



Aoraki Polytechnic Painting Room Extraction System



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General 1

Control Panel 1.1



The control panel consists of a PLC controller, and a single system on off switch. On the next page is an image of the controller, with the relevant parts labeled by a white circle containing a number. Below the image is a key to the numbers giving the name of the item as it will be referred to in the rest of this manual.



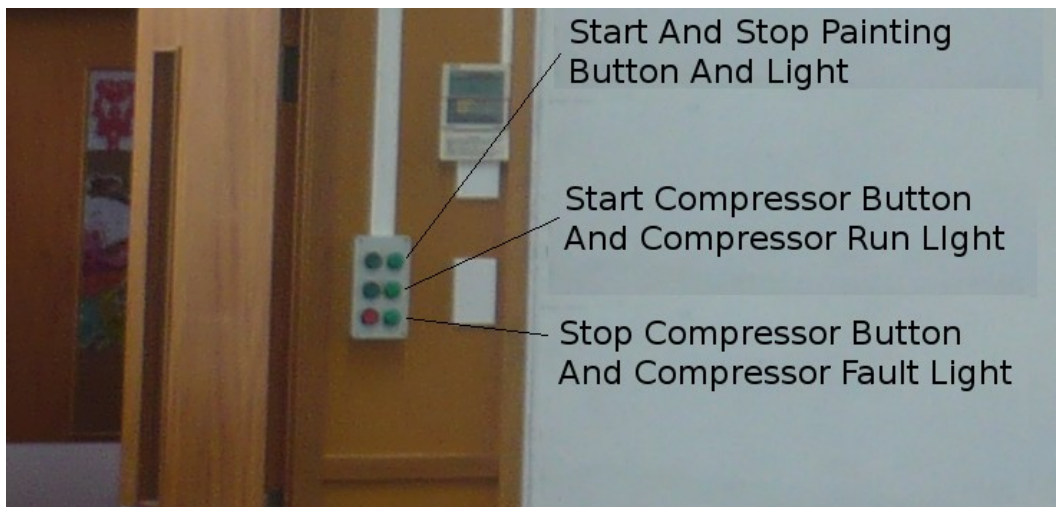
- 1. Display
- 4. Up arrow key
- 7. Info key

- 2. Keypad numbers 0 to 9
- 5. Right arrow key
- 8. Enter key

- 3. Left arrow key
- 6. Down arrow key

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In Class Controls



Functional Description 1.2

Unoccupied

1. It is assumed that when the lights are off, the room is not occupied.
2. It is assumed that there are hazardous goods stored in the room at all times.
3. When the room is unoccupied the system will run periodically. This delay is set in the "System Off Delay" screen. In this mode the system will not heat the air.
4. When the room is unoccupied and the system delay has timed out, the system will run for the period set in the "System Off Run Time" screen.

Occupied

1. When the room light switch is turned on, the system will run on high for one minute to evacuate any potential fumes in the air intake duct. This delay is set in the "Entry Delay Stage One" screen.
2. Next the air intake fan will start on high, and will run for the time set in the "Entry Delay Stage Two" screen.
3. When the start intake delay has timed out, the lights and any power systems will be enabled. At this point the heaters will turn on if enabled in the "Heating" screen, and the fans will slow to the normal running speed.
4. Prior to any painting the user needs to operate the "Painting Button" as shown in the "In Room Controls" image on the "Control Panel" page. This will increase the speed of the extract and intake fans.

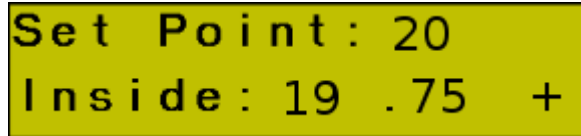
Compressor

1. The compressor can be started and stopped from the control box just inside the class door.

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General Information 1.3

The Default Screen



Set Point: 20
Inside: 19 .75 +

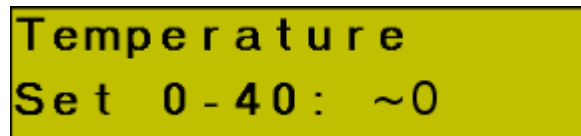
All the instructions in this manual will assume that you are starting from the default screen, which will appear similar to the image above where "Set Point" is the desired inside temperature, and "Inside" is the actual current reading. The "+" symbol in the bottom right hand corner indicates whether it is heating "+", cooling "-", or waiting "nothing displayed".

You can return to the default screen by pressing the left arrow key (key 3), until the screen is displayed.

The only instance where this will not be true, is if you have activated a screen that requires input. In this case you must complete the screen before being able to return to the default screen. This will be described in greater detail later in the manual.

When a screen is calling for input it will display a flashing cursor similar to this "_".

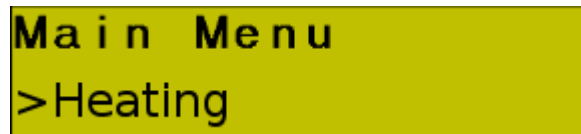
For various reasons this cannot be displayed by the screen captures of the control panel, so the flashing cursor is substituted by the tilde symbol like this "~". An example is displayed below in the set system time screen.



Temperature
Set 0 - 40: ~0

Menu's

Any screen with a ">" symbol, as in the image below, indicates you are in a menu. In the case of the image below, you are in the "Main Menu" with the "Heating" sub menu selected.



Main Menu
>Heating

You can scroll through menu items by using the up and down arrow key's, (key's 4 and 6). You can select the menu item by using the right arrow key, (key 5), or you can return to the previous screen by using the left arrow key, (key 3).

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Layout 1.4

Extraction

Below is an image showing the location of the extract velocity sensor. The extract fan is mounted in a weather proof cabinet on the roof.



Make Up Air

The image below shows the location of all the other field components in the system except the make up air velocity sensor, which is mounted on the roof, near the first 90 degree bend.

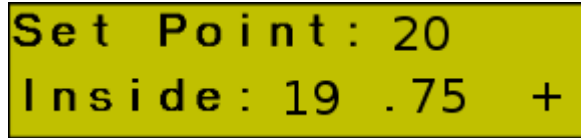


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Delays 2

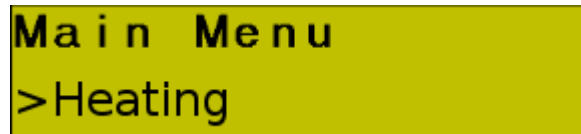
Set Stage One Entry Delay 2.1

1. If you are not already in the default screen, press the left arrow key (key 3) until the screen looks similar to the image below.



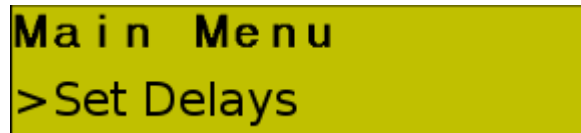
Set Point: 20
Inside: 19 .75 +

2. Press the enter key (key 8). The screen will now appear as the image below.



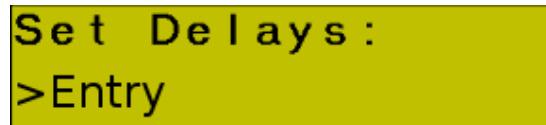
Main Menu
>Heating

3. Press the down arrow key (key 6). The screen will now appear as the image below.



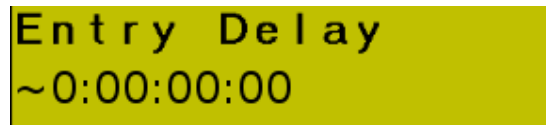
Main Menu
>Set Delays

4. Press the right arrow key (key 5). The screen will now appear as the image below.



Set Delays:
>Entry

5. Press the right arrow key (key 5). The screen will now appear as the image below. Note that if this has been set before the numbers may not be all zero's.



Entry Delay
~0:00:00:00

6. Enter the desired time from the key pad (keys 2). Let's say we want to set the system to purge for 1 minutes no hours, no seconds, and no milliseconds. Press key 0 three times, press the 1 key. At this point we could press the enter key (key 8) so long as the rest of the unset numbers were at 0. Otherwise we keep pressing the 0 key until the remainder are set, and then press the enter key (key 8). This will return to the set delays menu as shown in step 6.

7. You can now press the left arrow key (key 3) until you have returned to the default screen as shown in step 1.

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Set Stage Two Entry Delay (Intake Fan Run Time) 2.2

1. If you are not already in the default screen, press the left arrow key (key 3) until the screen looks similar to the image below.

A yellow rectangular screen with black text. The top line reads "Set Point: 20" and the bottom line reads "Inside: 19.75 +".

2. Press the enter key (key 8). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Main Menu" and the bottom line reads ">Heating".

3. Press the down arrow key (key 6). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Main Menu" and the bottom line reads ">Set Delays".

4. Press the right arrow key (key 5). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Set Delays:" and the bottom line reads ">Entry".

5. Press the down arrow key (key 6) three times. The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Set Delays:" and the bottom line reads ">Start Intake".

6. Press the right arrow key (key 5). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Intake Delay" and the bottom line reads "~0:00:00:00".

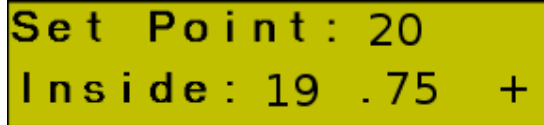
7. Enter the desired time from the key pad (keys 2). Let's say we want to set the system to continue purging for a further 3 minutes no hours, no seconds, and no milliseconds. Press key 0 three times, press the 3 key. At this point we could press the enter key (key 8) so long as the rest of the unset numbers were at 0. Otherwise we keep pressing the 0 key until the remainder are set, and then press the enter key (key 8). This will return to the set delays menu as shown in step 6.

8. You can now press the left arrow key (key 3) until you have returned to the default screen as shown in step 1.

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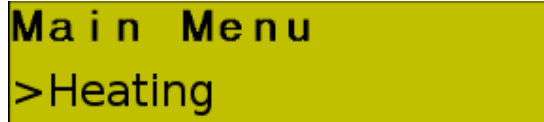
Set Off Delay Time 2.3

1. If you are not already in the default screen, press the left arrow key (key 3) until the screen looks similar to the image below.



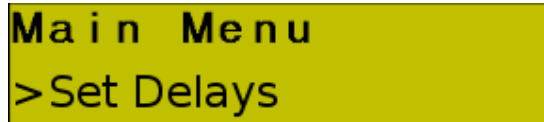
Set Point: 20
Inside: 19 .75 +

2. Press the enter key (key 8). The screen will now appear as the image below.



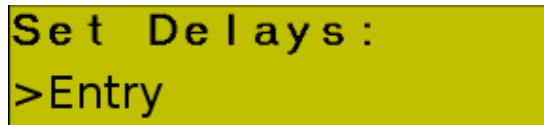
Main Menu
>Heating

3. Press the down arrow key (key 6). The screen will now appear as the image below.



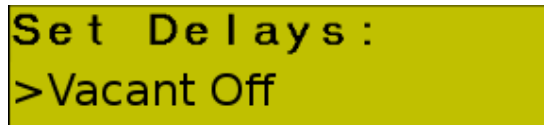
Main Menu
>Set Delays

4. Press the right arrow key (key 5). The screen will now appear as the image below.



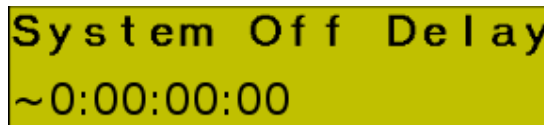
Set Delays:
>Entry

5. Press the down arrow key (key 6). The screen will now appear as the image below.



Set Delays:
>Vacant Off

6. Press the right arrow key (key 5). The screen will now appear as the image below. Note that if this has been set before the numbers may not be all zero's.



System Off Delay
~0:00:00:00

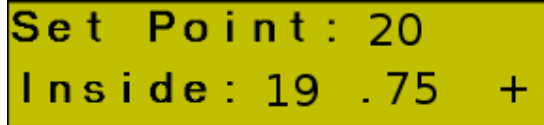
7. Enter the desired time from the key pad (keys 2). Let's say we want to set the delay for 4 hours, no minutes, no seconds, and no milliseconds. Press key 0, key 4. At this point we could press the enter key (key 8) so long as the rest of the unset numbers were at 0. Otherwise we keep pressing the 0 key until the remainder are set, and then press the enter key (key 8). This will return to the set delays menu as shown in step 6.

8. You can now press the left arrow key (key 3) until you have returned to the default screen as shown in step 1.

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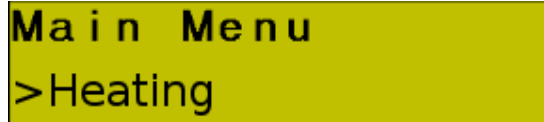
Set Off Delay Run Time 2.4

1. If you are not already in the default screen, press the left arrow key (key 3) until the screen looks similar to the image below.



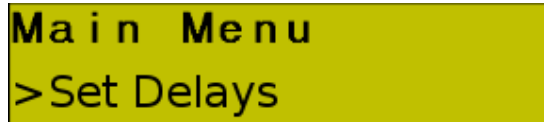
Set Point: 20
Inside: 19 .75 +

2. Press the enter key (key 8). The screen will now appear as the image below.



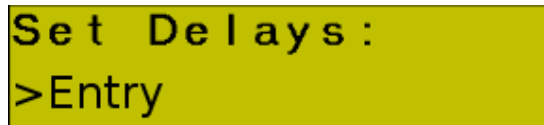
Main Menu
>Heating

3. Press the down arrow key (key 6). The screen will now appear as the image below.



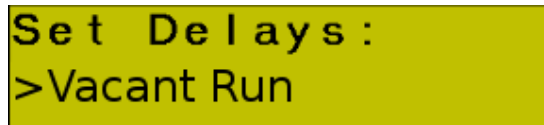
Main Menu
>Set Delays

4. Press the right arrow key (key 5). The screen will now appear as the image below.



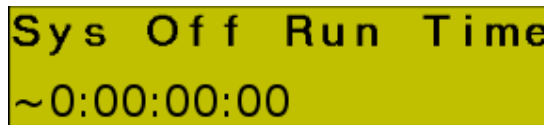
Set Delays:
>Entry

5. Press the down arrow key (key 6) twice. The screen will now appear as the image below.



Set Delays:
>Vacant Run

6. Press the right arrow key (key 5). The screen will now appear as the image below. Note that if this has been set before the numbers may not be all zero's.



Sys Off Run Time
~0:00:00:00

7. Enter the desired time from the key pad (keys 2). Let's say we want to set the system to run for 5 minutes, no hours, no seconds, and no milliseconds. Press key 0 three times, press the 5 key. At this point we could press the enter key (key 8) so long as the rest of the unset numbers were at 0. Otherwise we keep pressing the 0 key until the remainder are set, and then press the enter key (key 8). This will return to the set delays menu as shown in step 6.

8. You can now press the left arrow key (key 3) until you have returned to the default screen as shown in step 1.

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Faults 3

Faults 3.1

There are five fault conditions allowed for in the controller. These are:

Fire: The smoke detector has operated.

Fault
Fire!!!

Low Flow For Elements: The air flow over the elements is not sufficient to stop them from over heating.

Fault
Low Flow Element

Low Flow For Extract: The extraction is not sufficient.

Fault
Low Flow Extract

Low Flow For Occupancy: The make up air is not sufficient for the given occupancy.

Fault
Low Flow Occupy

Element Over Temperature: The element safety cut off in the element bank has operated, and shut down the elements.

Fault
Element O/L

If one of the fault screens is showing, the system will not be running. The problem causing the fault needs to be rectified. Once this is done press the enter key (key 8), and the default screen will be displayed.

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Heating 4

Enable Or Disable Heating 4.1

1. If you are not already in the default screen, press the left arrow key (key 3) until the screen looks similar to the image below.

A yellow rectangular screen with black text. The first line reads "Set Point: 20" and the second line reads "Inside: 19.75 +".

2. Press the enter key (key 8). The screen will now appear as the image below.

A yellow rectangular screen with black text. The first line reads "Main Menu" and the second line reads ">Heating".

3. Press the right arrow key (key 5). The screen will now appear as the image below.

A yellow rectangular screen with black text. The first line reads "Heating" and the second line reads "> On Off".

4. Press the right arrow key (key 5). The screen will now appear as one of the images below.

A yellow rectangular screen with black text. The first line reads "Heating <Enter>" and the second line reads "Currently: Off".

A yellow rectangular screen with black text. The first line reads "Heating <Enter>" and the second line reads "Currently: On".

5. Press the enter key (key 8) to toggle the heat setting on or off.

6. Press the left arrow key (key 3) until the default screen is displayed.

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Temperature Set Point 4.2

1. If you are not already in the default screen, press the left arrow key (key 3) until the screen looks similar to the image below.

A yellow rectangular screen with black text. The top line reads "Set Point: 20" and the bottom line reads "Inside: 19.75 +".

2. Press the enter key (key 8). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Main Menu" and the bottom line reads ">Heating".

3. Press the right arrow key (key 5). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Heating" and the bottom line reads "> On Off".

4. Press the down arrow key (key 6). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Heating" and the bottom line reads ">Set Temperature".

5. Press the right arrow key (key 5). The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Temperature" and the bottom line reads "Set 0 - 40: ~0".

6. Enter the desired temperature between 0 and 40 degrees, from the numerical keypad (keys 2). Let's say you have set the temperature to 20 degrees Celcius, by pressing 2 and 0. The screen will now appear as the image below.

A yellow rectangular screen with black text. The top line reads "Temperature" and the bottom line reads "Set 0 - 40: 20".

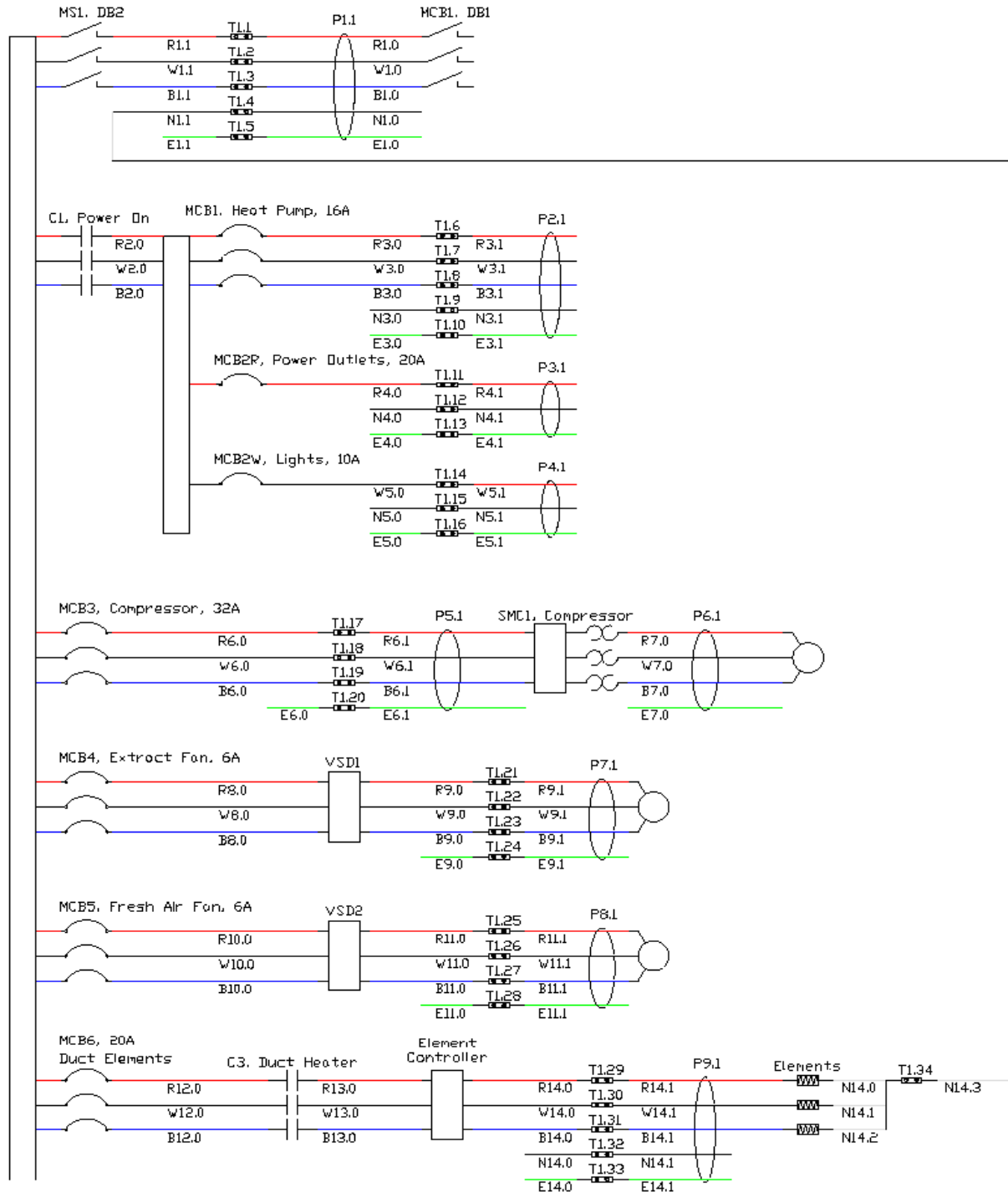
7. Press the left enter key (key 8). This will return you to the heating menu screen as displayed in step 4.

8. Press the left arrow key (key 3) until the default screen is displayed.

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Circuit Diagrams 5

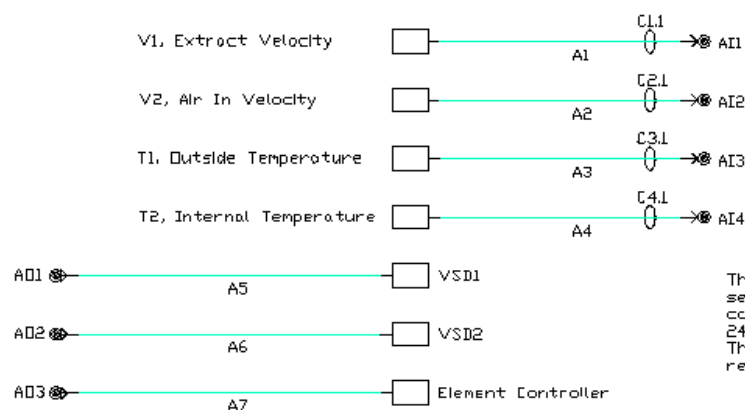
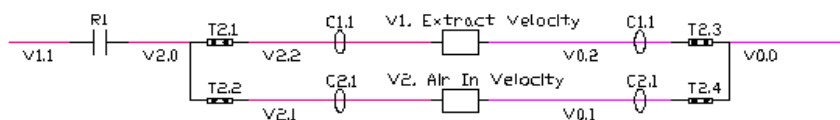
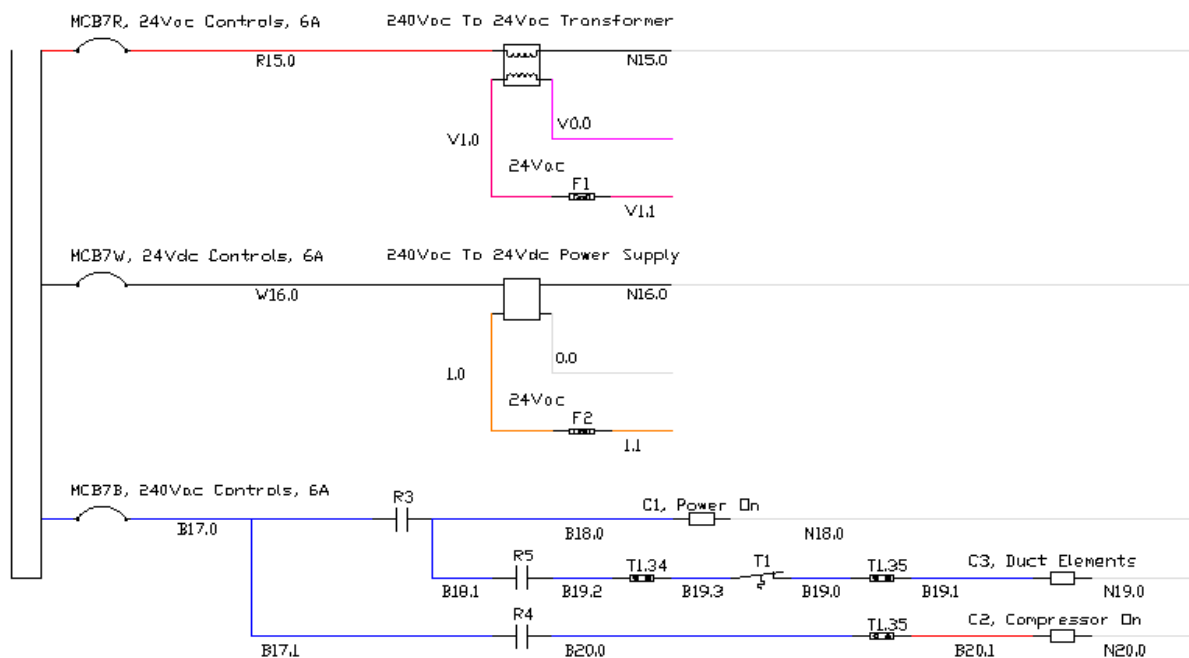
Page 1 415Vac 5.1



Project: Aoraki Polytechnic Air Brushing Extraction	Drawn By: Brian Bates	Date: 9.10.9
Drawing: 415Vac	Scale: NTS	Sheet Number: 1 Of: 3 Revision: 1

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Page 2 415Vac, 24Vac, Analog 5.2

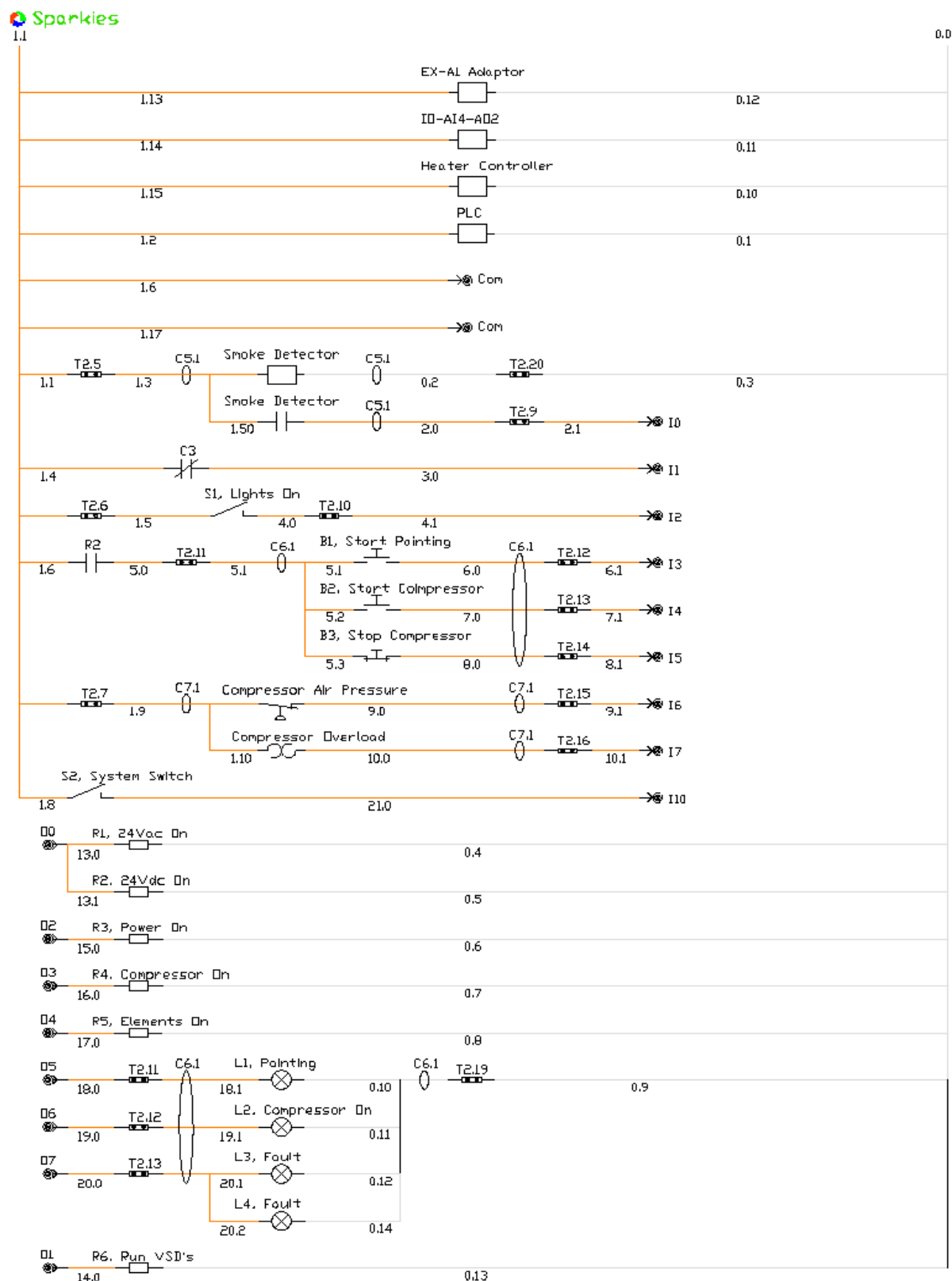


The two air temperature sensors are connected common to 0Vdc rail, and 24Vdc rail to the sensor. The sensor cable then returns to the input.

Project: Aoraki Polytechnic Air Brushing Extraction	Drawn By: Brian Bates		Date: 9.10.9	
Drawings: 415Vac, 24Vac, And Analog	Scale: NTS	Sheet Number: 2	Of: 3	Revision: 1

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Page 3 24Vdc 5.3



Project: Aerok Polytechnic Air Brushing Extraction	Drawn By: Brian Botes		Date: 9.10.9	
Drawing: 24Volc	Scale: NTS	Sheet Number: 3	Of: 3	Revision: 1