Quick-fitting Type Ejector

Vacuum Gererator VK

Features

- Air supply solenoid valve can be selected from Normally-open or Normally-closed.
- A wide-ranging combinations of modulized units enable the user to choose the optimum unit combination suitable for the exact use.
- With the stand-alone type, two types of piping, double-side type (VKA) and single-side type (VKB) are available. With manifold type, vacuum port can be chosen from either the side or upper plane.
- Two types of vacuum switchs, the pressure sensor type with digital display and the lowcost, easy-to-use mechanical type, are available for choice.
- For the vacuum release valve, the solenoid valve type and the air-timer type are available for choice. Since each type has a built-in switching valve, vacuum release air blowing in a short period of time is possible, while considerations are also given to fine adjustment of release air.
- Directions of pulling out lead wires are concentrated on one side, greatly simplifying wiring layout. Also, both the solenoid valve and the sensor's lead wires are of the connector mode.
- The pilot system is adopted for the supply and vacuum release solenoid valves, with the supply power source of 24VDC or 100VAC.
- 4 types of nozzle diameters, 05, 07, 10, 12, are standard features.
- The silenser and filter elements can be replaced with ease.
  (For both the stand-alone and manifold types.)
- Pin type cartridge method adopted for connection of the tube fitting with the main body makes tube fitting replacement easy in the event of a trouble.
- Joint of stand-alone type can be selected from straight ϕ4, ϕ6, and ϕ8 at air supply port, ϕ4, ϕ6, and ϕ8 at vacuum port, and ϕ8 at concentrated exhaust.
- Joint of mainfold type can be selected from staight ϕ6, ϕ8, ϕ10, ϕ12 and elbow ϕ8, ϕ10, ϕ12 at air supply port, straight ϕ8, ϕ10, ϕ12, ϕ16, Rcϕ1/4, Rcϕ3/8, Rcϕ1/2, silencer and elbow ϕ8, ϕ10, and ϕ12 at exhaust port, and ϕ4, ϕ6, ϕ8 at vacuum port.
- The manifold-type silencer has been made times greater in capacity than conventional VD's, there by coping with growing exhaust air resistance resulting from increase in the number of manifolds.
- Increased use of plastic resins has made 2 part much lighter in weight than conventional products.
- Products special-made to the users' particular specifications can be provided.
- Color choice from either black or Ivory.

Note: Vacuum Generator VD Type is not compatible with Vacuum Generator VK Type in fitting dimensions and parts.

Air supply pressure specification

Fluid admitted	Air	
Service pressure range	35~100psi	0.25~0.7MPa
Service temperature range	41~122°F	5~50°C
Lubrication	Not required	

Ejector characteristics

Model	Nozzle dia.	Air supply pressure MPa(psi)	Final vacuum -KPa(-in. Hg)	Suction flow Nℓ/min(SCFM)	Air consumption Nℓ/min(SCFM)	Nozzle set replacement, Unit ordering code
VK□H05···	0.5mm (0.02in.)	0.5(72.5)	91(26.8)	7(0.25)	11.5(0.40)	VK HN05
		0.35(50.8)	73(21.6)		9(0.32)	
VK□L05···		0.5(72.5)	67(19.7)	11(0.39)	11.5(0.40)	VK LN05
VK□H07···	0.7mm (0.028in.)	0.5(72.5)	93(27.6)	13(0.46)	23(0.80)	VK HN07
		0.35(50.8)	73(21.6)		17(0.60)	
VK□L07···		0.5(72.5)	67(19.7)	26(0.91)	23(0.80)	VK LN07
VK□E07···		0.35(50.8)	91(26.8)	10.5(0.37)	17(0.60)	VK EN07
VK□H10···	1.0mm (0.039in.)	0.5(72.5)	93(27.6)	27(0.95)	46(1.61)	VK HN10
		0.35(50.8)	73(21.6)		34(1.19)	
VK□L10···		0.5(72.5)	67(19.7)	40(1.40)	46(1.61)	VK LN10
VK□E10···		0.35(50.8)	91(26.8)	21(0.74)	34(1.19)	VK EN10
VK□H12···	1.2mm (0.047in.)	0.5(72.5)	93(27.6)	38(1.33)	70(2.45)	VK HN12
		0.35(50.8)	73(21.6)	36(1.26)	47(1.64)	
VK□L12···		0.5(72.5)	67(19.7)	50(1.75)	70(2.45)	VK LN12
VK□E12···		0.35(50.8)	91(26.8)	27(0.95)	47(1.64)	VK EN12

Note: Secure pressure supply as listed above when the vacuum generator is in operation.
(Take pressure drop into account.)

Solenoid valve (vacuum generator, vacuum breaker)

Construction	Vacuum generator solenoid valve(Code···S)		Vacuum breaker solenoid valve(Code···R)	
Rated voltage	DC 24V	AC 100V	DC 24V	AC 100V
Allowable voltage range	DC 21.6~26.4V (DC 24V±10%)	AC 90~110V (AC 100V±10%)	DC 21.6~26.4V (DC 24V±10%)	AC 90~110V (AC 100V±10%)
Surge limit circuit	Diode	Bridge diode	Diode	Bridge diode
Power consumption	1.2W	–	1.2W	–
Operation type	Pilot-type			
Insulation	B type equivalent			
Manual operation	Push-type non-Lock			
Operation Indication	Red LED lights up during coil excitation			
Wiring method and lead wire length	Connector : 300mm			
Proof pressure	1.03MPa (149psi)			
Stand-by valve position	N.C	N.O	N.C	N.O	N.C
Effective cross-sectional area	3.5mm² (0.1897 Cv)	3.5mm² (0.1897 Cv)	3.5mm² (0.1897 Cv)	3.5mm² (0.1897 Cv)	0.6mm² (0.03252 Cv)

Lead wire color

Air supply solenoid valve alone		Combination of air supply and vacuum breaker solenoid valves	
DC 24V	AC 100V	DC 24V	AC 100V
Red (+) Black (-)	Blue	Black (- : Air supply solenoid valve) Red (+ : common) White (- : Vacuum breaker solenoid valve)	White (common) Blue (Air supply solenoid valve) Black (Vacuum breaker solenoid valve)

Vacuum switch with digital Display

Specification	Negative pressure
Set value at shipment	H, E type: -53KPa(-15.7in. Hg) (N.O.), L type: -40KPa(-11.8in. Hg) (N.O.)
Current consumption	NPN open collector : max. 30mA PNP open collector : 40mA
Pressure sensing method	Diffused semiconductor pressure switch
Service pressure range	-0.1MPa (0~-29.9in. Hg)
Pressure setting range	-0.1MPa (0~-29.9in. Hg)
Proof pressure	0.2MPa (29psi)
Storage temperature range	-20~70°C(-4~158°F)
Service humidity range	35~95%RH(No freezing)
Power supply	DC12~24V±10% Ripple(P-P)5%or below
Protective structure	IEC standard P40 Equivalent
No. of pressure setting	1
Operation accuracy	±3%F.S.max (at Ta=25°C(77°F))
Hysterisis	0.5~10%F.S.(Adjustable by hysterisis)
Switch output	NPN open collector output 28V 80mA max Residual voltage1V or below PNP open collector output Current voltage 80mA max Residual voltage1V or below
Response	2m sec max
Indication	2·1/2 digit LCD Display Measured pressure (MEAS) or Set pressure (SET) (Selectable by switch)
No. of Indication	About 4 / 1 sec
Indication accuracy	±3%F.S.±2 digit
Operation indication	LED ON above set pressure in N.O. LED OFF above set pressure in N.C.
Function	1.Indication selector switch (MEAS or SET) 2.Output selector switch (N.O. or N.C.) 3.Hysterisis setting trimmer (0.5~10%F.S.by 2/3 turn trimmer) 4.Pressure setting trimmer (2/3 turn trimmer)

Vacuum maintaining system

(Combination : B, D, F, H, K, M, S, T, W)

Vacuum leakage tolerance	1.3KPa(0.39in. Hg) /10 min or below

Secure the above specificatin when vacuum is maintained over a long time.

Mechanical Vacuum Switch

Pressure sensing mode	Diaphram-microswitch
Pressure setting range	-20.0~-80.0KPa(-5.9~-23.6in. Hg)
Setting method	Continuos by nut rotation
Switch terminal	Common, NO, NC
Accuracy	±4.0KPa(1.2in. Hg)
Hysterisis	5.3~10.7KPa(1.6~3.1in. Hg)
Microswitch	QJ Type (AM8100) Matsushita or J-7 OMRON
Microswitch rate	7A 250V AC

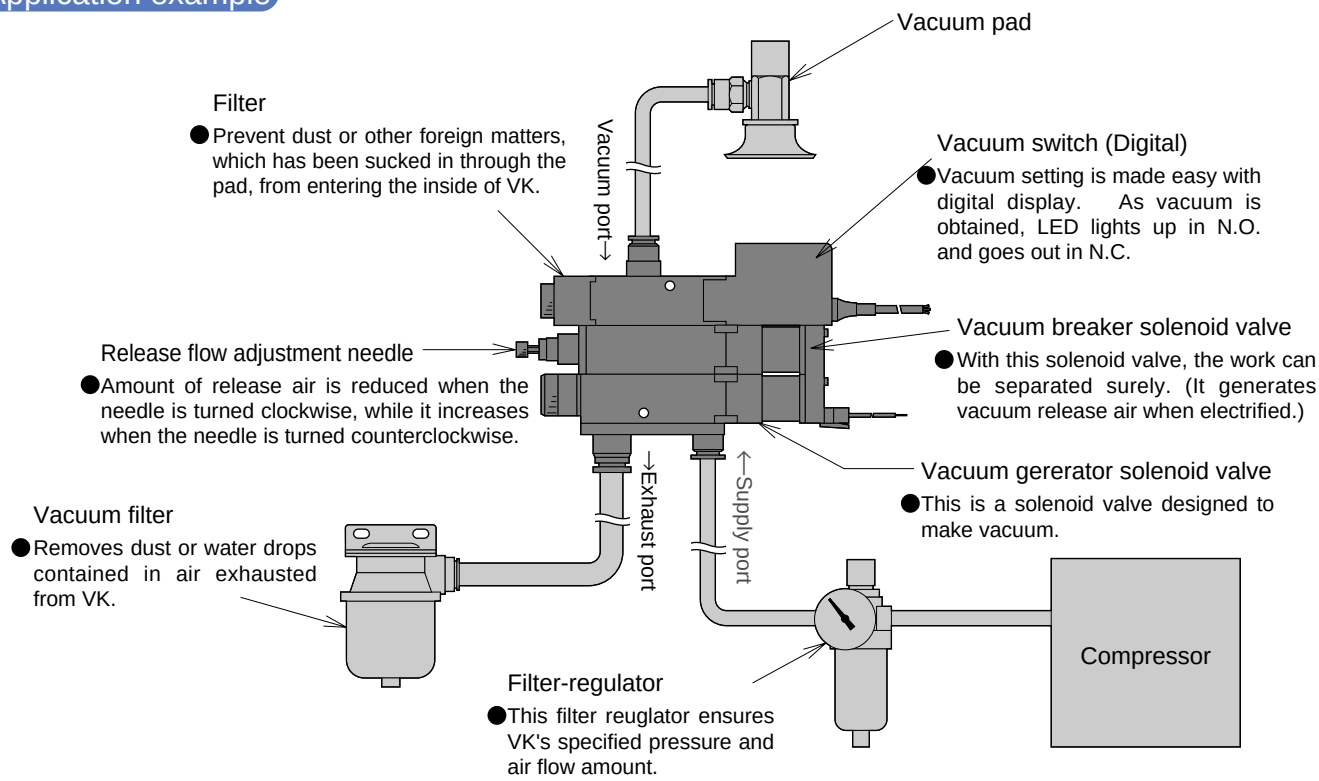
Air-timer type vacuum breaker

Construction	Delay by timer cylinder, poppet-type, 2-way valve
Breaking time	0.3~3 sec.after vacuum generator solenoid valve shutoff
Breaking air flow	0~40Nℓ/min(0~1.40SCFM)[Supply pressure 0.5MPa(72.5psi)]
Time setting method	Control by speed controller of timer cylinder

Filter

Element material	Polyvinyl formal
Filtering accuracy	10μm
Filter area	1130mm² (1.75in.²)
Replacement element ordering code	VGFE 10

Application example



Usage notes

⚠Caution

- ■Do not use the VK beyond its service temperature range of 5°C (41°F) to 60°C (140°F) (no freezing).
- ■Compressed air contains a lot of drain (water, oxidized oil, tar, foreign matter). Since drain can extremely deteriorate the performance of VK, try to enhance air quality by dehumidifying with an after cooler/dryer.
- ■Do not use an oiler.
- ■Rust and the like inside the piping can cause malfunction. So provide a max.5μm filter right in front of the supply port.
- ■Do not use VK in places where there is corrosive gas or inflammable gas. Also, never use it as fluid.
- ■Take care not to inhale dust, salt or iron powder.
- ■When vacuum is being made, do not put the vacuum release solenoid valve into operation.

Model Designation (example)

VK **A** (1) **H** (2) **07** (3) **W** (4) - **06** (5) **06** (6) **08** (7) **E** (8) - **B** (9) (10) **-PNP** (11)

(1)Port position

A : Stand-alone type Double connection ports
B : Stand-alone type single connection port
M : Manifold type

(2)Vacuum characteristics

H : High Vacuum Medium flow type
L : Medium Vacuum Lange flow type
E : High Vacuum Small flow type
NO code : Manifold alone

(3)Nozzle diameter

Code	Size	H type, vacuum, suction flow	L type, vacuum, suction flow	E type, vacuum, suction flow
05	0.5mm (0.02in.)	-26.8in. Hg(-91KPa) 0.25SCFM(7Nℓ/min)	-19.7in. Hg(-67KPa) 0.39SCFM(11Nℓ/min)	—
07	0.7mm (0.028in.)	-27.6in. Hg(-93KPa) 0.46SCFM(13Nℓ/min)	-19.7in. Hg(-67KPa) 0.91SCFM(26Nℓ/min)	-26.8in. Hg(-91KPa) 0.37SCFM(10.5Nℓ/min)
10	1.0mm (0.039in.)	-27.6in. Hg(-93KPa) 0.95SCFM(27Nℓ/min)	-19.7in. Hg(-67KPa) 1.40SCFM(40Nℓ/min)	-26.8in. Hg(-91KPa) 0.74SCFM(21Nℓ/min)
12	1.2mm (0.047in.)	-27.6in. Hg(-93KPa) 1.33SCFM(38Nℓ/min)	-19.7in. Hg(-67KPa) 1.75SCFM(50Nℓ/min)	-26.8in. Hg(-91KPa) 0.95SCFM(27Nℓ/min)

*Air supply pressure is 0.5MPa (71.1psi) for H and L types or 0.35MPa (49.8psi) for E type.

No code : Manifold alone

(4)Combination(18 type)

Code	Filter	Vacuum generator solenoid valve	Check valve	Mechanical Vacuum switch	Electrical vacuum switch with digital display	Air-timer type vacuum breaker valve	Solenoid valve type vacuum breaker valve
A	○	-	-	-	-	-	-
B	○	-	○	-	-	-	-
C	○	-	-	○	-	-	-
D	○	-	○	○	-	-	-
E	○	-	-	-	○	-	-
F	○	-	○	-	○	-	-
G	○	○	-	-	-	-	-
H	○	○	○	-	-	-	-
J	○	○	-	○	-	-	-
K	○	○	○	○	-	-	-
L	○	○	-	-	○	-	-
M	○	○	○	-	○	-	-
P	○	○	-	-	-	○	-
Q	○	○	-	○	-	○	-
R	○	○	-	-	○	○	-
S	○	○	-	-	-	-	○
T	○	○	-	○	-	-	○
W	○	○	-	-	○	-	○

No code : Manifold alone

(5)Vacuum port (Tube dia.)

■Stand-alone type

Code	04	06	08	5/32	1/4	5/16
dia.	ϕ4mm	ϕ6mm	ϕ8mm	ϕ3.97mm	ϕ6.35mm	ϕ7.94mm

*ϕ4mm is only for nozzle dia. 0.5 and 0.7mm.

■Manifold type (VKM)

Port position	Side (Straight)(mm)				Top (Straight)(mm)		
Code	S4	S6	S8	PP	T4	T6	T8
Size	ϕ4	ϕ6	ϕ8	Stopper	ϕ4	ϕ6	ϕ8

Port position	Side (Straight)(inch)				Top (Straight)(inch)		
Code	S5/32	S1/4	S5/16	PP	T5/32	T1/4	T5/16
Size	5/32	1/4	5/16	Stopper	5/32	1/4	5/16

00 : Applycable to a manifold installation top-mounting unit alone, with theport to be installed on the side. Applycable to model designation for manifold alone and when the number of manifold for the port differs even by one.

*Refer to the attached Manifold Type reference chart to select the port position. (P.415)

(6)Air supply port

■Stand-alone type

Code	04	06	08	5/32	1/4	5/16
dia.(mm)	ϕ4	ϕ6	ϕ8	ϕ3.97	ϕ6.35	ϕ7.94

*ϕ4mm is only for nozzle dia. 0.5 and 0.7mm.

■Manifold type

Port type		Straight (mm)				Elbow (mm)		
Code	R side	16	18	10	12	48	40	42
	Both side	26	28	20	22	58	50	52
	L side	36	38	30	32	68	60	62
dia.		ϕ6	ϕ8	ϕ10	ϕ12	ϕ8	ϕ10	ϕ12

Port type		Straight (inch)				Elbow (inch)		
Code	R side	11/4	15/16	13/8	11/2	45/16	43/8	41/2
	Both side	21/4	25/16	23/8	21/2	55/16	53/8	51/2
	L side	31/4	35/16	33/8	31/2	65/16	63/8	61/2
dia.		1/4	5/16	3/8	1/2	5/16	3/8	1/2

00 : Applicable to a manifold installation top-mounting unit alone.

(7)Exhaust port

■Stand-alone type

S : With silencer
08 : ϕ8Straight-type tube fitting (concentrated exhaust)
L8 : ϕ8Elbow-type tube fitting(concentrated exhaust)
5/16 : ϕ5/16in. straight tube fitting(concentrated exhaust type)
L5/16 : ϕ5/16in. Elbow tube fitting(concentrated exhaust type)

■Manifold-type (VKM)

		Open to atomosphere	Concentated exhaust									
Port type		Silencer	Straight fitting(mm)				Elbow fitting(mm)			Female thread		
Code	R side	S1	18	10	12	13	48	40	42	72	73	74
	Both side	S2	28	20	22	23	58	50	52	82	83	84
	L side	S3	38	30	32	33	68	60	62	92	93	94
dia.		—	ϕ8	ϕ10	ϕ12	ϕ16	ϕ8	ϕ10	ϕ12	Rc1/4	Rc3/8	Rc1/2

		Open to atomosphere	Concentated exhaust									
Port type		Silencer	Straight fitting(inch)				Elbow fitting(inch)			Female thread		
Code	R side	S1	15/16	13/8	11/2	15/8	45/16	43/8	41/2	72N	73N	74N
	Both side	S2	25/16	23/8	21/2	25/8	55/16	53/8	51/2	82N	83N	84N
	L side	S3	35/16	33/8	31/2	35/8	65/16	63/8	61/2	92N	93N	94N
dia.		—	5/16	3/8	1/2	5/8	5/16	3/8	1/2	1/4NPT	3/8NPT	1/2NPT

00 : Applicable to a manifold installation top-mounting unit alone.

(8)Solenoid valve specification

*Make this entry only when the supply valve or the release valve of solenoid valve type is to be incorporated.

Working voltage	DC24V	AC100V
Normally closed(N.C.)	E	F
Normally open(N.O.)	G	H

No code : Manifold alone

(9)Color

W : Ivory
B : Black

(10)No.of valves (Entry for manifold only)

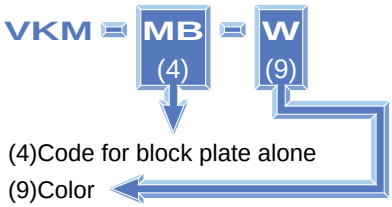
Code	02	03	04	05	06	07	08	09	10
No.	2	3	4	5	6	7	8	9	10

*Special-order for those with 11 or more manifold.

(11)Switch output

No code : NPN open collector output
-PNP : PNP open collector output
*Make this entry only in case output or vacuum switch is PNP.

Model Designation of Block plate alone (Example)



(4)Code for block plate alone

(9)Color

W : Ivoly

B : Black

*For a block plate, one exhaust port O-ring and two threads (M2.5*L10) are provided.

Model Designation of nozzle set alone (Example)

(2)Vacuum characteristics

H : High vacuum Medium flow type

L : Medium vacuum Large flow type

E : High vacuum Small flow type (not available for nozzle diameter 0.5mm)

(3)Nozzle diameter

Code	05	07	10	12
Size(mm)	0.5	0.7	1.0	1.2

Model designation

■ Manifold type

Example 1: When all units have common specifications.

VK M H 10 W - T6 20 S2 E - B 04

(1)(2)(3) (4) (5) (6) (7) (8) (9) (10)

(1)Port position: M→Manifold type

(2)Vacuum characteristics: H→High-vacuum type

(3)Nozzle diameter: 10→1.0mm

(4)Combination: W→Filter,vacuum-making solenoid valve,vacuum switch with digital display,vacuum release solenoid valve.

(5)Vacuum port: T6→Upper plane, ϕ6mm tube fitting

(6)Air supply port: 20→On both sides of manifold,ϕ10mm tube fitting

(7)Exhaust port: S2→On both sides of manifold. Silencer attached

(8)Solenoid Valve type: E→"Normally Closed"(N.C.) type DC24V Power source (for both supply and vacuum release)

(9)Color: B→Black

(10)No. of manifolds: 04→4 manifolds

■ Order example for manifold only

(Block plate not attaching to the top unit)

Example 2: When all vacuum ports are common specifications.

VK M - S6 48 62 - W 08

(1) (5) (6) (7) (9) (10)

(1)Port position: M→Manifold type

(5)Vacuum port: S6→ϕ6mm tube fitting (for each of 8 manifold)

(6)Air supply port: 48→On R side only ϕ8mm tube fitting (elbow)

(7)Exhaust port: 62→On L side only ϕ12mm tube fitting (elbow)

(9)Color: W→Ivory

(10)No. of manifolds: 08→8 manifolds

Example 3: when the vacuum ports differ even by one.

(Specification Order Form is required.)

VK M - 00 48 62 - W 08

(1) (5) (6) (7) (9) (10)

(1)Port position: M→Manifold

(5)Vacuum port: 00→When a vacuum port at any station differs in the manifolds even by one.

(Specification order form is requred separately)

(6)Air supply port: 48→On R side only, ϕ8mm tube fitting (elbow)

(7)Exhaust: 62→On L side only, ϕ12mm tube fitting (elbow)

(9)Color: W→Ivory

(10)No.of manifolds: 08→8 manifolds

■ Example of entry in specificcation form when vacuum port differ even by one.

			Config. (Port pos.) (1)	Vacuum charac. (2)	Nozzle dia. (3)	combination (4)	Vacuum port (5)	Air supply port (6)	Exhaust port (7)	Solenoid valve (8)	Color (9)	No. of Manifold (10)
Entry for manifold model			VKM		—		00	48	62	—	W	08
Entry for mounting unit type	L side	St 1					S6					
	Station No.	St 2					S6					
		St 3					S6					
		St 4					S6					
		St 5					S8					
		St 6					S8					
		St 7					S8					
Entry for vacuum port in case of Manifold alone		St 8					PP					
		St 9										
	R side	St 10										

*When making entries into the specification order form, fill in only the spaces for manifold model and vacuum port (5) at each station. For entriies into the vacuum port column (5), use only side port codes (S4, S6, S8, PP).

■ Order example for manifold top-mounting unit alone

Example 4: When vacuum port is installed on the side of the manifold.

VK M H 07 G - 00 00 00 E - W

(1)(2) (3) (4) (5) (6) (7) (8) (9)

(1)Port position : M→Manifold type

(2)Vacuum characteristics : H→High-vacuum type

(3)Nozzle diameter : 07→0.7mm

(4)Combination : G→Filter, vacuum-making solenoid valve

(5)Vacuum port : 00→Applicatable to a manifold installation top-mounting unit alone, with the port to be installed on the side.

(6)Air supply port : 00→On both sides of manifold, ϕ10mm tube fitting

(7)Exhaust port : 00→Applicable to a manifold installation top-mounting unit alone.

(8)Solenoid valve-type : E→"Normally Closed"(N.C.) type 24VDC Power source (for both supply and vacuum release)

(9)Color : W→Ivory

Example 5: When vacuum port is installed on the upper plane of the manifold.

VK M H 12 R - T6 00 00 E - W

(1)(2) (3) (4) (5) (6) (7) (8) (9)

(1)Port position : M→Manifold type

(2)Vacuum characteristics : H→High-vacuum type

(3)Nozzle diameter : 12→1.2mm

(4)Combination : R→Filter, vacuum making solenoid valve, Vacuum switch digital display, air timer-type vacuum release valve.

(5)Vacuum port : T6→Upper plane, ϕ6mm tube fitting

(6)Air supply port : 00→Applicatable to a manifold installation top-mounting unit alone

(7)Exhaust port : 00→Applicatable to a manifold installation top-mounting unit alone.

(8)Solenoid valve-type : E→"Normally Closed"(N.C.) type 24VDC Power source (for both supply and vacuum release)

(9)Color : W→Ivory

*A seal packing for vacuum port and two threads are provided.
(Seals for exhaust port and vacuum port are not provided.
→instead, they are attached to manifold.)

■ Example of model designation when top-mounting unit and vacuum port vary in type, while stations of the manifold type (VKM) are aligned.
The 1 and 2 below show model designation. Also fill in 3 (specification order form as of 3) which indicates station arrangements for top-mounting unit and vacuum port.

1.Models and number of units when ordering manifold only
VKM - 00 48 62 - W 08 1 unit···See the order form example 3 for manifold only

2.Models and number of units of top-mounting units
1)···VKM H 07 G - 00 00 00 E - W 3units
2)···VKM E 10 W - 00 00 00 G - W 1unit
3)···VKM H 12 R - T6 00 00 E - W 3units
} See the order form examples 3 and 4 for manifold top-mounting units only
4)···VKM - MB - W 1unit···See the order form example for block plates only.

3.Specification order form (example)
(Shows station arrangements for top-mounting unit and vacuum port.)

			Config. (port pos.) (1)	Vacuum charac (2)	Nozzle dia. (3)	Combination (4)	Vacuum port (5)	Air supply port (6)	Exhaust port (7)	Solenoid valve (8)	Color (9)	No. of Manifold (10)
Manifold model			VKM	—			00	48	62	—	W	08
Entry for mounting unit type	L side	St 1	VKM	H	07	G	S8	00	00	E	W	3
	Station No.	St 2	St 1				↖ Side port φ8mm joint					
		St 3	St 1				↙ Side port φ6mm joint					
		St 4	VKM	E	10	W	S6	00	00	G	W	1
		St 5	VKM	H	12	R	T6	00	00	E	W	3
		St 6	St 5				↖ Front port φ6mm joint					
		St 7	St 5				↙ Enter side port					
Entry for vacuum port in case Manifold alone		St 8	VKM			MB	S6		▼		W	1
		St 9										
	R side	St 10										

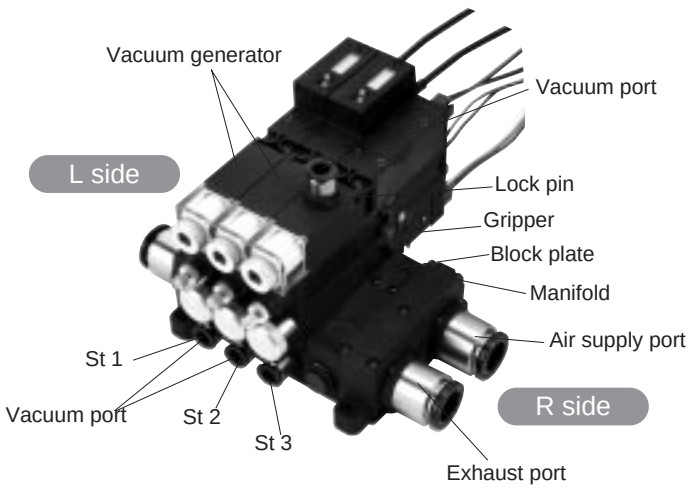
Notes on filling in the specification order form

(1). As for model designation forms 1) and 2) in item 2. above the space (5) for Vacuum port is entered 00, a side port-based specification, which accordingly dose not show the fitting size. The fitting size will be indicated in 3. specification order form. Therefore, there may be a difference in format style between 2. model designation form and 3. specification order form as to the Vacuum port space (5).

(2). Station numbers are arranged in serial order as St1, St2, ···St10 from the L side toward R side. To confirm the positions of the L and R sides, see the Manifold Type reference chart on page 85.

(3). If the top-mounting units for St1, St2 and St3 are of the same specifications as in the above example of specification order form, fill up the St1 space (uppermost) only, while enterring St1 in each of the St2 and St3 grids on the Config. (port pos.) column (1). [For example, if the top-mounting unit for St6 happens to be the same model as that of St1, enter St1 in St 6's grid on the Config. (port pos.) Column (1)] On the right-hand edge column are grids to enter the number of common units for respective St numbers. Remember to fill in there grids as a verification of the number of common units per manifold. With respect to solenoid valves, we have, in principle, unified working voltage. Therefore, we cannot provide the manifold type in different working voltages such as 24VDC and 100VAC. However, we can only provide either N.O. or N.C. type even if the two type are of the same working voltage. Choose one as with the case of solenoid valve type (8).

Manifold Type (reference)



Detailed Safety Instruction

Before using the PISCO device, be sure to read the "Safety Instructions", "Common Safety Instructions for Products Listed in This Manual" on pages 23~24 and "Common Safety Instructions for Vacuum Generator VG and VK Types" on page 405.

⚠ Caution

1. With the lock pin removed, the cartridge joint, timer cylinder and element holder can be installed or removed. Before use, make certain that the lock pin is securely in place.
2. Never remove the gripper for body connection. A few times of removal may be possible, but the reduction of bonding strength may cause damage to the body.

VK Mass table

Combination code	Stand-alone mass (g)		Manifold mass (g)	
	VKA·····	VKB·····	VKM····-S···	VKM····-T···
A	60	60	75.5	77.5
B	60	60	75.5	77.5
C	78.5	78.5	94	96
D	78.5	78.5	94	96
E	84.5	84.5	100	102
F	84.5	84.5	100	102
G	78	78	93.5	95.5
H	78	78	93.5	95.5
J	96.5	96.5	112	114
K	96.5	96.5	112	114
L	102.5	102.5	118	120
M	102.5	102.5	118	120
P	128.5	128.5	144	146
Q	147	147	162.5	164.5
R	153	153	168.5	170.5
S	121	121	136.5	138.5
T	139.5	139.5	155	157
W	145.5	145.5	161	163

Manifold type		Mass(g)
Side block	VKM····-···S1···	72.5
	VKM····-···S2···	84
	VKM····-···S3···	72.5
	VKM····-·····-····	61
Intermediate block	VKM-M·····(Without stopper)	20.5
	VKM-MP-·····(With stopper)	22

Block plate	Mass(g)
VKM····-MB-····	6

Silencer	Mass(g)
Stand-alone open to atomosphere	2

Stand-alone cartridge	Mass(g)
CJC 09-04	3.5
CJC 09-06	3.5
CJC 09-08	10
CJC 14-08	10
CJP 09	1.5

Manifold cartridge	Mass(g)
CJC 18-06	20.5
CJC 18-08	20
CJC 18-10	19
CJC 18-12	26
CJC 18-16	36.5
CJL 18-08	25
CJL 18-10	31.5
CJL 18-12	37.5
CJF 18-02	43.5
CJF 18-03	34.5
CJF 18-04	38
CJP 18	6

■Calculate the mass of VK by the following formula;
(Stand-alone(Manifold), Combination×Quautity)+(Vacuum cartridge×Quautity)+(Supply cartridge×Quautity)+(Exhaust cartridge×Quautity)+Manifold type

Example 1. VKA H 10 W - 06 08 S E - W
(1) (2) (3) (4)

145.5+3.5+10+2=161g
(1)Stand-alone:VKA,combination code : W=145.5g
(2)Vacuum port cartridge : CJC 09-06=3.5g
(3)Supply port cartridge : CJC 09-08=10g
(4)Exhaust port cartridge : Stand-alone open to atomosphere=2g

Example 2. VKM H 07 P - S6 28 72 E - W 02···(5)
(2) (3) (4)
(1)

288+7+40+49.5+61=437.5g
(1)Manifold : VKM····-S···,Combination code : P,No.:2valves=144g×2=288g
(2)Vacuum port cartridge : CJC 09-06=3.5g×2=7g
(3)Supply port cartridge : CJC 18-08=20g×2=40g
(4)Exhaust port cartridge : CJF 18-02+CJP 18=43.5g+6g=49.5g
(5)Manifold type : VKM····-·····=61g

Example 3. Complex combination

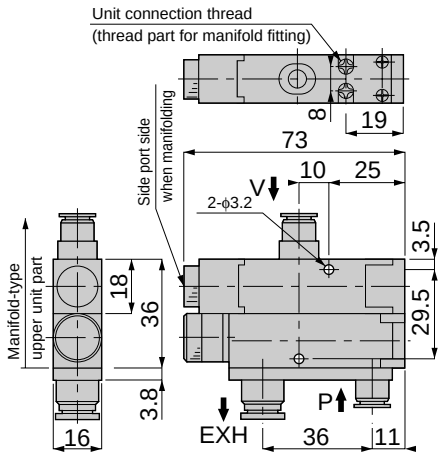
VKM-0010S2-B03 (Manifold)···(1)
VKMH12M-T60000E-B (St.1)···(2)
VKML07Q-S80000G-B (St.2)···(3)
VKM-MBPP-B (St.3)···(4)

109+123.5+172.5+28=433g
(1)Manifold type : VKM····-S2···+Supply port cartridge : CJC 18-10+Supply port stopper : CJP 18=84g+19g+6g=109g
(2)Manifold type : VKM····-T···,Combination code : M,Vacuum port cartridge : CJC 09-06=120g+3.5g=123.5g
(3)Manifold type : VKM····-S···,Combination code : Q,Vacuum port cartridge : CJC 09-08=162.5g+10g=172.5g
(4)Intermediate block (with stopper)VKM-MP-····+Block plate : VKM-MB···=22g+6g=28g

CAD **VKA A·B TYPE**

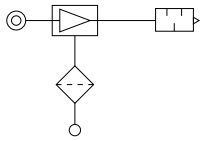
Model : VKA ☐ ☐☐A……
VKA ☐ ☐☐B……

unit:mm

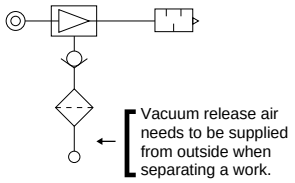


Circuit Diagram

VKA☐ ☐☐A
(Combination code A type, with a vacuum generator and filter)



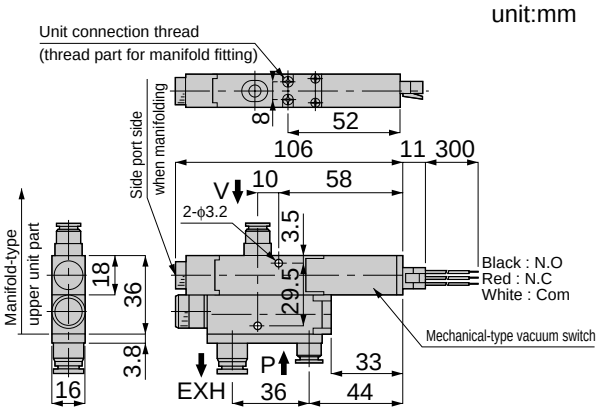
VKA☐ ☐☐B
(Combination code B type, with a vacuum generator, filter and check valve)



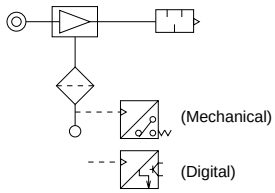
CAD **VKA C·D TYPE**

Model : VKA ☐ ☐☐C……
VKA ☐ ☐☐D……

unit:mm



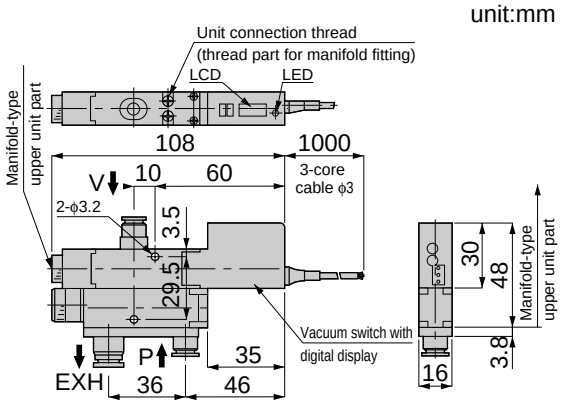
VKA☐ ☐☐C……
Mechanical-type vacuum switch
(Combination code C type, with a vacuum generator, filter and mechanical-type vacuum switch)
VKA☐ ☐☐E……
vacuum switch with digital display
(Combination code E type, with a vacuum generator, filter and vacuum switch with digital display)



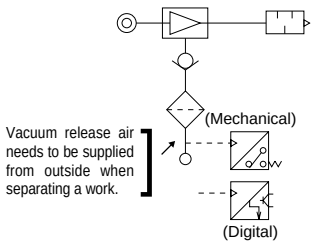
CAD **VKA E·F TYPE**

Model : VKA ☐ ☐☐E……
VKA ☐ ☐☐F……

unit:mm



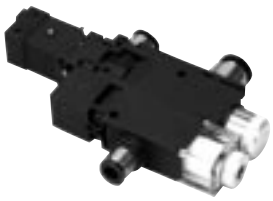
VKA☐ ☐☐D……
Mechanical-type vacuum switch
(Combination code D type, with a vacuum generator, filter, check valve and mechanical-type vacuum switch)
VKA☐ ☐☐F……
vacuum switch with digital display
(Combination code F type, with a vacuum generator, filter, check valve and vacuum switch with digital display)



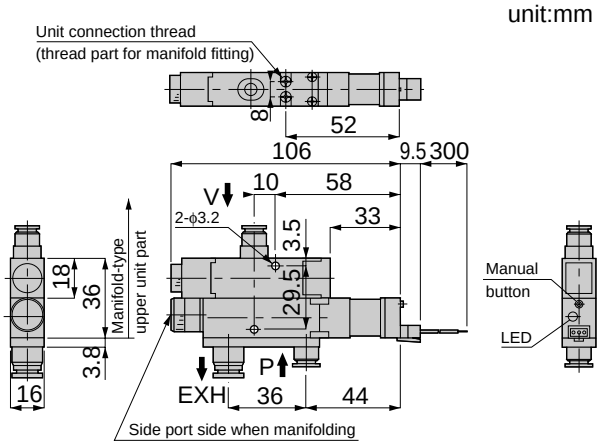
Vacuum Series Vacuum Generator VK Type

CAD **VKA G·H TYPE**

Model : VKA□ □□G·····
VKA□ □□H·····

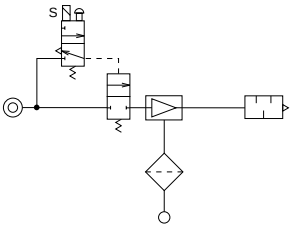


unit:mm

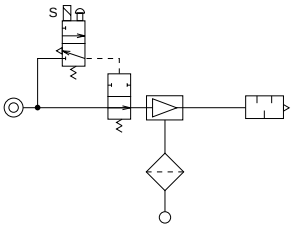


Circuit Diagram

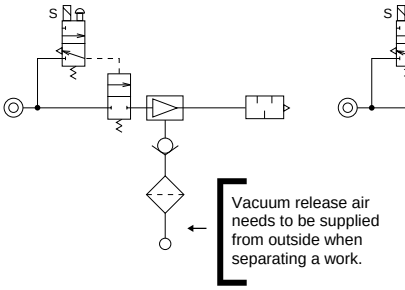
VKA□ □□G ·····E or F
(Combination code G type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed) and filter)



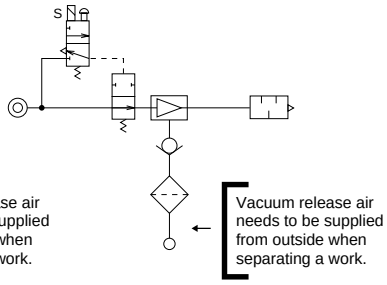
VKA□ □□G ·····G or H
(Combination code G type, with a vacuum generator, vacuum-making solenoid valve (Normally Open) and filter)



VKA□ □□H ·····E or F
(Combination code H type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter and check valve)



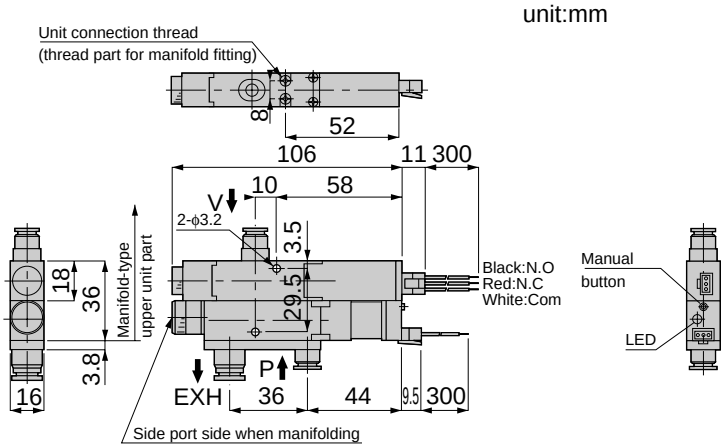
VKA□ □□H ·····G or H
(Combination code H type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter and check valve)



CAD **VKA J·K TYPE**

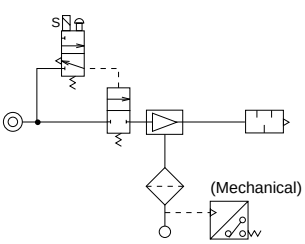
Model : VKA□ □□J·····D
VKA□ □□K·····D

unit:mm

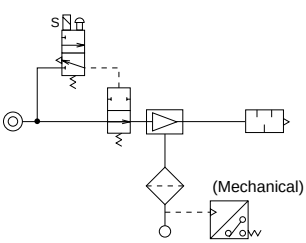


Circuit Diagram

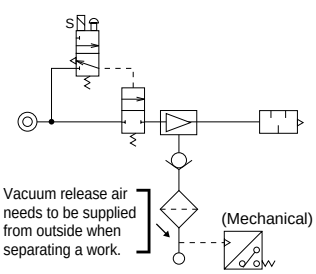
VKA□ □□J ·····E or F
·····Mechanical-type vacuum switch
(Combination code J type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter and mechanical-type vacuum switch)



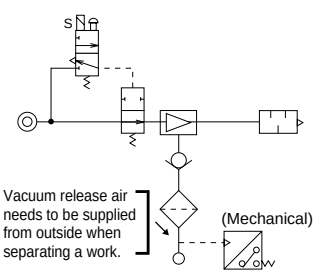
VKA□ □□J·····G or H
·····Mechanical-type vacuum switch
(Combination code J type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter and mechanical-type vacuum switch)



VKA□ □□K·····E or F
·····Mechanical-type vacuum switch
(Combination code K type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter, check valve and mechanical-type vacuum switch)



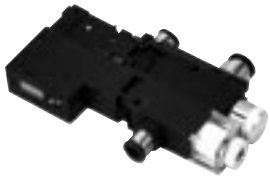
VKA□ □□K·····G or H
·····Mechanical-type vacuum switch
(Combination code K type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter, check valve and mechanical-type vacuum switch)

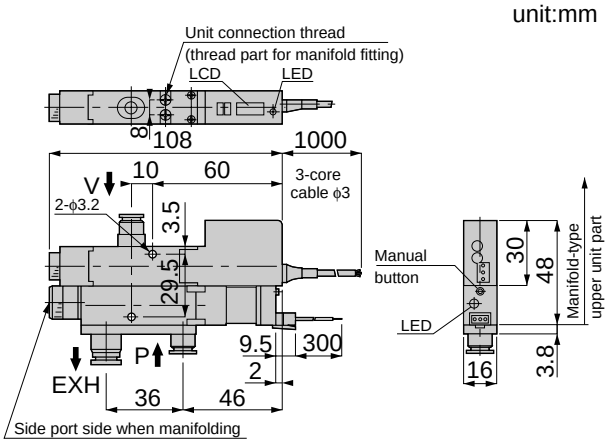


CAD **VKA L·M TYPE**

Model : VKA □ □□L·····
VKA □ □□M·····

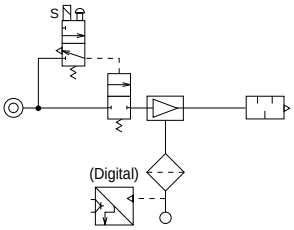
unit:mm



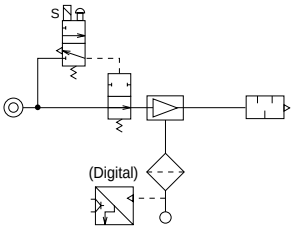


Circuit Diagram

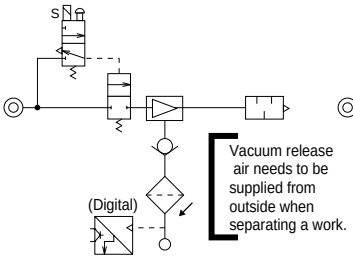
VKA□ □□L·····E or F
·····Vacuum switch with digital display
(Combination code L type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter and vacuum switch with digital display)



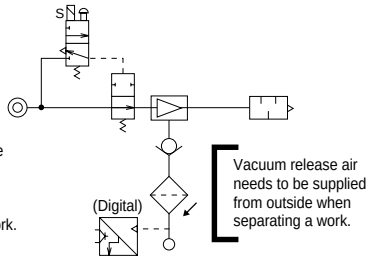
VKA□ □□L·····G or H
·····Vacuum switch with digital display
(Combination code L type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter and vacuum switch with digital display)



VKA□ □□M·····E or F
·····Vacuum switch with digital display
(Combination code M type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter, check valve and vacuum switch with digital display)



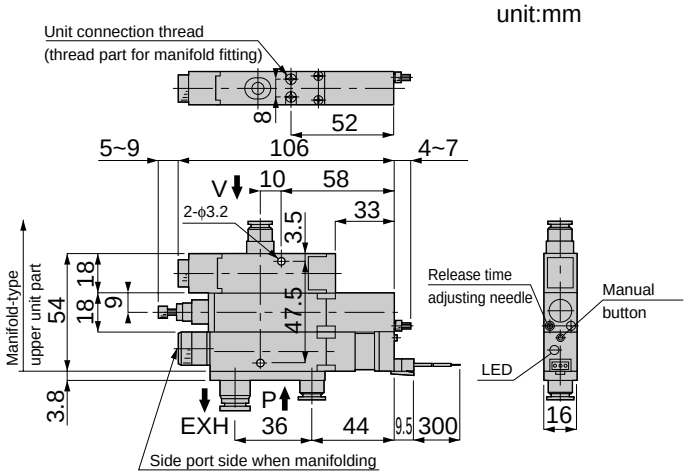
VKA□ □□M·····G or H
·····Vacuum switch with digital display
(Combination code M type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter, check valve and vacuum switch with digital display)



CAD **VKA P TYPE**

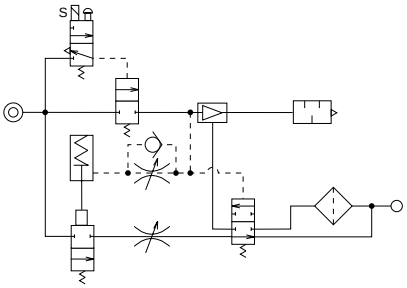
Model : VKA □ □□P·····

unit:mm

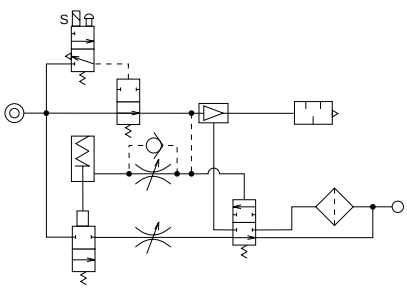


Circuit Diagram

VKA□ □□P·····E or F
(Combination code P type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), air timer-type vacuum release valve and filter)



VKA□ □□P·····G or H
(Combination code P type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), air timer-type vacuum release valve and filter)

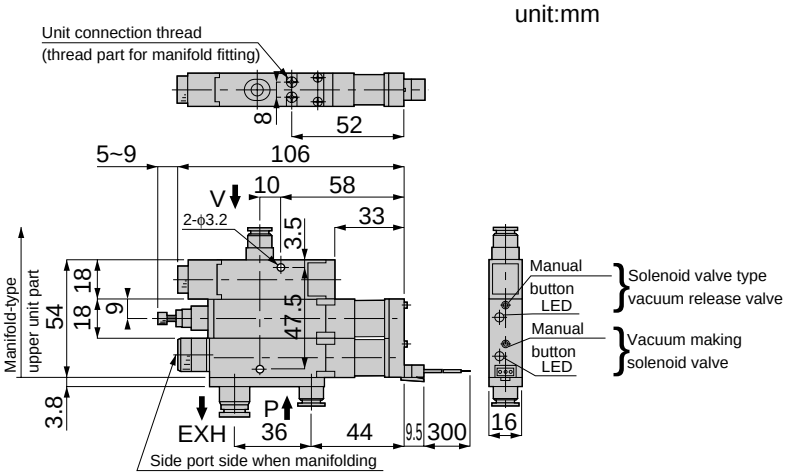


Vacuum Series Vacuum Generator VK Type

VKA S TYPE

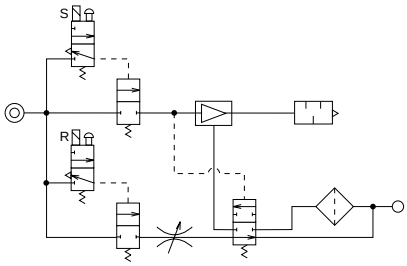
Model : VKA ☐ ☐☐S……

unit:mm

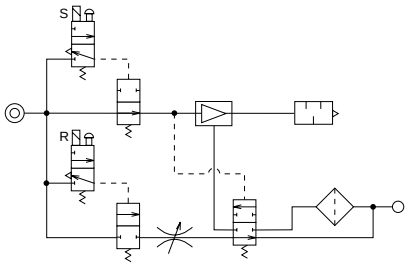


Circuit Diagram

VKA ☐ ☐☐S……E or F……Mechanical-type vacuum switch
(Combination code S type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), solenoid valve-type vacuum release valve and filter)

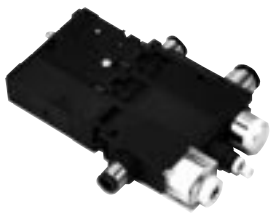


VKA ☐ ☐☐S……G or H……Mechanical-type vacuum switch
(Combination code S type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), solenoid valve-type vacuum release valve and filter)

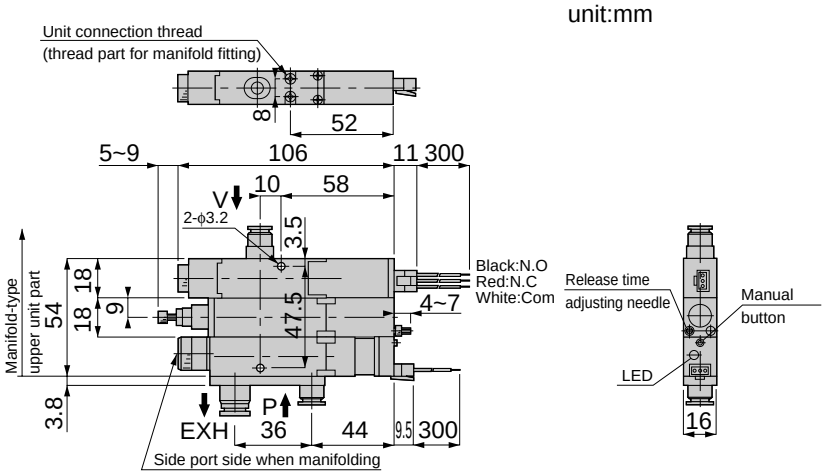


VKA Q TYPE

Model : VKA ☐ ☐☐Q……

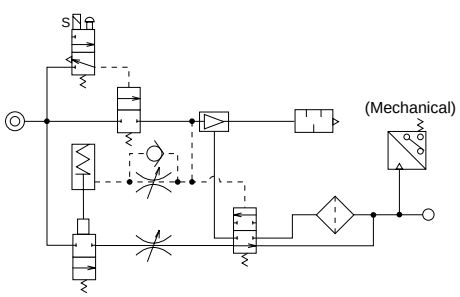


unit:mm

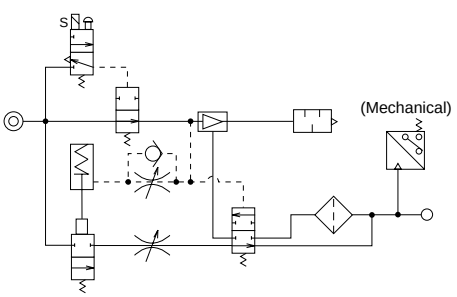


Circuit Diagram

VKA ☐ ☐☐Q……E or F……Mechanical-type vacuum switch
(Combination code Q type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), air timer-type vacuum release valve, filter and mechanical-type vacuum switch)



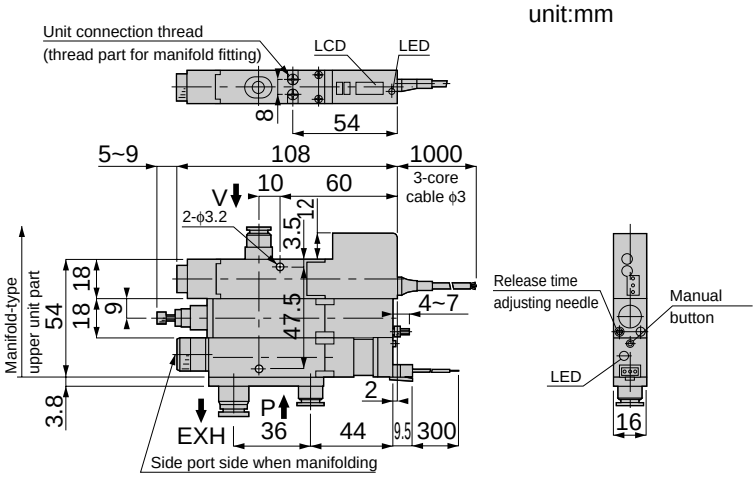
VKA ☐ ☐☐Q……G or H……Mechanical-type vacuum switch
(Combination code Q type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), air timer-type vacuum release valve, filter and mechanical-type vacuum switch)



CAD **VKA R TYPE**

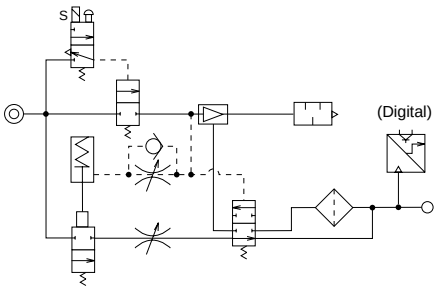
Model : VKA □ □□R·····

unit:mm

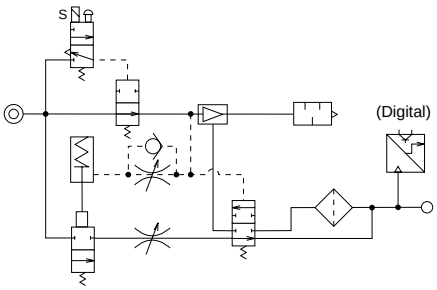


Circuit Diagram

VKA□ □□R·····E or F·····Vacuum switch with digital display
(Combination code R type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), air timer-type vacuum release valve, filter and vacuum switch with digital display)

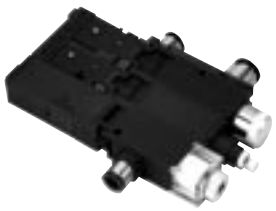


VKA□ □□R·····G or H·····Vacuum switch with digital display
(Combination code R type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), air timer-type vacuum release valve, filter and vacuum switch with digital display)

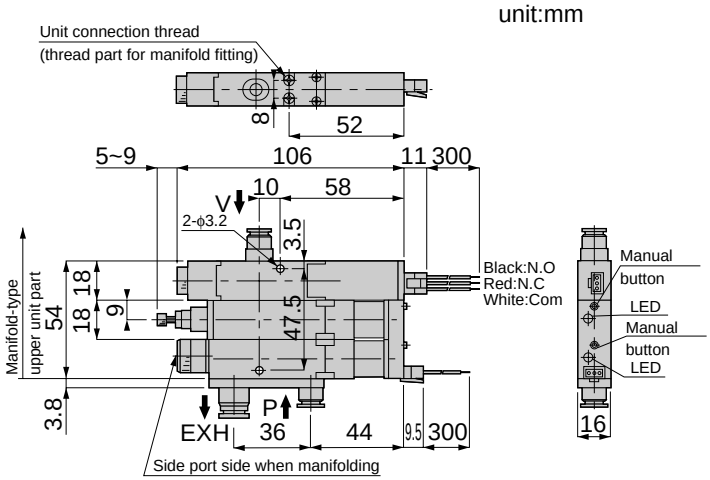


CAD **VKA T TYPE**

Model : VKA □ □□T·····

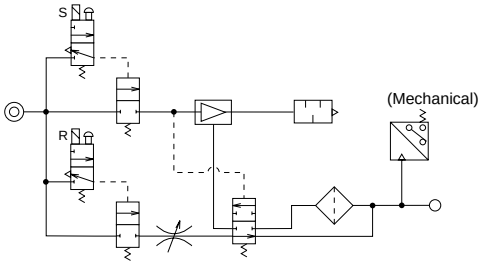


unit:mm

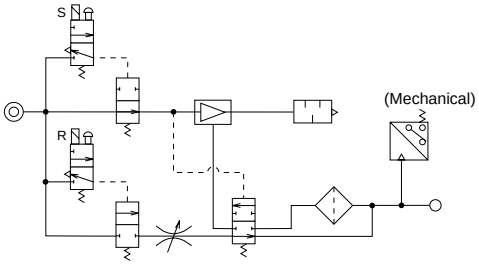


Circuit Diagram

VKA□ □□T·····E or F·····Mechanical-type vacuum switch
(Combination code T type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), solenoid valve-type vacuum release valve, filter and mechanical-type vacuum switch)



VKA□ □□T·····G or H·····Mechanical-type vacuum switch
(Combination code T type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), solenoid valve-type vacuum release valve, filter and mechanical-type vacuum switch)

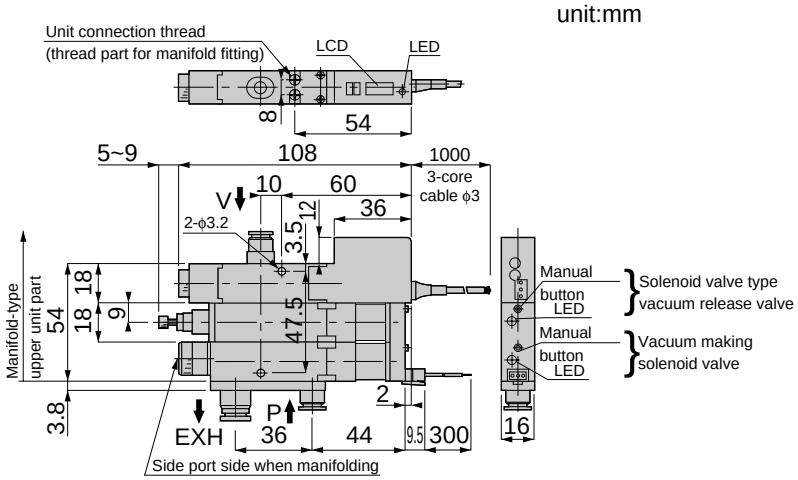


Vacuum Series Vacuum Generator VK Type

CAD **VKA W TYPE**

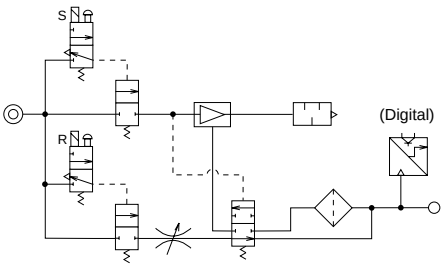
Model : VKA □ □□W·····

unit:mm

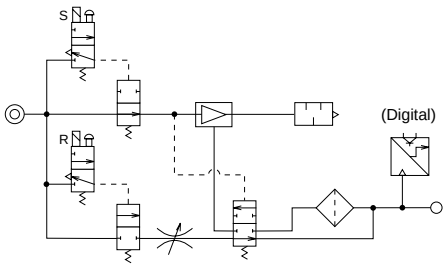


Circuit Diagram

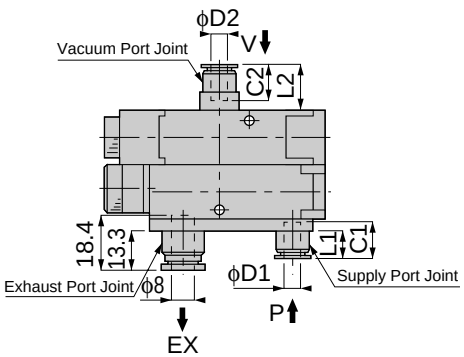
VKA□ □□ W·····E or F·····Vacuum switch with digital display
(Combination code W type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), solenoid valve-type vacuum release valve, filter and vacuum switch with digital display)



VKA□ □□ W·····G or H·····Vacuum switch with digital display
(Combination code W type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), solenoid valve-type vacuum release valve, filter and vacuum switch with digital display)



●VDA-type joint dimensions

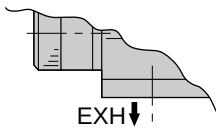


unit:mm

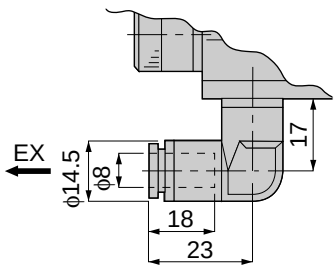
	Tube dia. ϕD1	Tube dia. ϕD2	L1	L2	C1	C2
P Port	4(5/32)	-	6	-	11	-
	6(1/4)	-	9	-	12	-
	8(5/16)	-	17.5	-	18.5	-
V Port	-	4(5/32)	-	11.5	-	11
	-	6(1/4)	-	14.5	-	12
	-	8(5/16)	-	23	-	18.5

( ):inch

●Silencer (exhaust) common to VKA/VKB



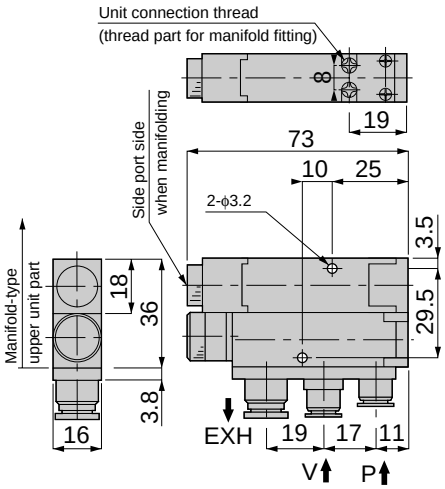
●Exhaust port joint (elbow) common to VKA/VKB



CAD **VKB A·B TYPE**

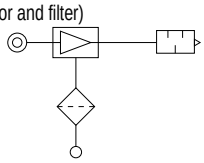
Model : VKB ☐ ☐☐A……
VKB ☐ ☐☐B……

unit:mm

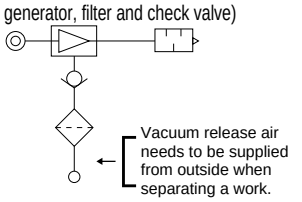


Circuit Diagram

VKB☐ ☐☐ A
(Combination code A type, with a vacuum generator and filter)



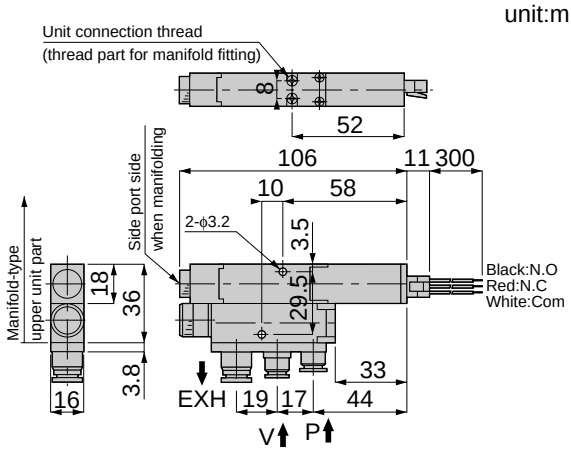
VKB☐ ☐☐ B
(Combination code B type, with a vacuum generator, filter and check valve)



CAD **VKB C·D TYPE**

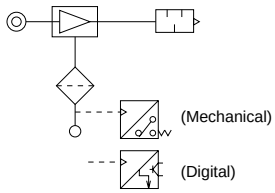
Model : VKB ☐ ☐☐C……
VKB ☐ ☐☐D……

unit:mm



VKB☐ ☐☐ C……
Mechanical-type vacuum switch
(Combination code C type, with a vacuum generator, filter and mechanical-type vacuum switch)

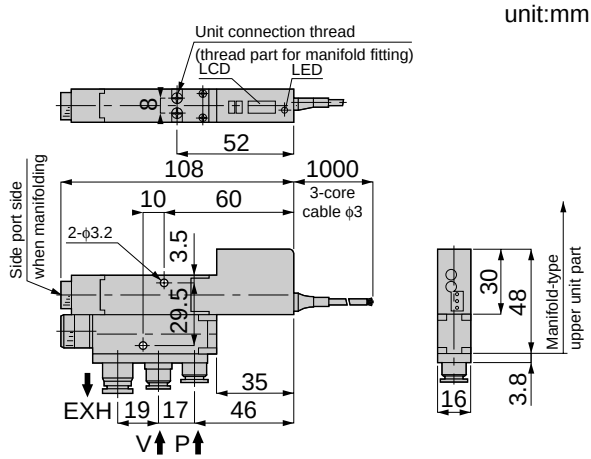
VKB☐ ☐☐ E……
Vacuum switch with digital display
(Combination code E type, with a vacuum generator, filter and vacuum switch with digital display)



CAD **VKB E·F TYPE**

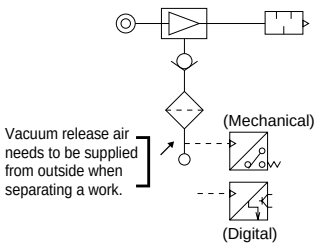
Model : VKB ☐ ☐☐E……
VKB ☐ ☐☐F……

unit:mm



VKB☐ ☐☐ D……
Mechanical-type vacuum switch
(Combination code D type, with a vacuum generator, filter, check valve and mechanical-type vacuum switch)

VKB☐ ☐☐ F……
Vacuum switch with digital display
(Combination code F type, with a vacuum generator, filter and vacuum switch with digital display)

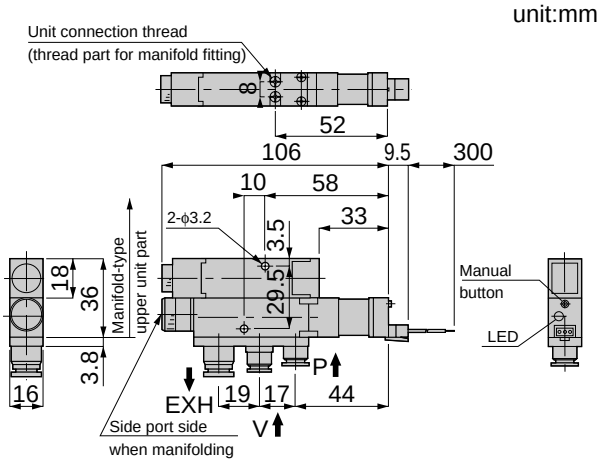


Vacuum Series Vacuum Generator VK Type

CAD **VKB G·H TYPE**

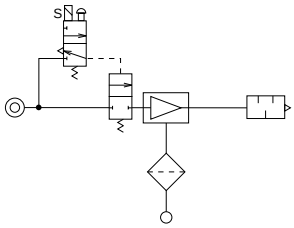
Model : VKB □ □□G·····
VKB □ □□H·····

unit:mm

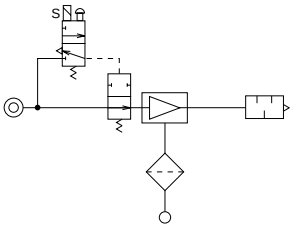


Circuit Diagram

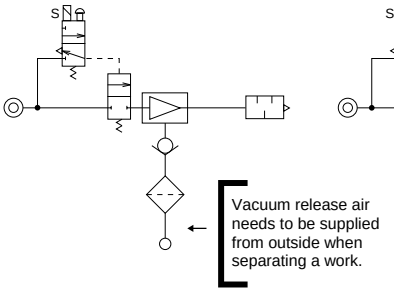
VKB□ □□ G ·····E or F
(Combination code G type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed) and filter)



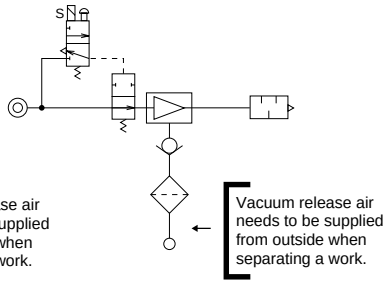
VKB□ □□ G ·····G or H
(Combination code G type, with a vacuum generator, vacuum-making solenoid valve (Normally Open) and filter)



VKB□ □□ H ·····E or F
(Combination code H type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter and check valve)



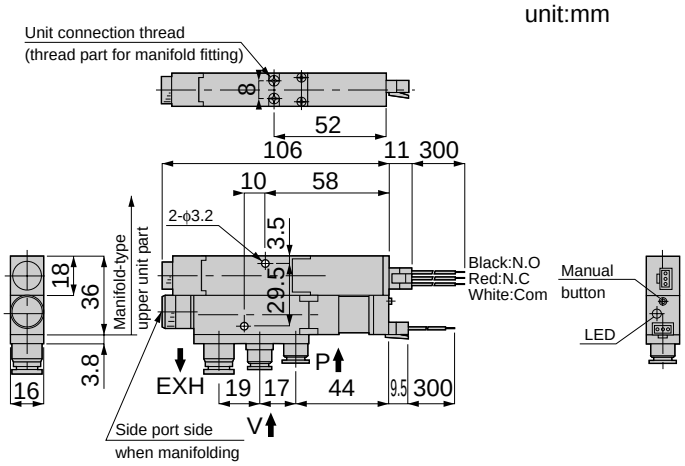
VKB□ □□ H ·····G or H
(Combination code H type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter and check valve)



CAD **VKB J·K TYPE**

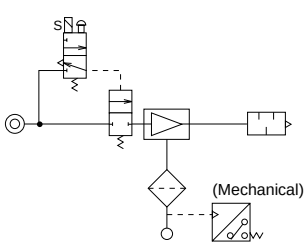
Model : VKB □ □□J·····
VKB □ □□K·····

unit:mm

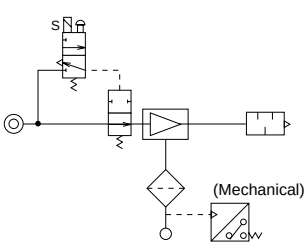


Circuit Diagram

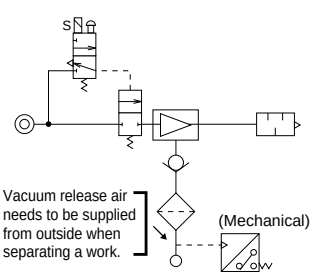
VKB□ □□ J·····E or F
·····Mechanical-type vacuum switch
(Combination code J type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter and mechanical-type vacuum switch)



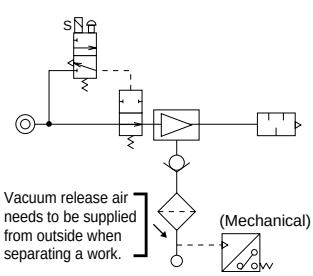
VKB□ □□ J·····G or H
·····Mechanical-type vacuum switch
(Combination code J type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter and mechanical-type vacuum switch)



VKB□ □□ K·····E or F
·····Mechanical-type vacuum switch
(Combination code K type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter, check valve and mechanical-type vacuum switch)



VKB□ □□ K·····G or H
·····Mechanical-type vacuum switch
(Combination code K type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter, check valve and mechanical-type vacuum switch)

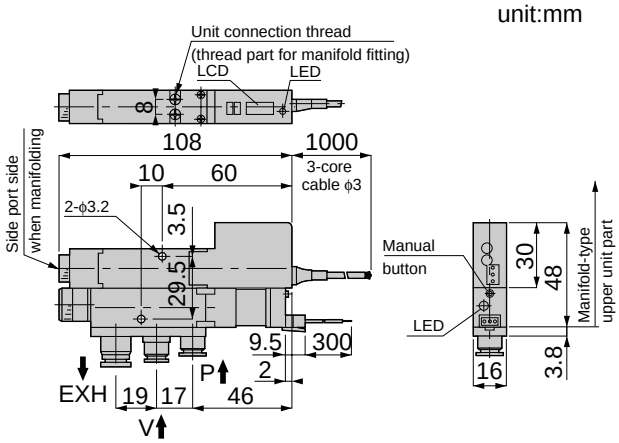


CAD

VKB L·M TYPE

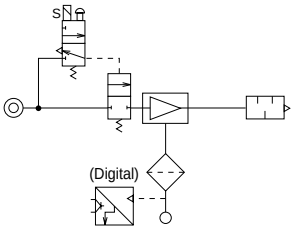
Model : VKB ☐ ☐☐L·····
VKB ☐ ☐☐M·····

unit:mm

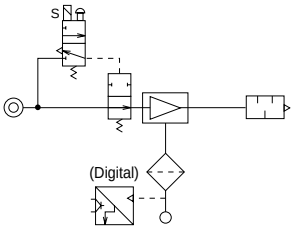


Circuit Diagram

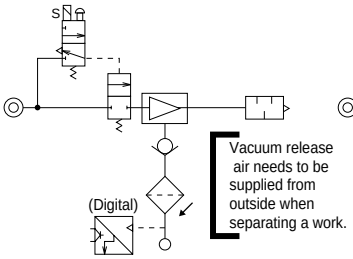
VKB☐ ☐☐ L·····E or F
·····Vacuum switch with digital display
(Combination code L type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter and vacuum switch with digital display)



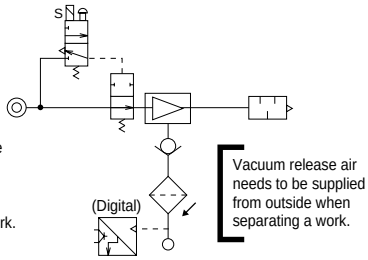
VKB☐ ☐☐ L·····G or H
·····Vacuum switch with digital display
(Combination code L type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter and vacuum switch with digital display)



VKB☐ ☐☐ M·····E or F
·····Vacuum switch with digital display
(Combination code M type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), filter, check valve and vacuum switch with digital display)



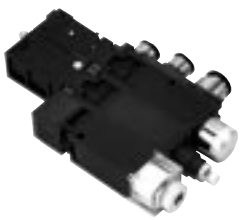
VKB☐ ☐☐ M·····G or H
·····Vacuum switch with digital display
(Combination code M type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), filter, check valve and vacuum switch with digital display)



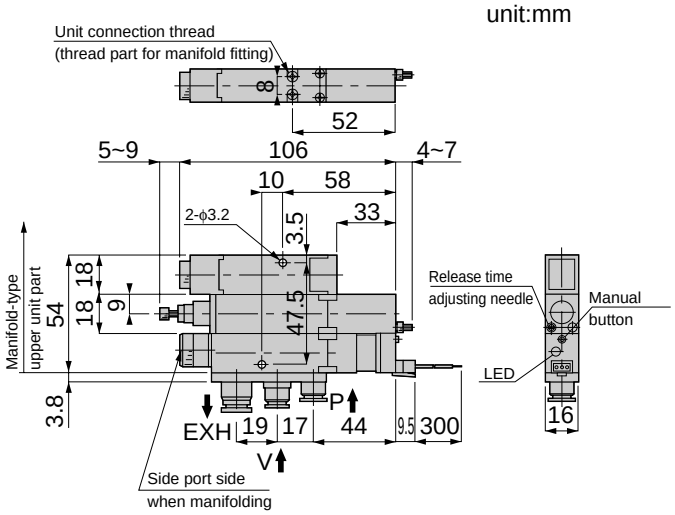
CAD

VKB P TYPE

Model : VKB ☐ ☐☐P·····

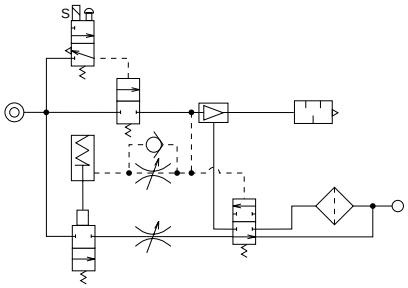


unit:mm

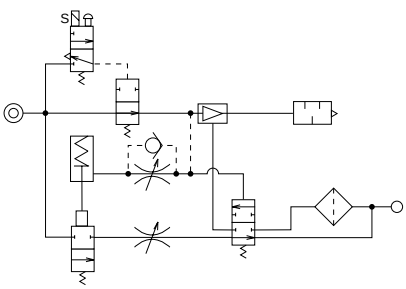


Circuit Diagram

VKB☐ ☐☐ P·····E or F·····Mechanical-type vacuum switch
(Combination code P type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), air timer-type vacuum release valve and filter)



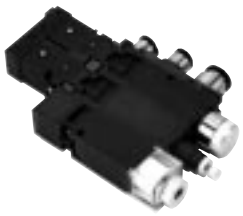
VKB☐ ☐☐ P·····G or H·····Mechanical-type vacuum switch
(Combination code P type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), air timer-type vacuum release valve and filter)



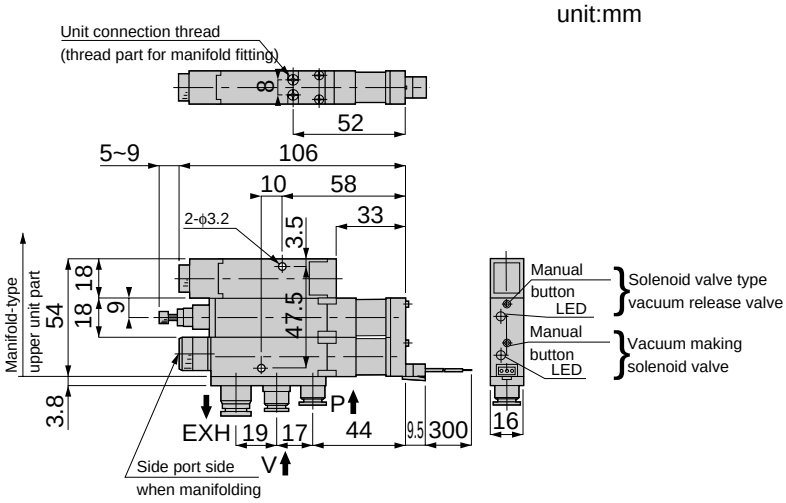
Vacuum Series Vacuum Generator VK Type

CAD **VKB S TYPE**

Model : VKB ☐ ☐☐S·····

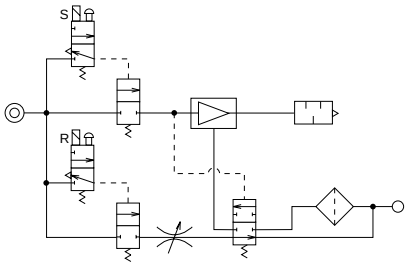


unit:mm

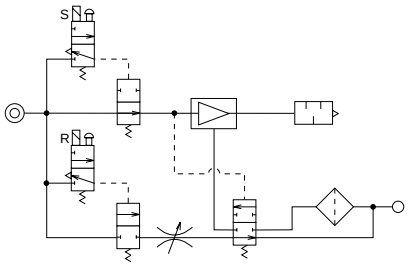


Circuit Diagram

VKB☐ ☐☐ S·····E or F·····Mechanical-type vacuum switch
(Combination code S type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), solenoid valve-type vacuum release valve and filter)

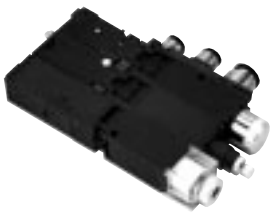


VKB☐ ☐☐ S·····G or H·····Mechanical-type vacuum switch
(Combination code S type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), solenoid valve-type vacuum release valve and filter)

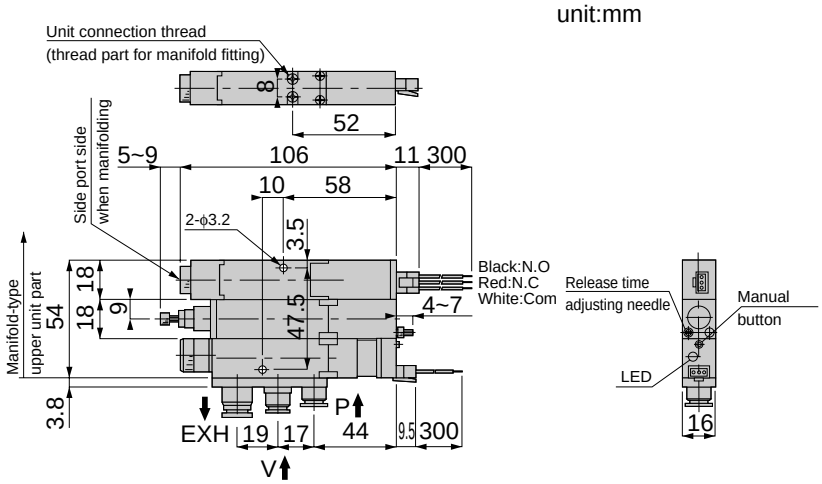


CAD **VKB Q TYPE**

Model : VKB ☐ ☐☐Q·····

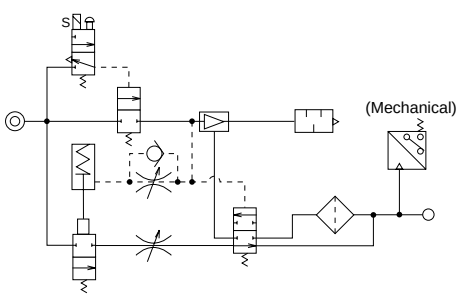


unit:mm

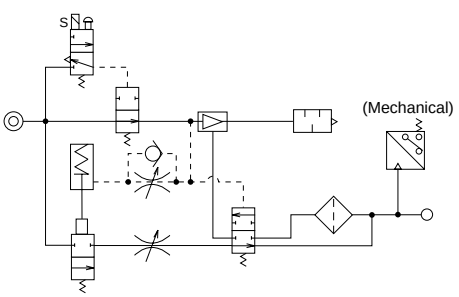


Circuit Diagram

VKB☐ ☐☐ Q·····E or F·····Mechanical-type vacuum switch
(Combination code Q type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), air timer-type vacuum release valve, filter and mechanical-type vacuum switch)



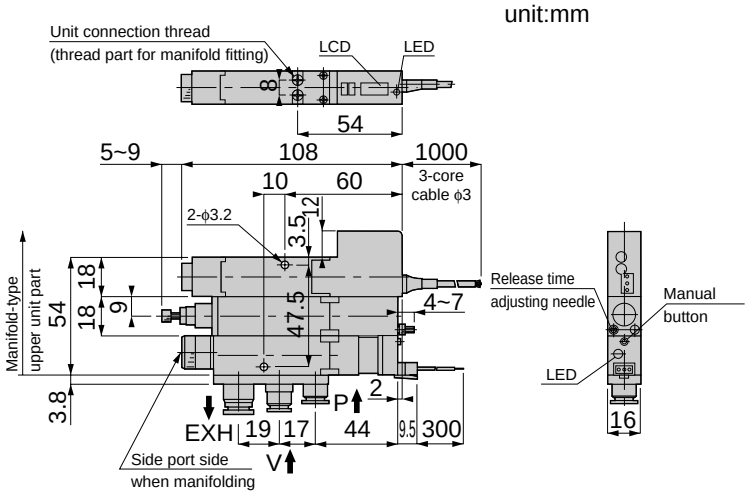
VKB☐ ☐☐ Q·····G or H·····Mechanical-type vacuum switch
(Combination code Q type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), air timer-type vacuum release valve, filter and mechanical-type vacuum switch)



CAD **VKB R TYPE**

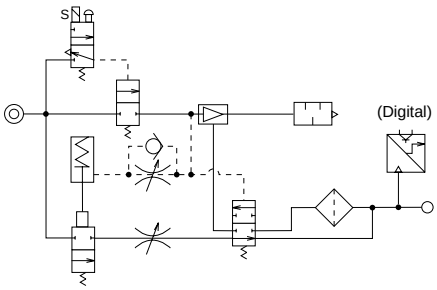
Model : VKB □ □□R·····

unit:mm

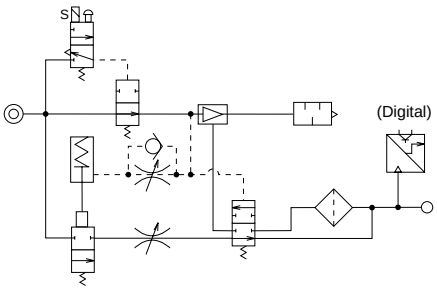


Circuit Diagram

VKB□ □□R·····E or F·····Vacuum switch with digital display
(Combination code R type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), air timer-type vacuum release valve, filter and vacuum switch with digital display)

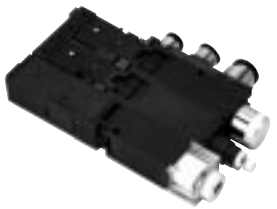


VKB□ □□R·····G or H·····Vacuum switch with digital display
(Combination code R type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), air timer-type vacuum release valve, filter and vacuum switch with digital display)

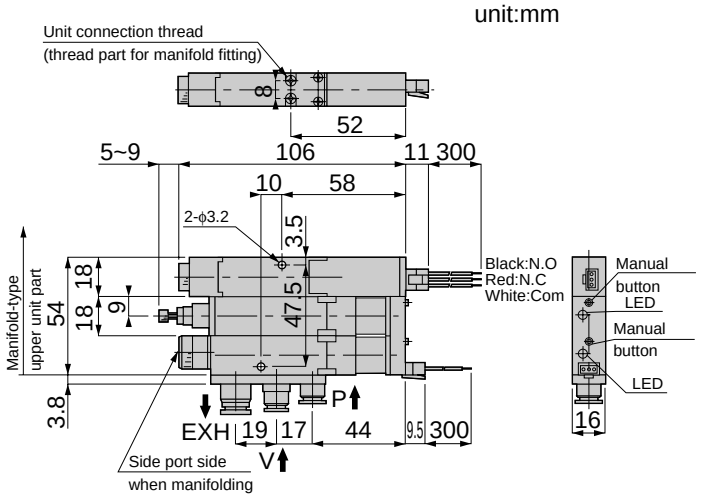


CAD **VKB T TYPE**

Model : VKB □ □□T·····

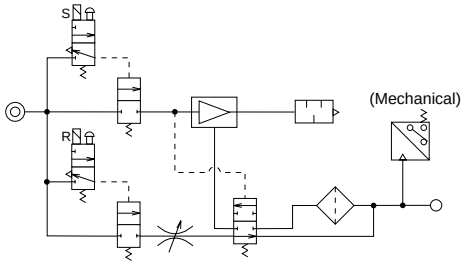


unit:mm

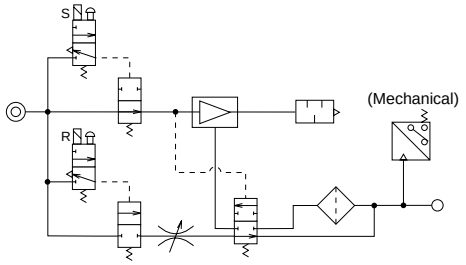


Circuit Diagram

VKB□ □□T·····E or F·····Mechanical-type vacuum switch
(Combination code T type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), solenoid valve-type vacuum release valve, filter and mechanical-type vacuum switch)



VKB□ □□T·····G or H·····Mechanical-type vacuum switch
(Combination code T type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), solenoid valve-type vacuum release valve, filter and mechanical-type vacuum switch)

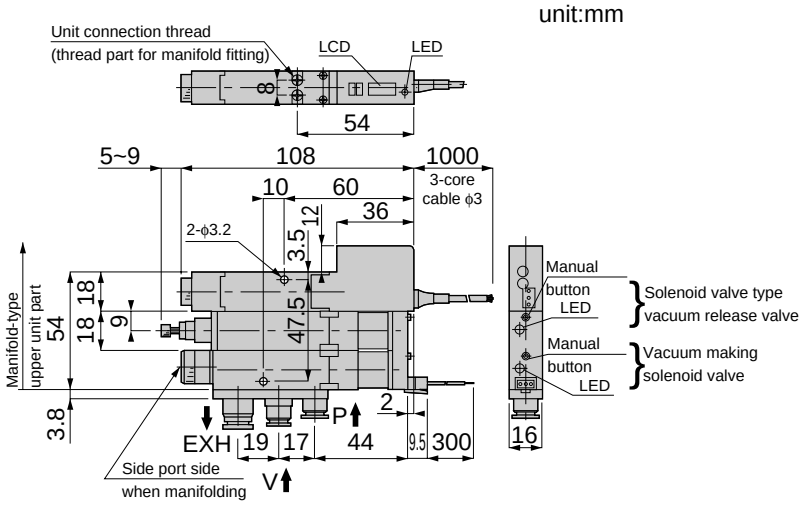


Vacuum Series Vacuum Generator VK Type

CAD **VKB W TYPE**

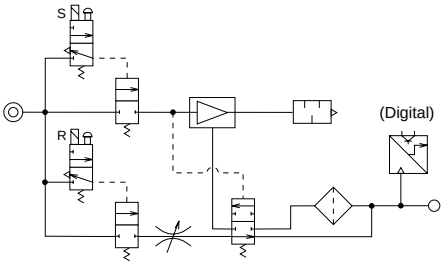
Model : VKB □ □□W·····

unit:mm

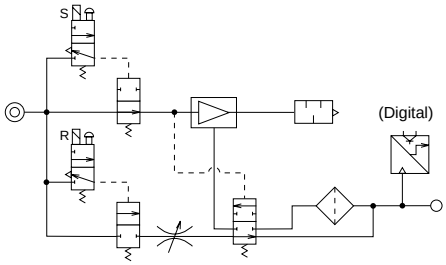


Circuit Diagram

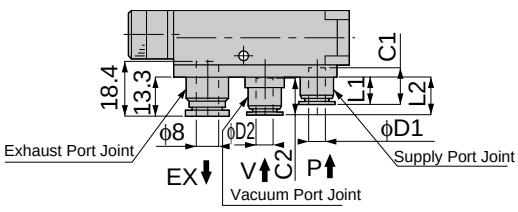
VKB□ □□ W·····E or F·····Vacuum switch with digital display
(Combination code W type, with a vacuum generator, vacuum-making solenoid valve (Normally Closed), solenoid valve-type vacuum release valve, filter and vacuum switch with digital display)



VKB□ □□ W·····Vacuum switch with digital display
(Combination code W type, with a vacuum generator, vacuum-making solenoid valve (Normally Open), solenoid valve-type vacuum release valve, filter and vacuum switch with digital display)



●VDA-type joint dimensions

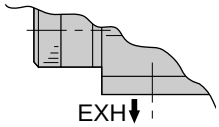


unit:mm

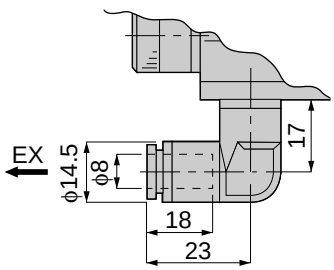
	Tube dia. ϕD1	Tube dia. ϕD2	L1	L2	C1	C2
P Port	4(5/32)	-	6	-	11	-
	6(1/4)	-	9	-	12	-
	8(5/16)	-	17.5	-	18.5	-
V Port	-	4(5/32)	-	9.5	-	11
	-	6(1/4)	-	12.5	-	12
	-	8(5/16)	-	21	-	18.5

( ):inch

●Silencer (exhaust) common to VKA/VKB



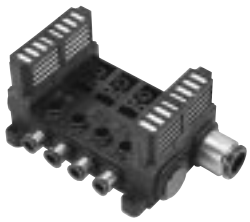
●Exhaust port joint (elbow) common to VKA/VKB

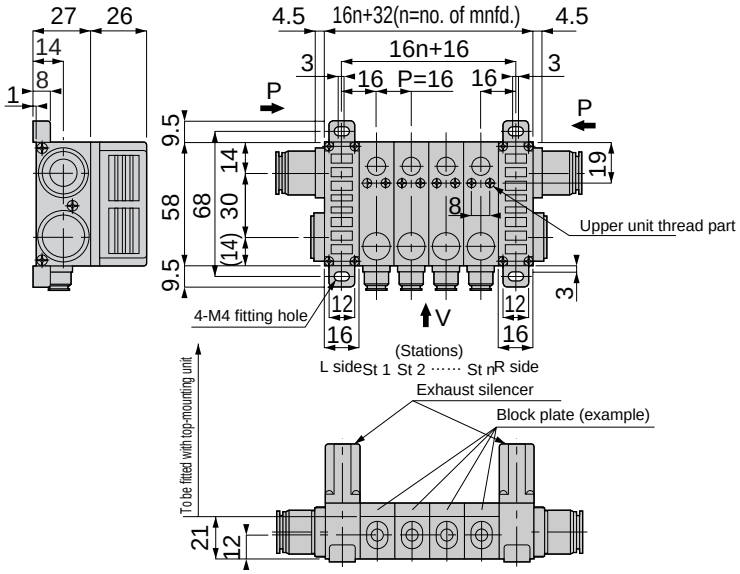


unit:mm

CAD **VKM**

VKM Manifold
(Open-to-Air Type)

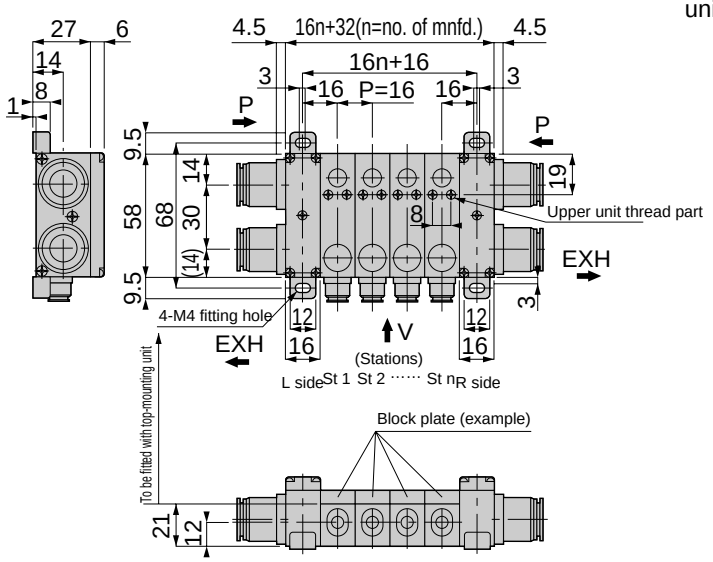




unit:mm

CAD **VKM**

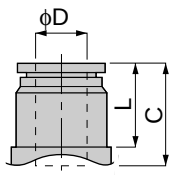
VKM Manifold
(Concentrated Exhaust Type)



●Supply port Joints

●Straight type

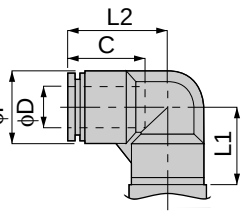
unit:mm



Tube dia. ϕD	L	C
6(1/4)	11	17
8(5/16)	12	18
10(3/8)	14	20
12(1/2)	19	23.5

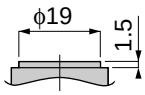
●Elbow type

unit:mm



Tube dia. ϕD	ϕP	C	L1	L2
8(5/16)	14.5	18	17	23
10(3/8)	17.5	20	21	26.5
12(1/2)	21	23.5	23	29.5

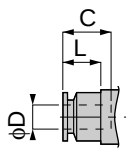
●Tap



●Vacuum port Joint

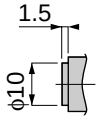
●Straight type

unit:mm



Tube dia. ϕD	L	C
4(5/32)	6	11
6(1/4)	9(16)	12(17)
8(5/16)	17.5	18.5

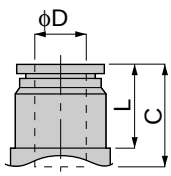
●Tap



●Exhaust port Joints

●Straight type

unit:mm

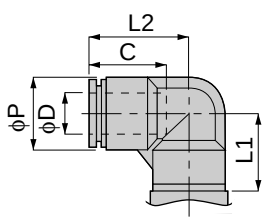


Tube dia. ϕD	L	C
8(5/16)	12	18
10(3/8)	14	20
12(1/2)	19	23.5
16(5/8)	23.5	24.5

●Exhaust port Joints

●Elbow type

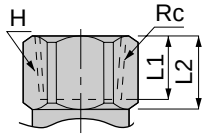
unit:mm



Tube dia. ϕD	ϕP	C	L1	L2
8(5/16)	14.5	18	17	23
10(3/8)	17.5	20	21	26.5
12(1/2)	21	23.5	23	29.5

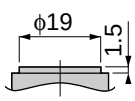
●Internal thread Type

unit:mm



Rc	H	L1	L2
Rc1/4(1/4NPT)	22	10	14
Rc3/8(3/8NPT)	22	10	14
Rc1/2(1/2NPT)	24	13	17

●Tap



Precautions for UsingManifolds

■As manifolds increase in number, unsatisfactory performances or troubles may possibly result due to the following reasons. In that event, contact one of our sales offices.

1) When vacuum performance drops due to insufficient supply air.

Countermeasures : (1) Check amount of supply air.
(2) Shorten piping as much as possible.
(3) Use larger-size joints.
(4) Supply air from both sides of the manifold.

2) When vacuum performance drops or exhaust air comes out of other station's vacuum port due to insufficient exhaust port capacity. →Depending on nozzle size, vacuum performance or etc. manifold numbers are made available which are good enough to maintain the required performance capability when manifolding. Contact one of our sales offices.

Cause of trouble with silencer type: Increased exhaust air resistance due to insufficient silencer capacity results in a decline in performance.

Countermeasures : If the one currently in use is a single-sided silencer, replace it with a double-sided silencer.
Install an external silencer. (Special order)
Introduce individual exhausting for each station. (Special order)
Keep the exhaust part away from a wall and the like. Reduce the number of manifolds.

Cause of trouble with concentrated exhaust type: Performance drops due to increased piping resistance.

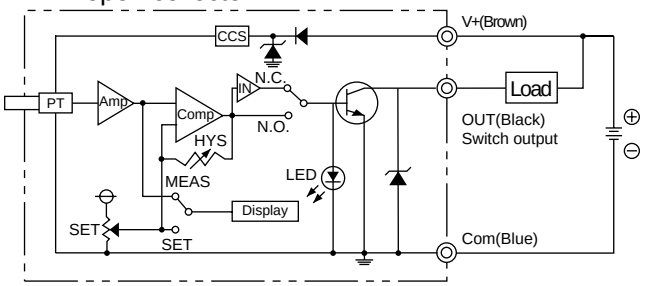
Countermeasures : If the one currently in use is of a single-sided exhaust, replace it with that of a double-sided exhaust.
Shorten piping as much as possible.
Use larger-size exhaust joints.
Introduce individual exhausting for each station. (Special order)
Reduce the number of manifolds.

Pressure Sensor with Digital Display

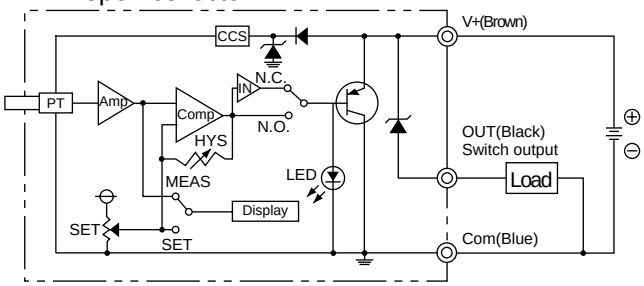
1. Wiring/piping

· Be sure to shut off the power before wiring.
· Take care not to short-circuit the output terminal (black) with the source terminal (brown) or Common terminal (blue).
· For connection, refer to the Connection with internal circuit below.
· Do not give strong drawer pull or extreme bending to the drawer cable.
· The cable can be attached to or detached from the connector part.
· To detach....Hold the cable and pull it out.
· To attach....Hold the connector part and plug in with its top and bottom set in proper directions.
(Note) Do not attempt to detach or attach the cable when not necessary because it entails load on the cable and substrate.

NPN open collector



PNP open collector



2. Pressure setting

(1) Select N.O. or N.C. with the output change-over switch.
N.O. (Normally Open): ON at the set pressure value or more
N.C. (Normally Closed): OFF below the set pressure value Turning on the current
(2) Apply the DC power after checking the wiring.
(3) Set the indication change-over switch in the pressure setting mode (SET).
(4) With the differential response setting trimmer (HYS),
set the differential response range at minimum by turning the trimmer counterclokwise to the full.
(5) Set the indication at a desired value by turning the pressure setting trimmer (SET) with a mini screwdriver.
(6) Set the change-over switch to MEAS and apply pressure to see if the sensor actually operates.
When in N.O. (Normally Open), the indication lamp (red LED) lights up at the set value or more.

3. Differential response adjustment

· Adjustment of differential response (hysteresis) can be made with the differential response adjusting trimmer (HYS).
· The differential response adjusting range is 0.5~10%F.S. Differential response diminishes as the trimmer (HYS) is turned counterclockwise and increases as it is clockwise.

[To confirm differential response]
Set the indication change-over switch to the pressure indication mode (MEAS). Gradually increase or decrease pressure in the proximity of the set pressure value to read the valuea as the LED lamp lights up and goes out.
The difference between the two readings becomes the differential response.

[Examples of differential response adjustment]
· Increase differential response when there is pulsation in pressure and the output repeats frequent intermittence.
· When you wish to set an allowed range for pressure drop.

Precautions

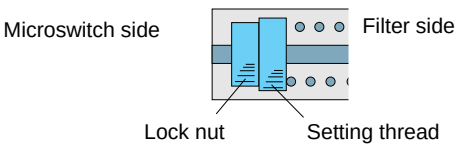
· This product is not of the drip-proof type. (Avoid using it where it is exposed to splashing water drops.)
· Do not use it with an ambience or gas containing a corrosive substance.
· Keep the fluid used as clean as possible.
· For power source, use DC which is stable.
· Incorporate a surge absorber circuit in relays, solenoid valves, relay, etc. which are to be connected with output and source terminals. Avoid any use which involves over 80mA in current.
· Ground the FG terminal when using a unit power source such as switching current.
· Take care not to short-circuit the output terminal (black) with any other terminal.
· Do not apply a forcible impact or excessive force from outside to the sensor body.
· Malfunctions may result if the wiring is designed or used in a way to allow noise to be applied.

Notes on Vacuum Switches

■When using VK vacuum switches, try to shorten the vacuum piping as much as possible.
■Lengthy vacuum piping gives rise to piping resistance when vacuum is generated. This can result in sensor malfunctions as the vacuum level for the sensor part rises even when no absorption is made. In case it is unavoidable for the piping to become lengthy, fix the simplex sensor type around the tip of the piping like the pad, etc.

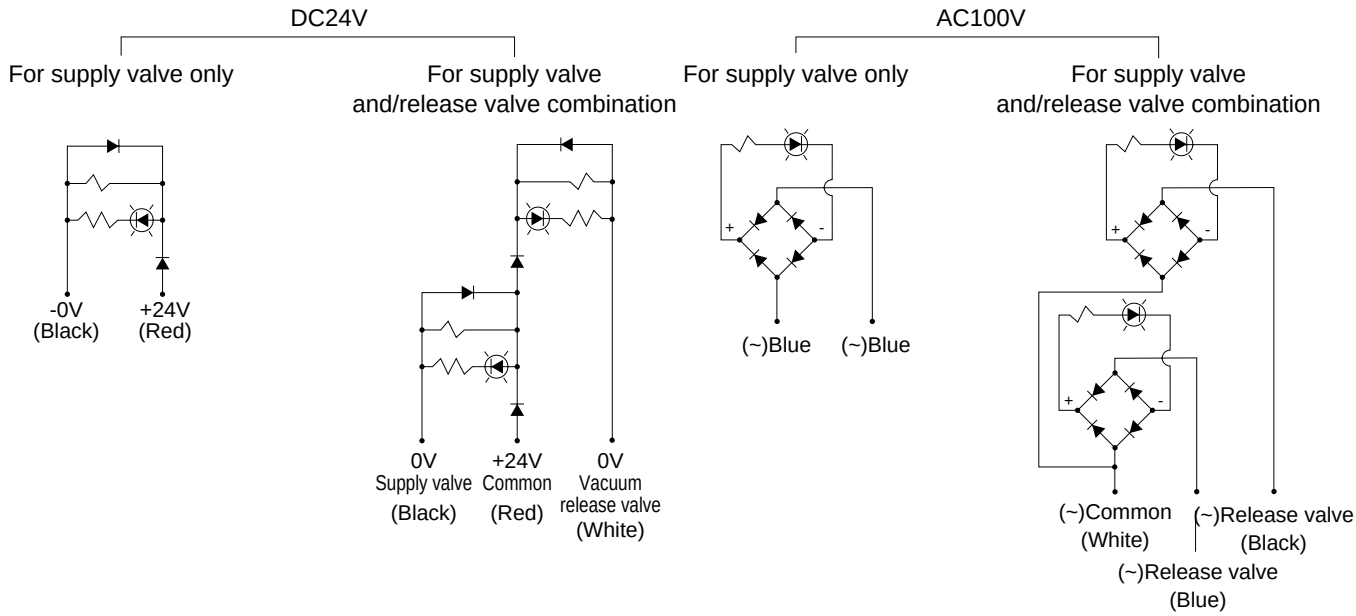
Mechanical Vacuum Switches

■For VK vacuum switches, use connector-type lead wires and carry out wiring referring to the diagram below.
■Adjust pressure with a setting thread after opening the cover with a screwdriver.
The set level of vacuum rises by turning the thread clockwise. Carry out adjustment after loosening the adjustment thread which is usually fixed with a lock nut. When adjustment is over, settle the thread with your finger, then tighten it with the lock nut. Remember to lightly hold down the cover with your finger so that it won't fly away while removing.
Call our local sales office to ask for repair if a malfunction or trouble should occur.

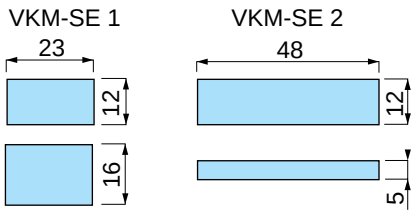


Lead wire color	
White	Common
Red	N.C.
Black	N.O.

Solenoid valve (Circuit diagram)



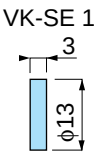
●Silencer Element for Manifold



※Silencer element SET for manifold.
(Note) A single-sided silencer incorporates built-in elements corresponding to SET.

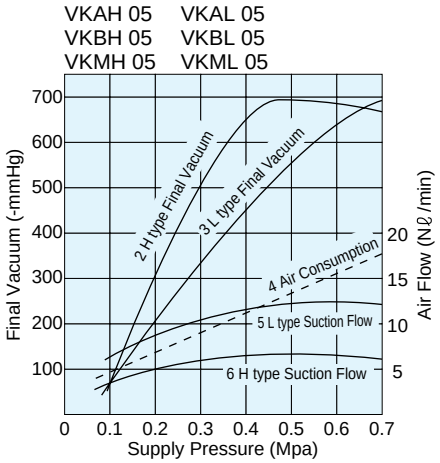
VKM-SET { VKM-SE 1 2pcs. / VKM-SE 2 1pc.

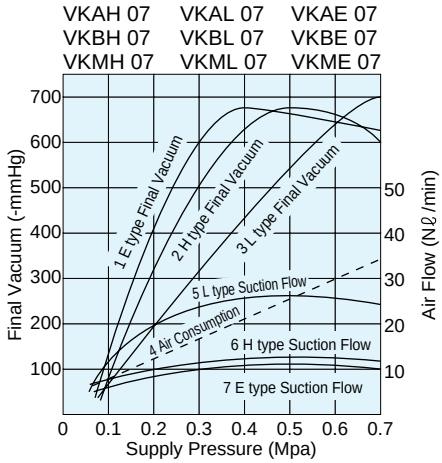
●Stand-alone type Silencer Element

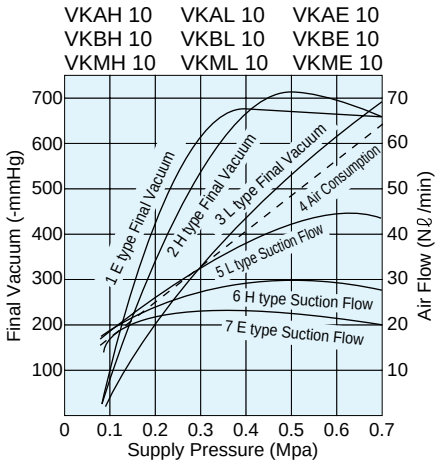


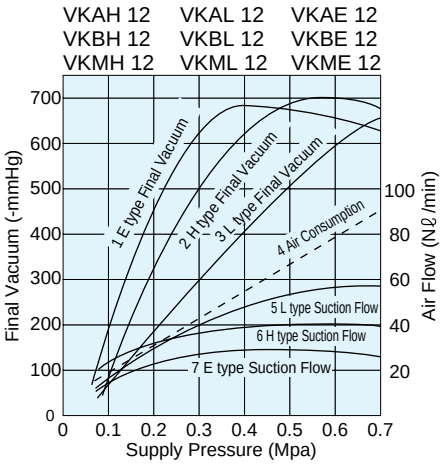
Vacuum Series Vacuum Generator VK Type

Characteristics









Note 1 : In the characteristics shown above, supply pressures refer to those when vacuum is generated.

Note 2 : In the characteristics shown above, an odd noise may be heard when supply pressures immediately before the peak of vacuum levels (H (High vacuum) type: 0.39~0.44MPa [56.6~63.8psi], and E (Economy) type: 0.28~0.31MPa [40.6~45.0psi]). The sounding of this odd noise means the characteristics are unstable. If nothing is done, the sound may become even noisier. This situation can also adversely affect the sensor, resulting in a malfunction or trouble. So reset the supply pressure.

(Ex. 1: When the vacuum generator H type is in operation with the original pressure of 0.49MPa (71.0psi), the odd noise began to be heard due to a drop in supply pressure to 0.42MPa (60.9psi). →Reset the supply pressure for the vacuum generator in operation at 0.49MPa (71.0psi).)

Note 3 : Piping design and equipment selection should be made with an effective sectional area being 3 times as large as the nozzle diameter as a atandard.

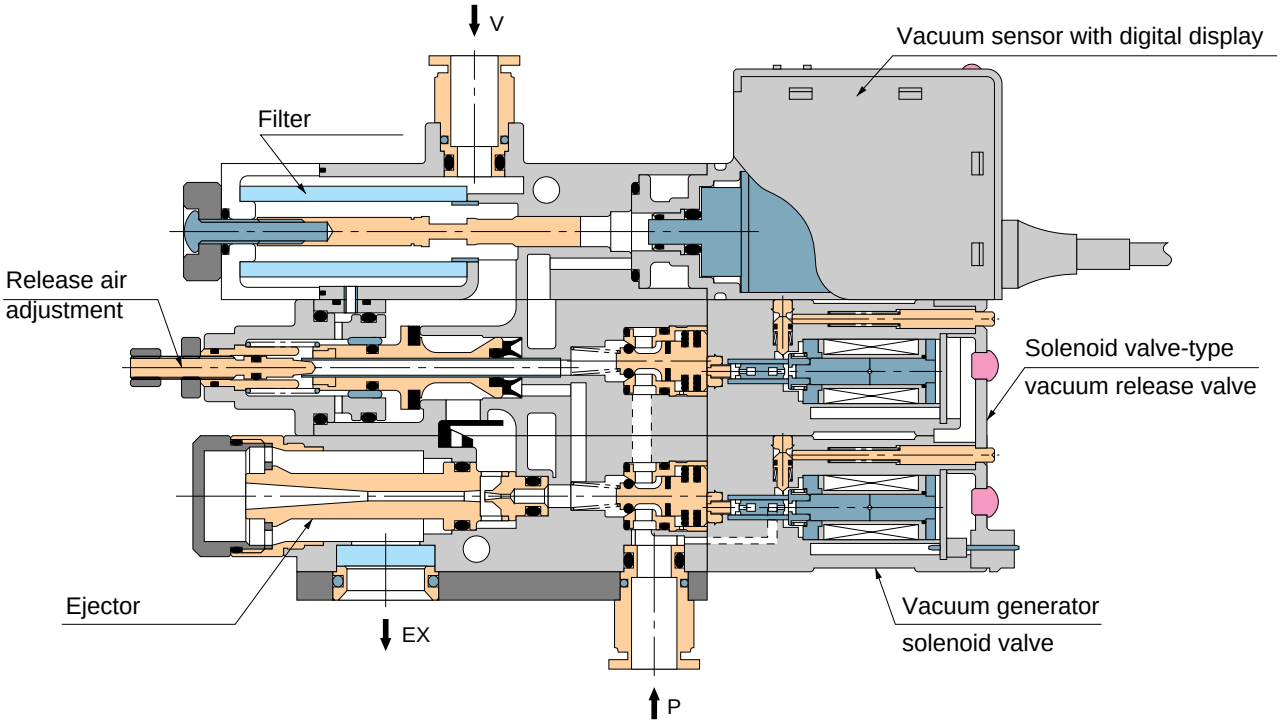
Satisfactory vacuum characteristics are not obtained unless sufficient supply air flow is secured.

(The odd noise is heard even when pressure is at the set value, suction flow is insufficient, the final vacuum is falling short of the required level, etc.)

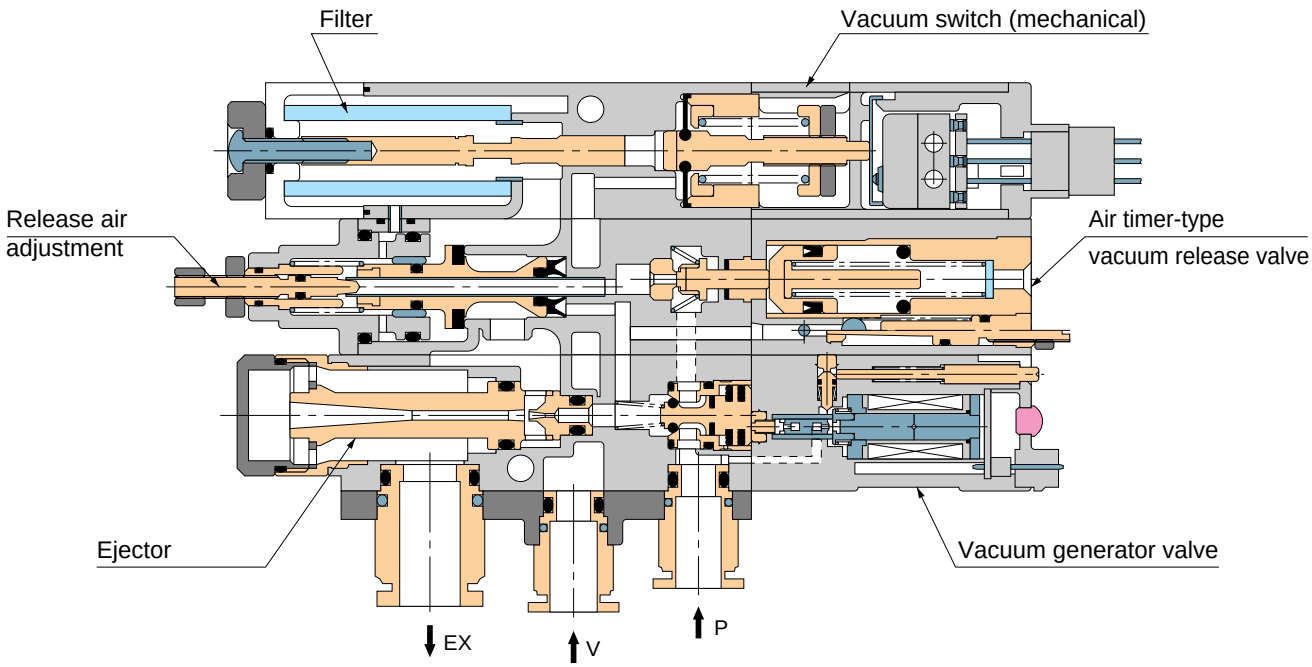
(Ex. 2: For a vacuum generator with the nozzle diameter of 1.0mm (0.039in.), carry out piping design and equipment selection so that 2.3mm^2 (0.12466 Cv) or more of effective sectional area can be secured, based on a calculation: sectional area $0.5^2\times\pi=0.785mm^2\times3=2.35mm^2$ ($0.00364in.^2$).) →Supply air flow is insufficient. (Supply air flow sufficient enough to satisfy the characteristics is not obtained because piping resistance and other factors as a constrictor reduces the amount of supply air at just this side of the vacuum generator. →Design the piping and select equipment that are good enough to secure the effective sectional area required.)

Construction

Example 1. VKA□□□W···Solenoid valve-type vacuum release valve(Vacuum generator valve normally closed)



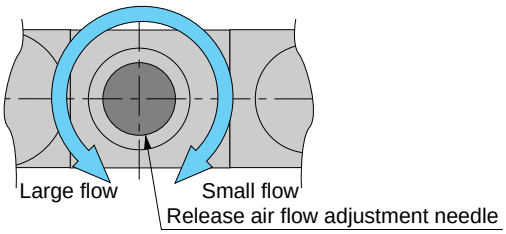
Example 2. VKB□□□Q···Air timer-type vacuum release valve(Vacuum generator valve normally closed)



Adjustment

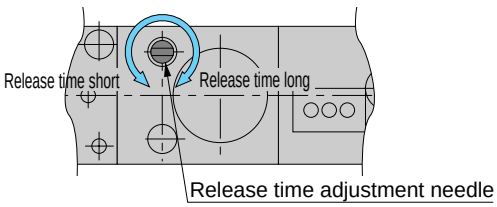
■Vacuum release air (Solenoid valve-type vacuum release valve, Air timer type Vacuum release valve)

· Amount of release air is reduced when the needle is turned clockwise, while it increases when the needle is turned counterclockwise.



■Release time of air timer-type vacuum release valve

· Release time is increased when the release time adjustment needle is turned clockwise where it decreases when turned counterclockwise.

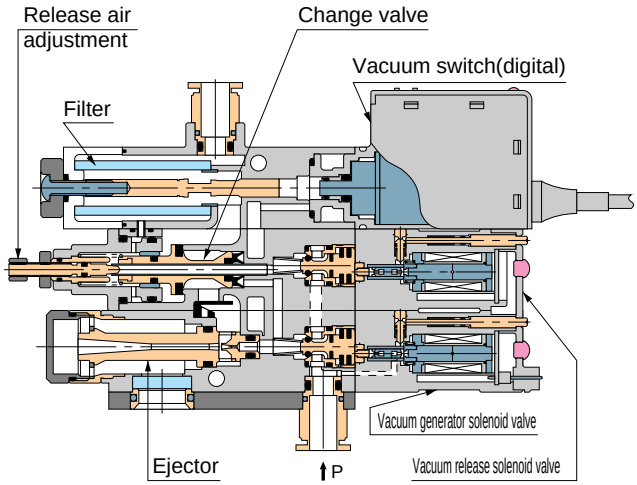


Operation diagram

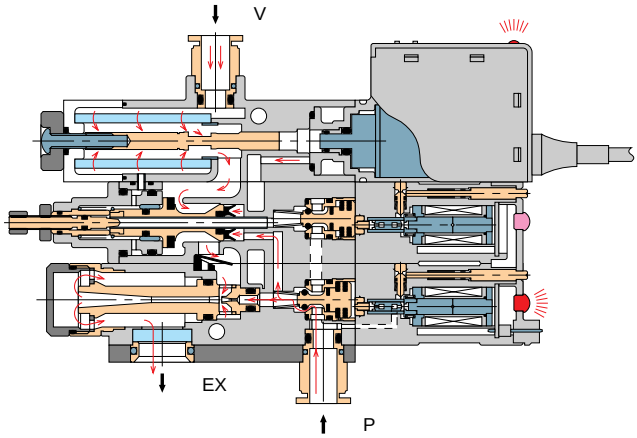
Example 1. VKA□□□W·····E

Vacuum generator solenoid valve(Normally closed), Vacuum release solenoid valve, Filter, Vacuum switch with digital display

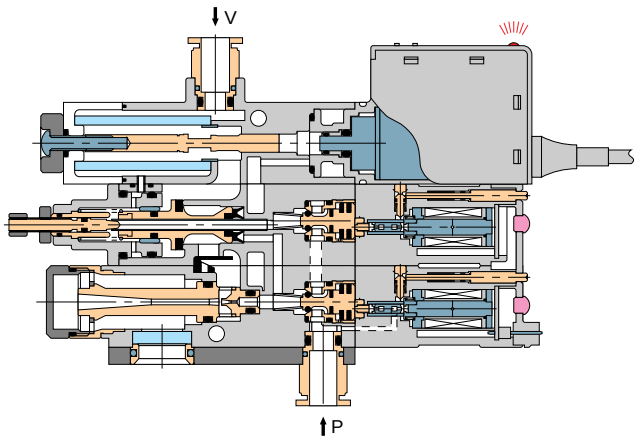
(1) Stand-by



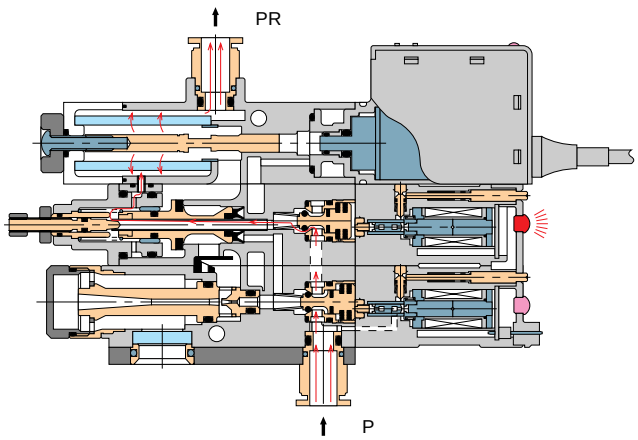
(2) Generating vacuum



(3) Maintaining vacuum

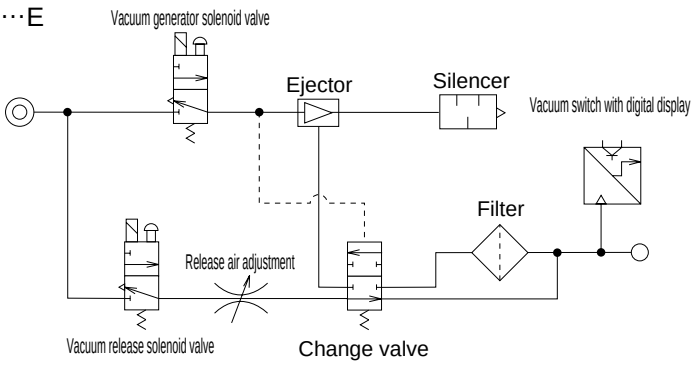


(4) Releasing vacuum



Circuit

VKA□ □□W·····E



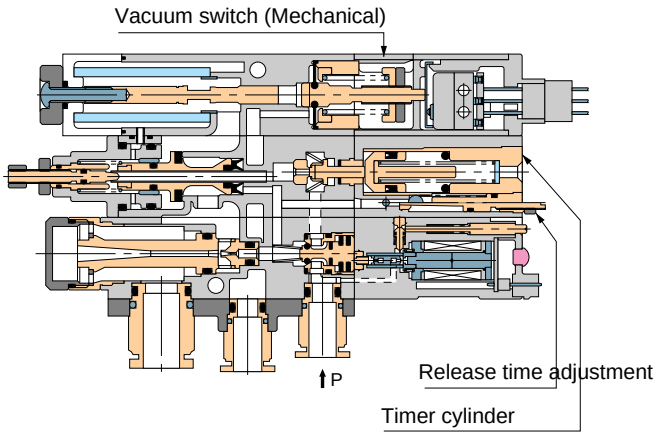
Vacuum Series Vacuum Generator VK Type

Operation diagram

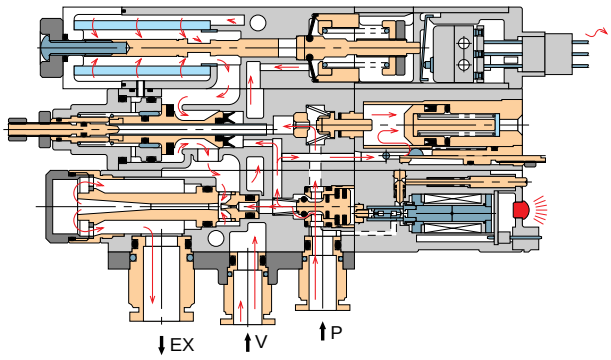
Example 2. VKB□□□Q·····E

Vacuum generator solenoid valve(Normally closed), Air timer-type vacuum release valve, Filter, Mechanical vacuum switch

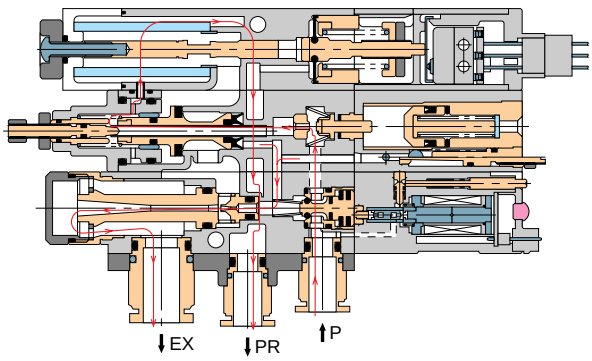
(1) Stand-by



(2) Generating vacuum

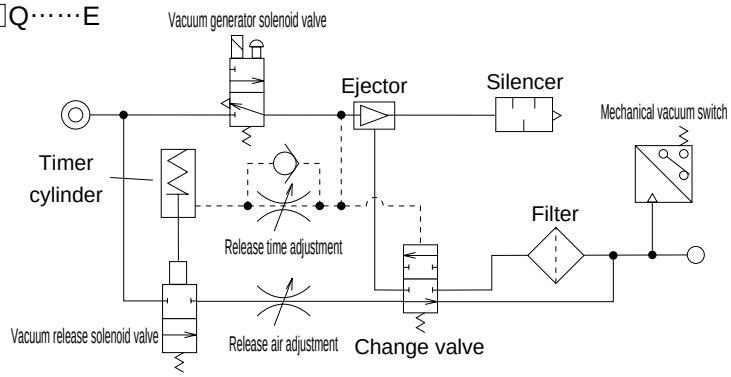


(3) Releasing vacuum (Right after vacuum generator valve is shut off)



Circuit

VKB□ □□Q·····E



Vacuum Pad

Theoretical Suction Force

⚠Caution

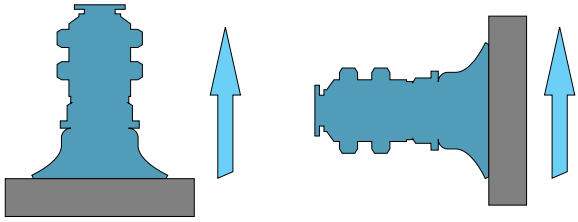
From the pad area and the vacuum level created in the pad, the theoretical suction force can be calculated as follows:

$$W=\frac{C\times P}{760}$$

W=Theoretical suction force(kg)
C=Pad area (cm^2)
P=Vacuum level (-mmHg)

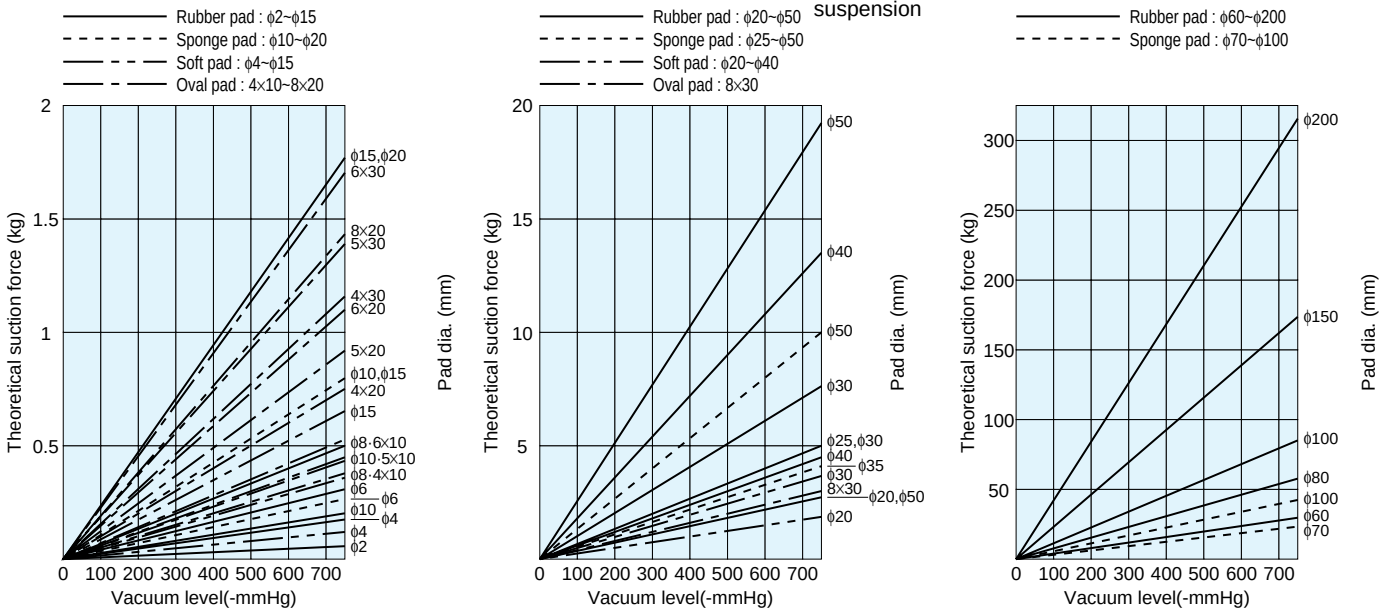
*Refer to the table below for the suction force of the soft pad, which is different from the theoretical value obtained by the calculation formula.
*As to a sponge pad, use the inner area for the calculation.

*The theoretical suction force is calculated under a completely static condition. In actual operation, therefore, suction force must be understood to be reduced to 1/2 of the theoretical suction force for horizontal suspension or 1/4 of the force for vertical suspension. (Remember 1/2 and 1/4 as the safety factors.) In addition, the acceleration must be taken into account when a part is to be moved by the pad.



Horigontal suspension

Vertical suspesion



Information for selection

●Characteristics of pads

Material / Condition	Nitrile rubber	Silicon rubber	Urethane rubber	Fluoric rubber	Fluoro Silicon rubber	Sponge
Work with smooth surface	◎	○	○	◎	○	○
Work with rough surface	×	○	○	×	○	◎
Service temprature upper limit	130°C (266°F)	280°C (536°F)	60°C (140°F)	300°C (572°F)	200°C (392°F)	120°C (248°F)
Service temprature lower limit	-10°C (14°F)	-70°C (-94°F)	-30°C (-22°F)	-40°C (-40°F)	-20°C (-4°F)	-50°C (-58°F)
Durability	◎	△	○	◎	○	△
Acid proof	○	△	×	◎	○	△
Alkali proof	○	◎	×	×	×	○
Oil proof (benzol)	△	△	○	◎	◎	×

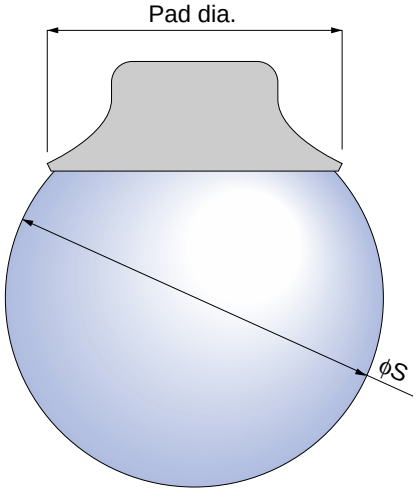
◎: Very good, ○: Good, △: Poor, ×: Very poor

*The upper and lower limits of the service temprature specified above are for a momentary exposure. As a safety factor, 3/4 of the theoretical suction force must be taken into account when the pad is kept at a constant temprature for a long time.

●Holding of sphere (Deep-type pad)

Minimum Holdable Size

Pad dia.(mm)	ϕ15 (0.59in.)	ϕ20 (0.79in.)	ϕ25 (0.98in.)	ϕ30 (1.18in.)	ϕ40 (1.57in.)	ϕ50 (1.97in.)
Sphere dia.(ϕSmm)	ϕ20 (0.79in.)	ϕ30 (1.18in.)	ϕ40 (1.57in.)	ϕ50 (1.97in.)	ϕ80 (3.15in.)	ϕ100 (3.94in.)



⚠Common Safety Instructions for Vacuum Pads

Be sure to read the following instructions before selecting and using the PISCO devices. Also read the detailed instructions for individual series.

⚠Warning

1.Where there is the danger of work dropping, provide some drop prevention means to assure safety.

2.When installing the pad holder, make sure that it is fixed securely. Looseness may cause trouble.

3.Take special care of the screwed pad which performs swinging transport. Swinging can loosen the screws, thus leading to trouble.

4.Trouble may arise from leaks or clog in the vacuum circuit, wear, cracking or deterioration of the pad, galling of the sliding part of the pad holder or loosenes at connections. Therefore be sure to carry out periodic maintenance and checks.

5.For applications involving transport by the Pad, take acceleration, shocks and draft pressure into consideration. Otherwise work may drop during transport.

⚠Caution

1.Select the pad material as instructed to best suit for your service environment and conditions.

2.Select the pad form (type) according to the type and form of work to be held. Read the manual carefully for the right choice.

3.Use a spring-type holder when the work height varies or when the work is subject to damage by external forces. Confirm the specified spring force and stroke in the manual before use.

4.When using a spring-type holder, which has a sliding part, take care to minimize the lateral forces. Otherwise the holder life will be shortened and malfunction will be caused.

5.When replacing the pad, confirm the procedure by checking the Vacuum Pad drawing in the manual. Then tighten it with a proper tool at the recomended tightening torque (see table below), using the hexagonal part of the holder and then make sure that there is no looseness.

6.When replacing the filter element of the Pad with filter, confilm the procedure by checking the Vacuum Pad drawing in the manual.

● Table Recommended Tightening Torque

Pad thread size (mm)	Tightening torque	
M4×0.7	0.25~0.4N·m(0.18~0.30lbf·ft)	
M6×1	1.4~2.4N·m(1.03~1.77lbf·ft)	
M10×1.5	Pad dia : ϕ60mm(ϕ2.36in.) 5~6N·m(3.69~4.42lbf·ft)	Pad dia : ϕ80mm(ϕ3.15in.), ϕ100mm(ϕ3.94in.) 8.3~9.3N·m(6.12~6.86lbf·ft)
M20×2	9~10N·m(6.64~7.38lbf·ft)	

7.Handle the joint by observing the "Common Safety Instructions for Quick-Fitting Joints".

8.Please refer to the Common safety Instructions for Quick-Fitting Joint for handling the Filtings.