PR SERIES
WATER SOURCE HEAT PUMP SYSTEM
SELECTION AND OPTIMIZATION GUIDE
Creating a New Project

1. Open ACE Interface within the web browser. The ACE Interface performs best using the Google Chrome browser. **Do not use Internet Explorer.**

   ![User Login](image)

   **Username:**
   juan.hincapie@addison-hvac.com

   **Password:**
   ************

   [Login]

   [Remember Me]

   Forgotten your password?

   Request User Account

2. Click on the **My Projects** tab at the top of the screen.

3. Enter the **Project Name** in the dialog box, click **New** and then click **Add New** button to the right.

   ![Create Project](image)
4. On the Project Information screen, confirm the Project Name and select the appropriate information for all required fields identified with a red asterisk. If the Building Size is unknown, enter 0. This will not affect the unit selection.

5. After completing the Project Information section, click the Save button at the bottom of the screen.

   Note: Contact Information on this screen will appear on the submittal cover page printout.

6. The ACE Interface will move to the Project Schedule screen. The top box includes details to select the primary criteria for the unit(s) that will be added to the job. An empty grid schedule is displayed below this box.
Adding a Unit to the Project Schedule - Water Source Heat Pump

1. Select the Product Family and Product Category from the drop-down menus. 
   Water Source Heat Pumps

2. Select the model family from the Select a Model menu.
   
   PRRW - Mixed or return air model 
   PROW - DOAS model

3. Choose the quantity of this model required for the application.
   
   *Quantity can be changed later in the selection process.*

4. Click the Add button.

Selecting the Unit

The preferred method for unit selection uses the Optimize for Price function of the ACE Interface. This method provides a snap-shot of potential cabinet, fan, subcooling and reheat options that can provide the required leaving air temperatures and capacity.

For some applications, greater user control is required to match specific requirements on the schedule or within the job specifications report. In these situations the Optimize for Price button is deselected and manual unit selection is performed. Details on manual unit selection are included in the Manual Unit Selection section at the end of this guide.

1. Confirm the Optimize for Price check box is selected in the Heat Pump section.
2. Enter the unit tag referenced in the equipment schedule in the Tagging box within the Design Inputs section.

3. Leave the Unit Size set to Auto. This will allow the ACE tool to provide potential configurations that will meet the application criteria.

4. Select the Unit Voltage.

5. Select the Air Volume Application.

6. Select the Cabinet options.

7. Select the Heating Type from the drop-down menu. Additional information is provided in the Heat Selections section.

8. Choose whether the unit will be equipped with an ECW in the Heat Recovery menu. If equipped, choose Total Energy Wheel from the menu.

9. Enter the design CFM in the Total Airflow box. On mixed air units, enter the Outside Airflow requirement in the associated box.

One of the most common errors made in unit selection is the use of incorrect or erroneous data in the ERW performance screen. The data entered for the ERW has a direct impact on cooling and heating capacity calculations made by the ACE Interface. In many instances, the information is not complete in the equipment schedule and incorrect assumptions are made. If ERW information is incomplete or out-of-range, a conversation with the engineer is advised.

On mixed air units, without an ECW, the mixed air entering air temperature must be either drawn from the equipment schedule or calculated. If it is not available on the equipment schedule, use the Mixed Air Calculator to calculate the mixed air temperature based on the outdoor ambient and return air conditions.
ECW Performance Data

If an ECW is selected, click on box with three dots to the right of Heat Recovery menu to enter performance data for the ECW device. If this option is not required, skip to step 13.

10. Enter the Exhaust Flow thru ECW, Return ESP, summer and winter conditions in the ECW performance screen based on data in the equipment schedule.

10.1 Leave the Preferred ECW Size drop-down menu selection set to Auto.
11. Select any required ECW accessory options from the drop-down menu in the top-right corner of the Energy Conservation Wheel screen.

   On/Off Defrost

12. Click OK

   *Energy conservation wheel performance will override the entering air conditions information at the Heat Pump box.*

**Selecting the Unit (continued)**

13. Enter the design external static pressure in the External SP box.

   External SP  1  in.wg

14. If a specific fan type is specified, choose the fan from the drop-down menu. If a specific fan is not required, keep the Fan Type set to Auto.

   Fan Type  Auto

15. If a specific motor type is specified, choose the motor from the drop-down menu. If a specific motor is not required, keep the Motor Type set to Auto.

   Motor Type  Auto

16. Leave the Max HP selection set to None. The motor HP for potential unit matches will be checked later in the selection process.

   Max HP  None

17. Enter the altitude of the equipment application in the Altitude box.

18. Enter the desired minimum and maximum coil leaving air temperatures. In many cases these boxes can be left at defaults.
Do not be too restrictive with preliminary search criteria such as Max HP, Desired Min Coil LAT and Desired Max Coil LAT. For example, if the desired LAT is 55°F and the min/max range is set to 56-60°F, potential equipment solutions will not be provided. It is a best practice to leave at least four degrees of separation and later review whether the additional matches meet the application requirements.

19. Enter the Desired Unit LAT, Entering Fluid Temp (cooling), EAT DB and EAT WB temperatures in the appropriate box based on the unit schedule. The Desired Unit LAT is the reheat temperature which is normally between 70-75°F. If the unit is equipped with an ECW, the DB and WB entering air temperatures are overwritten within the selection program.

![Heat Pump Image]

20. Enter the Fluid Flow in gallons per minute, then select the Fluid Type from the drop-down box. Based on the equipment schedule, enter the glycol percentage in the Volume Glycol box.

![Fluid Flow Image]

21. Select the Reheat Type required for the application. This information is normally found in schedule notes or within the equipment specifications document. Modulating reheat is the most common selection.

![Reheat Type Image]
22. Enter the **EAT DB** (heating) temperature and the **Entering Fluid Temp** (heating) for mechanical heat operation.

![Image showing Heating input fields]

### Heat Selections

The heat criteria box displayed is dependent on the **Heating Type** selection in the **Design Inputs** box. Steam coil heat requires a factory selection for PR models. If steam heat is required, select the unit as a **No Heat** model and contact the factory for a custom selection.

- Steam or no factory installed heat required – skip to step 33 – (Selecting the Unit continued)
- Hot Water – skip to step 23
- Electric Heat- skip to step 28
- Gas Furnace - skip to step 30

### Supplemental and Auxiliary Heat

When selecting additional heat sources on water source heat pumps, an understanding of the difference between supplemental and auxiliary heat is necessary.

Supplemental heat is used when the mechanical heat available from the heat pump system is not sufficient to reach the desired leaving unit air temperature. In these situations, additional heat is added after the primary DX coil through the use of electric heat strips, gas heat, hot water or steam coils.

On supplemental heat applications, the capacity of the additional heat source adds to the heat capacity available from the heat pump system at design conditions.

*When selecting a DOAS unit with supplemental heat only, leave the Auxiliary button unchecked in the ACE selection tool Electric Heat, Gas Furnace, Steam or Hot Water heat box. The EAT DB for additional heat will auto calculate based on the heat pump output within the software.*

On auxiliary heat applications, the capacity of the additional heat source is capable of supporting the entire heating load without heat from the heat pump system. This can serve as a redundant heat system in case of heat pump system failure or emergency heat in situations where the outdoor ambient temperature is too low for efficient heat pump heating operation.
Systems equipped for auxiliary heat operation are also capable of providing supplemental heat. This is accomplished by a control defined balance point or Compressor Disable temperature.

**When selecting a DOAS unit with auxiliary heat, select the Auxiliary button in the ACE selection tool Electric Heat, Gas Furnace, Steam or Hot Water heat box. The EAT DB box must be changed to the design condition for auxiliary heat operation.**

**On auxiliary heat applications, the heating design OA temperature will be below the specified unit balance point or Compressor Disable temperature. This information is often located in the equipment specifications report.**

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**Hot Water**

23. If Auxiliary heat is selected, enter the EAT DB and Min Unit LAT (dry bulb air temperatures) in the appropriate boxes based on the equipment schedule if the Calculation Method is Leaving Air Temp. If Auxiliary heat is not required, the EAT DB temperature will autofill from the heat pump heating output.
24. If Auxiliary heat is selected, enter the EAT DB and Total Capacity in the appropriate boxes based on the equipment schedule if the Calculation Method is Capacity. If Auxiliary heat is not required, the EAT DB temperature will autofill from the heat pump heating output.

25. Enter the Entering Fluid Temp and Leaving Temp (entering and leaving fluid temperatures through the hot water coil) based on the equipment schedule if the chosen Filter Method and Calculation Method is Leaving Temp.
26. If the Filter Method is Fluid Flow, enter the Fluid Flow rate in gallons per minute from the equipment schedule.

27. Select the Fluid Type from the drop-down menu.

**Electric Heat**

28. If Auxiliary heat is selected, enter the EAT DB and LAT DB from the equipment schedule. If Auxiliary heat is not required, the EAT DB temperature will autofill from the heat pump heating output.

The applied voltage is non-adjustable and auto-filled from the Unit Voltage box in the Design Inputs section.
29. Select the kW rating and the required number of heat stages in the Stages box for the required electric heat.

![Kilowatt Rating](image)

Gas Furnace

30. If Auxiliary heat is selected, enter the EAT DB from the equipment schedule. If Auxiliary heat is not required, the EAT DB temperature will auto-fill from the heat pump heating output.

![Gas Furnace](image)

31. Select either the desired LAT DB temperature or the required Furnace Capacity. If the Furnace Capacity is selected, the LAT-DB will auto-fill based on the capacity of the heat section.

![Gas Furnace](image)

32. Select the required Fuel Type based on the equipment schedule.
Selecting the Unit (continued)

33. Click on the **Edit** button in the **Features and Options** screen on the right side.

34. When using the **Optimize for Price** feature of the ACE Interface, two selections must be made in the **Features and Options** section. These include:
   - Ventilation & Controls
   - Filters

   *When using the Optimize for Price feature, do not select additional features until the preliminary unit selection is complete.*

35. After selecting the appropriate ventilation and filters options, click **OK** to exit the screen.

36. Click **Calculate** at the bottom of the Packaged and Split System screen.
Final Selection and Comparison

After making preliminary selections, the ACE Interface will provide potential units that fit the basic criteria in a Packaged and Split Systems Possible Selections screen. The initial selection criteria, airflow, cooling capacity, efficiency and heat section will determine what units options are provide

Packaged and Split Systems Possible Selections

Select your desired unit by clicking on the model size.

<table>
<thead>
<tr>
<th></th>
<th>PROW 72</th>
<th>PROW 84</th>
<th>PROW 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unverified Price</td>
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<td>80</td>
<td>80</td>
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<tr>
<td>Cabinet</td>
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<td></td>
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</tbody>
</table>

**SUPPLY FAN**

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<tr>
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<th>PROW 84</th>
<th>PROW 96</th>
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<td>2000</td>
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<td>ESP (in wg)</td>
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<tr>
<td>TSP (in wg)</td>
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<tr>
<td>Fan Motor BHP</td>
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<tr>
<td>Fan Motor HP</td>
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**COOLING PERFORMANCE**

<table>
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<th>PROW 72</th>
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<td>Total MMB Gross (MBH)</td>
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<td>96.20</td>
<td>101.10</td>
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<tr>
<td>Airflow MBB Gross (MBH)</td>
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<td>68.60</td>
<td>70.70</td>
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<td>Entering Fluid Temp (°F)</td>
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<td>95.0</td>
<td>95.0</td>
</tr>
<tr>
<td>Entering Air Temp (°F)</td>
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<td>95.9766.0</td>
<td>95.9766.0</td>
</tr>
<tr>
<td>Leaving Air Temp (°F)</td>
<td>65.6/65.5.5</td>
<td>64.1/63.2</td>
<td>63.2/62.4</td>
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<tr>
<td>Leave Air Temp (°F)</td>
<td>66.4/65.8</td>
<td>65/65.5</td>
<td>64.2/62.8</td>
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<td>Face Velocity</td>
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<td>Evaporator Face Area</td>
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<td>Evaporator Raws</td>
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<tr>
<td>Evaporator FPI</td>
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<td>EER @ Operating Conditions</td>
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<td>15.6</td>
<td>14.6</td>
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<td>MBH Rejected (MBH)</td>
<td>92.10</td>
<td>114.00</td>
<td>121.30</td>
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<td>Watts</td>
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<td>5964.9</td>
<td>6891.29</td>
</tr>
<tr>
<td>Fluid Flow (gpm)</td>
<td>35.00</td>
<td>35.00</td>
<td>35.00</td>
</tr>
</tbody>
</table>

1. Compare the following information to the specified values on the equipment schedule and select the best match.

   - LAT DB/WB
   - LAT DB for heating
   - LAT Unit
   - Total Cooling Capacity
   - Sensible Capacity
   - MCA/MFS
   - Cabinet size - consider options to move to a smaller cabinet that will still meet performance requirements.

2. Select the unit by clicking on the model button at the top of the grid.
3. The ACE Interface will output a selection summary based on the model chosen.

4. Click **Back to Schedule** to add the unit to the project grid.

5. To change the selection, click **Re-Select**.

6. In the **Project Schedule** menu, select the **Price** icon.

7. Select the final features and options by clicking the **Edit** button.
8. After selecting the final features and options, click the **Update Price** and **Save** buttons in the **Pricing Summary** box above.

9. Click **Back to Schedule** to add additional units to the project.

**Manual Unit Selection**

The process for creating a project and adding units to the project is the same when preparing for manual selection. After a unit has been added to the project and the **Design Inputs** section has been completed, the process for manual selection diverges.

As previously covered, the **Optimize for Price** option sets up a general set of guidelines that the ACE Interface uses to provide a suitable match. When manually selecting a unit, there are important unit criteria that must be hand selected in the absence of **Optimize for Price** logic. These include:

- Number of DX coil rows
- Refrigeration options
  - Single circuit reheat (On/Off or Modulating)
  - Dual circuit reheat (On/Off or Modulating)
  - Subcooling coil
- Filters (similar to the requirement for Optimize for Price selections)
- Ventilation (similar to the requirement for Optimize for Price selections)

Due to the large number of potential selections within this product line, it is often a best practice to run an **Optimize for Price** selection as a guide to potential cabinets, condenser fan configurations and reheat/subcooling combinations.
When reviewing the output from the initial **Optimize for Price** selection, note the various unit criteria used to provide the desired LAT DB/WB from the DX coil and unit. This will help save time when backtracking to make the selection manually.

1. To make a manual unit selection, deselect the **Optimize for Price** feature of the ACE Interface in the **Heat Pump** menu box.

   When this box is deselected, notice that the following inputs disappear:
   - Desired Min Coil LAT
   - Desired Max Coil LAT
   - Desired Unit LAT
   - Reheat Type
2. If an **Optimize for Price** selection was previously completed, enter noted unit specifications in the **Design Inputs** section. Manual selection of all values within the **Design Inputs** section is not required. The **Auto** feature of many values can remain even during the manual selection process.
3. Enter the **Entering Fluid Temp** (cooling) and the **EAT DB** and **EAT WB** in the **Heat Pump** box. Then enter the **Entering Fluid Temp** (heating) and **EAT DB** for heat pump heating.

4. The number of DX coil **Rows** must be selected in the **Heat Pump** menu. The information from an **Optimize for Price** selection can be used if run previously. If not, select 4 rows from the drop-down menu and return to this selection screen after calculating performance if the leaving air temperature is not within range.

5. Enter the **Fluid Flow**, **Fluid Type** and **Volume Glycol** in the Heat Pump menu.
6. Three baseline selections must be made in the **Features and Options** section. These include:

- Ventilation & Controls
- Filters
- Refrigeration Controls

The **Refrigeration Controls** selection has a large impact on the overall unit. Reheat and subcooling coil combinations directly affect the **Unit LAT** and can only be combined in specific configurations. When selecting the combination, keep in mind that only three coil slots are available.

*Slot 1 = DX coil - this is non-selectable.*
*Slot 2 = Reheat coil or sub cooling coil.*
*Slot 3 = Reheat coil or empty.*

For example, a unit is configured with reheat + sub cooling.

*Slot 1 would be the standard DX coil*
*Slot 2 would be the sub cooling coil*
*Slot 3 would be the single circuit reheat coil (On/Off or Modulating)*

7. After the baseline selections are made, click the **Calculate** button at the bottom of the screen.

8. Compare the selection results to find a unit that meets the required specifications and select by clicking the model button at the top of the **Packaged and Split Systems Possible Selections** menu.

9. If a suitable unit configuration is not found, return to the previous selection screen by clicking the **Cancel** button. Then make adjustments to the unit criteria and recalculate.
Appendix

Table 1: PR CABINET RULES

<table>
<thead>
<tr>
<th>Cabinet</th>
<th>Max CFM</th>
<th>Horizontal Discharge Limitation*</th>
<th>MAX Blower Size</th>
<th>MAX ECW</th>
<th>Max Furnace Capacity</th>
<th>Max Furnace XL Cabinet</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Cabinet</td>
<td>PRO:2,230, PRR:3,325</td>
<td>SA:3,300, RA:2,700</td>
<td>ECM355 (ECM Only)</td>
<td>ECW364</td>
<td>100 MBH Furnace (30 kW Electric)</td>
<td>N/A</td>
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<tr>
<td>B Cabinet</td>
<td>PRO:4,750, PRR:5,700</td>
<td>SA:5,200, RA:3,300</td>
<td>ECM450, BI16</td>
<td>ECW424</td>
<td>200 MBH Furnace (100 kW Electric)</td>
<td>(2)200 MBH</td>
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<td>C Cabinet</td>
<td>PRO:7,600, PRR:7,600</td>
<td>SA:7,000, RA:3,000</td>
<td>GHKM450, BI20</td>
<td>ECW486</td>
<td>300 MBH Furnace (100 kW Electric)</td>
<td>(2)400 MBH</td>
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<tr>
<td>D Cabinet</td>
<td>PRO:13,500, PRR:13,500</td>
<td>SA:10,000, RA:5,500</td>
<td>2-ECM450, BI25</td>
<td>ECW706</td>
<td>400 MBH Furnace (150 kW Electric)</td>
<td>(2)600 MBH</td>
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<tr>
<td>E Cabinet</td>
<td>PRO:20,000, PRR:20,000</td>
<td>XL Cabinet Only</td>
<td>SA:15,500, RA:2,700</td>
<td>(2) AF20, BI25, (2)ECM450</td>
<td>ECW8412</td>
<td>600 MBH Furnace (150 kW Electric)</td>
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*Contact the factory for Horizontal Return

Table 2: Furnace Control

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<tr>
<th>Furnace MBH Input</th>
<th>Furnace MBH Output</th>
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### Table 3: PRO Refrigeration Control Rules

<table>
<thead>
<tr>
<th>Compressor Type</th>
<th>How to Implement HGRH</th>
<th>How to Implement HGBP</th>
<th>Notes</th>
<th>How to Implement Liquid Subcooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Scroll/Single Circuit</td>
<td>Single Circuit</td>
<td>Required 100% OA applications. HGBP on the Lead circuit</td>
<td>PRO*096 and smaller</td>
<td>- Single Circuit HGRH (single circuit units can have reheat and subcooling coil)</td>
</tr>
<tr>
<td>Dual Scroll/ Dual Circuit</td>
<td>Dual Circuit Single Circuit</td>
<td>Dual Circuit HGBP</td>
<td>PRO*120 and larger</td>
<td>- Not recommended to select without reheat</td>
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<tr>
<td>Digital Scroll/Single Circuit</td>
<td>Single Circuit</td>
<td>No HGBP with Digital Scrolls.</td>
<td>PRO*096 and smaller Required on PROH/PROW</td>
<td></td>
</tr>
<tr>
<td>Single Digital Single Scroll(Dual Circuit)</td>
<td>Dual Circuit Single Circuit</td>
<td>Required 100% OA applications. HGBP on the Lag circuit</td>
<td>PRO*120 and larger</td>
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<tr>
<td>Dual Digital Scroll (Dual Circuit)</td>
<td>Dual Circuit Single Circuit</td>
<td>No HGBP with Digital Scrolls.</td>
<td>PRO*120 and larger Required on PROH/PROW</td>
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