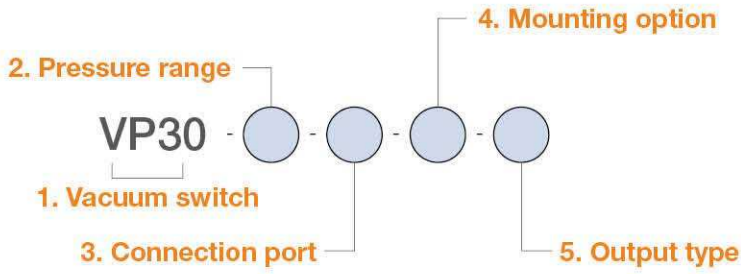
2 PNP outputs, NO or NC – Independently selectable for each output
 3-colour LCD display, easy readout
 7 programmable vacuum units, for example kPa, inHg, mmHg, etc.
 Dual display allows actual and set value to be displayed at the same time
 Selectable “Key-Lock mode” with display indicator to avoid unauthorized changes
 Selectable “Power-Save mode” with display indicator
 Mounting brackets included

Specifications

Model		VP30 (Compound)	
Pressure Measure	Range of measure	-100kPa	
	Setting range	-100kPa ~ 100kPa	
	Withstand pressure	-100kPa ~ 100kPa	
	Pressure type	Non-flammable, non-corrosive gas, gauge pressure measurement	
	Measure accuracy	≤±0.2% F.S.(Ambient temperature 25°C)	
	Temperature error	≤±0.3% F.S.(Temperature range 0~50°C)	
	Measure pattern	Hysteresis mode Compare mode of upper and lower bounds	
Port size		External R1/8, NPT1/8, G1/8 option, internal thread M5	
Display	Brief description	Double LCD display	
	Statue display	4-digital measurement value, unit display, output status display	
	Display model	Adjustable backlight, 4 groups of display models	
Voltage range		12~24VDC ±10%	
Power consumption		40mA Max(non-load)	
Output signal	Transistor output	NPN open-collector output Output current : 80mA MAX Voltage drop : ≤ 1V	PNP open-collector output Output current : 80mA MAX Voltage drop : ≤ 1V
	Analog output	Voltage output Signal amplitude : 1~5V Load resistance : ≥1KΩ	Current output Signal amplitude : 4~20mA Load resistance : ≤400Ω
	Response time	Adjustable : 2.5ms, 20ms, 100ms, 500ms, 1000ms, 2300ms	
	Short-circuit protection	Yes	
Environmental resistance	IP level	IP40	
	Ambient temperature	Operating temperature 0~50°C, storage temperature -20~60°C	
	Ambient humidity	Operation humidity 35~80%RH	
	Insulation voltage	1000VAC 1min	
	Insulation resistance	≥50KΩ(500VDC)	
	Shock	Max 100m/s ² , 3 times each in 6 directions of X, Y and Z	
Vibration	Amplitude 1.5mm, 10HZ~500HZ, 2hours each direction of X, Y and Z		

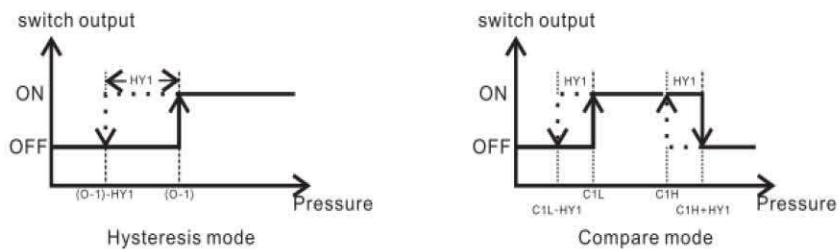
VACUUM SWITCHES

Build an Ordering No.

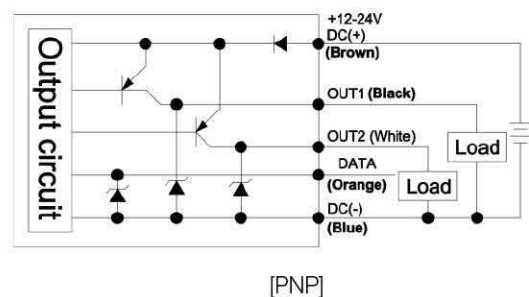
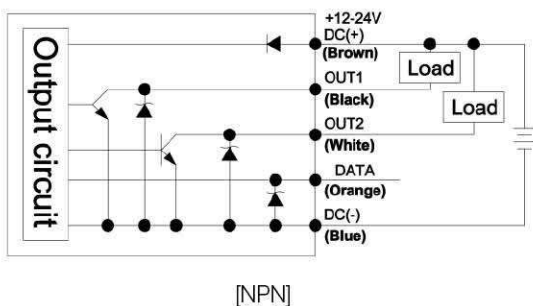


1. Vacuum switch	Description	Ordering No.
	Vacuum Switch, LED-Display	VP30
2. Pressure range	Description	Ordering No.
	Compound pressure (-100.0 ~ 100.0 kPa)	01
3. Connection port	Description	Ordering No.
	R1/8	R
	NPT 1/8	N
	G1/8	G
4. Mount option	Description	Ordering No.
	For panel installation	M
	For bracket installation	Z
5. Output type	Description	Ordering No.
	NPN	N
	PNP	P

Operating mode

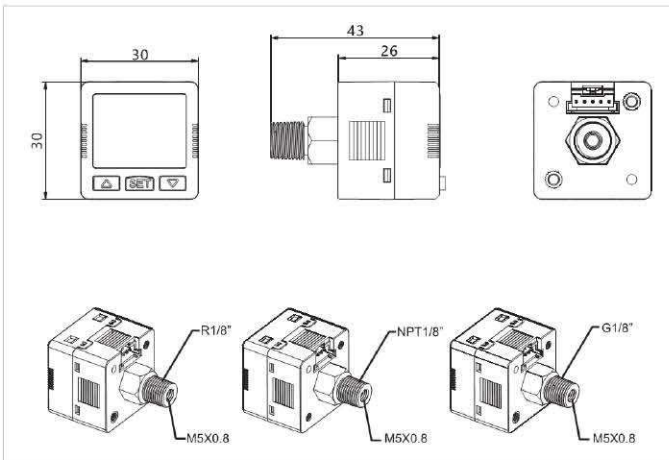


Circuit diagram and examples of connection

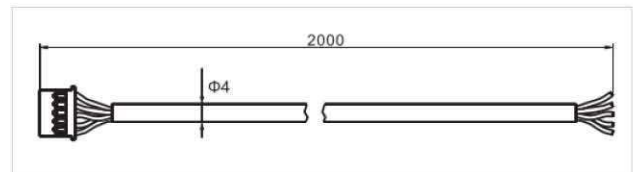


I Dimension – Basic Pump

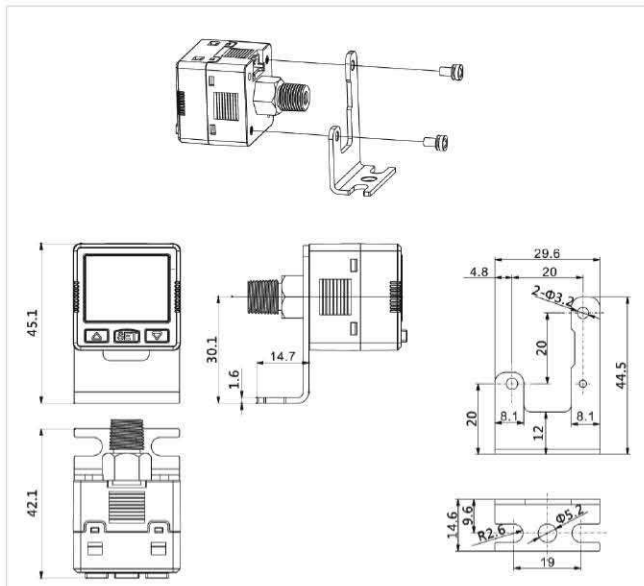
[Unit : mm]



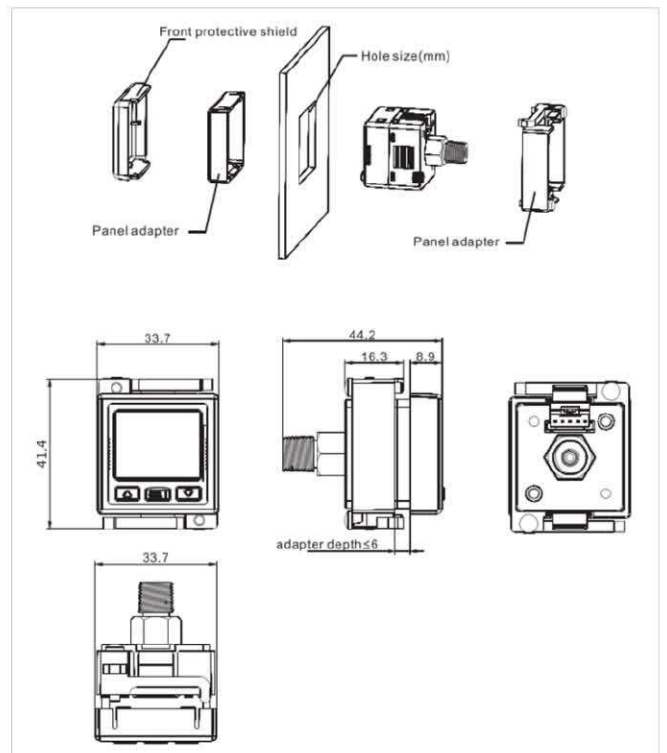
[Overall dimensions & connection port]



[Wire dimensions]



[Bracket mounting : Z]



[Panel mounting: M]

VACUUM SWITCHES

VP32

Features and Strengths

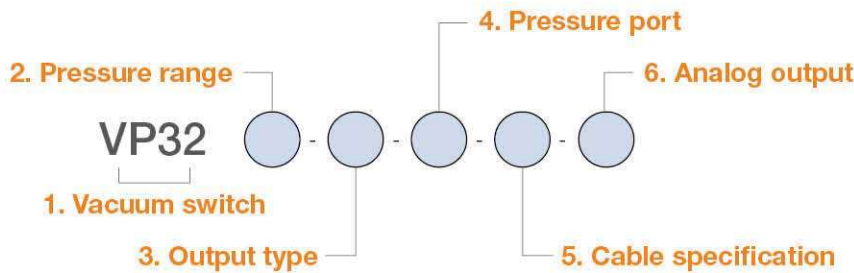
2 PNP outputs, NO or NC – Independently selectable for each output
 3-colour LCD display, easy readout
 7 programmable vacuum units, for example kPa, inHg, mmHg, etc.
 Dual display allows actual and set value to be displayed at the same time
 Selectable "Key-Lock mode" with display indicator to avoid unauthorized changes
 Selectable "Power-Save mode" with display indicator
 Mounting brackets included



Specifications

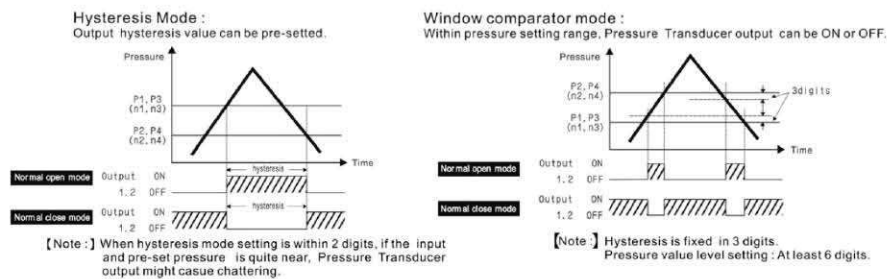
Model	VP32C	VP32V	VP32P
Applicable fluid	Air, Non corrosive gases, Incombustible gases		
Pressure range	-100.0 ~ 100.0 kPa	0.0 ~ -101.3 kPa	0.000 ~ 1.000 MPa
Withstand pressure	300 kPa		
Indicator resolution	kPa	0.1	-
	MPa	-	0.001
	Kgf / cm ²	0.001	0.01
	bar	0.001	0.01
	Psi	0.01	0.1
	inHg	0.1	-
	mmHg	1	-
Power supply voltage	12 ~ 24 VDC ±10%, Ripple (P-P) 10% or less		
Current consumption	≤ 40 mA (with no load)		
Switch output	NPN open collector Max. load current : 125mA Max. supply voltage : 30VDC Residual voltage : ≤ 1.5V (load current 125mA)	PNP open collector Max. load current : 125mA Max. supply voltage : 24VDC Residual voltage : ≤ 1.5V (load current 125mA)	
Analog output	Output Voltage : 1~5V ≤ ±2.5%F.S.(within rated pressure range) Linearity : ≤±1% F.S. Output impedance : 1kΩ		
Repeatability (Switch output)	≤±0.2% F.S. ±1digit		
Response time	≤2.5ms (chattering-proof function : 25ms,100ms, 250ms, 500ms, 1000ms, 1500ms selections)		
Output short circuit protection	Yes		
Indicator accuracy	One point set	Adjustable within 1~8 digits	
	Hysteresis mode	Adjustable within 1~8 digits	
	Window mode	Fixed (3 digits)	
Environment	Enclosure	IP40	
	Ambient temp. range	Operation : 0 ~ 50°C, Storage : -10 ~ 60°C (No condensation or freezing)	
	Ambient humidity range	Operation/ Storage : 35~85% RH (No condensation)	
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-150Hz-10Hz scan for 1 minute, hours each direction of X, Y and Z	
	Shock	1000 %g (10G), 3 times each indirection of X,Y and Z	
Temperature characteristic	≤±2% F.S of detected pressure (25°C) at temp. range 0~50°C		
Port size	PT 1/8" male, M5		
Lead wire	F1: 1/8" PT, M5		
Weight	Approx. 80g (with 2M lead wire), Approx. 45g (with male connector)		

I Build an Ordering No.



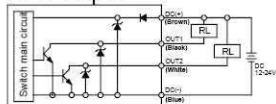
1. Vacuum switch	Description	Ordering No.
	Vacuum Switch, LED-Display	VP32
2. Pressure range	Description	Ordering No.
	Compound pressure (-100.0 ~ 100.0 kPa)	C
	Negative pressure (-101.3 ~ 0 kPa)	V
	Positive pressure (0.00 ~ 1.00 MPa)	P
3. Output type	Description	Ordering No.
	2 NPN output	01
	2 PNP output	03
4. Pressure port	Description	Ordering No.
	PT1/8" male, M5 female	F1
5. Cable specification	Description	Ordering No.
	2m Lead wire type	Blank
	M8-4 pin male connector	C
6. Analog output	Description	Ordering No.
	No analog output	Blank
	1 ~ 5V Analog output : <i>only for wire type</i>	A

I Operating mode

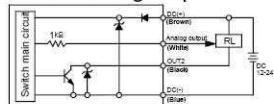


I Circuit diagram and examples of connection

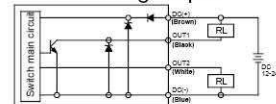
VP32□-01-F1-□
NPN output



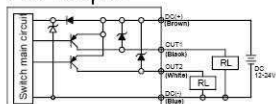
VP32□-01-F1-□-A
NPN +Analog output



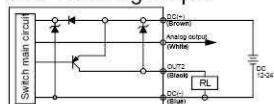
VP32□-01-F1-□-A1
NPN +Analog output



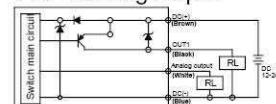
VP32□-03-F1-□
PNP output



VP32□-03-F1-□-A
PNP +Analog output



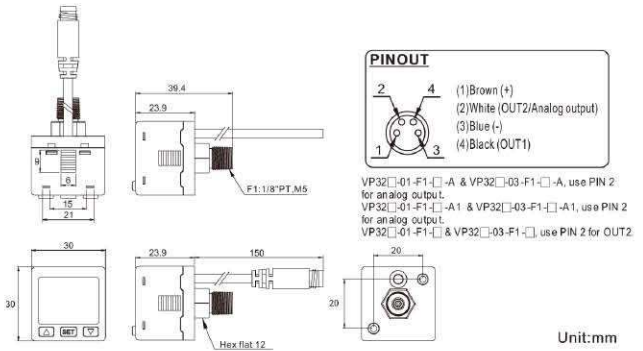
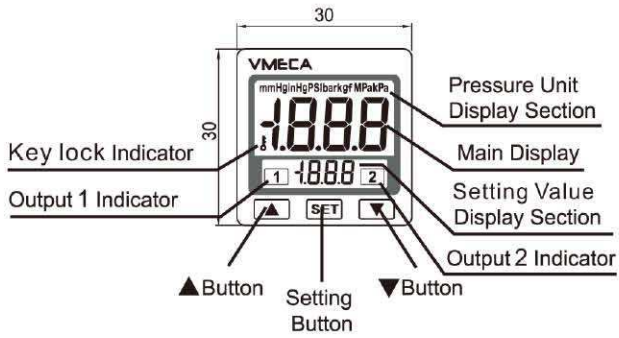
VP32□-03-F1-□-A1
PNP +Analog output



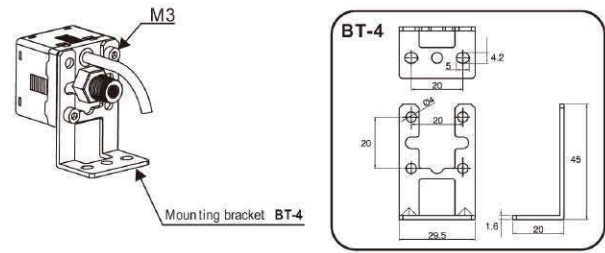
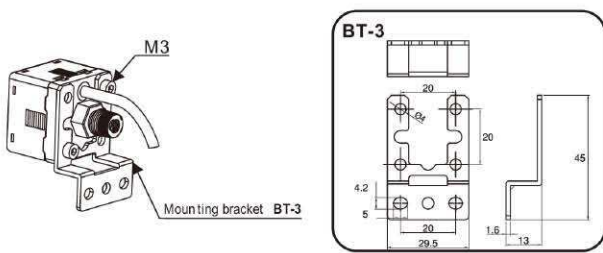
VACUUM SWITCHES

Dimension

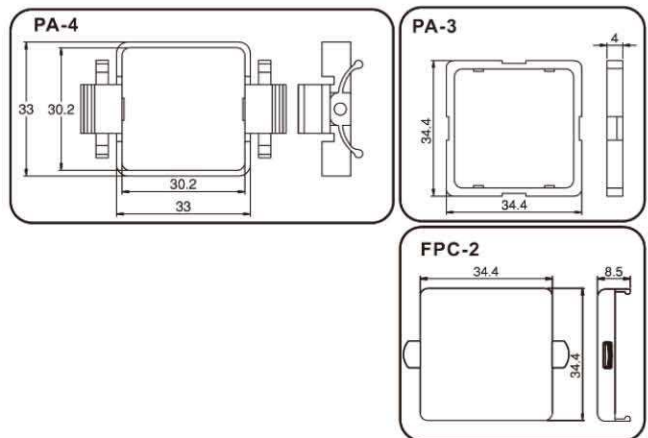
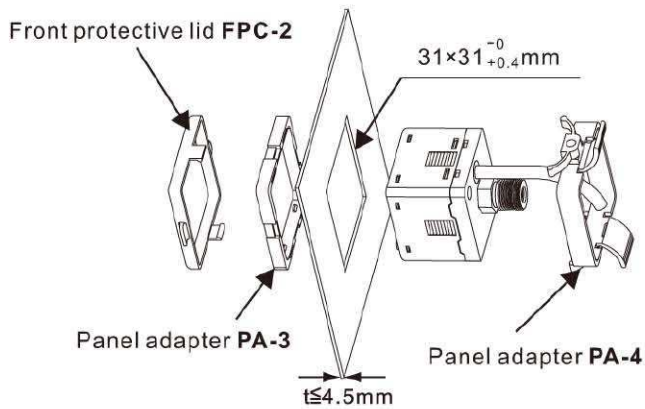
[Unit : mm]



[Body]



[Mounting bracket]



[Panel type]

Pneumtical Vacuum Switches

Features and Strengths

These switches are used to convert a vacuum signal into a pneumatical signal, e.g. for use with an air saving kit. The switch uses a vacuum actuated membrane to operate a pressure Air 3/2 way valve. The level at which the pressure Air valve will operate can be adjusted using the lockable screw. Two options of valve are available a normally closed version or a normally open version.



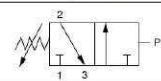
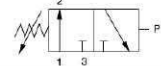
Specifications

Type	VPS-01	VPS-02
Output function	NC (Normal Closed)	NO (Normal open)
Pressure (bar)	1.5 ~ 8	1.5 ~ 8
Single range (-kPa)	15 ~ 95	10 ~ 95
Hysteresis (kPa)	12	3
Temperature (°C)	-10 ~ +60	-10 ~ +60
Weight (g)	69	69
Vacuum connection	G1/8"	G1/8"

Build an Ordering No.



1. Vacuum switch 2. Function

Function	Adjustable
NC (normally closed)	
NO (normally open)	

1. Vacuum switch	Description	Ordering No.
	Pneumatical vacuum switch, G1/8" inlet threads	VPS
2. Function	Description	Ordering No.
	Normally closed	01
	Normally open	02

Dimensions

[Unit : mm]

