

WHELEN[®]

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Installation Manual: 295HFS4 Series Siren

DANGER! Sirens produces 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!**

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.

- Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.
- 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 any 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.
- If this product uses a remote device to activate or control this product, make sure this control is located in an area that allows both the vehicle and the control to be operated safely in any driving condition. **DO NOT ATTEMPT TO ACTIVATE OR CONTROL THIS DEVICE IN A HAZARDOUS DRIVING SITUATION.**
- 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!	
 Wear Protection!	CAUTION Loud siren noise can cause hearing damage and/or loss. Refer to OSHA Section 1910.95 prior to putting ANY siren into service!

For warranty information regarding this product, visit www.whelen.com/warranty

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 295HFS4, although technologically advanced, is simple to install. An aftermarket center console is recommended for the mounting location. This not only allows the driver to reach the controls easily, but also keeps the unit safely out of the path of the vehicle's SRS air bag. Follow the console manufacturer's instructions for mounting information. If a console-type mount is not possible, the unit is specially designed for dash (or panel) mounting. **WARNING:** Mounting will require drilling. Make sure that no vehicle components behind the mounting area will be damaged. If damage is possible, select another location.

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.
3. Using the supplied sheet metal screws, secure the remote amplifier to the vertical trunk wall.

12-POSITION INPUT CONNECTOR

RED and BLACK / Power & Ground 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!

Control Head:

For 6 feet of wire 22 AWG wire
 For 9.5 feet of wire 20 AWG wire
 For 15 feet of wire 18 AWG wire

Amplifier:

For 6 feet of wire 16 AWG
 For 9.5 feet of wire 14 AWG
 For 15.5 feet of wire 12 AWG wire

1. Insert the wiring harness into its 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.
3. Install a 20 amp fuse block (user supplied) on the end of the RED wires.

NOTE: Remove the fuse from the fuse block before connecting any wires to the battery.

READ BEFORE INSTALLING!!!

Do not install this product or route any wires in the deployment area of your airbag. Equipment mounted or located in the airbag deployment area will damage or reduce the effectiveness of the airbag, or become a projectile that could cause serious personal injury or death. Refer to your vehicle owners 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. Whelen Engineering Co. assumes no liability or responsibility for determining individual applications or exact installation location criteria.

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 BLACK wire to factory chassis ground.

YELLOW, ORANGE & BROWN / Speaker Wires

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

1. Route YELLOW, ORANGE and BROWN wires toward vehicle's siren speakers.
2. Connect YELLOW wire to POSITIVE speaker connection on Speaker #1.
3. Connect ORANGE wire to POSITIVE speaker connection on Speaker #2.
4. Connect BROWN wire to 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 (2) BLUE wires are used to connect your two-way radio's external speaker to the 295HFS4 for radio rebroadcast. This is an optional connection and doesn't effect other operations of the 295HFS4.

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 contains a power amp circuit in the speaker assembly, do not enable radio rebroadcast.

MOUNTING and WIRING the CONTROL HEAD

1. Remove front, driver's side rocker sill plate and kick panel.
2. Fold the floor covering so that access is gained to the factory wire harness routed under the driver's seat area.
3. Extend the wires from the control head as described in the following sections.

8-POSITION SIREN CONNECTOR

RED / Power

1. Insert the 8-position siren connector into its port.
2. Route RED wire to POSITIVE (+) battery terminal.
3. Install a 5 amp fuse block (user supplied) on the end of the RED wire. Remove the fuse from the fuse block before connecting any wires to the battery.

YELLOW / Dimmer Control

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

WHITE & GREY / Horn Relay Wires

1. Route WHITE and GREY wires along factory wire harness and through 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. Cut the wire that connects the vehicle horn to horn relay.
4. Connect WHITE wire to wire coming from horn relay.
5. Connect the GREY wire to wire coming from horn.

BLACK-WHITE / Remote Siren Tone Activation

Slide switch position #3 can be configured to automatically activate siren tones by connecting it to the AUX ENABLE input (WHITE / GREEN on P2).

CONTROL HEAD COMMUNICATION CABLE

1. Connect the Control Head Communication Cable to the 3-position connector coming from the 8-position siren connector (VIOLET, BLACK & GREEN).
2. With rear seat and drivers sill plate still removed, route the Communication Cable towards the driver side sill plate.

3. Following the factory harness, route the Communication Cable towards the remote amplifier.
4. Insert the pinned wires into the 12-position connector located on the back of the remote amplifier as shown in the Wiring Diagram on page 6.

9-POSITION CONTROL HARNESS

NOTE: The push-button and slide switch control wires are designed to activate relays with a coil rating no greater than 250 ma. Do not attempt to connect these wires to any circuit that carries a higher rating.

GREEN, GREY, BLUE & BROWN

Slide-Switch Control

1. Route and connect GREEN wire (slide switch position #1) to desired lightbar function control wire.
2. Route and connect GREY wire (slide switch position #2) to desired lightbar function control wire.
3. Route and connect BLUE wire (slide switch position #3) to desired lightbar function control wire.
4. Route and connect BROWN wire to +12 VDC fused @ 3 amps (customer supplied fuse).

VIOLET, WHITE, YELLOW, ORANGE & WHITE-BLACK Push-Button Control Wires

The 295HFS4 push button switches control the following wires:

- P-BUTTON #1** WHITE / BLACK
P-BUTTON #2 WHITE
P-BUTTON #3 YELLOW
P-BUTTON #4 ORANGE
P-BUTTON #5 See "Connecting the 4-Position Input Assembly"
P-BUTTON #6 VIOLET

NOTE: P-button #6 is a momentary switch. This is best used for momentary-use circuits such as low power control, trunk release or gun lock.

4 POSITION INPUT ASSEMBLY

RED To +12 VDC fused @ 3 amps
(customer supplied fuse)

BLACK To CHASSIS GROUND

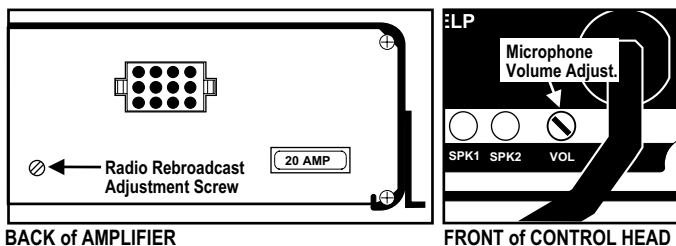
WHITE-GREEN AUX ENABLE (Optional)

If desired, splice to the BLACK/WHITE wire of the 8-position siren connector. This enables remote siren tone activation from slide switch position #3.

BLACK-WHITE Controlled by Push-button #5.

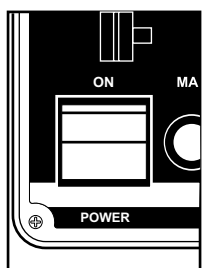
NOTE: This push-button control wire is designed to activate a relay with a coil rating no greater than 250 ma. Do not attempt to connect this wire to any circuit that carries a higher rating.

To Adjust the Radio Repeat Levels: Before using the 295HFS4, 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.

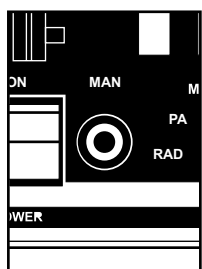


Microphone Volume (PA) Locate the microphone adjustment port (potentiometer) below the microphone cord. With the vehicle in an enclosed area, turn the Rotary Knob to PA and speak into the microphone. While speaking, turn the screwdriver in a clockwise direction to increase the volume. Continue to increase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

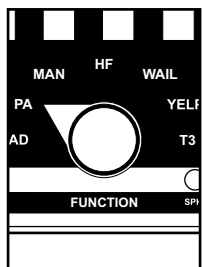
Operating the 295HFS4 Controls:



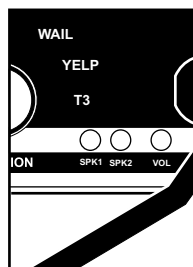
Power Switch This switch has two positions: Down / Off and Up / On. When this switch is in the Off position, the unit will not function. When the switch is in the On position the siren is functional and may be activated at the operator's discretion. **NOTE:** If the 295HFS4 is connected to the vehicle's horn ring circuit, the vehicle horn is disabled when the 295HFS4 power is ON.



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 the Rotary Switch Operations section of this manual.



Rotary Knob The Rotary Knob controls the siren and PA (Public Address) functions of the 295HFS4. There are 7 positions that may be selected. Each position and its function is outlined in the Rotary Switch Operations section.



SI-TEST® SI-TEST is a diagnostic feature of the 295HFS4 and allows the operator to confirm the proper operation of the siren speakers connected to the 295HFS4 without activating an audible siren tone. To initiate the SI-TEST cycle, set the rotary knob to the RAD position. Now press and hold the MAN button for at least 5 seconds. As the siren is tested, its diagnostic indicator will turn on if no problems are detected. If the indicator doesn't light, a problem with either the siren or its connectors has been detected. Check the wire connections for the failed speaker and repeat the SI-TEST. If the speaker fails the test again, have the siren itself inspected by a qualified technician.

NOTE: Installed speakers are tested by generating an ultra-high frequency tone through each speaker. Although these tones are inaudible to humans, be sure that there is nobody within at least 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 on the next page 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.

<u>Fault Condition</u>	<u>Diagnostic Indicators Response</u>
Under Voltage	Speaker LED #2 will be in a double flash mode (2 quick flashes followed by a longer pause) and siren tones will not operate.
Over Voltage	Speaker LED #1 will be in a double flash mode (2 quick flashes followed by a longer pause) and siren tones will not operate.
Speaker #1 Short Circuit	Speaker LED # 1 will be in a single flash mode (the LED will be on and off an equal amount of time) and siren tones will not operate.
Speaker #2 Short Circuit	Speaker LED #2 will be in a single flash mode (the LED will be on and off an equal amount of time) and siren tones will not operate.
Speaker #1 Open Circuit	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.
Speaker #2 Open Circuit	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.

ACTIVATION OF THIS SIREN MAY DAMAGE UNPROTECTED EARS!



Wear Protection!

⚠ CAUTION

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

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 loudspeaker (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 AIRHORN 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 stand-by 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 vehi-*

295HFS4 SPECIFICATIONS

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

SIREN / SQUARE WAVE

TONES	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.

cle'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 AIRHORN tone until the HORN RING button is released.
- Activating the AUX ENABLE input has no effect.

T3 (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 / LO 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 AIRHORN tone until the HORN RING button is released.
- Activating the AUX ENABLE will have no effect.

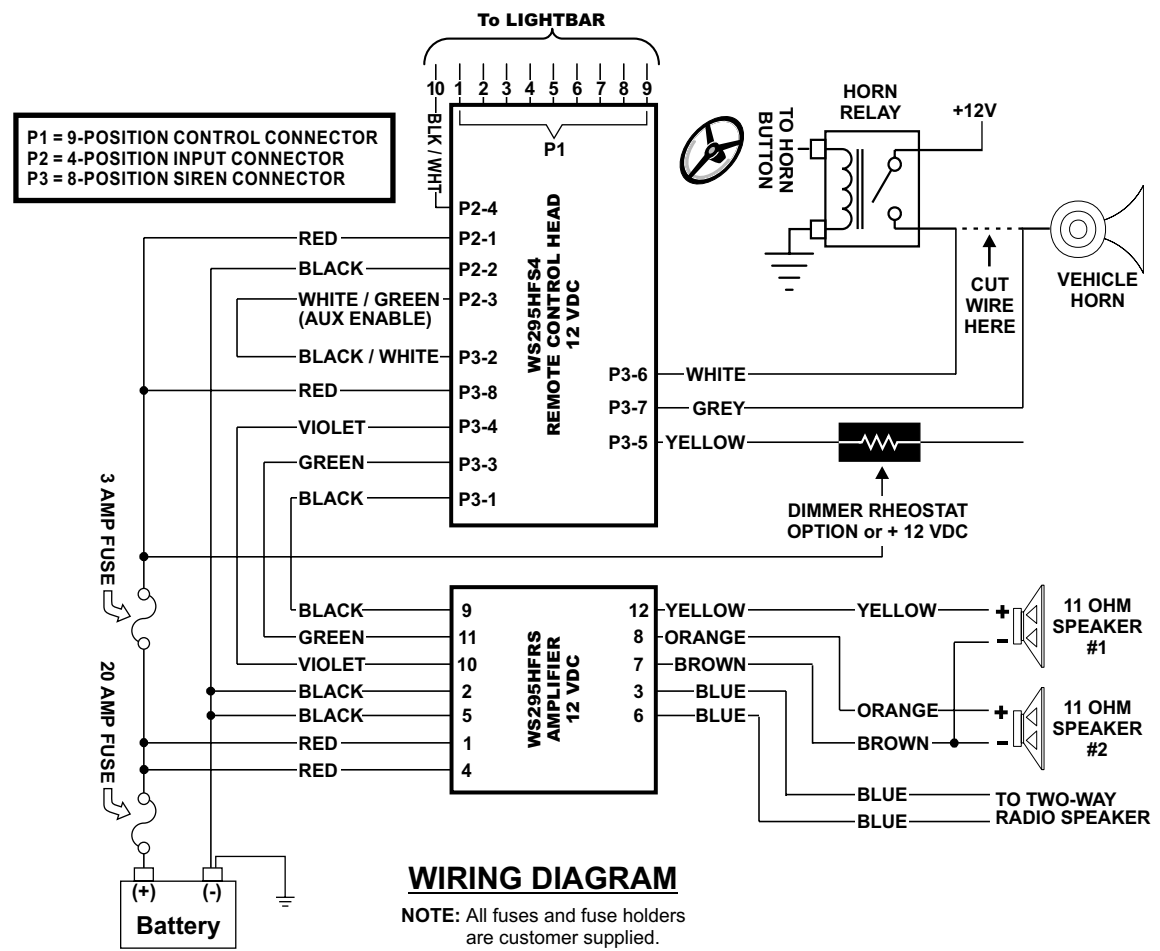
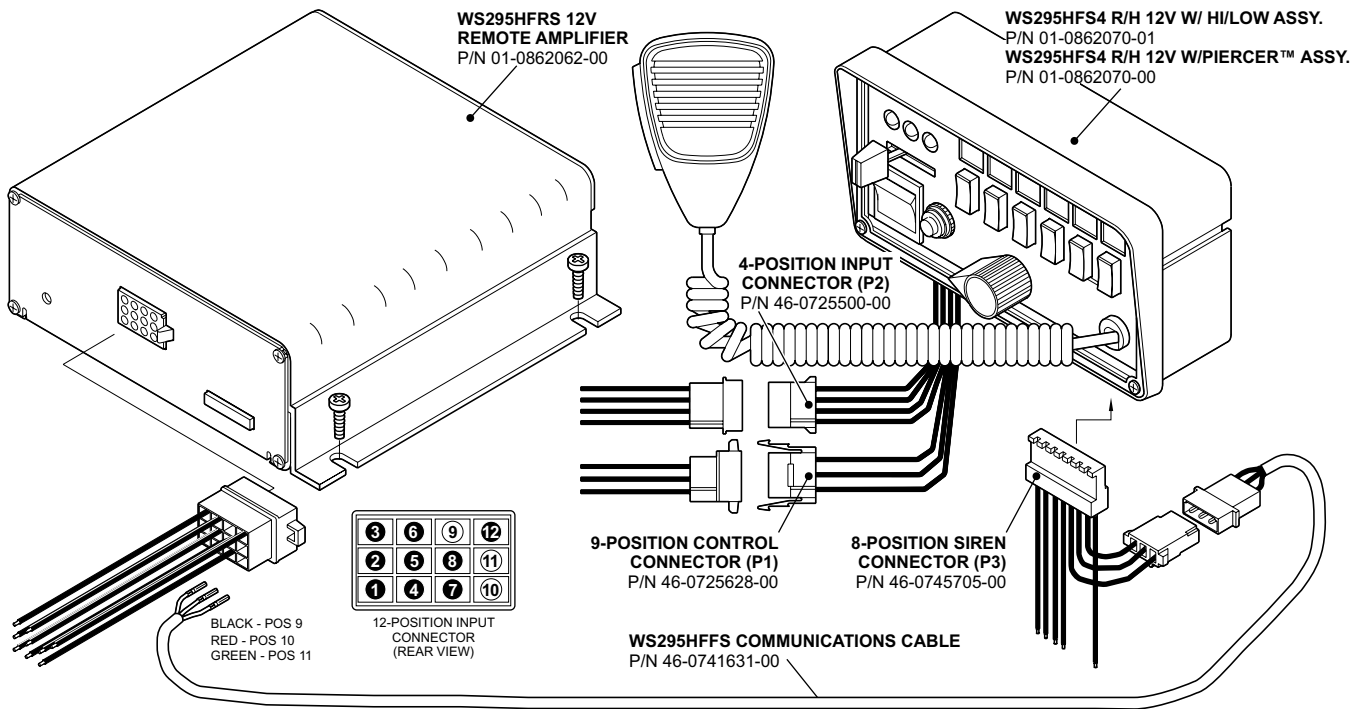
AIR HORNCOMPOSITE CONSTANT
HI/LOW (OPTIONAL) .550 TO 650 Hz. 60 CYCLES PER MIN.

OUTPUT VOLTAGE @ 15 VDC @ 11 OHMS 32 V RMS MAX.
OUTPUT POWER @ 15 VDC @ 11 OHMS 105 WATTS MAX.
OUTPUT POWER @ 15 VDC @ 5.5 OHMS 185 WATTS MAX.

AUDIO (SINE WAVE)

AUDIO BANDWIDTH @ 25 WATTS 300 Hz TO 10 KHz ±3db
DISTORTION @ 25 WATTS @ 1 KHz 1% MAX.
OUTPUT VOLTAGE @ 15 VDC @ 11 OHMS 24 VRMS MAX.
OUTPUT POWER @ 15 VDC @ 11 OHMS 50 WATTS
RADIO INPUT LEVEL @ R44 MAX. @24 VRMS +10db ±3db

SI-TEST® - RADIO/MANUAL BUTTON FREQ. - 18 KHz



WIRING DIAGRAM

NOTE: All fuses and fuse holders are customer supplied.