



NAPCO[®]

333 Bayview Avenue
Amityville, New York 11701
For Sales and Repairs, (800) 645-9445
For Technical Service, (800) 645-9440
Publicly traded on NASDAQ Symbol: NSSC

© NAPCO 2005

ADVANCED ADAPTIVE PIR/MICROWAVE TECHNOLOGY SENSORS

C-101STLRE11, C-102STLRE11

C-101STLRE15, C-102STLRE15

INSTALLATION INSTRUCTIONS

WI1475 11/05

GENERAL DESCRIPTION

SPECIFICATIONS

General Coverage with standard wide-angle lens, measured indoors at 20° C (68° F), typical: **C-101STLRE11:** 11m x 10.7m; **C-101STLRE15:** 15m x 12m. **C-102** models only: "Look Down" zone added.

Operating Temperature: -10° to +50° C (14° to 122° F)

Mounting: Wall or corner, 1.8m to 3m max.

Output Relay: Form C or Form A

Relay Time: Approximately 4 seconds

Contact Ratings: 100mA, 24Vdc with internal 10Ω current-limiting resistor

Trouble: Form A, selectable N.O. or N.C.

Test Input: "TST" terminal: <6V (LED) enabled; >6V (or floating) Test Mode (LED) disabled (internal pullup).

Self-Test Interval: 11-16 hours.

Power-Supply Requirements

Note: This unit is intended for operation from a power source that provides battery backup in the event of a power failure. To meet CE Flammability Requirements, this unit is to be powered by an agency approved power supply meeting the requirements of EN60950 : 2000 clause 2.5 Limited Power Sources.

Filtered Dc: 12Vdc

Current Drain at 12Vdc: Idle, 37mA; Alarm, 40mA; Idle with trouble relay NC selected is 12mA extra.

Microwave Frequency: 10.687GHz ±25MHz

Physical Dimensions: (HxWxD) 11.6 x 6.3 x 6.3cm

Shipping Weight: 1.0lb (454gm)

FEATURES

- Microprocessor signal processing
- Power-up system diagnostic tests virtually all electronics
- Remote Control of Walk-Test LED
- Microwave and PIR self test
- Watchdog microprocessor supervision
- Microwave circuit supervision
- Dome of Protection for antimasking and antiblocking (selectable option) with Range Control
- Trouble Output—Selectable N/C or N/O
- Automatic PIR operation on microwave failure
- Dual-element PIR sensor
- High-efficiency, dirt-resistant grooves-in lens
- "Look-down" zone added for C-102 models only
- Extensive RFI and EMI filtering ensure optimum immunity to false alarms
- Large lens area assures high PIR sensitivity
- Selectable Microwave/PIR LED indication visible from virtually any angle, extinguishable after testing.
- Small size; modern, unobtrusive design
- Silent operation
- Bracket-free corner or wall mountable
- Universal Swivel Bracket Kit available

ORDERING INFORMATION

SVLBKT Swivel Bracket Kit

BASIC OPERATION

This unit is a combination passive-infrared sensor and microwave sensor, both contained in a single package. The unit will go into alarm when both sensors detect intrusion at the same time. The PIR section operates by detecting a rapid change in temperature when an intruder crosses a protected area. When a beam experiences a change in heat (projected back through the lens), a pulse is generated by the sensor element. The microwave transmitter sends out short bursts of RF energy, and the receiver detects changes in the returned signal caused by motion within its coverage area.

The microwave section is unaffected by visible light, air drafts, or temperature changes (as from space heaters or air conditioners, for example), but is sensitive to motion. Strong vibrations can be troublesome. Microwave signals may pass through non-metallic walls and windows. Infrared is virtually unaffected by vibration, and will not penetrate walls or windows.

Thus the two technologies complement each other, and it is the combination of the two that provides an inherent immunity to false alarms. Dual technology is ideal for use in hostile environments. Since both must trip to cause an alarm, installation is easier and requires less discipline.

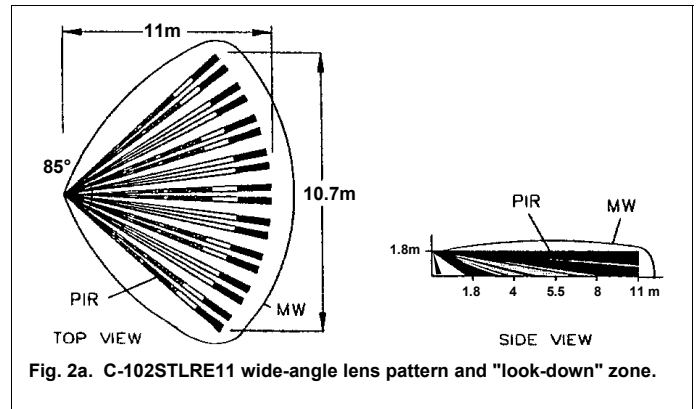


Fig. 2a. C-102STLRE11 wide-angle lens pattern and "look-down" zone.

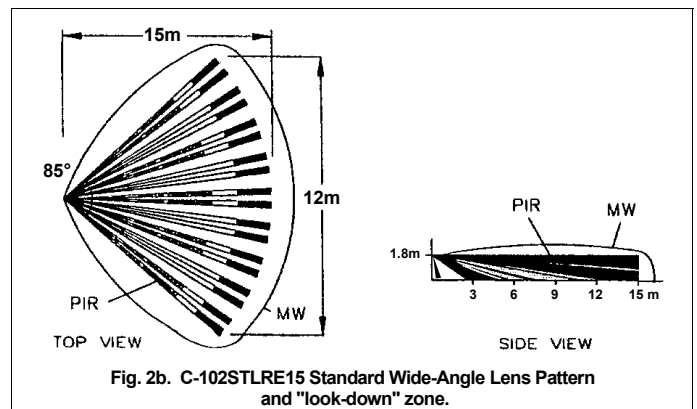


Fig. 2b. C-102STLRE15 Standard Wide-Angle Lens Pattern and "look-down" zone.

DETECTION PATTERNS

Figures 2a & 2b illustrate maximum PIR and microwave detection patterns superimposed on each other for each model.

STANDARD LENS

The supplied lens will perform best in typical applications, thus it is factory installed. Following are its specifications.

Number of Zones: 18 zones, 40 beams, plus look down in both C-102 models.

Maximum Coverage: C-101STLRE11: 11m long x 10.7m wide;
C-101STLRE15: 15m long x 12m wide

Field of View: 80°

Note: (1) Should the lens become heavily soiled, it may be cleaned using lukewarm water and a mild detergent. To dry, use a soft lint-free cloth or allow to air dry. (2) If the standard lens does not suit the application, select another available lens.

INSTALLATION

CHOOSING A SUITABLE LOCATION

The unit may be either wall mounted or corner mounted. Corner mounting is generally recommended as greater coverage may be obtained. Select a rigid surface that is relatively free of vibration.

Position the sensor with respect to access doors or windows so that an intruder will pass across its field of view, not directly toward or away from it. Avoid areas containing devices that may pose a chronic problem to either sensor. For the dual-technology feature to be truly effective in rendering the unit free from false alarms, neither sensor should detect intrusion under normal conditions. **Note:** The unit is shipped from the factory with Jumper J1 in the Alarm position.

MOUNTING THE SENSOR

Open the case by inserting a small screwdriver in the slot at the bottom and pushing up slightly. Remove the front cover.

An array of "push-thru" holes is provided in the rear case to simplify wall or corner mounting. A round push-thru hole permits cable entry at the bottom. Cutaway notches in the rear case will accommodate surface-mounted cables if the outer jacket is removed. After the proper knockouts have been removed, the rear case may be used as a template to mark drill holes. **Note:** Any unused knockout **must be sealed** with the caulking material supplied to eliminate drafts and prevent entry by insects. If mounting higher than 3 meters, it may be necessary to tilt the unit downward slightly for proper microwave coverage, and to reset the Height Scale slightly for proper PIR coverage

WIRING

Complete terminal-strip connections as follows:

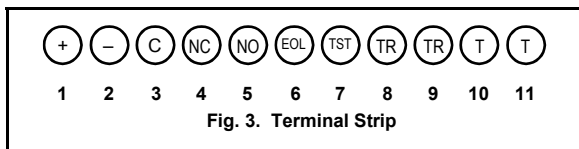


Fig. 3. Terminal Strip

Terminals 1 [+] and **2 [-]** (**POWER**) - Apply 12Vdc to Terminals 1 [+] and 2 [-]. The power source may be regulated or unregulated. Power should be supplied from a control center or other power source equipped with a rechargeable battery backup to maintain operation in the event of a power failure. Check SPECIFICATIONS for complete power supply requirements.

Terminals 3 [Common] and 4 [NC] and 5 [NO] (**ALARM RELAY CONTACTS**) - This is a normally-closed relay with contact ratings of 100mA, 24Vdc. Either detection of an intruder or loss of power will cause the relay to trip.

Terminal 6 [EOL] (**BINDING POST**) - The EOL terminal is a non-connective (not connected to the circuit) binding post used for binding an EOLR (if used) to one leg of your loop, providing a clean, secure connection. Connect one end of the resistor to terminal 4 [NC] and the other can be connected to terminal 6

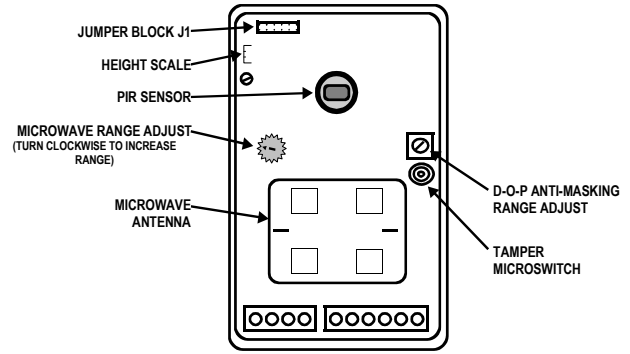


Fig. 4. Circuit board layout

[EOL] along with the last device in the loop.

Terminal 7 [TST] (TEST INPUT) - Remotely controls the display of the Walk Test alarm LED. If the TST input remains unused and unchanged from its factory default setting, the unit will operate normally (the Walk Test alarm LED will illuminate when the unit detects motion). To *disable* the Walk Test alarm LED, first bring the TST input high and low several times (to enable the TST terminal), and then bring the terminal high.

Note: When the TST terminal is enabled (any voltage applied), the operation of the Walk Test LED is altered as follows: LED is disabled when the TST terminal is brought high; enabled when the TST terminal is brought low. If you wish to reset the TST terminal to its original factory setting, remove power and re-power the device. **Note:** Troubles (such as dome of protection violation or self-test failure) will always override the Walk Test alarm LED, allowing the LED to operate regardless of the status of the TST terminal.

Terminals 8 [TR] and 9 [TR] (TROUBLE RELAY) - Terminals 8 & 9 are dry relay contacts that are activated during an anti-masking or self-test trouble. The trouble polarity jumper, if installed, configures the relay as NC (and opens on a trouble) or with the jumper removed, as NO (and closes on a trouble).

Note: The jumper is not installed at the factory (therefore is NO), and if installed (configured for NC), the sensor will draw an extra 12mA (approximately).

Terminals 10 [T] and 11 [T] (TAMPER) - Closed with cover in place.

Self Test

The self-test diagnostic simulates motion and tests the PIR sensor, amplifier and related circuitry; and the microwave transmitter, receiver, and associated circuitry. This test is initiated each time the unit is powered up and randomly at 11- to 16-hour intervals after the last alarm to assure that the unit is always in operating order. At power-up, the LED will come on and both the alarm and trouble outputs will be held "safe". If the unit is operating properly, the LED will extinguish after about 1½ minutes. However, if it fails the self test, the LED will flash rapidly, indicating a need for service. After the LED goes out, indicating a successful self-test, proceed as follows.

Setting the Height Scale

The Height Scale must be set to obtain the maximum recommended coverage. Remove the front cover. Note that the Height Scale is printed along the edge of the circuit board in the upper-left corner (see Fig. 4). The scale calibrations represent sensor mounting height (2-3 meters) for the **standard wide-angle lens only**. To set, loosen the Lock Screw shown in the illustration to slide the board up or down, and align the index embossed into the rear case with the pointer on the scale representing the mounting height of the unit. Then tighten the Lock Screw (do not over-tighten!).

Look Down Zone

Coverage sensitivity is extended to the look down zone, located directly below the unit. To remove the Look Down Zone, simply remove the lens from the look down holder. You may wish to remove the Look Down Lens if there are large pets that may get below the unit.

Jumper Block

The Jumper Block (see Fig. 6) is used to select operating modes, as follows:

(S) SENSITIVITY. Install the jumper for high sensitivity or when using in narrow areas or corridors.

(D) LED DISABLE. Install the jumper if you want to disable the LED and you also do not want to use the TST input terminal during installation. Note: See **Terminal 7 [TST]** for TST terminal operation.

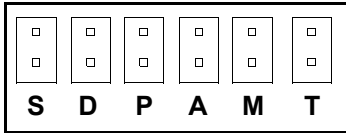


Fig. 6. Jumper block J1

The alarm relay will operate only with the LED

DISABLE or the ALARM jumper installed. Therefore, after testing, be sure to install the ALARM jumper for normal LED operation, or the LED DISABLE jumper, which prevents the LED from lighting on an alarm condition.

Note: Regardless of the position of the LED disable jumper or the TST status LED, troubles (such as dome of protection violation or self-test failure) will always be displayed.

Only when the unit is in its normal operating mode does the LED disable jumper (and the TST terminal) take precedence—they will work only in normal operation (when there is no other Walk-Test mode selected).

(P) PIR. PIR Walk-Test Mode. LED indicates PIR trips only.

(A) ALARM. LED indicates simultaneous PIR and Microwave trips.

(M) MWAVE. Microwave Walk-Test Mode. LED indicates microwave trips only.

(T) TROUBLE MODE SELECT. The jumper is not installed at the factory, providing a NO open relay at terminals 8 & 9.

Range Adjustment

The microwave RANGE ADJUST control (see Fig. 4) should be set at the minimum required to achieve the desired coverage. It is set so that the Walk-Test LED lights when motion is detected at the maximum desired range, but does not light (motion is not detected) beyond the maximum desired range.

All tests must be made with the front cover in place.

1. Remove the front cover and place the LED Jumper (see Fig. 6) in the M (microwave) position.
2. Set the RANGE CONTROL at mid position and *walk test* the unit.
3. If the desired range was insufficient, advance the RANGE CONTROL slightly and repeat the test as necessary, increasing the control each time, until motion is detected at the desired range, but not beyond. (If the desired range was excessive, reduce the control slightly and repeat this step). Turn knob clockwise to increase range.
4. Replace the LED Jumper in the ALARM position.

NOTE: This is the proper setting of the control. Because the range of the microwave detector is not limited by the confines of walls, windows or doors, further advancement of the control may result in detection of motion beyond the desired coverage area.

TESTING THE COVERAGE AREA

After the unit has been mounted and set up, its coverage should be tested and, if necessary, altered to accommodate local environmental conditions (within the coverage area). Satisfactory checks may be made using the Walk-Test LED on the front of the unit. It is recommended that the coverage area be tested at least once a year.

Testing the Unit

Complete connections to the terminal strip (see WIRING). The unit will require a 1-minute “settling” time to adjust itself to the surrounding temperature. After sufficient time has been allowed, proceed as follows.

Test the range of the coverage. Install the PIR Walk-Test jumper and replace the front cover. Walk out to the maximum determined coverage distance, then walk across the field of coverage. The LED will remain lit as long as motion is detected. Repeat this test with the microwave MWAVE jumper installed. Repeat once again with the ALARM jumper installed. Confirm that the LED lights at the maximum desired range, **but not beyond**.

Zone Masking

A problem zone may be deactivated in order to preserve reliable system operation by zone masking the lens. Carefully apply a piece of zone-masking foil (supplied) to the grooved inside surface of the lens segment representing the problem zone to block signal from the offending device (refer to Fig. 7).

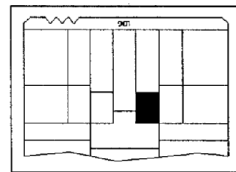


Fig. 7. Zone-masking foil (shaded area) applied to a lens segment to deactivate a problem zone.

COMPLETING THE INSTALLATION

Either the ALARM jumper or the LED DISABLE jumper must be installed for the alarm relay to operate. In the Alarm position, the LED will indicate a condition that would cause an alarm if the system were armed. To extinguish the Walk-Test LED after testing, remove the LED Jumper and place across the LED Disable terminals. In this position, the LED is disabled during normal operation, but is enabled for diagnostic indications.

ADVANCED FEATURES

Dome of Protection (D-O-P)

The Dome of Protection is a short-range protected area (adjustable by the installer) immediately in front of the sensor that detects a person or object that enters this high-security area. An attempt to disable or vandalize the sensor or to block the lens, whether intentional (by sprays, paints, etc.) or unintentional (by careless placement of a skid of boxes that block the sensor, for example) will be detected by the dome. Violation of the Dome of Protection is displayed as a “1 second on and 1 second off” LED flashing, followed by a trouble output on the trouble line 90 seconds later.

Adjusting the Size of the Dome

The size of the dome is adjustable by means of a separate Range Control. When jumpers are installed in both the PIR and MWAVE positions (see Fig. 9), the LED will flash whenever motion is detected within the dome. Range is adjusted by the D-O-P Range Control from 0 to about 2 meters. (The Dome of Protection is disabled when the D-O-P Range Control is set fully counterclockwise).

Adjustment of the Dome of Protection should be made in accordance with the type of violation (the size of the object) that may be encountered, as its range is greater for larger objects.

That is, to protect against tampering or vandalism, set the DOP Range Control using your hand to simulate the actions of an intruder. Or, to guard against blocking by large boxes, skids, etc., temporarily move a large object in front of the unit and note the distance at which



Fig. 9. LED jumper placement for Dome-of-Protection testing.

the LED begins to flash. Set the control for the desired range. To prevent false Dome-of-Protection trips, adjust the DOP Range Control for the minimum setting required to detect the violation. Turn the DOP Range Control knob clockwise to increase the size of the dome.

Note: After adjustment, be sure to return the jumpers to their respective positions as the unit is forced into an alarm condition in the Dome-of-Protection adjustment mode.

DOP Operation

To understand how the Dome of Protection operates, it must first be clear that, even though the LED indicates entry into the dome, (a) violation of the dome does not immediately cause a trouble output; (b) the Dome of Protection cannot be reset for at least 5 seconds;

and (c) the trouble will be cancelled if the unit detects motion outside the dome by both technologies (verifying that the unit is operating); if no motion is detected within 90 seconds, a trouble is output to the control panel. This trouble may be reset by allowing the unit to detect motion.

So long as motion is detected within the dome, a trouble will not be output. The intruder (whether it be the installer, a maintenance man, etc.) leaving the dome, will be detected by both technologies, cancelling the Dome-of-Protection trouble. If the intruder attempts to tamper with the unit or to defeat its function, as by masking or blocking the lens, he will not be detected by both technologies and a trouble will be output within 1 minutes. Similarly, if a large object (such as a skid of boxes) is placed in front of the dome, a trouble will be output within 1 minutes.

CAUTION: The Dome of Protection may be used only where there is no possibility of disturbances in close proximity to the sensor (within the dome). Beware of such conditions as loose ceiling tiles, which could violate the dome without resetting it. In an environment such as this, the Dome of Protection should be disabled by reducing the D-O-P Range Control fully counterclockwise to "Off/Disabled". **For best security when using DOP, the lockdown feature should be disabled by either removing the small lockdown lens located just below the PIR sensor element, or blocking the lockdown window located at the bottom of the front cover.**

IMPORTANT: Do NOT wire Dome of Protection relay in series with alarm loop. Use a separate trouble non-alarm zone.

TROUBLESHOOTING GUIDE		
SYMPTOM	PROBABLE CAUSE	REMEDY
LED flashing 1 second on, one second off	DOP violation	Check for masking followed by walk test.
Rapid LED flash, twice a second	Microwave failure	Power down for 5 seconds. Power up again and wait 1½ minutes. If symptom persists, return for repair.
High speed LED winking flash.	PIR Failure	Power down for 5 seconds. Power up again and wait 1½ minutes. If symptom persists, return for repair.
Unit holding loop in alarm	Walk-Test Mode selected.	Check jumper is in Alarm or LED Disable position.

NAPCO LIMITED WARRANTY

NAPCO SECURITY SYSTEMS, INC. (NAPCO) warrants its products to be free from manufacturing defects in materials and workmanship for thirty-six months following the date of manufacture. NAPCO will, within said period, at its option, repair or replace any product failing to operate correctly without charge to the original purchaser or user.

This warranty shall not apply to any equipment, or any part thereof, which has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to acts of God, or on which any serial numbers have been altered, defaced or removed. Seller will not be responsible for any dismantling or reinstallation charges.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF NAPCO.

Any action for breach of warranty, including but not limited to any implied warranty of merchantability, must be brought within the six months following the end of the warranty period. IN NO CASE SHALL NAPCO BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT.

In case of defect, contact the security professional who installed and maintains your security system. In order to exercise the warranty, the product must be returned by the security professional, shipping costs pre-paid and insured to NAPCO. After repair or replacement, NAPCO assumes the cost of returning products under warranty. NAPCO shall have no obligation under this warranty, or otherwise, if the product has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to accident, nuisance, flood, fire or acts of God, or on which any serial numbers have been altered, defaced or removed. NAPCO will not be responsible for any dismantling, reassembly or reinstallation charges.

This warranty contains the entire warranty. It is the sole warranty and any prior agreements or representations, whether oral or written, are either merged herein or are expressly cancelled. NAPCO neither assumes, nor authorizes any other person purporting to act

on its behalf to modify, to change, or to assume for it, any other warranty or liability concerning its products.

In no event shall NAPCO be liable for an amount in excess of NAPCO's original selling price of the product, for any loss or damage, whether direct, indirect, incidental, consequential, or otherwise arising out of any failure of the product. Seller's warranty, as hereinabove set forth, shall not be enlarged, diminished or affected by and no obligation or liability shall arise or grow out of Seller's rendering of technical advice or service in connection with Buyer's order of the goods furnished hereunder.

NAPCO RECOMMENDS THAT THE ENTIRE SYSTEM BE COMPLETELY TESTED WEEKLY.

Warning: Despite frequent testing, and due to, but not limited to, any or all of the following; criminal tampering, electrical or communications disruption, it is possible for the system to fail to perform as expected. NAPCO does not represent that the product/system may not be compromised or circumvented; or that the product or system will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; nor that the product or system will in all cases provide adequate warning or protection. A properly installed and maintained alarm may only reduce risk of burglary, robbery, fire or otherwise but it is not insurance or a guarantee that these events will not occur. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE, OR OTHER LOSS BASED ON A CLAIM THE PRODUCT FAILED TO GIVE WARNING. Therefore, the installer should in turn advise the consumer to take any and all precautions for his or her safety including, but not limited to, fleeing the premises and calling police or fire department, in order to mitigate the possibilities of harm and/or damage.

NAPCO is not an insurer of either the property or safety of the user's family or employees, and limits its liability for any loss or damage including incidental or consequential damages to NAPCO's original selling price of the product regardless of the cause of such loss or damage.

Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, or differentiate in their treatment of limitations of liability for ordinary or gross negligence, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.