

**STULZ**

CLIMATE. CUSTOMIZED.



# CyberRow CW

**Engineering Manual**

**Row-Based Precision Air Handlers**  
**26 kW - 53 kW / 60 Hz**

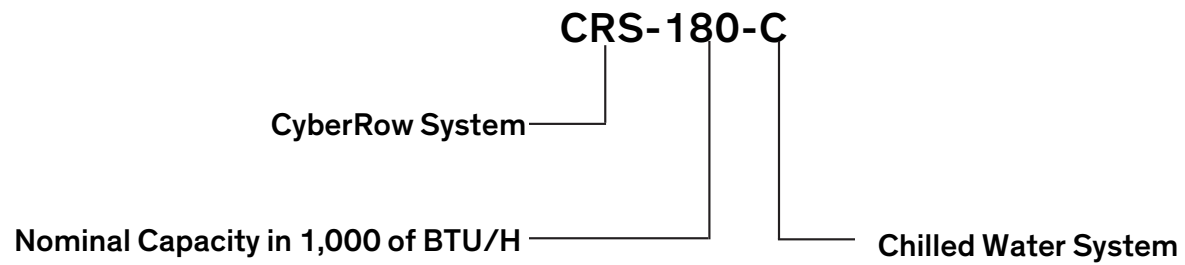
## Table of Contents

|   |           |
|---|-----------|
| <b>Configurations .....</b>   | <b>6</b>  |
| <b>Technical Data .....</b>   | <b>7</b>  |
| <b>Performance Data.....</b>  | <b>8</b>  |
| <b>Performance Data.....</b>  | <b>9</b>  |
| <b>Electrical and Sound Data .....</b>                                | <b>10</b> |
| <b>Dimensional Data - CRS-090-C.....</b>                              | <b>11</b> |
| <b>Dimensional Data - CRS-180-C.....</b>                              | <b>12</b> |
| <b>Standard Product Features.....</b>                                 | <b>13</b> |
| <b>Product Guide Specifications.....</b>                              | <b>14</b> |
| CyberRow 13 – 77 kW Row Based Precision Control Air Conditioners..... | 14        |
| Chilled Water Systems.....  | 14        |
| Summary.....  | 14        |
| Design Requirements.....  | 14        |
| Quality Assurance.....  | 14        |
| Cabinet.....  | 14        |
| Airflow Patterns.....   | 14        |
| Air Filtration .....  | 14        |
| Mechanical Components.....  | 15        |
| Backward Inclined, Plenum Side Fan, with an EC Motor .....            | 15        |
| Chilled Water Cooling Coil .....                                      | 15        |
| Piping Configuration .....  | 15        |
| Condensate Pump.....  | 15        |
| Way (Standard).....   | 15        |
| Way (Optional) .....  | 15        |
| Electrical System .....   | 15        |
| Automatic Dual Power Transfer Switch (Optional) .....                 | 16        |
| Remote Stop/Start Controls.....                                       | 16        |
| Main Power Service Switch .....                                       | 16        |
| <i>E<sup>2</sup></i> Series Controller Description General .....      | 16        |
| Field Configurable .....  | 16        |
| Password Protection .....   | 16        |
| Restorable Parameters/Factory Defaults .....                          | 17        |
| Timer Feature.....  | 17        |

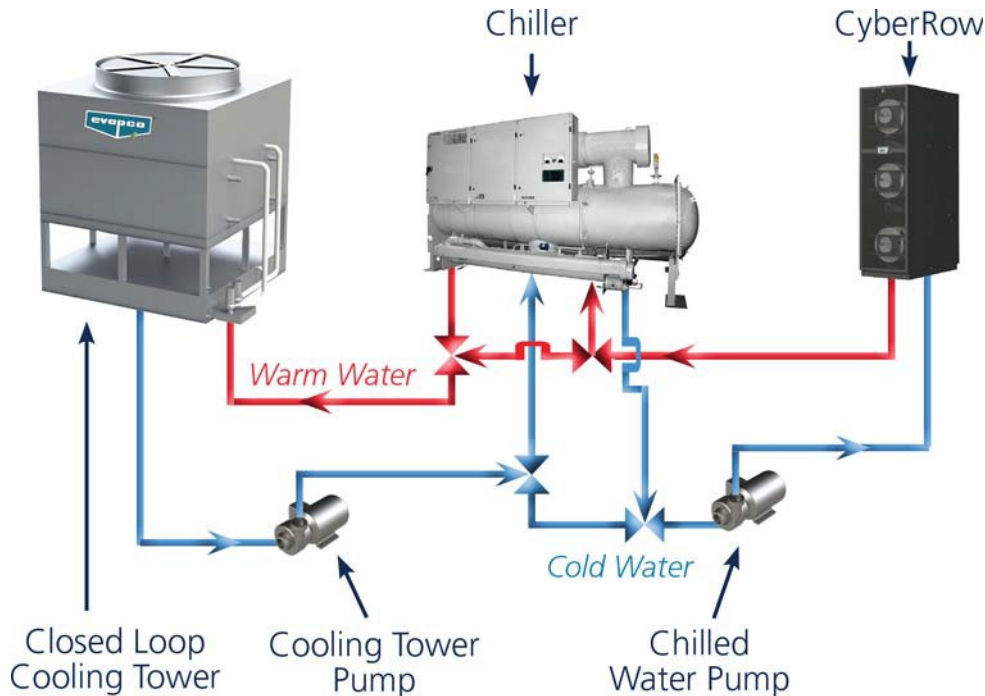
|   |    |
|---|----|
| A/C Grouping pLAN Operation .....             | 17 |
| BMS Interface.....                            | 17 |
| Alarms .....                                  | 17 |
| Small Bezel Display Panel.....                | 17 |
| Optional Accessories.....                     | 18 |
| Mechanical Flow Switch (Optional).....        | 18 |
| Differential Temperature Flow (Optional)..... | 18 |
| Smoke Detection .....                         | 18 |
| Firestat .....                                | 18 |
| Remote Water Detector Spot Type .....         | 18 |
| Remote Water Detector Strip Type .....        | 18 |
| Code of Conformance .....                     | 18 |

## Nomenclature

### CyberRow Row-Based System



## Hybrid Free Cooling



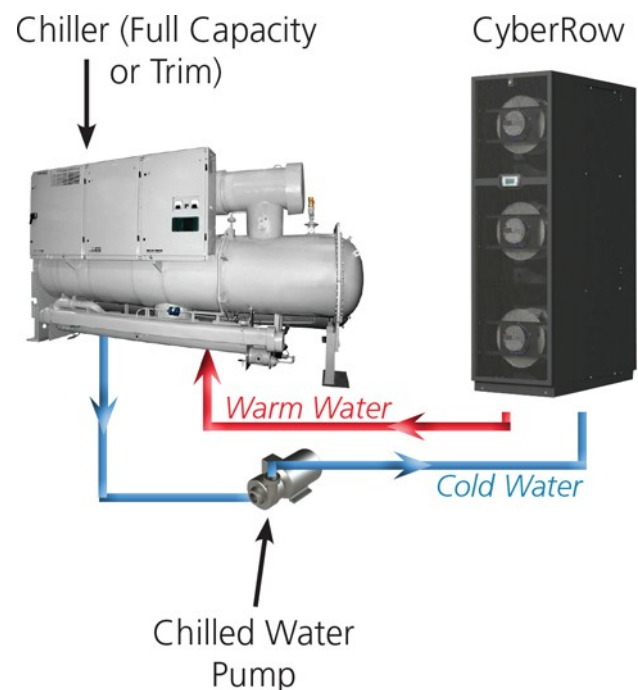
## CyberRow Chilled Water (C)

Chilled water (C) is supplied to the CyberRow unit via building chiller or other chilled water plant. Chilled water has high affinity for heat, thus making it a very efficient cooling method. STULZ **E<sup>2</sup>** controller allows for independent valve and fan control so the unit can adjust immediately and precisely, to varying heat loads and optimize energy efficiency.

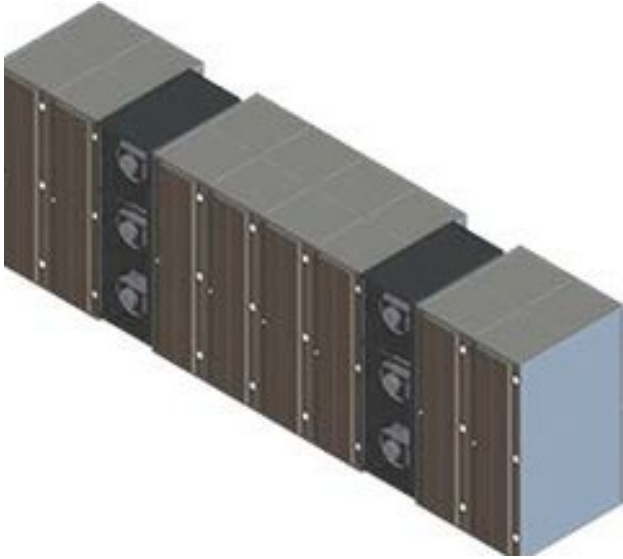
## Features

- Highest cooling capacities in the industry
- 12" and 24" cabinet widths
- 3 EC fans: Independently and infinitely adjustable EC fans ensure maximum efficiency
- Used in containment, open architecture, and hot spot reduction applications
- Adapts to both high and low density IT environments
- Wide range of cooling capacities available
- 100% front and rear service access
- Adapts to all major manufacturers racks and rack containment systems
- Seamless integration with most BMS platforms
- pLAN link to 8 units without a BMS
- High air flow with less noise
- Built in redundancy and capacity assist functions
- 2-Way or 3-Way control valves
- Top and bottom piping options
- Casters and Leveling Feet included
- Indoor use only
- Installation on raised and non-raised floors

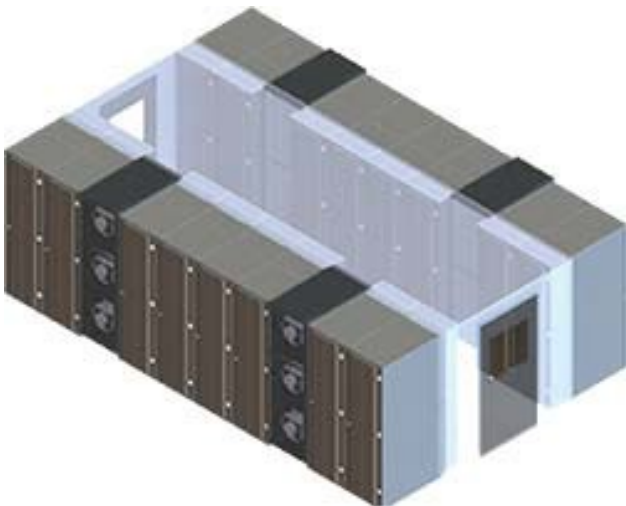
## Traditional



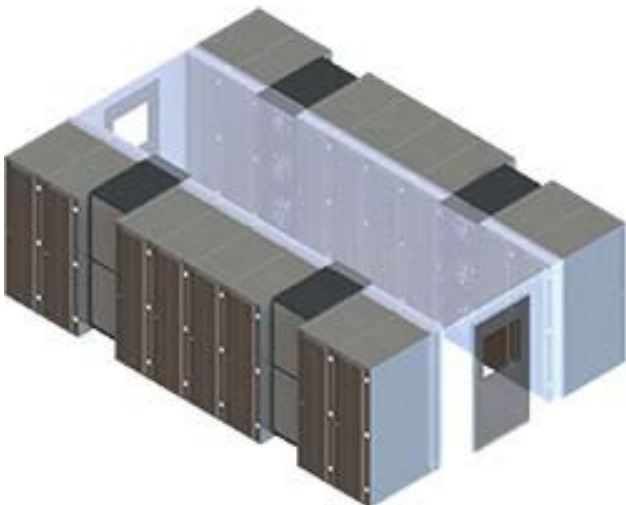
## Configurations



**Open aisle** configuration organizes racks in a single row or in hot and cold aisle rows, but without containment. The STULZ CyberRow draws hot air from the external environment or hot aisle, removes the heat, and supplies cooled air to the front of IT equipment in the cold aisle.



**Hot aisle** containment captures the hot exhaust air from IT equipment and prevents from mixing with cool air. The front of IT equipment is accessed in the external cold aisle. The STULZ CyberRow draws the contained hot air from the hot aisle, removes the heat, and supplies cooled air into the external cold aisle.



**Cold aisle** containment captures cooled air from the STULZ CyberRow and prevents it from mixing with hot air. The front of IT equipment is accessed in the contained cold aisle. The STULZ CyberRow draws hot air from the external environment, removes the heat, and supplies cooled air back into the contained cold aisle.

## Technical Data

| Model  | 12" Chilled Water      | 24" Chilled Water      |
|--|------------------------|------------------------|
|  | CRS-090-C              | CRS-180-C              |
| <b>Chilled Water Control Valve</b>                     |                        |                        |
| <b>2-way (standard) - Modulating</b>                   |                        |                        |
| Size" / (Cv)   | 3/4 (24)               | 1 (46)                 |
| Valve Pressure Rating - psi                            | 600                    | 600                    |
| Close-off Pressure Rating - psi                        | 200                    | 200                    |
| <b>3-way (optional) - Modulating</b>                   |                        |                        |
| Size" / (Cv)   | 3/4 (23)               | 1 (40)                 |
| Valve Pressure Rating - psi                            | 600                    | 600                    |
| Close-off Pressure Rating - psi                        | 200                    | 200                    |
| <b>Chilled Water Coil - Aluminum Fin, Copper Tube</b>  |                        |                        |
| Rows/Face Area (ft <sup>2</sup> )                      | 4 / 5.8                | 4 / 11.6               |
| Face Velocity, fpm                                     | 500                    | 500                    |
| <b>Blower/Motor - Backward Curved Direct Driven EC</b> |                        |                        |
| Horsepower (Each)                                      | 1/4 H.P.               | 1-1/4 H.P.             |
| CFM  | 2,900*                 | 5,800                  |
| Quantity of Blowers                                    | 3                      | 3                      |
| Drive Method   | Direct                 | Direct                 |
| <b>Washable Filters</b>                                |                        |                        |
| Nom. Size (in.), (Qty.)                                | 10.5 × 37.38 × .43 (2) | 22.0 × 37.38 × .43 (2) |
| <b>Connection Sizes (Copper)</b>                       |                        |                        |
| Condensate Drain, (w/ pump)                            | 1/2" FPT               | 1/2" FPT               |
| Water In/Out   | 1-1/4" NPT             | 1-1/2" NPT             |
| <b>Physical Data</b>                                   |                        |                        |
| Approx. Weight (Lbs)                                   | 380                    | 550                    |
| Dimensions: (H"xW"xD")                                 | 78.5" x 11.6" x 42.1"  | 78.5" x 23.4" x 42.1"  |
| Approx. Shipping Weight (lbs)                          | 570                    | 711                    |
| Approx. Shipping Dimensions (H"xW"xD")                 | 84" x 22" x 48"        | 84" x 32" x 48"        |

\*Note: When 110v/1Ph/60Hz Power Input is selected, unit airflow is decreased by 200 CFM, which will result in capacity reduction of 3.5% or less.

## Performance Data

| 12" Chilled Water<br>CRS-090-C             |         | Total Capacity |      | Sensible Capacity |      | Flow Rate<br>GPM | Total System<br>Pressure<br>Drop,<br>Ft. H <sub>2</sub> O |
|--|---------|----------------|------|-------------------|------|------------------|---|
|  |         | BTU/H          | kW   | BTU/H             | kW   |                  |   |
| 100°FDB/ 69.2°FWB Entering Air Temperature |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 129,617        | 38.0 | 129,617           | 38.0 | 26.2             | 24.5  |
|  | 12°F ΔT | 125,139        | 36.7 | 125,139           | 36.7 | 21.0             | 16.1  |
| 45°F EWT                                   | 10°F ΔT | 117,368        | 34.4 | 117,368           | 34.4 | 23.7             | 20.1  |
|  | 12°F ΔT | 113,122        | 33.2 | 113,122           | 33.2 | 19.1             | 13.4  |
| 50°F EWT                                   | 10°F ΔT | 105,218        | 30.8 | 105,218           | 30.8 | 21.4             | 16.5  |
|  | 12°F ΔT | 100,811        | 29.5 | 100,811           | 29.5 | 17.0             | 10.6  |
| 95°FDB/67.7°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 121,726        | 35.7 | 120,757           | 35.4 | 24.6             | 21.8  |
|  | 12°F ΔT | 112,386        | 32.9 | 112,386           | 32.9 | 19.0             | 13.3  |
| 45°F EWT                                   | 10°F ΔT | 104,535        | 30.6 | 104,535           | 30.6 | 21.2             | 16.3  |
|  | 12°F ΔT | 100,245        | 29.4 | 100,245           | 29.4 | 17.0             | 10.7  |
| 50°F EWT                                   | 10°F ΔT | 92,192         | 27.0 | 92,192            | 27.0 | 18.7             | 12.7  |
|  | 12°F ΔT | 88,031         | 25.8 | 88,031            | 25.8 | 15.0             | 8.4   |
| 90°FDB/66.1°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 109,059        | 32.0 | 107,198           | 31.4 | 22.0             | 17.6  |
|  | 12°F ΔT | 99,391         | 29.1 | 99,391            | 29.1 | 16.8             | 10.5  |
| 45°F EWT                                   | 10°F ΔT | 91,692         | 26.9 | 91,692            | 26.9 | 18.7             | 12.8  |
|  | 12°F ΔT | 87,216         | 25.6 | 87,216            | 25.6 | 14.8             | 8.3   |
| 50°F EWT                                   | 10°F ΔT | 79,320         | 23.2 | 79,320            | 23.2 | 16.2             | 9.7   |
|  | 12°F ΔT | 74,959         | 22.0 | 74,959            | 22.0 | 12.8             | 6.2   |
| 85°FDB/64.5°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 96,555         | 28.3 | 93,527            | 27.4 | 19.5             | 14.0  |
|  | 12°F ΔT | 86,499         | 25.4 | 86,499            | 25.4 | 14.7             | 8.2   |
| 45°F EWT                                   | 10°F ΔT | 78,630         | 23.0 | 78,630            | 23.0 | 16.0             | 9.6   |
|  | 12°F ΔT | 74,137         | 21.7 | 74,137            | 21.7 | 12.6             | 6.1   |
| 50°F EWT                                   | 10°F ΔT | 66,315         | 19.4 | 66,315            | 19.4 | 13.6             | 7.0   |
|  | 12°F ΔT | 61,825         | 18.1 | 61,825            | 18.1 | 10.6             | 4.4   |
| 80°FDB/62.8°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 84,202         | 24.7 | 80,116            | 23.5 | 17.2             | 11.1  |
|  | 12°F ΔT | 80,458         | 23.6 | 77,242            | 22.6 | 13.7             | 7.2   |
| 45°F EWT                                   | 10°F ΔT | 65,745         | 19.3 | 65,745            | 19.3 | 13.5             | 6.9   |
|  | 12°F ΔT | 61,176         | 17.9 | 61,176            | 17.9 | 10.5             | 4.3   |
| 50°F EWT                                   | 10°F ΔT | 53,253         | 15.6 | 53,253            | 15.6 | 11.0             | 4.7   |
|  | 12°F ΔT | 48,608         | 14.2 | 48,608            | 14.2 | 8.4              | 2.7   |



## Performance Data

| 24" Chilled Water<br>CRS-180-C             |         | Total Capacity |      | Sensible Capacity |      | Flow Rate<br>GPM | Total System<br>Pressure<br>Drop,<br>Ft. H <sub>2</sub> O |
|--|---------|----------------|------|-------------------|------|------------------|---|
|  |         | BTU/H          | kW   | BTU/H             | kW   |                  |   |
| 100°FDB/ 69.2°FWB Entering Air Temperature |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 270,762        | 79.4 | 267,158           | 78.3 | 56.0             | 55.2  |
|  | 12°F ΔT | 252,610        | 74.0 | 252,610           | 74.0 | 43.5             | 34.3  |
| 45°F EWT                                   | 10°F ΔT | 235,275        | 69.0 | 235,275           | 69.0 | 49.0             | 42.6  |
|  | 12°F ΔT | 228,040        | 66.8 | 228,040           | 66.8 | 39.5             | 28.4  |
| 50°F EWT                                   | 10°F ΔT | 210,435        | 61.7 | 210,435           | 61.7 | 44.0             | 34.5  |
|  | 12°F ΔT | 203,363        | 59.6 | 203,363           | 59.6 | 35.5             | 23.1  |
| 95°FDB/67.7°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 245,849        | 72.1 | 239,969           | 70.3 | 51.0             | 46.4  |
|  | 12°F ΔT | 239,974        | 70.3 | 235,218           | 68.9 | 41.5             | 31.5  |
| 45°F EWT                                   | 10°F ΔT | 209,408        | 61.4 | 209,408           | 61.4 | 43.5             | 34.1  |
|  | 12°F ΔT | 202,307        | 59.3 | 202,307           | 59.3 | 35.2             | 22.9  |
| 50°F EWT                                   | 10°F ΔT | 184,879        | 54.2 | 184,879           | 54.2 | 39.0             | 27.6  |
|  | 12°F ΔT | 177,574        | 52.0 | 177,574           | 52.0 | 31.2             | 18.1  |
| 90°FDB/66.1°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 220,747        | 64.7 | 212,936           | 62.4 | 46.0             | 38.2  |
|  | 12°F ΔT | 214,208        | 62.8 | 207,808           | 60.9 | 37.0             | 25.4  |
| 45°F EWT                                   | 10°F ΔT | 183,826        | 53.9 | 183,826           | 53.9 | 38.5             | 27.1  |
|  | 12°F ΔT | 176,252        | 51.7 | 176,252           | 51.7 | 31.0             | 18.1  |
| 50°F EWT                                   | 10°F ΔT | 158,847        | 46.6 | 158,847           | 46.6 | 33.5             | 20.7  |
|  | 12°F ΔT | 151,093        | 44.3 | 151,093           | 44.3 | 26.7             | 13.5  |
| 85°FDB/64.5°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 195,763        | 57.4 | 185,634           | 54.4 | 41.0             | 30.8  |
|  | 12°F ΔT | 188,714        | 55.3 | 180,359           | 52.9 | 33.0             | 20.5  |
| 45°F EWT                                   | 10°F ΔT | 158,051        | 46.3 | 158,051           | 46.3 | 33.5             | 20.9  |
|  | 12°F ΔT | 149,579        | 43.8 | 149,579           | 43.8 | 26.5             | 13.5  |
| 50°F EWT                                   | 10°F ΔT | 132,979        | 39.0 | 132,979           | 39.0 | 28.5             | 15.3  |
|  | 12°F ΔT | 124,153        | 36.4 | 124,153           | 36.4 | 22.2             | 9.6   |
| 80°FDB/62.8°FWB Entering Air Temperature   |         |                |      |                   |      |                  |   |
| 40°F EWT                                   | 10°F ΔT | 170,522        | 50.0 | 158,384           | 46.4 | 36.0             | 24.2  |
|  | 12°F ΔT | 162,601        | 47.7 | 152,689           | 44.8 | 28.5             | 15.6  |
| 45°F EWT                                   | 10°F ΔT | 131,334        | 38.5 | 131,334           | 38.5 | 28.0             | 15.0  |
|  | 12°F ΔT | 122,660        | 35.9 | 122,660           | 35.9 | 22.0             | 9.5   |
| 50°F EWT                                   | 10°F ΔT | 105,995        | 31.1 | 105,995           | 31.1 | 23.0             | 10.3  |
|  | 12°F ΔT | 96,888         | 28.4 | 96,888            | 28.4 | 17.7             | 6.3   |

## Electrical and Sound Data

| Electrical Data     | CRS-090-C |      |     | CRS-180-C |      |     |
|---------------------|-----------|------|-----|-----------|------|-----|
|                     | FLA       | MCA  | MFS | FLA       | MCA  | MFS |
| <b>COOLING ONLY</b> |           |      |     |           |      |     |
| 120/1/60            | 8.3       | 10.4 | 15  | N/A       | N/A  | N/A |
| 208/1/60            | 5         | 6.2  | 15  | N/A       | N/A  | N/A |
| 208/3/60            | 5         | 6.2  | 15  | 9.3       | 11.6 | 15  |
| 460/3/60            | 2.5       | 3.2  | 15  | 4.5       | 5.6  | 15  |
| 575/3/60            | 2.1       | 2.7  | 15  | 3.7       | 4.6  | 15  |

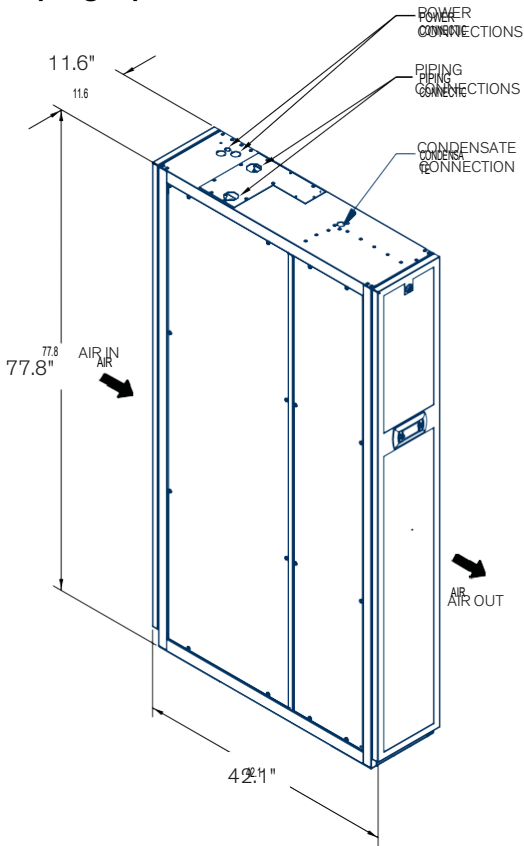
Note: Standard 1 KAIC rating, optional 65 KAIC rating available.

| Sound Data  |                | CRS-090-C   |      |      |      |      |      |      |      |           |          |
|-------------|----------------|---|------|------|------|------|------|------|------|-----------|----------|
| Fan Speed % | Airflow (SCFM) | Sound Pressure<br>LpA, free field (dBA) in a 121.13 ft² (3.43m³) room at<br>3.28 (1.0m) distance    |      |      |      |      |      |      |      |           |          |
|             |                | 63  | 125  | 250  | 500  | 1000 | 2000 | 4000 | 8000 | Total dBA | NR Value |
| 50%         | 1800           | 15.8  | 19.7 | 31.3 | 35.0 | 38.8 | 35.1 | 25.3 | 10.9 | 42.0      | 39       |
| 75%         | 2150           | 13.1  | 41.6 | 42.7 | 45.2 | 48.1 | 46.2 | 38.5 | 23.4 | 52.6      | 48       |
| 100%        | 2900           | 19.6  | 47.2 | 49.8 | 51.4 | 53.6 | 51.7 | 45.0 | 30.6 | 58.4      | 54       |
| Fan Speed % | Airflow (SCFM) | CRS-180-C   |      |      |      |      |      |      |      |           |          |
|             |                | Sound Pressure<br>LpA, free field (dBA) in a 146.91 ft² (4.16m³) room at<br>3.28 ft (1.0m) distance |      |      |      |      |      |      |      |           |          |
| 50%         | 4100           | 29.4  | 42.5 | 46.6 | 48.6 | 52.3 | 52.5 | 41.5 | 26.1 | 57.0      | 54       |
| 75%         | 5000           | 34.9  | 49.7 | 57.3 | 59.7 | 62.8 | 60.5 | 56.0 | 40.3 | 67.0      | 63       |
| 100%        | 5800           | 43.0  | 52.6 | 61.5 | 64.0 | 67.0 | 64.2 | 59.6 | 45.8 | 71.1      | 67       |

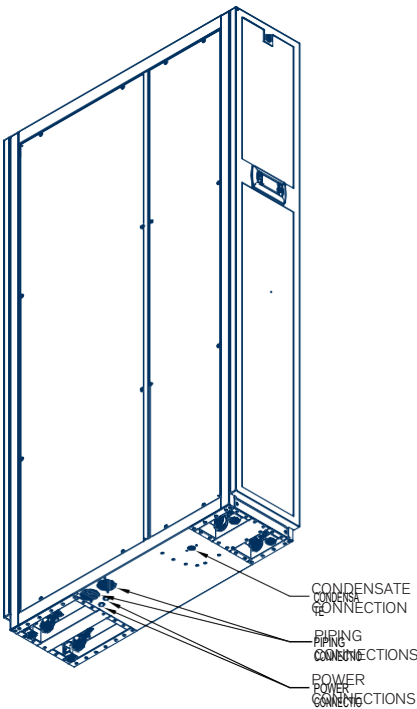
Note: All sound testing is performed in accordance to ISO 9614-2 Determination of Sound Power Levels. ISO 9614-2 Specifies a method for measuring the component of sound intensity normal to a measurement surface which is chosen so as to enclose the noise source(s) of which the sound power level is to be determined.

# Dimensional Data - CRS-090-C

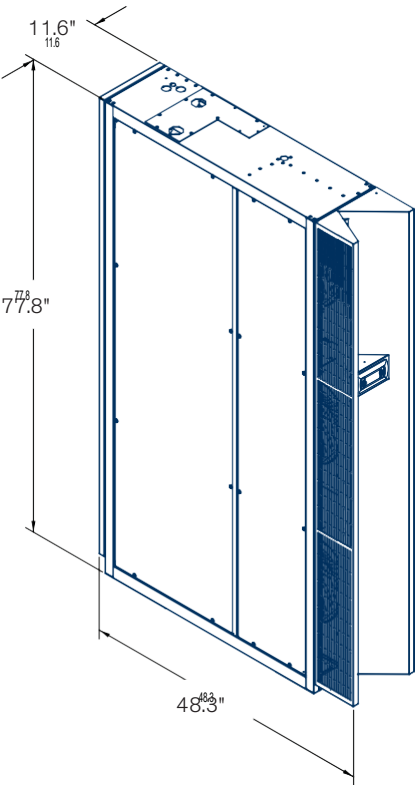
Top Piping Option



Bottom Piping Option

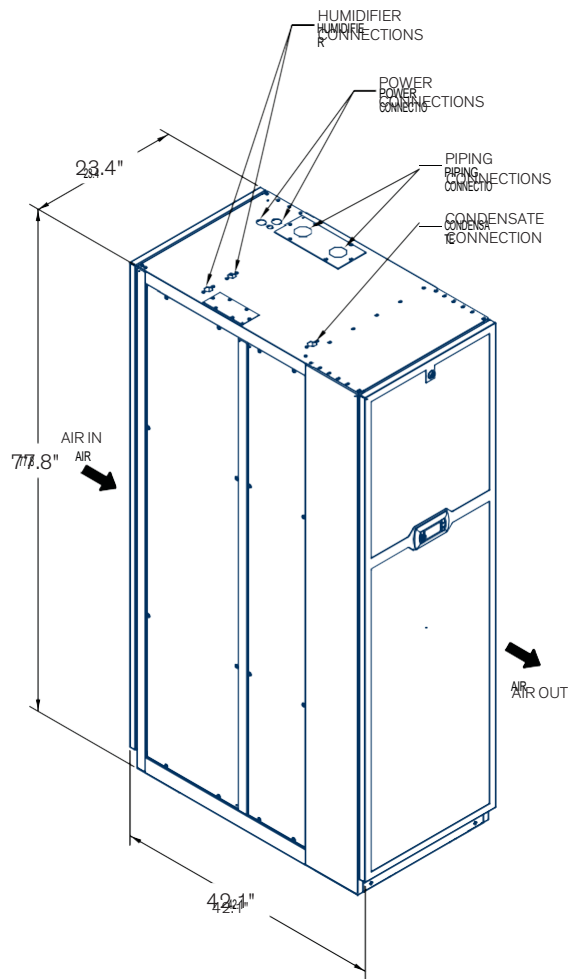


Side Diverted Front Panel Option

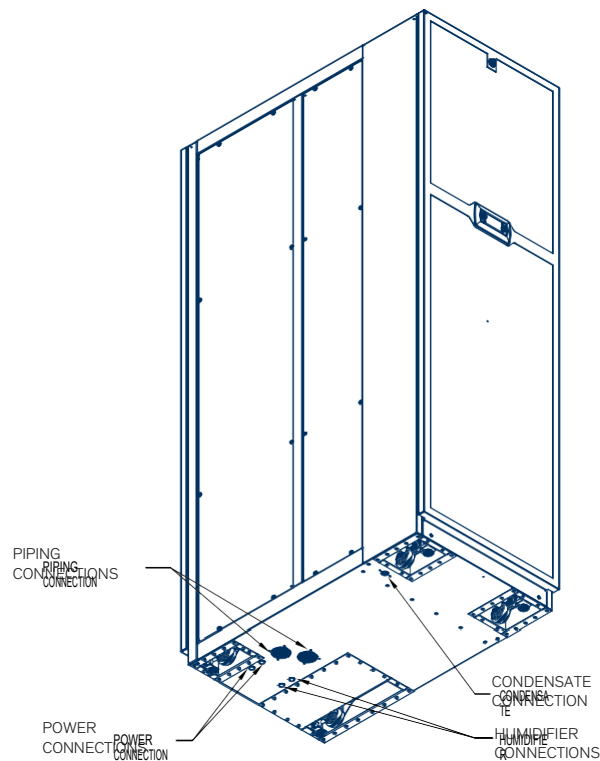


# Dimensional Data - CRS-180-C

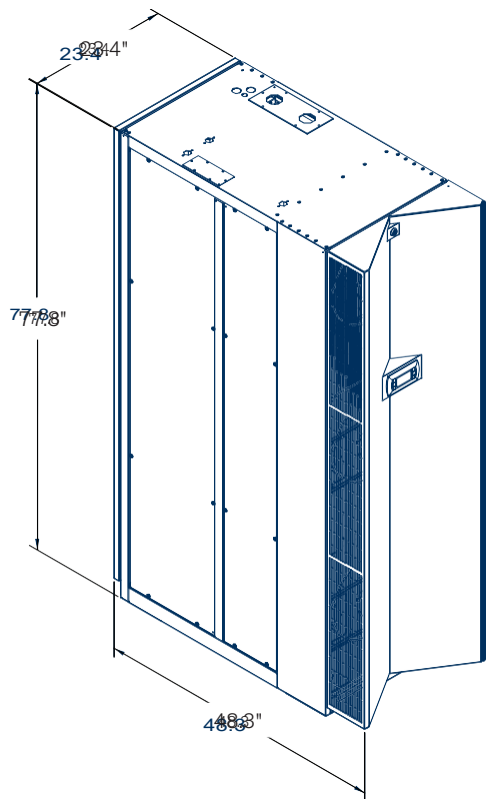
Top Piping Option



Bottom Piping Option



Side Diverted Front Panel Option



## Standard Product Features

| STANDARD PRODUCT FEATURES<br>MODEL                    |             | CRS-090-C   | CRS-180-C | PAGE |
|---|-------------|-------------|-----------|------|
| <b>CABINET</b>  |             |             |           | 15   |
| Galvannealed Steel, Black Powder Coated Finish        | Standard    | Standard    |           |      |
| <b>AIR PATTERN AND FILTRATION</b>                     |             |             |           | 15   |
| Front Discharge                                       | Standard    | Standard    |           |      |
| Front Diverted Discharge                              | Optional    | Optional    |           |      |
| Permanent Washable Filters                            | Standard    | Standard    |           |      |
| <b>MECHANICAL COMPONENTS</b>                          |             |             |           | 16   |
| Backward Inclined, Plenum Style Fan, with an EC Motor | Standard    | Standard    |           |      |
| Chilled Water Cooling Coil                            | Standard    | Standard    |           |      |
| Piping Configuration (Top, or Bottom)                 | Selectable* | Selectable* |           |      |
| Condensate Pump                                       | Standard    | Standard    |           |      |
| 2-Way Modulating Chilled Water Control Valve          | Standard    | Standard    |           |      |
|   | Optional    | Optional    |           |      |
| <b>ELECTRICAL SYSTEM</b>                              |             |             |           | 16   |
| Automatic Dual Power Transfer Switch                  | Optional    | Optional    |           |      |
| Remote Stop/Start Contacts                            | Standard    | Standard    |           |      |
| Main Power Switch                                     | Standard    | Standard    |           |      |
| <b>E<sup>2</sup> MICROPROCESSOR CONTROLLER</b>        |             |             |           | 17   |
| A/C Grouping pLAN Interface                           | Optional    | Optional    |           |      |
| BMS Interface   | Optional    | Optional    |           |      |
| Common Alarm, Dry Contact                             | Standard    | Standard    |           |      |
| <b>OPTIONAL ACCESSORIES</b>                           |             |             |           | 18   |
| Mechanical Flow Switch                                | Optional    | Optional    |           |      |
| Differential Temperature Flow                         | Optional    | Optional    |           |      |
| Smoke Detection                                       | Optional    | Optional    |           |      |
| Firestat  | Optional    | Optional    |           |      |
| Remote Water Detector                                 | Optional    | Optional    |           |      |
| <b>CODE CONFORMANCE</b>                               |             |             |           | 19   |
| ETL Conformance Compliance to UL 1995 Standard        | Standard    | Standard    |           |      |
| CAN/CSA C22.2 No. 236                                 | Standard    | Standard    |           |      |

\*Note: Piping connection location to be specified at time of order.

## Product Guide Specifications

### CyberRow 13 – 77 kW Row Based Precision Control Air Conditioners

#### Chilled Water Systems

##### Summary

This specification describes requirements for a precision environmental control system. The STULZ CyberRow® is a row-based cooling system that shall provide precision temperature control for computer rooms or rooms containing telecommunications or other highly sensitive heat load equipment where continuous 24 hour a day, 365 days a year air conditioning is required.

Designed with both front and rear access, CyberRow® systems require minimum floor space. The supplied system shall be provided with ETL Certification. The CyberRow® model number shall be, CRS- - .

##### Design Requirements

The environmental control system shall be a STULZ CyberRow® Chilled Water factory-assembled unit. The unit shall be designed for a row-based installation with removable front and rear access panels. No allowance for side service access shall be required, however removable side access panels shall be provided for additional access.

The CyberRow® units are especially adapted for both raised and unraised floors. The air handling section shall be specifically designed for high sensible heat ratio. Each system shall be capable of handling CFM at inches of water external static pressure. The unit shall have the cooling capacity of BTU/H, and the sensible cooling capacity of BTU/H based on entering air condition of °F dry bulb and °F (°C) wet bulb.

##### Quality Assurance

The manufacture shall maintain a set of international standards of quality management to ensure product quality. Each system shall be subjected to a complete operational and functional test procedure at the factory prior to shipment.

##### Cabinet

Side access panels shall be fabricated from 20 gauge galvanized steel and shall be securely bolted to a 14 gauge base and the top plate. The top plate, front and rear panels shall be fabricated from 16 gauge galvanized steel.

The cabinet shall be powder coated to provide durability, and to protect from corrosion. Armaflex elastomeric thermal insulation shall be used to block noise. Casters and leveling feet shall be included to ease the installation and level the equipment with existing IT solutions.

##### Airflow Patterns

All units shall be designed using a front discharge with a rear return airflow pattern. An optional, front diverted discharge plenum is available.

##### Air Filtration

All units shall be equipped with removable, washable filters. These filters shall consist of an open cell structured polyurethane foam with a roll formed 3000 series aluminum frame. Filters shall meet both UL 900 and UL 94 HF-1 standards.

## Mechanical Components

### Backward Inclined, Plenum Site Fan, with an EC Motor

The blowers shall be backward inclined plenum style fans with an Electronically Commutated (EC) motor, for maintenance free operation. The motor shall include integrated electronic control board and direct microprocessor control signaling for fan speed control, soft-starting capabilities, and integrated current limitations. Each fan shall be low noise, low vibration manufactured with an aluminum impeller. Each fan impeller shall be dynamically and statically balanced in two planes to minimize vibration during operation.

### Chilled Water Cooling Coil

The coil shall be constructed of seamless drawn copper tubes, mechanically bonded to tempered aluminum fins, and mounted in a stainless steel condensate drain pan. The coil shall be designed for a maximum of 500 ft./min. face velocity. The water circuit shall be designed to distribute water into the entire coil face area.

### Piping Configuration

**Top Piping:** When top piping is specified, the CyberRow® units shall be provided with connections for both the chilled water piping and condensate discharge on the top of the cabinet.

**Bottom Piping:** When bottom piping is specified (e.g. raised floor applications), the CyberRow® units shall be provided with connections for both chilled water piping and condensate pump discharge on the bottom of the cabinet.

### Condensate Pump

The CyberRow® shall include a factory wired and installed condensate pump. The condensate pump shall have the capacity of 80 gal/hr. at 23 ft. of lift with a maximum shut off (head) of 115 ft. The condensate pump shall be piped with either top or bottom discharge connections to remain consistent with top or bottom chilled water piping connections.

### Way (Standard)

A 2-way modulating valve rated for a maximum 600 psig w.w.p. shall be factory piped and wired. The 2-way chilled water modulating valve shall automatically meter the flow of chilled water to the cooling coil in response to a proportional signal (0- 10 VDC) provided to the valve by the microprocessor controller w.w.p.

### Way (Optional)

A 3-way modulating valve rated for a maximum 600 psig w.w.p. shall be factory piped and wired. The 2-way chilled water modulating valve shall automatically meter the flow of chilled water to the cooling coil in response to a proportional signal (0- 10 VDC) provided to the valve by the microprocessor controller w.w.p.

## Electrical System

The electrical system shall conform to National Electrical Code (NEC) requirements. In accordance with NEC Class II circuits, the control circuit shall be 24 volts AC and control circuit wiring shall not be smaller than 18 AWG. All wiring shall be neatly wrapped, run in conduit or cable trays, and routed in bundles. Each wire shall end with a service loop and be securely fastened by an approved method. Each wire in the unit shall be numbered for ease of service tracing.

All electrically actuated components shall be easily accessible from the front and rear of the unit without reaching over exposed high voltage components or rotating parts. Each high voltage circuit shall be individually protected by circuit breakers or manual motor starters on all three phases. The blower motor shall have thermal and short circuit protection. Line voltage and 24 volt control circuit wiring shall be routed

in separate bundles. The electric box shall include all the contactors, starters, fuses, circuit breakers and terminal boards required for operation of the CyberRow® unit and shall allow for full service via front and rear access panel.

### **Automatic Dual Power Transfer Switch (Optional)**

Two individual main power input disconnect switches shall be provided, one for each incoming power source. In the event the primary power fails or a phase loss/imbalance occurs, the automatic transfer switch transfers power to the secondary power source. Once the primary power has been restored, the transfer switch automatically shifts the power load back to the primary power. The transfer time from one source to the other is user adjustable to allow staging or sequence restart of load.

In addition to the automatic transfer switch function, the local controller display shall indicate which power source has failed. This indication is a visual depiction that allows the user to determine the status of the input source. This status can also be conveyed thru the BMS serial communication link.

### **Remote Stop/Start Contracts**

Included in the system's electrical control circuit shall be a 2-pin terminal connection for remote stop/start of the CyberRow® air conditioner by remote source.

### **Main Power Service Switch**

The CyberRow unit shall be provided with a unit mounted main power service switch.

## **E<sup>2</sup> Series Controller Description General**

The advanced microprocessor based **E<sup>2</sup>** Series controller shall be equipped with flexible software capable of meeting the specific needs of the application. The setpoints shall be default and their ranges shall be easily viewed and adjusted from the user interface display. The program and operating parameters shall be permanently stored on a non-volatile system in the event of power failure.

The controller shall be designed to manage temperature levels to a user defined setpoint via control output signals to the CyberRow® unit.

The controller shall receive inputs for measurable temperature control conditions via return air or room mounted sensors. The internal logic will then determine if the conditions require cooling. Control setpoints shall be established to maintain design conditions of the installation. The controller will respond accordingly to changes in these conditions and control the output/demand for the appropriate mode of operation until user defined conditions are achieved.

### **Field Configurable**

The program for the **E<sup>2</sup>** Series controller shall be field configurable, allowing the operator the capability of selecting control setpoints specific to the application. Operator interface for the **E<sup>2</sup>** controller is provided via a door mounted user interface display panel. The display panel shall have a backlit LCD graphical display and function keys giving the user complete control and monitoring capability of the precision cooling system. The menu driven interface shall provide users the ability to scroll through and enter various menu screens.

### **Password Protection**

Access to the Info Menu, Alarms Log, and the ability to monitor room conditions shall be allowed without the use of a password. Modifications to the control setpoints shall require the use of a password. The controller shall be programmed to recognize predetermined security levels before allowing access to display screens containing critical variables. Three secured menu levels (Control, Service and Factory) will support unique passwords that must be entered to access the menu screens so only authorized personnel may perform modifications to the settings.



## Restorable Parameters/Factory Defaults

Upon initial start-up the CyberRow® system shall operate using the setpoints programmed by the factory. The customer may enter new operating parameters in the Control menu and the system will then operate accordingly.

The new setpoints may be stored as, "Customer Default Setpoints". The primary setpoints entered by the factory still remain stored in the controllers' memory as, "Factory Setpoints". The setpoints for the system may be re-adjusted in the Control menu at any time. If it becomes necessary, the customer may restore the setpoints back to the Customer Default setpoint values or to the original Factory (primary) setpoint values.

## Timer Feature

The timer shall allow the user to set up an operating schedule to automatically scale back or shut down the air conditioner during low demand or unoccupied periods. This is an energy saving feature offering the user the ability to create an operating schedule tailored to the needs of the building. An evening (night-setback) schedule may also be created, allowing the CyberRow® unit to operate at night with relaxed temperature setpoints and offsets.

## A/C Grouping pLAN Operation

Multiple CyberRow system controllers shall be able to be connected (grouped) to a pLAN local network, allowing the communication of data and information from each controller to a central control terminal or Lead controller. The Lead controller display screens can be used to monitor and adjust group control variables for the individual system controllers. Each **E<sup>2</sup>** controller connected to the pLAN network shall be identified with its own unique address.

Multiple CyberRow units consisting of up to eight STULZ precision air conditioners equipped with like controllers may be controlled and monitored via the E<sup>2</sup> series controller. With multiple CyberRow® units each unit can selectively be configured as "Active" to operate as a primary A/C, "Capacity Assist" for staged operation, or as "Standby" to come online in case of a failed air conditioning unit to ensure continuous availability.

The controller may also be configured to rotate units with timed duty cycling to promote equal run-time and assure that each CyberRow unit within the rotating group is operationally exercised on a periodic timed basis.

## BMS Interface

The **E<sup>2</sup>** series controller may incorporate a 10 Mbps communication interface port that can be field connected through a serial interface to a Building Management System via Modbus, BACnet, SNMP, or HTTP as configured by the factory. A controller interfaced to a network must be configured for BMS communication.

## Alarms

Alarm conditions shall activate a red LED indicator that backlights the alarm function key. As an option, an alarm condition may also be enunciated by an audible alarm signal. An alarm is acknowledged by pressing the alarm key.

This calls up alarm display screens that provide a text message detailing the alarm conditions. After an alarm condition is corrected, the alarm can be cleared by pressing the alarm key.

## Small Bezel Display Panel

The small bezel user interface display panel features an easy to read, backlit liquid-crystal alphanumeric

display equipped with contrast adjustment and LED illuminated function keys. The screens that appear on the user interface display panel present data that originates from the controller I/O module. The controller is operated via a 6-key menu-driven loop structure and offers an alarm log plus four different interface menu levels to the operator: Information, Control, Service, and Factory. These menus permit the user to easily view, control, and configure operating parameters for the CyberRow® unit.

## **Optional Accessories**

### **Mechanical Flow Switch (Optional)**

A shipped loose flow switch shall activate a loss of flow alarm in the event of chilled water flow interruption.

### **Differential Temperature Flow (Optional)**

A factory mounted and wired temperature sensor for inlet and outlet water temperatures shall permit a loss of flow alarm in the event the temperature difference is within 1° F (adjustable) during chilled water valve operation.

### **Smoke Detection**

A photo-electric smoke detector shall be factory installed and wired in the return air stream. The air conditioner will shut down upon sensing smoke in the return air stream.

### **Firestat**

The air conditioner shall be provided with a factory wired and mounted firestat. The firestat will shut down the air conditioner upon sensing a high return air temperature.

### **Remote Water Detector Spot Type**

A remote single point water/leak detector shall be factory supplied and shall ship separately for field installation. Upon sensing a water leak, the normally closed water detector control circuit shall open, thereby shutting down the STULZ CyberAiR floor-mounted air conditioning unit's water producing components.

### **Remote Water Detector Strip Type**

A 20 ft. in length remote strip/cable type water/leak detector shall be provided for remote field installation. In addition to the 20 ft. sensing cable, a 24 volt water detector power module shall require field mounting and wiring to the factory provided terminal connection. Upon sensing a water leak, the normally closed water detector control circuit shall open, thereby shutting down the STULZ CyberAiR floor-mounted air conditioning unit's water producing components.

### **Code of Conformance**

The unit shall be designed and built to conform to UL STD 1995, certified to CAN/CSA C22.2 No. 236. and listed with ETL.



North American Headquarters

**STULZ Air Technology Systems, Inc.**

1572 Tilco Drive | Frederick, MD 21704

301.620.2033 | Fax: 301.662.5487 | [info@stulz-ats.com](mailto:info@stulz-ats.com)

Technical Support: 888.529.1266

[www.stulz-usa.com](http://www.stulz-usa.com)