



Delaware
315 S. Chapel Street
Newark, DE 19711
Phone
302.738.7172
Fax
302.738.7175

Pennsylvania
Duane Morris Plaza
30 S. 17th Street
Suite 830
Philadelphia, PA 19103
Phone
267.804.7286
www.dedc-eng.com

PRE-BID MEETING SUMMARY
STATE OF DELAWARE – DEALWARE ARMY NATIONAL GUARD (DEARNG)
BUILDING 136 HVAC REPLACEMENT – PHASE 4
DEARNG CONTRACT # 2019-02
ADDENDUM #4

QUESTIONS:

1. **Q: Requesting specifications for the stand-alone carbon monoxide sensors.**
A: See attachments.

2. **Q: The existing ceiling grid will need to be removed and reinstalled to allow for ductwork demo/reinstallation as well as the spray foam to be completed. Would you like to include replacing the entire ceiling grid with new? We feel it may be damaged during this process.**
A: The entire ceiling grid shall be replaced with new in the billet area and lounge area.

Questions and substitution submission deadline was April 8, 2019 @ 3:00 p.m.
No more questions will be answered moving forward.

Summarized By: DEDC, LLC
Ryan Malin
Date: April 9, 2019

BRASCH

DIGITAL CONTROL PANEL (MULTI-POINT SYSTEM)



Key Features

- Microprocessor Controlled
- Protected Sensors
- Electrically Isolated
- Corrosion Resistant Enclosure
- LCD Readout
- Static Discharge Protection
- Low Voltage Wiring To Sensors
- Fail-Safe If Power Loss
- Battery Backup-Memory And Clock
- Full Factory Calibration
- Available For Monitoring Carbon Monoxide (CO) and Nitrogen Dioxide (NO₂) Gases

Flexibility

- Power (120VAC)
- Internal Audible Alarm With Relay
- High And Low Alert Delay Selections
- Up To 20 Remote Sensors Per Panel
- High And Low Alert Relay Control
- Up To 6 Programmable Fan Zones
- Up To 1000 Feet Between Sensor And Control Panel
- Monitors Combinations Of Various Sensors

Typical Installations

- Commercial Parking Garages
- Condominiums & Apartments
- Schools
- Warehouses & Factories
- Car & Bus Maintenance Garages
- Tunnels
- Firehouses
- Auto Service Centers



GDCP-A Digital Gas Detector Control Panel

Input Channels:

Max. Ch.: 20 ea.
Input Signal: RS-485 com port
Max. Distance Between
Control Panel & Sensor: 1000 Feet

Output Zones:

Max. Zones: 6 ea.
Output Relays: 125 VAC, 50/60 Hz.
5 Amp Resistive
250 VA Inductive
1/8 HP Motor
2 Relays per Zone

Alarms: Alarm relay with internally mounted buzzer, automatically actuated and manually silenced.

Display: 4 line x 20 char. LCD with LED backlight.

Keyboard: 4 key - keypad with sealed, tactile feedback switches.

Timing: Real time clock with outputs for minutes, hours, day, day-of-week, month and year.

Circuit: Microprocessor controlled with battery backup to retain timing and settings during power interruptions for up to 10 years.

Input power: 120 VAC, 50/60 Hz., 63 VA

Housing: Heavy gauge painted steel cabinet has locking door with clear lexan window which allows clear view of displays but prevents tampering.

Size and weight: 14 lb.

Control panel: 10 1/4 in. H x 14 in. W x 5 in. D.

Transmitters: 5 in. H x 3 1/4 in. W x 2 5/8 in. D.

Recognitions: ETL listed to UL 61010B-1 and CSA C22.2 No. 1010.1

Mounting

This unit can only be mounted indoors in a dry location at a height suitable for viewing the display. The location of the control panel should provide easy access to all functions of operation. The control panel should be mounted in an area where periodic monitoring can be accomplished.

Description

The BRASCH Multipoint Digital Gas Detector System is ideal for monitoring large areas that require multiple sensors. The standard system can simultaneously monitor up to 20 sensors and control up to six ventilation zones. Any combination of GSE-CM-TRA or GSE-ND-TRA Brasch Digital Sensor Transmitters can be used and each sensor can be assigned to any of the six ventilation zones. For example, four carbon monoxide and four nitrogen dioxide sensors can be connected as inputs. Each sensor can control the activity of a specific zone, all zones or any combination of zones. The user maintains complete flexibility from one central location.

The GDCP-A requires the use of the GSE-CM-TRA and/or GSE-ND-TRA sensor/transmitter. Power to the sensor/transmitter is supplied by the control panel, while communication occurs over an RS-485 port. The sensor/transmitter can be sequentially "daisy chain" connected up to 1000 feet from the control panel.

Operating parameters are entered at the control panel using a sealed, tactile feedback keypad and liquid crystal display. Selections for the type of sensor, type of ventilation equipment, alert actuation concentrations and delay times can be entered for each sensor and zone.

Override ventilation control of each zone is provided with three weekday (Monday through Friday) and three weekend (Saturday and Sunday) automatic ventilation time periods. For example, the user can choose to operate a zone, or zones, for two hours every weekday morning using this feature. Alternately, the user can choose to have selected zones actuate for 10 minutes at the beginning of each hour.

Other features include software activation or lock out of specific sensors or zones, and changes in the date and time settings. The status of the system, including program settings, can be reviewed at any time.

If an event occurs, such as a sensor failure or an alert level is exceeded, that event will be indicated on the front panel. The indication will continue until the event is no longer valid.

During a power interruption or a system failure, the low alert and alarm relays will close (failsafe condition), sound an alarm and activate the ventilation fans. The user can choose to have the system return from a power loss with or without specific ventilation zones active.

Brasch Manufacturing Co., Inc.
11880 Dorsett Road Maryland Heights, Missouri 63043
314 - 291 - 0440 FAX 314 - 291 - 0646
e mail: braschmfg@braschmfg.com
Website: www.braschmfg.com

SAMPLE SPECIFICATION

GDCP-A Digital Control Panel & GSE-xx-TRA Transmitters

**The Control Panel shall be as manufactured by
Brasch Manufacturing Company, Inc.
Input and Output ratings shall be as indicated.**

General:

1. The control panel shall be ETL listed containing a digital control board and power supply/relay board and shall conform completely to the UL 61010B-1 and certified to CAN/CSA STD. C22.2, No. 1010.1.
2. The NEMA 1 enclosure shall be constructed of heavy gauge, bonderized steel with gray, painted finish and conforms to the UL 61010B-1 standard. The cover shall close flush with the sides of the box and be secured with a keyed lock that protects the front panel controls when locked.
3. The enclosure shall have 6, ½" knockouts and 6, ¾" knockouts, pre-punched for connection of field conduit.
4. The unit shall be protected against static discharge, excessive electrical noise, and tested for safety in accordance with the UL 61010B-1 standard.
5. The unit shall have a four line, 20 characters per line, LC display that will continually indicate the present date and time on the top two lines and user instructions on the bottom two lines.
6. Programming and current status of the unit and all sensors shall be controlled from a front panel 5 key keypad. Factory programming to the user's specifications is available.
7. Front panel lamps shall indicate the status of the power, output zone relays and the alarm.

Overcurrent Protection:

1. The control panel shall contain a supply fuse rated for 1 Amp at 250 VAC. Each output relay shall have a fuse rated for 5 Amps at 250 Vac. The fuses shall be of the time-lag type similar to Wickmann Series 374.

Switches and Controls:

1. Each sensor connected to the control panel shall provide an 8-bit, digital signal in direct relationship to the concentration of the type of gas being monitored. Sensors are connected in "daisy chain" fashion for both power and signal.
2. The control panel shall have the capability of assigning each sensor to a specific output ventilation control zone, or to multiple control zones. Sensors may control zones individually or in combination with other sensors.
3. A key on the keypad shall be provided to silence the internal alarm. The alarm circuit will automatically be reset once the current alarm condition ceases to exist.
4. Output relays providing a normally closed set of contacts for low alert and the alarm shall be provided. These relays shall provide a fail-safe situation and will automatically operate ventilation equipment upon power loss to the control panel or sensor. The low and high alert relays shall have a field selectable configuration for 2-speed or 50%/100% fan control. Relays shall be suitable for the connection of 24 VAC, 24 VA inductive circuits.
5. Field adjustment of the low-alert detection level shall be available for each sensor. The range of the detection level shall depend upon the type of gas being monitored. An on/off time delay range of 0 to 10 minutes in increments of 1 minute shall be available for all sensors.
6. The control panel shall come standard with the capability to accept up to 20 transmitters/sensors and control up to 6 output zones.
7. The control panel shall have a battery backup feature capable of retaining the programmed parameters in case of a power loss.

SAMPLE SPECIFICATION

GDCP-A Digital Control Panel & GSE-xx-TRA Transmitters

GDCP-A Control Panel Specifications

Electrical

Power requirements	
Voltage	120 VAC, +/- 10 %
Frequency	50/60 Hz.
Inductive power	120 VA
Installation category	II (Local level, over-voltage transients below 1500 volts.)

Environmental

Temperature	
Operating	-15° C to 40° C, (5° F to 104° F)
Storage	-50° C to 120° C, (-58° F to 248° F)
Humidity	
Operating	10% to 90%, (non-condensing)
Storage	10% to 90%, (non-condensing)

General

Size	14 in. W. x 10 ¼ in. H. x 5 in. D. 35.6 cm. W. x 26.0 cm. H. x 12.7 cm. D.
Weight	14 Lbs. (6.36 KGs)
Housing	Heavy gauge, painted steel, NEMA 1 classification.

Recognition

Agency	ETL listed to U.L. Standard 61010B-1 and Canadian CSA C22.2, NO 1010-1
--------	---

System, Electrical

Display	20 char. X 4 line LCD with LED backlight
Keypad	5 embossed keys with tactile feedback
Timing	Real-time clock with output for minutes, hours, day-of-week, day, month and year.
Circuit	Microprocessor controlled digital circuitry with battery backup, (up to 10 year lifetime).
Input channels	
Number	20 inputs, (max.)
Type	Model GSE-CM-TRA, Model GSE-ND-TRA transmitters
Input signal	8-bit digital word, RS-485 transceiver
Connection	Inputs are true daisy-chain, both power and communication.
Maximum distance	1000 feet between most remote input transmitter and panel.
Output channel	
Number	6 outputs, (std.)
Type of output	Two each, dry-contact, mechanical relays per channel, fused at 5 Amps.
Maximum voltage rating	125 VAC, 50/60 Hz.
Current capacity	5 Amps, resistive at 30 VDC.
Power (inductive)	250 VA, (1/8 H.P.)

SAMPLE SPECIFICATION

GDCP-A Digital Control Panel & GSE-xx-TRA Transmitters

Alarm channel

Number	One internal and one external, common to all output channels.
External, (for optional, remote-mounted horn/strobe.)	
Type	One each, dry-contact, mechanical relay, fused at 5 Amps.
Maximum voltage	125 VAC, 50/60 Hz.
Current capacity	5 Amps, (resistive) at 30 VDC
Power, (inductive)	250 VA, (1/8 H.P.)
Internal	
Type	Piezoelectric ceramic element
Frequency	3.7 KHz.
Sound level	110 db. @ 10 cm.

Model GSE-xx-TRA Transmitter Specifications

Type

Transmitters shall be available for monitoring two types of target gases.

Model GSE-CM-TRA:	Monitors for Carbon Monoxide
Model GSE-ND-TRA:	Monitors for Nitrogen Dioxide, (Diesel exhaust)

Electrical

Power requirements	
Voltage	25-28 VDC, (supplied by the GDCP-A panel)

Environmental

Temperature	
Operating	-15° C to 40° C, (5° F to 104° F)
Storage	-50° C to 120° C, (-58° F to 248° F)
Humidity	
Operating	10% to 90%, (non-condensing)
Storage	10% to 90%, (non-condensing)

General

Size	3 ¼ in. W. x 5 in. H. x 2 ¾ in. D. 8.3 cm. W. x 12.7 cm. H. x 7.0 cm. D.
Weight	1 Lb. (2.2 KGs)
Housing	Heavy gauge, painted steel, NEMA 1 classification.

Recognition

Agency	ETL listed to U.L. Standard 61010B-1 and Canadian CSA C22.2, NO 1010-1
--------	---

Sensors

Accuracy	Transmitters shall be accurate to within +/- 5% of the full scale value.
	GSE-CM-TRA +/- 10 PPM carbon monoxide
	GSE-ND-TRA +/- 0.5 PPM nitrogen dioxide
Expected Useful lifetime	GSE-CM-TRA 5 years or greater*
	GSE-ND-TRA 2 years or greater*

*Useful lifetimes will vary according to total exposure to target gas.

Brasch GDCP-A Control Panel Operating Sequence and Programming Specification

- Normal Operation

If the monitored gas concentration level is below the programmable, field adjustable LOW ALERT setting, the control panel will be in the NORMAL mode. In this mode the front panel liquid crystal display will indicate the time and date on the top two lines and the bottom two lines will display "PRESS MENU KEY FOR OPTIONS". The panel output control relays will be in the inactive state and no front panel lamps will be illuminated.

- Low Alert Operation

If the monitored gas concentration level of any transmitter rises above the LOW ALERT setting, the panel will activate an entrance zone delay timer for that zone. If the concentration level remains above the LOW ALERT level for the duration of the entrance zone delay period, the Low Alert Relay contacts for the affected zone(s) will close and the associated low alert front panel lamp(s) will illuminate. This contact closure can be used to actuate exhaust fans.

Once the monitored gas concentration level drops below the LOW ALERT setting, the panel will activate an exit zone delay timer. The length of a zone's exit time delay is the same as its entrance time delay. If the concentration level remains below the LOW ALERT level for the duration of the exit zone delay period, the panel will revert to the Normal Operation state.

Entrance/exit zone delays are field programmable from 0 to 10 minutes.

- High Alert Operation

If the panel is in a Low Alert status and the monitored gas concentration continues to rise, reaching a factory set high alert concentration, the panel will actuate that zone's High Alert Relay contacts and front panel lamp. If configured for 50%-100% operation, these contacts may be used to activate additional stages of ventilation. If configured for 2 speed operation, the Low Alert Relay contacts will open. Once the concentration falls below the high alert concentration level, the panel will return to the Low Alert Operation mode.

If the Low Alert Relay is actuated, High Alert Operation will be immediate. If the panel is processing a low alert entrance zone delay period, the panel will enter the High Alert Operation mode upon its completion.

- Alarm Mode Operation

If a zone's monitored gas concentration remains above the factory set high alert level longer than 15 minutes, a set of Alarm Relay contacts will close and an internal buzzer will sound. This set of contacts can be used to actuate an external alarm. The buzzer will stay on and the contacts will remain closed until the monitored gas concentration falls below the factory set high alert level. The internal buzzer may be silenced by pressing a front panel mounted push-button switch.

Brasch GDCP-A Control Panel Operating Sequence and Programming Specification

- Fail-Safe Operation

If any sensor fails, the zone(s) to which it is assigned will enter a Fail-Safe operating mode. The Low Alert Relay contacts will close, actuating the ventilation equipment controlled by that relay; the internal buzzer will sound and the Alarm Relay contacts will activate. The bottom two lines of the panel LCD will read "FAILED SENSOR", "CHECK SYSTEM STATUS".

If the panel loses power, the Low Alert Relay contacts will close and allow controlled ventilating equipment with power to operate. The panel has a battery that will retain programmed settings. When power is restored, the panel will reset. This Power Back process will take approximately 2 ½ minutes at the end of which, the panel will again monitor the transmitters and respond based upon the program parameters. The panel can be programmed to leave all fans off or operate selected fans during the Power Back process.

- Automatic Override Operation

The panel may be programmed to close all Alert Relay contacts or selected Alert Relay contacts for 10 minutes at the beginning of each hour or actuate specific Alert Relay contacts for one hour increments for up to three periods per day. If daily selection is made, timed periods must begin and end on the hour, be a minimum of one hour and may not overlap. Periods for weekdays may be different than periods for weekends.

The GDCP-A Control Panel can be programmed at the factory with the customer's requested operating parameters. The panel will retain the settings, allowing the panel to be delivered and installed without losing the program placed in its memory prior to shipment. Once power is applied after installation, the panel will operate without the need for on-site programming. However, the panel's program can still be altered in the field as desired.

If you wish to have the Factory custom program your GDCP-A system, please provide the following information. Default factory settings are indicated in **bold** type. Upon completion, please retain a copy of the document and submit the original to your Brasch representative for inclusion with your purchase order to Brasch Manufacturing Company.

Brasch GDCP-A Control Panel Operating Sequence and Programming Specification

Output Zones:

Place a check mark by each ventilation zone that is to be active or used.

Zone 1: **Zone 2:** **Zone 3:** **Zone 4:** **Zone 5:** **Zone 6:**

Circle the type of fan control for each active zone. (Choose only one type per zone.)

2-Speed: Zone: 1 2 3 4 5 6

50% / 100%: Zone: **1** **2** **3** **4** **5** **6**

Circle the entrance/exit zone delay for each active zone. (Entrance and exit times are identical.)

Zone 1: 0 1 2 **3** 4 5 6 7 8 9 10 Minutes

Zone 2: 0 1 2 **3** 4 5 6 7 8 9 10 Minutes

Zone 3: 0 1 2 **3** 4 5 6 7 8 9 10 Minutes

Zone 4: 0 1 2 **3** 4 5 6 7 8 9 10 Minutes

Zone 5: 0 1 2 **3** 4 5 6 7 8 9 10 Minutes

Zone 6: 0 1 2 **3** 4 5 6 7 8 9 10 Minutes

Transmitters (Sensors):

Circle the type of gas being monitored by each transmitter; carbon monoxide (CO) or nitrogen dioxide (NO2).

Transmitter 1: CO NO2 Transmitter 2: CO NO2 Transmitter 3: CO NO2

Transmitter 4: CO NO2 Transmitter 5: CO NO2 Transmitter 6: CO NO2

Transmitter 7: CO NO2 Transmitter 8: CO NO2 Transmitter 9: CO NO2

Transmitter 10: CO NO2 Transmitter 11: CO NO2 Transmitter 12: CO NO2

Transmitter 13: CO NO2 Transmitter 14: CO NO2 Transmitter 15: CO NO2

Transmitter 16: CO NO2 Transmitter 17: CO NO2 Transmitter 18: CO NO2

Transmitter 19: CO NO2 Transmitter 20: CO NO2

Circle the number of each transmitter assigned to each active zone. (Zones may share assigned transmitters.)

Transmitter number

Zone 1: **1** **2** **3** **4** **5** **6** **7** **8** **9** **10** **11** **12** **13** **14** **15** **16** **17** **18** **19** **20**

Zone 2: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Zone 3: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Zone 4: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Zone 5: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Zone 6: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Brasch GDCP-A Control Panel Operating Sequence and Programming Specification

Indicate the Low Alert trigger concentration for each active transmitter. Choose from the following values.

CO: 20, 25, 30, **35**, 40, 45, 50 and 55 PPM

NO2: **1.0**, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0 and 4.5 PPM

Transmitter 1: _____ Transmitter 2: _____ Transmitter 3: _____
 Transmitter 4: _____ Transmitter 5: _____ Transmitter 6: _____
 Transmitter 7: _____ Transmitter 8: _____ Transmitter 9: _____
 Transmitter 10: _____ Transmitter 11: _____ Transmitter 12: _____
 Transmitter 13: _____ Transmitter 14: _____ Transmitter 15: _____
 Transmitter 16: _____ Transmitter 17: _____ Transmitter 18: _____
 Transmitter 19: _____ Transmitter 20: _____

Auto Override Features:

Specify the type of Auto Override programming. You may choose to actuate all fans, or specific fans, for 10 minutes at the beginning of each hour, (choose "EACH HOUR"), or actuate specific fans for up to three periods each day, (choose "BY DAY"). If you choose "BY DAY", the timed periods must begin and end on the hour. The minimum time is one hour. Timed periods may not overlap. Periods for weekdays can be different than periods for weekends.

(Place a check mark by the selected type of Auto Override, if desired.)

Each Hour _____ Circle active zones **None** 1 2 3 4 5 6

By Day _____ Circle active zones None 1 2 3 4 5 6

Specify ON/OFF times

Weekdays: Time 1 ON ____:00 AM PM OFF ____:00 AM PM

Time 2 ON ____:00 AM PM OFF ____:00 AM PM

Time 3 ON ____:00 AM PM OFF ____:00 AM PM

Weekends: Time 1 ON ____:00 AM PM OFF ____:00 AM PM

Time 2 ON ____:00 AM PM OFF ____:00 AM PM

Time 3 ON ____:00 AM PM OFF ____:00 AM PM

Power Back programming:

You may choose to have specific zones turn on fans immediately after a power interruption. These fans will operate for a period of approximately 2 ½ minutes after the power is restored.

Circle active zones: **None** 1 2 3 4 5 6

WARNING



MESSAGE

WARNING MESSAGE TO INSTALLERS AND MAINTENANCE PERSONNEL OF HORN-LIGHT SYSTEMS

People's lives depend on your safe installation of our products. It is important to follow all instructions shipped with the products. This device is to be installed by a trained electrician who is thoroughly familiar with the National Electrical Code and will follow the NEC Guidelines as well as local codes.

The selection of the mounting location for the device, its controls and the routing of the wiring is to be accomplished under the direction of the Facilities Engineer and the Safety Engineer. In addition, listed below are some other important safety instructions and precautions you should follow:

- Read and understand all instructions before installing or operating this equipment.
- Failure to follow all safety precautions and instructions may result in property damage or serious injury to you or others.
- This unit should be installed by a qualified electrician in accordance with local electrical and fire codes.
- If the unit is not installed in a supervisory system, it must be tested at regular intervals. Refer to local fire codes for this information.
- After installation, test the light system to ensure that it is operating properly.
- After testing is complete, provide a copy of this instruction sheet to all operating and servicing personnel.
- Disconnect power before any installations are made.
- Establish a procedure to routinely check the light system for proper activation and operation.
- Any maintenance to the light system must be performed by a trained electrician in accordance with NEC Guidelines and local codes.
- The nameplate, which may contain cautionary or other information of importance to maintenance personnel, should NOT be obscured in any way. Ensure that the nameplate remains readable when the housing's exterior is painted.

INSTALLATION INSTRUCTIONS FOR STROBE LIGHT ON HORNS AND SPEAKERS

A. Introduction.

This sheet provides the user with instructions for the installation of Strobe Warning Lights on horns and speakers. All instructions assume that mounting provisions have been completed and electrical power has been routed to the installation site.

The warning light can be weatherproofed by installing the supplied gasket (refer to paragraph E). Also the audible signal or adapter plate should be weatherproofed by using the proper electrical box.

WARNING

High voltages may be present inside the light assembly even though power is not connected. If access to the component board is required (removal or replacement), the capacitor must be discharged by touching a wire to both ends of the strobe tube. Do not attempt to touch or move the assembly until the capacitor has been discharged.

B. Installation on Adapter Plate.

WARNING

- Refer to "Warning Message to Installers" packed with this unit. Also, refer to Introduction and Basic Installation instructions in this instruction sheet before installing device.
- Use only 14 to 18 AWG wire for power connection. Strip no more than 0.25-inch of wire insulation from the ends of the power leads.
 1. Insert bushing (supplied) into adapter plate. Route power leads through the slot in the BCL or SFL Adaptor Plate, as shown in Figure 1. Snap the front cover of the light off. Route power leads through board assembly as shown in Figure 2. Connect the power leads to the terminals of the two position connector by inserting the stripped ends of the wire into the connector as far as they can travel, polarity MUST be observed on DC units. Make sure supply lead insulation is flush with connector. If stranded wire is used, be sure that there are no loose strands outside the connector plug that could touch the adjacent lead and cause a short circuit. Replace cover on light, lens should snap onto board assembly.
 2. Attach the light to the adapter plate, using two of the 8-32 screws and nuts supplied.
 3. Attach the adapter plate to the 4-inch electrical box with two 8-32 screws.

C. Installation on 4-Inch Horns.

WARNING

- Refer to "Warning Message to Installers" packed with this unit. Also, refer to Introduction and Basic Installation instructions in this instruction sheet before installing device.
- Use only 14 to 18 AWG wire for power connection. Strip no more than 0.25-inch of wire insulation from the ends of the power leads.
 1. Turn off power to the horn and detach the horn from its mounting location by removing the slotted screws. Disconnect all electrical connections to the horn.
 2. See Figure 3A. Using a small blunt tool, such as a pin punch, knock out the slot in the horn housing from the rear. Figure 3A shows the mechanism removed from the horn, for clarity. DO NOT remove the mechanism before knocking out the slot.
 3. Insert the supplied nylon bushing into the slot from the front of the horn, as indicated in Figure 3B.

NOTE

In order to properly seat the bushing, excess burrs must be removed from the slot area.

4. Remove the two Phillips head screws from the corners of the horn. Retain the screws.
5. Route power leads through the horn and through the nylon bushing. Snap the front cover of the light off. Route power leads through board assembly as shown in Figure 2. Connect the power leads to the terminals of the two position connector by inserting the stripped ends of the wire into the connector as far as they can travel, polarity MUST be observed on DC units. Make sure supply lead insulation is flush with connector. If stranded wire is used, be sure that there are no loose strands outside the connector plug that could touch the adjacent lead and cause a short circuit. Replace cover on light, lens should snap onto board assembly.
6. If the horn is to be flush mounted, attach the accessory plate at this time. Position the light so that the wires are directly over the nylon bushing and the wires will not be visible after the light is attached. Attach the light to the horn, using the two screws that were removed in step 4.
7. Connect the light leads following the diagram in Figure 4. Insulate all splices.

D. Installation on 4-Inch Speakers.

WARNING

- Refer to "Warning Message to Installers" packed with this unit. Also, refer to Introduction and Basic Installation instructions in this instruction sheet before installing device.
- Use only 14 to 18 AWG wire for power connection. Strip no more than 0.25-inch of wire insulation from the ends of the power leads.
 1. Remove the two Phillips-head screws from the front of the speaker. Retain the screws.
 2. See Figure 5. Using a small pin punch or similar blunt tool, knock out hole "B" from the rear of the speaker, if a two wire light is being installed. If a four wire light is being installed, knock out both holes "A" and "B" from the rear of the speaker. If the speaker is housed in a metal enclosure, use a round file to remove any burrs that may be present. Figure 5 shows a basic 4-inch speaker enclosure containing no parts other than the speaker. However, some 4-inch speaker units do include components in addition to the speaker. DO NOT remove any parts before knocking out the holes indicated in Figure 5.
 3. Route power leads through the horn and out of knockout hole "B", see Figure 5. Snap the front cover of the light off. Route power leads through board assembly as shown in Figure 6. Connect the power leads to the terminals of the two position connector by inserting the stripped ends of the wire into the connector as far as they can travel, polarity MUST be observed on DC units. Make sure supply lead insulation is flush with connector. If stranded wire is used, be sure that there are no loose strands outside the connector plug that could touch the adjacent lead and cause a short circuit. Replace cover on light, lens should snap onto board assembly.
 4. See Figure 7. Connect the leads to the power source. Polarity on AC units does not matter. Insulate all splices.

E. Installation of Gasket.

WARNING

Refer to "Warning Message to Installers" packed with this unit. Also, refer to Introduction and Basic Installation instructions in this instruction sheet before installing device.

The light can be weatherproofed by installing the supplied gasket and mounting on a weather-proof horn/speaker, or by using the BCL plate to mount the strobe on a WB backbox. Slots are provided in the gasket which allow the light wires to pass to the audible device.

The slots can be located by gently pulling on the gasket near the applicable slots (see Figure 8). Note that there are four slots in the upper-center of the gasket. These slots should be used when the light is to be installed on a horn or mounting plate. To install, merely run the light wires through the applicable slots and seat the gasket firmly on the light (see Figure 8).

Refer to the previously described applicable installation instructions.

F. Strobe Tube Replacement.

Disconnect power from the electrical circuit. Wait five (5) minutes before removing lens. Remove the screws fastening lens to mounting surface. Snap lens off of mounting plate. Carefully remove the burnt out strobe tube, it is best to lift from both sides at once.

Replace the new tube making sure all three pins enter the board connectors applying pressure slowly to ends of tube, preferably the outer leads. Place the outer lens back into position, reinstall referring to appropriate previous installation instruction as necessary.

G. Service.

The Federal Signal factory will service your equipment or provide technical assistance with any problems that cannot be handled locally.

Any units returned to Federal Signal for service, inspection, or repair must be accompanied by a Return Material Authorization. This R.M.A. can be obtained from the local Distributor or Manufacturer's Representative.

At this time a brief explanation of the service requested, or the nature of the malfunction, should be provided.

Address all communications and shipments to:

Industrial Systems

2645 Federal Signal Drive • University Park, IL 60484-3167

Tel: 708-534-4756 • Fax: 708-534-4852

Email: elp@federalsignal.com • www.federalsignal-indust.com

H. Replacement Parts.

Description	Part Number
Lens Kit, Amber	K8435D539
Lens Kit, Blue	K8435D539-08
Lens Kit, Clear	K8435D539-02
Lens Kit, Green	K8435D539-03
Lens Kit, Red	K8435D539-07
Strobe Tube	K149128

I. UNDERWRITERS LABORATORIES WARNING EXPLANATION.

“Warning-Not to be used as a visual public mode alarm notification appliance”



WHAT DOES THIS MEAN?

Underwriters Laboratories uses two different standards to investigate and List visual signal appliances. The first UL Standard for Safety is UL1971 - Signaling Devices for the Hearing Impaired. This standard covers visual signaling devices intended for fire alarm systems to alert the hearing impaired. The second UL Standard for Safety is UL1638 - Visual Signaling Appliances-Private Mode Emergency and General Utility Signaling. While this standard may also cover visual signal appliances, it does not include the determination of adequacy relative to alerting hearing-impaired individuals in a fire alarm system.

To prevent misapplication of a visual signal appliance Listed to UL1638, UL determined it is the manufacturer's responsibility to warn the installer in the field and Authority Having Jurisdiction (AHJ) of what would be an inappropriate use of the product. Therefore, manufactures whose products Listed to UL1638 are required by Underwriters Laboratories to bear the warning, “Warning - Not to be used as a visual public mode alarm notification appliance”.

“Public Operating Mode” and “Notification Appliance” as defined in the National Fire Alarm Code, NFPA 72 is as follows:

Public Operating Mode - Audible or visible signaling to occupants or inhabitants of the area protected by the fire alarm system.

Notification Appliance - A fire alarm system component such as a bell, horn, speaker, light, or text display that provides audible, tactile, or visible outputs, or any combination thereof.

In other words, this device **should not** be used as a component of a commercial fire alarm system.

AUDIBILITY INFORMATION

AC HORNS

VOLTAGE	CURRENT (AMPS)	dB*	dB**
12	0.9	94	91
24	0.9	99	94
120	0.18	99	94
240	0.09	99	94

DC HORNS

VOLTAGE	CURRENT (AMPS)	dB*	dB**
12	0.50	99	94
24	0.25	99	94
125	0.05	99	94
250	0.025	99	94

* MEASURED ON-AXIS AT TEN FEET/3 METERS IN AN ANECHOIC CHAMBER.

** UNDERWRITERS LABORATORIES OMNIDIRECTIONAL SOUND PRESSURE LEVEL RATING AT TEN FEET.

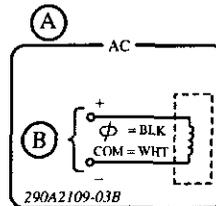
* MEDICION EN AXIS A 10 PIES/9 METROS EN UNA CAMARA ANECOICA.

** VALOR DEL NIVEL DE PRESION DE SONIDO OMNIDIRECCIONAL A 10 PIES EN LOS LABORATORIOS DEL ASEGURADOR.

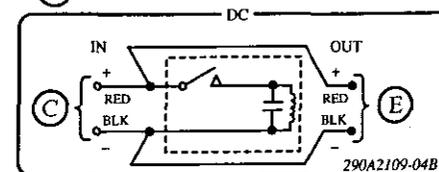
* MESURE DANS L'AXE A 3 MÈTRES DANS UN CHAMBRE SOURDE.

** LABORATOIRE DE CONTRÔLE PRESSION SONORE OMNIDIRECTIONNELLE NOMINALE A 3 MÈTRES.

A



D



English

- A. Standard AC horn wiring
- B. AC input power
- C. DC input power

- D. Standard DC horn wiring
- E. To exit device, or insulate and terminate

Español

- A. Cableado estándar CA de la bocina
- B. Potencia de entrada CA
- C. Potencia de entrada DC

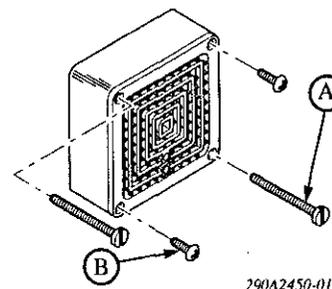
- D. Cableado estándar DC de la bocina
- E. Al siguiente dispositivo, o aislar

Français

- A. Câblage standard du klaxon en courant alternatif
- B. Alimentation en courant alternatif
- C. Alimentation en courant alternatif

- D. Câblage standard du klaxon en courant alternatif
- E. Au prochain dispositif, ou isoler et terminer

B



English

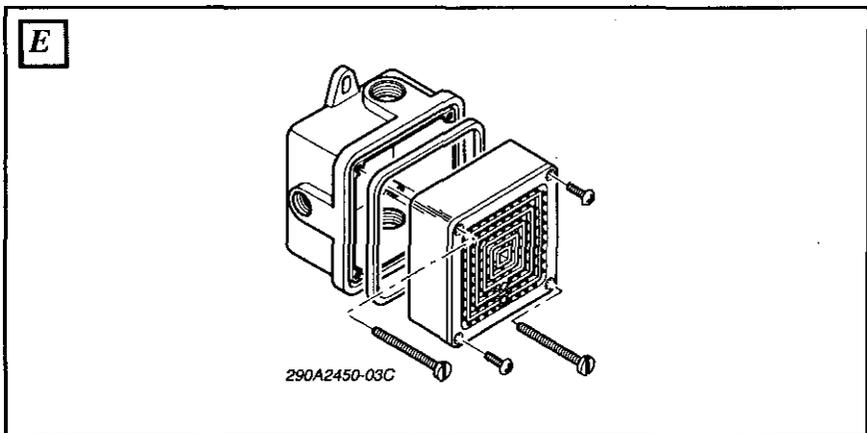
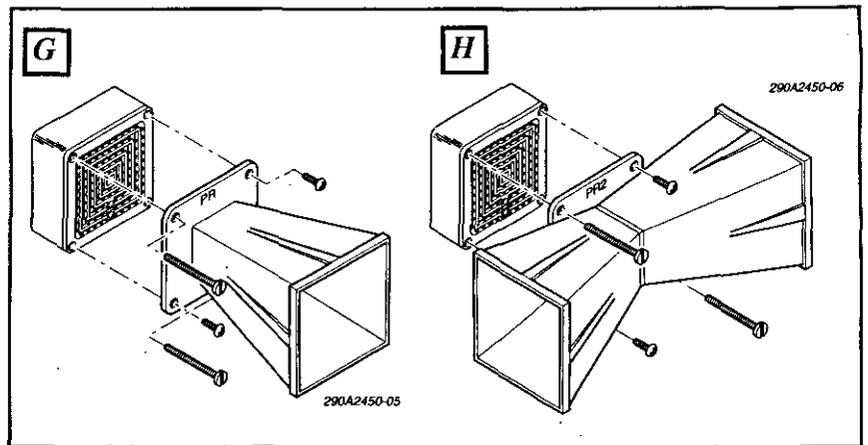
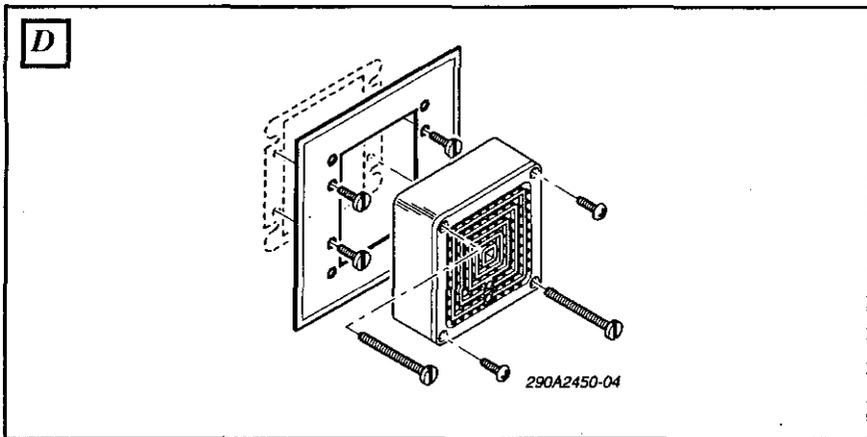
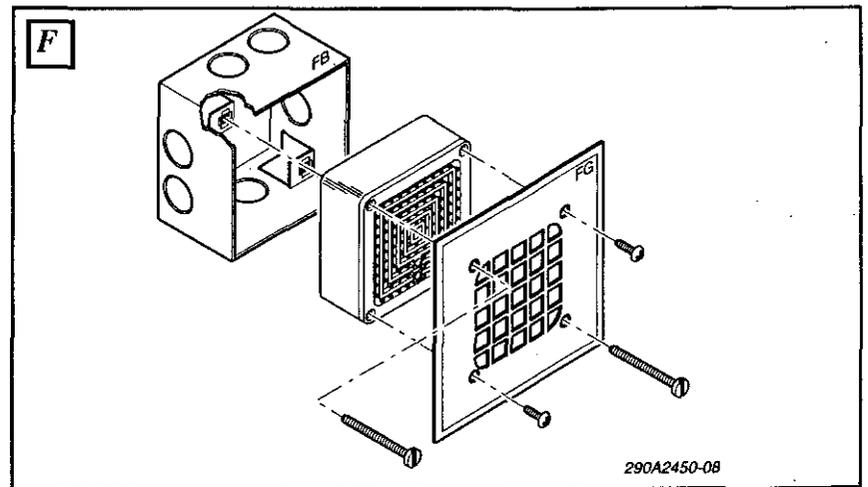
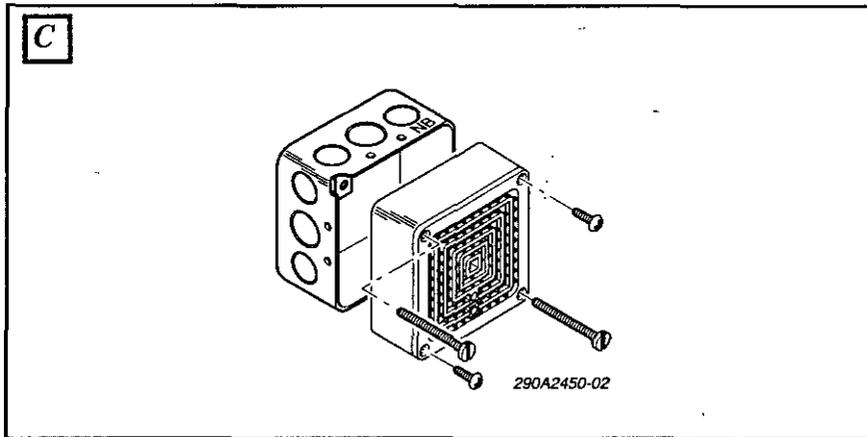
- A. 8-32 x 1 5/8" screw (2)
- B. 10-32 x 1/2" phillips head Taptite screw (2)

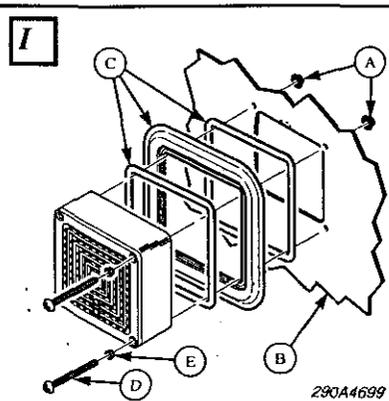
Español

- A. 8-32 x 1 5/8" tornillo (2)
- B. 10-32 x 1/2" tornillo Taptite de cabeza de doble ranura ortogonal (2)

Français

- A. 8-32 x 1 5/8" vis (2)
- B. 10-32 x 1/2" vis auto-taraudeuse à tête cruciforme (2)





English

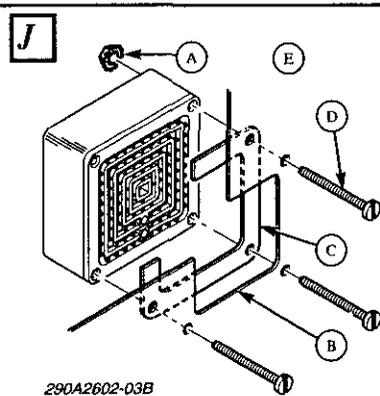
- A. 8-32 keps nut (4)
- B. Panel
- C. Trim Ring
- D. Screws (4)
- E. Collars (4)

Español

- A. Tuercas Keps 8-32 (4)
- B. Panel
- C. Anillo de acabado
- D. Tornillos (4)
- E. Abrazaderas (4)

Français

- A. Écrou d'arrêt 8-32 (4)
- B. Panneau
- C. Anneau enjoliveur
- D. Vis (4)
- E. Colliers (4)



English

- A. 8-32 keps nut (4)
- B. Panel
- C. Gasket
- D. #8-32 x 1 5/8" screw (4)
- E. Flush mount

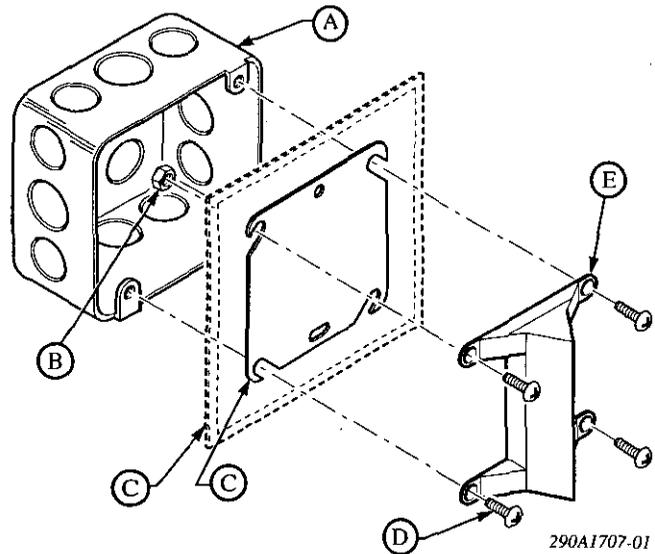
Español

- A. 8-32 tuercas keps (4)
- B. Panel
- C. Junta
- D. #8-32 x 1 5/8" tornillos (4)
- E. Montaje a ras

Français

- A. 8-32 écrous keps (4)
- B. Panneau
- C. Joint
- D. #8-32 x 1 5/8" vis (4)
- E. Montage à ras

1

**English**

- A. 4" electrical box
- B. #8-32 nuts (2)
- C. SFL plate or BCL plate as required
- D. #8-32 screws (4)
- E. Light

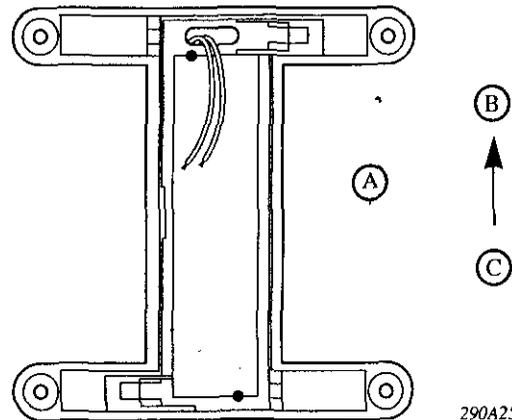
Español

- A. 4" caja eléctrica
- B. #8-32 tuercas (2)
- C. Placa SFL o BCL como convenga
- D. #8-32 tornillos (4)
- E. Luz

Français

- A. Boîtier électrique 4"
- B. Écrous (2) #8-32
- C. Plaque SFL ou plaque BSL selon besoin
- D. Vis (4) #8-32
- E. Lampe

2

**English**

- A. Back view
- B. up
- C. Mounting position

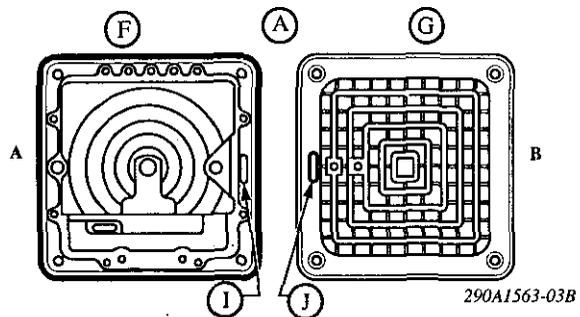
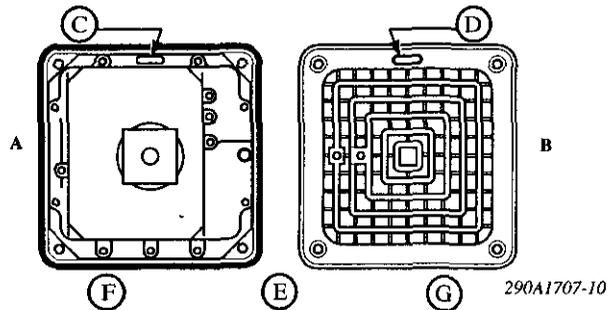
Español

- A. Vista posterior
- B. Arriba
- C. Posición de montaje

Français

- A. Vue arrière
- B. Haut
- C. Position de montage

3



English

- C. Knock-out
- D. Insert bushing
- E. AC horn
- F. Back

- G. Front
- H. DC horn
- I. Knock-out
- J. Insert bushing

Español

- C. Pieza desmontable
- D. Inserte el manguito
- E. Bocina CA
- F. Posterior

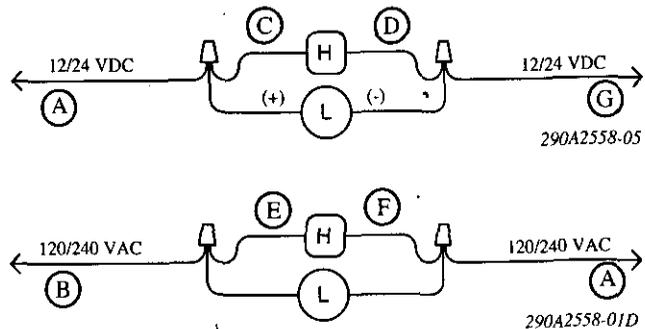
- G. Vista del
- H. Bocina CC
- I. Pieza desmontable
- J. Inserte el manguito

Français

- C. Découpage
- D. Insérer douille
- E. Klaxon CA
- F. Arrière

- G. Avant
- H. Klaxon CC
- I. Éjection
- J. Douille insérer

4



English

- A. Positive (+)
- B. Phase
- C. Red
- D. Black

- E. Black
- F. White
- G. Negative (-)
- H. Common

Español

- A. Positivo (+)
- B. Fásico
- C. Rojo
- D. Negro

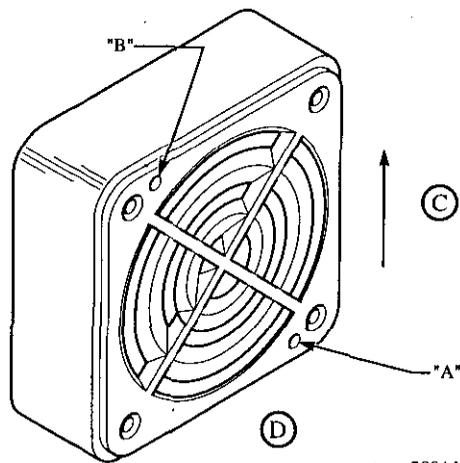
- E. Negro
- F. Blanco
- G. Negativo (-)
- H. Común

Français

- A. Positif (+)
- B. Phase
- C. Rouge
- D. Noir

- E. Noir
- F. Blanc
- G. Négatif (-)
- H. Commun

5



290A1563-08C

English

- C. Up mounting position
- D. Surface mount

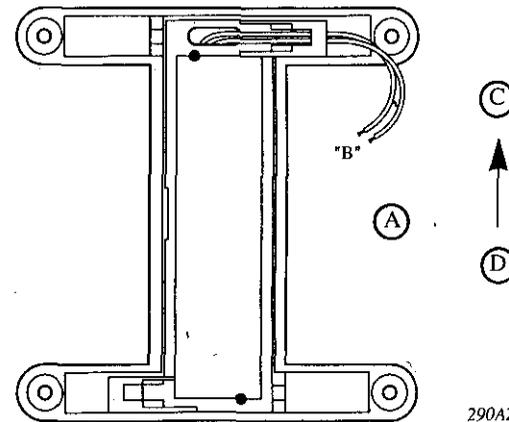
Español

- C. Posición de montaje hacia arriba
- D. Montaje en superficie

Français

- C. Position de montage debout
- D. Montage en surface

6



290A2558-03B

English

- A. Back view
- C. Up
- D. Mounting position

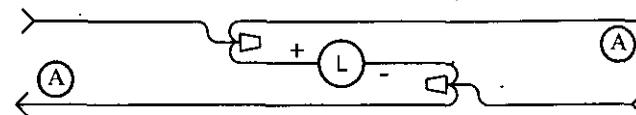
Español

- A. Vista posterior
- C. Arriba
- D. Posición de montaje

Français

- A. Vista postérieur
- C. Haut
- D. Vue arrière position de montage debout

7



290A2558-02B

English

- A. Power

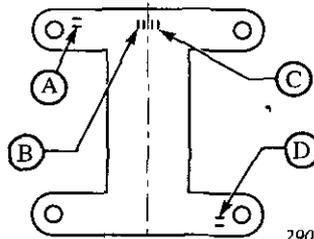
Español

- A. Alimentación

Français

- A. Alimentation

8



290A1707-09

English

- A. NOTE: Use for two and four speakers only.
- B. Knife slots 3/32" long, typical 8 places.
- C. NOTE:-Use for horns and mounting plate.
- D. NOTE:-Use for four wire speakers only.

Español

- A. NOTA: Usar para altavoces de dos y cuatro cables únicamente.
- B. Ranuras de 3/32" de largo, 8 lugares usuales.
- C. NOTA: Usar para bocinas y placa de montaje.
- D. NOTA: Usar para altavoces de cuatro cables únicamente.

Français

- A. NOTA: N'utiliser que pour les haut-parleurs a deux et quatre fils.
- B. Fentes-couteur longueur 3/32" typiquement a 8 endroits.
- C. NOTA: Utiliser pour les klaxons et la plaque de montage
- D. NOTA: N'utiliser que pour les haut-parleurs a quatre fils.