Modular Self-Contained
Water Cooled - 40 to 80 Tons
Introduction

Modular Self-Contained Units

- **Unique cassette design ideal for replacement market** allowing all components to fit through a standard width commercial door and through standard IBC hallways.
- **Left hand/Right hand water connections** (Field Interchangeable).
- **Left hand/Right hand electrical connections** (Field Interchangeable).
- **Variable speed compressors** for highest efficiencies.
- **Plenum fan** with integrated motor, electronics, and VFD for efficient operation safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.
- **Unit-mounted microprocessor control** with human interface panel and touch screen.
- **Waterside valve package** option to enhance system efficiency.
- **Sight glasses** with ports for viewing unit while running.
- **Two-inch flat filter box** inside unit casing.
- **Waterside economizer.**

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Features and Benefits

Features

Standard Features

- 40 through 80 ton commercial water cooled, modular self-contained units
- Unique Cassette Design Ideal for Replacement Market allowing all components to fit through a standard 36” width commercial door and through standard IBC 44” hallways
- Variable Speed Technology on lead compressor
- Fully integrated, factory-installed, and commissioned microelectronic controls
- Variable Speed Compressor for highest efficiencies
- Constant volume (CV) and variable air volume (VAV) operation
- Direct Drive Plenum Fans with integrated VFD’s on each fan
- Low ambient compressor lockout adjustable control input
- Plenum fans with integrated motor, electronics, and VFD
- Emergency stop input
- Units are shipped with Nitrogen
- Factory piped, chemically cleanable, brazed plate condensers for efficient operation and modularity. Condensers do not need to be removed from unit for cleaning
- Upstream inline 20 mesh strainer for added protection along with alerts for when strainer needs to be cleaned
- Sloped drain pans to ensure complete condensate removal for IAQ
- Expansion Valves and Filter Driers are easily accessible
- Access panels and clearance provided to clean both evaporator and waterside economizer coil fins
- Shipped as individual cassettes
- One inch insulated panel modular frame construction
- Panels meet UL1995, ASTM E84/UL 723 for flame spread and smoke develop rating.

Standard Control Features

- Durable unit-mounted touch screen display. The 7-inch WVGA 800 x 480 resolution touch-sensitive color screen is backlit, which enables viewing in poor light conditions including outdoor usage.
- Phase reversal protection provided in each compressor - fixed or variable.
- Compressor lead/lag
- Fan failure detection
- Occupied/unoccupied switching
- Timed override activation
- Programmable water purge during unoccupied mode
- High entering air temperature limit
Optional Features

- BACnet® Communication Interface Module
- Generic BAS interface
- Waterside modulating with spring return temperature control valves include factory installed piping and control wiring
- Fully integrated, factory-installed/commissioned variable frequency drive control
- Refrigerant suction discharge line service (shut-off) valves
- Protective coatings for the evaporator coils
- Stainless steel sloped drain pan
- Medium efficiency throwaway filters
- Non-fused disconnect switch
- Left hand/right hand electrical connections
- Left hand/right hand water connections
- 2- and 4-inch filter racks for all sizes.
- Condensing pressure control on all variable water flow systems with valves

Factory-Installed or Ship-Separate Options

- Waterside economizer with factory-installed piping and controls
- Optional clean in place fittings on brazed plate condensers.
- Field-Installed Accessories.

Benefits

Servicing Advantages

- Strategically placed service doors with easy access to critical components
- Cassette Concept allows for easier maintenance than other built-up systems.

Tenant Satisfaction

- Complete HVAC system on each floor minimizes tenant inconvenience during routine maintenance
- Tenants can control system after hours to increase productivity and minimize expense.

Lower Installed Cost

- Single point water connection. Left hand or right hand water connections for easier installation in existing applications. LH/RH connections are interchangeable in the field
- Single point power connections. Left hand to right hand electrical connections for easier installation into existing applications. LH/RH connections are interchangeable in the field
- Factory-commissioned and tested controls
- Factory-installed options.
Features and Benefits

Economical Operation

- Free cooling with optional waterside economizer
- Energy savings with floor-by-floor system since only units on floors requiring cooling need to operate
- Variable speed compressors for increased efficiency
- Variable speed plenum fans for increased efficiency
- Energy savings from the integrated water valve control using pump unloading.

Assured Acoustical Performance

- Horizontal discharge opening provides smooth airflow, reducing static pressure losses for optimum acoustical performance
- Multiple compressor design reduces acoustical levels. Scroll compressor design smooths gas flow for quieter operation.

Indoor Air Quality (IAQ) Features

- Sloped drain pan
- Stainless steel sloped drain pan option
- Double wall insulated panel modular frame construction
- High-efficiency throwaway filter option
- Easily cleanable evaporator, condensers, and waterside economizers
- Filter access door allows easy removal to encourage frequent filter changing.

Enhanced Serviceability

- Access Doors for ease of service
- Hinged and removable panels on all components
- Easy to adjust setpoints and operating parameters using the human interface panel on units.
- Refrigerant line sight glasses in view during operation.

Competitive Advantage

- Cassette construction for transporting unit components into the most demanding spaces
- Optional left hand/right hand electrical connections meets the needs of the mechanical room
- Optional left hand/right hand water connections meets the needs of the mechanical room
- Compact cabinet to minimize mechanical room requirements
- Up to 17% more efficient than competitive units
- Low leaving air temp capability to reduce fan motor energy, improve acoustical performance, and minimize duct sizes
- Factory-installed and tested microprocessor controller.

Variable Frequency Drives (VFD)

- Variable frequency drives on the fans are integral to the fans and are tested in the factory. Easy field wiring ensures quick/easy startup
- Variable frequency drive on the compressor are factory installed and tested. Easy field wiring ensures quick and easy startup.
Application Considerations

Modular Self-Contained Acoustical Recommendations

Successful acoustical results are dependent on many system design factors. Following are general acoustical recommendations. For more information, or if there is concern about a particular installation, contact a professional acoustical consultant.

Location and Orientation of the Mechanical Equipment Room

Locate the equipment room adjacent to stairwells, utility rooms, electrical closets, and rest rooms if possible, to minimize the acoustic effects and risk of workmanship or installation errors. (See figure below) Place the discharge and return air ductwork over these less acoustically sensitive areas, using vertical or horizontal fresh air shafts. Consult code requirements for fresh air and smoke purge constraints.

Return Air Ductwork

Duct the return air into the mechanical equipment room. Connect ductwork to the unit if local code dictates. The return air ductwork must have an elbow inside the equipment room. This elbow will reduce sound transmissions through the return duct. Extend the ductwork from the elbow far enough to block the “line of sight” to the exterior of the equipment room. Use a minimum ductwork length of 15 feet to the equipment room exterior. Line the duct with two-inch, three-pound density insulation. Use multiple, small return ducts for better acoustical performance to the occupied space.

Supply Air Ductwork

Insulate the supply air duct with two-inch, three-pound density insulation. Extend this lining at least 15 feet out from the equipment room wall, keeping the duct aspect ratio as small as possible. Minimize large flat panels since they transmit sound. In addition, small aspect ratios will minimize potential “oil canning” of the duct due to flow turbulence.

The horizontal discharge plenum opening option helps avoid complicated ductwork transitions. Ductwork turning vanes typically improve pressure drop but degrade acoustical performance.
Application Considerations

Recommended Maximum Air Velocities

The maximum recommended velocity for the discharge air duct is 2,000 fpm. The maximum recommended velocity for the return air duct is 1,000 fpm. Limit air velocities below these operating points to minimize the risk of flow turbulence that causes regenerated noise. Using round supply duct and static regain allows maximum discharge air velocities up to 3,000 fpm. Lining round supply duct also substantially lowers frequency noise attenuation. However, flow regenerated noise potential increases dramatically at air velocities over 3000 fpm.

Equipment Room Construction Options

The preferred equipment room wall construction is concrete block. If this is not feasible then a double stud offset wall is suggested (See figure below). This removes physical contact that would transmit sound through the equipment room wall to the occupied space. Interweave fiberglass insulation between the wall studs. Use two layers of drywall on each side of the wall.

Workmanship details are critical to acoustical performance. Seal all wall and floor penetrations by the ductwork, water piping, and equipment room access doors with a flexible material such as caulk and/or gasketing to stop noise and air leaks.

Locate the equipment room door away from acoustically sensitive areas like conference rooms. The door should swing out of the equipment room, if possible, so that the low pressure in the equipment room pulls the door in to help maintain a tight seal.

Figure 2. Double stud offset wall with interwoven insulation

Equipment Options

The horizontal discharge opening allows multiple outlet options. This minimizes the risk of acoustic and/or pressure drop problems by avoiding complex transitions close to the fan discharge.

Static Pressure Versus Acoustics

Design the system to minimize the total static pressure required from the self-contained unit fan. Typically a change in static pressure of only 0.5 inches can reduce NC level by approximately 2 or 3 in the occupied space.
Isolation Recommendations

Unit

The compressors are internally isolated. All fans are factory balanced. Therefore, external isolation is not required. Consult a vibration specialist before considering external or double vibration isolation.

Ductwork

Design duct connections to the unit using a flexible material. Consult local codes for approved flexible duct material to prevent fire hazard potential.

Piping Connections

Rubber isolator connectors are recommended for condenser piping to prevent vibration transmission to or from the building plumbing. The self-contained unit is internally isolated and does not require additional isolation. However, ensure that proper system vibration isolation design prevents vibration transmission from the building plumbing to the unit. Also be sure to properly isolate the drain line.

Condenser Water Piping

Piping Location and Arrangement

Provide at least 24 inches of clearance between the piping and the unit for service. Place the risers away from the side of the unit if possible. Be sure to allow sufficient space for valves and unions between the piping and the self-contained unit. Lay out condenser piping in reverse returns to help balance the system. This is accomplished by equalizing the supply and return pipe length. Multi-story buildings can use a direct return system with balancing valves at each floor. Install all heat exchangers and most cooling tower piping below the sump operating water level to prevent overflow during unit and/or system shut down.

Recommended Pump Location

Locate pump downstream of the cooling tower and upstream of the modular self-contained unit. This provides smoother and more stable unit operation.

When the tower and pump are both roof mounted, be sure to provide the necessary net positive suction head pressure to prevent cavitation. Raise the tower or submerge the pump in a sump to provide positive suction. To prevent an on-line pump failure, use a standby pump to avoid a complete system shutdown.

Several partial capacity pumps or variable speed pumps can be used. Review the economics of these alternate pumping options.

Strainers and Water Treatment

Water strainers are required at the unit inlet to eliminate potential unit damage from dirty water. Each unit will be supplied with a field installed 20 mesh strainer. Untreated or poorly treated water may result in equipment damage. Consult a water treatment specialist for treatment recommendations.

Isolation Valves

Install isolation valves at each unit before the strainer and after the condenser. This allows periodic servicing of the unit or strainer while allowing other units in the system to remain in operation.

Pressure Gauges

Install pressure gauges on the inlet and outlet of the self-contained unit. Select the gauge’s scale so that the unit design operating point is approximately mid-scale.
**Thermometers**
Install thermometers on the condenser water inlet and outlet lines to each unit for system analysis. Trane® recommends using a thermometer temperature range of 40°F to 140°F, using a 2°F temperature increment.

**Drains**
Install trapped drain in the low point of the mechanical equipment room floor to collect water from cleaning operations.

*Note: Units are not internally trapped. Trapped drain must be added in the field.*

**Condensing Pressure Control (Water-Cooled Condensers)**
Often cold condensing water applications between 35°F and 54°F require a condensing pressure control valve. However, to utilize this feature, the building water system must be capable of operating at reduced water flow rates through the modular self-contained units. It is imperative to install variable volume pumps or an external bypass in the water distribution system.

**Waterside Economizer Flow Control**
Units equipped with waterside economizer and intermediate piping package can be set up for variable or constant water flow.

Use constant water flow setup on water systems that are not capable of unloading water supply to the unit. The economizer and condenser valves will operate in complement to one another to provide continuous water flow.

Use variable water flow setup with water flow systems that can take advantage of pump unloading for energy savings. Since non-cooling operation restricts water flow during part load economizing or condensing temperature control, it is imperative to install variable volume pumps or an external bypass in the water distribution system.

*Figure 3. Waterside economizer flow control*
Application Considerations

Free Cooling Opportunities and Alternatives

Free cooling is available with the waterside economizer option. The advantages are listed as follows:

Waterside Economizer

The waterside economizer substantially reduces the compressor energy requirements because it uses the cooling water before it enters the condensers. Additional equipment room space is not required since the coils are contained within the overall unit dimensions.

Disadvantages include higher airside pressure drop and a higher head on condenser water pumps.

Unit Operating Limits

Airflow

The minimum recommended airflow for proper VAV system staging and temperature control is 35 percent of nominal design airflow. Adjusting VAV boxes with the appropriate minimum settings prevents the self-contained unit from operating in a surge condition at airflows below this point. Continuous operation in a surge condition can cause fan failure.

Note: Contact MJC Sales at 770-988-8338 for minimum airflow conditions.

Water Flow

Use 3 gpm/ton for optimum unit capacity and efficiency. Use 2.5 or 2 gpm/ton to reduce pump energy, cooling tower, and piping costs. However, these reduced water flows may impact unit capacity and efficiency by one or two percent. Consult factory for unit specific water flow ranges.
Model Number Descriptions

Modular Self-Contained

**Digit 1 — Unit Model**
S = Self-Contained

**Digit 2 — Unit Type**
C = Commercial

**Digit 3 — Condenser**
W = Water Cooled

**Digit 4 — Construction**
M = Modular

**Digit 5 — Refrigerant**
N = Nitrogen
R = R410a

**Digit 6, 7, 8 — Capacity**
040 = 40 tons
050 = 50 tons
060 = 60 tons
070 = 70 tons
080 = 80 tons

**Digit 9 — Unit Voltage**
F = 230/60/3
4 = 460/60/3

**Digit 10, 11 — Design Sequence**
00 = Initial Release

**Digit 12 — #Fans**
3 = 3 Fans
4 = 4 Fans
5 = 5 Fans
6 = 6 Fans

**Digit 13 — Compressor Configuration**
A = 2 Compressors (1 Variable, 1 Fixed)
B = 3 Compressors (1 Variable, 2 Fixed)
C = 4 Compressors (2 Variable, 2 Fixed)

**Digit 14 — Control Valves**
0 = None
H = Head Pressure Control Valves

**Digit 15 — Condenser Cleanable Options**
0 = None
C = Clean in Place Fittings (Chemically cleanable)

**Digit 16 — Economizer**
0 = No Economizer
C = With Water Side Economizer, Chemically Cleanable
W = With Water Side Economizer

**Digit 17 — Water Connections**
L = Left Hand Connections
R = Right Hand Connections

**Digit 18 — Unit Water Connections**
1 = Victaulic
2 = Pipe Connections

**Digit 19 — Air Discharge**
H = Horizontal Discharge
V = Vertical Discharge

**Digit 20 — Electrical Connections**
1 = Disconnect Switch
2 = Terminal Block

**Digit 21 — Unit Electrical Connections**

**Digit 22 — Drain Pan**
G = Galvanized Drain Pan
S = Stainless Steel Drain Pan

**Digit 23 — Industrial Options**
0 = None
A = Protective Coating Evaporator Coil

**Digit 24 — Filter Type**
A = 2 inch
B = 4 inch
C = 2 inch pre 4 inch after
D = 6 inch

**Digit 25 — Heater**
0 = None
1 = Hydronic

**Digit 26 — Shipping Method**
C = Cassette
M = Modular

**Digit 27 — Unit Isolators**
0 = None
A = Isopads

**Digit 28 — Control Interface Options**
A = UC600 VAV Control Scheme (Fixed DA Temp)
B = UC600 VAV Control Scheme (Return Air Reset)
C = UC600 VAV Control Scheme (Space Temp Reset)

**Digit 29 — Agency Listing**
0 = None
E = ETL listing

**Digit 30 — Options**
0 = None
1 = Duct High Temperature cutout

**Digit 31 — Space Sensor Options**
0 = None
1 = Space Sensor Only
2 = Space Sensor with On/Cancel Buttons
3 = Space Sensor/Setpoint with On/Cancel Button

**Digit 32 — GBAS Options**
0 = None
1 = GBAS Points Included

**Digit 33-38 — None**
0 = None

**Digit 39 — Major Design Version**
A = 1.0

**Digit 40 — Design Special**
0 = None
S = Design Special
## General Data

### Table 1. SCWM/SCAM water-cooled self-contained, 40 to 80 tons

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>40 Ton</th>
<th>50 Ton</th>
<th>60 Ton</th>
<th>70 Ton</th>
<th>80 Ton</th>
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<tr>
<td>Quantity</td>
<td>1 VS - 1 FS</td>
<td>1 VS - 2 FS</td>
<td>1 VS - 2 FS</td>
<td>2 VS - 2 FS</td>
<td>2 VS - 2 FS</td>
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<td>2</td>
<td>3</td>
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<td>4</td>
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<tr>
<td><strong>Evaporator Coil Data</strong></td>
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</tr>
<tr>
<td>Rows</td>
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<td>Sq. Ft.</td>
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<td>33.9</td>
<td>38.0</td>
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<td>Fins/in.</td>
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<td>13.5</td>
<td>13.5</td>
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<td>Number of Coils</td>
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<td>1</td>
<td>1</td>
<td>2</td>
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<td><strong>Condenser Data</strong></td>
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<tr>
<td>Minimum GPM w/o Econ&lt;sup&gt;(a)&lt;/sup&gt;</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Minimum GPM w/ Econ&lt;sup&gt;(a)&lt;/sup&gt;</td>
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<td>Maximum GPM</td>
<td>140</td>
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<td><strong>Evaporator Fan Data</strong></td>
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<tr>
<td>Diameter</td>
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<td>Power consumption kW</td>
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<tr>
<td>Minimum Design cfm</td>
<td>7,401</td>
<td>9,818</td>
<td>11,026</td>
<td>14,802</td>
<td>14,802</td>
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<tr>
<td>Maximum Design cfm</td>
<td>15,313</td>
<td>20,313</td>
<td>22,813</td>
<td>30,625</td>
<td>30,625</td>
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<td><strong>Refrigerant Charge, lbs. R-410A</strong></td>
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<td>Circuit A</td>
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<td>19.7</td>
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<td>Circuit C</td>
<td>x</td>
<td>19.7</td>
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<tr>
<td>Circuit D</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>19.7</td>
<td>19.7</td>
</tr>
</tbody>
</table>

(a) All performance data is provided in the Performance Selection Program. Contact MJC Sales at 770-988-8338 for more information.
### Table 2. SCWM/SCAM EER/IEER ratings

<table>
<thead>
<tr>
<th>Model</th>
<th>EER</th>
<th>IEER (VAV)</th>
<th>AHRI Net Cooling Capacity (MBTUH)</th>
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</thead>
<tbody>
<tr>
<td>SCWMR040F</td>
<td>14.8</td>
<td>20.6</td>
<td>468</td>
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<tr>
<td>SCWMR0404</td>
<td>14.8</td>
<td>20.6</td>
<td>468</td>
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<tr>
<td>SCWMR050F</td>
<td>14.9</td>
<td>19.5</td>
<td>600</td>
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<tr>
<td>SCWMR0504</td>
<td>14.9</td>
<td>19.5</td>
<td>600</td>
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<tr>
<td>SCWMR060F</td>
<td>14.8</td>
<td>18.5</td>
<td>696</td>
</tr>
<tr>
<td>SCWMR0604</td>
<td>14.8</td>
<td>18.5</td>
<td>696</td>
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<tr>
<td>SCWMR070F</td>
<td>14.9</td>
<td>19.5</td>
<td>840</td>
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<td>SCWMR0704</td>
<td>14.9</td>
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<td>840</td>
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<td>SCWMR080F</td>
<td>14.7</td>
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<tr>
<td>SCWMR0804</td>
<td>14.7</td>
<td>20.8</td>
<td>936</td>
</tr>
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</table>

**Notes:**
1. Cooling Only.
2. Cooling performance is rated at 80°F EDB/67°F EWB with 85°F EWT for water-cooled performance and 95°F Ambient for air-cooled performance.
3. EER, IEER, and AHRI Net Cooling Capacity are tested in accordance with the AHRI 340/360 (I-P) and certified to 10 CFR Part 431 from the US Department of Energy.

### Table 3. SCWM/SCAM water volumes

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Water Volume in U.S. Gallons/Liters</th>
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<tbody>
<tr>
<td></td>
<td>w/o Economizer</td>
<td>With Chem. Cleanable Econ, Add</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gallons</td>
<td>Liters</td>
<td>Gallons</td>
</tr>
<tr>
<td>40 Ton</td>
<td>8.2</td>
<td>31.0</td>
<td>12.0</td>
</tr>
<tr>
<td>50 Ton</td>
<td>9.7</td>
<td>36.7</td>
<td>14.4</td>
</tr>
<tr>
<td>60 Ton</td>
<td>9.7</td>
<td>36.7</td>
<td>19.1</td>
</tr>
<tr>
<td>70 Ton</td>
<td>12.9</td>
<td>48.9</td>
<td>24.0</td>
</tr>
<tr>
<td>80 Ton</td>
<td>12.9</td>
<td>48.9</td>
<td>24.0</td>
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</tbody>
</table>

### Table 4. SCWM/SCAM refrigerant circuits, number of compressors by circuit

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Ton</td>
<td>1-15T VS</td>
<td>1-15T FS</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>50 Ton</td>
<td>1-15T VS</td>
<td>1-13T FS</td>
<td>1-13T FS</td>
<td>N/A</td>
</tr>
<tr>
<td>60 Ton</td>
<td>1-15T VS</td>
<td>1-15T FS</td>
<td>1-15T FS</td>
<td>N/A</td>
</tr>
<tr>
<td>70 Ton</td>
<td>1-15T VS</td>
<td>1-13T FS</td>
<td>1-13T FS</td>
<td>1-15T VS</td>
</tr>
<tr>
<td>80 Ton</td>
<td>1-15T VS</td>
<td>1-15T FS</td>
<td>1-15T FS</td>
<td>1-15T VS</td>
</tr>
</tbody>
</table>

**Notes:**
1. This table depicts compressor location in unit, plan view from left corner.
2. VS- Variable Speed Compressor.
3. FS- Fixed Speed Compressor.
### General Data

**Important:** All performance data is provided in the Performance Selection Program. Contact MJC Sales at 770-988-8338 for more information.

#### Table 5. SCWM/SCAM filter data, water-cooled units

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>40 Ton</th>
<th>50 Ton</th>
<th>60 Ton</th>
<th>70 Ton</th>
<th>80 Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number - Size (in.)</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>20&quot;x 20&quot;</td>
<td>20&quot;x 20&quot;</td>
<td>20&quot;x 20&quot;</td>
<td>20&quot;x 20&quot;</td>
<td>20&quot;x 20&quot;</td>
</tr>
</tbody>
</table>

#### Table 6. Number of compressors

<table>
<thead>
<tr>
<th>MSC</th>
<th>40 Ton</th>
<th>50 Ton</th>
<th>60 Ton</th>
<th>70 Ton</th>
<th>80 Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 HP - Variable Speed</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>15 HP - Fixed Speed</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>13 HP - Fixed Speed</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Table 7. Number of fans/unit

<table>
<thead>
<tr>
<th>MSC</th>
<th>40 Ton</th>
<th>50 Ton</th>
<th>60 Ton</th>
<th>70 Ton</th>
<th>80 Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fans</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

*40-50 qty(4) fans optional

*70-80 qty(6) fans optional

#### Table 8. Waterside economizer coil physical data

<table>
<thead>
<tr>
<th>Model</th>
<th>Unit Size</th>
<th>Rows</th>
<th>FPF</th>
<th>Height</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC</td>
<td>40 Ton</td>
<td>4</td>
<td>150</td>
<td>75</td>
<td>49</td>
</tr>
<tr>
<td>MSC</td>
<td>50 Ton</td>
<td>4</td>
<td>150</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>MSC</td>
<td>60 Ton</td>
<td>4</td>
<td>150</td>
<td>75</td>
<td>73</td>
</tr>
<tr>
<td>MSC*</td>
<td>70 Ton</td>
<td>4</td>
<td>150</td>
<td>75</td>
<td>49</td>
</tr>
<tr>
<td>MSC*</td>
<td>80 Ton</td>
<td>4</td>
<td>150</td>
<td>75</td>
<td>49</td>
</tr>
</tbody>
</table>

*QTY (2)
Controls

The Trane Modular Self-Contained unit is controlled through Trane Tracer™ UC600 controller programmed with specific controls sequences to meet the needs of the unit configuration and application. The Tracer UC600 controller and Tracer TD7 display provide the Human Machine Interface for the Trane Modular Self-Contained unit. Additional inputs and outputs are achieved through a communication bus (IMC) talking with Tracer Expansion modules (XM70, XM30 and XM32).

Modular Series Self-Contained Units

The Trane Modular Self-Contained unit includes Trane UC600 unit controls and the TD7 touch screen display.

Trane controls are designed to work with Trane® equipment for optimum efficiency. The factory installs and commissions each control component to ensure simple and reliable operation.

Depending upon unit options, units can operate as follows:

- Stand-alone
- Interface with Trane BACnet building management system
- Interface with a generic (non-Trane) building management system

Figure 4. UC600

Figure 5. XM70
Available Inputs and Outputs for the Unit Module (on all units with controls)

**Binary Inputs**
- Emergency stop
- External auto/stop
- Unoccupied/occupied
- Dirty filter

**Binary Outputs**
- VAV box drive max (VAV units only)
- Alarm
- Fan run request
- Water pump request (water-cooled only)

**Generic BAS Option (GBAS)**

<table>
<thead>
<tr>
<th>Figure 6.</th>
<th>TD7</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Figure 7.</th>
<th>XM30 and XM32</th>
</tr>
</thead>
</table>

**Binary Inputs**
Demand limit contacts
Binary Outputs
- Dirty filter relay
- Refrigeration fail relay
- Heat fail relay
- Supply fan fail relay
- Active diagnostics

Analog Inputs
- Occupied zone cooling setpoint
- Occupied zone heating setpoint
- Unoccupied zone cooling setpoint
- Unoccupied zone heating setpoint or minimum outside air flow setpoint
- Supply air cooling setpoint
- Supply air heating setpoint
- Supply air static pressure setpoint

BACnet/Building Automation System
The BACnet Communication Interface for self-contained (BCI-I) controller expands communications from the unit UCM network to Tracer® SC or a third party building automation system, utilizing BACnet, and allows external setpoint and configuration adjustment and monitoring of status and diagnostics. The BCI-I utilizes the BACnet defined MS/TP protocol as defined in ASHRAE standard 135-2004. This controller works in standalone mode, with Tracer® SC or when connected to a third party building automation system that supports BACnet.

Standard Unit Control Features

Note: All set-up parameters are preset from the factory, requiring less start-up time during installation.

Unit Features
- Durable unit-mounted touch screen display. The 7-inch WVGA 800 x 480 resolution touch-sensitive color screen is backlit, which enables viewing in poor light conditions including outdoor usage.
- Compressor lead/lag
- For units with two fixed speed compressors
- Fan failure detection
- Occupied/unoccupied switching
- Timed override activation
- Programmable water purge during unoccupied mode
Trane Tracer® TD7

Screen Overview

There are three distinct areas on the TD7 screens:

- Top display area
- Main display area
- Bottom display area

Figure 8. Tracer® TD7 display screen

Top Display Area
Controls

<table>
<thead>
<tr>
<th>Main Display Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>This area serves as the main task area in which you can view custom graphics, create reports, view and take action on alarms, and view or change display settings.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bottom Display Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>The bottom display area contains functional buttons that provide a link to the appropriate screen.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control Sequences of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic Building Automation System Module (GBAS) Option</strong></td>
</tr>
<tr>
<td>The generic building automation system module (GBAS) provides broad control capabilities for building automation systems other than Trane Tracer® systems. A field-provided potentiometer or a 0-5 Vdc signal can be applied to any of the inputs of the GBAS to provide the following inputs and outputs:</td>
</tr>
</tbody>
</table>

- **GBAS Analog Inputs** — Four analog inputs that can be configured to be any of the following:
  - Occupied zone cooling
  - Unoccupied zone cooling
  - Occupied zone heating
  - Unoccupied zone heating
- SA cooling setpoint
- SA heating setpoint
- SA static pressure setpoint

**GBAS Binary Outputs** — Each of the five relay outputs can be mapped to any/all of the available diagnostics.

**Demand Limiting Binary Input** — This function is operational on units with a GBAS and is used to reduce electrical consumption at peak load times. There are two types of demand limiting, 50% and 100%. When demand limiting is needed, mechanical cooling and heating operation are either partially (50%), or completely disabled (100%) to save energy. The demand limit definition is user definable at the human interface panel. Demand limit binary input accepts a field supplied switch or contact closure. When the need for demand limiting has been discontinued, the unit’s cooling/heating functions will again become fully enabled.

**Occupied/Unoccupied Switching**

There are four ways to switch occupied/unoccupied:

1. Programmable night setback sensor
2. Field-supplied contact closure — This input accepts a field supplied switch or contacts closure such as a time clock.
3. Tracer® — The Trane Tracer® system can control the occupied/unoccupied status of the self-contained unit.

**Timed Override Activation—ICS**

This function is operational. When this function is initiated by the push of the override button on the zone sensor, the unit will switch to the occupied mode. Unit operation (occupied mode) during timed override is terminated by a signal from Tracer®.

**Timed Override Activation—Non-ICS**

This function is active. When this function is initiated by the push of the override button on the zone sensor, the unit will switch to the occupied mode. Automatic cancellation of the timed override mode occurs after three hours of operation.

**Compressor Lead/Lag**

Compressor lead/lag is a present in the controls for all units with two fixed speed compressors. After each request for compressor operation, the lead refrigeration circuit or compressor switches, thereby causing a more equitable or balanced run time among compressors.

**Emergency Stop Input**

A binary input is provided on the terminal strip for installation of a field-provided switch or contacts to immediately shutdown all unit functions.

**Water Flow Control**

With compatible piping configurations, the unit can be configured to provide variable water flow, which maximizes energy saving by unloading the water pumping system.

**Head Pressure Control**

Water-cooled condensers — Units that are set up for variable water flow will modulate a water valve to maintain a user-defined condensing temperature setpoint. Condensing temperature will be referenced utilizing factory installed sensors located at each condenser.
Controls

Water Purge
This user-definable feature allows the user to select a purge schedule to automatically circulate water through the economizer and condensers periodically during non-operational times. This allows fresh chemicals to circulate in waterside heat exchangers.

Supply Air Static Pressure Limit
The opening of the VAV boxes are coordinated during unit start up and transition to/from occupied/unoccupied modes to prevent over-pressurization of the supply air duct-work. However, if for any reason the supply air pressure exceeds the user-defined supply air static pressure limit that was set at the human interface panel, the supply fan/VFD is shut down. Then unit is then allowed to restart up to three times. If the over-pressurization condition still occurs on the third restart, the unit shuts down and a manual reset diagnostic sets and displays at the human interface panel.

Supply Air Temperature Control Unit Sequence of Operation

1 — Occupied Supply Air Temperature Control

Cooling/Waterside Economizer
During occupied cooling mode, the waterside economizer option and mechanical cooling are used to control the supply air temperature. The supply air temperature setpoint and deadband are user defined at the human interface panel. Waterside economizing enables when the units entering water temperature is below the units entering mixed air temperature by 4°F plus the user adjustable economizer approach temperature. The approach temperature default is 4°F and is adjustable from 0-9°F at the HI. Waterside economizing disables when the units entering water temperature is not below the units entering mixed air temperature by at least the water economizer approach temperature.

The economizer acts as the first stage of cooling. If the economizer is unable to maintain the supply air setpoint, the compressor module will bring on compressors as required to meet the setpoint. If the unit does not include an economizer, only mechanical cooling will satisfy cooling requirements.

Supply Air Setpoint Reset
Supply air reset can be used to adjust the supply air temperature setpoint on the basis of a zone temperature. Supply air reset adjustment is available from the TD7 for supply air cooling control.

Reset Based on Zone Temperature
Zone reset is applied to the zone(s) in a building that tends to overcool or overheat. The supply air temperature setpoint is adjusted based on the temperature of the critical zone(s). This can have the effect of improving comfort and/or lowering energy usage. The user-defined parameters are the same as for outdoor air reset.
Zone Sensor Options

Zone Temperature Sensor, BAYSENS077

This zone sensor includes an internal thermistor and should be mounted in the zone, Model Number Digit 31=1. This sensor is available for use with all zone sensor options to provide remote sensing capabilities.

Additional sensors are also available for order using the Model Number Digit 31.

Integrated Comfort™ Systems Sensors for CV and VAV Applications

Zone Temperature Sensor with Timed Override Buttons and Local Setpoint Adjustment, BAYSENS074

This zone sensor is for use with cooling/heating ICS™, Model Number Digit 31=3. It provides the following features and system control functions:

- Remote temperature sensing in the zone
- A timed override button to move an Integrated Comfort™ System or a building management system from unoccupied to occupied mode.
- Setpoint thumbwheel for local setpoint adjustment.
- Cancel button to cancel the unoccupied override command.
Zone Temperature Sensor with Timed Override Buttons, BAYSENS073

Zone temperature sensor with timed override buttons, Model Number Digit 31=2.
This zone sensor is for use with cooling/heating Integrated Comfort™ Systems (ICS). It provides the following features and system control functions:

- Remote temperature sensing in the zone.
- A timed override button to move an ICS or building management system from it unoccupied to occupied mode.
- Cancel button to cancel the unoccupied override command.
Electrical Data

Selection Procedures

- RLA = Rated Load Amps
- Compressor LRA = Locked Rotor Amps
- Compressor Input = VFD drive Input
- Compressor Output = VFD drive output
- Voltage utilization range is ±10%

Determination of Minimum Circuit Ampacity (MCA)

MCA = 1.25 x Largest motor amps/VFD Input + the sum of the remaining motor amps.

Determination of Max Fuse (MFS) and Max Circuit Breaker (MCB) sizes

MFS and MCB = 2.25 x Largest motor amps (RLA)/VFD input) + the sum of the remaining motor amps.

If the rating value calculation does not equal a standard over current protective device rating, use the next lower standard rating as the maximum.

Table 9. Number of compressors

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZP181KCE-TE</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>96CC-ZPV0962 (vfd)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 10. Number of fans

<table>
<thead>
<tr>
<th>Drive (K3G500) - Motor (M3G150-1F)</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive (K3G500) - Motor (M3G150-1F)</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 11. Compressor electrical data

<table>
<thead>
<tr>
<th>15 Ton</th>
<th>200</th>
<th>460</th>
<th>200</th>
<th>460</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLA</td>
<td>LRA</td>
<td>RLA</td>
<td>LRA</td>
<td>INPUT</td>
</tr>
<tr>
<td>ZP181KCE-TE</td>
<td>55.77</td>
<td>340</td>
<td>23.77</td>
<td>110</td>
</tr>
<tr>
<td>96CC-ZPV0962 (vfd)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 12. Fan motor electrical data

<table>
<thead>
<tr>
<th>Drive (K3G500) - Motor (M3G150-1F)</th>
<th>200</th>
<th>460</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT</td>
<td>18.6</td>
<td>9</td>
</tr>
</tbody>
</table>
# Electrical Data

## Table 13. Electrical service sizing data — motors — 40 to 80 tons

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Model Number</th>
<th>Nameplate Voltage</th>
<th>Voltage Range</th>
<th>MCA</th>
<th>MOP</th>
<th>Disc</th>
<th>Qty</th>
<th>RLA</th>
<th>LRA</th>
<th>Qty</th>
<th>Max Input (A)</th>
<th>Qty</th>
<th>kW</th>
<th>FLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>SCWMN040F</td>
<td>208-230/60/3</td>
<td>187-253</td>
<td>221.6</td>
<td>300</td>
<td>225</td>
<td>1</td>
<td>55.77</td>
<td>340</td>
<td>1</td>
<td>84</td>
<td>3</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0404</td>
<td>460/60/3</td>
<td>414-506</td>
<td>128.2</td>
<td>200</td>
<td>125</td>
<td>1</td>
<td>23.72</td>
<td>110</td>
<td>1</td>
<td>60</td>
<td>3</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>50</td>
<td>SCWMN050F</td>
<td>208-230/60/3</td>
<td>187-253</td>
<td>268.4</td>
<td>350</td>
<td>300</td>
<td>2</td>
<td>51.28</td>
<td>300</td>
<td>1</td>
<td>84</td>
<td>3</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0504</td>
<td>460/60/3</td>
<td>414-506</td>
<td>150.7</td>
<td>225</td>
<td>150</td>
<td>2</td>
<td>23.10</td>
<td>150</td>
<td>1</td>
<td>60</td>
<td>3</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>60</td>
<td>SCWMN060F</td>
<td>208-230/60/3</td>
<td>187-253</td>
<td>295.9</td>
<td>400</td>
<td>300</td>
<td>2</td>
<td>55.77</td>
<td>340</td>
<td>1</td>
<td>84</td>
<td>4</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0604</td>
<td>460/60/3</td>
<td>414-506</td>
<td>160.9</td>
<td>225</td>
<td>175</td>
<td>2</td>
<td>23.72</td>
<td>110</td>
<td>1</td>
<td>60</td>
<td>4</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>70</td>
<td>SCWMN070F</td>
<td>208-230/60/3</td>
<td>187-253</td>
<td>389.6</td>
<td>500</td>
<td>450</td>
<td>2</td>
<td>51.28</td>
<td>300</td>
<td>2</td>
<td>84</td>
<td>5</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0704</td>
<td>460/60/3</td>
<td>414-506</td>
<td>228.7</td>
<td>300</td>
<td>250</td>
<td>2</td>
<td>23.10</td>
<td>150</td>
<td>2</td>
<td>60</td>
<td>5</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>80</td>
<td>SCWMN080F</td>
<td>208-230/60/3</td>
<td>187-253</td>
<td>398.5</td>
<td>500</td>
<td>450</td>
<td>2</td>
<td>55.77</td>
<td>340</td>
<td>2</td>
<td>84</td>
<td>5</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0804</td>
<td>460/60/3</td>
<td>414-506</td>
<td>229.9</td>
<td>300</td>
<td>250</td>
<td>2</td>
<td>23.72</td>
<td>110</td>
<td>2</td>
<td>60</td>
<td>5</td>
<td>6.15</td>
<td>9.0</td>
</tr>
</tbody>
</table>

**Notes:**

1. MCA: Minimum Circuit Ampacity is 125% of the largest compressor RLA or Drive input current, plus 100% of the other compressor(s) RLA, plus the sum of the condenser fan RLA, plus any other load rated at 1 AMP or more.
2. Maximum Breaker Overcurrent Protection (MOP): 225% of the largest compressor RLA or VSD drive Input, plus 100% of the other compressor(s) RLA, plus the sum of the condenser fan Motor/Drive FLA, plus any other load rated at 1 AMP or more.
3. Recommended Disconnect switch: 110% to 115% of the sum of the RLA of the compressors, VSD drive input, fan motor/drive and controls FLA.
4. RLA: Rated in accordance with UL standard 1995
5. Local codes may take precedence.
6. Fixed speed compressor are across the line starting, the VSD compressors are controlled by VSD drive. Compressors will never start simultaneously.
7. Voltage utilization range is ±10 percent.
### Table 14. Electrical data — 40 to 80 tons

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Model Number</th>
<th>Nameplate Voltage</th>
<th>Compressor (EA)</th>
<th>Fan (EA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fixed Speed</td>
<td>Variable Speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Qty</td>
<td>RLA</td>
</tr>
<tr>
<td>40</td>
<td>SCWMN040F</td>
<td>208-230/60/3</td>
<td>1</td>
<td>55.77</td>
</tr>
<tr>
<td>40</td>
<td>SCWMN0404</td>
<td>460/60/3</td>
<td>1</td>
<td>23.72</td>
</tr>
<tr>
<td>50</td>
<td>SCWMN050F</td>
<td>208-230/60/3</td>
<td>2</td>
<td>51.28</td>
</tr>
<tr>
<td>50</td>
<td>SCWMN0504</td>
<td>460/60/3</td>
<td>2</td>
<td>23.10</td>
</tr>
<tr>
<td>60</td>
<td>SCWMN060F</td>
<td>208-230/60/3</td>
<td>2</td>
<td>55.77</td>
</tr>
<tr>
<td>60</td>
<td>SCWMN0604</td>
<td>460/60/3</td>
<td>2</td>
<td>23.72</td>
</tr>
<tr>
<td>70</td>
<td>SCWMN070F</td>
<td>208-230/60/3</td>
<td>2</td>
<td>51.28</td>
</tr>
<tr>
<td>70</td>
<td>SCWMN0704</td>
<td>460/60/3</td>
<td>2</td>
<td>23.10</td>
</tr>
<tr>
<td>80</td>
<td>SCWMN080F</td>
<td>208-230/60/3</td>
<td>2</td>
<td>55.77</td>
</tr>
<tr>
<td>80</td>
<td>SCWMN0804</td>
<td>460/60/3</td>
<td>2</td>
<td>23.72</td>
</tr>
</tbody>
</table>

### Table 15. Compressor electrical data — 40 to 80 tons

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Model Number</th>
<th>Nameplate Voltage</th>
<th>Compressor (EA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fixed Speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Qty</td>
</tr>
<tr>
<td>40</td>
<td>SCWMN040F</td>
<td>208-230/60/3</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>SCWMN0404</td>
<td>460/60/3</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>SCWMN050F</td>
<td>208-230/60/3</td>
<td>2</td>
</tr>
<tr>
<td>50</td>
<td>SCWMN0504</td>
<td>460/60/3</td>
<td>2</td>
</tr>
<tr>
<td>60</td>
<td>SCWMN060F</td>
<td>208-230/60/3</td>
<td>2</td>
</tr>
<tr>
<td>60</td>
<td>SCWMN0604</td>
<td>460/60/3</td>
<td>2</td>
</tr>
<tr>
<td>70</td>
<td>SCWMN070F</td>
<td>208-230/60/3</td>
<td>2</td>
</tr>
<tr>
<td>70</td>
<td>SCWMN0704</td>
<td>460/60/3</td>
<td>2</td>
</tr>
<tr>
<td>80</td>
<td>SCWMN080F</td>
<td>208-230/60/3</td>
<td>2</td>
</tr>
<tr>
<td>80</td>
<td>SCWMN0804</td>
<td>460/60/3</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 16. Fan motor electrical data — 40 to 80 tons

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Model Number</th>
<th>Nameplate Voltage</th>
<th>VSD</th>
<th>Qty</th>
<th>kW</th>
<th>FLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>SCWMN040F</td>
<td>208-230/60/3</td>
<td></td>
<td>3</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0404</td>
<td>460/60/3</td>
<td></td>
<td>3</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>50</td>
<td>SCWMN050F</td>
<td>208-230/60/3</td>
<td></td>
<td>3</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0504</td>
<td>460/60/3</td>
<td></td>
<td>3</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>60</td>
<td>SCWMN060F</td>
<td>208-230/60/3</td>
<td></td>
<td>4</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0604</td>
<td>460/60/3</td>
<td></td>
<td>4</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>70</td>
<td>SCWMN070F</td>
<td>208-230/60/3</td>
<td></td>
<td>5</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0704</td>
<td>460/60/3</td>
<td></td>
<td>5</td>
<td>6.15</td>
<td>9.0</td>
</tr>
<tr>
<td>80</td>
<td>SCWMN080F</td>
<td>208-230/60/3</td>
<td></td>
<td>5</td>
<td>6.15</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>SCWMN0804</td>
<td>460/60/3</td>
<td></td>
<td>5</td>
<td>6.15</td>
<td>9.0</td>
</tr>
</tbody>
</table>
Dimensional Data

Figure 9. Unit dimensions (in inches)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WIDTH</th>
<th>HEIGHT</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC-40, 50, 60</td>
<td>96</td>
<td>84</td>
<td>69</td>
</tr>
<tr>
<td>MSC-70, 80</td>
<td>126</td>
<td>84</td>
<td>69</td>
</tr>
</tbody>
</table>

* ALL DIMENSIONS IN INCHES
Figure 10. Fan assembly footprint (in mm/inches)
Figure 11. Variable speed compressor assembly footprint (in mm/inches)
Figure 12. Starter cassette assembly footprint (in mm/inches)
Figure 13. Evaporator cassette assembly footprint (in inches)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WIDTH</th>
<th>HEIGHT</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC-40, 50, 60</td>
<td>96.0</td>
<td>84.0</td>
<td>34.0</td>
</tr>
<tr>
<td>MSC-70, 80</td>
<td>126.0</td>
<td>84.0</td>
<td>34.0</td>
</tr>
</tbody>
</table>
Dimensional Data

Figure 14. Discharge opening top view (in mm/inches)

Service Clearances

Table 17. Service/code clearance requirements

<table>
<thead>
<tr>
<th>Side</th>
<th>Distance - in (mm)</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>42 (1066)</td>
<td>Fans, Compressors, Condensers, Refrigeration access</td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Hand Starter</td>
<td>42 (1066)</td>
<td></td>
</tr>
<tr>
<td>Right Hand Starter</td>
<td>9 (229)</td>
<td>NEC Code Requirement (Starter Panel)</td>
</tr>
<tr>
<td>Right</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Hand Starter</td>
<td>9 (229)</td>
<td>NEC Code Requirement (Starter Panel)</td>
</tr>
<tr>
<td>Right Hand Starter</td>
<td>42 (1066)</td>
<td></td>
</tr>
<tr>
<td>Inlet</td>
<td>18 (457)</td>
<td>Provides uniform air flow</td>
</tr>
</tbody>
</table>
# Weights

## Table 18. Unit weights

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Base Weight (lbs)</th>
<th>Base Weight (kg)</th>
<th>Waterside Economizer (lbs)</th>
<th>Waterside Economizer (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Ton</td>
<td>3041</td>
<td>1379</td>
<td>381</td>
<td>173</td>
</tr>
<tr>
<td>50 Ton</td>
<td>3506</td>
<td>1590</td>
<td>468</td>
<td>212</td>
</tr>
<tr>
<td>60 Ton</td>
<td>3641</td>
<td>1652</td>
<td>568</td>
<td>258</td>
</tr>
<tr>
<td>70 Ton</td>
<td>4733</td>
<td>2146</td>
<td>762</td>
<td>346</td>
</tr>
<tr>
<td>80 Ton</td>
<td>4733</td>
<td>2146</td>
<td>762</td>
<td>346</td>
</tr>
</tbody>
</table>

*Note:* All unit weights include refrigerant, water, and controllers.

## Table 19. Unit shipping weights (Fan cassette)

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Overall Dimensions</th>
<th>Unit Weight (lbs)</th>
<th>Fan Cassette</th>
<th>Number of Dual</th>
<th>Fan Weight (Two Fans)</th>
<th>Number of Single</th>
<th>Fan Weight (Single Fan)</th>
<th>Total Fan Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>2933</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>1</td>
<td>408</td>
<td>1</td>
<td>308</td>
<td>716</td>
</tr>
<tr>
<td>50 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>3365</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>1</td>
<td>408</td>
<td>1</td>
<td>308</td>
<td>716</td>
</tr>
<tr>
<td>60 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>3500</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>408</td>
<td>0</td>
<td>308</td>
<td>816</td>
</tr>
<tr>
<td>70 Ton</td>
<td>70&quot; x 84&quot; x 126&quot;</td>
<td>4545</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>408</td>
<td>1</td>
<td>308</td>
<td>1124</td>
</tr>
<tr>
<td>80 Ton</td>
<td>70&quot; x 84&quot; x 126&quot;</td>
<td>4545</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>408</td>
<td>1</td>
<td>308</td>
<td>1124</td>
</tr>
</tbody>
</table>

## Table 20. Unit shipping weights (Compressor cassette)

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Overall Dimensions</th>
<th>Unit Weight (lbs)</th>
<th>Compressor Cassette</th>
<th>Number Fixed Spd</th>
<th>FS Condensing Unit Cassette</th>
<th>Number Var Spd</th>
<th>VS Condensing Unit Cassette</th>
<th>Total Condensing Unit Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>2933</td>
<td>34.5&quot;x 29.5&quot;x 27.6&quot;</td>
<td>1</td>
<td>385</td>
<td>1</td>
<td>335</td>
<td>720</td>
</tr>
<tr>
<td>50 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>3365</td>
<td>34.5&quot;x 29.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>385</td>
<td>1</td>
<td>335</td>
<td>1105</td>
</tr>
<tr>
<td>60 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>3500</td>
<td>34.5&quot;x 29.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>385</td>
<td>1</td>
<td>335</td>
<td>1105</td>
</tr>
<tr>
<td>70 Ton</td>
<td>70&quot; x 84&quot; x 126&quot;</td>
<td>4545</td>
<td>34.5&quot;x 29.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>385</td>
<td>2</td>
<td>335</td>
<td>1440</td>
</tr>
<tr>
<td>80 Ton</td>
<td>70&quot; x 84&quot; x 126&quot;</td>
<td>4545</td>
<td>34.5&quot;x 29.5&quot;x 27.6&quot;</td>
<td>2</td>
<td>385</td>
<td>2</td>
<td>335</td>
<td>1440</td>
</tr>
</tbody>
</table>

## Table 21. Unit shipping weights (Starter cassette)

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Overall Dimensions</th>
<th>Unit Weight (lbs)</th>
<th>Starter Cassette</th>
<th>Starter Cassette Weight (230 VAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>2933</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>323</td>
</tr>
<tr>
<td>50 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>3365</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>323</td>
</tr>
<tr>
<td>60 Ton</td>
<td>70&quot; x 84&quot; x 95.5&quot;</td>
<td>3500</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>323</td>
</tr>
<tr>
<td>70 Ton</td>
<td>70&quot; x 84&quot; x 126&quot;</td>
<td>4545</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>323</td>
</tr>
<tr>
<td>80 Ton</td>
<td>70&quot; x 84&quot; x 126&quot;</td>
<td>4545</td>
<td>34.5&quot;x 54.5&quot;x 27.6&quot;</td>
<td>323</td>
</tr>
</tbody>
</table>
### Table 22. Unit shipping weights (Evaporator cassette)

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Overall Dimensions</th>
<th>Unit Weight (lbs)</th>
<th>Evaporator Cassette</th>
<th>Total Weight of Cassette (exc. Economizer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Ton</td>
<td>70”x 84” x 95.5”</td>
<td>2933</td>
<td>34.5”x 84”x 94”</td>
<td>1127</td>
</tr>
<tr>
<td>50 Ton</td>
<td>70”x 84” x 95.5”</td>
<td>3365</td>
<td>34.5”x 84”x 94”</td>
<td>1219</td>
</tr>
<tr>
<td>60 Ton</td>
<td>70”x 84” x 95.5”</td>
<td>3500</td>
<td>34.5”x 84”x 94”</td>
<td>1254</td>
</tr>
<tr>
<td>70 Ton</td>
<td>70”x 84” x 126”</td>
<td>4545</td>
<td>34.5”x 84”x 126”</td>
<td>1651</td>
</tr>
<tr>
<td>80 Ton</td>
<td>70”x 84” x 126”</td>
<td>4545</td>
<td>34.5”x 84”x 126”</td>
<td>1651</td>
</tr>
</tbody>
</table>
Mechanical Specifications

Modular Series Self-Contained Units

**Note:** Certified DOE Performance:
- Trane Commercial Self-Contained units are tested in accordance with AHRI 340/360 (I-P).
- The net cooling capacity and EER performance are certified to 10 CFR Part 431 from the US Department of Energy.

Cabinet

- The unit framework are formed structural members of sturdy-gauge aluminum. Exterior panels are fabricated from 1" thick insulating foam core sandwiched between two layers of exterior grade cement and finished aluminum sheets.
- The unit is provided with removable panels to allow service access to compressors, condensers, fans, coils, and valves. Removable panels are secured with quick-acting hinges that allow panel to act as door, or completely remove panel when necessary. The refrigerant sight glasses are accessible during operation.

Compressors

- Units have multiple compressors with independent circuits.
- Compressors are manufactured by an independent manufacturer.
- Scroll compressors are heavy duty suction cooled type with suction screen, centrifugal oil pump with dirt separator, oil charging valve, and oil sight glass.
- Protective devices for low pressure, high pressure, and motor temperature are provided.
- The compressors are mounted on isolators for vibration isolation.

Phase and Voltage Monitor

- Protects 3-phase equipment from phase loss, phase reversal and low voltage.
- Any fault condition will produce a Failure Indicator LED and send the unit into an auto stop condition.
- cULus approved.

Condenser

- One condenser is provided for each compressor.
- The condensers are brazed plate and are chemically cleanable. A 20 mesh removable screen is provided upstream of all condensers for additional protection. Pressure differential across the screen also alerts user if the screen needs to be cleaned.
- Condenser waterside working pressure is 400 psig.

Evaporator

Refrigerant Circuit

- Refrigerant circuits are independent and include sight glasses, distributors, thermal expansion valves with adjustable superheat and external equalizer, and high pressure relief valves with ½-inch (13 mm) flare connection.
- Unit is provided with adequate means of frost control.
- The circuits are shipped with a small nitrogen charge
- Compressors are mounted on rubber-in-shear isolators for vibration isolation.
Mechanical Specifications

Supply Fan
Direct drive plenum fans for increased efficiency. Plenum fans are equipped with integrated motor, electronics, and Variable Frequency drives (VFD) are tested in the factory and easy field wiring ensures quick, easy, and reliable startup.

Filters
- Standard filters are 2" MERV 8 (20" x 20").
- Optional 4" and 6" available.

Unit Controls—DDC
- Microprocessor controls are provided to control all unit functions. The control system provided is the Trane Tracer™ UC600 Controller. The controls are factory-installed and mounted in the main control panel. All factory-installed controls are fully commissioned (run tested) at the factory. The unit provides a unit-mounted Tracer TD7 user interface with a 7-inch WVGA 800 x 480 resolution touch-sensitive color screen. The screen is backlit, which enables viewing in poor light conditions. The TD7 display is standard to provide the operator with full adjustment and display of control data functions. The unit controls are used as a standalone controller or as part of a building management system involving multiple units.

The unit is equipped with a complete microprocessor control system. This system consists of temperature and pressure (thermistor and static pressure transducer) sensors, control modules, and a unit mounted user interface panel. Modules are individually replaceable for service ease. All microprocessors, modules, and sensors are factory mounted, wired, and tested.
- Light emitting diodes (LEDs) indicate the operation and communication status of the controller.
- Zone sensors are available in several combinations with selectable features depending on sensor.
- The TD7 display supports 25 built-in languages.

Agency Listing
Units shall have the Intertek ETL agency listing.

Modular Self-Contained Options

Air Volume/Temperature Control

Zone Temperature Control
This option includes a zone sensor, microprocessor unit control module, a microprocessor compressor controller, and a unit-mounted human interface panel. The unit operates at a design airflow based on the fan and motor drive selections.

Supply Air Temperature Control With Variable Frequency Drive
This option controls the VAV self-contained unit from the discharge air temperature using factory-mounted, direct drive plenum fans with variable frequency drives (VFD). The VFD safely varies the fan motor speed to allow the motor to meet the dynamic requirements at the motor shaft and meet the system static. Other control components include a discharge air microprocessor controller and discharge air sensor. The microprocessor controller coordinates the economizer control and the stages of cooling with discharge air temperature reset capabilities. The VFD receives 0-10 Vdc signal from the unit microprocessor based upon supply static pressure and causes the drive to accelerate or decelerate as required to maintain the supply static pressure setpoint.
Waterside Economizer

The waterside economizer takes advantage of cooling tower water to either pre-cool the entering air to aid the mechanical cooling process or, provides total system cooling if the water temperature is low enough. Waterside economizing enables when the unit’s entering water temperature is below the unit’s entering mixed air temperature by a minimum of 4 °F plus the economizer’s approach temperature. The approach temperature default is 4 °F and is adjustable from 0 to 9 °F. Waterside economizing disables when the unit’s entering water temperature is not below the unit’s entering mixed air temperature by at least the water economizer approach temperature. The economizer acts as the first stage of cooling. If the economizer is unable to maintain the supply air setpoint, the unit control module brings on compressors as required to meet the setpoint.

The waterside economizer includes a coil, modulating valves, controls, and piping with cleanouts. The coil construction is ½-inch (13 mm) OD seamless copper tubes expanded into aluminum fins. The evaporator and economizer coils share a common sloped (IAQ) drain pan. Drain pan options are either galvanized or stainless steel and insulated.

Waterside Economizer Flow Control

Units equipped with a waterside economizer can be set from the human interface panel for variable or constant water flow.

Constant Water Flow

Two-way modulating control shutoff valves are wired, controlled, and installed in the unit. One valve is located in the economizer’s water inlet, and the other is in the condenser bypass water inlet. When the waterside economizer enables, the two-way valve modulates to maintain the discharge air temperature setpoint. As the economizer valve opens, the condenser bypass valve closes, and vice versa. Full water flow is always maintained through the condensers. Both valves will close in the event of a power failure.

Variable Water Flow

Two-way modulating control shutoff valves are wired, controlled, and installed in the unit. One valve is located in the economizer’s water inlet, and the other is in the condenser bypass water inlet. When the economizer valve is active, the condenser bypass valve closes. The economizer valve modulates, thus water flow through the unit modulates. If the water is cool enough for economizing, but mechanical cooling is also required, the economizer valve fully opens to establish full water flow through the condensers. Whenever the water is too warm for economizing and there is a call for cooling, the economizer valve fully closes and the bypass valve fully opens, establishing full water flow through the condensers. Full water flow is always maintained through the condensers when mechanical cooling is required. Both valves close whenever cooling is not required and in the event of a power failure.

Water Flow Switch

A water flow switch is factory installed in the condenser water pipe within the unit. Whenever the flow switch detects a water flow loss prior to or during mechanical cooling, compressor operation locks out and a diagnostic code displays. If water flow is restored, the compressor operation automatically restores.

Non-fused Disconnect Switch Optional - Terminal Block is Standard

The unit has a factory mounted non-fused disconnect switch accessible without opening the control panel door.

Protective Coating

Coils— Three to five mL of protective coating is applied to the coil using a multiple dip-and-bake process displays a diagnostic. A manual reset is required at the unit. The high duct temperature can be adjusted at the thermostat.
**Stainless Steel Drain Pan**

The drain pan is positively sloped, fabricated from 304L stainless steel, and insulated with ¾-inch (19 mm) of 1-lb. (0.5 kg) density fiberglass.

**Dirty Filter Sensor**

A factory installed pressure sensor senses the pressure differential across the filters. When the differential pressure exceeds 0.9-inches (23 mm) WG, contact closure occurs.

A field installed indicator device may be wired to relay terminals that indicate when filter service is required. Contacts are rated at 115 VAC and are powered by a field supplied transformer.

**Generic Building Automation System Module (GBAS)**

The GBAS module is for use with a non-Trane building management system. The module provides a binary input for demand limiting, four analog inputs for setpoint adjustment, and five relay outputs for diagnostic reporting. Inputs can use a potentiometer or 0-5 vdc signal.

**BACnet Building Automation System**

The BACnet® Communication Interface for self-contained (BCI-I) controller expands communications from the unit UCM network to Tracer® SC or a 3rd party building automation system, utilizing BACnet, and allows external setpoint and configuration adjustment and monitoring of status and diagnostics.

**Air Fi® Wireless Communications Interface (WCI)—Field Installed**

Air Fi® Wireless Communications Interface—Provides wireless communication between the Tracer® SC, Tracer® Unit Controllers and BACnet Communication Interface (BCI) modules.
Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands—including Club Car®, Ingersoll Rand®, Thermo King® and Trane®—work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a global business committed to a world of sustainable progress and enduring results.

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