



Broadcast Transmitting Antenna Ice Detectors

MODEL CIT™-XTV

Part Number 17797

MANUAL

Installation and Operation Manual

Environmental Technology, Inc.

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FAX (574) 233-2152 or (888) 234-4238
<http://www.networketi.com/>

Safety

Make all electrical connections in compliance with the National Electric Code (NFPA 70) and local electrical code. If you have questions concerning the installation or application, contact Customer Service.

Additional Information

More information is regularly made available through our website, www.networketi.com. Please visit us online for datasheets, manuals, white papers, technical articles and more. The most current and up to date version of this and every other manual for our products can be found in Acrobat (pdf) format to view online or to print. This is to assist you in installing and using our products to the best effect possible. If you have any comments about this or any other material from Environmental Technology please contact us.

Contacting Environmental Technology

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

Voice: (800) 234.4239 (USA and Canada) or (574) 233.1202 (elsewhere)
 Fax: (888) 234.4238 (USA and Canada) or (574) 233.2152 (elsewhere)
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General

Introduction

Many VHF and UHF broadcasting antenna designs are sensitive to accumulated ice. Icing causes both electrical and mechanical problems. The dielectric properties of ice alter antenna impedance and directivity. The standing wave ratio (SWR) increases with icing which reduces effective radiated power. High voltage conditions accompanying increased SWR can damage rf components and cause the transmitter to trip off the air.

In the antenna environment, clear or rime ice occur individually or occur in combination. Clear ice forms when super cooled rain drops (i.e., freezing rain) hit the antenna and instantaneously freeze. Often clear ice accumulates rapidly - up to several inches per hour. Freezing rain occurs when water droplets fall from warm layer above the freezing temperature into a cold layer below freezing.

At temperatures between approximately 15° and 32° F, clouds can be made up of either microscopic super cooled or liquid water droplets. Super cooled water droplets instantly change to rime ice having a milky white color with a rough texture resulting from air entrapment during freezing.

Accumulated ice on antenna components creates buff bodies capable of vortex shedding at low wind speeds. Vortex shedding causes mechanical vibrations can cause metal fatigue resulting in antenna failure. This problem is identical to the "galloping guy wire" phenomena.

Antenna heaters eliminate icing problems. Depending upon the antenna design, heaters consume up to 40 kilowatts, or more. Minimizing energy costs requires an automatic control that operates heaters only while needed. The CIT–XTV Icing Condition Sensor when used with either an APS–3C or APS–4C Control Panel provide cost effective automatic heater control.

Operation

The CIT–XTV incorporates both a solid state thermostat and a precipitation sensor. Heater operation starts when the ambient temperature is below 38°F (3.3°C) and precipitation is present on the sensor grid. Once either condition clears, the control panel's adjustable hold-on timer continues heater operation to melt accumulated ice and snow. A low temperature lock out at 0°F (–17.8°C) protects against ice tunneling by inhibiting heater operation at temperatures too low for efficient ice melting.

An APS–4C or an APS–3C Control Panel controls heater operation. Either control panel allows hold-on times from .5 to 10 hours and off. A heater cycle push-button allows heaters to be manually operated for the set hold-on time. LED's on both controllers provide indication of power, sensor status and heater operation. The APS–4C also includes an LED indicator for ground fault status and a toggle switch for ground fault test and reset. Heater operation voltage, heater load and ground fault requirements will determine which controller is to be used.

The APS–4C Control Panel is available in operation voltages of either 208-240 Vac or 277 Vac, 50/60 Hz. An integral 2 pole contactor switches heater loads to 40 amps. Built into the controller is 30 ma ground fault equipment protection. Up to ten SC–40C Satellite Contactors may be used in conjunction with an APS–4C to provide heater control to multiple antenna heaters from a single master control.

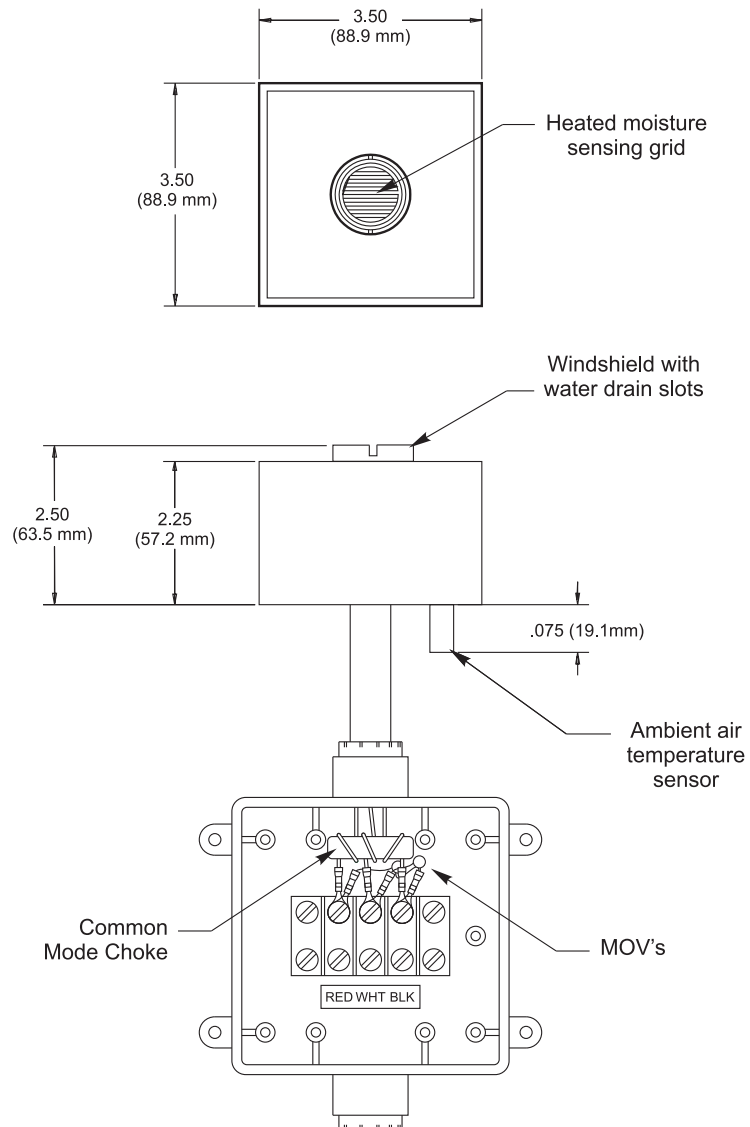


Figure 1: CIT–XTV Broadcast Transmitting Antenna Detector.

The APS–3C Control Panel is available in operation voltages of either 120 Vac or 208–240 Vac, 50/60 Hz. A double pole, double through output relay switches up to 24 amp heater loads or may be used to operate either mechanically or electrically held remote contactors.

The Optional RCU–3 or RCU–4 Remote Control Units are available for use with their respective control panels for remote system indication and heater cycling. Heaters cycled from an RCU–3 or RCU–4 will operate heaters for the hold-on time set on the host control panel. The RCU–3 or RCU–4 interfaces with its host controller via 2 conductor #18 AWG jacketed cable with an installed length to 2,000' (609.6m).

An APS–4C or APS–3C will support up to six sensors. The use of additional sensors at different altitudes can improve performance. When multiple antennas are mounted on a single tower and share heater controls, a sensor should be mounted in the vicinity of each antenna.

Unpacking

Immediately inspect the container and packing material for shipping damage. Unpack the CIT–XTV and related accessories, taking care not to damage the packaging materials. Save the shipping container and related materials until normal operation has been established.

Packing List

17797	CIT–XTV Sensor
17925	Common Mode Choke & MOV package
18035	CIT–XTV Installation and Operation manual

Initial Inspection

Inspect the CIT–XTV for shipping damage. If any of the following problems are found contact the Customer Service Department.

- Contents incomplete or incorrect
- Internal or external mechanical damage

Customer service is available between 8:00 a.m. and 5:00 p.m. ET at (574) 233-1202 or (800) 234-4239. In the event of shipping damage, keep the packing materials for inspection by the carrier. Normally, Environmental Technology, Inc. will repair or replace the CIT–XTV without waiting for the claims settlement.

Installation

IF YOU HAVE ANY QUESTIONS ABOUT THIS PRODUCT OR ITS INSTALLATION, CALL CUSTOMER SERVICE. THERE IS NO CHARGE FOR TECHNICAL ASSISTANCE.

THIS EQUIPMENT MUST BE INSTALLED AND USED IN ACCORDANCE WITH ALL ELECTRICAL AND BUILDING CODES AND REGULATIONS.

The sensor operates on 24 Vac supplied from the host control panel. User supplied 3 conductor jacketed cable connects the sensor to the control panel. Use #18 AWG (ETI p/n 11647 or equivalent) for lengths to 500' (152.4m), #12 AWG for lengths to 2,000' (609.6m).

Mount the sensor securely in an upright position. The sensor should be located near the antenna being deiced in a location which will expose the sensor to direct precipitation. a 1/2" (16mm) NPT opening is provided on the underside of the junction box for rigid conduit entry. Ensure all conduit joints are watertight.

Remove the four screws from the junction box cover, remove cover and set aside. Thread 3 conductor cable from control panel to sensor through the conduit. Connect wires to appropriate terminals with in the junction box (see figure 2). Reinstall junction box cover and secure with the four screws.

At the control panel pass the leads from the sensor cable through and around the supplied common mode choke. Connect wires to appropriate terminals in the control panel. Also connect the supplied MOV's to the terminal block, one across the black and white leads the other across black and red (see figure 2). Refer to the appropriate manual(s) for installation instructions for APS–3C, APS–4C, SC–40C and/or RCU–3/4.

Initial Checkout

Thoroughly check the system before placing it in service. The majority of operation failures are the result of installation errors. Test the sensor before considering the installation complete.

Before testing the CIT–XTV ensure correct operation of the host control panel. Refer to the control panel manual for appropriate checkout procedure. A voltmeter and freeze spray (preferred) or a cup of ice water are required for testing.

CIT–XTV testing procedure:

1. Ensure the moisture sensing grid is clean and dry.
2. Connect the voltmeter across the black and red leads from the sensor. The voltmeter should read from 24 Vac to 28 Vac. Connect the voltmeter across the black and white sensor leads. The voltmeter should read from 24 Vac to 28 Vac assuming a warm, above 38°F (3.3°C), and/or dry sensor.
3. Cool the temperature probe of the sensor with freeze spray (you have frost on the unit) or place the temperature probe in ice water (this may take more than 15 minutes). Voltmeter should read 24 Vac to 28 Vac across the black and white leads.
4. While the temperature probe is still cool, apply moisture across the moisture grid. A couple drops of water or a wet finger or cloth is adequate. Voltmeter should read less than half of previous readings across the white and black leads.
5. Allow sensor grid to dry. Voltmeter reading should return to 24 Vac to 28 Vac.
6. Cool and moisten the unit as above. While the sensor grid is still moist

allow temperature probe to warm. The voltmeter should return to 24 Vac to 28 Vac as the temperature passes through 38°F (3.3°C).

If any of the above checks fail verify system installation. If system installation and control panel operation are verified correct and sensor still fails contact customer service.

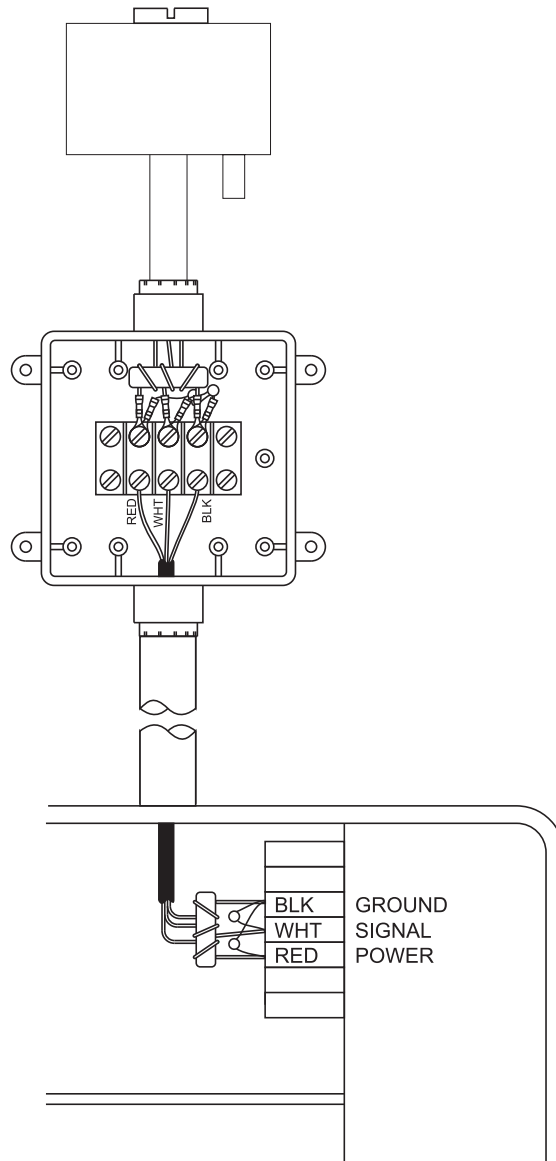


Figure 2: Typical CIT–XTV/APS connections.

Preventative Maintenance

The CIT–XTV does not normally require periodic maintenance. Power should be supplied to the sensor year round. Internal heaters in the sensor housing keep the sensor head free from standing moisture and protect the housing itself from collecting condensate. Any collected residue or corrosion on the sensor grid may cause a false snow signal. In the event of a false snow indication at the host controller clean the sensor head with a clean cloth and rubbing alcohol. It is recommended that any time a technician is sent up the tower for any other reason that the technician visually inspect the sensor head and clean if required. When painting the tower cover the sensor to avoid overspray on the sensor head.

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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