

## DOOR/WINDOW SENSORS (DWS)

Model number 60-015. Underwriters Laboratories Listed  
Household Burglary Warning System Control Unit Accessory.

### OVERVIEW

These transmitters are designed to be used to protect doors, windows, cabinets, or anything that opens and closes. Each contains a magnetic reed switch and will go into alarm by moving the supplied magnet away from the reed switch. The base of a Sensor contains screw terminals that will accept normally open or normally closed hardwire devices (switches, carpet mats, etc.).



**CAUTION!! ANYTHING WIRED TO A DOOR/WINDOW SENSOR MUST GIVE A ONE SECOND MINIMUM ACTIVATION (OPEN OR CLOSURE) WHEN TRIPPED.**

**CAUTION!! USE NORMALLY CLOSED (OPEN ON ALARM) DEVICES WHENEVER POSSIBLE. IF YOU USE NORMALLY OPEN DEVICES THEN THEY MUST BE MOMENTARY (CLOSE ONLY FOR A FEW SECONDS UPON ALARM) OR BATTERY LIFE WILL BE SHORTENED DRAMATICALLY.**

Each sensor or transmitter is programmed so it will transmit a specific number from 02-76. Each sensor number is also programmed into the CPU's microprocessor memory. Because of this, each sensor is able to identify itself to the CPU with its own unique number. The CPU communicates the exact sensor number which caused the alarm to the Interactive Central Station\*. Central Station personnel in turn notify the proper authorities depending upon the sensor number reported.

A Door/Window Sensor will transmit two signals during normal operation. When a door is opened, a "VIOLATION" signal is sent to the CPU. When the door is closed a "RESTORE" signal is transmitted. These signals are sent whether the system is armed or not. If an attempt is made to arm the system when a sensor is in a violated state (door open, for example), the CPU will "protest" by emitting a series of continuous beeps and refuse to arm to the desired level. The number of the violated sensor will also be displayed on the CPU's LED display. The system can only be armed when all of the sensors used at a particular protection level are in the "RESTORE" condition, or, if the user deliberately "BYPASSES" one or more sensors.

### LOW BATTERY INDICATIONS

In addition to VIOLATION and RESTORE, sensors will transmit a signal to the CPU if their 9-volt batteries deteriorate to a level of about 5.7 volts. Batteries can normally be expected to last about 12-18 months. If a low battery is reported after only a few months, then either the battery is defective or the sensor could be causing an excessive current drain.

A sensor's battery will usually power the sensor for a few weeks after reporting a low battery. If the battery is not changed, the sensor will eventually fail and a supervisory report will be sent to the central station\*. When the battery is changed the low battery condition will be removed automatically.

The CPU will power up so that low battery conditions on any sensors are reported to the Central Station\* on a weekly basis. Optionally, the CPU can be programmed so that sensor low battery conditions will never report to the Central Station\*.

U.L. NOTE: The SX-IVB digital communicator and the ITI Central Station Receiver have not been investigated by Underwriters Laboratories.

## SUPERVISORY INDICATIONS

Every 24 hours, each sensor sends 3 supervisory signals to the CPU. The CPU keeps track of these signals. If, after 24 hours, no signals have been received from a particular sensor, the number of the problem sensor is displayed on the Sensor Number window on the CPU and will be reported to the central station. (NOTE: U.L. has not investigated the communications ability of the SX-IVB.) The SUPERVISORY indication will be removed automatically when the CPU receives a transmission from the missing sensor or if you arm to protection Level 9.

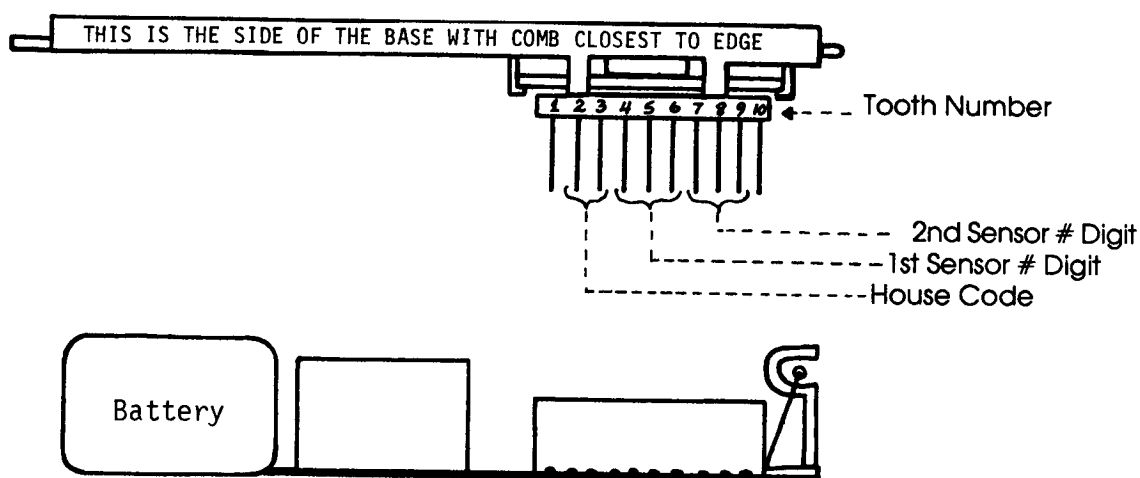
## PROGRAMMING DOOR/WINDOW SENSORS

Sensors are shipped on a certain frequency, usually 340 MHz. Since sensors will arrive already set to their frequency, you need only program their HOUSE CODE and their SENSOR NUMBER. The frequency cannot be changed in the field. Sensors are marked with a tiny sticker indicating their factory set frequency.

Sensors are set to their correct HOUSE CODE and SENSOR NUMBER by cutting or bending teeth on a small comb within each sensor. The eight inner teeth are used to determine the House Code and Sensor Number. The comb is snapped into the sensor base and its teeth extend into a 10 position socket on the transmitter circuit board.

Ignoring the two outer teeth, how teeth 2 and 3 are cut determines the HOUSE CODE; teeth 4, 5, & 6 establish the first digit of the two digit SENSOR NUMBER; and teeth 7, 8 & 9 establish the second digit of the SENSOR NUMBER.

- IMPORTANT:**
- (1) **The battery MUST BE removed during comb insertion.**
  - (2) **You MUST BE free of static when handling the transmitter circuit board.**
  - (3) **Be careful not to bend the metal RF shield as this will have an adverse effect on transmitter range.**



TRANSMITTER AND SENSOR BASE WITH PROGRAMMING COMB

## PROGRAMMING THE HOUSE CODE

To program the HOUSE CODE for each sensor, you must cut or leave intact teeth 2 and 3 on the programming comb. All HOUSE CODES must be the same for the installation.

Select the HOUSE CODE by cutting the proper teeth as follows:

HOUSE CODE	SECOND TOOTH	THIRD TOOTH	REPRESENTATION (teeth 2+3 only)
0	CUT	CUT	--
1	CUT	LEAVE	-
2	LEAVE	CUT	-
3	LEAVE	LEAVE	

## PROGRAMMING THE SENSOR NUMBER

To program the two digit SENSOR NUMBER for each transmitter you must cut, or leave intact, teeth 4, 5, 6 and 7, 8, 9 on the programming comb. The SENSOR NUMBER will be DIFFERENT for each transmitter installed.

Select the SENSOR NUMBER digits by cutting the proper teeth for EACH DIGIT as follows:

DIGIT	TOOTH 4 or 7	TOOTH 5 or 8	TOOTH 6 or 9	REPRESENTATION (teeth group 4+5+6 or 7+8+9)
0	CUT	CUT	CUT	---
1	CUT	CUT	LEAVE	--
2	CUT	LEAVE	CUT	- -
3	CUT	LEAVE	LEAVE	-
4	LEAVE	CUT	CUT	--
5	LEAVE	CUT	LEAVE	-
6	LEAVE	LEAVE	LEAVE	

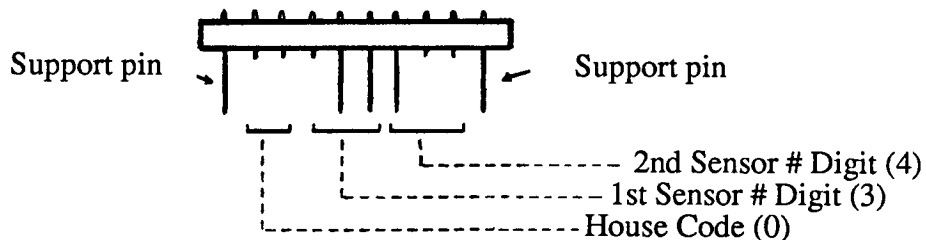
Cut teeth 4, 5 & 6 for the first digit and teeth 7, 8 & 9 for the second digit.

As an example, to program House Code "0" and SENSOR NUMBER "34" the comb would be cut as follows:

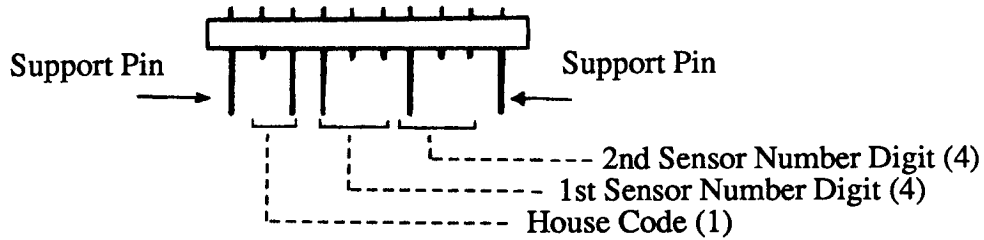
### REPRESENTATION

--	-	--
0	3	4

The Comb would look like this:



To program HOUSE CODE "1" and SENSOR NUMBER "44" the comb would be cut as follows:



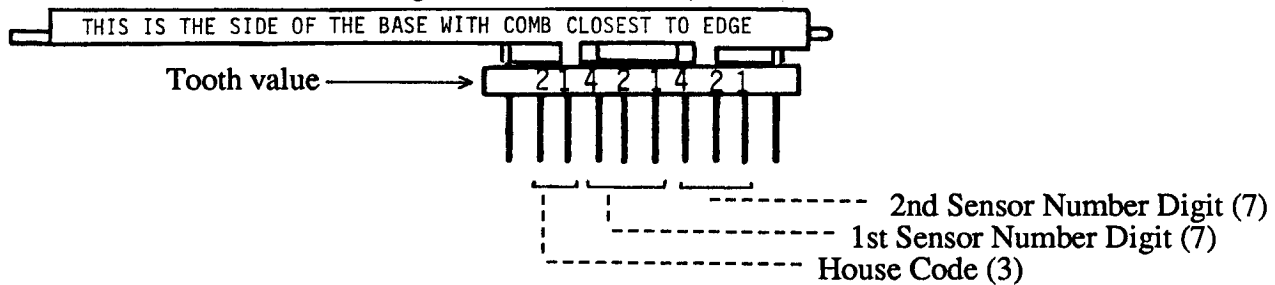
The chart on the next page illustrates how to cut (or bend) the combs for a sensor to program the various sensor numbers.

On the following four pages you will see how the combs would look after they are cut.

### PROGRAMMING HINT

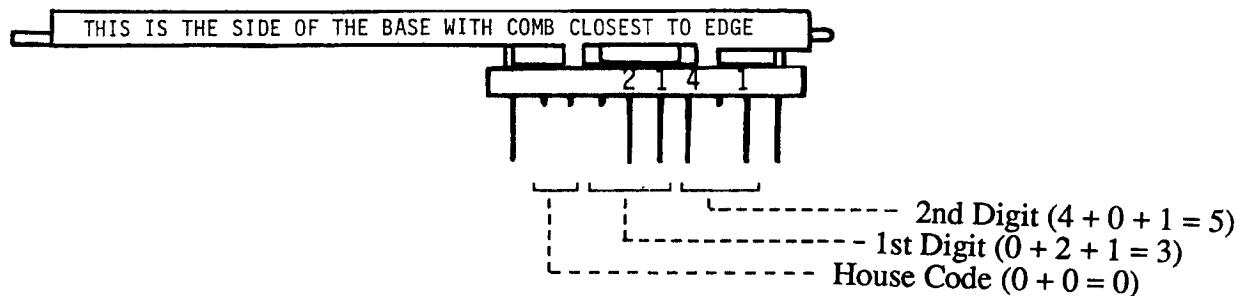
You don't need the comb charts to figure out how to cut the teeth on a comb. You can use the system shown below if you prefer.

The teeth have values assigned to each one as shown below:



You add the values together of the group of teeth to determine the digits value. For example with no teeth cut the House Code is 3 (2+1) and the first and second digits would both be 7 (4+2+1).

The following shows House Code 0, Sensor Number 35:



## USE THIS CHART TO SELECT SENSOR NUMBERS

**SENSOR NUMBER      SWITCH or COMB REPRESENTATION**

### SYSTEM CONFLICT

Active in 0-8, silent, unsupervised  
Used to see if another CPU is within range.

01            - - - - - |

### POLICE PANIC - AUDIBLE - UNSUPERVISED

Active in levels 0-8  
loud intermittent police siren

02            - - - - - | -

03            - - - - - | |

### POLICE PANIC - SILENT - UNSUPERVISED

Active in levels 0-8

04            - - - - - | - -

05            - - - - - | - |

### POLICE PANIC - AUDIBLE - SUPERVISED

Active in levels 0-8  
loud intermittent police siren

06            - - - - - | | -

### POLICE PANIC - SILENT - SUPERVISED

Active in levels 0-8

07            - - - - - | | |

### MEDICAL PANIC - AUDIBLE - UNSUPERVISED

Active in levels 0-8  
low level beeping sound

10            - - | - - -

11            - - | - - |

### ENVIRONMENTAL - AUDIBLE - SUPERVISED (FLOOD, FREEZE, ETC)

Active in levels 0-8, supervised

12            - - | - | -

13            - - | - | |

14            - - | | - -

15            - - | | - |

16            - - | | | -

17            - - | | | |

COLUMN ONE SENSORS (01 to 17)  
HAVE NOT BEEN INVESTIGATED  
BY U.L.      COLUMN TWO SENSORS  
(20 to 57) ARE U.L. SENSOR NUMBERS.

**SENSOR NUMBER      SWITCH or COMB REPRESENTATION**

### FIRE EMERGENCY

Active in levels 0-8, supervised  
loud steady tone siren.

20            - | - - - -

21            - | - - - -

23            - | - - | |

24            - | - | - -

25            - | - | - |

26            - | - | | -

27            - | - | | |

### SPECIAL INTRUSION SENSORS

For gun cabinets, wall safes, etc.  
Active in levels 1-7, supervised  
loud modulated siren.

30            - | | - - -

31            - | | - - |

32            - | | - | -

33            - | | - | |

### DELAYED ENTRANCE INTRUSION

For delayed entry/exit doors  
Active in 3-7, Chime 2, Instant 7  
loud modulated siren

34            - | | | - -

35            - | | | - |

36            - | | | | -

37            - | | | | |

### INSTANT EXTERIOR INTRUSION

For instant doors and windows  
Active in levels 3-7, chime level 2  
loud modulated siren

40            | - - - - -

41            | - - - - |

42            | - - - | -

43            | - - - | |

44            | - - - | - -

45            | - - - | - |

46            | - - - | - | -

47            | - - - | - | |

50            | - | - - -

51            | - | - - |

52            | - | - - | -

53            | - | - - | |

54            | - | - - | - -

55            | - | - - | - |

56            | - | - - | | -

57            | - | - - | | |

## USE THIS CHART TO SELECT SENSOR NUMBERS

**SENSOR NUMBER      SWITCH or COMB REPRESENTATION**

### **INTERIOR INTRUSION - MOMENTARY**

For Motions, Mats, Sound Sensors  
Active in levels 4-7, instant in 7  
loud modulated siren

60	- ---
61	- --
62	- - -
63	- -

### **INTERIOR INTRUSION - MOMENTARY**

For Motions, Mats, Sound Sensors  
Active in levels 4-5  
loud modulated siren

64	-  - -
65	-  -

### **DELAYED INTERIOR INTRUSION - MOMENTARY**

For Motions, Mats, Sound Sensors  
Active in levels 4-5  
loud modulated siren

66	-   -
67	-

**SENSOR NUMBER      SWITCH or COMB REPRESENTATION**

### **INTERIOR INTRUSION - DOORS**

Active in levels 4-7  
loud modulated siren

70	---
71	--
72	- -

### **INTERIOR INTRUSION - DOORS**

Active in levels 4-5  
loud intermittent police siren

73	-
74	- -

### **DELAYED INTERIOR INTRUSION**

Active levels 4- 5  
loud modulated siren

75	-
76	-

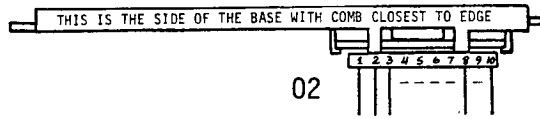
**NOTE 1 - COLUMN ONE SENSORS (60 to 67) HAVE NOT BEEN INVESTEGATED BY U.L. COLUMN TWO SENSORS (70 to 76) ARE U.L. APPROVED SENSOR NUMBERS.**

**NOTE 2 - Sensors 66-67 and 75-76 initiate a delay just like an entrance door. Thus, if a customer gets up in the morning and trips one of these sensors, the delay tone will sound to let him know that he should disarm the system before it goes into alarm.**

**NOTE 3 - Sensors 60-65 and 70-74 will be deactivated during a delay initiated by an entry door (34-37) or initiated by the delayed interior sensors (66-67 and 75-76). Otherwise they will activate instantly.**

# DRAWINGS OF COMB CUTS

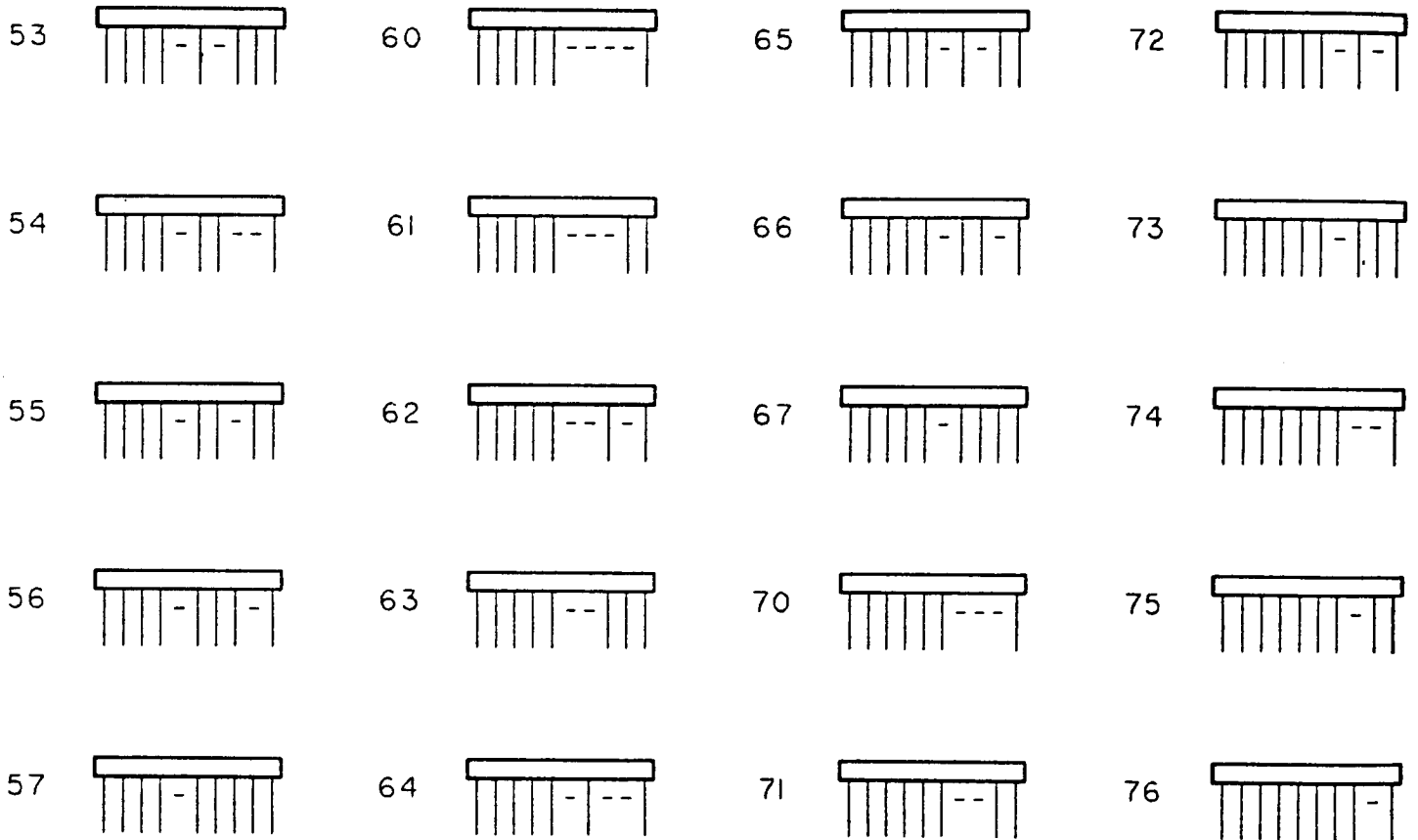
NOTE: The HOUSE CODE in each example below is "3", so teeth 2 and 3 are both left uncut.  
 Only sensor numbers 30 - 57 and 70 - 76 are acceptable for use with U.L. systems.



03	15	27	41
04	16	30	42
05	17	31	43
06	20	32	44
07	21	33	45
10	22	34	46
11	23	35	47
12	24	36	50
13	25	37	51
14	26	40	52

# DRAWINGS OF COMB CUTS

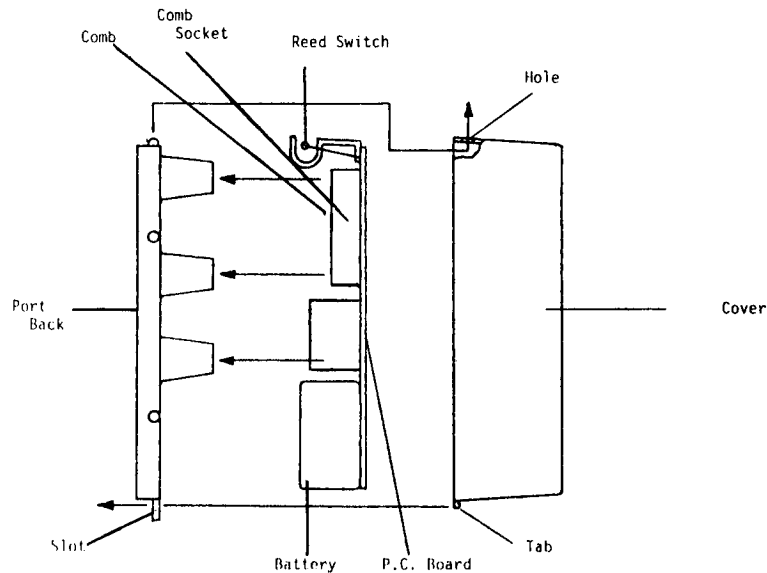
NOTE: The HOUSE CODE in each example below is "3", so teeth 2 and 3 are both left uncut.  
Only sensor numbers 30 - 57 and 70 - 76 are acceptable for use with U.L. systems.





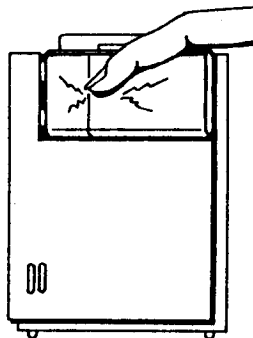
## INSTALLING DOOR/WINDOW SENSORS

1. Remove the sensor cover by pressing on the cover end to disengage the tab on the cover from the slot in the sensor back.



SENSOR COMPONENTS

2. **CAUTION!!!** It is important for you to be free of all static electricity when handling transmitters. Touch something metal, or touch the sensor battery, before touching the transmitter circuitry.



3. **DISCONNECT THE BATTERY FROM THE TRANSMITTER. THIS IS IMPORTANT!**
4. Separate the PC board from the sensor back by pulling the two apart.
5. Program the sensor by cutting the proper teeth on the programming comb to create the desired HOUSE CODE and 2-digit SENSOR NUMBER. Use a VERY SMALL pair of wire clippers to cut and remove the teeth. It is important to clip the teeth as close as possible to the circuit board which holds the teeth. The sensor numbers should be the ones you have selected and indicated on the CENTRAL STATION DATA CARD for this installation. See Appendix B.
6. Do not reinsert the PC board into the sensor back at this time, but it may be helpful to pencil the sensor number on the sensor back to keep track of the sensors.

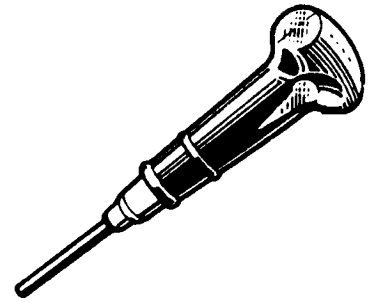
REPEAT STEPS 1 THROUGH 6 UNTIL ALL THE SENSORS ARE PROGRAMMED.

7. Mount sensors at their respective openings using # 6 x 1/2" screws if mounting on wood and #8-10 plastic anchors with #6 x 3/4" screws if mounting into dry wall or plaster.

- a. To avoid damage, do not mount within 5 inches of the floor on doors.
- b. Generally mount sensor on door, magnet on frame.
- c. Avoid mounting sensors or magnets on any metallic surfaces such as metal doors or foil wallpaper. If you must, then use spacers to keep sensor and magnet away from the metal.
- d. For double doors mount magnet on one door, sensor on the other.
- e. Sensors may be mounted vertically or horizontally, however, vertical mounting might give you a slightly better range.
- f. Mount sensors with screws, NOT TWO-SIDED TAPE.
- g. Try to keep all transmitters within 75 feet of the CPU.

8. Mount magnet using two #18 x 1/2" wire nails. A Brad Driver works well for this. Notches are provided if you prefer to use screws.

- a. Be sure magnet doesn't interfere with door or window opening.
- b. Mount within 3/8" of sensors reed switch, centered on end of the sensor. DON'T EXCEED 3/8".
- c. Do not use two sided tape.



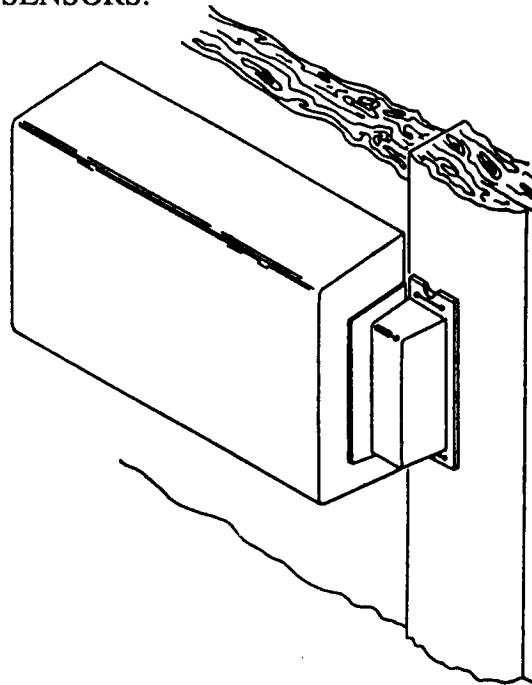
BRAD DRIVER

9. Replace PC board into sensor base, make sure the comb is properly set into the transmitter board. Also, make sure magnet and reed switch are properly aligned & within 3/8".

10. Discharge any static and replace sensor battery.

11. Replace Sensor Cover.

REPEAT STEPS 7-11 FOR ALL SENSORS.



DOOR/WINDOW SENSOR AND MAGNET CORRECTLY INSTALLED

## INTERFACING REMOTE DEVICES TO A DOOR/WINDOW SENSOR

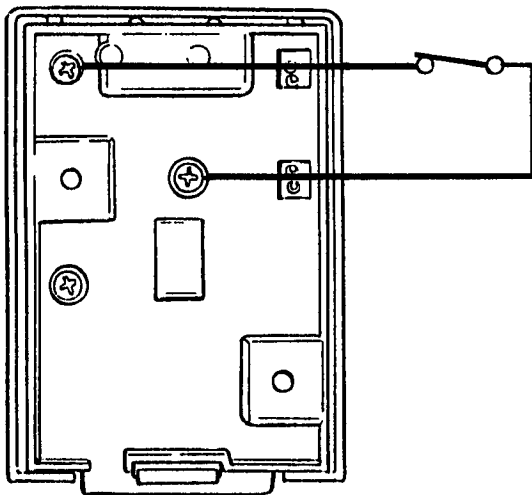
U.L. NOTE: For a U.L. installation connect only U.L. listed devices to an ITI Door/Window Sensor.

The diagrams below illustrate how to wire a NORMALLY CLOSED (opens on alarm) device and a NORMALLY OPEN (closes on alarm) device to a transmitter. The built-in reed switch in the Door/Window Sensor becomes inoperative whenever anything is wired into the sensor's normally closed hardwire terminals.

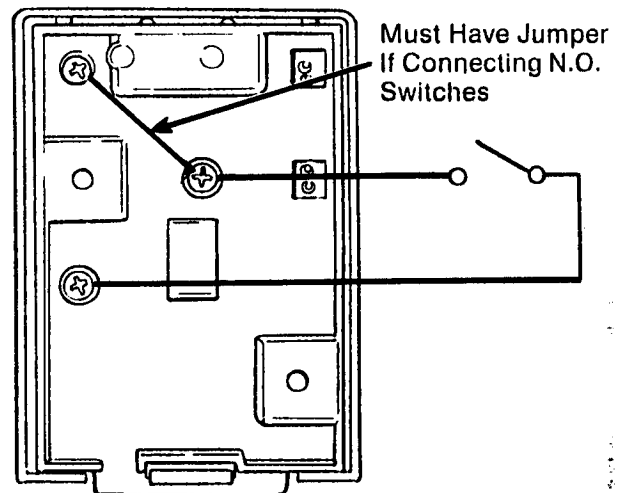
Multiple normally CLOSED devices would be wired in SERIES all in the same line. Multiple normally OPEN devices would be wired in PARALLEL all to the same two screw terminals.

You can connect any normally closed or normally open magnetic switch, motion detector, alarm screen or under carpet pad to a sensor as long as you follow these guidelines:

- (1) **The device must supply a minimum 1 FULL SECOND open or closure on alarm. THIS IS IMPORTANT! Don't attempt to connect fast pulse devices such as Window Bugs to a Sensor.**
- (2) **Use normally closed devices whenever possible.** If you use normally open devices do not use them for any application where the device could be left in an alarm condition for an extended period of time. For example, do not use normally open switches on doors or windows that may be left open. *Extended closures on the normally open loop will cause severe battery drain.*
- (3) If you are using untwisted wire don't exceed 6 feet of wire in any wire run.
- (4) If you are using twisted wire then don't exceed 25 feet of wire in any wire run.
- (5) Always use stranded wire, never solid core wire.
- (6) Don't run wires within 18" of electrical wiring. Never run parallel to electrical wires, cross them at a 90 degree angle.
- (7) Only one alarm screen can be wired to a DWS.
- (8) Use only reed switches, do not use mechanical switches.
- (9) A maximum of five switches can be wired to a DWS. Fewer than five is preferable so you can zone out as much of the system as possible.
- (10) Mounting a sensor on a metallic surface is *never* recommended. If you must, then put a spacer under the sensor that is at least 1/4" thick.

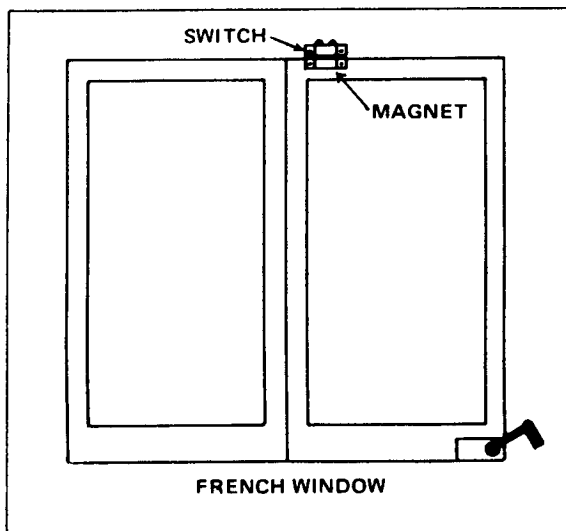


NORMALLY CLOSED WIRING DIAGRAM  
(open on alarm)



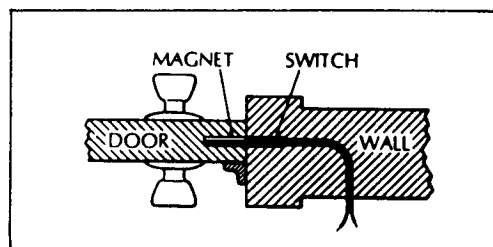
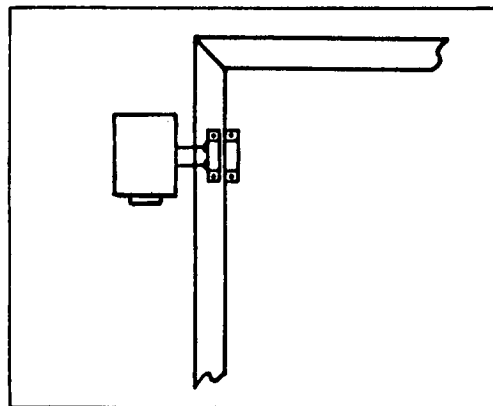
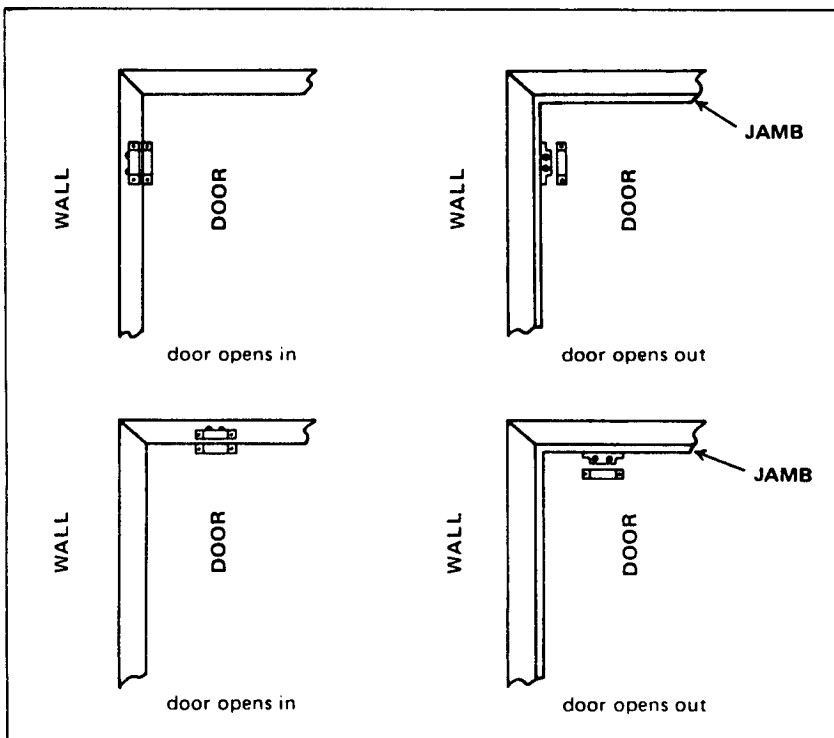
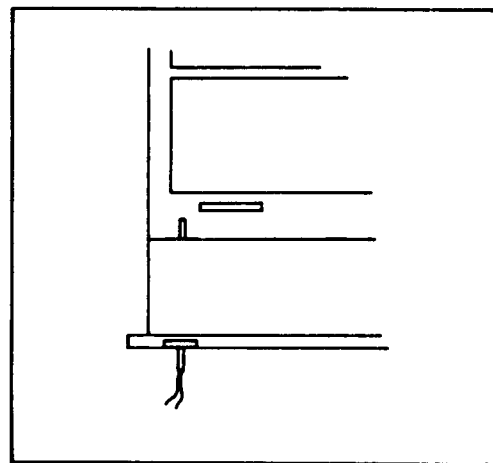
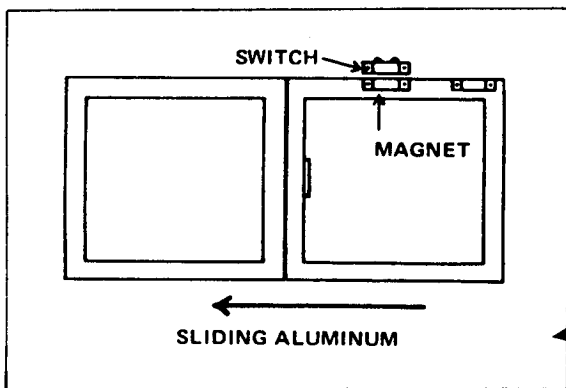
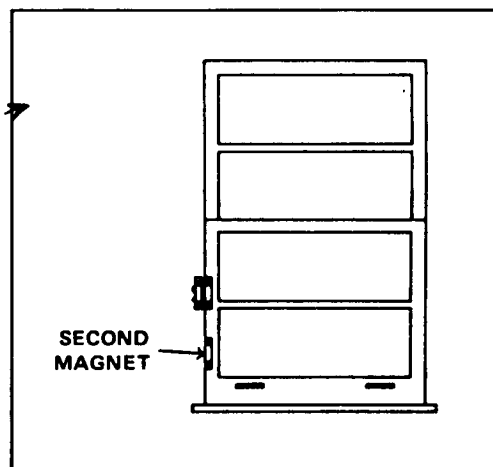
NORMALLY OPEN WIRING DIAGRAM  
(close on alarm)  
See Note #2 above.

The following diagrams show how to connect a Door/Window Sensor to both surface mount external magnetic contacts and recessed magnetic contacts.



**NOTE:**

If using two magnets they must be far enough apart to operate the reed switch one at a time. Also you must move slowly from one to the other to allow the D/WS to transmit its full data stream for each condition. (i.e. open or closed)



## TAMPER SWITCH

Door/Window sensors can be fitted with a tamper switch for high security applications. The tamper switch is **DISABLED** when the sensor is shipped. A jumper wire on the sensor circuit board must be cut and a conductive tamper dot must be installed in the sensors cover to **ENABLE** the tamper feature.

With the tamper switch **ENABLED**, removing a sensor cover (to deliberately remove the battery, for example) causes the sensor to transmit a violation signal to the CPU. If that sensor is presently active or "armed" the CPU will go into alarm. If the sensor is not armed it will still send a violation signal to the CPU, but the CPU will not go into immediate alarm. Instead, the CPU will remember the signal and "protest" (as if the sensor had been left open) when the customer attempts to arm the system. The protest sound will alert the customer that the sensor has been tampered with (ie: the battery taken out) or that the sensor is not properly closed.

**WE RECOMMEND THE TAMPER FEATURE BE LEFT DISABLED IN RESIDENTIAL INSTALLATIONS AND ONLY ENABLED IN COMMERCIAL APPLICATIONS WHERE YOU FEEL THERE IS A LIKELIHOOD THAT TAMPERING MAY TAKE PLACE.**

**NEVER TAMPER ANY TRANSMITTERS EXCEPT THOSE USED TO PROTECT DOORS OR WINDOWS. IF YOU WERE TO ENABLE THE TAMPER FEATURE ON A 24 HOUR TRANSMITTER SUCH AS A SMOKE SENSOR, HEAT SENSOR, PANIC BUTTON, OR FREEZE DETECTOR THEN THE SYSTEM WILL GO INTO ALARM IF YOU REMOVE THE COVER TO CHANGE THE BATTERY.**

### TO ENABLE TAMPER FEATURE:

1. Cut the circuit board jumper to **ENABLE** the tamper feature.
2. Install the self-adhesive "tamper dot" in the recessed hole in the sensor cover. When handling the tamper dot please try to keep your finger oils off the surface that touches the transmitter. Tamper dots are free upon request.
3. Use a clean pencil eraser or alcohol to clean the two solder surfaces on the back side of the circuit board that the tamper dot will come in contact with. You are doing this to remove any solder flux that may be left over from manufacturing.
4. If using the tamper feature be advised that annual cleaning of the contact pads will be necessary to assure reliable operation.

