



Description of Operation

Model: DT-7550C

Variant Models: DT-7450C, DT-7450, DT-7435C, DT-7435, and DT-7425.

DT-7500

The DT-7500 series intrusion detection units are motion detection devices which incorporate both Microwave & Passive Infrared detection technologies to sense volumetric motion within a given area.

The design is microprocessor based. Functions supported by the microprocessor include Anti-Mask/Anti-Sabotage, Queue Event Logic, Diagnostics, Selectable Sensitivity, Single-Tec Operation, Digital Microwave Interference Filter, Digital Adaptive Microwave Threshold, Adaptive baselines, and "True Temperature Compensation". The design exhibits exceptional catch performance and false alarm immunity.

Overview

The Microwave detection transceiver device operates in the "K" band (24.125 or 24.200 GHz). Motion is sensed when the frequency of the reflected return signal, within the volumetric area of view, is different from that of the transmitted waveform. Internal filtering components are included to reject / ignore reflected frequency changes above 500Hz. Range adjustment is provided via potentiometer **R8**, the Microwave detection pattern increases when adjusted clockwise.

Passive Infrared detection occurs when the pyroelectric detector circuitry senses a change in temperature of a target versus background within the optical field of view. Temperature compensation circuitry is provided to vary the sensitivity of the PIR detection component, sensitivity is greatest when ambient temperature at the detector is 93° F to 95° F. PIR detection / trigger adjustment is provided via dual option pulse count control located at SW1-1. Optical resolution of the PIR detection area is viewed via a Fresnel lens.

The output of the M.W. & PIR detection elements is input into a micro-controller-based signal processing circuit. Detection by either sensing technology will initiate a timer at the signal processing circuit, if the opposite detection technology senses movement within this detection window an alarm condition is issued. Filtering & timing parameters within the signal processing unit analyses the detection input to verify that the energy level of the detected stimulus matches the characteristics of human movement.

Upon alarm condition, the signal processor output de-energizes the alarm relay circuit & energizes the alarm LED indicator.

A Normally Closed Tamper switch is provided to indicate separation of the Top / Front housing component from the Base / Rear (mounted) housing Component.

Automatic and installer self-test functions are integrated into the micro-controller operation

Anti-masking Features

The DT-7500 series sensor triggers a trouble signal if covered by an object that reflects a microwave signal up to 24" from the detector.

These are the technologies that make this feature work:

Power-up Anti-mask

The sensor checks for normal activity on both technologies following the Start-up Test Mode (110 seconds). This activity is not timed, once both technologies have been verified for normal operation, the Power-up anti-mask test is complete. If the power-up anti-mask fails the sensor activates the trouble relay.

Standard Anti-mask

The sensor activates the trouble relay when a mask condition is detected. A mask condition is cleared by subsequent PIR and microwave activity.

Diagnostic Self Testing

The DT-7500 incorporates three internal self-test functions; these self-test functions are performed at detector power-up, manually via shorting of "Installer Test" pads located below R8, and at the intervals listed below.

Microwave Supervision:

Monitors the MW circuit functions continuously.

PIR Self-Test:

Injects a transient pulse into the PIR circuit to verify the amplifier channel once an hour.

Temperature:

Monitors thermistor circuit "True-Temperature Compensation" function every 30 seconds.

The following responses are initiated upon detection of a self-test failure

Test Failure

Sensor Response

Microwave Supervision
Failure

The sensor opens the trouble relay, continues operating using PIR as the only detection method, and the RED LED flashes rapidly. When detection occurs on the PIR channel, the alarm relay will latch open until the Microwave trouble is removed. If the trouble is not

	cleared by an internal self-test, the unit will need to be replaced.
PIR Self-test Failure	The sensor opens the trouble relay and flashes RED LED rapidly. If the trouble is not cleared by an internal self-test, the unit will need to be replaced. During this failure the sensor cannot signal an alarm event.
Temperature Failure	The sensor will open the trouble relay and flash the RED LED rapidly. When an alarm occurs, the alarm relay will latch open until the trouble is cleared. If the trouble is not cleared by an internal self-test, the unit will need to be replaced.

Control Functions

Switch SW1

Sensitivity – SW1 position 1

Switch 1 **Off**, sets the PIR is set to low sensitivity, pulse count 2. This setting is optimized for harsh environments.

When switch 1 is **On**, the PIR is set to high sensitivity, pulse count 1. This setting allows for optimum catch performance.

LED Enable/Disable – SW1 position 2

When switch 2 is **Off**, the LED is completely disabled except for the following conditions: during the power-up sequence, when a diagnostic failure occurs, or during a manually initiated self-test and zone finder. That is, if the switch is off and zone finder mode is used, the LED will automatically be disabled after 10 minutes.

When switch 2 is **On**, the LED displays sensor status. The RED LED will light for 5 seconds on every **Alarm** trigger; the GREEN LED will light for 1 second on every PIR trigger; and the YELLOW LED will light for 2 seconds on every **Microwave** trigger. A rapidly flashing RED LED indicates a self-test failure.

50 Hz / 60 Hz Fluorescent Light Filter – SW1 position 3

When switch 3 is **Off**, the sensor signal processing is set to reject 60 Hz fluorescent light interference.

When switch 3 is **On**, the sensor signal processing is set to reject 50 Hz fluorescent light interference.

Walk-testing

NORMAL WALK TESTING

You should walk test the sensor in ALARM mode immediately following self-test and initialization.

Adjust the **Microwave** range to minimum (CCW) and begin walking in the intended detection area. Increase the **Microwave** range adjustment as necessary to provide satisfactory coverage while keeping it at the lowest possible setting. When you walk through the detection pattern, the RED LED will indicate alarm detection.

WALK TESTING WITH ZONE FINDER

When you initiate an installer self-test, the unit will perform a self-test followed by **Zone Finder** mode for 10 minutes. While in **Zone Finder**, the RED LED for **Alarm** indication is suppressed. The **Alarm** and **Trouble** relay functions are normal.

To walk test individual technologies, walk in the detection pattern and view the LED. The GREEN PIR LED takes priority and lights 1 second for every PIR trigger. Stopping while in the detection pattern will allow viewing of the YELLOW MICROWAVE LED since it lights for 2 seconds on every **Microwave** trigger. Moving through several areas of the pattern will enable you to verify each technology's coverage and make any necessary adjustments.

Begin with the **Microwave** range adjustment set at minimum (CCW). Walk the detection pattern and increase the **Microwave** range adjustment as necessary to provide satisfactory coverage while keeping it at the lowest possible setting.

DT-7400

The DT-7400 series intrusion detection units are motion detection devices which incorporate both Microwave & Passive Infrared detection technologies to sense volumetric motion within a given area.

The design is microprocessor based. Functions supported by the microprocessor include Queue Event Logic, Diagnostics, Selectable Sensitivity, Single-Tec Operation, Digital Microwave Interference Filter, Digital Adaptive Microwave Threshold, Adaptive baselines, and "True Temperature Compensation". The design exhibits exceptional catch performance and false alarm immunity including reasonable immunity to animals up to 100 pounds, in addition to being difficult to defeat.

Overview

The Microwave detection transceiver device operates in the "K" band (24.125 or 24.200 GHz). Motion is sensed when the frequency of the reflected return signal, within the volumetric area of view, is different from that of the transmitted waveform. Internal filtering components are included to reject / ignore reflected frequency changes above 500Hz. Range adjustment is provided via potentiometer **R8**, the Microwave detection pattern increases when adjusted clockwise.

Passive Infrared detection occurs when the pyroelectric detector circuitry senses a change in temperature of a target versus background within the optical field of view.

Temperature compensation circuitry is provided to vary the sensitivity of the PIR detection component, sensitivity is greatest when ambient temperature at the detector is 93° F to 95° F. PIR detection / trigger adjustment is provided via dual option pulse count control located at SW1-1. Optical resolution of the PIR detection area is viewed via a Fresnel lens.

The output of the M.W. & PIR detection elements is input into a micro-controller-based signal processing circuit. Detection by either sensing technology will initiate a timer at the signal processing circuit, if the opposite detection technology senses movement within this detection window an alarm condition is issued. Filtering & timing parameters within the signal processing unit analyses the detection input to verify that the energy level of the detected stimulus matches the characteristics of human movement

Upon alarm condition, the signal processor output de-energizes the alarm relay circuit & energizes the alarm LED indicator.

A Normally Closed Tamper switch is provided to indicate separation of the Top / Front housing component from the Base / Rear (mounted) housing Component.

Automatic and installer self-test functions are integrated into the micro-controller operation.

PET IMMUNITY

The Pet Immunity features of this product are achieved through a combination of uniform sensitivity optics and signal analysis of the PIR and MW signals. The optic focus is arranged in such a manner as to give more strength to vertical targets (people) than that given to horizontal targets (animals).

Diagnostic Self Testing

The DT-7400 series incorporates three internal self-test functions; these self-test functions are performed at detector power-up, manually via shorting of "Installer Test" pads located below R8, and at the intervals listed below.

<u>Microwave Supervision:</u>	Monitors the MW circuit functions continuously.
<u>PIR Self-Test:</u>	Injects a transient pulse into the PIR circuit to verify the amplifier channel once an hour.
<u>Temperature:</u>	Monitors thermistor circuit "True-Temperature Compensation" function every 30 seconds.

The following responses are initiated upon detection of a self-test failure

Test Failure

Sensor Response

Microwave Supervision
Failure

The sensor continues operating using PIR as the only detection method and the RED LED flashes rapidly. When detection occurs on the PIR channel, the alarm relay will latch open until the Microwave trouble is removed. If the trouble is not cleared by an internal self-test, the unit will need to be replaced.

PIR Self-test Failure

The sensor flashes RED LED rapidly. If the trouble is not cleared by an internal self-test, the unit will need to be replaced. During this failure the sensor cannot signal an alarm event.

Temperature Failure

The sensor continues to operate as using PIR and MW for detection and flashes the RED LED rapidly. When an alarm occurs, the alarm relay will latch open until the trouble is cleared. If the trouble is not cleared by an internal self-test, the unit will need to be replaced.

Control Functions

Switch SW1

Sensitivity – SW1 position 1

Switch 1 **Off**, sets the PIR is set to low sensitivity, pulse count 2. This setting is optimized for harsh environments.

When switch 1 is **On**, the PIR is set to high sensitivity, pulse count 1. This setting allows for optimum catch performance.

LED Enable/Disable – SW1 position 2

When switch 2 is **Off**, the LED is completely disabled except for the following conditions: during the power-up sequence, when a diagnostic failure occurs, or during a manually initiated self-test and zone finder. That is, if the switch is off and zone finder mode is used, the LED will automatically be disabled after 10 minutes.

When switch 2 is **On**, the LED displays sensor status. The RED LED will light for 5 seconds on every **Alarm** trigger; the GREEN LED will light for 1 second on every PIR trigger; and the YELLOW LED will light for 2 seconds on every **Microwave** trigger. A rapidly flashing RED LED indicates a self-test failure.

50 Hz / 60 Hz Fluorescent Light Filter – SW1 position 3

When switch 3 is **Off**, the sensor signal processing is set to reject 60 Hz fluorescent light interference.

When switch 3 is **On**, the sensor signal processing is set to reject 50 Hz fluorescent light interference.

Walk-testing

NORMAL WALK TESTING

You should walk test the sensor in ALARM mode immediately following self-test and initialization.

Adjust the **Microwave** range to minimum (CCW) and begin walking in the intended detection area. Increase the **Microwave** range adjustment as necessary to provide satisfactory coverage while keeping it at the lowest possible setting. When you walk through the detection pattern, the RED LED will indicate alarm detection.

WALK TESTING WITH ZONE FINDER

When you initiate an installer self-test, the unit will perform a self-test followed by **Zone Finder** mode for 10 minutes. While in **Zone Finder**, the RED LED for **Alarm** indication is suppressed. The **Alarm** relay functions are normal.

To walk test individual technologies, walk in the detection pattern and view the LED. The GREEN LED indicates a PIR trigger when lit. A YELLOW LED indicates a MICROWAVE trigger when lit. Moving through several areas of the pattern will enable you to verify each technology's coverage and make any necessary adjustments.

Begin with the **Microwave** range adjustment set at minimum (CCW). Walk the detection pattern and increase the **Microwave** range adjustment as necessary to provide satisfactory coverage while keeping it at the lowest possible setting.

Differences between Models

DT-7550C Parent Model.
50' (15.2m) x 60' (18.3) detection pattern.
Energized Form C (NO/NC) Alarm Relay output.
Micro-controller based Mask-Alert, anti-masking technology.
Micro-controller based signal processing and operational self-testing.
Fresnel Lens Part No.= 5-432-492-01

DT-7450C: A DT-7550C without the Mask-Alert anti-masking feature
50' (15.2m) x 60' (18.3m) detection pattern.
Fresnel Lens Part No.= 5-432-492-01

Component Differences from DT-7550C

Components Removed:

RV2
RV3
CR4
TB1-9
TB1-10

DT-7450: DT-7450C with energized Form A (NC) alarm relay output in place of Form C
50' (15.2m) x 60' (18.3m) detection pattern.
Fresnel Lens Part No.= 5-432-492-01

Component Differences from DT-7550C

Components Removed:

RV1
TB1-6
TB1-9
TB1-10

DT-7435C: A DT-7450C with small animal (pet) immunity features added to the micro-controller code. Reduced detection capabilities
35' (11.2) x 40' (11.8m) detection pattern.

Component Differences from DT-7550C

Component changes:

Fresnel lens: 5-432-489-00

Components Removed:

RV2
RV3
CR4
TB1-9
TB1-10

DT-7435: A DT-7435C with energized Form A (NC) alarm relay output in place of Form C
35' (11.2) x 40' (11.8m) detection pattern.

Component Differences from DT-7550C

Component changes:

Fresnel lens: 5-432-489-00

Components Removed:

RV1

TB1-6

TB1-9

TB1-10

DT-7425: A DT-7435C with energized Form A (NC) alarm relay output in place of Form C. R41 is changed to reduce the gain in the microwave circuit. 25' (7.6m) x 25' (7.6m) detection pattern.

Component Differences from DT-7550C

Component changes:

Fresnel lens: 5-432-489-00

R41

Components Removed:

CR4

K1

K3

RV1

RV2

RV3

SW2

TB1-6

TB1-7

TB1-9

TB1-10