

| FCAP Battery Calculation | | | 3/9/2017 |
|---|---------|-------------------|--|
| PROJECT NAME: PURESTAT EXTRUSION, LLC | | | |
| Required Standby Time: 24 Hours | | | |
| Required Alarm Time: 3 Minutes | | | |
| Regulated Load in Standby | | Number of Devices | Total Current (Amps) |
| Device Type | Number | Current (Amps) | Total Current (Amps) |
| FCAP - MS-9200UDLS MAIN CIRCUIT BOARD | 1 | 0.14500 | 0.14500 |
| ANN-80 REMOTE ANNUNCIATOR | 1 | 0.01500 | 0.01500 |
| SD35 SMOKE DETECTOR | 4 | 0.00020 | 0.00080 |
| 85-72LX PULL STATION | 3 | 0.00321 | 0.00963 |
| TOTAL STANDBY LOAD | | | 0.16210 |
| Regulated Load in Alarm | | Number of Devices | Total Current (Amps) |
| Device Type | Number | Current (Amps) | Total Current (Amps) |
| FCAP - MS-9200UDLS MAIN CIRCUIT BOARD | 1 | 0.27500 | 0.27500 |
| ANN-80 REMOTE ANNUNCIATOR | 1 | 0.04000 | 0.04000 |
| MAX ALARM DRAW - ALL ADDRESS DEVICES | 1 | 0.40000 | 0.40000 |
| NAC-1 (See Voltage Drop Calculations) | 1 | 0.56000 | 0.56000 |
| NAC-2 (See Voltage Drop Calculations) | 1 | 0.63600 | 0.63600 |
| NAC-3 (See Voltage Drop Calculations) | 1 | 0.63600 | 0.63600 |
| NAC-4 (Spare) | 1 | 0.00000 | 0.00000 |
| TOTAL ALARM LOAD | | | 2.54700 |
| Battery Requirements | | | |
| Standby Load Current (Amps) | 0.16210 | X | 24.00000 = 3.89040 |
| Alarm Load Current (Amps) | 2.54700 | X | Required Alarm Time in Hours = 4.01225 |
| Derating Factor | | | 4.10265 |
| BATTERIES TO BE PROVIDED (2 - 12V) | | | |
| | | | 1.2 |
| | | | 7 AH |

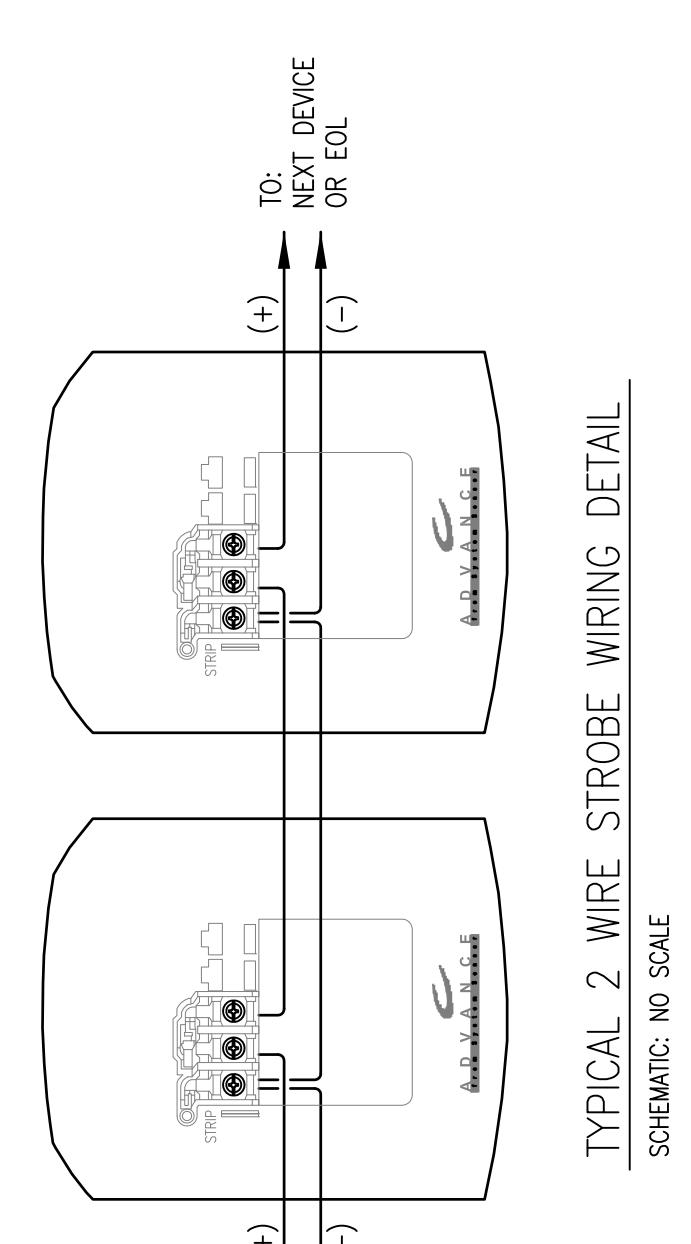
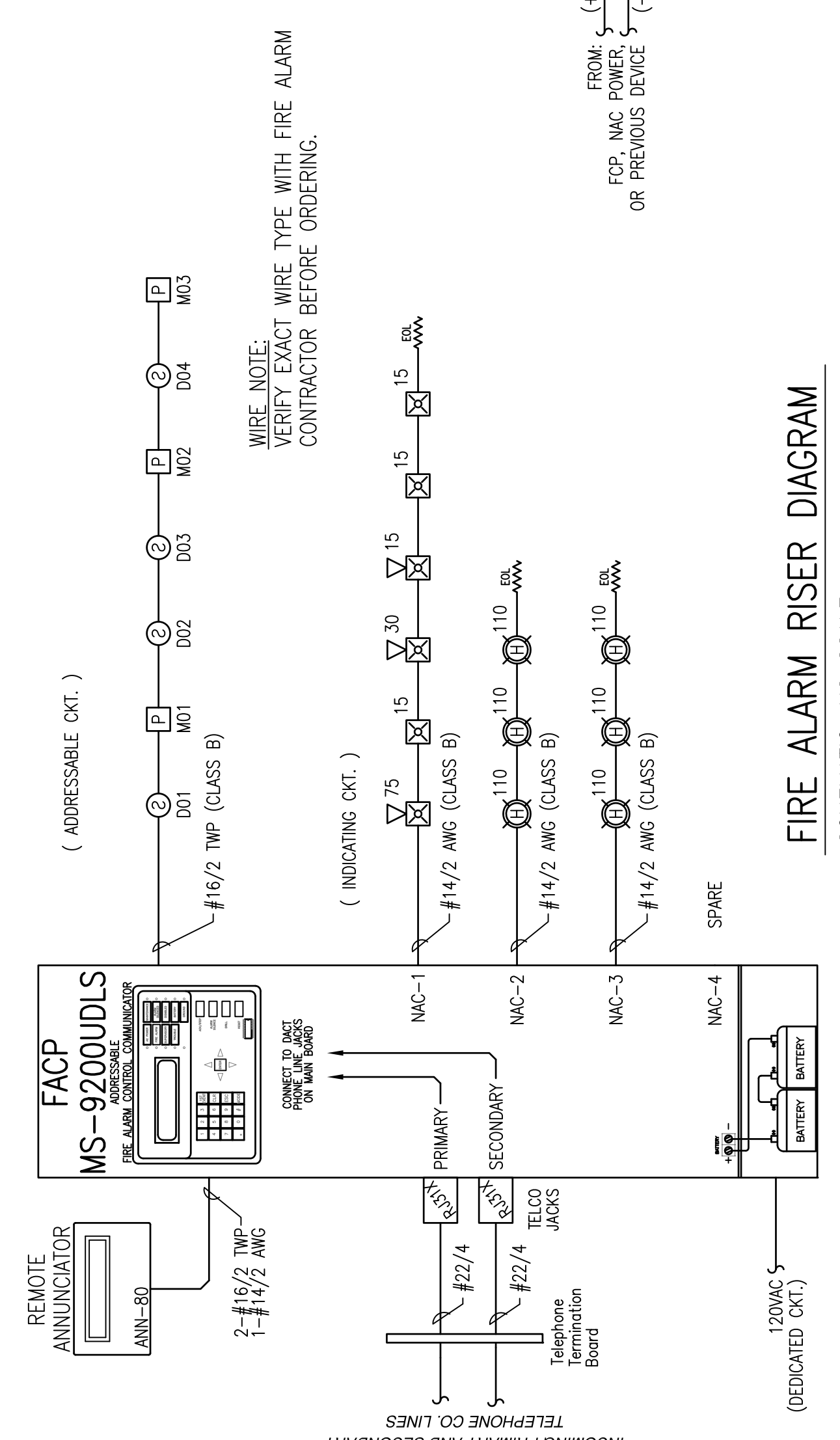
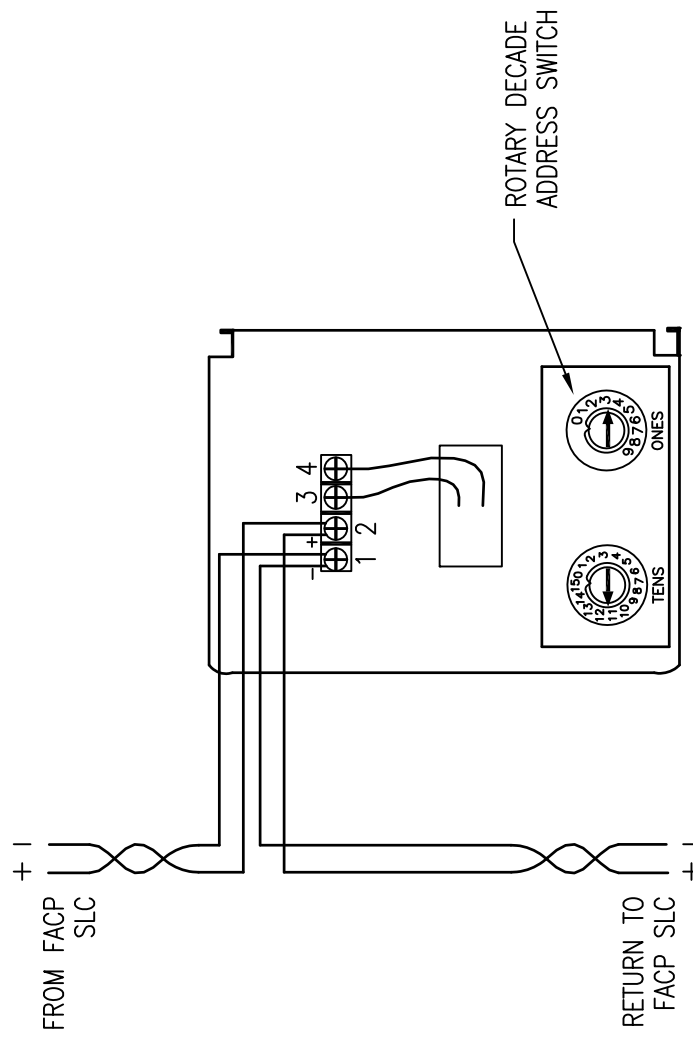
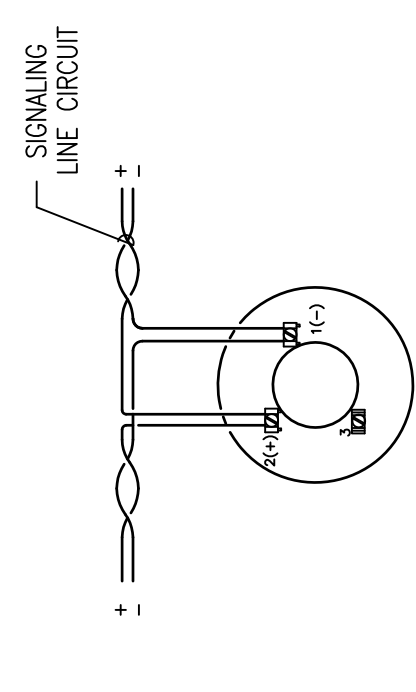
| Point to Point NAC Voltage Drop Calculation | | 3/9/2017 |
|--|-------------|----------------------------|
| PROJECT NAME: PURESTAT EXTRUSION, LLC | | |
| Circuit Number: NAC-1 | | |
| Nominal System Voltage | 20.4 volts | Resistance Per 1000 |
| Minimum Device Voltage | 16.0 volts | Wire Gauge |
| Distance from source to 1st device | 35 feet | 14 |
| Wire Gauge for balance of circuit | 14 | 3.07 |
| Max Output Current | 1.50 amps | |
| Total Circuit Current | 0.580 amps | |
| End of Line Voltage | 20.18 volts | |
| Circuit is within limits | | |
| Device Current | Distance | Voltage at previous device |
| Device 1 | 0.176 | 35 |
| Device 2 | 0.056 | 20.28 |
| Device 3 | 0.107 | 20.24 |
| Device 4 | 0.079 | 20.22 |
| Device 5 | 0.058 | 20.20 |
| Device 6 | 0.058 | 20.18 |
| Totals | 0.580 | 20.18 |
| Notes: Wire resistance is doubled in the calculations for two wires (Positive and Negative). The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage. (E: rated operating voltage: 16-33 VDC (24 VDC nominal)). | | |

| Point to Point NAC Voltage Drop Calculation | | 3/9/2017 |
|--|-------------|----------------------------|
| PROJECT NAME: PURESTAT EXTRUSION, LLC | | |
| Circuit Number: NAC-2 | | |
| Nominal System Voltage | 20.4 volts | Resistance Per 1000 |
| Minimum Device Voltage | 16.0 volts | Wire Gauge |
| Distance from source to 1st device | 45 feet | 14 |
| Wire Gauge for balance of circuit | 14 | 3.07 |
| Max Output Current | 1.50 amps | |
| Total Circuit Current | 0.636 amps | |
| End of Line Voltage | 20.10 volts | |
| Circuit is within limits | | |
| Device Current | Distance | Voltage at previous device |
| Device 1 | 0.212 | 45 |
| Device 2 | 0.212 | 20.22 |
| Device 3 | 0.212 | 20.13 |
| Totals | 0.636 | 20.10 |
| Notes: Wire resistance is doubled in the calculations for two wires (Positive and Negative). The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage. (E: rated operating voltage: 16-33 VDC (24 VDC nominal)). | | |

| Point to Point NAC Voltage Drop Calculation | | 3/9/2017 |
|--|-------------|----------------------------|
| PROJECT NAME: PURESTAT EXTRUSION, LLC | | |
| Circuit Number: NAC-3 | | |
| Nominal System Voltage | 20.4 volts | Resistance Per 1000 |
| Minimum Device Voltage | 16.0 volts | Wire Gauge |
| Distance from source to 1st device | 85 feet | 14 |
| Wire Gauge for balance of circuit | 14 | 3.07 |
| Max Output Current | 1.50 amps | |
| Total Circuit Current | 0.636 amps | |
| End of Line Voltage | 19.93 volts | |
| Circuit is within limits | | |
| Device Current | Distance | Voltage at previous device |
| Device 1 | 0.212 | 85 |
| Device 2 | 0.212 | 20.07 |
| Device 3 | 0.212 | 19.98 |
| Totals | 0.636 | 19.93 |
| Notes: Wire resistance is doubled in the calculations for two wires (Positive and Negative). The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage. (E: rated operating voltage: 16-33 VDC (24 VDC nominal)). | | |

GENERAL NOTES:

- SCOPE OF WORK: THIS PROJECT SHALL INCLUDE INSTALLATION OF AN ADDRESSABLE FIRE ALARM CONTROL PANEL AND DEVICES; PROVIDE AND INSTALL NOTIFICATION APPLIANCES FOR OCCUPANT NOTIFICATION.
- THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
- INSTALLATION SHALL COMPLY WITH NEC, NFPA 72 AND ALL OTHER APPLICABLE CODES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
- WIRING DEPICTED ON THESE PLANS IS SCHEMATIC - ACTUAL WIRE LOCATIONS MAY DIFFER FROM THESE PLANS. WIRING SHALL BE PERFORMED AS ACTUAL BUILDING CONSTRUCTION CONDITIONS ALLOW AND TO MINIMIZE PENETRATIONS THROUGH AREA SEPARATION WALLS AND FIRE WALLS; THE USE OF A RACEWAY IS PERMITTED AS LONG AS NO 110V OR HIGHER VOLTAGE CABLES ARE IN THE SAME RACEWAY.
- FIRE RATINGS SHALL BE MAINTAINED FOR ALL PENETRATIONS THROUGH FIRE-RATED CONSTRUCTION.
- POWER FOR ALL FIRE ALARM PANELS AND FIRE ALARM POWER SUPPLIES MUST BE PROVIDED BY A DEDICATED AC BRANCH CIRCUIT; THE LOCATION OF THE BRANCH CIRCUIT BREAKER SHALL BE PERMANENTLY IDENTIFIED AT THE CONTROL UNIT AND SHALL HAVE A RED MARKING IN ACCORDANCE WITH NFPA 72.
- POWER-LIMITED AND NONPOWER-LIMITED CIRCUIT WIRING MUST REMAIN SEPARATED IN CABINET. ALL POWER-LIMITED CIRCUIT WIRING MUST REMAIN AT LEAST 0.25" AWAY FROM ANY NONPOWER-LIMITED CIRCUIT WIRING. FURTHERMORE, ALL POWER-LIMITED AND NONPOWER-LIMITED CIRCUIT WIRING MUST ENTER AND EXIT THE CABINET THROUGH DIFFERENT KNOCK OUTS AND/OR SEPARATE CONDUITS.
- WHEN UTILIZING CLASS "A" CIRCUITS, SEPARATE OUTGOING AND RETURN CONDUCTORS OF CLASS "A" CIRCUITS BY A MINIMUM OF 12" WHERE RUN VERTICALLY AND 48" WHERE RUN HORIZONTALLY.
- WHEN UTILIZING SHIELDED CABLE TIE SHIELDS THROUGH AND INSULATE AT EACH JUNCTION BOX, INSULATE AND TAPE BACK AT END.
- ALL FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE.
- SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER CONSTRUCTION CLEAN-UP IS COMPLETED AND FINAL.
- LOCATE SMOKE DETECTORS A MINIMUM OF THREE (3) FEET FROM MECHANICAL DIFFUSERS, WALL-MOUNTED, SMOKE DETECTORS SHALL BE LOCATED A MINIMUM OF 4" AND A MAXIMUM OF 12" FROM CEILING.
- PROVIDE SYNCHRONIZATION OF ALL VISUAL NOTIFICATION APPLIANCE CIRCUITS. PROVIDE ALL REQUIRED SYNC MODULES; PROVIDE A MULTI-SYNC MODE SLAVE CONNECTION BETWEEN ALL SYNC MODULES.
- VERIFY ALL FIELD SELECTABLE AUDIBILITY SETTINGS OF NOTIFICATION APPLIANCES WITH FIRE ALARM CONTRACTOR.
- UPON COMPLETION OF THE FIRE ALARM SYSTEM INSTALLATION AND PROGRAMMING, THE INSTALLING CONTRACTOR SHALL PERFORM FINAL TESTING OF THE ENTIRE SYSTEM, PER ALL APPLICABLE CODES, AND SHALL COORDINATE AND PERFORM A FINAL FIRE ALARM SYSTEM INSPECTION.
- PROVIDE OFF-SITE MONITORING AS REQUIRED BY THE INTERNATIONAL FIRE CODE, SECTION 907.6.5 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
- INSTALLING CONTRACTOR SHALL, PHYSICALLY, LABEL ALL INITIATING DEVICES AND NOTIFICATION APPLIANCE CIRCUIT END OF LINE (WHEN WIRING CLASS "B"); THESE LABELS SHALL BE IN PLACE PRIOR TO START-UP AND TESTING.



| FIRE ALARM SYMBOL LEGEND | | |
|--------------------------|--------------------------------|----------------|
| SYMBOL | DESCRIPTION | MOUNTING |
| [FCP] | FIRE ALARM CONTROL PANEL | WALL-TOP @ 66" |
| [FVS] | FIRE ALARM POWER SUPPLY | FIELD VERIFY |
| [FSA] | FIRE SYSTEM ANNUNCIATOR | WALL-TOP @ 66" |
| [FSD] | FIRE/SMOKE DAMPER | BY OTHERS |
| ⊙ | SMOKE DETECTOR | CEILING |
| ⊙ | DUCT SMOKE DETECTOR | BY OTHERS |
| ⊙ | HEAT DETECTOR | CEILING |
| ⊙ | ADDRESSABLE CONTROL MODULE | FIELD VERIFY |
| ⊙ | ADDRESSABLE MONITOR MODULE | FIELD VERIFY |
| ⊙ | MANUAL PULL STATION | WALL @ 48" |
| ⊙ | CONTROL RELAY (MULTI-VOLTAGE) | FIELD VERIFY |
| ⊙ | ADDRESSABLE RELAY MODULE | FIELD VERIFY |
| ⊙ | MAGNETIC DOOR HOLDER | FIELD VERIFY |
| ⊙ | WATER FLOW SWITCH | BY OTHERS |
| ⊙ | VALVE SUPERVISORY SWITCH | BY OTHERS |
| ⊙ | KNOX BOX | BY OTHERS |
| ⊙ | CEILING MOUNT STROBE | FIELD VERIFY |
| ⊙ | CEILING MOUNT HORN / STROBE | FIELD VERIFY |
| ⊙ | CEILING MOUNT SPEAKER / STROBE | FIELD VERIFY |
| ⊙ | HORN | WALL @ 10'-0" |
| ⊙ | HORN / STROBE | WALL 80"-96" |
| ⊙ | SPEAKER / STROBE | WALL 80"-96" |
| ⊙ | SPEAKER | WALL @ 90" |
| ⊙ | STROBE | WALL 80"-96" |
| ABBREVIATION | | |
| E | EXISTING | |
| G | WITH GUARD | |
| P | PENDENT MOUNT | |
| R | RESIDENTIAL (T10V) | |
| S | SHOWER BASE | |
| WP | WEATHER PROOF | |
| EOL | END OF LINE RESISTOR | |
| ELR | END OF LINE RELAY | |
| AWG | AMERICAN WIRE GAUGE | |
| AWG | AWG | |
| TWSP | TWISTED SHIELDED PAIR | |
| TPSP | TWISTED PAIR | |
| FIRE | FIRE POWER LIMITED PNEUM | |
| FFRP | FIRE POWER LIMITED RESER | |
| NAC | NOTIFICATION APPLIANCE CIRCUIT | |
| SLC | SIGNALING LINE CIRCUIT | |

APPLICABLE CODES:
MAINE UNIFORM ENERGY & BUILDING CODE
PORTLAND CITY CODE, CHAPTER 10, FIRE PREVENTION & PROTECTION
NFPA 1, FIRE CODE, & NFPA 101, LIFE SAFETY CODE

| OPERATIONS MATRIX | | |
|----------------------------|------------------------------------|---|
| FIRE ALARM OUTPUT | ACTIVATE ALARM INDICATOR | ● |
| ACTIVATE AUDIBLE ALARM | ACTIVATE AUDIBLE TROUBLE INDICATOR | ● |
| ACTIVATE TROUBLE INDICATOR | ACTIVATE TROUBLE SIGNAL | ● |
| ACTIVATE ALARM SIGNAL | ACTIVATE TROUBLE SIGNAL | ● |
| ACTIVATE TROUBLE SIGNAL | ACTIVATE ALARM SIGNAL | ● |

| | |
|--------------------------|---|
| FIRE ALARM INPUT | ● |
| SMOKE DETECTORS | ● |
| PULL STATIONS | ● |
| FIRE ALARM AC POWER FAIL | ● |
| FIRE ALARM LOW BATTERY | ● |
| OPEN CIRCUIT | ● |
| GROUND FAULT | ● |
| NAC SHORT CIRCUIT | ● |
| LOSS OF AC TO BUILDING | ● |

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CALCS, DETAILS, LEGEND, MATRIX, NOTES

| | |
|----------|--------------------------------|
| DRAWN | JPB UNICAD JOB #17126 |
| CHECKED | WAYNE B. HAWS NCEET # 90496 |
| DATE | 3/10/2017 |
| REVISION | 0 |
| SCALE | AS NOTED |

FA-1

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