NAiS

COMPACT VL TYPE TOUCH LIMIT SWITCHES

VL-T Mini Touch (AZ84) Limit Switches

Operate just by touching lightly. Comes with sensitivity adjustment function and indicates operation.



Free attachment type Wire spring type

PRODUCT TYPE

Actuator	Part No.
Free attachment	AZ8430
Wire spring	AZ8469

FEATURES

1. Compact
Same size as the VL mini limit switch: a compact limit switch perfectly suited to space-saving requirements.

2. Sturdy construction
A sturdy construction comparable to any limit switch which uses a zinc die-cast body, a glass-weave reinforced plastic head, and a cover. The terminal cover also boasts excellent dust-proof and drip-proof capabilities.

3. Easy wiring
Because this unit uses the same terminal screw wiring method as the VL mini limit switch, the wiring space is large and the wiring work easy.

4. Highly accurate position detection
Because hardly any pretravel (P.T.) is necessary, highly accurate position detection is possible.

5. Detection of thin sheet materials is also possible
Because the movement differential (M.D.) is zero, detection of thin sheet materials is also possible.

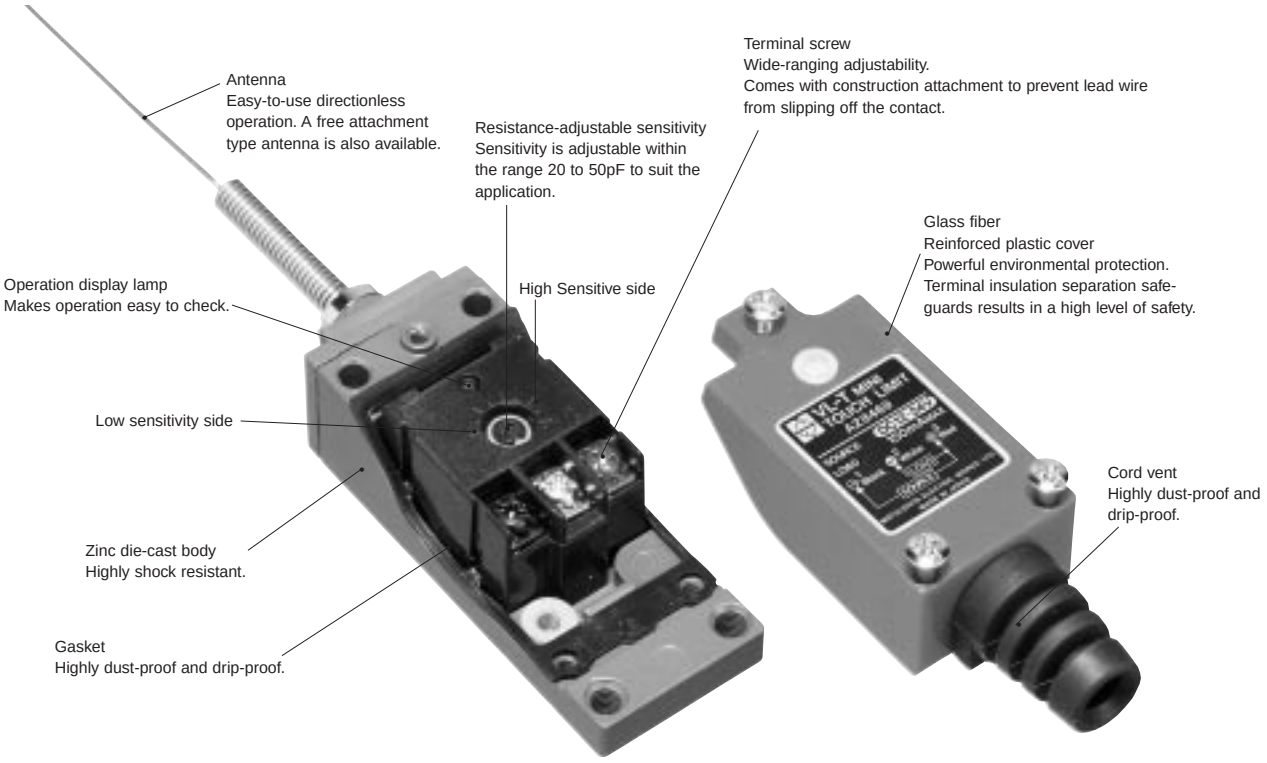
6. Level control of conducting fluids is also possible
Because contact detection is possible, the level of conducting fluids can also be controlled.

7. High frequency detection possible
Because the output is solid-state, there is no contact chatter or bounce. This makes for fast response speed and high frequency detection, with long unit life.

8. Comes with operation display lamp
Any operation can be verified by means of the blinking light-emitting diode.

9. Comes with sensitivity adjustment function
The sensitivity can be set appropriate to the application by adjusting the touch sensitivity.

PARTS NAMES AND FUNCTIONS



SPECIFICATIONS

1. Output Rating

Rated control voltage	12/24V DC (at 12V DC: approx. 6 mA, 24V DC: approx. 11 mA)
Response time	Max. 10ms
Output current	Max. 150 mA

Note) When used as a direct load, any DC type relay may be applied.

2. Characteristics

Allowable operating voltage		10 to 30V DC (Ripple factor: max. 10%)
Adjustable sensitivity		20 to 50pF
Vibration resistance	Functional	10 to 55 Hz, double amplitude of 0.3mm .012inch
	Destructive	16.7 Hz, double amplitude of 4mm .157inch
Shock resistance		Min. 980m/s² {100G}
Initial insulation resistance (At 500V DC)		Min. 100MΩ; Between each terminal, antenna and ground
Breakdown voltage		1,500V AC for 1 min Between each terminal, antenna and ground
Expected life (min. operations)		10^7 (at 500 cps, 150mA resistive load) (Antenna portion of wire spring type: operating speed 120 cpm at O.T.=20mm)
Power source ripple factor		Max. 10%
Ambient temperature/humidity		–20 to +60°C –4 to +140°F/Max. 95%R.H. (at 20°C 68°F)
Max. operating speed		500 cps (Antenna portion of wire spring type: 120 cpm at O.T.=20mm)
Detected object		Conductor

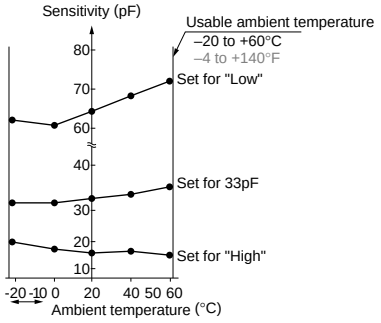
3. Protective characteristics

Protective construction	VL-T mini touch limit switches
IEC	
IP60	○
IP64	○

DATA

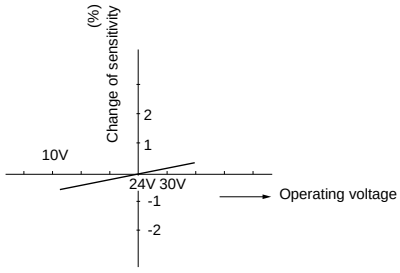
1. Temperature characteristics

(typical characteristics at 20°C 68°F)



2. Voltage characteristics

(typical characteristics at 24V DC)



APPLICABLE WIRE

Name of electric wire	Applicable wire		
	Wire stand	Conductor	Finished outside diameter
Vinyl insulation vinyl captive cord (round) (VCTF)	3-wire	0.75mm²	6 dia. to 9 dia.
		1.25mm²	
Rubber insulation vinyl captive cable (round) (RVCTF)		2.0mm²	

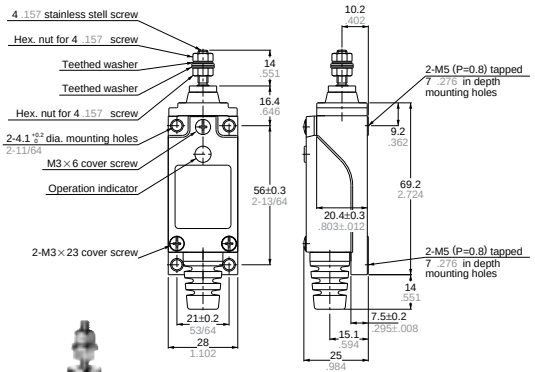
MOUNTING DIMENSIONS

The dimensions are the same as for the VL type limit switches. Refer back to the VL type data.

DIMENSIONS

mm inch

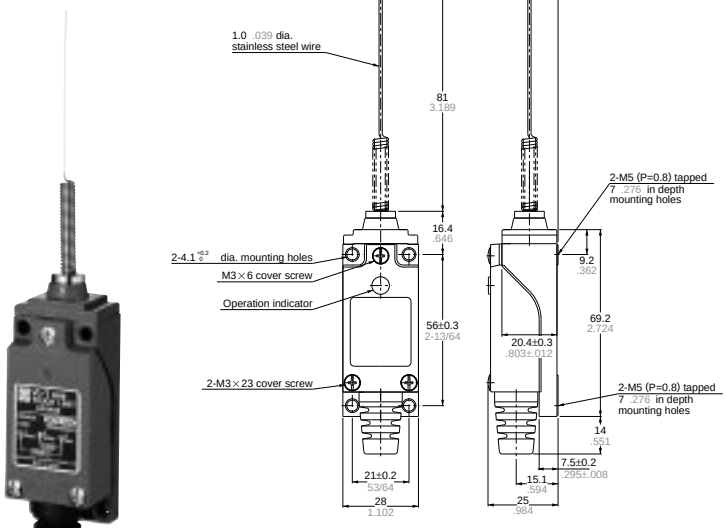
• **Free attachment type**





AZ8430

• **Spring wire type**



AZ8469

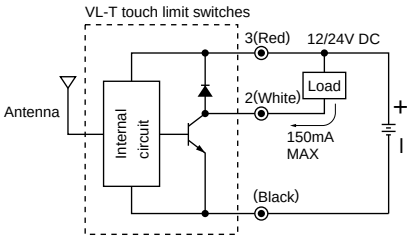
General tolerance: ±0.4 ±.016

WIRING

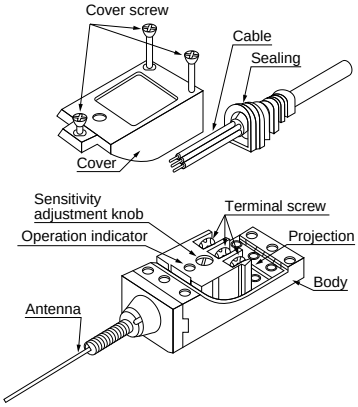
mm inch

If the wiring is miswired, the unit may be damaged. Ensure that the power ⊕ is connected to the red screw, and the ground ⊖ is connected to the black screw.

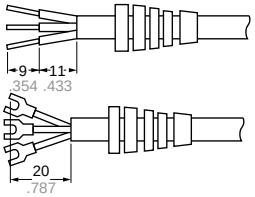
Wiring diagram



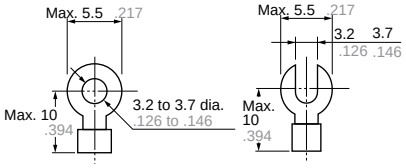
• Analysis figure



• Cable treatment



• Applicable connectors

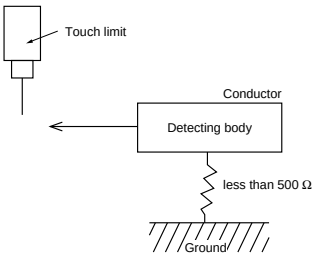


APPLICATION HINTS

1. Fundamental applications

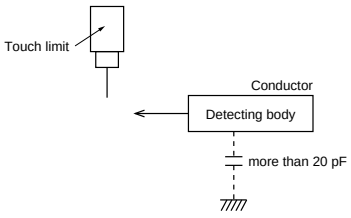
(1) Detection of grounded objects

The resistance between objects (conductor) and ground should be less than 500Ω; if they are grounded. It has nothing to do with the volume of objects.



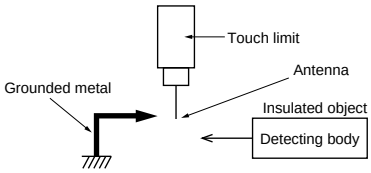
(2) Detection of ungrounded objects

Detection is possible if the surface area of objects is large enough and electrostatic capacitance between objects and ground is more than 20 pF. (more than approx. 30 cm³) For example, a human body has more than 60 pF electrostatic capacitance, therefore it can be detected.



(3) Detection of insulated objects

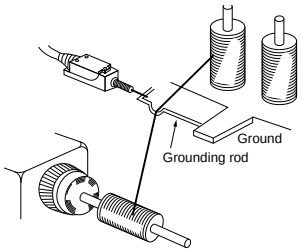
It is possible to detect insulated objects by having the antenna touch grounded metals, making use of the movement of the objects.



2. Typical applications

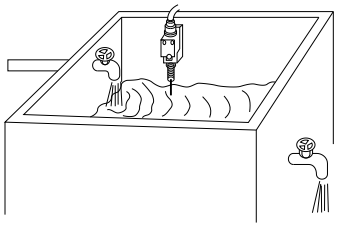
(1) Broken thread detection

When threads are snapped, the grounded rod will touch the antenna and actuate the switches. The force of the grounded rod can be small because just touching is enough.



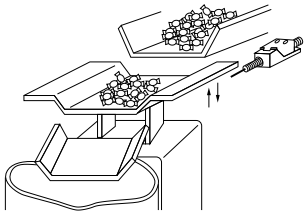
(2) Liquid level control

The switches are actuated when the antenna touches liquid materials (conductor). Liquid level control like the detection of overflow is possible.



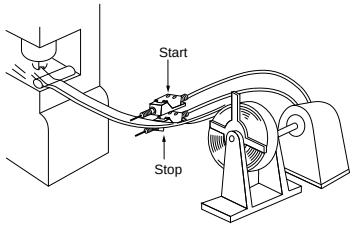
(3) Measuring equipment

A receptacle (conductor) is lowered down by the weight of measured objects, touches the antennas and actuates the switches. As there is almost no movement differential (MD), accurate measurement is possible.



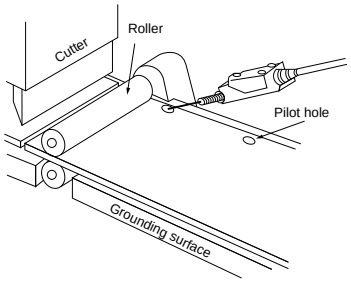
(4) Loop material detection

When loop materials are loosened, a motor stops and starts again when they are pulled.



(5) Detection of cloth and paper

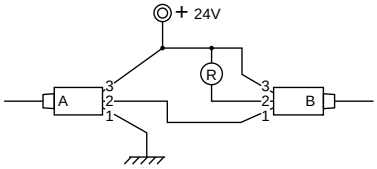
When cloth and paper are removed, the antenna touches ground and actuates the switches.



3. Construction of logic circuits

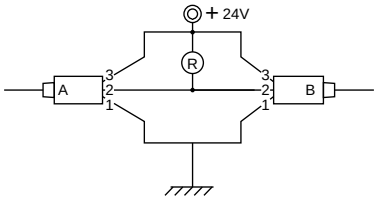
(1) AND circuit

Load R will operate only when both A and B touch limit switches are in detecting condition.



(2) OR circuit

Load R will operate when either A or B touch limit switch is in detecting condition.

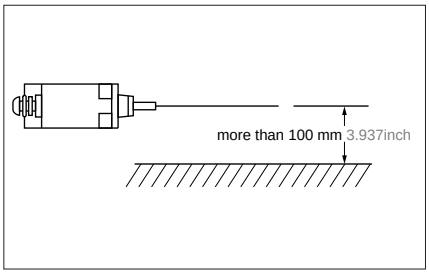


CAUTIONS

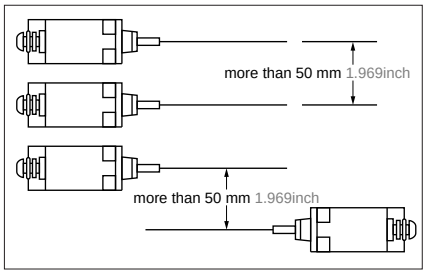
1. Antenna

(1) Antenna material:
Any kind of material is usable if it is conductive. Protect it from oil, dirt and rust which may lead to non-conductivity.

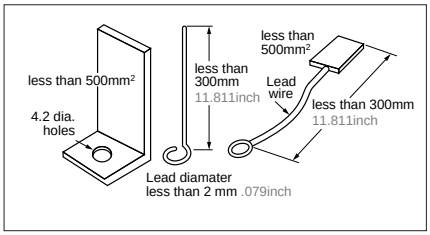
(2) Distance between antenna and ground:
At least 100 mm 3.937inch distance is required between antenna and earth ground.



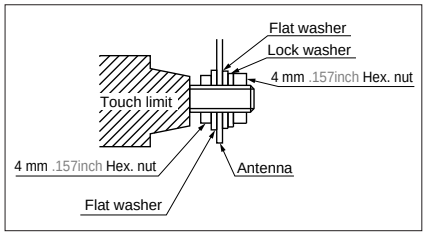
(3) Distance between antennas used in parallel:
More than 50 mm 1.969inch distance is required when two or more switches are used in parallel.



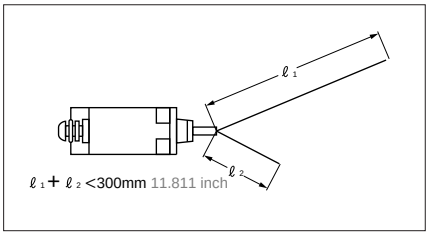
(4) Limitation of free attachement antenna:
Any kind of shape is usable. If it is too large, switches may malfunction. Total area should be within 500 mm² and maximum length should be 300 mm 11.811inch.



(5) Mounting of free attachment antenna:
Fasten it tightly using attached washers.



(6) Limitation of free attachment antenna (in the case of more than one antenna)
Total length should be less than 300 mm 11.811inch for line materials (dia. <2 mm .079inch) and total area should be less than 500 mm² for metal plates.



2. Ambient conditions

(1) Avoid using VL-T switches in the following conditions:
• In corrosive gases.
• In flammable or explosive atmospheres
(2) When VL-T detects water (conductor), its antenna can be immersed in water. Since its body is not of water tight construction, avoid using it in locations where water or oil can splash over it or dust is heavily accumulated.
(3) Avoid installing lead wires or antenna of VL-T in parallel with power wire.
(4) Surge absorbing elements are recommended to protect internal circuit when external surge voltage exceeds 500 V [at ± (1 × 40) µs single polarity all wave voltage].
(5) Heavy static electricity at the antenna may damage the internal circuit. Avoid using this switch where more than 3 kV of static electricity is present.
(6) When VL-T is operated by dry cells or batteries, DC power source with ⊕ polarity grounded by chassis, ground ⊕ or ⊖ polarity of power source.
(7) It is not necessary to ground main units.

3. Sensitivity adjustment

(1) Use a flathead screw driver and turn the sensitivity adjustment knob to the right (H) for higher sensitivity and to the left (L) for lower sensitivity. Max. 20 pF to min. 50 pF sensitivity adjustment is possible.
(2) Set the sensitivity a little higher than the detection level and provide a sensitivity allowance.

4. Refer to temperature and voltage

Characteristics in DATA in page 50 when temperature and voltage fluctuate extremely. Testing under a practical condition is recommended.