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*Thank you for using our products.*  
**INSTALLATION INSTRUCTIONS**

**SERIES ET70/90 LOW PROFILE HIGH INTENSITY SPEAKER STROBES**

*Use this product according to this instruction manual. Please keep this instruction manual for future reference.*

**GENERAL:**

Wheelock’s Series ET70/90 Low Profile High Intensity Speaker Strobes are UL Listed under Standard 1971 for Signaling Devices for the Hearing Impaired and UL Standard 1480 for Speaker Appliances. They are designed for multiple power requirements with high dBA output at each power tap. All models offer a choice of field selectable taps, 1/8W to 8W for either 25.0VRMS or 70.0VRMS audio systems. The Low Profile design incorporates a high efficiency speaker for maximum output at minimum power across a frequency range of 400Hz to 4000Hz, and features a sealed back construction for extra protection and improved audibility. The Series ET appliances also incorporate a Speaker Mounting Plate attached to the speaker for ease of installation. The Low Profile Speaker Strobes can provide a non-synchronized strobe appliance when connected directly to a Fire Alarm Control Panel (FACP), or provide a synchronized strobe appliance when used in conjunction with a Sync Module (SM), Dual Sync Module (DSM) or Wheelock’s Power Supplies. The Strobes use a Xenon flashtube with solid state circuitry enclosed in a rugged Lexan® lens to provide maximum visibility and reliability for effective visible signaling.

**NOTE:** “Lexan” is a registered trademark of General Electric Corporation.

**NOTE:** All **CAUTIONS** and **WARNINGS** are identified by the symbol . All warnings are printed in bold capital letters.

**WARNING: READ THESE INSTRUCTIONS CAREFULLY. FAILURE TO COMPLY WITH ANY OF THE FOLLOWING INSTRUCTIONS, CAUTIONS AND WARNINGS COULD RESULT IN IMPROPER APPLICATION, INSTALLATION AND/OR OPERATION OF THESE PRODUCTS IN AN EMERGENCY SITUATION, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

**SPECIFICATIONS:**

<b>Table 1: UL Listed Models and Ratings</b>													
Models	Speaker								Strobe			Mounting Options	
	Voltage (VRMS)	dBA at 10 Feet (Rated Watts)							Regulated Voltage (VDC/VRMS)				Candela
		1/8	1/4	1/2	1	2	4	8	Min	Nom	Max		
ET70-24150W	25/70	75	78	81	84	87	90	93	----	----	----	150	A,B
ET70-24177W	25/70	75	78	81	84	87	90	93	16	24	33	177	A,B
ET70-24185W	25/70	75	78	81	84	87	90	93	16	24	33	185	A,B
ET70-24150C	25/70	75	78	81	84	87	90	93	16	24	33	150	A,B
ET70-24177C	25/70	75	78	81	84	87	90	93	16	24	33	177	A,B
ET90-24150W	25/70	75	78	81	84	87	90	93	16	24	33	150	A
ET90-24177W	25/70	75	78	81	84	87	90	93	16	24	33	177	A
ET90-24185W	25/70	75	78	81	84	87	90	93	16	24	33	185	A
ET90-24150C	25/70	75	78	81	84	87	90	93	16	24	33	150	A
ET90-24177C	25/70	75	78	81	84	87	90	93	16	24	33	177	A

**NOTES:**

1. Strobes will produce 1 flash per second over the “Regulated Voltage” range.
2. All models are UL Listed for indoor use with a temperature range of +32°F to +120°F (0°C to +49°C) and maximum humidity of 85% RH.
3. dBA is rated per UL Standard 1480 for Speaker Appliances.

**NOTE: THE MAXIMUM WIRE IMPEDENCE BETWEEN STROBES SHALL NOT EXCEED 35 OHMS. THE MAXIMUM NUMBER OF STROBES ON A SINGLE NOTIFICATION APPLIANCE CIRCUIT SHALL NOT EXCEED 47.**

**WARNING: THESE APPLIANCES WERE TESTED TO THE OPERATING VOLTAGE LIMITS OF 16-33 VOLTS USING FILTERED (DC) OR UNFILTERED FULL-WAVE-RECTIFIED (FWR). DO NOT APPLY 80% AND 110% OF THESE VOLTAGE VALUES FOR SYSTEM OPERATION.**

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**⚠ WARNING: CHECK THE MINIMUM AND MAXIMUM OUTPUT OF THE POWER SUPPLY AND STANDBY BATTERY AND SUBTRACT THE VOLTAGE DROP FROM THE CIRCUIT WIRING RESISTANCE TO DETERMINE THE APPLIED VOLTAGE TO THE STROBES.**

<b>Table 2: Current Ratings (AMPS)</b>			
Rated Average Current			
Voltage	150cd	177cd	185cd
16.0VDC	0.506	0.570	0.545
24.0VDC	0.308	0.350	0.333
33.0VDC	0.227	0.250	0.245
16.0VRMS	0.773	0.865	0.820
24.0VRMS	0.469	0.540	0.520
33.0VRMS	0.398	0.415	0.410
Rated Peak Current *			
Voltage	150cd	177cd	185cd
16.0VDC	0.768	0.850	0.800
24.0VDC	0.648	0.700	0.675
33.0VDC	0.800	0.900	0.850
16.0VRMS	2.400	2.500	2.450
24.0VRMS	1.800	2.100	1.950
33.0VRMS	1.800	2.000	1.900

\* The time duration for the peak current is 1 millisecond.

**NOTE:** Inrush current is less than rated peak current.

**⚠ WARNING: MAKE SURE THAT THE TOTAL AVERAGE CURRENT, TOTAL PEAK CURRENT AND TOTAL INRUSH CURRENT REQUIRED BY ALL APPLIANCES THAT ARE CONNECTED TO THE SYSTEM'S PRIMARY AND SECONDARY POWER SOURCES, NAC CIRCUITS, SM, DSM SYNC MODULES OR WHEELOCK'S POWER SUPPLIES DO NOT EXCEED THE POWER SOURCES' RATED CAPACITY OR THE CURRENT RATINGS OF ANY FUSES ON THE CIRCUITS TO WHICH THESE APPLIANCES ARE WIRED. OVERLOADING POWER SOURCES OR EXCEEDING FUSE RATINGS COULD RESULT IN LOSS OF POWER AND FAILURE TO ALERT OCCUPANTS DURING AN EMERGENCY, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

When calculating the total average, peak or inrush currents: Use Table 2 to determine the highest value of "Rated Average Current" for an individual strobe (across the expected operating voltage range of the strobe), and the highest value of "Rated Inrush Current" or "Rated Peak Current" (whichever is higher) of an individual strobe (across the expected voltage range of the strobe), then multiply these values by the total number of strobes; be sure to add the currents for any other appliances, including audible signaling appliances, powered by the same source and include any required safety factors.

If the inrush current or peak current exceeds the power supplies' inrush capacity, the output voltage provided by the power supplies may drop below the listed voltage range of the appliances connected to the supply and the voltage may not recover in some types of power supplies. For example, an auxiliary power supply that lacks filtering at its output stage (either via lack of capacitance and/or lack of battery backup across the output) may exhibit this characteristic.

**⚠ CAUTION:** Strobes are not designed to be used on coded systems in which the applied voltage is cycled on and off.

**LIGHT DISTRIBUTION:**

**Table 3: Horizontal Plane**

Horizontal Angle (in deg.)	150C		177C		150W		177W		185W	
	UL Min.	Typ. 150C	UL Min.	Typ. 177C	UL Min.	Typ. 150W	UL Min.	Typ. 177W	UL Min.	Typ. 185W
0	150.0	212	177.0	237	150.0	212	177.0	237	185.0	234
5	135.0	198	159.3	218	135.0	198	159.3	218	166.5	242
10	135.0	172	159.3	195	135.0	172	159.3	195	166.5	238
15	135.0	168	159.3	195	135.0	168	159.3	195	166.5	239
20	135.0	167	159.3	190	135.0	167	159.3	190	166.5	241
25	135.0	169	159.3	193	135.0	169	159.3	193	166.5	243
30	112.5	162	132.8	183	112.5	162	132.8	183	138.8	251
35	112.5	163	132.8	185	112.5	163	132.8	185	138.8	255
40	112.5	152	132.8	175	112.5	152	132.8	175	138.8	271
45	112.5	134	132.8	155	112.5	134	132.8	155	138.8	272
50	82.5	102	97.4	121	82.5	102	97.4	121	101.8	259
55	67.5	93	79.7	109	67.5	93	79.7	109	83.3	205
60	60.0	93	70.8	103	60.0	93	70.8	103	74.0	177
65	52.5	84	62.0	93	52.5	84	62.0	93	64.8	167
70	52.5	79	62.0	88	52.5	79	62.0	88	64.8	150
75	45.0	72	53.1	82	45.0	72	53.1	82	55.5	121
80	45.0	67	53.1	77	45.0	67	53.1	77	55.5	90
85	37.5	72	44.3	81	37.5	72	44.3	81	46.3	68
90	37.5	55	44.3	64	37.5	55	44.3	64	46.3	63

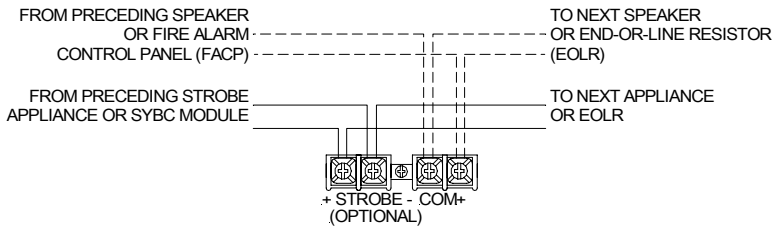
**Table 3A: Vertical Plane**

Vertical Angle (in deg.)	150C		177C		150W		177W		185W	
	UL Min.	Typ. 150C	UL Min.	Typ. 177C	UL Min.	Typ. 150W	UL Min.	Typ. 177W	UL Min.	Typ. 185W
0	150.0	214	177.0	242	150.0	214	177.0	242	185.0	234
5	135.0	207	159.3	239	135.0	207	159.3	239	166.5	255
10	135.0	203	159.3	231	135.0	203	159.3	231	166.5	267
15	135.0	200	159.3	228	135.0	200	159.3	228	166.5	239
20	135.0	196	159.3	228	135.0	196	159.3	228	166.5	231
25	135.0	194	159.3	224	135.0	194	159.3	224	166.5	243
30	112.5	187	132.8	218	135.0	187	159.3	218	166.5	237
35	112.5	182	132.8	210	97.5	182	115.1	210	120.3	193
40	112.5	172	132.8	200	69.0	172	81.4	200	85.1	152
45	112.5	160	132.8	184	51.0	160	60.2	184	62.9	110
50	82.5	137	97.4	155	40.5	137	47.8	155	50.0	89
55	67.5	130	79.7	152	33.0	130	38.9	152	40.7	87
60	60.0	109	70.8	123	27.0	109	31.9	123	33.3	84
65	52.5	88	62.0	97	24.0	88	28.3	97	29.6	84
70	52.5	70	62.0	78	22.5	70	26.6	78	27.8	83
75	45.0	65	53.1	70	19.5	65	23.0	70	24.1	81
80	45.0	48	53.1	54	18.0	48	21.2	54	22.2	77
85	37.5	43	44.3	49	18.0	43	21.2	49	22.2	80
90	37.5	38	44.3	49	18.0	38	21.2	49	22.2	60

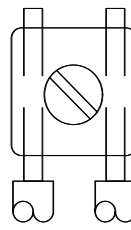
**WIRING INFORMATION:**

- Each doubling of rated Watts increases sound output by 3 dBA. Field selectable input terminals are provided on each unit. The following wattage selections are available: 1/8W, 1/4W, 1/2W, 1W, 2W, 4W, and 8W. Frequency range of speakers is 400-4000Hz.
- A 10µF blocking capacitor for DC supervision of audio lines by the FACP is factory wired in series with the speaker input.

**Figure 1.**



**Figure 2.**

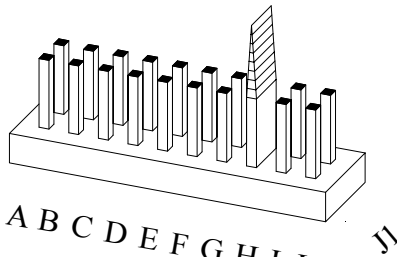


- Low Profile Speaker Strobe models have in-out wiring terminals that accept two #12 to #18 American Wire Gauge (AWG) wires at each screw terminal. Strip leads 3/8 inches and connect to screw terminals.
- Break all in-out wire runs on supervised circuits to assure integrity of circuit supervision as shown in Figure 2. The polarity shown in the wiring diagrams is for operation of the appliances.

\* Refer to Sync Module instruction sheets SM (P83123), DSM (P83177) or Wheelock's Power Supplies for additional information.

**⚠ WARNING: THE SPEAKER STROBE APPLIANCES MUST BE FIELD SET TO THE DESIRED dBA SOUND OUTPUT LEVEL BEFORE THEY ARE INSTALLED. THIS IS DONE BY PROPERLY INSERTING JUMPER PLUGS IN ACCORDANCE WITH THESE INSTRUCTIONS. INCORRECT SETTINGS WILL RESULT IN IMPROPER PERFORMANCE, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

**Figure 3: Jumper plug is used to select tap settings which = dBA loudness. Figure 4: Tap Settings (Factory setting is 70V @ 1/2W (F))**



A	B	C	D	E	F	G	H	I	J
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○

Note: Use needle nose pliers to pull and properly insert the jumper plug to the desired tap setting.

Connect speaker wires to common and positive of terminal block and select the power tap terminal for 1/8W, 1/4W, 1/2W, 1W, 2W, 4W or 8W; 25V or 70V as required (see Figures 1, 2, 3, 4 and Table 4).

Each letter corresponds to a plug position of the header located on the printed circuit board. Select voltage and wattage as shown in Table 4 below.

Position	25V	70V
A	8	-----
B	4	-----
C	2	-----
D	1	8
E	1/2	4
F	1/4	2
G	1/8	1
H	-----	1/2
I	-----	1/4
J	-----	1/8

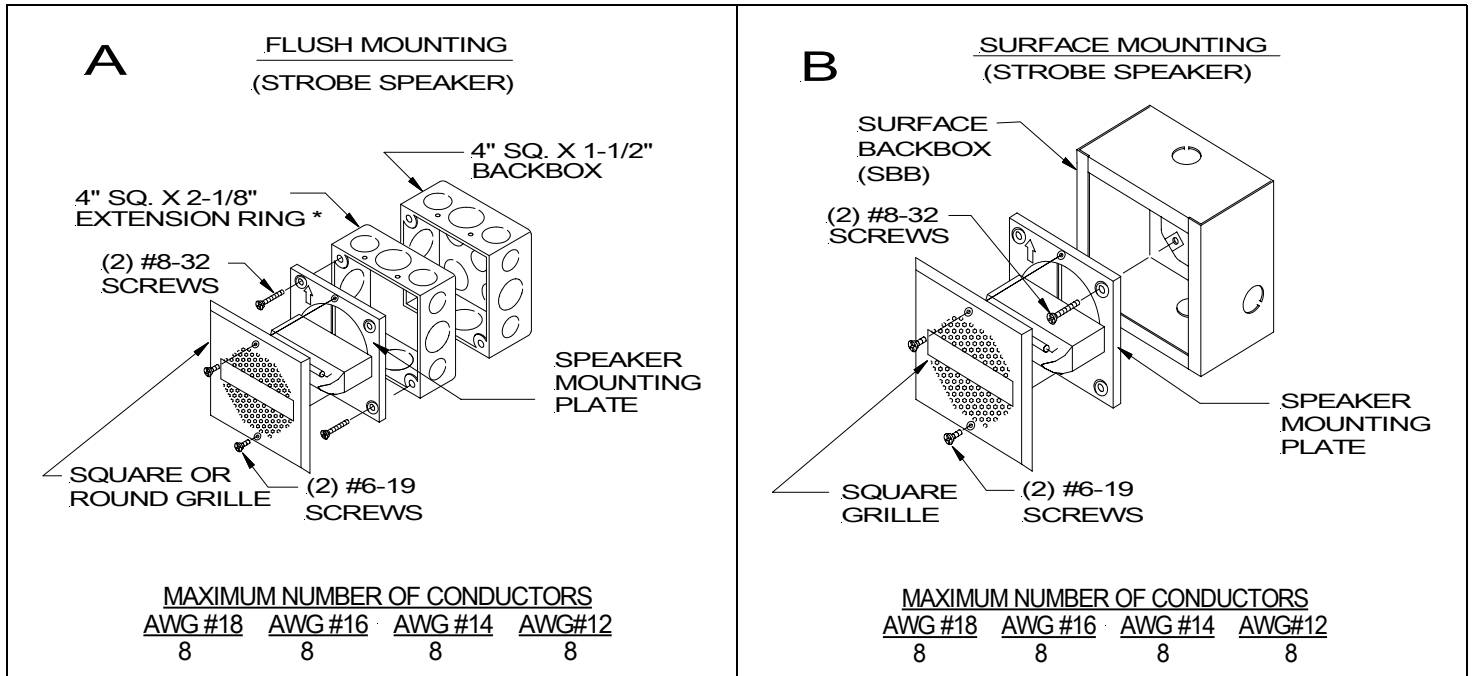
**GROUNDING:** Connect ground wire to backbox. Install signaling appliance to backbox using mounting screws provided.

**⚠ WARNING: CHECK ELECTRICAL RATINGS SPECIFIED IN TABLE 1 AND 2 TO ENSURE PROPER ELECTRICAL INPUT. BE SURE THAT SPEAKER WIRING IS CONNECTED TO SPEAKER TERMINALS ONLY AND STROBE WIRING IS CONNECTED TO STROBE TERMINALS ONLY. CHECK TO INSURE THAT WIRING AT FACP IS CORRECT. IMPROPER ELECTRICAL INPUT CAN DAMAGE THE PRODUCT OR CAUSE IT TO MALFUNCTION.**

## MOUNTING OPTIONS:

**⚠ CAUTION:** The following figures show the maximum number of field wires (conductors) that can enter the backbox used with each mounting option. If these limits are exceeded, there may be insufficient space in the backbox to accommodate the field wires and stresses from the wires could damage the product.

Although the limits shown for each mounting option comply with the National Electrical Code (NEC), Wheelock recommends use of the largest backbox option shown and the use of approved stranded field wires, whenever possible, to provide additional wiring room for easy installation and minimum stress on the product from wiring.



**NOTE:** Surface backbox (SBB) in Figure B, is compatible with wiremold and conduit, mounting holes are for single-gang, double-gang, 4"sq., 3-1/2" & 4" octagon or round backboxes.

## MOUNTING PROCEDURES:

**⚠ CAUTION:** Check that the installed product will have sufficient clearance and wiring room prior to installing backboxes and conduit, especially if sheathed multiconductor cable or 3/4" conduit fittings are used.

1. ET70/90 models have an integrated Speaker Mounting Plate.
2. The Speaker Mounting Plate must be oriented correctly when it is mounted to the backbox. Turn the Speaker Mounting Plate so that the arrow above the words "Horizontal Strobe" points to the top side of the Speaker Mounting Plate.
3. First mount the Speaker Mounting Plate to the backbox with the Cone Protector on; after the Speaker Mounting Plate is attached to the backbox, remove the Cone Protector before installing the grille. Next slide the grille over the Speaker Mounting Plate strobe and attach with (2) screws.
4. When terminating field wires, do not use more lead length than required. Excess lead length could result in insufficient wiring space for the signaling appliance.
5. Conduit entrances to the backbox should be selected to provide sufficient wiring clearance for the installed product.
6. Do not pass additional wires (used for other than the signaling appliance) through the backbox. Such additional wires could result in insufficient wiring space for the signaling appliance.
7. Mounting hardware for each mounting option is supplied.
8. All models can be flush mounted to a 4" square by 1-1/2" deep backbox with a 4" square 1-1/2" extension ring (Figure A). ET70 models can also be surface mounted to a SBB (Figure B).
9. Use care and proper techniques to position the field wires in the backbox so that they use minimum space and produce minimum stress on the product. This is especially important for stiff, heavy gauge wires and wires with thick insulation or sheathing.

**⚠ CAUTION:** Always operate audio amplifiers and speakers within their specified ratings. Excessive input may distort sound quality and may damage audio equipment. Do not exceed +130% of speaker input voltage per UL 1480. Improper input voltage can damage speaker. If distortion is heard, check for clipping of the audio appliance with an oscilloscope and reduce the amplifier input level or gain level to eliminate any clipping.

**⚠ WARNING:** WHEN INSTALLING STROBES IN AN OPEN OFFICE OR OTHER AREAS CONTAINING PARTITIONS OR OTHER VIEWING OBSTRUCTIONS, SPECIAL ATTENTION SHOULD BE GIVEN TO THE LOCATION OF THE STROBES SO THAT THEIR OPERATING EFFECT CAN BE SEEN BY ALL INTENDED VIEWERS, WITH THE INTENSITY, NUMBER, AND TYPE OF STROBES BEING SUFFICIENT TO MAKE SURE THAT THE INTENDED VIEWER IS ALERTED BY PROPER ILLUMINATION, REGARDLESS OF THE VIEWER'S ORIENTATION. FAILURE TO DO SO COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

High Intensity strobe models are Listed for use in sleeping or non-sleeping areas when installed in accordance with appropriate NFPA Standards and the Authority Having Jurisdiction.

**⚠ WARNING:** INSTALLATION OF WHEELOCK HIGH INTENSITY CANDELA STROBE PRODUCTS IN SLEEPING AREAS SHOULD BE WALL MOUNTED AT LEAST 24" BELOW THE CEILING AS FOLLOWS: (1) THE ON-AXIS (DIRECTLY IN FRONT OF LENS) LIGHT OUTPUT SHOULD BE DIRECTED AT THE EYE-LIDS OF THE SLEEPING PERSON, E.G. PILLOW END OF BED, BED HEAD; (2) NO PART OF THE BED SHALL BE MORE THAN SIXTEEN (16) FEET FROM THE STROBE NOTIFICATION APPLIANCE. INSTALLERS MUST ADVISE OWNERS AND OPERATORS OF BUILDINGS WITH SLEEPING OCCUPANTS, E.G. HOTELS AND MOTELS, TO WARN GUESTS, RESIDENTS AND EMPLOYEES TO NOT MOVE THE BED LOCATION TO A POSITION VIOLATING POINTS (1) AND (2) ABOVE OR SERIOUS INJURY AND/OR LOSS OF LIFE MAY OCCUR DURING A FIRE EMERGENCY.

**⚠ WARNING:** A SMALL POSSIBILITY EXISTS THAT THE USE OF MULTIPLE STROBES WITHIN A PERSON'S FIELD OF VIEW, UNDER CERTAIN CIRCUMSTANCES, MIGHT INDUCE A PHOTO-SENSITIVE RESPONSE IN PERSONS WITH EPILEPSY. STROBE REFLECTIONS IN A GLASS OR MIRRORED SURFACE MIGHT ALSO INDUCE SUCH A RESPONSE. TO MINIMIZE THIS POSSIBLE HAZARD, WHEELOCK STRONGLY RECOMMENDS THAT THE STROBES INSTALLED SHOULD NOT PRESENT A COMPOSITE FLASH RATE IN THE FIELD OF VIEW WHICH EXCEEDS FIVE (5) Hz AT THE OPERATING VOLTAGE OF THE STROBES. WHEELOCK ALSO STRONGLY RECOMMENDS THAT THE INTENSITY AND COMPOSITE FLASH RATE OF INSTALLED STROBES COMPLY WITH LEVELS ESTABLISHED BY APPLICABLE LAWS, STANDARDS, REGULATIONS, CODES AND GUIDELINES.

**NOTE:** NFPA 72/ANSI 117.1 conform to ADAAG Equivalent Facilitation Guidelines in using fewer, higher intensity strobes within the same protected area.

If this appliance is required to produce a distinctive three-pulse Temporal Pattern Fire Alarm Evacuation Signal (for total evacuation) in accordance with NFPA 72, 1999 Edition, the appliance must be used with a fire alarm control unit that can generate the temporal pattern signal. Refer to manufacturer's installation manual for details.

**⚠ CAUTION:** Check the installation instructions of the manufacturers of other equipment used in the system for any guidelines or restrictions on wiring and/or locating Notification Appliance Circuits (NAC) and notification appliances. Some system communication circuits and/or audio circuits, for example, may require special precautions to assure electrical noise immunity (e.g. audio crosstalk).

**NOTE:** This equipment 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 installation. 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 communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) Reorient or relocate the receiving antenna, 2) Increase the separation between the equipment and receiver, 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, and 4) Consult the dealer or an experienced radio/TV technician for help.

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**IMPORTANT: READ SEPARATE "GENERAL INFORMATION" SHEET FOR INFORMATION ON THE PLACEMENT, LIMITATIONS, INSTALLATION, FINAL CHECKOUT, AND PERIODIC TESTING OF NOTIFICATION APPLIANCES.**

## **Limited Warranty**

These products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with these instructions at the time of installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and laws. Specification, application, installation, operation, maintenance and testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), Underwriters' Laboratories of Canada (ULC), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ). These products when properly specified, applied, installed, operated, maintained and operationally tested as provided above are warranted against mechanical and electrical defects for a period of three years from date of manufacture (as determined by date code). Correction of defects by repair or replacement shall be at manufacturer's sole discretion and shall constitute fulfillment of all obligations under this warranty. THE FOREGOING LIMITED WARRANTY SHALL IMMEDIATELY TERMINATE IN THE EVENT ANY PART NOT FURNISHED BY THE MANUFACTURER IS INSTALLED IN THE PRODUCT. THE FOREGOING LIMITED WARRANTY SPECIFICALLY EXCLUDES ANY SOFTWARE REQUIRED FOR THE OPERATION OF OR INCLUDED IN A PRODUCT. THE MANUFACTURER MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS, IMPLIED OR STATUTORY WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER.

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