

WHELEN[®]

ENGINEERING COMPANY INC.

51 Winthrop Road
Chester, Connecticut 06412-0684
Phone: (860) 526-9504
Internet: www.whelen.com
Sales e-mail: autosale@whelen.com
Customer Service e-mail: custserv@whelen.com

Installation Guide:
295HFS2 Series Siren

DANGER! Sirens produce extremely loud emergency warning tones! Exposure to these tones without proper and adequate hearing protection, could cause ear damage and/or hearing loss! The Occupational Safety & Health Administration (www.osha.gov) provides information necessary to determine safe exposure times in Occupational Noise Exposure Section 1910.95. Until you have determined the safe exposure times for your specific application, operators and anyone else in the immediate vicinity should be required to wear an approved hearing protection device. Failure to follow this recommendation could cause hearing loss!

Warnings to Installers

Whelen's emergency vehicle warning devices must be properly mounted and wired in order to be effective and safe. Read and follow all of Whelen's written instructions when installing or using this device. Emergency vehicles are often operated under high speed stressful conditions which must be accounted for when installing all emergency warning devices. Controls should be placed within convenient reach of the operator so that they can operate the system without taking their eyes off the roadway. Emergency warning devices can require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections. Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or vehicle damage, including fire. Many electronic devices used in emergency vehicles can create or be affected by electromagnetic interference. Therefore, after installation of any electronic device it is necessary to test all electronic equipment simultaneously to insure that they operate free of interference from other components within the vehicle. Never power emergency warning equipment from the same circuit or share the same grounding circuit with radio communication equipment. All devices should be mounted in accordance with the manufacturer's instructions and securely fastened to vehicle elements of sufficient strength to withstand the forces applied to the device. Driver and/or passenger air bags (SRS) will affect the way equipment should be mounted. This device should be mounted by permanent installation and within the zones specified by the vehicle manufacturer, if any. Any device mounted in the deployment area of an air bag will damage or reduce the effectiveness of the air bag and may damage or dislodge the device. Installer must be sure that this device, its mounting hardware and electrical supply wiring does not interfere with the air bag or the SRS wiring or sensors. Mounting the unit inside the vehicle by a method other than permanent installation is not recommended as unit may become dislodged during swerving; sudden braking or collision. Failure to follow instructions can result in personal injury. Whelen assumes no liability for any loss resulting from the use of this warning device. PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.

Warnings to Users

Whelen's emergency vehicle warning devices are intended to alert other operators and pedestrians to the presence and operation of emergency vehicles and personnel. However, the use of this or any other Whelen emergency warning device does not guarantee that you will have the right-of-way or that other drivers and pedestrians will properly heed an emergency warning signal. Never assume you have the right-of-way. It is your responsibility to proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes. Emergency vehicle warning devices should be tested on a daily basis to ensure that they operate properly. When in actual use, the operator must ensure that both visual and audible warnings are not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should be familiar with all applicable laws and regulations prior to the use of any emergency vehicle warning device. Whelen's audible warning devices are designed to project sound in a forward direction away from the vehicle occupants. However, because sustained periodic exposure to loud sounds can cause hearing loss, all audible warning devices should be installed and operated in accordance with the standards established by the National Fire Protection Association.

Safety First

This document provides all the necessary information to allow your Whelen product to be properly and safely installed. Before beginning the installation and/or operation of your new product, the installation technician and operator must read this manual completely. Important information is contained herein that could prevent serious injury or damage.

⚠ WARNING: This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, visit www.whelen.com/regulatory.

- Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.
- Whelen Engineering requires the use of waterproof butt splices and/or connectors if that connector could be exposed to moisture.
- Any holes, either created or utilized by this product, should be made both air- and watertight using a sealant recommended by your vehicle manufacturer.
- Failure to use specified installation parts and/or hardware will void the product warranty.
- If mounting this product requires drilling holes, the installer MUST be sure that no vehicle components or other vital parts could be damaged by the drilling process. Check both sides of the mounting surface before drilling begins. Also de-burr the holes and remove any metal shards or remnants. Install grommets into all wire passage holes.
- If this manual states that this product may be mounted with suction cups, magnets, tape or Velcro®, clean the mounting surface with a 50/50 mix of isopropyl alcohol and water and dry thoroughly.
- Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag, or become a projectile that could cause serious personal injury or death. Refer to your vehicle owner's manual for the air bag deployment area. The User/Installer assumes full responsibility to determine proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.
- For this product to operate at optimum efficiency, a good electrical connection to chassis ground must be made. The recommended procedure requires the product ground wire to be connected directly to the NEGATIVE (-) battery post (this does not include products that use cigar power cords).
- If this product uses a remote device for activation or control, make sure that this device is located in an area that allows both the vehicle and the device to be operated safely in any driving condition.
- It is recommended that these instructions be stored in a safe place and referred to when performing maintenance and/or reinstallation of this product.
- FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN DAMAGE TO THE PRODUCT OR VEHICLE AND/OR SERIOUS INJURY TO YOU AND YOUR PASSENGERS!

**ACTIVATION OF THIS
SIREN MAY DAMAGE
UNPROTECTED EARS!**



CAUTION

Loud siren noise can cause hearing damage and/or loss. Refer to OSHA Section 1910.95 prior to putting ANY siren into service!

WARNING!

DISCONNECTING THE VEHICLE BRAKE LAMP CIRCUIT USING ANY SIRENS WITH RELAY OUTPUTS OR SWITCH CONTROLLERS COULD CAUSE VEHICLE OR PROPERTY DAMAGE, SERIOUS INJURY OR EVEN DEATH.

DISABLING THIS CIRCUIT IS A VIOLATION OF THE FEDERAL MOTOR VEHICLE SAFETY STANDARD FOR THE THIRD BRAKE LIGHT, AS WELL AS REAR BRAKE LIGHTS.

FUNCTIONS THAT BLACK OUT THE REAR BRAKE LIGHTS (SOMETIMES CALLED “BRAKE LIGHT CUT OUT”) MAY INTERFERE WITH THE BRAKE SHIFT LOCK MECHANISM, AND CAUSE THE VEHICLE TO MOVE UNEXPECTEDLY AND DANGEROUSLY.

DISCONNECTING THE BRAKE LIGHTS IN ANY WAY IS AT YOUR OWN RISK AND IS NOT RECOMMENDED BY WHELEN.

The 295HFS2, although technologically advanced, is simple to install. The 295HFS2 is specially designed for dash (or panel) mounting. **WARNING:** Mounting will require drilling. It is absolutely necessary to make sure that no vehicle components behind the mounting area will be damaged. If damage is possible, select another location.

NOTE: Before starting read all warnings on next page.

Installation: Control Head

The flush mount unit can be mounted in a console, dash or other suitable location. Using the measurements below, cut-out the hole for the control head, then slide the unit in and drill the 4 holes for the customer supplied mounting hardware.

IMPORTANT: Template is not to scale. Check measurements before drilling. Measurements are given in decimals and fractions for your convenience. For a more accurate measurement and installation you *should* use the decimals.

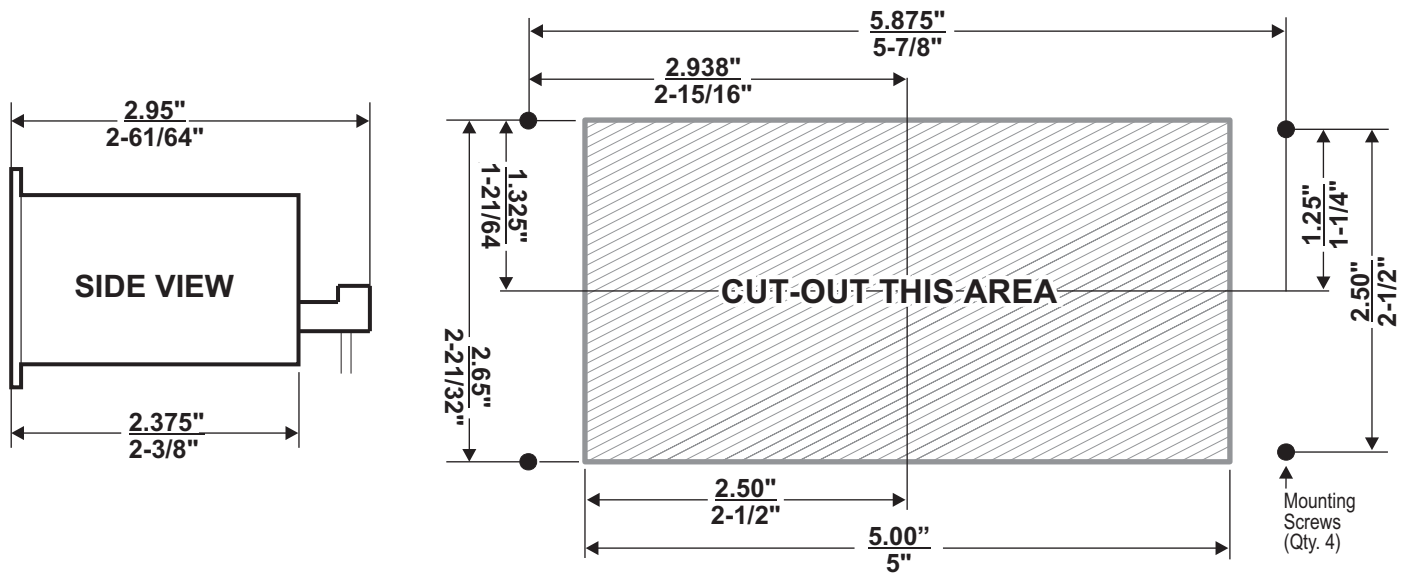
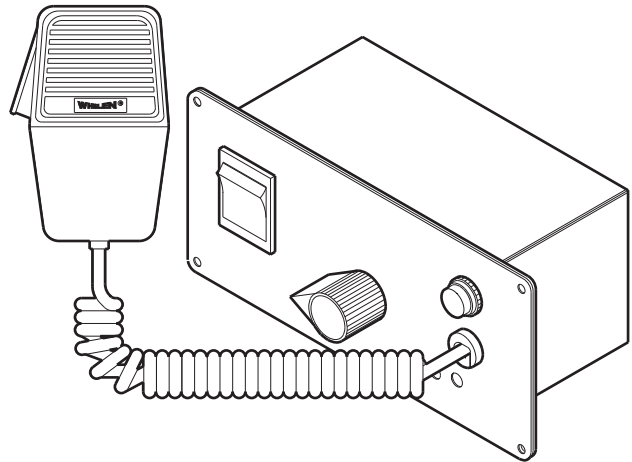
Installation: Amplifier

1. From inside the trunk, position the amplifier against the vertical trunk wall behind the rear seat and mark off the 4 mounting holes using a scribe or other suitable tool. Be sure that the remote amplifier fits properly and does not interfere with any parts of the trunk or seat back.
2. Carefully drill the indicated holes using an appropriately sized drill bit, then, using the supplied sheet metal screws, secure the remote amplifier to the vertical trunk wall.

READ BEFORE INSTALLING!!!

Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag or become a projectile that could cause serious personal injury or death. Refer to your vehicle owner's manual for the air bag deployment area.

The User/Installer assumes full responsibility to determine the proper mounting location, based on providing ultimate safety to all passengers inside the vehicle. Whelen Engineering Co. assumes no liability or responsibility for determining individual applications or exact installation location criteria.



Connecting the 12-Position Input Harness:

RED & BLACK - Power & Ground Wires:

1. Insert wiring harness into it's port.
2. Splice the 2 RED (Power) wires together, then extend this single RED wire toward the vehicle battery. Splice the 2 BLACK (Ground) wires together and extend this single BLACK wire toward the vehicle battery. To pass the RED and BLACK wires through, you may have to drill a hole in the firewall. Be sure there are no components that could be damaged. Insert a grommet in the hole to protect the wires.

WARNING: All customer supplied wires that connect to the positive terminal of the battery must be sized to supply at least 125% of the maximum operating current and FUSED at the battery to carry that load. DO NOT USE CIRCUIT BREAKERS WITH THIS PRODUCT (see customer wire size chart)!

3. Install a 20 amp fuse block (user supplied) on the end of the RED wire. **Note:** Remove the fuse from the fuse block before connecting any wires to the battery.
4. Connect the fuse block wire to the POSITIVE (+) terminal on the battery. There must not be more than two (2) feet of wire between the fuse block and the battery. As the wire between the fuse and the battery is unprotected, do not allow this wire to come in contact with any other wires.
5. Connect the BLACK wire to the factory chassis ground adjacent to the battery.

YELLOW, ORANGE & BROWN - Speaker Wires:

Note: This section outlines a two-speaker installation. If a one-speaker installation is used, cut and cap the ORANGE wire, skip step 3 and connect the BROWN wire to the NEGATIVE terminal of Speaker #1.

1. Route the YELLOW, ORANGE and BROWN wires toward the vehicle's siren speakers.
2. Connect the YELLOW wire to the POSITIVE speaker connection on Speaker 1.
3. Connect the ORANGE wire to the POSITIVE speaker connection on Speaker 2.
4. Connect the BROWN wire to the NEGATIVE speaker connection on Speaker 2.
5. Splice a wire from the NEGATIVE connection on speaker 2 to the NEGATIVE connection on Speaker 1.

BLUE - Radio Rebroadcast Wires:

Note: The two BLUE wires are used to connect your two-way radio's external speaker to the 295HFS2 for radio rebroadcast. This is an optional connection and does not effect the other operations of the 295HFS2.

1. Locate the two wires that connect the external speaker to the vehicle's two-way radio.
2. Cut one of these wires and splice one of the BLUE wires into this circuit.
3. Cut the remaining speaker wire and splice the remaining BLUE wire into this circuit.

NOTE: Radio rebroadcast will NOT work with amplified remote speakers. If your remote speaker is amplified (i.e.: contains a power amp circuit in the speaker assembly), do not enable the radio rebroadcast feature.

Connecting the 8-Position Siren Connector:

RED - Power:

1. Insert the 8-position siren connector into its port.
2. Route the RED wire to the POSITIVE (+) battery terminal.
3. Install a 3 amp fuse block (user supplied) on the end of the RED wire. **NOTE:** Remove the fuse from the fuse block before connecting any wires to the battery.

WARNING: All customer supplied wires that connect to the positive terminal of the battery must be sized to supply at least 125% of the maximum operating current and FUSED at the battery to carry that load. DO NOT USE CIRCUIT BREAKERS WITH THIS PRODUCT (see customer wire size chart)!

YELLOW - Dimmer Control:

1. Route the YELLOW wire along the factory wire harness toward the driver's side rocker sill plate location.
2. Follow the factory harness towards the firewall. Do not go beyond the firewall.
3. Connect the YELLOW wire to the dashlight dimmer circuit located under the dashboard. Depending on the type of vehicle, there are several good locations to access this circuit. For example; the ashtray courtesy light in a Crown Victoria is connected to the dimmer circuit.

WHITE & GREY - Horn Relay

1. Route the WHITE and GREY wires along the factory wire harness and through the firewall at the same point as the RED and BLACK wires.
2. Locate your vehicle's horn relay and route the WHITE and GREY wires to this. If possible, follow the factory wire harness to this relay.
3. Locate the wire that connects the vehicle horn to the horn relay. Cut this wire.
4. Connect WHITE wire to wire coming from horn relay.
5. Connect the GREY wire to the wire coming from the horn.

BLACK/WHITE - Remote Siren Tone Activation

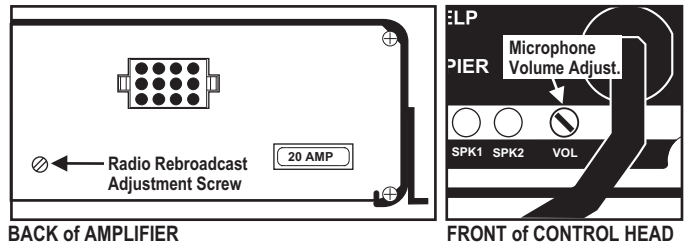
An auxiliary switch can be connected to automatically activate siren tones. If this is desired, connect the BLACK/WHITE wire to a ground activated switch.

Connecting the Control Head to the Remote Amplifier:

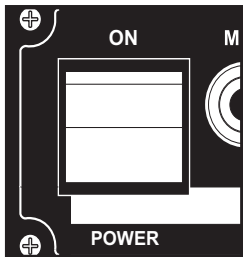
1. Remove the rear seat (both sections) from the vehicle.
2. Remove the rear, driver side rocker sill plate.
3. Extend the VIOLET and GREEN wires (from the 8-position connector) to the remote amplifier.
4. Connect the GREEN wire from the control head to the GREEN wire from the amplifier.
5. Connect the VIOLET wire from the control head to the VIOLET wire from the amplifier (see wiring diagram).

To Adjust the Radio Repeat Levels: Before using the 295HFS2, the Radio Repeat output volume and microphone volume (PA) must be adjusted to satisfactory operating levels. To adjust this level, a small, flat blade screwdriver is needed. Locate the Radio Repeat adjustment port (potentiometer) to the left of the 12 position input port on the back of the remote amplifier. Set the volume level of the vehicle's two-way radio to its normal operating volume. Turn the Rotary Knob on the control head to RAD to activate Radio Repeat. Insert the screwdriver in the Radio Repeat adjustment port and turn in a clockwise direction to increase the sound level.

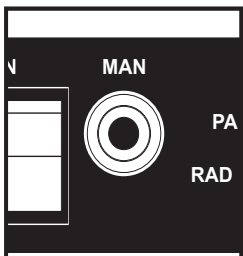
Microphone Volume (PA) Locate the microphone adjustment port (potentiometer) below the microphone cord. With the vehicle in an enclosed area, turn the Rotary Knob to PA and speak into the microphone. While speaking, turn the screwdriver in a clockwise direction to increase the volume. Continue to increase the PA volume until audio feedback occurs, then turn the screwdriver in a counter-clockwise direction until the feedback is eliminated.



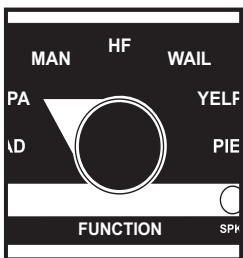
Operating the 295HFRS Controls



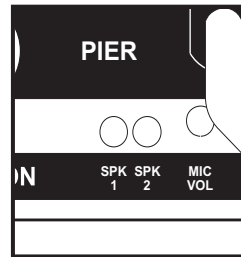
POWER SWITCH - This switch has two positions: Down / Off and Up / On. When this switch is in the Off position, the 295HFS2 will not function. When the switch is in the On position the siren is functional and may be activated.
NOTE: If the 295HFS2 is connected to the vehicle's horn ring circuit, the vehicle horn is disabled when the power switch is in the ON position.



MAN BUTTON - The Manual button generates a variety of tones, depending on what position the rotary knob is in. For further explanation of this button's function, refer to Rotary Switch Operations.



ROTARY SWITCH - The Rotary Knob controls the siren and PA (Public Address) functions. There are 7 positions that may be selected. Each position and it's function is outlined under "Rotary Switch Operations".



SI-TEST® & DIAGNOSTIC INDICATORS - SI-TEST is a diagnostic feature and allows the operator to confirm the proper operation of the siren speakers connected to the unit without activating an audible siren tone. To initiate the SI-TEST cycle, set the rotary knob to the RAD position. Now press and release the MAN button. As the siren is tested, its diagnostic indicator will turn on steady for about 1.5 seconds if no problems are detected. If the indicator flashes, or does not light at all, a problem with either the siren, speakers, or wiring has been detected. Check the wire connections of the failed speaker and repeat the SI-TEST. If the speaker fails to test again, have the siren inspected by a qualified technician.
WARNING: Installed speakers are tested by generating an ultra-high frequency tone through each speaker. Although these tones are inaudible to humans, be sure there is nobody within 5 feet of the speakers when SI-TEST is running.

DIAGNOSTIC INDICATORS: This unit has two diagnostic indicators on the front panel which are used to indicate fault conditions with your siren system. The table below lists the type of fault and the indicators response. If the indicator is on steady while a tone is in use, this implies that there is no fault with the associated speaker output.

Fault Condition Diagnostic Indicators Response

Under Voltage	<i>Speaker LED #2 will be in a double flash mode (2 quick flashes followed by a longer pause) and the siren tones will not operate.</i>
Over Voltage	<i>Speaker LED #1 will be in a double flash mode (2 quick flashes followed by a longer pause) and the siren tones will not operate.</i>
Speaker #1 Short Circuit	<i>Speaker LED # 1 will be in a single flash mode (the LED will be on and off an equal amount of time) and the siren tones will not operate.</i>
Speaker #2 Short Circuit	<i>Speaker LED #2 will be in a single flash mode (the LED will be on and off an equal amount of time) and the siren tones will not operate.</i>
Speaker #1 Open Circuit	<i>Speaker LED #1 will be off (having a single speaker system will always cause this condition for the speaker output not in use) all tones will continue to operate.</i>
Speaker #2 Open Circuit	<i>Speaker LED #2 will be off (having a single speaker system will always cause this condition for the speaker output not in use) all tones will continue to operate.</i>

Rotary Switch Operations

RAD (Radio Repeat) - When the rotary knob is in the RAD position, any signal that is received by the vehicle's two-way radio will be simultaneously broadcast over the vehicle's loud-speaker (unit must be connected to the two-way radio as outlined in this manual).

With the Rotary Switch in this Position:

- Pressing the MAN button will result in SI-TEST®.
- Activating the HORN RING input results in the AIRHORN tone until the HORN RING input is released.
- Activating the AUX ENABLE input has no effect.

PA (Public Address) - When the rotary switch is in this position the siren is in a standby state where no tones have been activated, but is waiting for another action to be taken by the operator. This position is often the best choice when public address is required.

With the Rotary Switch in this Position:

- Pressing the MAN button will result in the AIRHORN tone until the MAN switch is released.
- Activating the HORN RING input will result in the AIR-HORN tone until the HORN RING input is released.
- Activating the AUX ENABLE input will result in a repeating WAIL tone.

MAN (Manual Siren) - When the rotary switch is in this position the siren is in a standby state where no tones have been activated, but is waiting for another action to be taken by the operator. This position is often the best choice when manual operation of the siren is desired.

With the Rotary Switch in this Position:

- Pressing the MAN switch will result in a WAIL tone ramping up to peak frequency and stopping when the MAN switch is released.
- Activating the HORN RING input will result in a WAIL tone ramping up to the peak frequency and stopping when the HORN RING input is released.
- Activating the AUX enable input will result in a repeating WAIL tone.

HF (Hands Free Operation) - When the rotary knob is in the HF position, the siren functions are placed in a standby mode. Siren tones are activated by a single 'tap' on the MAN button or a single tap on the vehicle's steering wheel horn ring (*if the vehicle's horn has been wired to the HORN RING input*). The

first tap produces a Wail tone (*a steady rise and fall tone*). A second tap produces a Yelp tone (*a fast rise and fall tone*). A third tap produces a Piercer™ tone (*an extremely fast rise and fall tone*). The next tap returns the siren to a wail tone and the cycle repeats itself. Two quick, successive taps will stop the siren.

With the Rotary Switch in this Position:

- Pressing the MAN button will result in the HF cycle as described above.
- Activating the HORN RING input will result in the HF cycle as described above.
- Activating the AUX ENABLE input will start the HF cycle.

WAIL (Wail Tone) - When the rotary knob is in the WAIL position, a steady, rise and fall tone (wail) is produced.

With the Rotary Switch in this Position:

- Pressing the MAN button will change the siren tone to a yelp pattern (*a fast rise and fall tone*). Pressing the MAN button a second time returns it back to a wail tone.
- Activating the HORN RING input will change the siren tone to a yelp pattern (*a fast rise and fall tone*). Activating the HORN RING input again returns it back to a wail tone.
- Activating the AUX ENABLE input has no effect.

YELP (Yelp Tone) - When the rotary knob is in the Yelp position, a fast rise and fall tone is produced.

With the Rotary Switch in this Position:

- Pressing the MAN button will result in the AIRHORN tone until the MAN button is released.
- Pressing the HORN RING button will result in the AIR-HORN tone until the HORN RING button is released.
- Activating the AUX ENABLE input has no effect.

PIER (Piercer Tone) When the rotary knob is in the T3 position, an extremely fast rise and fall tone is produced. May be used for Hi/Low and auto sequence in some applications.

With the Rotary Switch in this Position:

- Pressing the MAN button will result in the AIRHORN tone until the MAN button is released.
- Pressing the HORN RING button will result in the AIR-HORN tone until the HORN RING button is released.
- Activating the AUX ENABLE will have no effect.

SPECIFICATIONS

INPUT VOLTAGE	12.5 VDC ±20%
INPUT CURRENT @15VDC @5.5 OHMS	16 AMPS MAX.
INPUT FUSE	20 AMPS
SPEAKER IMPEDANCE	5.5 OHMS MIN
OPERATING TEMPERATURE	-30° C. TO +60
STORAGE TEMPERATURE	-40° C. TO +70
HUMIDITY	99% (NON CONDENSING)

SIREN / SQUARE WAVE

WAVE	SIREN FREQUENCY	SWEEP RATE
WAIL	800 to 1600 Hz.	12 Cycles Per Min.
YELP	800 to 1600 Hz.	180 Cycles Per Min.
PIERCER™ ..	800 to 1600 Hz.	800 Cycles Per Min.
AIR HORN ...	Composite	Constant

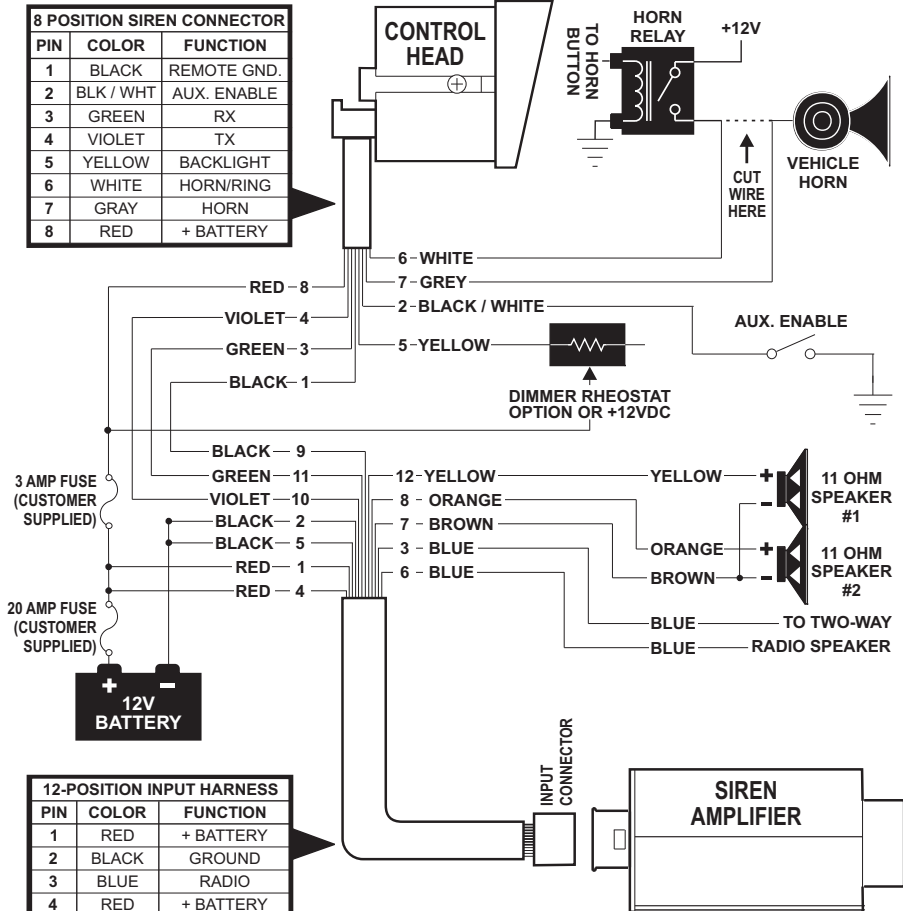
AUDIO / SINE WAVE

Audio Bandwidth @ 25 WATTS	300Hz TO 10KHz±3db
Distorsion 25 WATTS @ 1KHz	1% MAX.
Output Voltage @ 15VDC @ 11 OHMS	24V RMS MAX.
Output Power @ 15VDC @ 11 OHMS	50 WATTS
Radio Input Level @24 VRMS	+10db ±3db
SI-TEST®	Radio Manual Button
Frequency	18 Khz

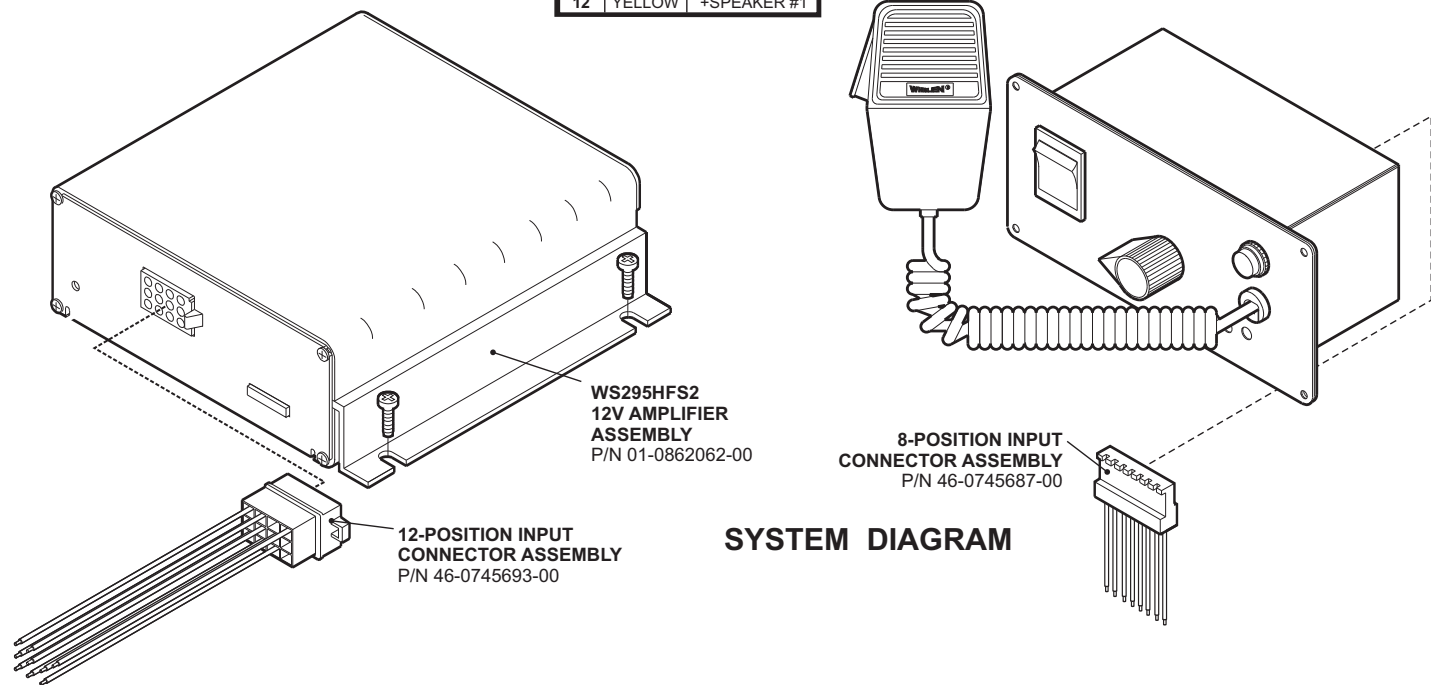
CUSTOMER SUPPLIED WIRE SIZE

LENGTH OF WIRE	WIRE GAUGE
FOR 15.5 FEET OF WIRE	12 AWG WIRE
FOR 24.5 FEET OF WIRE	10 AWG WIRE
FOR 39 FEET OF WIRE	8 AWG WIRE

PIN	COLOR	FUNCTION
1	BLACK	REMOTE GND.
2	BLK / WHT	AUX. ENABLE
3	GREEN	RX
4	VIOLET	TX
5	YELLOW	BACKLIGHT
6	WHITE	HORN/RING
7	GRAY	HORN
8	RED	+ BATTERY



WIRING DIAGRAM



SYSTEM DIAGRAM