# In-Duct High Pressure Nozzle Humidification System
**HP HVAC Series Submittal Drawings**

<table>
<thead>
<tr>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Name:</td>
</tr>
<tr>
<td>Contractor:</td>
</tr>
<tr>
<td>Contractor or Order No.:</td>
</tr>
<tr>
<td>Engineer:</td>
</tr>
<tr>
<td>Agent:</td>
</tr>
<tr>
<td>Agent P.O. No.:</td>
</tr>
<tr>
<td>Date Ordered:</td>
</tr>
<tr>
<td>Date Required:</td>
</tr>
</tbody>
</table>

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**Condair (USA) Inc.**  
2700 90th Street, Sturtevant, WI 53177 Tel: 262.884.4669

**Condair (Canada) Ltd.**  
2740 Fenton Road, Ottawa, ON K1T 3T7 Tel: 613.822.0335

**1-866-667-8321**  
Email: na.info@condair.com  
Fax: 613.822.7964
Water Inlet (RG 3/4")
(½” or 3/4” Barb Fitting Provided)

HP Outlet
(Use Supplied Hose)

51.2 in.
1301 mm

26.0 in.
660 mm

19.7 in.
500 mm

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HP Series - HP 100, 200VFD, 300, 500, 500VFD, 800, 800VFD, 1300VFD
December, 2018
HP Outlet (Use Supplied HP Hose)

RO Supply (From Tank)

RO Bypass (Return to Tank)

RO Supply (To Tank)

Drain Connector (O 1.25 in. / 32 mm)
Min. Diameter of Drain Hose: O 1.60 in / 40 mm

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HP Series - HPRO
HPRO 800, HPRO 800VFD
December, 2018

55.1 in. 1400 mm

63.0 in. 1601 mm

27.6 in. 700 mm
HP Series - HPRO 500 and 800
132 gallons (500 L) Tank
December, 2018
Technical specifications for high pressure hose:

Construction:
Inner tube: Polyester elastomer
Reinforcement: Wire of tensile carbon steel with brass
Cover: Polyurethane

Temperature range:
-40 °C to 98 °C
-40 °F to 208 °F

<table>
<thead>
<tr>
<th>Item no.</th>
<th>EX 1.1</th>
<th>EX 1.2</th>
<th>EX 1.4</th>
<th>EX 1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose dimension</td>
<td>inch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/16&quot;</td>
<td>1/8&quot;</td>
<td>1/4&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>Hose inner diameter</td>
<td>mm</td>
<td>1.91 ±0.1</td>
<td>3.35 ±0.1</td>
<td>6.48 ±0.15</td>
</tr>
<tr>
<td>Hose outer diameter</td>
<td>mm</td>
<td>5.54 ±0.1</td>
<td>6.98 ±0.15</td>
<td>11.68 ±0.15</td>
</tr>
<tr>
<td>Max. Operating pressure</td>
<td>bar</td>
<td>100</td>
<td>350</td>
<td>325</td>
</tr>
<tr>
<td></td>
<td>Psi</td>
<td>1,450</td>
<td>5,076</td>
<td>4,713</td>
</tr>
<tr>
<td>Min. burst pressure @20°C</td>
<td>bar</td>
<td>400</td>
<td>1,400</td>
<td>1,300</td>
</tr>
<tr>
<td></td>
<td>Psi</td>
<td>5,801</td>
<td>20,305</td>
<td>18,655</td>
</tr>
<tr>
<td>Min. bend radius</td>
<td>in (mm)</td>
<td>1.12 (30)</td>
<td>1.38 (35)</td>
<td>2.17 (55)</td>
</tr>
<tr>
<td>Nominal weight</td>
<td>g/m</td>
<td>38</td>
<td>60</td>
<td>165</td>
</tr>
</tbody>
</table>

Only to be used with stainless steel hose couplings supplied by Condair

<table>
<thead>
<tr>
<th>Coupling type</th>
<th>Item no.</th>
<th>EX 1.1</th>
<th>EX 1.2</th>
<th>EX 1.4</th>
<th>EX 1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>Item no.</td>
<td>160.000.000</td>
<td>160.001.000</td>
<td>160.005.000</td>
<td>160.006.000</td>
</tr>
</tbody>
</table>

Properties:

- Safety thermoplastic hose to work at high operating pressures
- Excellent flexibility and flex fatigue
- Excellent resistance to chemicals and solvents
- UV and ozone resistant
- Suitable for water based hydraulics up to 70 °C
- Excellent abrasion resistance
- Low volumetric expansion for quick hydraulic response time
- Static free – 100 % electrical conductivity
- Exceeds SAE 100 R1, R2 and DIN requirements
- Min flow resistance
- Low weight per meter

Condair
HP Series -
High-Pressure Flexible Hose
December, 2018
<table>
<thead>
<tr>
<th>Specifications</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nozzle</strong></td>
<td>5.5</td>
<td>9.9</td>
<td>13.2</td>
</tr>
<tr>
<td>lbs/hr</td>
<td>2.5</td>
<td>4.5</td>
<td>6</td>
</tr>
<tr>
<td>l/hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>3.74 - 5.5</td>
<td>7.7 - 11</td>
<td>9.9 - 14.3</td>
</tr>
<tr>
<td>lbs/hr</td>
<td>1.7 - 2.5</td>
<td>3.5 - 5.0</td>
<td>4.5 - 6.5</td>
</tr>
<tr>
<td>l/hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working Pressure</strong></td>
<td>507.63 - 1015.26</td>
<td>507.63 - 1015.26</td>
<td>507.63 - 1015.26</td>
</tr>
<tr>
<td>PSI</td>
<td>35-70</td>
<td>35-70</td>
<td>35-70</td>
</tr>
<tr>
<td>Bar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>316 Stainless Steel</td>
<td>316 Stainless Steel</td>
<td>316 Stainless Steel</td>
</tr>
<tr>
<td>Thread</td>
<td>12/24 UNC/2A</td>
<td>12/24 UNC/2A</td>
<td>12/24 UNC/2A</td>
</tr>
<tr>
<td>Non-Drip Valve</td>
<td>Standard</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Filter</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Requirements for Conductivity μS/cm*</td>
<td>5 &lt; EC &lt; 1000</td>
<td>5 &lt; EC &lt; 1000</td>
<td>5 &lt; EC &lt; 1000</td>
</tr>
</tbody>
</table>

*N*Lower conductivity results in longer service life and a lower risk for blockage*

Nortec HP nozzles are specifically designed to atomize water without the use of impingement pins or compressed air. Water under pressure is sprayed though an orifice which produces droplets between 5 and 10 microns in size. The nozzles are constructed from 316SS to ensure durability and long life. The nozzles also have a built-in anti-drip check valve to prevent dripping after the system has shut down.
### Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Length (in)</th>
<th>Length (mm)</th>
<th>Nozzle Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Bracket 420</td>
<td>19.5</td>
<td>495</td>
<td>3</td>
</tr>
<tr>
<td>Base Bracket 620</td>
<td>25.4</td>
<td>645</td>
<td>4</td>
</tr>
<tr>
<td>Base Bracket 820</td>
<td>33.1</td>
<td>840</td>
<td>5</td>
</tr>
<tr>
<td>Base Bracket 1020</td>
<td>41.1</td>
<td>1045</td>
<td>6</td>
</tr>
</tbody>
</table>

1/4" HP Hose Connection

L = Length

1.3 in. 33 mm

1.2 in. 30 mm

7.9 in. 200 mm

0.5 in. 12 mm

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HP Series
Nozzle Manifold Base Assembly
December, 2018
<table>
<thead>
<tr>
<th>Description</th>
<th>Length (in)</th>
<th>Length (mm)</th>
<th>Nozzle Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension Bracket 562</td>
<td>24.0</td>
<td>610</td>
<td>3</td>
</tr>
<tr>
<td>Extension Bracket 762</td>
<td>31.9</td>
<td>810</td>
<td>4</td>
</tr>
<tr>
<td>Extension Bracket 962</td>
<td>40.0</td>
<td>1015</td>
<td>5</td>
</tr>
<tr>
<td>Extension Bracket 1162</td>
<td>48.0</td>
<td>1220</td>
<td>6</td>
</tr>
<tr>
<td>Description</td>
<td>Height (in)</td>
<td>Height (mm)</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Mounting Rod, 0.5m</td>
<td>19.7</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Mounting Rod, 1.0m</td>
<td>39.4</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>
HP Series Droplet Separator

The Droplet Separator is a single bank droplet removal system, designed to capture water within its media. Entrained water is either evaporated by the passing airflow, increasing water efficiency, or flows down towards the drain pan at the bottom of the duct section.

The droplet separator is commonly installed at a slight upstream angle (10° - 30°). When installed this way, the top of the droplet separator is farther upstream than the bottom, and airflow drives the water downwards to the drains.

For duct sizes in between the standard sizes, the next largest droplet separator is ordered and trimmed to fit during installation.

Media Specifications:
Color: White
Coatings: Antimicrobial
UV: Compatible with UV duct sterilization
Thickness: 1" nominal
Basis Weight: 1 oz. per square foot
UL Rating: 900 Class 2

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2529872</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2529869</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>2529864</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>2529871</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>2529868</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2529863</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>2529870</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>2529867</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>2529862</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>2529866</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>2529861</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>2529865</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>2529860</td>
<td>20</td>
<td>12</td>
</tr>
</tbody>
</table>

Pressure Drop Across Wet Droplet Separator (in. H2O)
# Water Quality Requirements

## HP Series

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Supply</td>
<td>Reverse Osmosis of Demineralized Water</td>
</tr>
<tr>
<td>Conductivity</td>
<td>5 - 50 μS/cm</td>
</tr>
<tr>
<td>Total Dissolved Solids (TDS)</td>
<td>Maximum 35 mg/l</td>
</tr>
<tr>
<td>Potassium Permanganate (KMnO₄)</td>
<td>Maximum 10 mg/l</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Maximum 1 NTU</td>
</tr>
<tr>
<td>Temperature</td>
<td>Maximum 15°C (60°F)</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>Maximum 0.2 mg/l</td>
</tr>
<tr>
<td>Manganese (Mn)</td>
<td>Maximum 0.05 mg/l</td>
</tr>
<tr>
<td>Maximum Hardness</td>
<td>Maximum 1° dH (18 ppm CaCO₃)</td>
</tr>
<tr>
<td>Free Chlorine</td>
<td>Maximum 0.1 mg/l</td>
</tr>
</tbody>
</table>

## HP RO Series

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Supply</td>
<td>Potable Water</td>
</tr>
<tr>
<td>Conductivity</td>
<td>250 - 1000 μS/cm</td>
</tr>
<tr>
<td>Silt Index</td>
<td>Maximum 3</td>
</tr>
<tr>
<td>Potassium Permanganate (KMnO₄)</td>
<td>Maximum 10 mg/l</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Maximum 1 NTU</td>
</tr>
<tr>
<td>Temperature</td>
<td>Maximum 15°C (60°F)</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>Maximum 0.2 mg/l</td>
</tr>
<tr>
<td>Manganese (Mn)</td>
<td>Maximum 0.05 mg/l</td>
</tr>
<tr>
<td>Maximum Hardness</td>
<td>Maximum 20° dH (355 ppm CaCO₃)</td>
</tr>
<tr>
<td>Free Chlorine</td>
<td>Maximum 0.1 mg/l</td>
</tr>
</tbody>
</table>
# Modbus TCP/IP Communications

**Model:** PLC - S7- 1200  
**Default IP:** 192.168.1.101  
**Default Mask:** 255.255.255.0  
**Device ID:** 1  
**Port:** 502  
**Block 1 - Integers from PLC to BMS/CTS (7 Integers)**

**Notes:**
- The PLC acts as a server in the network.
- Valve 5 will only show active on masters / slaves with 31 stage controls.
- Slave 1, Slave 2, and Slave 3 are not present on all system configurations.

<table>
<thead>
<tr>
<th>Point</th>
<th>Type</th>
<th>Address</th>
<th>Range</th>
<th>Unit</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load: Master</td>
<td>Integer</td>
<td>40001</td>
<td>0 - 100</td>
<td>l/hr</td>
<td>Shows the humidification load for Master.</td>
</tr>
<tr>
<td>Load: Slave 1</td>
<td>Integer</td>
<td>40002</td>
<td>0 - 100</td>
<td>l/hr</td>
<td>Shows the humidification load for Slave 1.</td>
</tr>
<tr>
<td>Load: Slave 2</td>
<td>Integer</td>
<td>40003</td>
<td>0 - 100</td>
<td>l/hr</td>
<td>Shows the humidification load for Slave 2.</td>
</tr>
<tr>
<td>Load: Slave 3</td>
<td>Integer</td>
<td>40004</td>
<td>0 - 100</td>
<td>l/hr</td>
<td>Shows the humidification load for Slave 3.</td>
</tr>
<tr>
<td>Status Integer 1</td>
<td>Integer</td>
<td>40005</td>
<td></td>
<td></td>
<td>Send as an integer. The individual bit is</td>
</tr>
<tr>
<td>Status Integer 2</td>
<td>Integer</td>
<td>40006</td>
<td></td>
<td></td>
<td>used as boolean as described in the following section.</td>
</tr>
<tr>
<td>Status Integer 3</td>
<td>Integer</td>
<td>40007</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Status Integer 1**
- **System Active**  
  - **Type:** Boolean  
  - **Address:** 0  
  - **Range:** 0 - 1  
  - **Unit:**        
  - **Explanation:** Indicates system activity.

**Status Integer 2**
- **Slave 1 Valve 3**  
  - **Type:** Boolean  
  - **Address:** 0  
  - **Range:** 0 - 1  
  - **Unit:**        
  - **Explanation:** Indicates state of valve 3 for Slave 1.

**Status Integer 3**
- **Slave 3 Valve 1**  
  - **Type:** Boolean  
  - **Address:** 0  
  - **Range:** 0 - 1  
  - **Unit:**        
  - **Explanation:** Indicates state of valve 1 for Slave 3.

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HP Series -  
Modbus TCP/IP  
December, 2018