

Application Drawing

APP-02
0102R2

Field Wiring Guidelines

Wire Type:

The speaker circuits of most voice evacuation systems will typically be classified as power limited wiring. As such, these speaker circuits can be run with other fire alarm wiring without ill effects.

No special cabling is required for the speaker circuits. Standard FPL or FPLP wire is sufficient. Twisted pair or shielding twisted pair wiring is not necessary.

There is one exception, however. Certain addressable systems may generate extraneous noise from their addressable loop, and cannot be run using shielded cable. In this case, shielding of the evacuation speaker circuit will help to eliminate noise picked up by and heard in speakers during standby operation, and possible interference with the addressable loop.

Wire Gauge:

Generally, #18AWG will be adequate for speaker circuits. The only time that heavier wire is needed is when load is high, and wire runs are long. But remember, it never hurts to go with heavier wire. So if a #16 or #14 AWG pair is being pulled for strobes, it is often easier and less costly to pull the same wire for the evacuation speaker circuits.

The table below illustrates typical wire lengths for specific wire gauge and speaker load.*

Table with 5 columns: Power, #18 AWG, #16AWG, #14 AWG, #12AWG. Rows for 10W, 15W, 25W.

Table with 5 columns: Power, #18 AWG, #16AWG, #14 AWG, #12AWG. Rows for 10W, 15W, 25W.

* This table assumes that there is an even distribution of the speaker load on the speaker circuit, and that a 20% drop at the last device is allowable. If an even distribution of load is not the case, reduce all wire runs by 1/2.

1 SPEAKER CIRCUIT WIRING GUIDELINES NOT TO SCALE

SPEAKER CIRCUIT OPERATING VOLTAGE = 70V RMS
SPEAKER CIRCUIT A1 LOAD = 11 WATTS
APPROXIMATE LENGTH OF SPEAKER CIRCUIT A1 = 1,414 FEET
REFER TO SPEAKER CIRCUIT WIRING GUIDELINES. A MAXIMUM SPEAKER CIRCUIT LENGTH OF 24,200 FEET IS ALLOWED FOR #16 AWG CONDUCTORS AT A 10W LOAD. A MAXIMUM SPEAKER CIRCUIT LENGTH OF 9,680 FEET IS ALLOWED FOR #18 AWG CONDUCTORS AT A 25W LOAD.

2 SPEAKER CIRCUIT WATTAGE AND CIRCUIT LENGTH INFORMATION NOT TO SCALE

STROBE CIRCUIT VOLTAGE DROP CALCULATIONS

Table for Strobe Circuit Voltage Drop Calculations with columns for Power Supply, Located In, Loop Type, Devices (FA, Door, Horn, Mini, Strobes), Wire (Size, Resist, DC Resist, Total Alarm Current), One-Way Loop Length, Total VD, Voltage Drop, Minimum Battery Size, and Battery Selected.

FORMULAS USED FOR CALCULATIONS:

FORMULA FOR BATTERY SIZING:
FOR FACP/FAPS - 24 HOURS STANDBY & 15 MIN IN ALARM:
AMP HOUR = 1.25 [(24 HOURS X I(S)) + (15/60 HOUR X I(A))] X 1.30
FOR FACP - 24 HOURS STANDBY & 15 MIN IN ALARM:
AMP HOUR = 1.25 [(24 HOURS X I(S)) + (15/60 HOUR X I(A))] X 1.30
WHERE:
1.25 = BATTERY DERATING VALUE
I(S) = TOTAL SUPERVISORY CURRENT (0 FOR NOTIFICATION DEVICES AND 48 mA FOR FCPS-24)
I(A) = TOTAL ALARM CURRENT
1.30 = 30% SPARE BATTERY CAPACITY

FORMULA FOR VOLTAGE DROP CALCULATIONS

TOTAL DC RESISTANCE = # OF WIRES X Rdc/1000 X ONE-WAY LOOP LENGTH FROM POWER SUPPLY TO MIDDLE OF LOAD
TOTAL VD = TOTAL DC RESISTANCE X TOTAL ALARM CURRENT
MINIMUM VOLTAGE AT DEVICES = 20.4V - TOTAL VD
20.4V = MINIMUM VOLTAGE AT END OF USEFUL BATTERY LIFE (85% OF 24VDC)

NOTE:
THE MANUFACTURER'S OPERATING VOLTAGE IS BETWEEN 16VDC AND 33 VDC (FOR 24VDC NOMINAL)

BCSD OWENS (LOCATED IN EXISTING ADMIN. BLDG.)

"FACP" FIRE ALARM CONTROL PANEL BATTERY CALCULATION

Table for FACP Fire Alarm Control Panel Battery Calculation with columns for Device, Panel (Stand-By, Alarm), and FACP (Quantity, Stand-By, Alarm). Includes items like Fire Alarm Control Panel, Serial LCD Annunciator, Fast Response Contact Module, etc.

BCSD OWENS (LOCATED IN RELO A102)

"FAPS" POWER & BATTERY CALCULATION

Table for FAPS Power & Battery Calculation with columns for Device, Panel (Stand-By, Alarm), and FACP (Quantity, Stand-By, Alarm). Includes Fire Alarm Remote Power Supply, Speaker/Strobe interior walls, etc.

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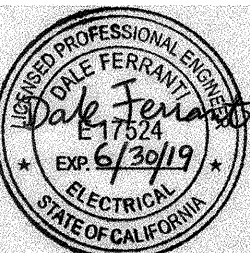
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REVISIONS

Table with columns: NO., DATE, APPRD., DESCRIPTION

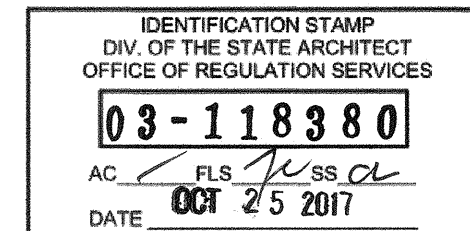
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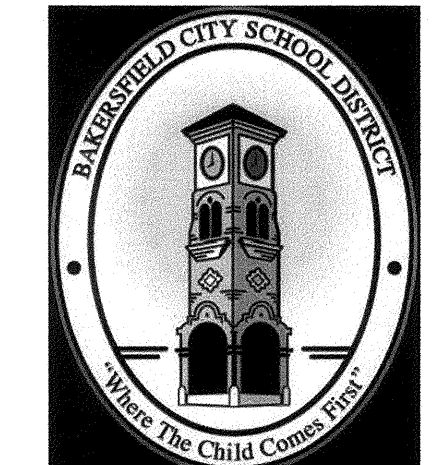


AGENCY INFORMATION:

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FILE NO. 15-6



BAKERSFIELD CITY SCHOOL DISTRICT



BESSIE OWENS INTERMEDIATE RELOCATABLES A101 - A106

815 EUREKA ST. BAKERSFIELD CA, 93305

OPSC or OSHPD PROJ. NO.

PROJECT NO: 16241.000

DRAWN BY: VZ

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SHEET TITLE

FIRE ALARM VOLTAGE DROP & BATTERY CALCULATIONS

SHEET NUMBER

E3.1

CONSTRUCTION DOCUMENTS