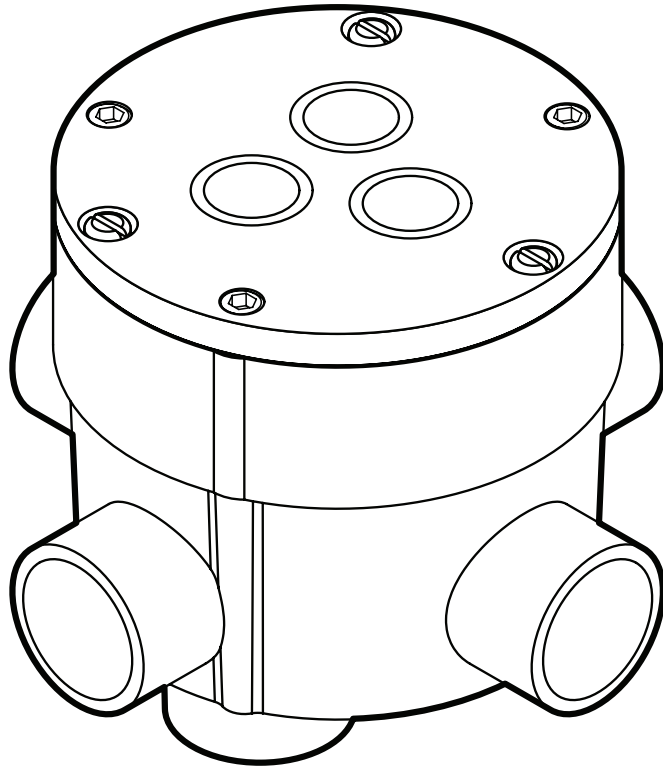


**eti**® **SNOW SWITCH® MODEL HSC-24**  
PAVEMENT-MOUNTED SNOW AND ICE SENSOR



## DESCRIPTION

The Snow Switch Model HSC-24, 24-volt Pavement-Mounted Snow and Ice Sensor reliably detects snow and ice conditions on pavement surfaces. The HSC-24 pavement sensor ensures that deicing heaters operate only while needed which minimizes energy costs without sacrificing snow melting effectiveness.

The HSC-24 is designed to be self-contained eliminating the need for an additional control panel, and it's independent relay-contact output is compatible with most heater control systems.

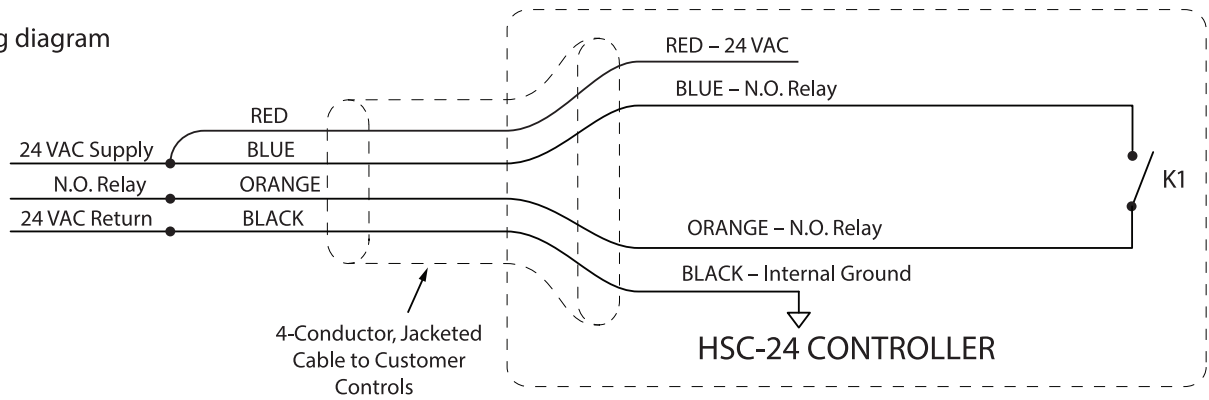
As part of a snow melting system, the HSC-24 sensor will signal for snow and ice melting at pavement temperatures below 38°F (3.3°C) while moisture in any form—including water, snow, sleet or ice—is present.





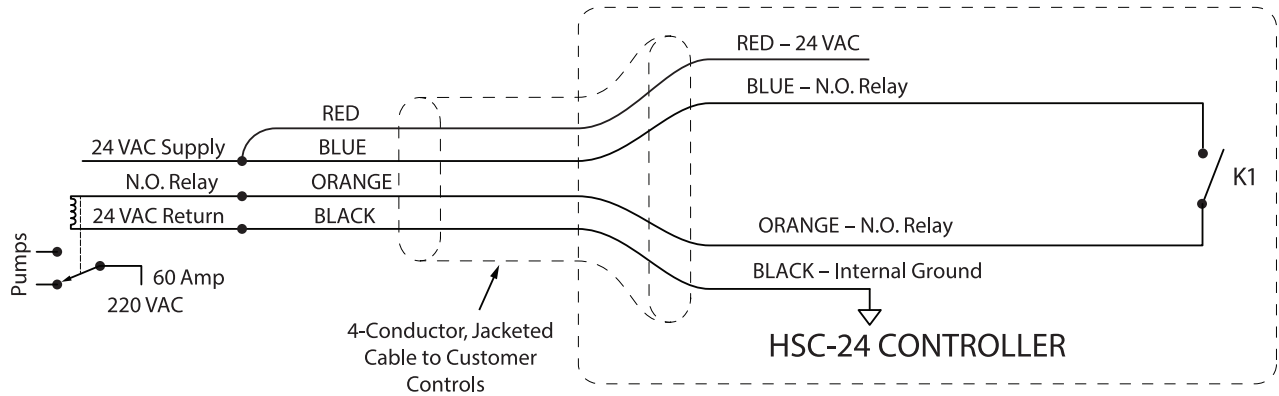


wiring diagram



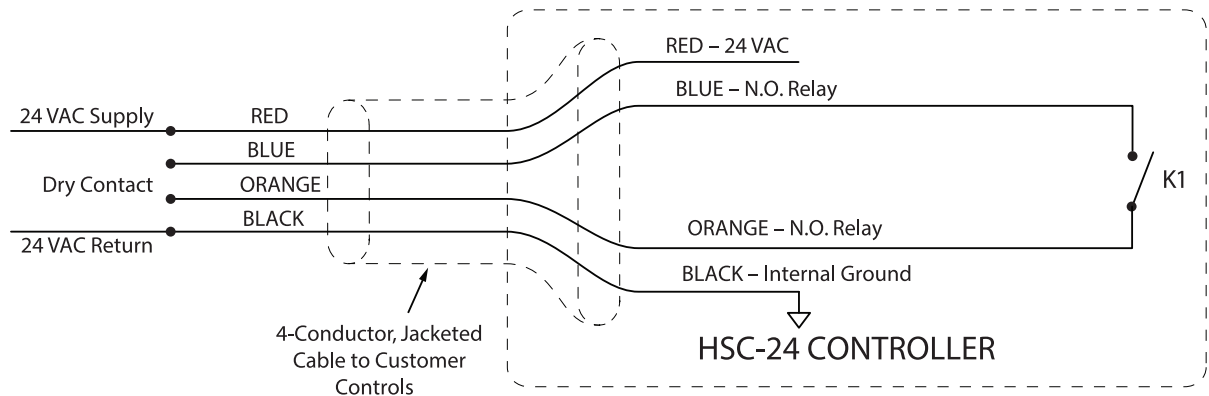
### HSC-24 Solenoids 24 VAC Wiring, Pumps < 1 Amp

FIGURE 4. Wire connections for 24 ac loads.



### HSC-24 "Ice Cube" Relay Wiring for Loads over 1 Amp

FIGURE 5. Wire connections for external relay with 24 ac coil.



### HSC-24 Wiring for Boiler Controllers

FIGURE 6. Wire connections for dry contact control.

## WIRING

Be sure to follow NEC and local code for all electrical connections.

A four-conductor direct-burial wet-environment cable is required to connect the HSC-24 sensor to the control panel. The 60-foot or 200-ft cable supplied with the HSC-24 meets these requirements. This may be extended up to 500 feet (152m) using 18 AWG 4-wire jacketed cable, or up to 2,000 feet (609m) using 12 AWG 4-wire jacketed cable.

Install all cables through conduit as indicated in the Conduit section.

Make sure that any cable runs greater than 60 or 200 feet are spliced together either in a suitable water-tight junction box or in some other water-tight or dry location.

Cable Connections for HSC-24 Snow Switch

Pavement Sensor:

### WIRE COLOR FUNCTION

**BLACK** Ground

**RED** 24 V Power (AC or full-wave rectified)

**BLUE** Sensor Output Signal

**ORANGE** Sensor Output Signal

### NOTE:

To call for heat, the blue and orange wires are connected together by the sensor's internal relay. These wires are interchangeable.

The HSC-24 can directly operate solenoids, pumps, or other loads up to a maximum of 60 W or 62 VA.

For applications of this type that operate at 24 V ac, see Figure 4.

For larger loads, the HSC-24 can operate a separate relay or contactor. Figure 5 shows the connections for an external relay with a 24 V ac coil.

Boiler controllers often need a dry contact closure to control their operation. The wiring for this type of connection is shown in Figure 6.

## TESTING

The sensor installation should be tested before being placed in service. The HSC-24 has an internal self-test mode which can be used to help verify correct operation. A Digital Volt Meter (DVM) is used to test its operation.

1. Verify the supply voltage to the sensor. With the system turned on, measure the voltage from the sensor's black lead to the red lead. By measuring with an AC range setting and then with a DC range setting, each type of voltage will be shown on the DVM. Depending on the controller used, the DVM readings should be 11-12 VAC and 24-28 VDC (with rectified source), 22-28 VAC and 0 VDC (with pure ac source), or 0 VAC and 22-26 VDC (with pulsed DC source).
2. Meter Connections for Self Test

During self test, the sensor's internal heater can be tested using the DVM as a current meter. The sensor current is measured with the DVM connected in series with the sensor power lead (the red wire). The meter can be set to DC amps when the sensor is being powered by a functioning ETI control panel. It can be set to AC amps when the unit is powered with a separate 24 VAC power supply. When the heater is off, the current will be about 5 mA. When the heater is on, the current will be about 250 mA.

During self test, the sensor's output signal can be tested with a voltmeter while the output lead is connected to a functioning control panel. The voltage is measured from the Blue lead to the Orange lead.

When the temperature is above 38°F or the sensor is dry, the output will be OFF. In this case there will be a voltage present from Blue to Orange (the voltage will depend on the system controller).

When the output is turned ON, the voltage from Blue to Orange will be zero volts.

The sensor can also be tested with at least one of the Blue and Orange leads disconnected, using the continuity-test mode on the DVM. When the output is OFF, Blue and Orange will be open; when the output is ON, they will have continuity.

3. After the meter connection is made, initiate the self-test mode as follows. A system power switch or temporary connection for the red power lead is needed to allow briefly interrupting the supply voltage to the sensor. See Figure 5.

- a. Power is applied to the sensor.
- b. Then between 0.1 second and 4 seconds later, the power is very briefly interrupted - for 50 to 100 milliseconds - and then reapplied. This can be done with a power switch, using a clip cable, or by temporarily wiring a normally-closed pushbutton so that it can be very briefly pressed.
- c. The power is maintained after that power-up pulse, and the self-test then begins.

The self-test mode can be identified by the initial increase in current draw (part 5a, below). If that does not happen, it may be that self-test mode was not entered; this happens if the power-off pulse time is too long. In that case, remove power for at least two seconds, then repeat the off-pulse sequence (a-c) described above (Figure 7).

4. After the self-test mode is initiated, the following action will happen:

- a. The heater turns on for three seconds. During this time, the current draw will increase to 0.25 amps. This can be monitored with the current meter as described in part 2.

- b. As shown in Figure 7, the output and heater temperature, measured to the nearest degree F. One pulse means below 38, 2 means at 38, 3 means above 38, 4 means there is a problem.

- c. After that, the unit will go into moisture-sense mode. At this point, when moisture is sensed, the output will turn on. When moisture is not sensed, the output will turn off. This is monitored with the DVM as described in part 2.

- d. Moisture can be simulated with water on the sensor (at any temperature) or with a metallic object placed on the sensor to short one of the electrode disks to the outside rim of the sensor.

When moisture is sensed, in addition to the output turning on, the heater will begin pulsing with one second on and two seconds off. You can see that happening with the current meter.

- e. After one minute, the self-test will end, and the sensor will begin normal operation.

5. As an alternative to the self-test mode, the sensor can be tested with ice. To do this, place ten pounds (4.54 kg) of crushed ice over the sensor and wait about 20 minutes before observing that a low output voltage (2 volts or less) is indicated by the DVM. When the sensor temperature goes below 38° F (3.3° C) the sensor's output will turn ON and change to a lower voltage. If the sensor surface temperature is initially very warm then this procedure may take longer, perhaps 40 minutes or more.

6. With satisfactory results, disconnect the DVM and restore all sensor wiring connections.

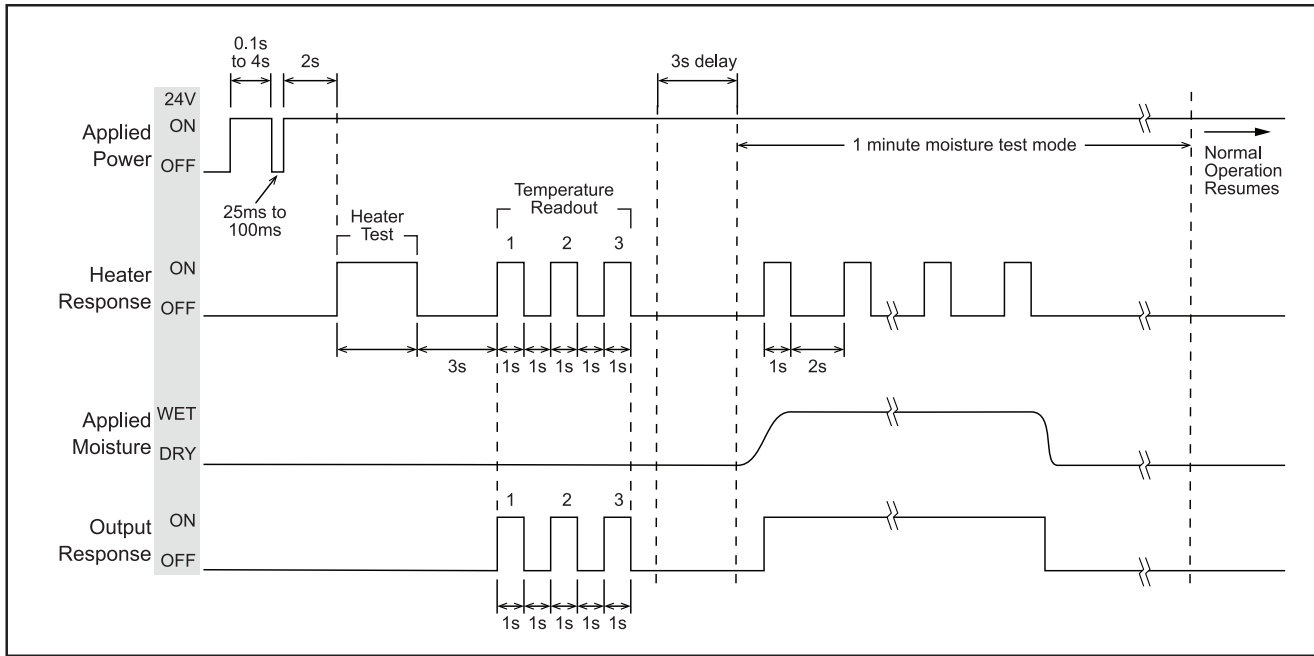


FIGURE 7. Sensor Self-Test Mode.

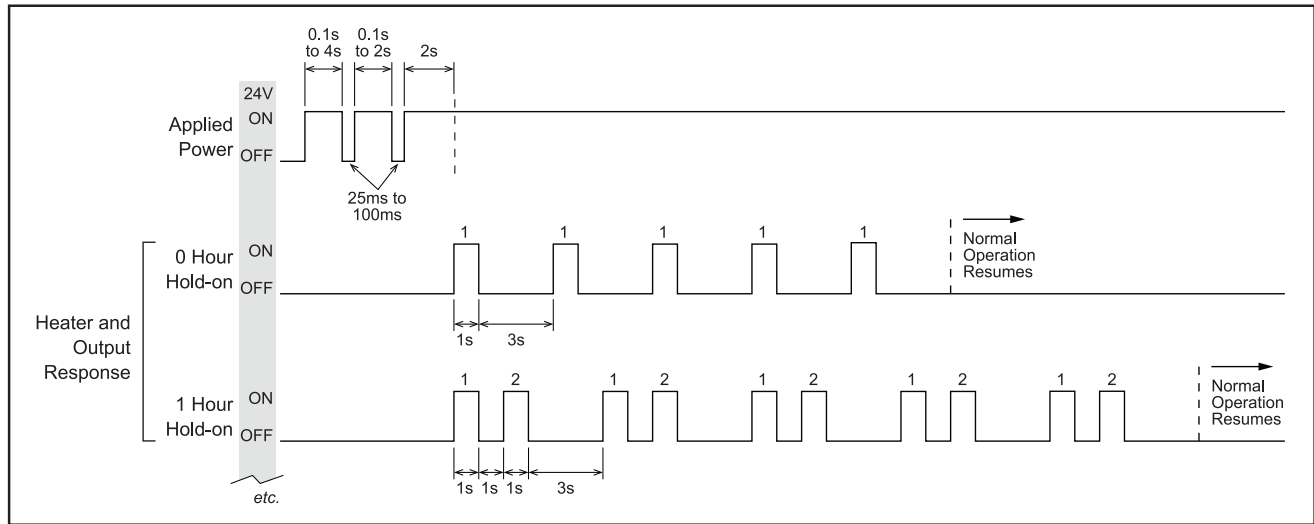


FIGURE 8. Hold-On Time Display Mode.

## HOLD-ON TIME DISPLAY

The programmed hold time can be determined with this test. Using the sensor and meters connected as in the self-test mode ("Testing" section 2), apply power to the sensor and within four seconds quickly interrupt and restore the power twice. After a two second delay, the unit will pulse

both the heater and output (one second on, one second off)  $n+1$  times to indicate the currently configured hold-on time. This will be repeated 5 times with 3 seconds between each set of pulses. See Figure 8.



## HOLD-ON TIME CONFIGURATION

The programmed hold time can be changed with this procedure. Apply power to the sensor and within four seconds quickly interrupt and restore the power three times. After a two second delay, the sensor will send three quick pulses to indicate it is in hold-on configuration mode. Interrupt and reapply power to create  $n+1$  quick pulses to zero volts, where  $n$  is the number of hours (from 0 to 6 hours, 1 to 7 pulses). See Figure 9. The first

pulse must be within 6 seconds or the process aborts. There can be up to two seconds between pulses. After configuring the hold-on time, wait two seconds to initiate a save of the hold-on time. Once the hold-on time has been saved the sensor will display the new hold-on time with the same pattern used during the hold-on time display mode (Figure 8).

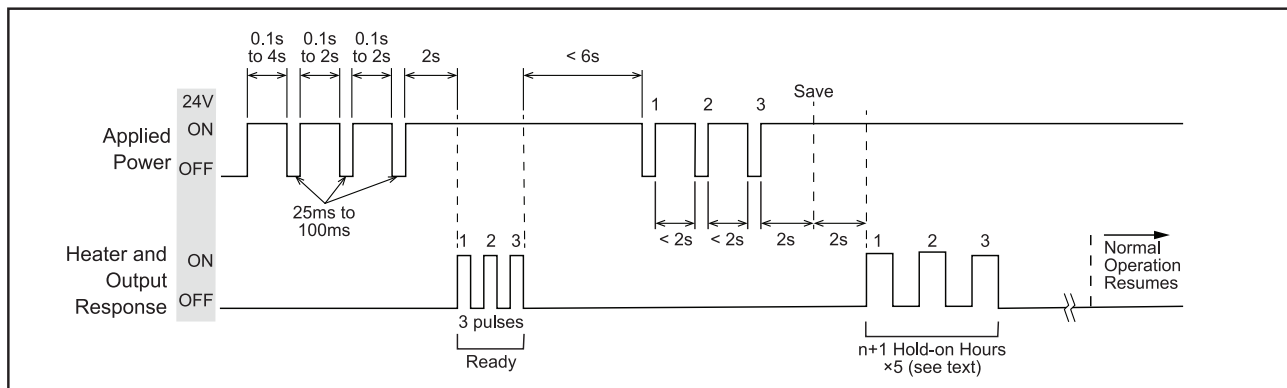


FIGURE 9. Hold-On Time Configuration Mode.

## TROUBLESHOOTING

Most issues are due to wiring error or moisture in the housing. Check for these issues first. If problem persists please contact your supplier or ETI Customer Service.

## MAINTENANCE

The top of the sensor should be kept reasonably clean and free of gravel, leaves, mud, or other debris. If paving material, salt or another residue becomes adhered to the sensing elements, clean the surface with a Scotch™ Brite Pad. Do not use metallic or coarse abrasives or detergents.

We recommend that the HSC-24 sensor's power supply operate continuously even though you may elect to de-energize the snow/ice melting system main heaters at the season's end. The sensor will consume very little energy (a small fraction of a watt) and this will enhance the long-term reliability of the HSC-24 sensor.

## RETURNS AND REPLACEMENTS

Equipment cannot be returned for credit once it has been installed. Environmental Technology will repair or replace faulty equipment under warranty. Prior to removal of equipment for warranty return, please contact ETI Technical Support at for troubleshooting assistance.

Before returning a unit to ETI, obtain a Return Merchandise Authorization from our Customer Service Department, available between 8:00 a.m. and 5:00 p.m. Eastern Time. If possible, use the original container and packing materials when packing the unit for shipment. It is important to mark the Return Merchandise Authorization clearly on the outside of the shipping container so that it may be correctly processed upon receipt at Environmental Technology.

## SPECIFICATIONS

### General

Area of Use	Pavement
Activation Temperature	38° F (3.3° C)
Hold-on Time	User configurable to 0 h, 1 h, 2 h, 3 h, 4 h, 5 h, or 6 h
Default Hold-On Time	0 h up to 3 minutes after snow/ice/water no longer detected or 5 minutes after temperature rises above sense range
Materials	Brass with Epoxy and Polyurethane Fill
Weight	0.5 kg (1.1 lb)
Dimensions	Top Diameter: 9.84 cm (3.875 in) Top Thickness: 6.35 mm (0.25 in) Mounting Depth: 5 cm (2 in)

### Electrical

Circuit type	NEC Class 2
Supply voltage	24 Vac +/- 15%
Supply Current	5 mA idle, 0.25 A max.
Operating Power	6 W max.
Snow/Ice Sense Response Time	10 to 20 seconds
Output Signal	Voltage drop
Output Off	Relay Open
Output On (snow/ice present)	Relay Closed
Contact Rating	220 Vdc / 250 Vac / 2 A / 60 W / 62 VA max.
Cable Type	Direct Burial 4-Conductor 18 AWG
Cable Length	60 ft (18.3 m) or 200ft (60.96 m) included; may be extended: <ul style="list-style-type: none"><li>• Up to 500' (152m) using 18 AWG 3-wire jacketed cable</li><li>• Up to 2,000' (609m) using 12 AWG 3-wire jacketed cable</li></ul>
Self Test Mode	Checks temperature, heater, and sensor grid. Indicates results with output and current pulses (see manual).
Compatible Controllers	APS , EUR, PD Pro, and GF Pro controllers, and other systems which can utilize contact-closure signaling and provide 24 Vac power.

### Environmental

Operating Temperature Range	-40 °C to 70 °C (-40 °F to 158 °F)
Snow/Ice Sense Temperature Range	-30 °C to 3 °C (-22 °F to 38 °F)
Storage temperature	-50°F to 180°F (-45°C to 82°C)

## ORDERING INFORMATION

ORDER#	DESCRIPTION
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25125	HSC-24 Pavement-Mounted Sensor (requires Pavement Sensor Housing)
25625	HSC-24 Pavement-Mounted Sensor 200' (requires Pavement Sensor Housing)
23832	Pavement Sensor Housing

## CONTACT CUSTOMER SERVICE

For assistance, contact Customer Service. Office hours are from 8:00 AM until 5:00 PM ET.

**Email:** [helpdesk@networketi.com](mailto:helpdesk@networketi.com)

**Web:** [networketi.com](http://networketi.com)

**Mail:** ETI  
1850 North Sheridan Street  
South Bend, IN 46628

## LIMITED WARRANTY

ETI's two year limited warranty covering defects in workmanship and materials applies. Contact Customer Service for complete warranty information.

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