SmartWalk™ 1400 Pedestrian Sensor

Preliminary Installation Instructions

Description

The SmartWalk™ 1400, from Microwave Sensors, Inc., allows state-of-the-art detection of pedestrians waiting to cross an intersection. Using Microwave Sensors' proprietary MICRO-MOTION™ technology, the SmartWalk™ 1400 eliminates the need for pedestrians to actively signal their intent to cross by using push buttons or other devices. Instead, after a pedestrian is in the detection pattern for an amount of time determined by the installer (thereby decreasing the chance of calls based on pedestrians merely passing through the pattern but not intending to cross the intersection), a signal is sent to the controller without the need for manual intervention. Those unable to see or reach push buttons, and those unaware of the need to press a button, are no longer ignored.

Features & Benefits

Features:	***Benefits:***
Enables hands-free pedestrian signal activation	Eliminates dependence on push buttons, providing benefits for those unable to see or reach the push button.
Employs Microwave Sensors' proprietary MICRO-MOTION™ technology	Provides enhanced pedestrian detection, able to sense motion down to a fraction of an inch per second.
Installs in minutes	Saves time and money by using existing poles.
Easy to set-up	No specific training is required; simply follow the easy-to-use instructions.
User selectable sensitivity	The installer can select the sensitivity, using a range potentiometer, ensuring proper coverage.
User selectable time delay	During installation, the time delay is set to zero seconds, for immediate feedback. Once installed, this feature allows the installer to select the time a pedestrian must remain in the pattern before a call is sent to the controller, decreasing the chance of false calls by those just passing through the pattern, but not intending to cross.
Environmentally secure:	Insensitive to heat, cold, rain, snow, reducing the need for service calls.
Stable detection pattern	Once the unit is mounted and aligned, additional service/adjustment calls are not necessary.
Tamper resistant, non-obtrusive enclosure	Unit is mounted out of reach of would-be vandals, further reducing the need for service calls. Captive screws further ensure the integrity of the enclosure.

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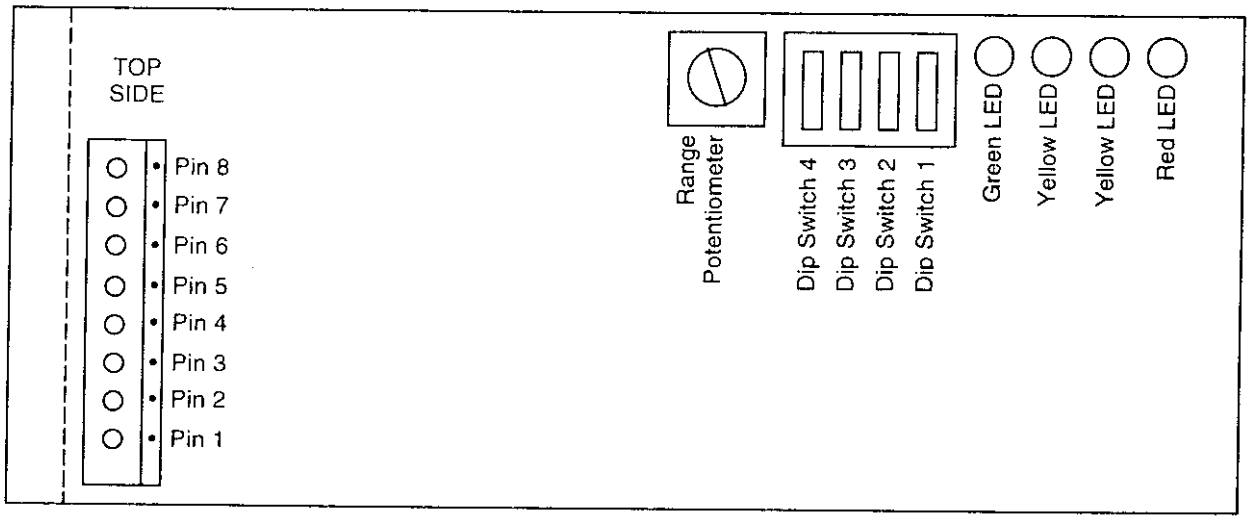
Wiring Instructions/Input Connector

Pin 1 ..... Voltage in (12V to 24V AC or DC)
Pin 2 ..... Voltage in (12V to 24V AC or DC)
Pin 3 ..... Relay Normally Open (N.O.)
Pin 4 ..... Relay Common (COM)
Pin 5 ..... Relay Normally Closed (N.C.)

Pin 6 – 8 ..... NOT USED



Dip Switch

The four-position dip switch sets sensitivity and relay hold time (the amount of time a person must remain sensed by MICRO-MOTION™ before a call is sent to the controller). The table below defines each switch position.

NOTE: SET DIP SWITCH TO ZERO (0) TIME DELAY FOR SET-UP. ONCE SET-UP IS COMPLETE, SWITCH TO PROPER SETTING FOR USER SELECTED DELAY.

Switch 3	Switch 2	Switch 1	Time Delay (seconds)
off	off	off	0
off	off	on	2
off	on	off	4
off	on	on	6
on	off	off	8
on	off	on	10
on	on	off	12
on	on	on	14

Switch 4	on	Motion More Sensitive
Switch 4	off	Motion Less Sensitive

NOTE: SUGGESTED MOUNTING HEIGHT IS 14' FOR OPTIMUM RESULTS.

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Theory of Operation

The Model MODEL 1400 One Way Motion/Micro-Motion™ Sensor, designed and manufactured by Microwave Sensors, Inc., is a field disturbance sensor intended for use under FCC Rules, Part 15. Attached to this description is the schematic and block diagram to aid in understanding the operational principles.

Block #1 is designated for the transceiver. The 86843 series CW, K-Band Doppler transceiver consists of a Gunn diode oscillator and two Schottky diode mixers assembled into a diecast waveguide package, designed for commercial applications in directional motion sensing. Through use of the Doppler effect, the mixers generate two I.F. output signals whose frequencies are proportional to the velocity of the target, and whose phase difference depends on the direction of motion, towards the antenna. If the motion is toward the transceiver, channel A signal will lead channel B signal by about 90 degrees. The frequency of the signals produced by the transceiver for an average man at 1.466 feet per second within the range of the MODEL 1400 unit is 72 Hz.

The signals from the transceiver, channel A and channel B, are coupled through coupling capacitors CA1 and CA3 into a preamplifier blocks 2 and 3. Amplifiers (blocks 2 and 3) have again of 101 using both halves of op-amp U3.

The amplified signals from blocks 2 and 3 are coupled through capacitors C10 and C12 to the main amplifiers depicted in blocks #4 (U1:A) and block #7 (U1:B) using two of the four op-amps in U1. A third channel is picked from the preamplifier depicted in block #9, using the third op-amp of U1:D, the fourth op-amp of U1:C is not used.

Block #4 and Block #7 further amplify the signals from Channel A and Channel B and have a threshold adjustment for each, depicted in Block #5 (R16) and Block #6 (R8). By adjusting the gain a threshold can be set for block #10 and block #11 which is configured as a voltage comparitor circuit (U2:A and U2:B).

Block #9 is a separate amplifier (U1:D) with a gain adjustment (R6) that provides the microprocessor with an analog signal that shall be referred to as micro motion.

The microprocessor depicted in Block #13 looks at channel A and channel B for a rising edge. When this edge is detected and the proper conditions are met, the processor will set an output port high enabling the relay driver in Block #15. While the relay is enabled, the microprocessor continues to scan channel A and channel B and looks at the signal, fromBlock #9. If the microprocessor has an active relay output and there is also activity on the micro motion channel the microprocessor will hold the output high until there has been an absence of activity of the micro motion channel for 5 seconds at which time the relay will become inactive.

Block #12 allows the end user to adjust the range of the unit. This is accomplished by comparing the A\D signals from blocks 9, 10 and 11 to the range potentiometer (R28).

Block #14 is a four-position dipswitch, which allows for custom user settings.

Switch Settings

SW3	SW2	SW1	Time Delay (sec)
Off	Off	Off	0
Off	Off	On	2
Off	On	Off	4
Off	On	On	6
On	Off	Off	8
On	Off	On	10
On	On	Off	12
On	On	On	14

Switch 4	on	motion more sensitive
Switch 4	off	motion less sensitive

Block #15 is relay with a transistor driver Q1. When the microprocessor port goes to a logic high, it turns on the transistor which completes a ground path for the relay coil.

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