Micro Channel Condenser Package Simulation
Software Genius version operation manual

From
Applied Engineering Solutions Co.
Setup procedure

Requirements
This software compatible with windows XP, Vista, Windows 7 & Windows 8

Setup
Installation our software is very easy, you only need follow the followings steps:
Many thanks for you’re trusting with our products please follow the followings steps to install the attached software’s:
1) You request put dongle on the request PC, then put Trend net (CD) in your PC to start the installing.
2) Then you request to remove the Trend net CD, & put Package CD, here you only request to making setup & then the software will installed by itself, after that icon will appear on your PC desktop, press double click, then select air cooled package simulation software.exe
Please note that you can install the software’s multi times at multi PC’S, but only one PC will be operate for each software at same time that connected to attach dongle.

Important Notes:
Please read operation manual carefully before setup & running the software.
The software will not running without putting dongle in the PC.
Micro Channel Condenser Package Simulation Software Genius version

Software Which design all unit components Compressor, Micro Channel Condenser coil specifications, Evaporator coil specifications, Expansion valve, Discharge size, Liquid size, Mixture size, Suction size, with ability for Comprehensive Performance Catalogue with excel file extracting ability, in addition to calculate Energy saving & Low ambient kit at different conditions with annual running cost.

We would like to introduce Applied Engineering Solutions as an innovative software development company in the fields of Air conditioning, Refrigeration & Freezing. Our long experience and professionalism of about 20 years has enabled us to develop software for all tasks related to the fields above.

Micro channel condenser package simulation software (Genius version) is done as complete LAB for technical, research, development (R&D), performance calculation, and design & optimizes selection for main refrigeration circuit components, configuration & specifications. All that by given the user the opportunity to select all specifications such as:

- Smart software which guide the designer for best & optimized selection by guiding him through many message & warning for selected unit specifications, in other words we advance the abstract of our experience in the software.
- Compressor optimized selection (Power supply, Type, Brand, Models & Quantity).
- Micro channel condenser & traditional evaporator optimized configuration & specifications with details.
- The facility of study & sense all variables affect (channel ort diam, tube width, leg #, rows #, fins type, fins material, fins number, fins thickness, air flow quantity, coil tube size, tube material, tube type, circuit #, ambient temp., coil area, refrigerant types...etc) & give very accurate result.
- All coil evaporator calculations are done according AHRI 410 specifications.
- The possibility of making cooling design & .
- All above facility are guiding the designer, & user all the probability & best optimization components selection for the unit, by control all the variables of the unit components selection.
Zeihl Axial Condenser Fan selection

![Image of software interface showing fan selection and data entry]

The system of units
- IM
- SI

Air quantity: 30000 CFM

Ziehl Fan: Qty 4

Fan model: FN550-ZA

Airflow volume: 5000

Static pressure / Total pressure: 50

Main supply: 1*230V 50Hz

Result:

- Lw(A) (Dn): 79.01
- Lw(A) (Dn): 77.87
- Lw(A) (Dn): 68.71
- Lw(A) (Dn): 60.69
- Power supply: 1*230V 50Hz
- n (rpm): 1011.97
- PF (F): 0.61
- Pd (F): 0.91
- Prex (V): 247.36
- qf (kW/h): 5000
- Ppd (kW/m3): 0.91
- SEP: 1
- UDF (V): 230
- Weight (kg): 1.2
Fan selection procedure:
Please note that you must fill data in cooling form then press calculate, new form will appear you can select Nicotra, Zeihl or air flow rate, if you select Nicotra, Zeihl new form will appear you must press Nicotra, Zeihl again.
That will let new form appear for Nicotra, Zeihl with Model selection bob up, Air flow rate in m3/hr & external static pressure in PA. If software give you ok that mean he accept data & selected fan is workable at request conditions otherwise you must select bigger or smaller fan.
After that you must press close at Nicotra, Zeihl fan.

Centrifugal Fan selection

Nicotra
Zeihl
New for Ultimate version:
- Catalogue for unit with Excel extracting at request conditions 3 different air flow rate, 3 different dry on coil temp., 3 different wet bulb on coil temp., & 5 different ambient temperatures.
- Dx pipe sizing for discharge, liquid, mixture & suction with many fittings (elbow 90 short or long radius, U bend 180, enlargement, contraction, shut off valve, solenoid valve, filter drier, check valve...etc), at request vertical (up word or down word) & horizontal distances.
- Refrigeration circuit analysis at each point to know exact enthalpy, pressure, temperature, entropy, specific volume, & quality.

- Refrigeration circuit schematic as per selected components.
- T-S chart & P-H chart at calculated conditions.
-Psychometric chart at calculated conditions.
- Expansion valve selection from Danfoss depending on conditions & calculated data.

- Energy saving with IPLV, or NPLV, & energy costing per year at request currency.
- Minimum ambient temp. That unit could be running & show you how to control through fan on off or adding frequency inverter depending on enters the percentage of air flow rate which suitable for this minimum ambient & check unit affect on unit running.
New for Genius version:

- Give designer the ability to select either Fan selection “Nicotra or Comfri” or select air flow rate.
- Save customer & project data & ability to retrieving its.
- Energy saving with adding part load data for Screw Compressors from BITZER brand name.

Features:

Input data:

- Compressor type selection (Screw, Scroll, Hermetic Reciprocating & Semi Hermetic Reciprocating).
- Company brand name selection (Copeland, Danfoss, Bitzer, and Hanbell & Refcomp).
- Compressor model selection & quantity either same compressors model or different.
- Micro Channel Condenser configurations & specifications selection such as:
  - Passage #.
  - Altitude above sea level.
  - Coil length.
  - Coil height.
  - Ambient temp.
  - Tube Height.
  - Tube Width.
  - Tube # 1.
  - Tube # 2.
  - Fins material (Aluminum or Copper).
  - Fins type (Flat, Wavy, Lanced or Louvered).
  - Fins thickness.
  - Leg #.
  - Leg Thickness.
  - Wall Thickness
  - Air flow quantity.
  - Motor power consumption.

- Evaporator data such as:
  - Coil tube size (5/16”; 3/8”; 1/2” & 5/8”).
  - Altitude above sea level.
  - Coil length.
  - Coil height.
  - Ambient temp.
  - Tube vertical distance.
  - Tube horizontal distance.
  - Circuit #.
  - Fins material (Aluminum or Copper).
  - Fins type (Flat, Wavy, Lanced or Louvered).
  - Fins thickness.
  - Fins per length.
  - Tube material (Aluminum or Copper).
  - Tube shape (Smooth or enhanced).
  - Rows # (1, 2, 3, 4 & 6)
  - Air flow quantity.
  - Motor power consumption.
Output:
- Total capacity.
- Compressor power consumption.
- Fan power consumption.
- Condensing temp.
- Evaporating temp.
- Off coil dry bulb temp.
- Off wet coil bulb temp.
- Condenser air static pressure.
- Condenser air velocity.
- Condenser refrigerant pressure drop.
- Evaporator air static pressure.
- Evaporator air velocity.
- Evaporator refrigerant pressure drop.
- COP.
- EER.

Summary:
- The possibility to calculate depending on your preferred unit measurement SI or Imperial.
- Optimized selection of all unit main components.
- Specify exactly all configurations or specifications of unit components after checking all variables affect to match the designer (user) requirements.
- Saving time & money for assemble many prototypes with many variables for checking & testing to get the result, so this software will show you the affect of all variables on the unit directly only by one press.
- Increase your competitive by give you the ability to get the result in very short time, which increase your plant flexibility.
- Add for manufacturer the facility of making & design the custom made unit which match special customer requirements.
- Give the consultant & contractor the possibility of checking the unit operation conditions.
- Checking the unit at high & low ambient.
- Checking the summer conditions for cooling.
- Depending on the result the designer & engineer can select the optimized expansion valve.
- Training your staff with all variables & its affect on the unit.
- All above that with very accurate data & very competitive price.
- Dx pipe sizing for discharge, liquid, mixture & suction line.
- Refrigeration circuit analysis
- Refrigeration circuit schematic
- Expansion valve selection
- IPLV or NPLV calculation
- Calculation of running cost depending on yearly hour operation is any request currency.
- Catalogue at many different conditions dry & wet on coil bulb temp., air flow rate & ambient temp.
  At one press.
- Low ambient kit study possibility, to determine the minimum ambient that your design unit could be run.
- Professional report with all required data.
- Separate circuit sub cooling in addition to integrated sub cooling.
- Save performance & customers data & ability for retrieving its
- Adding Part load for Compressor Screw from BITZER.
- The ability to select either Evaporator air flow rate or Centrifugal Fan either Comfri & Nicotra.
- Control all micro channel condenser specifications.
### INPUT DATA

- **Power Supply:** 380-415/3/60Hz
- **Compressor Type:** Scroll
- **Company Name:** Copeland
- **Refrigerant Type:** R22
- **Compressor Model 1:** ZR72KCE
- **Compressor Model 2:** ZR72KCE
- **Compressor Model 3:** ZR72KCE

#### Condenser

- **Altitude:** 0 ft
- **Coil Length:** 76 inch
- **Coil Height:** 45 inch
- **Fins Material:** Aluminum
- **Fins Type:** Wavy
- **Ambient Temp.:** 95 °F
- **Tube Height:** 0.08 inch
- **Wall Thickness:** 0.0215 inch
- **Tube Width:** 0.71 inch
- **Log Thickness:** 0.0215 inch
- **Passage #:** 2
- **Leg #:** 10
- **Tube Number 1:** 55
- **Tube Number 2:** 25
- **Air Quantity:** 17000 CFM
- **Condenser Motor Power Input:** 0 W

#### Evaporator

- **Coil Size:** 3/8
- **Dry On Coil Temp.:** 80 °F
- **Wet On Coil Temp.:** 67 °F
- **Relative Humidity:** 50.79%
- **Fins Material:** Aluminum
- **Fins Type:** Wavy
- **Fins Thickness:** 0.0055 inch
- **Fins per Length:** 12 inch
- **Coil Length:** 64 inch
- **Coil Height:** 28 inch
- **Tube Material:** Copper
- **Tube Shape:** Smooth
- **Rows #:** 6
- **Tube Vertical Distance:** 1 inch
- **Tube Horizontal Distance:** 0.87 inch
- **Air Quantity:** 6500 CFM
- **Evaporator Motor Power Input:** 4290 W
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Ambient Temp.</td>
<td>95°F</td>
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<tr>
<td>Capacity</td>
<td>217053.64 Btuh</td>
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<tr>
<td>Compressor Power Consumption</td>
<td>14906.73 W</td>
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<td>Fan Power Consumption</td>
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<td>Sensible Capacity</td>
<td>150696.09 Btuh</td>
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<td>Dry off Coil Temp.</td>
<td>58.94°F</td>
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<tr>
<td>Wet off Coil Temp.</td>
<td>57.74°F</td>
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<tr>
<td>Condensing Temp.</td>
<td>124.93°F</td>
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<tr>
<td>Evaporating Temp.</td>
<td>49.76°F</td>
</tr>
<tr>
<td>Condenser Static Pressure</td>
<td>0.03 inch H2O</td>
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<tr>
<td>Evaporator Static Pressure</td>
<td>0.94 inch H2O</td>
</tr>
<tr>
<td>Subcooling Temp.</td>
<td>28.7°F</td>
</tr>
<tr>
<td>Superheating Temp.</td>
<td>7.2°F</td>
</tr>
<tr>
<td>Air Velocity Condenser</td>
<td>715.79 ft/min</td>
</tr>
<tr>
<td>Air Velocity Evaporator</td>
<td>522.32 ft/min</td>
</tr>
<tr>
<td>Condenser Air Quantity</td>
<td>17000.14 CFM</td>
</tr>
<tr>
<td>Evaporator Air Quantity</td>
<td>6500.06 CFM</td>
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<td>Condenser Refrigerant Pressure Drop</td>
<td>0.34 Psi</td>
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<tr>
<td>Evaporator Refrigerant Pressure Drop</td>
<td>33.28 Psi</td>
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<tr>
<td>On Coil Humidity</td>
<td>78.8 grain/lb</td>
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<tr>
<td>Off Coil Humidity</td>
<td>69.57 grain/lb</td>
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<tr>
<td>Relative Humidity</td>
<td>92.9 %</td>
</tr>
<tr>
<td>Refrigerant Charge</td>
<td>27.68 lb</td>
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</tbody>
</table>

Prepared By

Checked By

Approved By
**DX Pipe Sizing Software**

**Project Name**

**Date** 7/17/2013 3:34:07 PM

<table>
<thead>
<tr>
<th>Refrigerant Type:</th>
<th>R22</th>
<th>Evaporating Temp.:</th>
<th>37.89 °F</th>
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<tr>
<td>Refrigerant Circuit #:</td>
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<td>120.31 °F</td>
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<td>Capacity:</td>
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<td>Isentropic Efficiency:</td>
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**Discharge Line**

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<thead>
<tr>
<th>Pipe Size:</th>
<th>Design</th>
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<tbody>
<tr>
<td>Horizontal Length:</td>
<td>16.4 ft</td>
</tr>
<tr>
<td>Vertical Length:</td>
<td>3.3 ft</td>
</tr>
<tr>
<td>UpWard</td>
<td></td>
</tr>
<tr>
<td>Elbows 90:</td>
<td>Long Radius 0</td>
</tr>
<tr>
<td>Elbows 45:</td>
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</tr>
</tbody>
</table>

Velocity: 2138.228 ft/min  
Pressure Drop: 1.092 Psi  
Pipe Size: 3/4

**Liquid Line**

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<th>Pipe Size:</th>
<th>Design</th>
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<tbody>
<tr>
<td>Horizontal Length:</td>
<td>16.4 ft</td>
</tr>
<tr>
<td>Vertical Length:</td>
<td>3.3 ft</td>
</tr>
<tr>
<td>UpWard</td>
<td></td>
</tr>
<tr>
<td>Elbows 90:</td>
<td>Long Radius 0</td>
</tr>
<tr>
<td>Elbows 45:</td>
<td></td>
</tr>
<tr>
<td>U Bend 180:</td>
<td>0</td>
</tr>
</tbody>
</table>

Velocity: 486.337 ft/min  
Pressure Drop: 5.206 Psi  
Pipe Size: 3/8
DX Pipe Sizing Software

Mixing Line

Pipe Size: Design
Horizontal Length: 1.6 ft
Vertical Length: 0 ft

U Bend 180: 0
Contraction: 1/2 0
Enlargement: 1/2 0

UpWard Shutt Off Valve: 0

Elbows 90: Long Radius 0
Elbows 45: 0

Velocity: 1492.207 ft/min
Pressure Drop: 0.043 Psi
Pipe Size: 1/2

Suction Line

Pipe Size: Design
Horizontal Length: 16.4 ft
Vertical Length: 3.3 ft

U Bend 180: 0
Contraction: 1/2 0
Enlargement: 1/2 0

UpWard Shutt Off Valve: 0

Elbows 90: Long Radius 0
Elbows 45: 0

Velocity: 4081.615 ft/min
Pressure Drop: 0.949 Psi
Pipe Size: 1 1/8

DATA

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<tr>
<th>Point</th>
<th>T</th>
<th>P</th>
<th>V</th>
<th>H</th>
<th>S</th>
<th>X</th>
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<td>6.16</td>
<td>0.041</td>
<td>407.999</td>
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<td>0.004</td>
<td>219.788</td>
<td>1.078</td>
<td>0.079</td>
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</tbody>
</table>

Prepared By
Checked By
Approved By

### DX Pipe Sizing Report

**Refrigerant Type:** R22  
**Refrigerant Flow:** 80598.48 kg/h  
**Capacity:** 9.6 kW  
**Isentropic Efficiency:** 99%  
**Evaporating Temp.:** 9.86 °C  
**Suctioning Temp.:** 90.52 °C  
**Subcooling Temp.:** 5 °C  
**Superheating Temp.:** 5 °C

#### Discharge Line

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Design</th>
<th>U Bend 180</th>
<th>Contraction</th>
<th>Enlargement</th>
<th>Shutoff Valve</th>
<th>Tee</th>
<th>Elbow 90: Long Radius</th>
<th>Tee</th>
<th>Elbow 45:</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
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<td>0</td>
<td>1/2</td>
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</tbody>
</table>

**Velocity:** 10.072 m/s  
**Pipe Size:** 1/2  
**Pressure Drop:** 0.1 Bar

#### Liquid Line

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Design</th>
<th>Contraction</th>
<th>Enlargement</th>
<th>Shutoff Valve</th>
<th>Tee</th>
<th>Elbow 90: Long Radius</th>
<th>Tee</th>
<th>Elbow 45:</th>
<th>U Bend 180</th>
<th>Tee</th>
<th>Elbow 90: U Bend 180</th>
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</table>

**Velocity:** 1.248 m/s  
**Pipe Size:** 3/8  
**Pressure Drop:** 0.091 Bar

#### Mixing Line

<table>
<thead>
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<th>Pipe Size</th>
<th>Design</th>
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<th>Contraction</th>
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</table>

**Velocity:** 7.869 m/s  
**Pipe Size:** 1/2  
**Pressure Drop:** 0.002 Bar
**Suction Line**

<table>
<thead>
<tr>
<th>Pipe Size:</th>
<th>Design</th>
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<tr>
<td>Horizontal Length:</td>
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<td>Vertical Length:</td>
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<tr>
<td>Elbows 45:</td>
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<table>
<thead>
<tr>
<th>Velocity:</th>
<th>14.601 m/s</th>
<th>Pressure Drop:</th>
<th>0.95 Bar</th>
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<tbody>
<tr>
<td>Pipe Size:</td>
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</table>

**DATA**

<table>
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<tr>
<th>$d$ (in)</th>
<th>$L$ (ft)</th>
<th>$V$ (ft/min)</th>
<th>$H$ (ft)</th>
<th>$S$ (ft)</th>
<th>$f$</th>
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<td>0.012</td>
<td>447.523</td>
<td>1.775</td>
<td>0.0</td>
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<tr>
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<td>0.012</td>
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<td>44.82</td>
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<td>209.830</td>
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<tr>
<td>14.86</td>
<td>4.133</td>
<td>0.036</td>
<td>209.830</td>
<td>1.743</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Limitation Messages in Cooling form

Ambient temperature values must be between (65°F – 130°F) in imperial, and (18.33°C – 54.4°C) in SI. Otherwise the following message will appear:

(“Note: The Maximum and Minimum Ambient Temp. is 130°F and 32°F, respectively.”) In Imperial
(“Note: The Maximum and Minimum Ambient Temp. are 54.4°C and 18.33°C, respectively.”) In SI

On coil dry bulb temperature value must be between (65°F - 115°F) in imperial and (18.33°C – 46.1°C) in SI. Otherwise the followings message will appear:

(“Note: The Maximum and Minimum On Coil Dry Temp. is 115°F and 65°F, respectively.”) In Imperial
(“Note: The Maximum and Minimum On Coil Dry Temp. is 46.1°C and 18.33°C, respectively.”) In SI

On coil wet bulb temperature value must be between (65°F - 90°F) in imperial and (18.33°C – 32.2°C) in SI. Otherwise the following message will appear:

(“Note: The Maximum and Minimum On Coil Wet Temp. is 90°F and 65°F, respectively.”) In Imperial
(“Note: The Maximum and Minimum On Coil Wet Temp. is 32.22°C and 18.33°C, respectively.”) In SI

On coil Relative Humidity (RH%) must be between (0% – 100%) in. Otherwise the following message will appear:

(“Note: The Maximum and Minimum Relative Humidity is 100% and 0%, respectively.”)

Altitude above sea level value must be between (0 ft – 20000ft) in imperial and (0 m – 6096m) in SI. Otherwise the following message will appear:

(“Note: The Maximum and Minimum Altitude is 20000ft and 0ft, respectively.”) In Imperial
(“Note: The Maximum and Minimum Altitude is 6096m and 0m, respectively.”) In SI

Compressor qty for first compressor must be between (1 up to 12), otherwise the following message will appear:

(“Note: The Maximum and Minimum Compressor number is 12 and 1, respectively.”)

Compressor qty for second & third compressor must be between (0 up to 12), otherwise the following message will appear:

(“Note: The Maximum and Minimum Compressor number is 12 and 0, respectively.”)

Fan motor consumption limitation is between (0w – 100000w) for both evaporator & condenser. Otherwise the following message will appear:

(“Note: The Maximum and Minimum Motor Fan Consumption is 100000W and 0, respectively.”)

Fins thickness value must be between (0.001 inch – 0.01 inch) in imperial and (0.0000254m – 0.000254m) in SI. Otherwise the following message will appear:

(“Note: The Maximum and Minimum Fins Thickness is 0.01 inch and 0.001 inch, respectively.”) In Imperial
(“Note: The Maximum and Minimum Fins Thickness is 0.000254m and 0.0000254m, respectively.”) In SI
Errors message in Cooling form

You must follow the following procedure exactly, otherwise software will not complete calculation.

Please be sure that you select power supply, compressor type, compressor brand, refrigerant type, then compressor model in the same arrangement to prevent the following messages appearing:

("Please reselect Refrigerant Type, Compressor Type, Compressor Model, Power Supply or Company Name")

When micro-channel condenser coil is very big related to selected compressor model & qty, the following message will appear:

("Please change condenser input data")

We recommend here to increase compressor size or qty, or decrease condenser size (length, height, rows, airflow rate, circuiting..etc).

When calculated condensing temperature is higher than compressor envelope condensing temperature, the following message will appear:

("Please enlarge condenser input data")

When calculated RH% & found less than 0%, the following message will appear:

("Please increase wet bulb on coil temp. or decrease dry bulb on coil temp.")

On coil wet bulb temperature must be less than on coil dry bulb temperature, otherwise the following message will appear:

("Please reenter On Coil Wet Bulb Temp.")

Circuit number must be bigger than Zero, otherwise the following message will appear:

("Please note the circuit number must be above zero")

When calculated off coil wet bulb temperature is less than -24 C, the following message will appear:

("Please increase dry and wet bulb on coil temperature")

When calculated evaporating temperature is higher than off coil wet bulb temperature, the following message will appear:

("Please increase wet bulb on coil temperature or increase evaporator coil dimension, rows or airflow rate")

When calculated evaporating temperature is less than -25 C, the following message will appear:

("Please enlarge Evaporator input data")

When calculated evaporating temperature is higher than 30 C, the following message will appear:

("Please reduce Evaporator input data")

When face velocity is less than 1.062 m/s or higher than 5.08 m/s for condenser coil, the following message will appear:

("Reenter Condenser Air Quantity")

When face velocity is less than 1.062 m/s or higher than 3.048 m/s for evaporator coil, the following message will appear:

("Reenter evaporator Air Quantity")

Warning messages in cooling & heat pump form

This type of message will appear, when user press OK or enter the software will complete calculation & will showing all results.

When calculated condensing temperature is less than 27 C, the following warning will appear:

("Please increase compressor size or decrease condenser size", "Warning")

When calculated evaporating temperature is less than -28 C, the following warning will appear:

("Please decrease compressor size or increase evaporator size", "Warning")
Please note that the recommended face velocity less than 0.762 m/s or higher than 4.064 m/s for condenser coil, the followings message ("Please note the recommended air velocity for condenser coil between 150 ft/min. and 800 ft/min.", "Warning" in imperial
("Please note the recommended air velocity for condenser coil between 0.762 m/s and 4.064 m/s", "Warning" in SI

Please note that the recommended face velocity less than 0.762 m/s or higher than 3.048 m/s for evaporator coil, the followings message ("Please note the recommended air velocity for condenser coil between 150 ft/min. and 600 ft/min.", "Warning" in imperial
("Please note the recommended air velocity for condenser coil between 0.762 m/s and 3.048 m/s", "Warning" in SI

Please note that the recommended refrigerant pressor drop in condenser coil between 2 Psi up to 15 Psi in imperial, 13600 kpa up to 100000 kpa in SI, otherwise the followings message will appear ("Please note the recommended condenser refrigerant pressure drop between 2 Psi and 15 Psi", "Warning", in imperial
("Please note the recommended condenser refrigerant pressure drop between 13600 Pa and 100000 Pa", "Warning", in SI.

Please note that the recommended refrigerant pressor drop in evaporator coil between 2 Psi up to 15 Psi in imperial, 13600 kpa up to 100000 kpa in SI, otherwise the followings message will appear Please note the recommended evaporator refrigerant pressure drop between 2 Psi and 15 Psi", "Warning", in imperial
("Please note the recommended evaporator refrigerant pressure drop between 13600 Pa and 100000 Pa", "Warning", in SI.

When calculated condensing temperature less than 27 C, the following message will appear to decrease condenser coil or increase compressor size or quantity.
("Please increase compressor size or decrease condenser size", "Warning", )

When calculated evaporating temperature less than -28 C, the following message will appear to increase evaporator coil or decrease compressor size or quantity.
("Please decrease compressor size or increase evaporator size", "Warning").
Errors message in DX Cooling form

For DX pipe sizing form either cooling or heat pump, the followings errors and message may appear, please read carefully.

Refrigerant circuit must be between (1 up to 20), otherwise the followings message will appear (“Please Refrigeration Circuit # must be larger than one and less than 20”)

Evaporating temperature must be higher than -25 C up to 15 C in SI & -13 F up to 59 F in imperial, otherwise the followings message will appear (“Please note evaporating temp. must be between -25°C and 15°C”) in SI & (“Please note evaporating temp. must be between -13°F and 59°F”) in imperial.

Condensing temperature must be higher than 30 C up to 65 C in SI & 86 F up to 149 F in imperial, otherwise the followings message will appear (“Please note condensing temp. must be between 30°C and 65°C”) in SI & (“Please note condensing temp. must be between 86°F and 149°F”) in imperial.

Subcooling must be between 0 up to 30 K in SI & 0 F up to 54 F in imperial, otherwise the followings message will appear (“Please note subcooling temp. must be between 0K and 30K”) in SI & (“Please note subcooling temp. must be between 0°F and 54°F”) in imperial.

Superheating must be between 0 up to 30 K in SI & 0 F up to 54 F in imperial, otherwise the followings message will appear (“Please note superheating temp. must be between 0K and 30K”) in SI & (“Please note superheating temp. must be between 0°F and 54°F”) in imperial.

Isentropic efficiency must be between 0.5 up to 0.99, otherwise the followings message will appear (“Please note Isentropic Efficiency must be between 0.5 and 0.99”)

Capacity range to can use DX pipe sizing between 100 w up to 1000000 watt in SI & 341 btuh up to 3412190 btuh in imperial, otherwise the followings message will appear (“Please note Capacity must be between 100 W and 1000000 W”) in SI & (“Please note Capacity must be between 341 BTUH and 3412190 BTUH”) in imperial.

For Discharge line the followings message may appear
(“No Data for Discharge line because the range of velocity and pressure drop, respectively, are: 984ft/min to 2952ft/min , 0 to 14.7Psi”)
Or
(“No Data for Discharge line because the range of velocity and pressure drop, respectively, are: 5m/s to 15m/s , 0 to 1Bar”)

For Liquid line the followings message may appear
(“No Data for Liquid line because the range of velocity and pressure drop, respectively, are: 149ft/min to 500ft/min , 0 to 29.4Psi”)
Or
(“No Data for Liquid line because the range of velocity and pressure drop, respectively, are: 0.76m/s to 2.54m/s , 0 to 2Bar”)


For Mixture line the following message may appear
("No Data for Mixture line because the range of velocity and pressure drop, respectively, are: 196ft/min to 4921ft/min, 0 to 5.88Psi")
Or
("No Data for Mixture line because the range of velocity and pressure drop, respectively, are: 0.1m/s to 25m/s, 0 to 0.4Bar")

For Suction line the following message may appear
("No Data for Suction line because the range of velocity and pressure drop, respectively, are: 984ft/min to 4921ft/min, 0 to 2.94Psi")
Or
("No Data for Suction line because the range of velocity and pressure drop, respectively, are: 5m/s to 25m/s, 0 to 0.2Bar")

For capillary or restrictor either cooling or heat pump in expansion valve devise selection, please note that the maximum capacity for both capillary & restrictor is 64500 BTUH in imperial, and 18.9 kw in SI, otherwise you must select expansion valve.
("No Data for Capacity more than 64500 Btuh, please select Expansion Valve")

When Unit capacity higher than expansion valve capacity the followings message will appear ("Please select Bigger Expansion Valve Model")

When Unit capacity less than 60% of expansion valve capacity the followings message will appear ("Please select Smaller Expansion Valve Model")
Flat Fins

Wavy Fins

Lanced Fins
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