

# Product Specifications

## MODEL 380 K-BAND OUTDOOR MICROWAVE TRANSCEIVER

### SPECIFICATION

#### 1.0 DESCRIPTION

Model 380 is a monostatic K-band Microwave Intrusion Sensor for indoor and outdoor applications. A Range Cut-off (RCO) circuit attenuates targets beyond the selected coverage area. The RCO distance is selected by means of an internal potentiometer. A Zero Range Suppression (ZRS) circuit reduces the effects of rain on the radome. The unit is equipped with synchronization and addressing circuitry that enables multiplexing of up to 16 units without mutual interference.

#### 2.0 APPLICABLE DOCUMENTS

F.C.C. Rules & Regulations, Part 15.

#### 3.0 SYSTEM PERFORMANCE

##### 3.1 Target Characteristics

###### 3.1.1 Minimum Cross Section

0.8 square meter (man/woman walking)  
0.07 square meter (man/woman crawling)

77 pound (35kg) human - walking, running, hands and knees crawling, or jumping. Prone crawling or rolling 77 pound human (35kg) or simulated with a 12 inch (30cm) diameter metal sphere, detected at maximum range of 150 feet (45.8m) with special site preparation.

###### 3.1.2 Target Velocity

0.2 ft/sec to 26 ft/sec (0.06m/sec to 7.9m/sec)

##### 3.2 Coverage Pattern

3.2.1 For upright walking or running man/woman, teardrop shaped detection pattern 200 feet (60.9m) long, 24 feet (7.3m) wide at widest point (maximum sensitivity), both azimuth and elevation.

3.2.2 For prone crawling (commando-style) man/woman, 150 feet (45.8m) long, 15 feet (4.6m) wide.

##### 3.3 Range Cut-Off

3.3.1 shall have an adjustable range cut-off providing continuous adjustment from 50 feet (15.2m) to 200 feet (60.9m) on man/woman walking. Tolerance on RCO distance shall be  $\pm 10\%$ . Signals from objects beyond the range cut-off distance shall be attenuated by at least 40 dB.

### 3.4 Sensitivity

#### 3.4.1 Threshold to Noise Ratio

13.8dB minimum (prior to integration).

#### 3.4.2 False Alarm Rate

One per year based on S/N (signal to noise) ratio.

#### 3.4.3 Sensitivity control shall have 18dB adjustment range.

### 3.5 Transmitter Characteristics

#### 3.5.1 Type

The transmitter shall be a cavity stabilized fundamental Gunn oscillator.

#### 3.5.2 Transmitter Output Power

32 milliwatts (15dBm) peak

#### 3.5.3 Modulation

Shall be modulated by 3.12% duty cycle. Pulsed at 32.0 kHz  $\pm$  10%.

#### 3.5.4 Unmodulated Carrier Frequency (Fo) and A and B Frequency

24.125  $\pm$  .025 GHz (Fo). (Frequency A is Fo-15MHz. Frequency B is Fo+15MHz.)

#### 3.5.5 Frequency Modulation

On alternate pulses the frequency shall shift by 0.6 MHz  $\pm$  10%.

#### 3.5.6 Spurious Emissions

All spurious signals including harmonics shall be at least 50dB below the unmodulated carrier when measured 100 feet from the transmitter.

#### 3.5.7 Polarization

Shall be circular with axial ratio of less than 2dB.

#### 3.5.8 Antenna

Beam width: 8 degrees. Gain: 22.4dB.

### 3.6 Power Requirements

#### 3.6.1 Voltage

11.0 to 14.0 VDC.

#### 3.6.2 Current

160 mA normal, 220 mA synchronized

#### 3.6.3 Fusing

The input power line shall be fused with a .25 amp fuse.

### 3.7 Remote Monitor

Shall utilize baseplate mounted MS3102A-14S-6S connector for remote test. To be used in conjunction with RM82 or RM83 performance monitor and mating connector MS3106A-14S-6P. The pin connections shall be as follows:

<u>PIN</u>	<u>VOLTAGE</u>
A	Input power 11-14 VDC
B	Internal supply (8.5 VDC $\pm$ 10%)
C	Alignment (2.5 VDC typical)
D	Ground
E	Doppler sensitivity
F	Alarm Status: +12 VDC "IN" 0 VDC "OUT"

### 3.8 Alarm Indication

By relay contacts, one normally open, one normally closed, and one common. Contact rating 2 amps at 28 VDC. (Form C) The alarm shall be activated for two seconds ( $\pm$  .25 seconds).

### 3.9 Display

Three LED displays shall be provided; one indicating a power "ON" condition (red), one indicating an alarm condition (red), and one indicating a "synchronized lock" condition (red).  
NOTE: In synchronized mode, master LED is always illuminated, slave LED's are off indicating "locked" condition.

### 3.10 Tamper Protection

Shall have switch actuated by radome cover. Switch shall have one normally open, one normally closed and one common terminal. Contact rating 2 amps at 28 VDC.

Blockage detector shall generate alarm if metal enclosure is placed over radome.

### 3.11 Gain Adjustment

Independent adjustments shall be provided inside the radome for detection pattern length (RCO) and width (sensitivity).

### 3.12 Remote Test

A terminal shall be provided which, when activated by a momentary 5 to 15 VDC signal will test the sensor to simulate an intrusion signal and provide an alarm indication. The circuit shall be protected such that the application of +15 volts for an indefinite period of time shall not cause damage.

### 3.13 Synchronization

Five terminals shall be provided for multiplexing units together to eliminate mutual interference. An address switch shall be provided to set time slot for synchronization code. The external clock shall be 1 kHz  $\pm$  5% square wave. An enable/disable (on/off) synchronization switch shall be provided.

## 4.0 MECHANICAL

4.1 Baseplate

10.6 inches diameter (27cm) primer washed per MIL-P-15328 and painted No. 10080 brown per FED STD 595A, exterior catalyst V66V29.

4.2 Radome

Tan ABS UV resistant with rain shield VSWR less than 1.25:1 at 24.125 GHz.

4.3 Shielding

All sensitive sensor circuitry shall be enclosed in an integral metallic enclosure and all input and output lines shall be filtered.

4.4 RF Filter

Shall incorporate a high pass filter with cutoff at 20 GHz.

4.5 Conduit

The unit shall be equipped with a ½ inch right angle liquid tight flexible conduit fitting for power and alarm signal wires.

4.6 Mounting.

Shall be supplied with ball swivel and U-bolt assembly for mounting to four inch O.D. post or flat surface (wall).

4.7 Terminal Strip

Terminal strip shall provide following connections:

- |    |               |    |               |
|----|---------------|----|---------------|
| a) | +12 VDC       | i) | Remote Test   |
| b) | Ground        | j) | Master - HI   |
| c) | Tamper N.O.   | k) | Master - LO   |
| d) | Tamper Common | l) | Shield Ground |
| e) | Tamper N.C.   | m) | Slave - HI    |
| f) | Alarm N.O.    | n) | Slave - LO    |
| g) | Alarm Common  |    |               |
| h) | Alarm N.C.    |    |               |

**5.0 ENVIRONMENTAL**

5.1 Operating Temperature Range

Shall be -30°F to +150°F (-35°C to +66°C).

5.2 Relative Humidity

Shall operate over 0 to 100% relative humidity.

5.3 Radio Frequency Interference

5.3.1 Radiated Emissions

The unit shall not alarm when subjected to radiated emissions of 10 volt/meter from 10 MHz to 1 GHz.

5.3.2 Transient Protection

A 1.5 KE18 transorb shall be incorporated on the input power line for transient protection.