# South Kortright School 2009 Capital Improvements

South Kortright, New York

As Prepared By

**AIR TEMP HEATING & AIR CONDITIONING, INC.**
A LINC SERVICE ® *CONTRACTOR*

1165 Front Street
Binghamton, New York 13905

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| | |
|---|---|
| Engineer/Architect | SWBR Architects |
| Mechanical Contractor | A. Treffeisen & Son |
| Job Number | P7790 |

AUTOMATEDLOGIC CORPORATION

# Table of Contents

# Symbol Legend

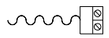

Supply Fan


DX Cooling Coil

Duct Temperature Sensor


Exhaust Fan

Electric Heating Coil



Averaging Duct Temperature Sensor


Return Fan


Gas Heating

Duct Humidity Sensor

Fan w/ Inlet Vane Control


Hot Water Heating Coil

Immersion Temperature Sensor w/ Well



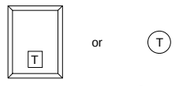
Pump




Chilled Water Cooling Coil



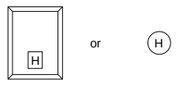

Pressure Sensor



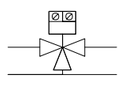

Room Temperature Sensor


Steam Heating Coil

Filter

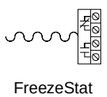



Room Humidity Sensor

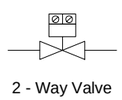


3 - Way Valve

Air Flow Station

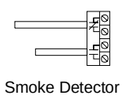


FreezeStat



2 - Way Valve

Damper



Smoke Detector

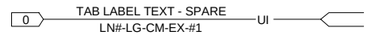

Flow Sensor

Common Abbreviations:

| | | | | | |
|---|---|---|---|---|---|
| AC | - Air Conditioning | EVAP | - Evaporator | SA | - Supply Air |
| ACU | - Air Conditioning Unit | F | - Fahrenheit | SF | - Supply Fan |
| AHU | - Air Handling Unit | FCU | - Fan Coil Unit | SP | - Static Pressure |
| AI | - Analog Input | HOA | - Hand / Off / Auto | TEMP | - Temperature |
| AO | - Analog Output | HP | - Heat Pump | UH | - Unit Heater |
| AUTO | - Automatic | HRU | - Heat Recovery Unit | UV | - Unit Ventilator |
| AUX | - Auxiliary | HTEX | - Heat Exchanger | VAV | - Variable Air Volume |
| C | - Common | HW | - Hot Water | VVTU | - Variable Volume Terminal Unit |
| CHW | - Chilled Water | HWP | - Hot Water Pump | W/ | - with |
| CHWP | - Chilled Water Pump | HWR | - Hot Water Return | W/O | - without |
| CHWR | - Chilled Water Return | HWS | - Hot Water Supply | WSHP | - Water-Source Heat Pump |
| CHWS | - Chilled Water Supply | MAX | - Maximum | | |
| COND | - Condenser | MIN | - Minimum | | |
| CW | - Condenser Water | MISC | - Miscellaneous | | |
| CWP | - Condenser Water Pump | NC | - Normally Closed | | |
| CWR | - Condenser Water Return | NO | - Normally Open | | |
| CWS | - Condenser Water Supply | OA | - Outdoor Air | | |
| DA | - Discharge Air | PIU | - Powered Induction Unit | | |
| DI | - Digital Input | RA | - Return Air | | |
| DO | - Digital Output | RF | - Return Fan | | |
| EA | - Exhaust Air | RH | - Relative Humidity | | |
| EF | - Exhaust Fan | RTU | - Roof-top Unit | | |

General Notes:

1. All control modules are drawn using standard ALC module representations.
2. Electrical points are identified by a tagged method (LN# - LG - CM - EX - Z0):




LN# - The line number (optional).
LG - The gateway number (optional).
CM - The control module address.
EX - The expander module number.
#1 - The channel number.

These tags include wiring for all AI's, DI's, AO's and DO's. Points using pneumatic tubing follow the same convention.

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Symbol Legend

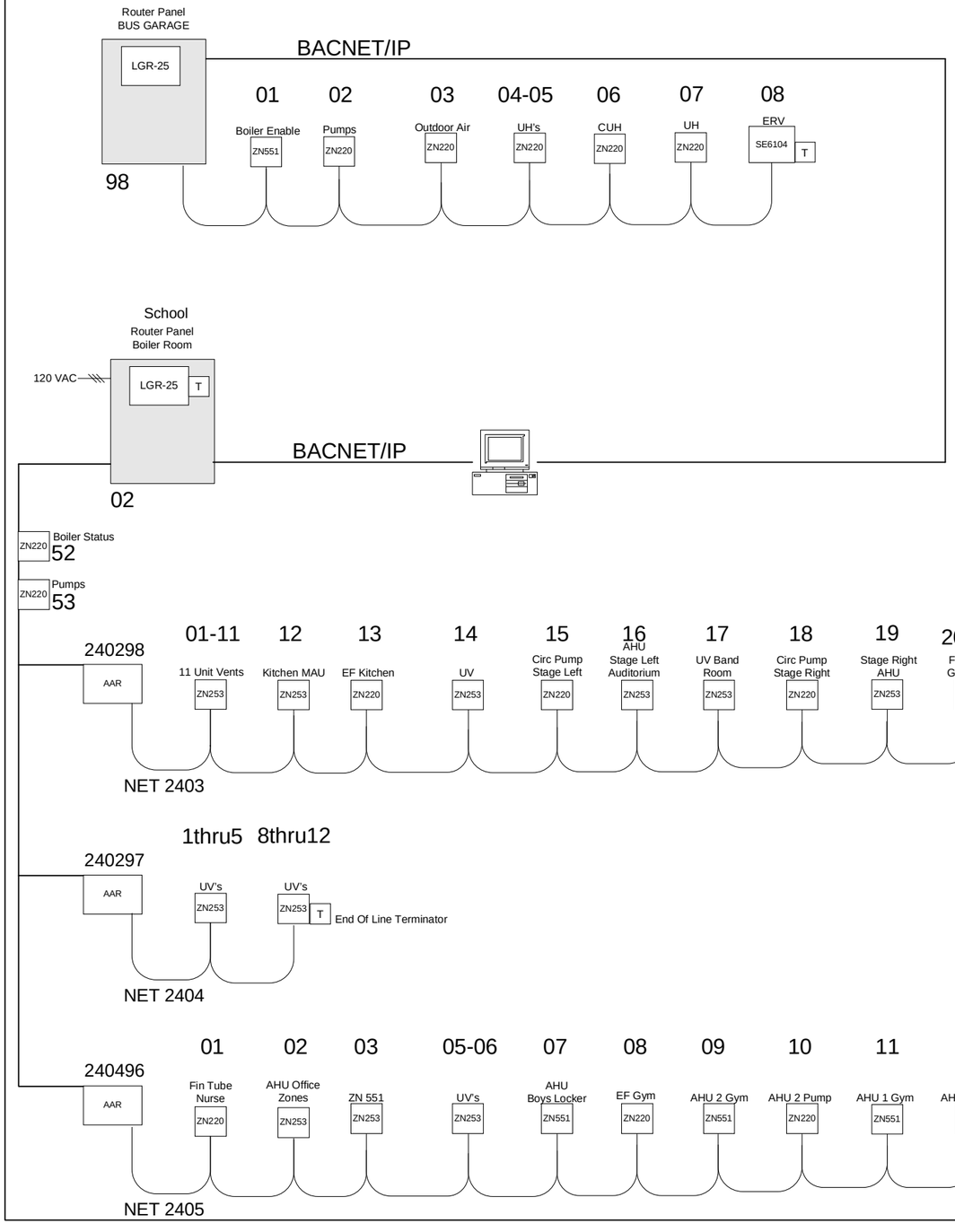
| | | | |
|---|---|---|---|
| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
| AUTOMATEDLOGIC® CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
| | | | 3 of 34 |

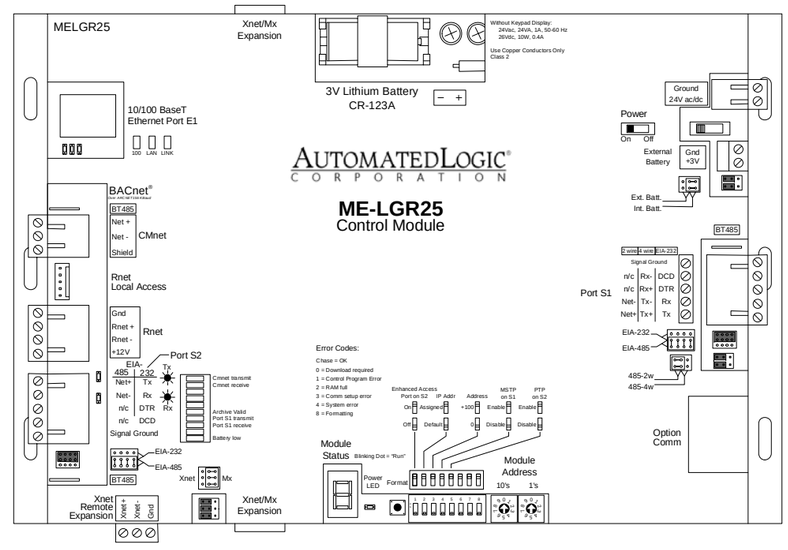
# Summary Bill of Materials

| Summary Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| CS-E | CURRENT SWITCH .5-200 AMP SOLID CORE GO/NO GO | VERUS IND. | H-800 | 28 ea |
| DA-AA | SR OPEN/CLOSE 60 IN-LB 24V AUX SWITCH | BELIMO | NF24-S ALC | 1 ea |
| DA-AC | NSR PROPORTIONAL 35 IN-LB 24 V | BELIMO | LM24-SR ALC | 89 ea |
| DID | | | | 1 ea |
| DPS-B | DIFF PRESSURE SWITCH 0-5 IN. WET | UNITED ELECTRIC | 24-013 | 4 ea |
| DPT-A | SERIES 600 LOW DRY PRESS | AUTOTRAN | 600 D 5IN. WC 12D 20 | 22 ea |
| DPT-AE | DIFF PRESSURE TRANSDUCER 0-5 IN. MA | MAMAC | PR-282-4-(0-5IN.)-B-1-2-A | 1 ea |
| DTS-D | DUCT 10K THERMISTOR PROBE 8 IN. | BAPI | ALC/10K-2-D-8 | 58 ea |
| E-AD | RET NEMA 1 18X12X7 | KELE & ASSOC. | RET 1812 | 2 ea |
| LSBASE | LOGISTAT 10K ROOM SENSOR WITH COMM | BAPI | LSBASE | 8 ea |
| LSPLUS | LOGISTAT 10K ROOM SENSOR W/ SETP ADJ, TLO, COMM | BAPI | LSPLUS | 49 ea |
| MELGR25 | ME-LGR25 | AUTOMATED LOGIC | ME-LGR25 | 1 ea |
| OAC-A | OA TEMPERATURE/HUMIDITY COMBO SENSOR | BAPI | ALC/10K-2-H220-O | 1 ea |
| RBXKF | CURRENT SENSOR | RIB | RBXKF | 4 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 28 ea |
| RIBU1C | RELAY 24 V | RIB | RIBU1C | 7 ea |
| RIBXKF | .25 TO 150 CURRENT SENSOR | FUNCTIONAL DEVICES | RIBXKF | 56 ea |
| RS | ROOM SENSOR | AUTOMATED LOGIC | RS | 7 ea |
| RTS-AC | 10K ROOM THERMISTOR SS WALL PLATE | BAPI | BA/10K-2-93-631 | 1 ea |
| RTS-F | 10K ROOM THERMISTOR RS | BAPI | ALC/10K-2-RS | 1 ea |
| SE6104 | SE6104 | AUTOMATED LOGIC | SE6104 | 1 ea |
| TR-A | TRANSFORMER, 120/24VAC, 50VA | CORE COMPONENTS | LE-117 | 7 ea |
| TR-AE | TRANSFORMER, 120/24VAC, 40VA | CORE COMPONENTS | LE-112 | 6 ea |
| TR-AF | TRANSFORMER, 120-24VAC W/BREAKER | KELE & ASSOC. | 691-K0A | 17 ea |
| TR-AG | TRANSFORMER, 120/24VAC 150VA W/CCT BREAKER | CORE COMPONENTS | LE-124 | 1 ea |
| W-A | TWP PART SS WELL 4IN. | BAPI | BA/4IN. | 2 ea |
| WS-A | 10K IMMERSION THERMISTOR | BAPI | ALC/10K-2-I-4 | 2 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 28 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 60 ea |
| ZN551 | ZN551 | AUTOMATED LOGIC | ZN551 | 2 ea |

# Riser

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| MELGR25 | ME-LGR25 | AUTOMATED LOGIC | ME-LGR25 | 1 ea |

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| Riser | | | |
| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
| AUTOMATEDLOGIC CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
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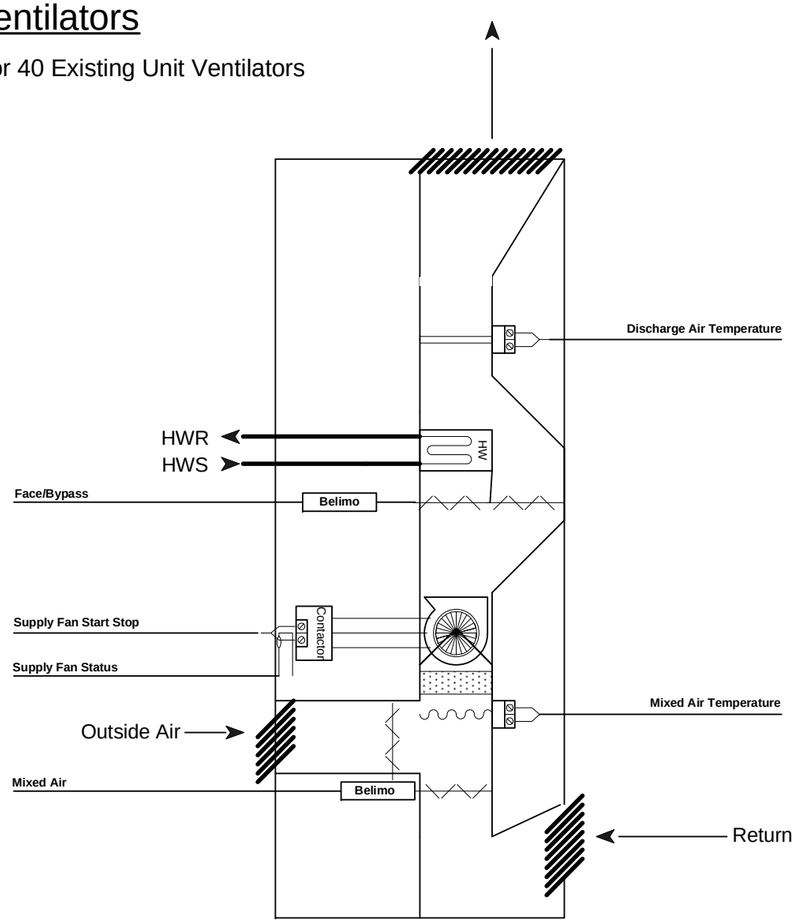
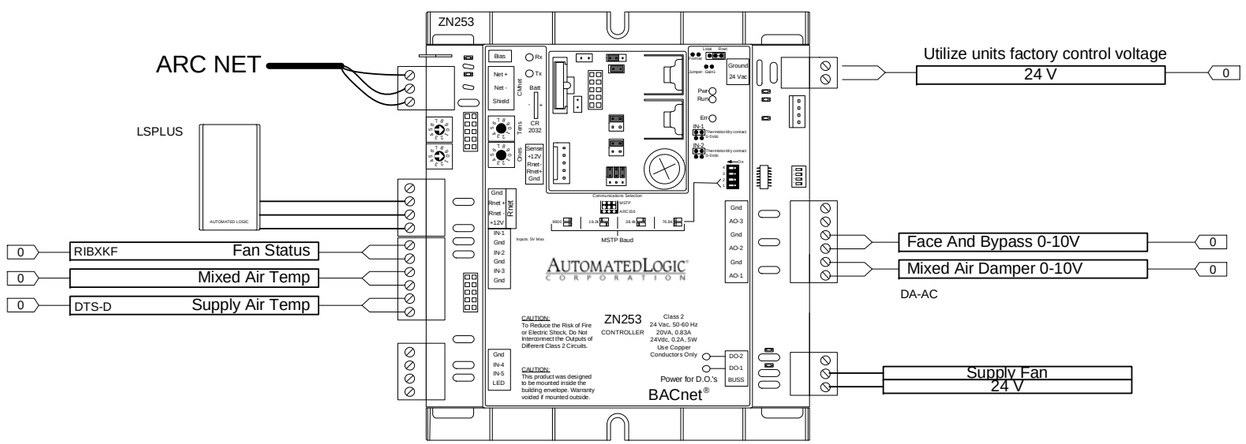
# Unit Ventilators

Typical For 40 Existing Unit Ventilators




## Bill of Materials

| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
|---|---|---|---|---|
| DA-AC | NSR PROPORTIONAL 35 IN-LB 24 V | BELIMO | LM24-SR ALC | 80 ea |
| DTS-D | DUCT 10K THERMISTOR PROBE 8 IN. | BAPI | ALC/10K-2-D-8 | 40 ea |
| LSPLUS | LOGISTAT 10K ROOM SENSOR W/ SETP ADJ, TLO, COMM | BAPI | LSPLUS | 40 ea |
| RIBXKF | .25 TO 150 CURRENT SENSOR | FUNCTIONAL DEVICES | RIBXKF | 40 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 40 ea |

Unit Ventilators

1. Provide a unitary controller with electronic outputs for both the face and bypass damper and the outside and return air damper control with the DDC system. Provide electronic mixed air sensor and discharge air sensor to replace existing pneumatic sensors.
2. The DDC system shall provide occupied/unoccupied scheduling of the unit ventilators.
3. During occupied hours, the fan shall run continuously. The space temperature sensor will modulate the outside air and the return air dampers, subject to a 55° F discharge air low limit, in sequence with the face and bypass damper to maintain its setting according to ASHRAE Cycle #2. At the coil, the discharge air high limit set at 125° F shall stop the fan, close the outside air damper and open the return air damper. During scheduled unoccupied hours, the space sensor will intermittently start and stop the fan, and position the face and bypass damper to full face with the outside air damper fully closed.
4. Provide interface with respective relief air damper actuator. Open relief air damper during occupied cycle and close during unoccupied cycle.
5. Display:
   a. DDC system graphic.
   b. DDC system on-off indication.
   c. DDC system occupied/unoccupied mode.
   d. Room temperature indication.
   e. Room temperature set point.
   f. Mixed air temperature.
   g. Discharge air temperature.
   h. Damper positions

discharge air low limit set at 35° F shall stop the fan, close the outside air damper and open the return air damper.

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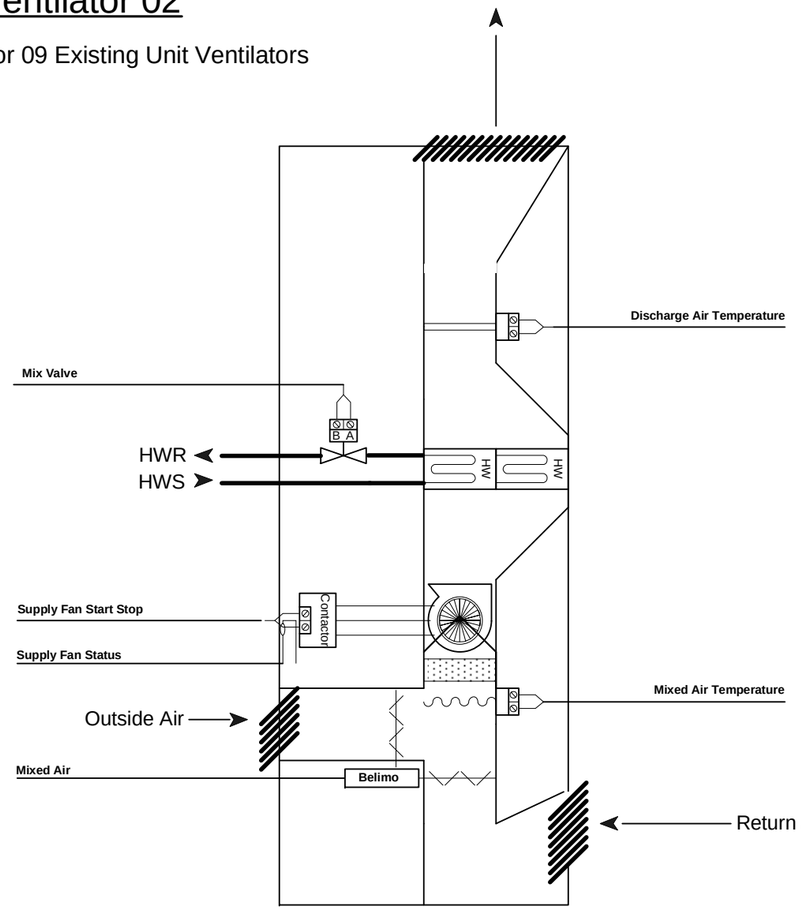
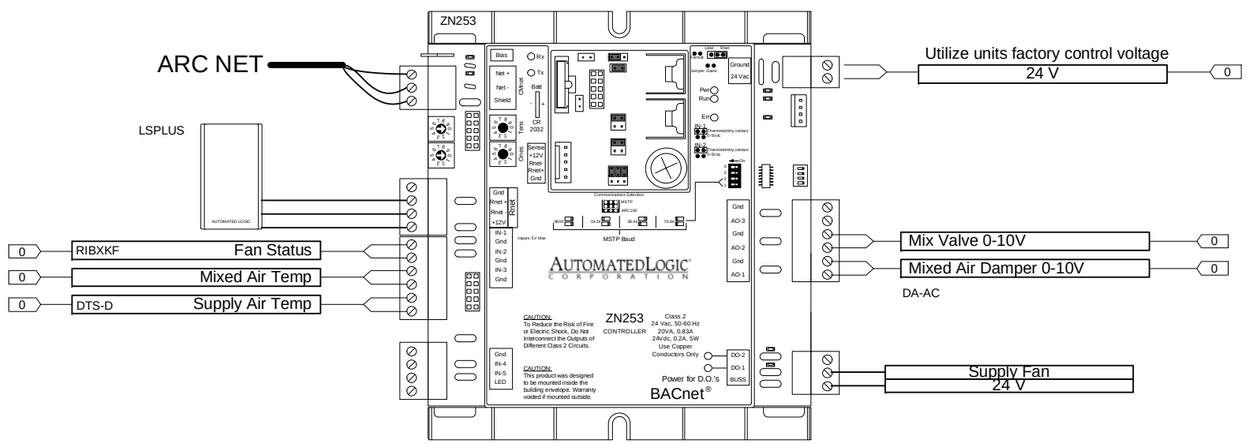
Unit Ventilators

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| | | | CHECK BY: RSL |
| AUTOMATED LOGIC CORPORATION | | | DSCODE: 07112.00 |
| | | | 6 of 34 |

# Unit Ventilator 02

Typical For 09 Existing Unit Ventilators




## Bill of Materials

| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
|---|---|---|---|---|
| DA-AC | NSR PROPORTIONAL 35 IN-LB 24 V | BELIMO | LM24-SR ALC | 9 ea |
| DTS-D | DUCT 10K THERMISTOR PROBE 8 IN. | BAPI | ALC/10K-2-D-8 | 9 ea |
| LSPLUS | LOGISTAT 10K ROOM SENSOR W/ SETP ADJ, TLO, COMM | BAPI | LSPLUS | 9 ea |
| RIBXKF | .25 TO 150 CURRENT SENSOR | FUNCTIONAL DEVICES | RIBXKF | 9 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 9 ea |

Unit Ventilators

1. Provide a unitary controller with electronic outputs for both the face and bypass damper and the outside and return air damper control with the DDC system. Provide electronic mixed air sensor and discharge air sensor to replace existing pneumatic sensors.
2. The DDC system shall provide occupied/unoccupied scheduling of the unit ventilators.
3. During occupied hours, the fan shall run continuously. The space temperature sensor will modulate the outside air and the return air dampers, subject to a 55° F discharge air low limit, in sequence with the mix valve to maintain its setting according to ASHRAE Cycle #2. At the coil, the discharge air high limit set at 125° F shall stop the fan, close the outside air damper and open the return air damper. During scheduled unoccupied hours, the space sensor will intermittently start and stop the fan, and position the mix valve to full open with the outside air damper fully closed.
4. Provide interface with respective relief air damper actuator. Open relief air damper during occupied cycle and close during unoccupied cycle.
5. Display:
   a. DDC system graphic.
   b. DDC system on-off indication.
   c. DDC system occupied/unoccupied mode.
   d. Room temperature indication.
   e. Room temperature set point.
   f. Mixed air temperature.
   g. Discharge air temperature.
   h. Damper positions

discharge air low limit set at 35° F shall stop the fan, close the outside air damper and open the return air damper.

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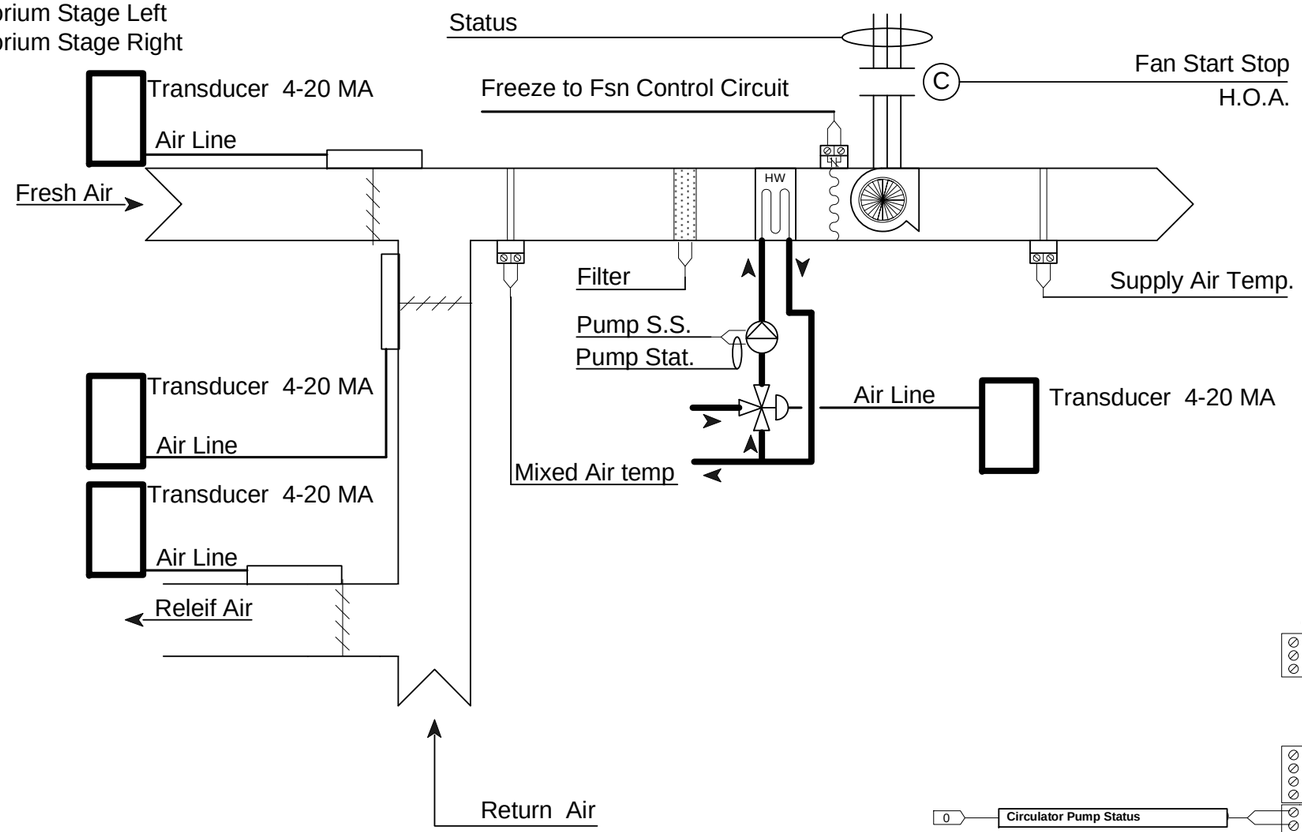
Unit Ventilator 02

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| | | | CHECK BY: RSL |
| AUTOMATEDLOGIC® CORPORATION | | | DSCODE: 07112.00 |
| | | |  |

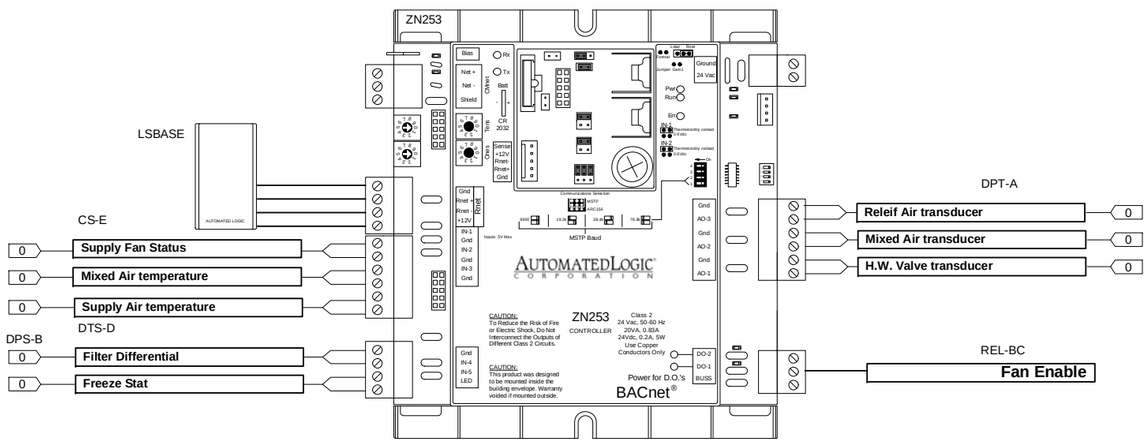
# Fan Coil Mix Valve

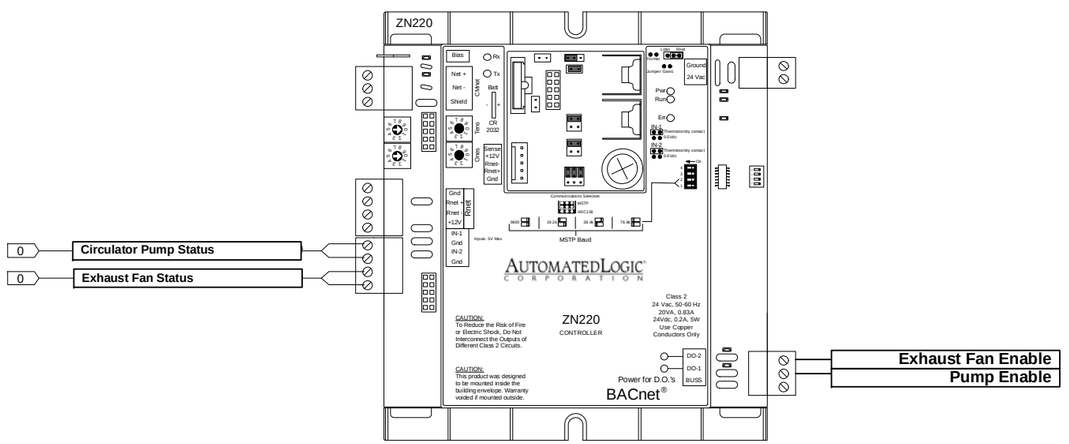
Gymnasium East
Gymnasium West
Auditorium Stage Left
Auditorium Stage Right




## Bill of Materials

| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
|---|---|---|---|---|
| CS-E | CURRENT SWITCH .5-200 AMP SOLID CORE GO/NO GO | VERUS IND. | H-800 | 7 ea |
| DPS-B | DIFF PRESSURE SWITCH 0-5 IN. WET | UNITED ELECTRIC | 24-013 | 4 ea |
| DPT-A | SERIES 600 LOW DRY PRESS | AUTOTRAN | 600 D 5IN. WC 12D 20 | 12 ea |
| DTS-D | DUCT 10K THERMISTOR PROBE 8 IN. | BAPI | ALC/10K-2-D-8 | 8 ea |
| LSBASE | LOGISTAT 10K ROOM SENSOR WITH COMM | BAPI | LSBASE | 4 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 2 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 1 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 4 ea |

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Fan Coil Mix Valve

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|---|---|---|---|
| | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |

# F.C. Mix Valve Sequence01

FAN COIL WITH MIXING VALVE SEQUENCE

1. Maintain space temperature by modulating outside air and return air dampers in sequence with heating coil mixing valve.

2. Start and stop supply fan.

A. Enable freeze protection

1. Input Device: Existing duct mounted element thermostat mounted before supply fan.

2. Output Device: Hard wired through motor starter.
3. Action: Allow start if duct temperature is above 37 degrees, signal alarm if fan fails to start.

B. Enable High Temperature protection.

1. Input Device: Duct mounted thermostat located in supply air.

2. Allow start if duct temperature is below 125 degrees.

C. Initiate unoccupied time schedule.

1. Input Device: D.D.C. system time schedule.

2. Output Device: Digital output to motor relay to motor starter.
3. Action: Energize fan.

D. Display

1. Supply fan on off indication via motion graphic

2. Mixed Air Control.

E. Occupied Time Schedule.

1. Input Device: D.D.C. system time schedule

2. Output device: D.D.C. system output.
3. Action: Enable control.

F. Minimum Position.

4. Input Device: D.D.C. system time schedule

5. Output device: Analog output to transducer.
6. Action: Open outdoor damper to minimum position.

G. Mixed Air Temperature.

7. Input Device: Electronic temperature sensor.

8. Output device: Analog output to transducer.
9. Action: Modulate outdoor and return air dampers to maintain minimum air temp of 55 degrees.

H. Unoccupied Time Schedule.

10. Input Device: D.D.C. system time schedule.

11. Output device: Analog output to transducer.
12. Action: Position outdoor damper closed, and return air damper open.

A. Display.

1. Mixed air temperature indication.

2. Mixed air temperature set point.
3. Action: Mixed air damper position.

B. Occupied Time Schedule

4. Input Device: D.D.C. system time schedule

5. Output Device: D.D.C. system output.
6. Action: Enable control

C. Differential Pressure

7. Input Device: Differential pressure switch.

8. Output Device: D.D.C. system alarm.
9. Action: signal alarm on high pressure differential condiditons.

D. Display.

10. Filter condition

E. Hydronic Heating Coil/Occupied Time Schedule

11. Input Device: D.D.C. system time schedule.

12. Output device: Binary output.
13. Action: Enable control.

F. Supply Air Temperature.

14. Input Device: Electronic temperature sensor

15. Output device: Normally open to coil, three way control valve.
16. Action: Maintain supply air temperature at supply air temperature set point.

G. Temperature Reset.

17. Input Device: Room thermostat.

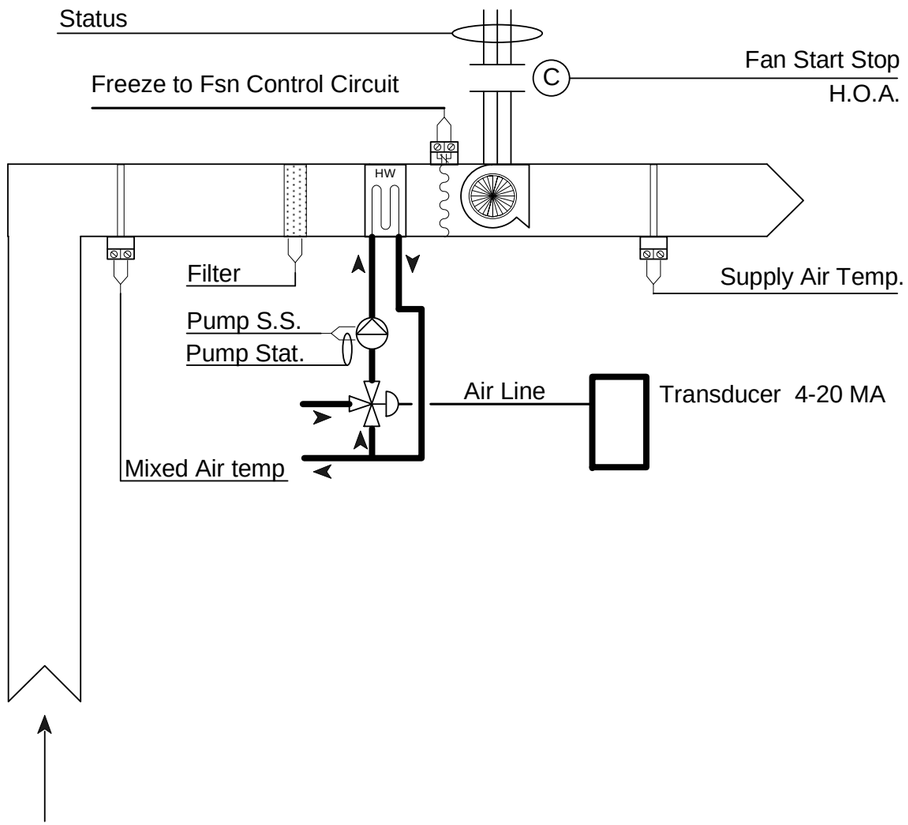
18. Output device: D.D.C. system
19. Action: Reset supply air temperature based on heating and cooling demand.

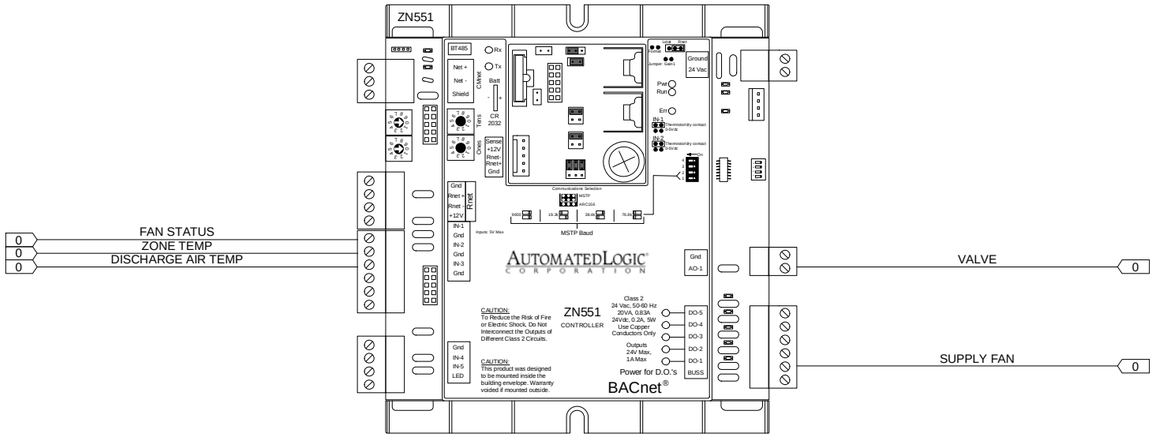
H. Unoccupied Time Schedule.

20. Input Device: D.D.C. system time schedule.

21. Output device: Room thermostat cycling fan.
22. Action: full heat with full return air to maintain unoccupied set point.

# Locker Room AHU's

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| Locker Room AHU's | | | |
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| AUTOMATED LOGIC CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
| | | | 10 of 34 |

# Locker Rooms AHU's Sequence

Locer Rooms AHU

1. Maintain space temperature by modulating heating coil face and bypass damper.

2. Start and stop supply fan.
A. Enable High Temperature protection.

1. Input Device: Duct mounted thermostat located in supply air.

2. Allow start if duct temperature is below 125 degrees.
B. Initiate unoccupied time schedule.

1. Input Device: D.D.C. system time schedule.

2. Output Device: Digital output to motor relay to motor starter.
3. Action: Energize fan.
C. Display

1. Supply fan on off indication via motion graphic

D. Occupied Time Schedule.

1. Input Device: D.D.C. system time schedule

2. Output device: D.D.C. system output.
3. Action: Enable control.
E. Unoccupied Time Schedule.

4. Input Device: D.D.C. system time schedule.

5. Output device: Analog output to transducer.
6. Action: Position outdoor damper closed
F. Differential Pressure

7. Input Device: Differential pressure switch.

8. Output Device: D.D.C. system alarm.
9. Action: signal alarm on high pressure differential condiditons.
G. Display.

10. Filter condition

H. Hydronic Heating Coil/Occupied Time Schedule

11. Input Device: D.D.C. system time schedule.

12. Output device: Binary output.
13. Action: Enable control.
I. Supply Air Temperature.

14. Input Device: Electronic temperature sensor

15. Output device: Normally Open 3 way Mixing Valve.
16. Action: Maintain supply air temperature at supply air temperature of 70 degrees.

A. Temperature Reset.

1. Input Device: Room thermostat.

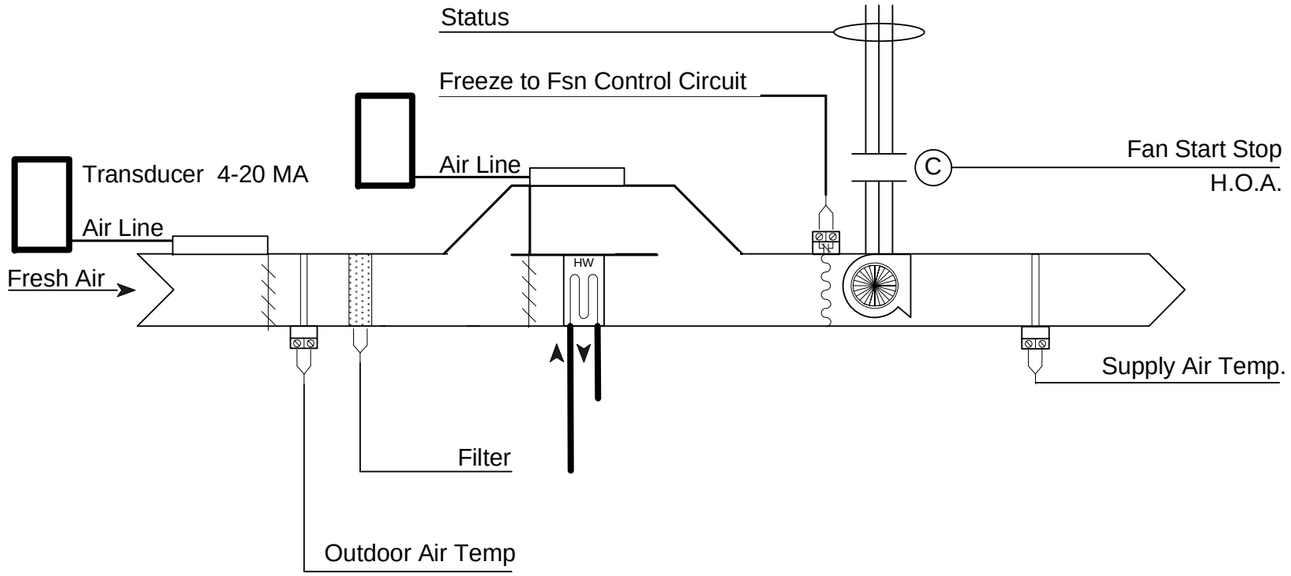
2. Output device: D.D.C. system
3. Action: Reset supply air temperature based on heating and cooling demand.
B. Unoccupied Time Schedule.

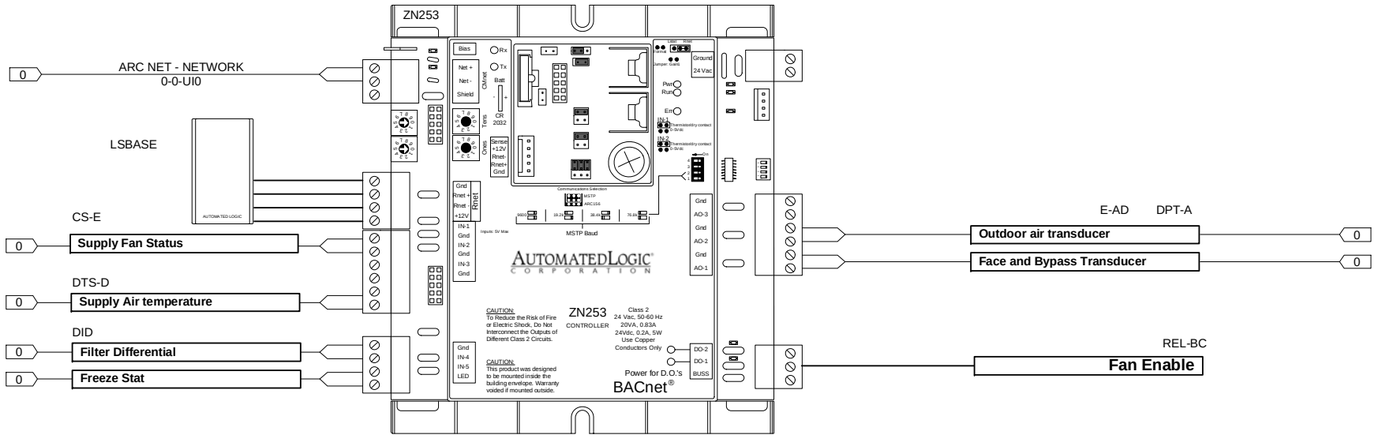
4. Input Device: D.D.C. system time schedule.

5. Output device: Room thermostat cycling fan.
6. Action: full heat with full return air to maintain unoccupied set point.

# Kitchen MAU

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| DID | | | | 1 ea |
| DPT-A | SERIES 600 LOW DRY PRESS | AUTOTRAN | 600 D 5IN. WC 12D 20 | 1 ea |
| DTS-D | DUCT 10K THERMISTOR PROBE 8 IN. | BAPI | ALC/10K-2-D-8 | 1 ea |
| E-AD | RET NEMA 1 18X12X7 | KELE & ASSOC. | RET 1812 | 1 ea |
| LSBASE | LOGISTAT 10K ROOM SENSOR WITH COMM | BAPI | LSBASE | 1 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 1 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 1 ea |




South Kortright School 2009 Capital Improvements

South Kortright, New York

AIR TEMP HEATING & AIR CONDITIONING, INC.
A LINC SERVICE ® *CONTRACTOR*

Kitchen MAU

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| AUTOMATEDLOGIC CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
| | | | 12 of 34 |

# Kitchen MAU Sequence

Kitchen Make up Air

1. Maintain space temperature by modulating heating coil face and bypass damper.

2. Start and stop supply fan.
A. Enable freeze protection

1. Input Device: Existing duct mounted element thermostat mounted before supply fan.

2. Output Device: Hard wired through motor starter.
3. Action: Allow start if duct temperature is above 37 degrees, signal alarm if fan fails to start.
B. Enable High Temperature protection.

1. Input Device: Duct mounted thermostat located in supply air.

2. Allow start if duct temperature is below 125 degrees.
C. Initiate unoccupied time schedule.

1. Input Device: D.D.C. system time schedule.

2. Output Device: Digital output to motor relay to motor starter.
3. Action: Energize fan.
D. Display

1. Supply fan on off indication via motion graphic

E. Occupied Time Schedule.

1. Input Device: D.D.C. system time schedule

2. Output device: D.D.C. system output.
3. Action: Enable control.
F. Unoccupied Time Schedule.

4. Input Device: D.D.C. system time schedule.

5. Output device: Analog output to transducer.
6. Action: Position outdoor damper closed
G. Differential Pressure

7. Input Device: Differential pressure switch.

8. Output Device: D.D.C. system alarm.
9. Action: signal alarm on high pressure differential condiditons.

A. Display.

1. Filter condition

B. Hydronic Heating Coil/Occupied Time Schedule

2. Input Device: D.D.C. system time schedule.

3. Output device: Binary output.
4. Action: Enable control.
C. Supply Air Temperature.

5. Input Device: Electronic temperature sensor

6. Output device: Normally closed face/bypass damper.
7. Action: Maintain supply air temperature at supply air temperature of 70 degrees.
D. Temperature Reset.

8. Input Device: Room thermostat.

9. Output device: D.D.C. system
10. Action: Reset supply air temperature based on heating and cooling demand.
E. Unoccupied Time Schedule.

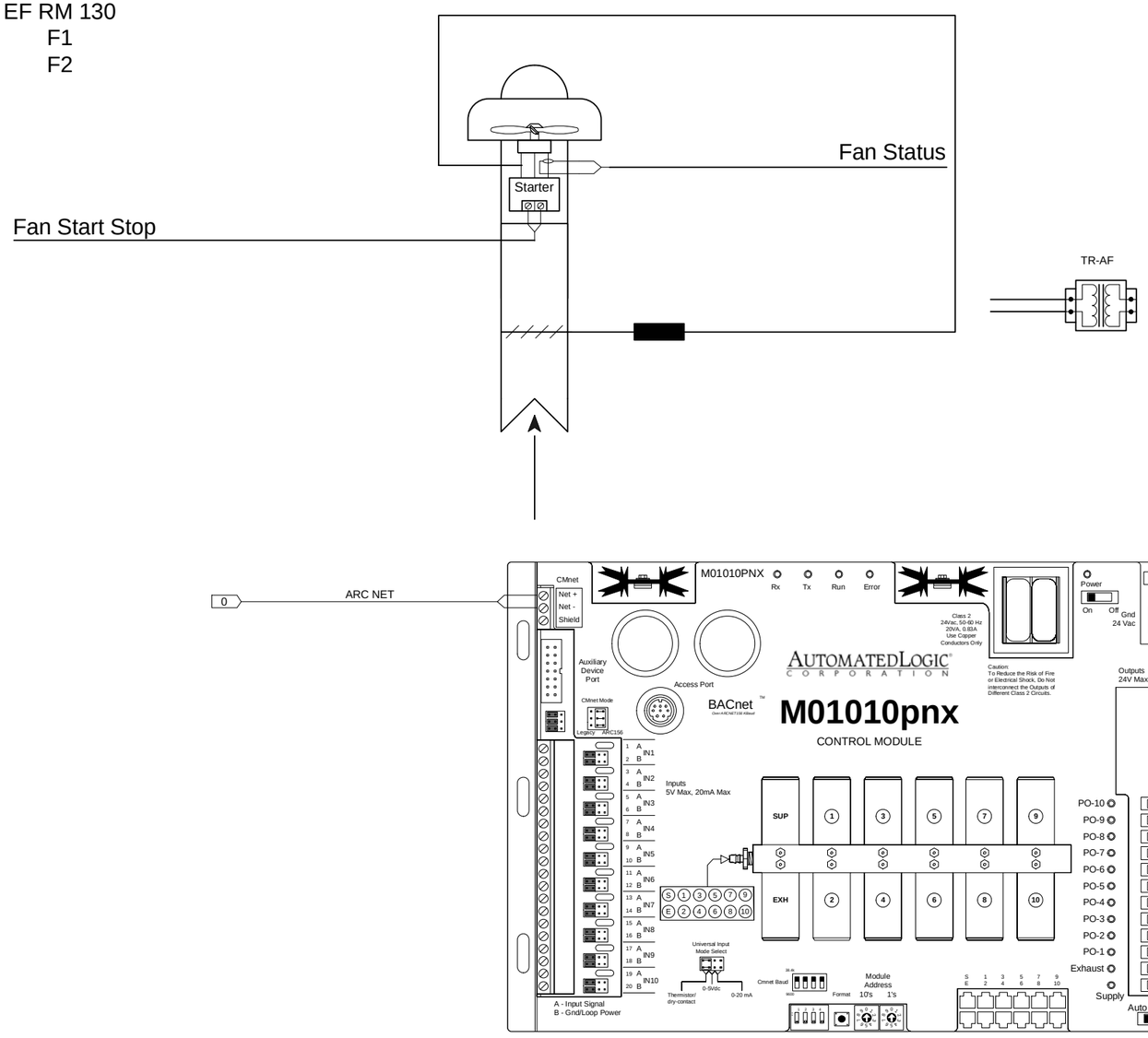
11. Input Device: D.D.C. system time schedule.

12. Output device: Room thermostat cycling fan.
13. Action: full heat with full return air to maintain unoccupied set point.

# Exhaust Interlocked

EF RM 137
EF RM 139
EF RM 141
EF RM 143
EF RM 147
EF RM 142
EF RM 158
EF RM 130
F1
F2

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| CS-E | CURRENT SWITCH .5-200 AMP SOLID CORE GO/NO GO | VERUS IND. | H-800 | 8 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 8 ea |
| TR-AF | TRANSFORMER, 120-24VAC W/BREAKER | KELE & ASSOC. | 691-K0A | 8 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 8 ea |




***EXHAUST FAN CONTROL***

1. fan shall be energized by BAS during occupied mode, and off during unoccupied mode. This fan is to be interlocked through logic with the space unit ventilator

2. Automatic damper shall open when fan is energized and close when fan is off

***EXHAUST FAN SAFETY***

1. Fan shall be shut down and damper closed when D.D.C. system receives a global fire alarm signal.

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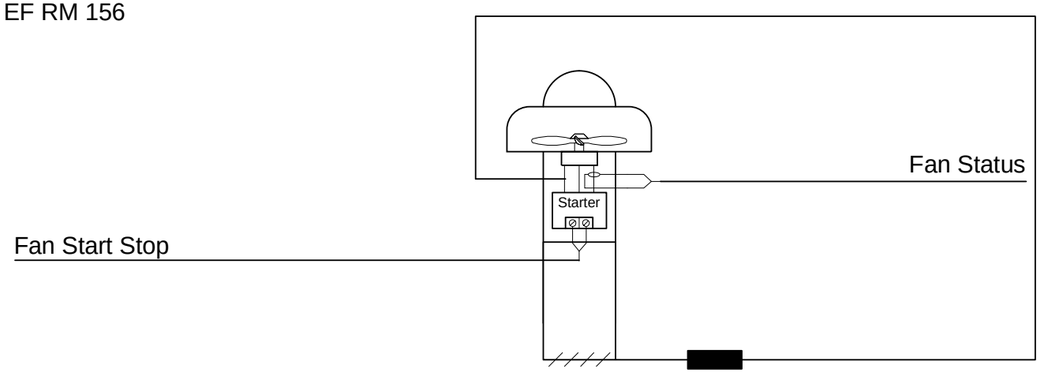
AIR TEMP HEATING & AIR CONDITIONING, INC.
A LINC SERVICE ® *CONTRACTOR*
Exhaust Interlocked

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |

AUTOMATED LOGIC CORPORATION

# Exhaust general

EF RM 138
EF RM 155
EF RM 148
EF RM 162
EF RM 150
EF RM 154
EF RM 156




| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| CS-E | CURRENT SWITCH .5-200 AMP SOLID CORE GO/NO GO | VERUS IND. | H-800 | 7 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 7 ea |
| TR-AF | TRANSFORMER, 120-24VAC W/BREAKER | KELE & ASSOC. | 691-K0A | 7 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 7 ea |

***EXHAUST FAN CONTROL***

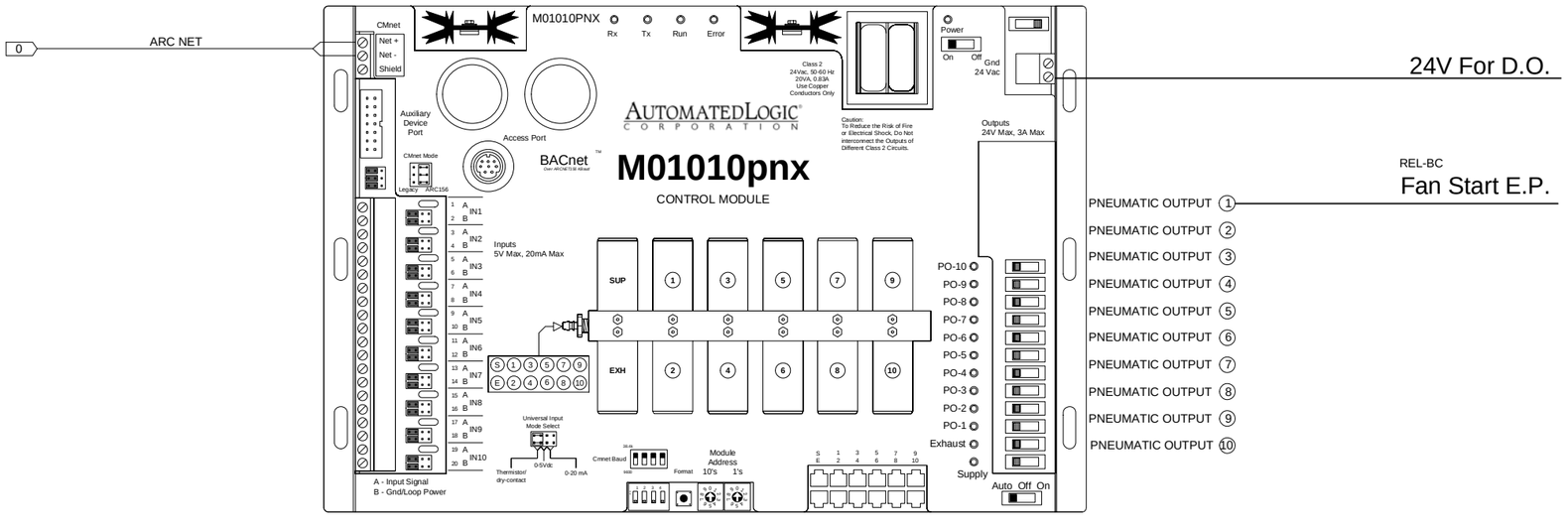
1. fan shall be energized by BAS during occupied mode, and off during unoccupied mode.

24V For D.O.

2. Automatic damper shall open when fan is energized and close when fan is off

REL-BC
***EXHAUST FAN*** Fan Start E.P.

1. Fan shall be shut down and damper closed when D.D.C. system receives a global fire alarm signal.




| South Kortright School 2009 Capital Improvements | | | |
|---|---|---|---|
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| Exhaust general | | | |
| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
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| | | | DSCODE: 07112.00 |
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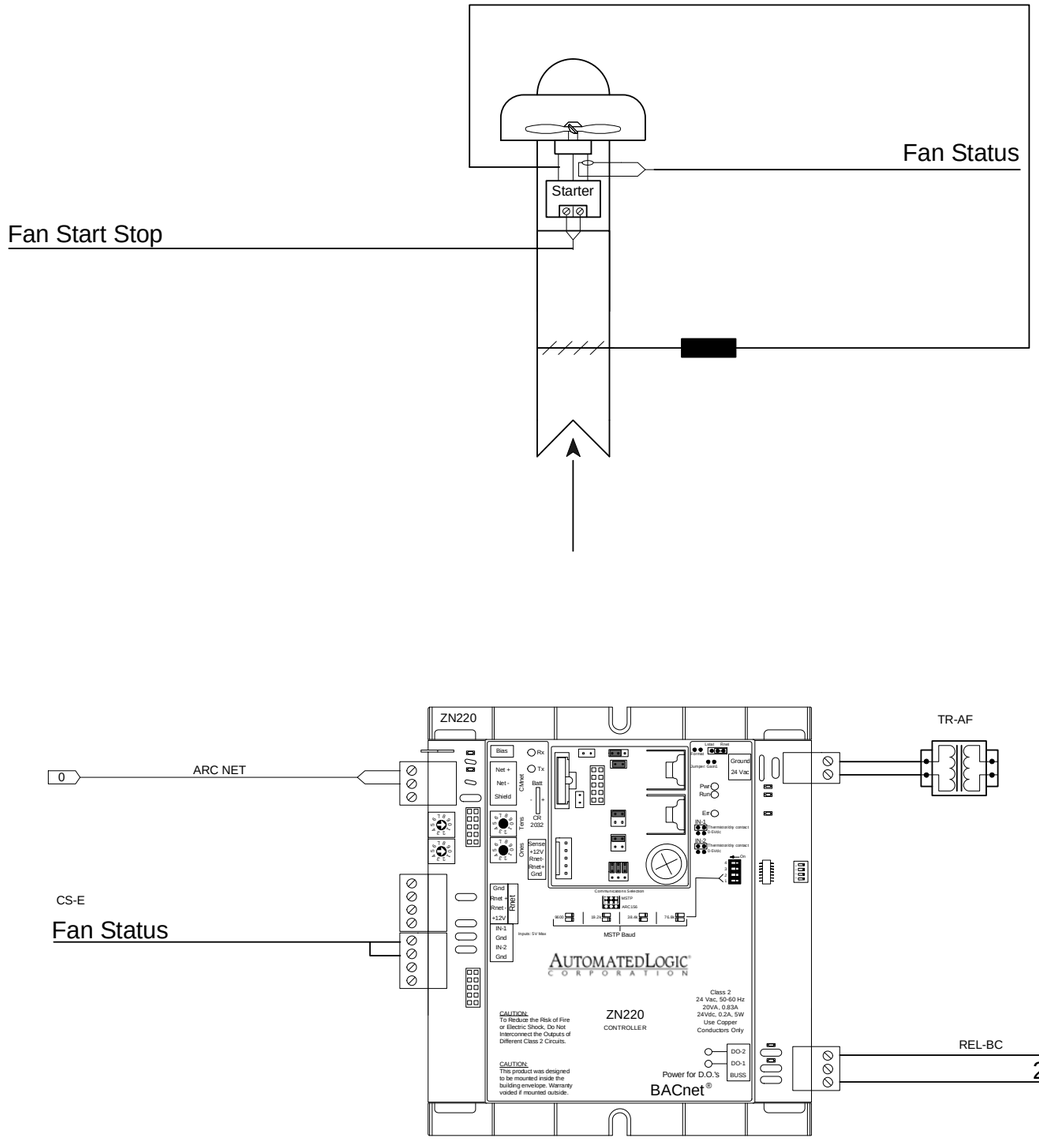
# Exhaust Bathroom

EF RM 140A
EF RM 158C

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| CS-E | CURRENT SWITCH .5-200 AMP SOLID CORE GO/NO GO | VERUS IND. | H-800 | 2 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 2 ea |
| TR-AF | TRANSFORMER, 120-24VAC W/BREAKER | KELE & ASSOC. | 691-K0A | 2 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 2 ea |




***EXHAUST FAN CONTROL***

1. fan shall be energized by BAS during occupied mode, and off during unoccupied mode.

2. Automatic damper shall open when fan is energized and close when fan is off

***EXHAUST FAN SAFETY***

1. Fan shall be shut down and damper closed when D.D.C. system receives a global fire alarm signal.

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South Kortright, New York
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Exhaust Bathroom

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|---|---|---|---|
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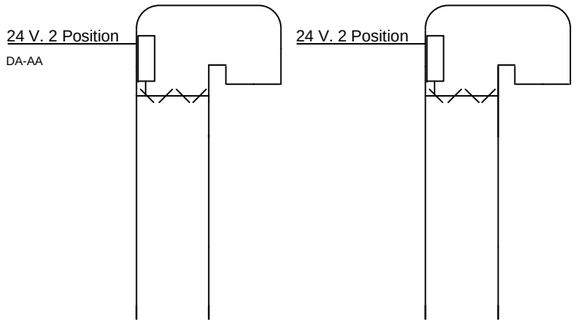
# RV Interlocks

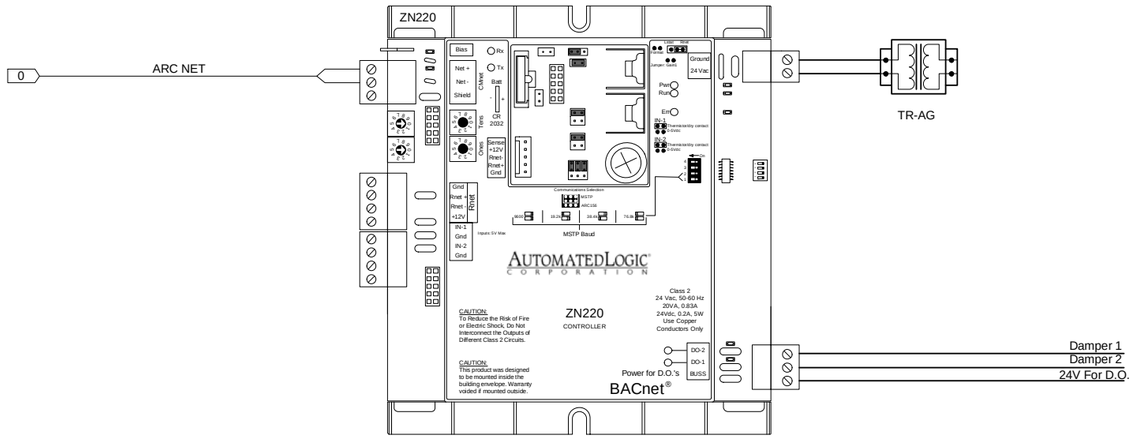
| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| DA-AA | SR OPEN/CLOSE 60 IN-LB 24V AUX SWITCH | BELIMO | NF24-S ALC | 1 ea |
| TR-AG | TRANSFORMER, 120/24VAC 150VA W/CCT BREAKER | CORE COMPONENTS | LE-124 | 1 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 1 ea |




***RV CONTROL***

1. RV shall be energized by BAS during occupied mode, and off during unoccupied mode. This RV is to be interlocked through logic with the space FCU

Network interlock with existing FCU's




South Kortright School 2009 Capital Improvements

South Kortright, New York

AIR TEMP HEATING & AIR CONDITIONING, INC.
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RV Interlocks

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| AUTOMATEDLOGIC® CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
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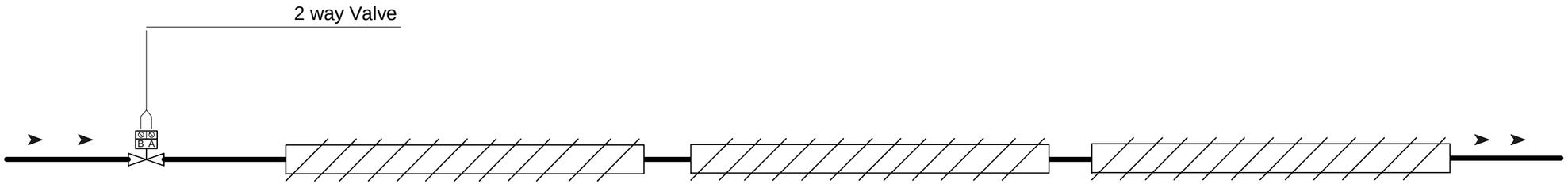
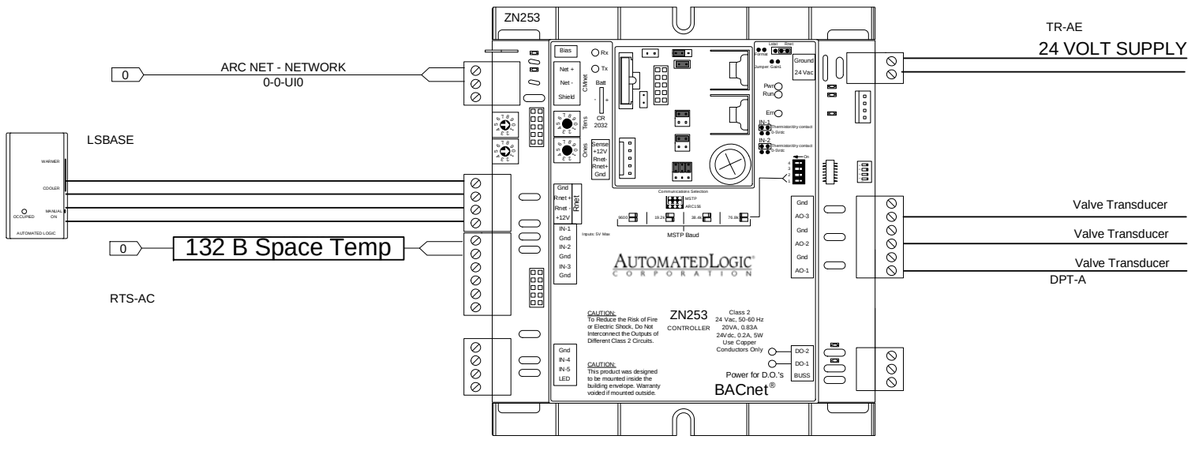
# Fin Tube Guidance A

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| DPT-A | SERIES 600 LOW DRY PRESS | AUTOTRAN | 600 D 5IN. WC 12D 20 | 5 ea |
| LSBASE | LOGISTAT 10K ROOM SENSOR WITH COMM | BAPI | LSBASE | 1 ea |
| RTS-AC | 10K ROOM THERMISTOR SS WALL PLATE | BAPI | BA/10K-2-93-631 | 1 ea |
| TR-AE | TRANSFORMER, 120/24VAC, 40VA | CORE COMPONENTS | LE-112 | 1 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 2 ea |




FTR CONTROL

A. Sequence Occupied
1. Scheduling shall be accomplished by the D.D.C. system

2. Existing pneumatic control valve shall modulate to maintain space temperature.

3. Provide wall mounted thermostat and interface with D.D.C. control system
4. Display
   A. Room temperature indication
   B. Room temperature set point occupied.
   C. Room temperature set point unoccupied.
   D. Control valve position as percent open.

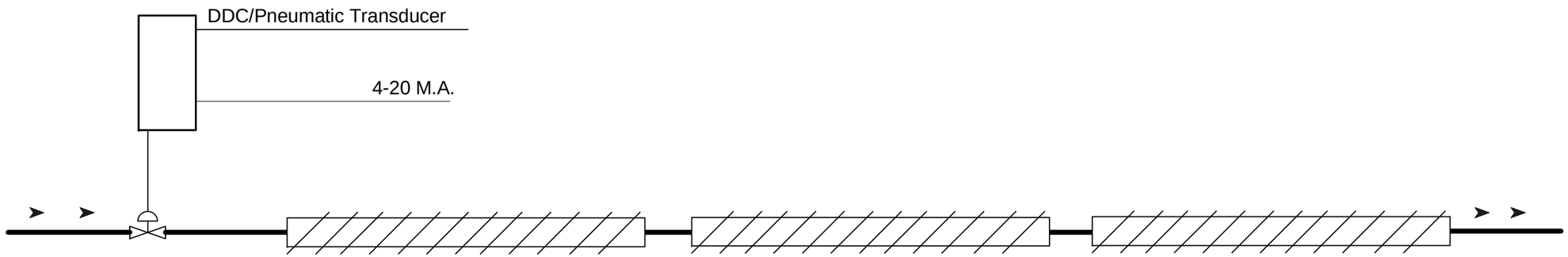
South Kortright School 2009 Capital Improvements
South Kortright, New York
AIR TEMP HEATING & AIR CONDITIONING, INC.
A LINC SERVICE ® *CONTRACTOR*
Fin Tube Guidance A

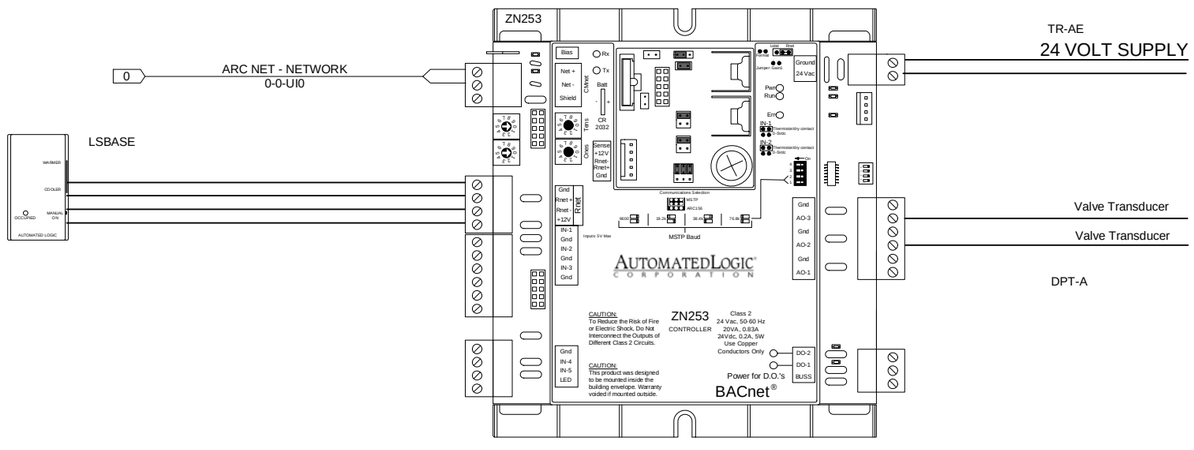
| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| | | | CHECK BY: RSL |
| AUTOMATEDLOGIC CORPORATION | | | DSCODE: 07112.00 |
| | | |  |

# Fin Tube Guidance B

Rooms
132D
132C

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| DPT-A | SERIES 600 LOW DRY PRESS | AUTOTRAN | 600 D 5IN. WC 12D 20 | 2 ea |
| LSBASE | LOGISTAT 10K ROOM SENSOR WITH COMM | BAPI | LSBASE | 1 ea |
| TR-AE | TRANSFORMER, 120/24VAC, 40VA | CORE COMPONENTS | LE-112 | 1 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 2 ea |




FTR CONTROL

A. Sequence Occupied
1. Scheduling shall be accomplished by the D.D.C. system

2. Existing pneumatic control valve shall modulate to maintain space temperature.

3. Provide wall mounted thermostat and interface with D.D.C. control system
4. Display
   A. Room temperature indication
   B. Room temperature set point occupied.
   C. Room temperature set point unoccupied.
   D. Control valve position as percent open.

South Kortright School 2009 Capital Improvements
South Kortright, New York
AIR TEMP HEATING & AIR CONDITIONING, INC.
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Fin Tube Guidance B

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
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| | | | DSCODE: 07112.00 |
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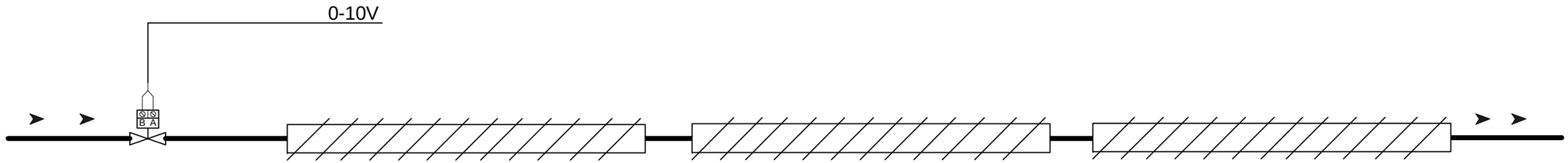
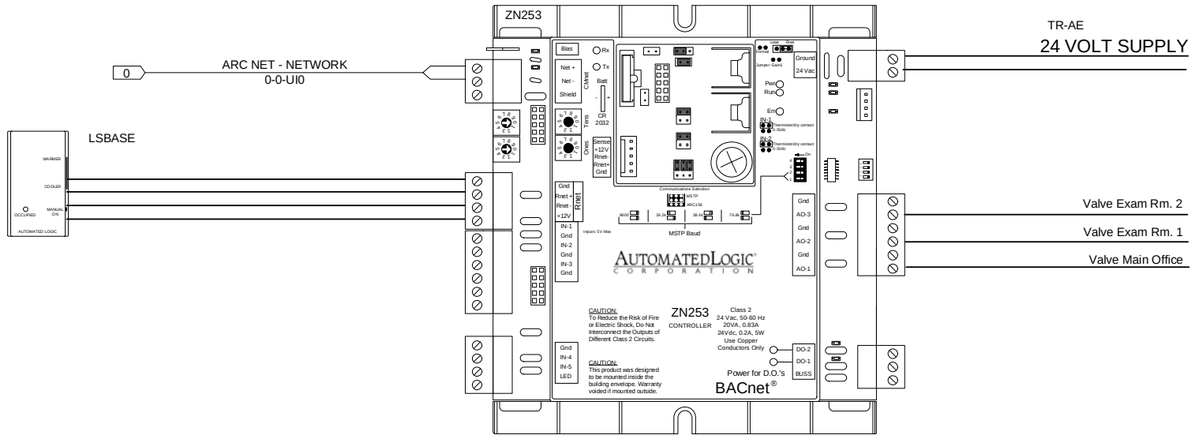
# Fin Tube Nurse

Rooms
Nurse Office
Exam 1
Exam 2

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| DPT-A | SERIES 600 LOW DRY PRESS | AUTOTRAN | 600 D 5IN. WC 12D 20 | 2 ea |
| LSBASE | LOGISTAT 10K ROOM SENSOR WITH COMM | BAPI | LSBASE | 1 ea |
| TR-AE | TRANSFORMER, 120/24VAC, 40VA | CORE COMPONENTS | LE-112 | 1 ea |
| ZN253 | ZN253 | AUTOMATED LOGIC | ZN253 | 2 ea |




FTR CONTROL

A. Sequence Occupied
1. Scheduling shall be accomplished by the D.D.C. system

2. Existing pneumatic control valve shall modulate to maintain space temperature.

3. Provide wall mounted thermostat and interface with D.D.C. control system
4. Display
   A. Room temperature indication
   B. Room temperature set point occupied.
   C. Room temperature set point unoccupied.
   D. Control valve position as percent open.

South Kortright School 2009 Capital Improvements
South Kortright, New York
AIR TEMP HEATING & AIR CONDITIONING, INC.
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Fin Tube Nurse

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| AUTOMATED LOGIC CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
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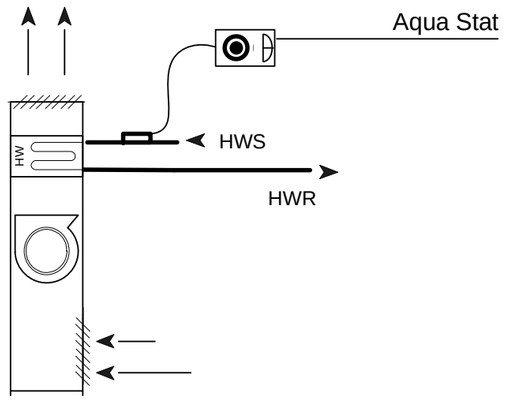
# CUH

1st Floor Hall

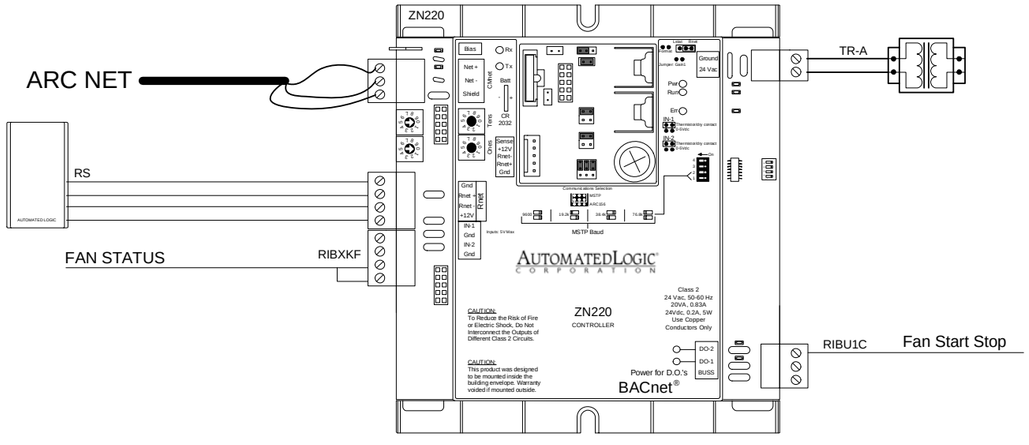
| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| RIBU1C | RELAY 24 V | RIB | RIBU1C | 1 ea |
| RIBXKF | CURRENT SENSOR | RIB | RIBXKF | 1 ea |
| RS | ROOM SENSOR | AUTOMATED LOGIC | RS | 1 ea |
| TR-A | TRANSFORMER, 120/24VAC, 50VA | CORE COMPONENTS | LE-117 | 1 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 1 ea |




**CABINET HEATER**

CABINET UNIT HEATER

1. Hot water shall circulate through the coil continuosely.
2. Fan shall cycle to maintain space temperature as sensed by wall mounted thermostat.
3. Provide wall mounted thermostat and interface with D.D.C.
4. Display
   A. Room temp
   B. Room temp S.P.




| | | | |
|---|---|---|---|
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| CUH | | | |
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| AUTOMATED LOGIC CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
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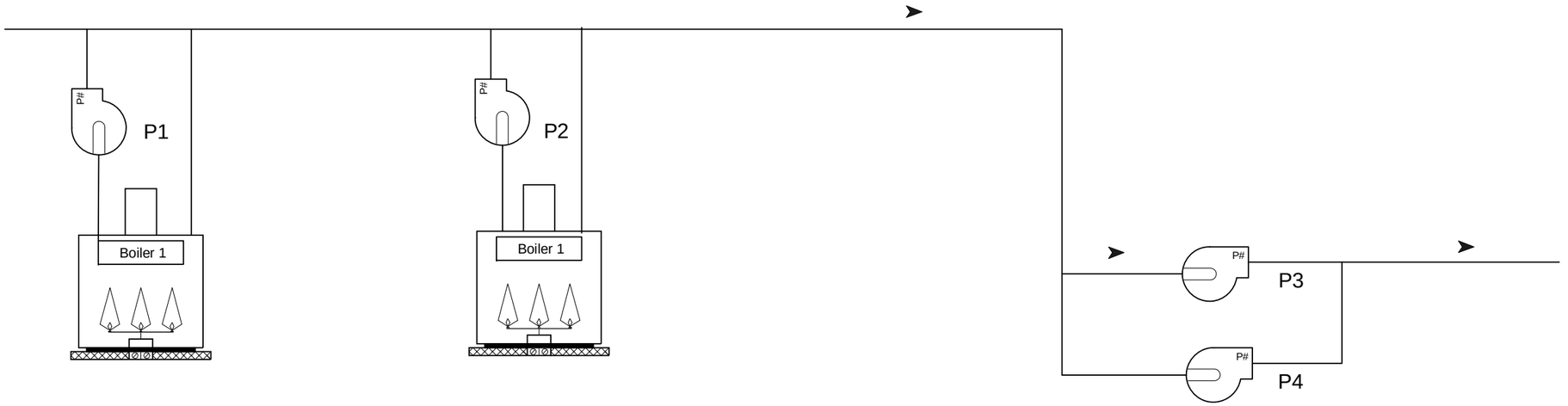
# Boiler Plant Main School

Existing wiring and hardware
Existing Logic
Update graphics to new Automated Logic Graphics

## Bill of Materials

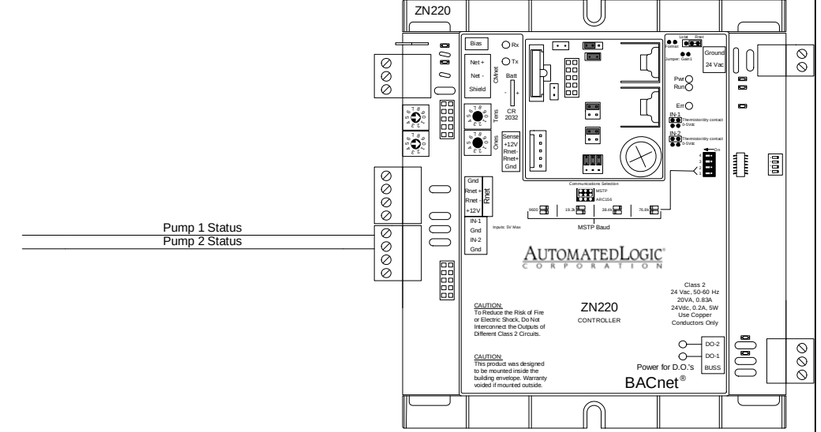
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
|---|---|---|---|---|
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 1 ea |
| ZN551 | ZN551 | AUTOMATED LOGIC | ZN551 | 1 ea |

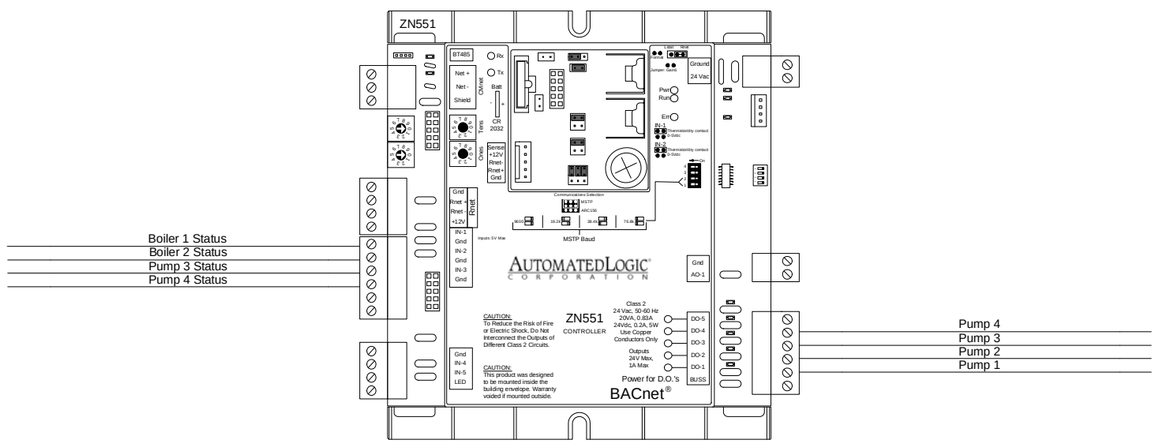
**P 2, and P3 are out of service. Logic is written for single pumps**




1. Boiler Control
a. Interface to existing Barber Colman MN800 controller.
NOTE Existing Barber Colman MN 800 is only controlling Pumps, monitoring boiler status, and switching pneumatic day/ night.

2. Pump Control.
A. Pump 1&2 energized based on user defined outdoor air temperature set point.
B. Pump 3&4 energized based on user defined outdoor air temperature set point.

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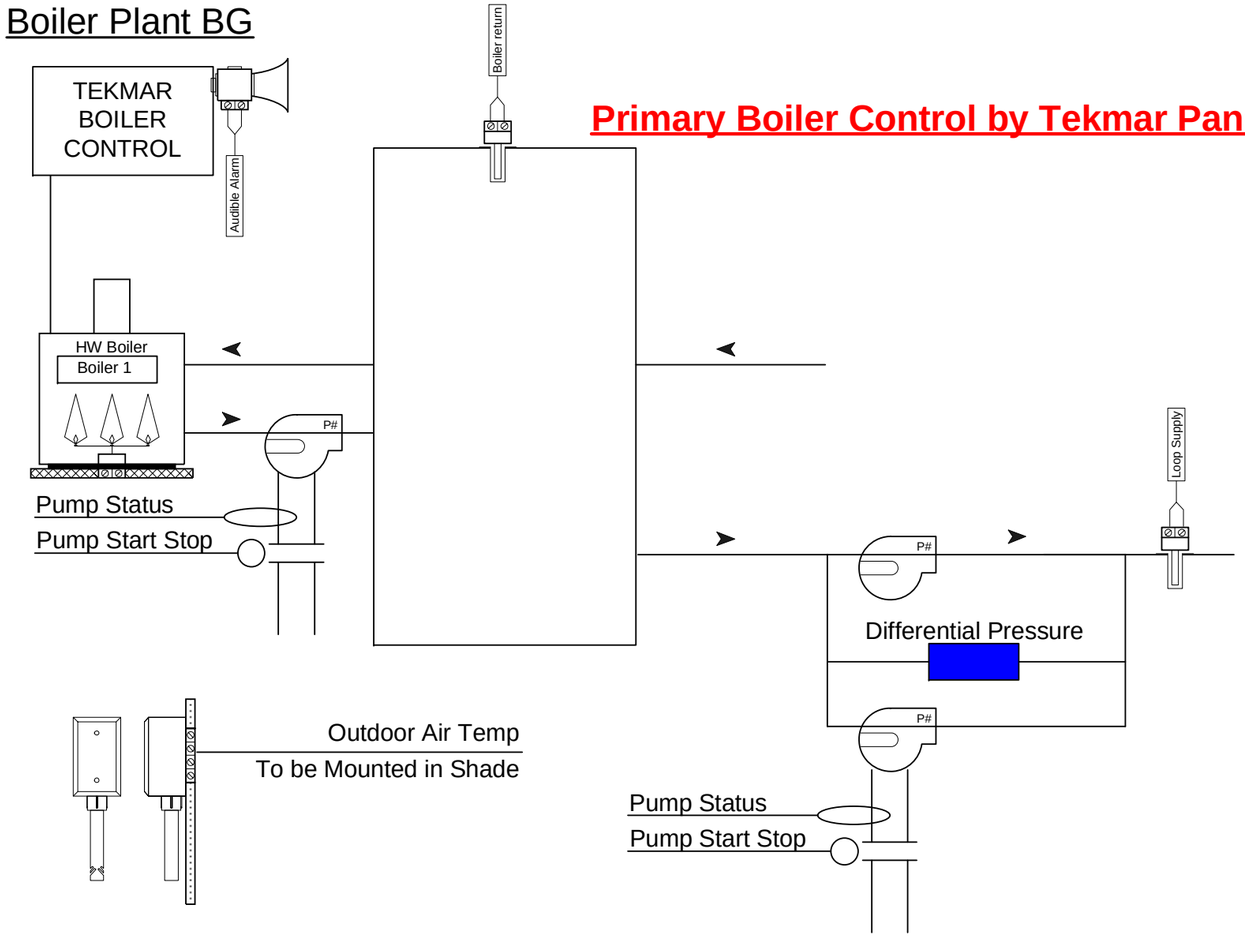
AIR TEMP HEATING & AIR CONDITIONING, INC.
A LINC SERVICE ® *CONTRACTOR*
Boiler Plant Main School

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
|---|---|---|---|
| AUTOMATED LOGIC CORPORATION | | | CHECK BY: RSL |
| | | | DSCODE: 07112.00 |
| | | | 22 of 34 |

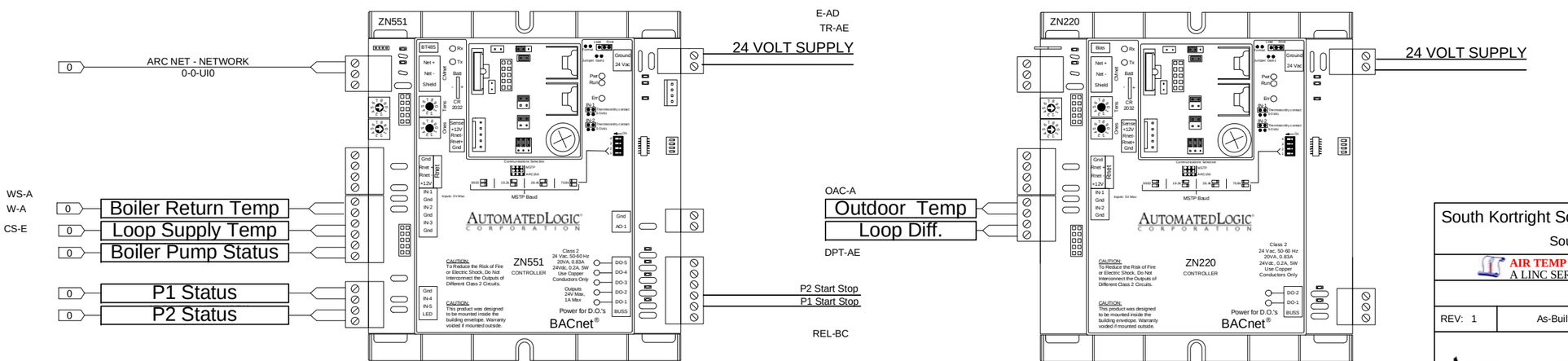
# Boiler Plant BG

## Primary Boiler Control by Tekmar Panel




## Bill of Materials

| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
|---|---|---|---|---|
| CS-E | CURRENT SWITCH .5-200 AMP SOLID CORE GO/NO GO | VERUS IND. | H-800 | 4 ea |
| DPT-AE | DIFF PRESSURE TRANSDUCER 0-5 IN. MA | MAMAC | PR-282-4-(0-5IN.)-B-1-2-A | 1 ea |
| E-AD | RET NEMA 1 18X12X7 | KELE & ASSOC. | RET 1812 | 1 ea |
| OAC-A | OA TEMPERATURE/HUMIDITY COMBO SENSOR | BAPI | ALC/10K-2-H220-O | 1 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 4 ea |
| TR-AE | TRANSFORMER, 120/24VAC, 40VA | CORE COMPONENTS | LE-112 | 1 ea |
| W-A | TWP PART SS WELL 4IN. | BAPI | BA/4IN. | 2 ea |
| WS-A | 10K IMMERSION THERMISTOR | BAPI | ALC/10K-2-I-4 | 2 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 1 ea |
| ZN551 | ZN551 | AUTOMATED LOGIC | ZN551 | 1 ea |

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|---|---|
| South Kortright School 2009 Capital Improvements | |
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| Boiler Plant BG | |
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# Boiler Plant BG Sequence01

SYSTEM ENABLE

The heating system shall automatically start when the outside air temperature falls below the system enable set point while the system enable is on. When the outside air temperature rises above this set point or the system enable is off the heating system shall be disabled.

BOILER CONTROL

The system consists of one discrete boiler with packaged controls from the boiler manufacturer. The boiler shall cycle to maintain supply water temperature to set point as reset by outside air temperature. The boiler shall be staged on and off as required to maintain control. The combustion air damper will be commanded open prior to starting the boiler and kept open until the boiler is commanded off.

HOT WATER PUMP CONTROL

when enabled, the pump associated with the boiler will be started. If the pump status does not match the command an alarm will be generated and the boiler will be stopped. Upon loss of status the pump will restart after the system restart is activated. After the boiler has been commanded off the pump will continue to run for a short time to dissipate the heat.

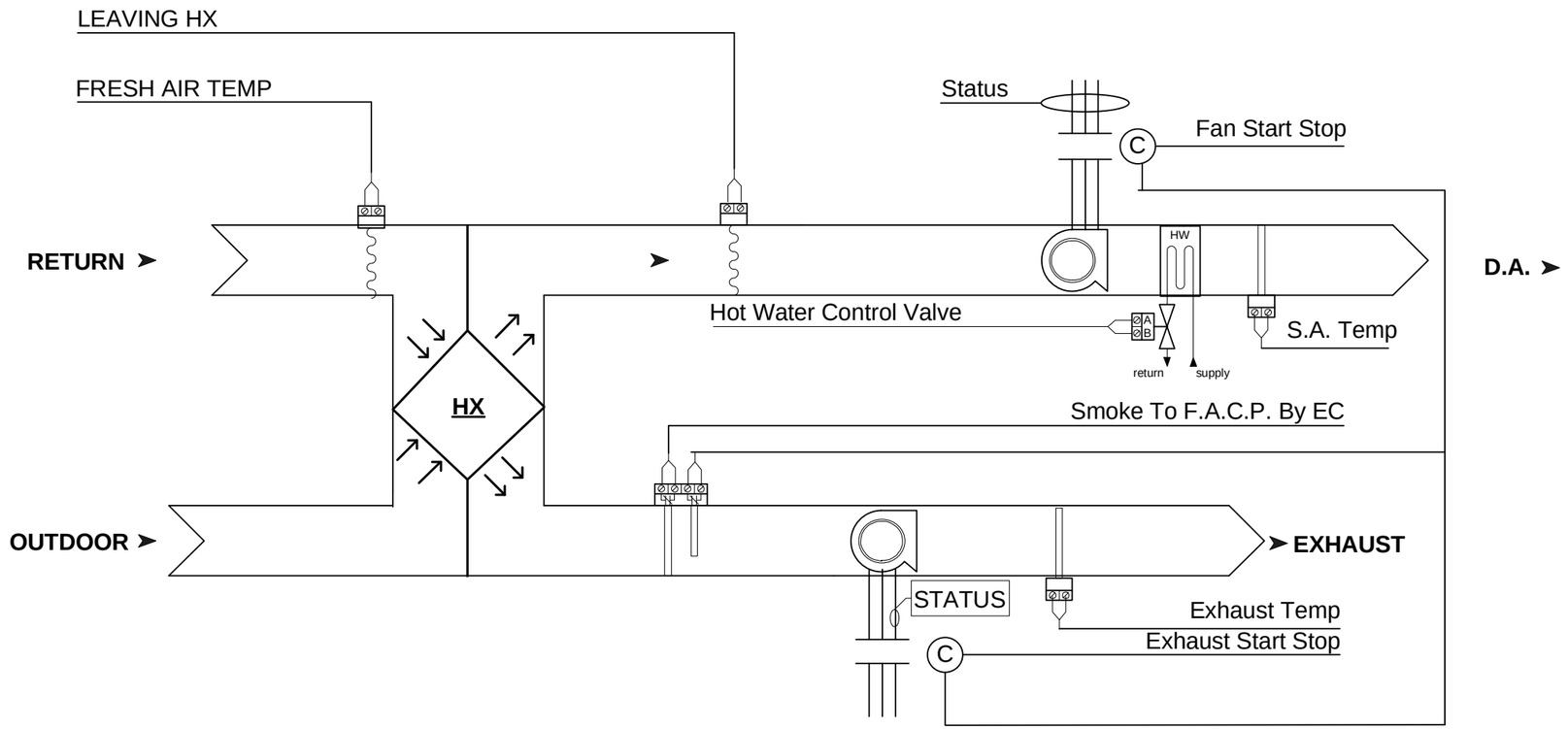
SECONDARY LOOP PUMPING.

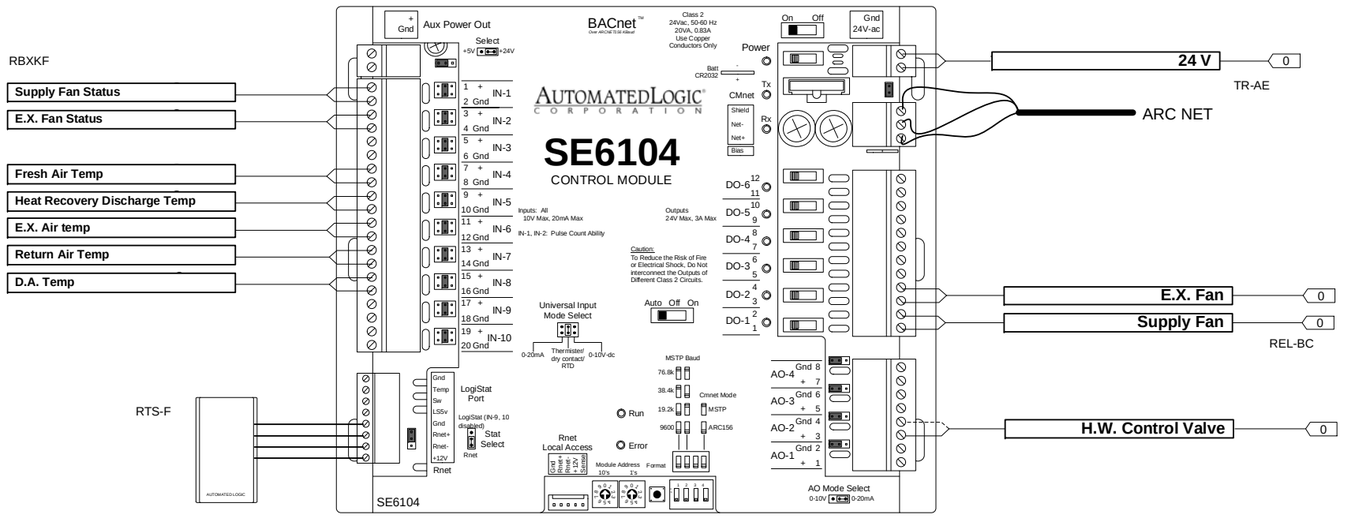
The lead secondary pump will be started when the system is enabled. Additional pumps will be started as required to maintain the differential pressure in the secondary loop. When additional pump is required, the pump with the lowest run time total shall be enabled to run. If the pump status does not match the command and alarm will be generated and the pump will be stopped. Upon loss of status the pump will restart after the system reset is generated.

# ERV BG

## Bill of Materials

| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
|---|---|---|---|---|
| RBXKF | CURRENT SENSOR | RIB | RBXKF | 4 ea |
| REL-BC | PILOT RELAY 24 VAC DPDT W/ LED | OMRON | LY2N-24V | 4 ea |
| RTS-F | 10K ROOM THERMISTOR RS | BAPI | ALC/10K-2-RS | 1 ea |
| SE6104 | SE6104 | AUTOMATED LOGIC | SE6104 | 1 ea |
| TR-AE | TRANSFORMER, 120/24VAC, 40VA | CORE COMPONENTS | LE-112 | 2 ea |

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| ERV BG | | | |
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B

# ERV BG Sequence

RUN CONDITIONS-SCHEDULED

The unit shall run to a user definable time schedule in the following modes.
Occupied: The unit shall maintain a 70 deg. F. adjustable heat set point.
Unoccupied: The unit shall maintain a 55 deg. Adjustable heat set point.

ALARMS SHALL BE PROVIDED AS FOLLOWS
Low Zone Temp: If the zone temperature is less than the heating set point by a user definable amount.

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SUPPLY FAN
The supply fan shall run any time the unit is commanded to run. The supply fan shall have a user definable minimum run time, unless shut down on safeties.

ALARMS SHALL BE PROVIDED AS FOLLOWS
Supply fan failure.

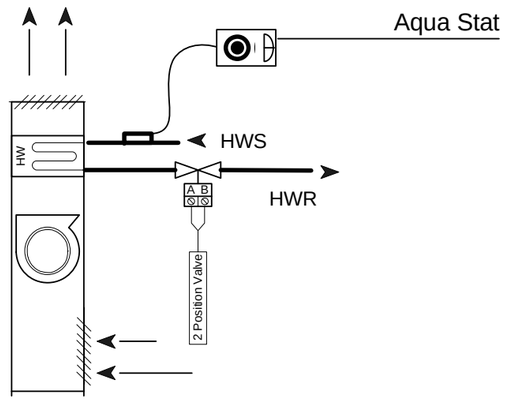
EXHAUST FAN
The exhaust fan shall run whenever supply fan runs, unless shut down on safeties.

ALARM SHALL BE PROVIDED AS FOLLOWS
Exhaust fan failure

# CUH BG

Entry 101

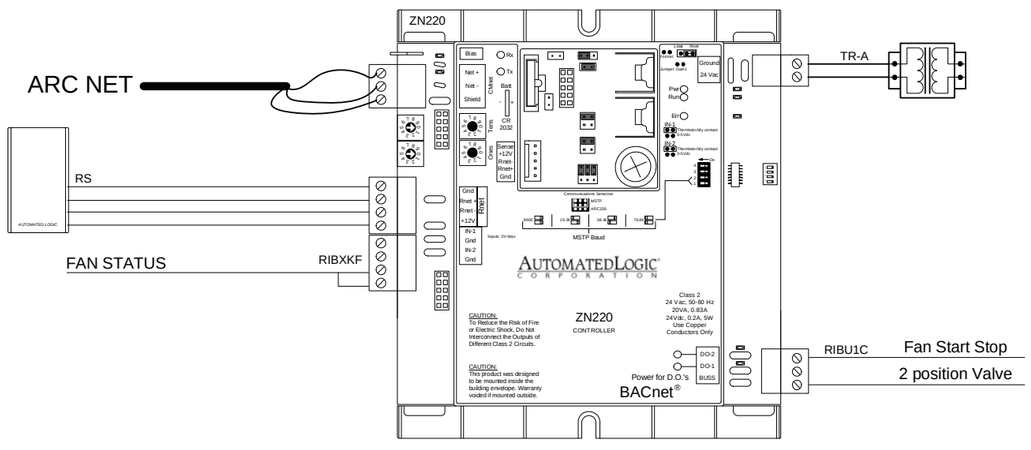
| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| RIBU1C | RELAY 24 V | RIB | RIBU1C | 1 ea |
| RIBXKF | CURRENT SENSOR | RIB | RIBXKF | 1 ea |
| RS | ROOM SENSOR | AUTOMATED LOGIC | RS | 1 ea |
| TR-A | TRANSFORMER, 120/24VAC, 50VA | CORE COMPONENTS | LE-117 | 1 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 1 ea |




**CABINET HEATER**

CABINET UNIT HEATER

1. Hot water shall circulate through the coil continuosely.
2. Fan shall cycle to maintain space temperature as sensed by wall mounted thermostat.
3. Provide wall mounted thermostat and interface with D.D.C.
4. Display
   A. Room temp
   B. Room temp S.P.

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| CUH BG | | | |
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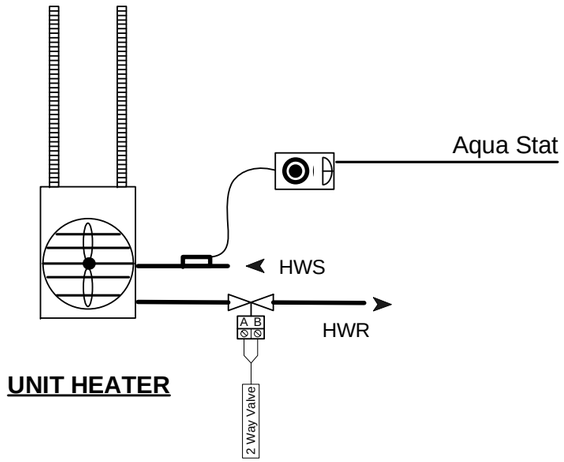
# Unit Heater B.G.

Existing UH 66
76
36
UH-1

| Bill of Materials | | | | |
|---|---|---|---|---|
| DID | DESCRIPTION | MANUFACTURER | PART NUMBER | QTY |
| RIBU1C | RELAY 24 V | RIB | RIBU1C | 5 ea |
| RIBXKF | CURRENT SENSOR | RIB | RIBXKF | 5 ea |
| RS | ROOM SENSOR | AUTOMATED LOGIC | RS | 5 ea |
| TR-A | TRANSFORMER, 120/24VAC, 50VA | CORE COMPONENTS | LE-117 | 5 ea |
| ZN220 | ZN220 | AUTOMATED LOGIC | ZN220 | 5 ea |




CABINET UNIT HEATER

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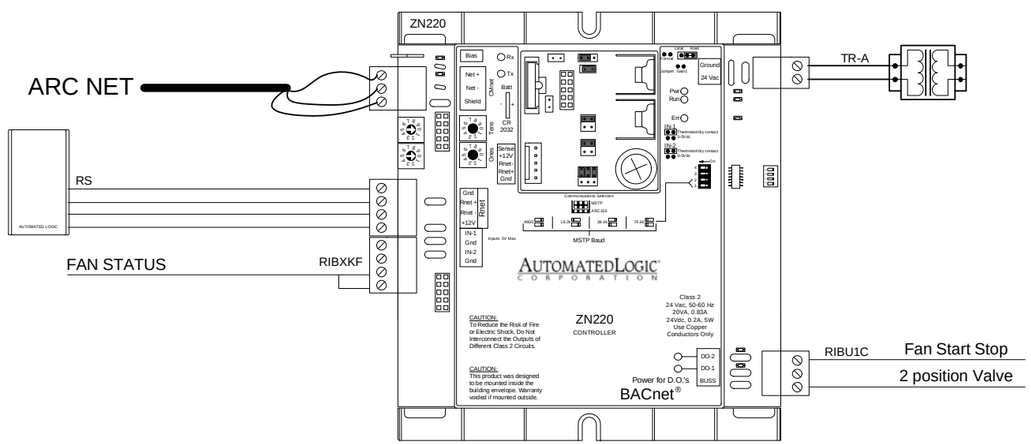
2. Fan shall cycle to maintain space temperature as sensed by wall mounted thermostat.
3. Provide wall mounted thermostat and interface with D.D.C.
4. Display
   A. Room temp
   B. Room temp S.P.

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| Unit Heater B.G. | | | |
| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
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# Valve Schedule

AUTOMATEDLOGIC CORPORATION

| Pos | Re-Order # | Qty | Tag | Datasheet | Valve Pattern | Pipe Size | Flow | DP | Req. Cv | Body Size | Valve Cv | Actual DP | | Valve Part Nr. | Actuator Part Nr. | Set Up |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | V2A2S3+LF24-S US | 4 | UH 2 | B2_VS_LF24.pdf | 2W | 3/4" | 1.9 | 0.95 | 1.95 | 1/2" | 2 | 0.9 | | B213VS | LF24-S US | NO/FO |
| 2 | Siemens | 9 | UV E | 24300210 | 2W | 1/2" | exist | exist | 1 | 1/2" | 1 | exist | | 243-00210 | siemens | NO/FO |
| 3 | V2A1S3+LF24-S US | 1 | CUH | B2_VS_LF24.pdf | 2W | 1/2" | 1.8 | 6.9 | 0.69 | 1/2" | 1 | 3.2 | | B212VS | LF24-S US | NO/FO |
| 4 | G2FAB3+AF24-SR US | 1 | ERV1 | G2_AF24_SR.pdf | 2W | 2" | 35.6 | 0.8 | 39.8 | 2" | 40 | 0.8 | | G250 | AF24-SR US | NO/FO |

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Valve Schedule

| REV: 1 | As-Built | 11/30/2008 | JOB NO: P7790 |
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| | | | CHECK BY: RSL |
| AUTOMATEDLOGIC CORPORATION | | | DSCODE: 07112.00 |
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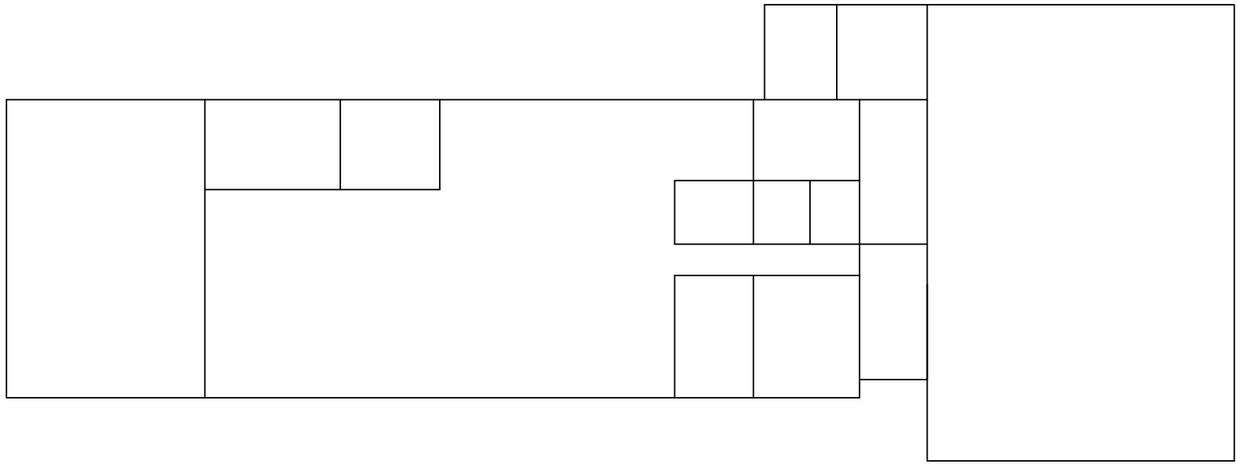
BUS GARAGE



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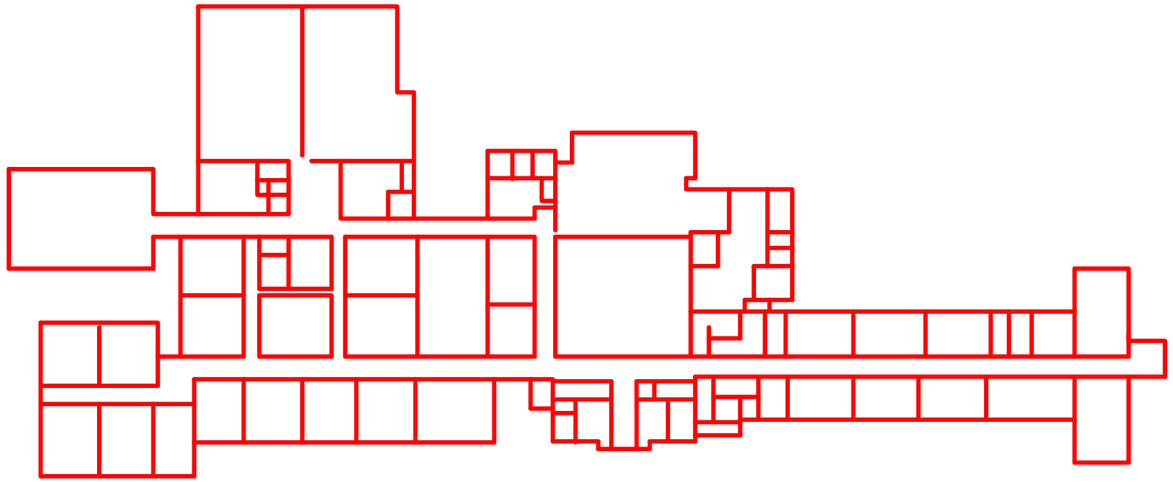
MAIN SCHOOL 1st FLOOR



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South Kortright, New York

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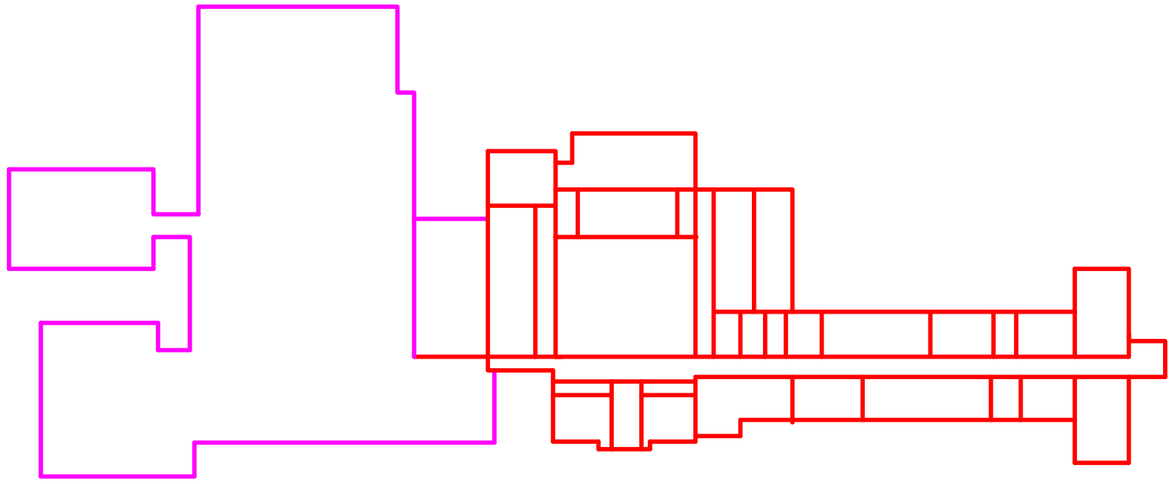
MAIN SCHOOL BASEMENT



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| AUTOMATEDLOGIC CORPORATION | | | CHECK BY: RSL |
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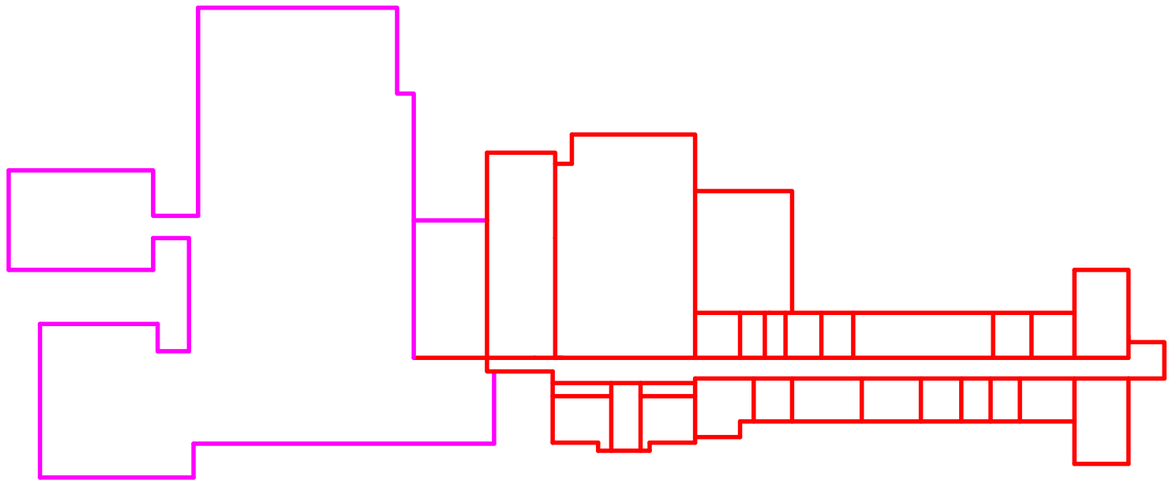
MAIN SCHOOL 2nd FLOOR



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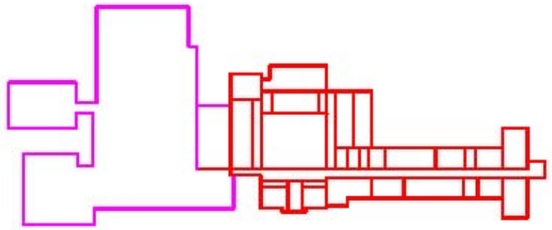
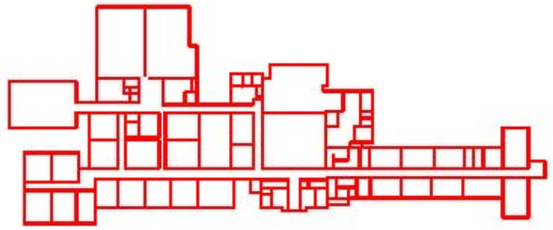
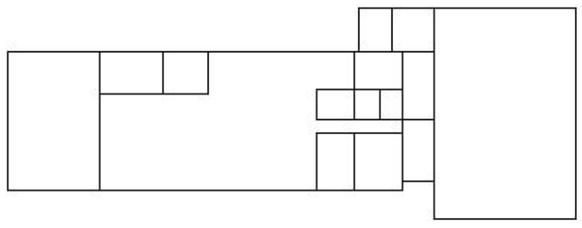
Main School Basement



Main School 1st Floor



Bus Garage



Main School 2nd Floor