**DUET-AM, DUET-AM G3**

**Dual-Technology Microwave/PIR Intrusion Detector**

**Installation Instructions**

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### 1. FEATURES

- **Combined Fresnel and cylindrical optics** improves detection range and false alarm immunity.
- **Look-down "creep zone" lens.**
- **True Motion Recognition™ (TMR) algorithm** (patented) for recognition of true motion of a human body.
- **DRO-stabilized MW microstrip technology.**
- **MW Motion Simulator** simulates the effect of a human body moving in the MW field (patent pending for MW self-test).
- **Range control** for adjusting the MW coverage.
- **PIR self-test** by applying a short heat pulse.
- **Temperature compensation** for the PIR section.
- **Unique tamper protection mechanism.**
- **Programmable motion event counter** (1 or 2 events).
- **Simple-to-use, three-position vertical adjustment.**
- **TEST input** to enable/disable the walk test LED remotely (per new European standard).
- **Relay output** for trouble.
- **Anti-masking protection.**
- **White light protection.**
- **Optional swivel brackets** for wall or ceiling installation.
- **DUET-AM G3** has back tamper switch and low-voltage detection.

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### 2. SPECIFICATIONS

**Input Voltage:** 9 to 16 VDC

**Current Drain @ 12 VDC:** 21 mA standby, 29 mA max.

**PIR SECTION**

- **Sensor:** Low noise dual-element pyroelectric type
- **Tripping Indication:** LED flashes green for up to 5 seconds
- **Motion Event Verification Counter:** Selectable, 1 or 2 events
- **Front Lens Data** (see Figure 2)
  - Beams: 32 in two layers (10 curtain beams in bottom layer)
  - Max. Coverage: 20 x 20 m (60 x 60 ft) / 90° field of view
- **Vertical Adjustment:** FAR, MID and NEAR, by sliding the circuit board along a 3-position scale.

**MW SECTION**

- **Oscillator:** Microstrip DRO-stabilized Doppler sensor
- **Frequency:** 10.687 GHz (in the UK only) or 10.525 GHz (10.525 GHz for movement detector is prohibited or restricted from use in Austria, Czech Republic, Estonia, Finland, France, Germany, Portugal, Slovak Republic, Turkey, UK, Spain and Sweden).
- **Detection Range:** Adjustable from 25% to 100% (5 m to 20 m)
- **Tripping Indication:** LED lights green for up to 5 seconds

**ALARM, TAMPER & TROUBLE DATA**

- **Alarm Indication:** LED lights red for 1.3 to 5 seconds if both sensors trip
- **Alarm output:** Solid State Relay, NC, 100 mA / 30 VDC, 35 ohm maximum internal resistance. "Open" for 2 – 3 sec, in case of alarm, masking event (applicable for DUET-AM G3 only) or complete power failure.
- **Alarm Duration:** 1.3 to 5 seconds
- **Tamper Switch:** N.C., rated at 50 mA resistive / 30 VDC
- **Trouble output:** Solid State Relay, NC, 100 mA / 30 VDC, 35 ohm maximum internal resistance. "Open" in case of auto-diagnostic failure, Anti-Mask event, low voltage (applicable for DUET-AM G3 only) or complete power failure.
- **Masking Detection Delay:** About 60 seconds

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**Trouble/ Masking Indication:** LED alternately flashes green and red and TRB relay opens until the detector is reset.

**MOUNTING**

- **Form:** Surface or corner (no brackets); surface, corner and ceiling with brackets
- **Height:** 2 - 2.6 m (6.5 - 8.5 ft) without bracket, 2 - 3.6 m (6.5 - 12 ft) with bracket.
- **Note:** Mounting heights of greater than 2.6m (8.5 ft) may reduce the detector's coverage range.
- **Caution:** with brackets in use, effective detection ranges may differ from those indicated in Figures 2 and 8.
- **Optional Brackets:** BR-1 (surface), BR-2 (corner) and BR-3 (ceiling).

**ENVIRONMENTAL**

- **RFI Protection:** >30 V/m up to 1000 MHz.
- **Operating Temperatures:** -10°C to 50°C (14°F to 122°F)
- **Storage Temperatures:** -20°C to 60°C (-4°F to 140°F).
- **Standards:** Complies with Part 15 of the FCC Rules. See frequency restriction under "Frequency", at the left side.

**PHYSICAL**

- **Dimensions (H X W X D):** 123 x 76 x 48 mm (4-13/16 x 3 x 1-7/8 in.)
- **Weight:** 145 g (4.5 oz).

**PATENTS**

U.S. Patents 5,237,330 and 5,693,943
3. INSTALLATION

3.1 Installation Tips

To minimize false alarms:

- Do not aim at heat sources
- Mount on solid, stable surfaces
- Do not expose to air drafts
- Do not install outdoors
- Prevent direct sunlight from reaching the detector
- Keep wiring away from electrical power cables
- Do not install behind partitions
- 2.0 to 2.6 meters (6.5 to 8.5 ft)

In addition, a few important rules must be observed while selecting a mounting location:

A. Microwave radiation passes through glass and non-metallic walls. Be sure to adjust the MW range so that it does not exceed the room limits, or else motion in the next room or moving traffic along the outer side of the wall will cause the MW sensor to trip.

B. Large reflecting objects (especially metals) in the coverage area can distort the microwave sensor's coverage pattern.

C. If two DUET-AM units are installed in the same room or on opposite sides of a shared wall, they should not face each other and must be mounted at least 2 meters apart.

D. Do not install the DUET-AM in places where one of the two sensor circuits alarms constantly or intermittently, due to environmental interference.

E. DUET-AM users are advised to mount the unit in locations where inadvertent approach to less than 1 m (3 ft) from the detector is unlikely to occur.

3.2 Mounting

A. Remove the front cover as shown in Figure 3.

**IMPORTANT:** When re-mounting the cover, remember to fasten the screw well - this will force the tamper switch actuator upon the tamper switch and will press it fully in.
3.3 Wiring

Refer to Figure 6 and wire up the terminal block:

**Table 1. Interpreting the Visual Indications**

<table>
<thead>
<tr>
<th>Visual Indication</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>No detection</td>
</tr>
<tr>
<td>Steady green (5 s)</td>
<td>MW walk-test detection</td>
</tr>
<tr>
<td>Flashing green</td>
<td>PIR walk-test detection</td>
</tr>
<tr>
<td>Steady red (5 s)</td>
<td>Alarm: MW + PIR detection</td>
</tr>
<tr>
<td>Flashing red and green (alternately)</td>
<td>- Trouble is being detected (or masking if mode switch 3 is ON) - Initial warm-up routine (stops 60 seconds after power up).</td>
</tr>
</tbody>
</table>

**Notes:**
1. During walk testing, the green light glows steadily (MW detection) or flashes (PIR detection), depending on which one of the two sensors discovered the movement first. Upon subsequent discovery of the movement by the other sensor, the green light goes off and the red light glows (alarm).
2. If the LED maintains alternate red and green flashing beyond the warm-up period, a malfunction has been diagnosed (or, if mode switch 3 is ON, the detector may be masked).

3.6 Visual Indications

The dual color LED is used to signal various alarm and trouble messages as shown in Table 1 below.

**3.7 Mode Selector**

The DIP switch mode selector is mounted on the unit’s PC board (see Figure 4). It controls four functions as demonstrated in Figure 7.

**3.8 Vertical Adjustment**

The vertical adjustment scale for the PIR sensor is located at the upper right edge of the PC board (refer to Figure 4). Three positions are available - FAR, MID and NEAR. All new DUET-AM units are set to the FAR position. To adjust, loosen the vertical adjustment screw, slide the PC board along the vertical slot until the pointer indicates the required position on the scale (see Figure 8). When done, tighten the adjustment screw firmly.

**3.4 The Power-up Process**

After connecting the (+) and (–) terminals to the power source, the DUET-AM starts a 60-second warm-up period, indicated by alternate flashing of the green and red lights.

**Note:** Use RTV to seal the base opening(s) to prevent insects from entering the detector.

**3.5 What Happens in Case of Masking?**

**Attention!** The following procedure is true only while mode switch 3 is in the ON position.

If an attempt is made to stick masking material over the lens or put a masking object close to the lens, a trouble alert will result about 60 seconds after masking:
- The LED will flash red and green alternately;
- The TRB relay will open and will remain so until masking is removed and the detector is reset (see Para. 3.13 for procedure).
3.9 Setting the Motion Event Counter
If you wish to set the PIR sensor for maximum false alarm immunity, shift DIP switch No. 1 (SW-1 to ON). In this position, two consecutive motion events are required to trip the PIR sensor. For faster catch performance, shift SW-1 to OFF. In this position, only one motion event is required to trip the PIR sensor.

3.10 PIR Walk Test
A. Rotate the MW RANGE control fully counterclockwise to MIN. 
B. Make sure that the LED is enabled, either by setting mode switch SW-2 to ON or by grounding the TST input.
C. Mount the front cover in place.
D. Walk into the detector's field of view at the expected far edge of the coverage area. The green light should flash for up to 5 seconds each time your motion is detected.

Note: If the LED lights green steadily for up to 5 seconds, your motion has been detected by the MW sensor.
E. If PIR detection is not obtained at the far end of the coverage area, remove the front cover and re-adjust the vertical position. Replace the cover and retest.

3.11 MW Walk Test
A. Remove the front cover.
B. Verify that the MW RANGE control is set fully counterclockwise to MIN and enable the LED either by setting mode switch SW-2 to ON or by grounding the TST input.
C. Start by moving into the coverage area at the far edge. The LED should light green for up to 5 seconds each time your motion is detected.
D. If your motion was not detected at the far edge, advance the MW RANGE control slightly clockwise toward MAX and try again until your motion is detected reliably at the far edge.

Caution! The MW detection range must not exceed the far edge of the desired coverage area.

4. MISCELLANEOUS COMMENTS
This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio and television reception. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one which supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

WARRANTY
Visonic Limited (the “Manufacturer”) warrants this product only (the “Product”) to the original purchaser only (the “Purchaser”) against defective workmanship and materials under normal use of the Product for a period of twelve (12) months from the date of shipment by the Manufacturer.

This Warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranties of merchantability, fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this Warranty or any other warranties whatsoever, as foreseen.

The Manufacturer shall not be liable to anyone for any consequential or incidental damages for breach of this Warranty or any other warranties whatsoever, as foreseen.

The Manufacturer shall be liable to anyone for any consequential or incidental damages for breach of this Warranty or any other warranties whatsoever, as foreseen.

The Manufacturer shall not be liable for any loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Product. This Warranty is exclusive to the original Purchaser and is not assignable.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty. The Manufacturer shall not be liable for any loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Product. This Warranty is exclusive to the original Purchaser and is not assignable.