

Waterproof Vertical Type Limit Switches

VCL Series

2 sets of SPDT built-in switches enable use as a 2-point detection switch or multi-circuit control switch.



- On the 2-point detection (center-neutral) switch, two different internal switches operate according to the direction (CW or CCW) of actuator rotation
- A single switch can detect two points (valve upper/lower limit, fully open/closed, etc.)
- On the multi-circuit control type, the two switches operate simultaneously according to actuator rotation
- High sensitivity (P.T.=10°, M.D.=3°)

ORDER GUIDE

Model selection guide: I II III IV Example: **VCL-5001-K**

I	II	III	IV	Description	O.F. (N)	P.T. (°)	M.D. (°)
Basic catalog listing	Operation method	Actuator shape	Custom specifications	Large water-proof vertical type limit switches	Max. 15.7	Max. 10	Max. 3
				2-point detection (center-neutral) type			
VCL-	50			Multi-circuit simultaneous control type			
	51			Roller lever (lever length = 30mm)			
		01		Adjustable roller lever			
		03		Standard load type, silver contact			
			Blank	Low current load type, gold alloy cross point contact			
			-K	Heat-resistant type (100°C)			
			-H	Cold-resistant type (-40°C)			
			-L				

• Contact operation

	Center-neutral			Simultaneous		
	Contact configuration and terminal No.					
	CCW operation	Free position	CW operation	CCW operation	Free position	CW operation
Switch 1						
Switch 2						

- Head mounting direction:
- Only two directions (front and rear) can be set on a center-neutral type. When the direction is set to the rear, operation of switches 1 and 2 is reversed.
 - The head can be set in all four directions on a simultaneous operation type.

PERFORMANCE

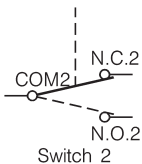
Item		Details	
External standards	Conformed standards	NECA C 4508	
Structure	Contact type	Single-Pole Double-Throw (SPDT) ×2	
	Contact shape	Standard load type: Pure silver rivet, Low current load type: Gold alloy cross point	
	Terminal shape	Screw (M4 binding head machine screw with toothed washer)	
	Protective structure	IP67 (IEC60529, JIS C 0920)	
Electrical performance	Electrical rating	Standard load type	250Vac-5A, 125Vdc-0.4A, 250Vdc-0.2A
		Low current load type	125Vac-0.1A, 30Vdc-0.1A
	Dielectric strength	Between non-continuous terminals: 600V, 50/60Hz for 1 minute Between each terminal and non-conducting metal part: 2,000V, 50/60Hz for 1 minute Between each terminal and ground: 2,000V, 50/60Hz for 1 minute	
	Insulation resistance	Max. 100MΩ (by 500Vdc megger)	
	Initial contact resistance	Silver contact: Max.50 mΩ (6 to 8 Vdc, energizing current 1A, measured by voltage drop method) Gold alloy cross point contact: Max.100 mΩ (6 to 8 Vdc, energizing current 0.1A, measured by voltage drop method)	
	Recommended min. contact operating voltage/current	24Vac/dc-10mA, 12Vac/dc-20mA	
	Temperature rise	Max. 30°C Terminal temperature measured by thermoelectric thermometer after energizing by rated current	
Mechanical performance	Actuator strength	Withstand load 5 times O.F. (operating direction for 1 minute)	
	Terminal strength	Withstand tightening torque strength of 0.6N-m for 1 minute	
	Impact resistance*	200m/s ² , Contact release of 1ms max. at free position and operating limit positions	
	Vibration resistance*	Frequency 10 to 55Hz, 1.5mm peak-to-peak amplitude for 2 continuous hours Contact release of 1ms max. at free position and operating limit positions or operating limit position	
	Allowable operating speed	0.3mm/s to 0.5m/s Min. speed: Unstable state of contacts 0.1s max. Max. speed: Actuator damage not allowed	
	Mechanical operating frequency	Max. 120 operations/minute	
Life	Mechanical life	Min. 2 million operations	
	Electrical life	Min. 100,000 operations (250Vac-3A resistive load)	
Environmental conditions	Operating temperature range	-10 to +70°C	
	Operating humidity range	98%RH max.	
Recommended tightening torque	Body	5 to 6N-m (M5 hexagon socket head bolt)	
	Terminal	0.4 to 0.6N-m (M4 binding head machine screw with toothed washer)	
	Operation head	1.3 to 1.7N-m (M3.5 screw)	
	Actuator	4 to 5.2N-m (M5 screw)	
	Cover	5 to 6 N-m (M5 hexagon socket head cap screw with spring washer)	

Note: Items marked by * are values for catalog listing **VCL-5001**. Unmarked items are values common to all models in the **VCL-5000** Series.

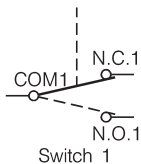
• Contact type

• Center-neutral type

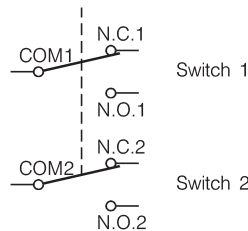
CCW operation



CCW operation



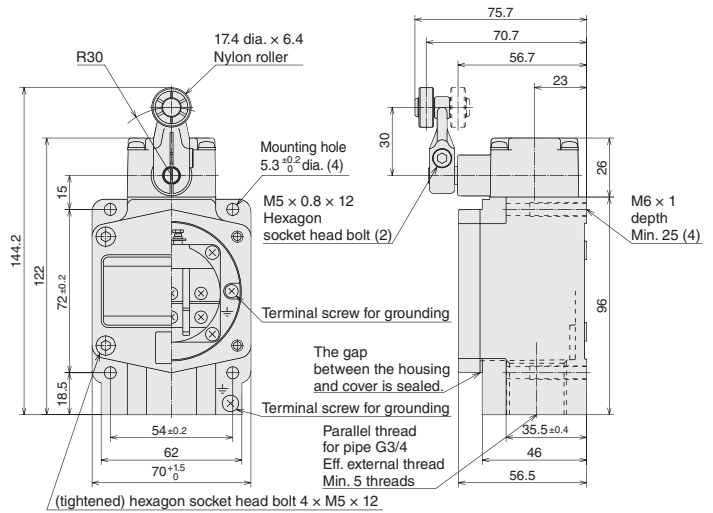
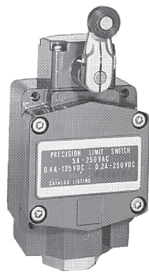
• 2-circuit simultaneous operation type



APPEARANCE, OPERATING CHARACTERISTICS AND EXTERNAL DIMENSIONS

(unit: mm)

• Roller lever type

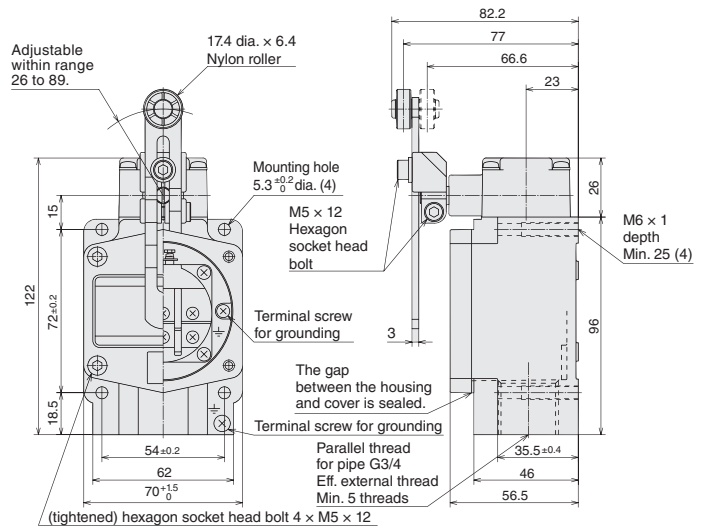
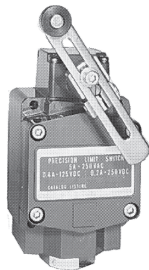


Model No.	Center-neutral	2-circuit simultaneous operation type
Catalog listing	VCL-5001(-H/K/L)	VCL-5101
O.F. (N max.)		15.7
R.F. (N min.)		2.2
P.T. (° max.)	10	12
M.D. (° max.)		3
O.T. (° min.)		35

Note: A G $\frac{3}{4}$ screw is threaded into the conduit section, and a blind stopper is assembled to ensure sealability up till wiring.

*Dimensional tolerance is ±0.8 unless otherwise specified.

• Adjustable roller lever type



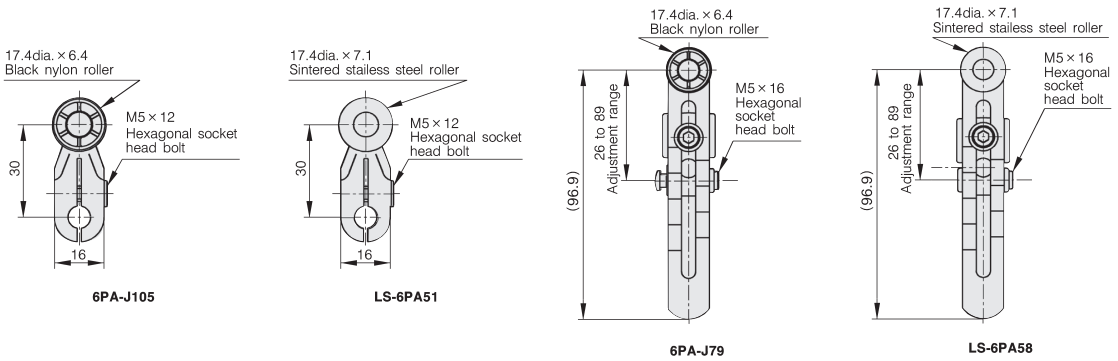
Model No.	Center-neutral	2-circuit simultaneous operation type
Catalog listing	VCL-5003	VCL-5103
O.F. (N max.)		15.7
R.F. (N min.)		2.2
P.T. (° max.)	10	12
M.D. (° max.)		3
O.T. (° min.)		35

Note: A G $\frac{3}{4}$ screw is threaded into the conduit section, and a blind stopper is assembled to ensure sealability up till wiring.

*Dimensional tolerance is ±0.8 unless otherwise specified.

● Auxiliary actuators

(unit: mm)



NOTES FOR USE OF VCL SERIES

1. Precautions for use

- This switch is not explosion-proof. If an explosion-proof switch is required, use the VCX-5*** series.
- Use this switch within the range described in the product specification.

2. Wiring

- Do not wire while the power is connected. Depending on the voltage used, there is a risk of electrical shock.
- Do not leave the switch unattended or use it with the cover or conduit section open. Doing so may allow water or dust to enter the switch, possibly causing a malfunction.
- Wire electric wires using crimp-type terminals with insulation so that they do not come into contact with the cover or housing.
- Securely tighten the cover and conduit. Insufficient tightening impairs sealing performance, leading to insulation failure and eventually preventing the switch from performing satisfactorily.
- Use a connector for the conduit section that has sealing performance equivalent to IP67 or higher.

3. Installing the switch

- Protective plugs should be left in until you begin connecting the wiring and conduit.
- Tighten each part of the limit switch to the appropriate tightening torque as described in the product specification. Overtightening will damage the threads or other parts. Insufficient tightening degrades the seal and other characteristics.

- Do not let the activating object come into contact with the lever arm. If it does, the actuator may become bent and the switch may not be able to return properly.
- Do not use leads with silicone rubber insulation, or silicone filler, or grease or oil containing silicone. They can cause contacts to fail to conduct electricity.

4. Precautions for adjustment

- Do not apply excessive force (5 times the O.F. or more) to the actuator beyond the travel limit position. Doing so may damage the switch.
- Set overtravel between 1/3 and 2/3 of the rated value. With a small overtravel, vibration or shock may cause the contacts to rattle or to make poor contact.

5. Environment

- Do not use the switch in an environment where strong acid or alkali is directly splashed onto it.

Before use, thoroughly read the “Precautions for use” and “Precautions for handling” in the Technical Guide on pages D-111 to D-122 as well as the instruction manual and product specification for this switch.