



Surna IsoStream™ Air Handler Operating & Maintenance Manual

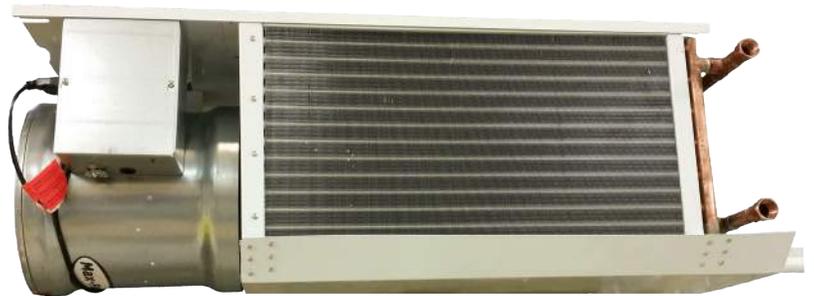


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Warranty Information

Thank you for choosing the Ceiling Mount Air Handler by Surna. Because your air handler is built with leading technologies and the highest quality components, with proper care and maintenance, it will provide you with years of worry free service. Please examine the unit upon arrival to be sure there is no damage as a result of shipping. If shipping damage has occurred, please note the damage on the receiving slip, and contact Surna immediately.

If you are missing parts or believe that you have a warranty issue, DO NOT return this item to the store of purchase. You must contact Surna at 303-993-5271 for troubleshooting and service instructions.

Limited Warranty

A 90-day all-inclusive warranty for: parts, labor, and shipping. Choice of repair facility and technician is at the discretion of Surna.

A 1-year warranty on any defective part is also provided. Choice of repair facility and technician is at the discretion of the air handler owner, although Surna is happy to assist with locating a technician. If Surna chooses the technician, limited labor coverage may apply.

Note: Extended warranty for parts, labor and shipping are available for purchase for a nominal fee. Contact Surna within 15 days of your air handler's arrival if you would like to purchase an extended warranty.

Limitation of Liability

To the extent allowable under applicable law, Surna's liability for consequential and incidental damages is expressly disclaimed. Surna's liability in all events is limited to and shall not exceed the cost of repair. Shipping damage is not covered under warranty. In the event that the item(s) arrive with shipping damage, Surna will assist with the repair or replacement of the damaged item ONLY if the damage is noted on the delivery receipt.

Warranty Disclaimer

Surna provides product information in this literature for the sole purpose of identification, and does not state or imply that the products are merchantable, or fit for a particular purpose, or that the products will conform to the descriptions.

Product Suitability

Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Surna attempts to ensure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and be sure that the product, installation and use will comply with them.

Service Under Warranty

This product is warranted by Surna against defects due to fault in workmanship or materials.

If the product has been damaged under normal use, it will be entitled to warranty service of the type described and within the timeframes outlined. Damage caused by abnormal use, or after the timeframes outlined have expired, carry no such guarantee. Service under warranty is provided only upon presentation of reasonable evidence (purchase receipt) that the date of claim is within the warranty period.

Service NOT Under Warranty

The warranty is not valid if the defect is due to accidental damage, misuse, shipping damage, neglect, or in the case of alterations or repair carried out by unauthorized persons. Surna can, at its discretion, assist the consumer with shipping claims in the case of damage incurred during shipping, so long as the customer follows the instructions outlined above.

Surna Ceiling Mount Air Handler Parts List

Below is a list of all parts provided with each Ceiling Mount Air Handler.

1. Surna Ceiling Mount Air Handler Manual
2. Ceiling Mount Air Handler
3. Flow Meter
4. Thermostat
5. HEPA filter Dust Shroom



2. Ceiling Mount Air Handler



3. Flow Meter (front and side view)



4. Thermostat



5. HEPA filter Dust Shroom

Routine Maintenance

This product is designed to provide many years of dependable, trouble free comfort when properly maintained. Proper maintenance will consist of routine heat exchanger cleanings, biannual check-ups that include (but are not limited to); heat exchanger inspections, electric heater inspections/cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic check-ups and cleaning can result in excessive operating cost and/or equipment failure.

Warnings

Safety Symbols Used



CAUTION: Important information, consult product manual and read the provided instructions carefully.



WARNING: Potential electric shock hazard.



Protective Earth Connection



Action Prohibited

Air Handler Safety Guide



Please read the information in this document carefully prior to attempting the installation, operation and/or servicing of the air handler unit. This document contains all information required to install and operate the Surna Ceiling Mount air handling device. Failure to follow the directions provided herein may impair the safeties provided and could cause damage to the air handler equipment and or accessory equipment, damage to building facilities, and/or cause serious injury or death to the operator. Please adhere to all applicable safety guideline requirements in this document and all applicable electrical and mechanical jurisdictional codes.



Before mounting the Air Handler, visually inspect the water line connections and the copper coil on the back of the unit for damage. Pressurize the water circuit with air or water to verify that there are no leaks prior to installing.



Prior to providing power to the equipment, be sure to inspect the area for water spills, which may present a shock hazard to the user. Take extra care to mount accessory electrical equipment away from areas regularly exposed to water and be sure to provide secure wire and cable routing to protect personnel from shock hazards.



Only operate the equipment with an appropriately sized breaker in place and wire sizes with adequate current carrying capacity. Consult with an electrician before attempting electrical installation.



Using Surna Air Handler equipment in a manner not described in this manual may void its warranty and any safeties provided herein.



Following unit installation and maintenance activities, the user shall observe the system operation to verify that normal operation has resumed prior to leaving the equipment to operate unattended.



Mount with the lowest moving parts at least 2.8 m (8 ft.) above the floor or grade level unless the fan vent cover that was provided with the unit is installed.



Only use parts provided with, or specified for use with, the air handler equipment.



Care must be taken when handling sheet metal. Sheet metal parts have sharp edges and could cause injury.



The components of this fan coil have been inspected at the factory and readied for shipment. Upon receiving the shipment, a visual inspection of the packaging must be performed.



Care must be taken to ensure the structural integrity of the supporting members when mounting these devices. Verify that the load bearing capacity of any mounting surface is rated for the load of the air handler.



Do not plug other equipment into the socket outlet on the chassis exterior. This connection is meant for the fan module only.



This equipment is not meant for connection to ducting.



12 inches of clearance is required around all sides of the air handler to allow for proper airflow and servicing.



DO NOT Use Ethylene Glycol with this system. Only Propylene Glycol is to be used at prescribed mixture ratios.



Adequate clearance shall be provided around the unit for regular servicing. After installation, service and maintenance personnel shall be able to access the power supply, coil connections and condensate drain.



This unit must be connected to a protective earthing system prior to operation. DO NOT remove the grounded connection while power is being supplied to the Surna air handling equipment. Doing so presents an electric shock hazard to users and service personnel.

Installation Instructions Electrical

Mechanical Installation

This air handler unit is designed for installation in a level horizontal orientation onto either a ceiling or other suitable support surface. Using 3/8" stainless steel bolts and washers, hang the air handler from its support via the mounting slots provided on the top of the unit, taking care to engage all of the threads of the nut and tightening until the air handler is secure. Care must be taken to ensure the structural integrity of the supporting members and mounting hardware which should be rated appropriately to support the air handlers weight (see Specifications). The supporting member shall have a minimum load bearing capacity equivalent to 14 gauge Unistrut, and shall have a mounting point span no longer than 38 inches with direct supporting members installed parallel to the direction of air flow through the fan. The Unistrut supports should be mounted to the building installation using a minimum size of 3/8 inch all-thread and the appropriate spring nuts and washers using standard Unistrut installation procedures. The all-thread mounting locations shall be located no further than 6 inches from the air handler chassis edges. When installing, clearances must be provided as a provision to allow servicing of the unit. Ensure that a minimum of 24" of clearance be provided around all lateral edges of the air handler unit and that adequate space is available to facilitate servicing of the electrical box, coil connections, and condensate drain.

A dust shroom/dust cover was provided with your air handler unit. To install, the equipment should be de-energized at the breaker or main disconnect. Attach the dust cover to the fan assembly using the supplied duct clamp and a flathead screwdriver. Verify that the dust cover is fully secured to the air handler prior to applying power to the equipment.

Electrical

All wiring shall comply with local and national codes. High and low voltage terminal blocks are provided in the unit's electrical panel. A knockout is provided in the cabinet for the routing of field wiring. An on/off switch is used to power on the equipment which is located beneath the electrical box and should be switched on to begin normal operation.

A 24 VAC transformer and fan relay are provided inside the cabinet for control through the low voltage terminal block where temperature and humidity controls can be incorporated as needed to fulfill specific application needs.

The fan is connected to the power supply through a socket outlet on the chassis exterior. Do not remove this plug when in operation or try to operate other equipment from this connection.

Wiring

WARNING: Turn off the breaker until all electrical connections are made.

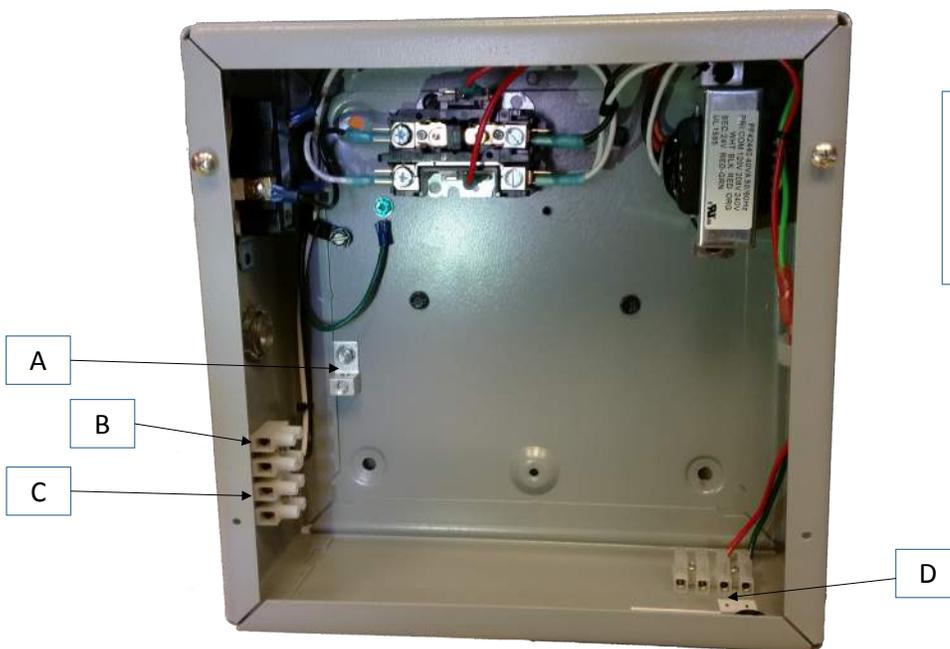
WARNING: This unit must be connected to a protective grounding system.

Before attempting system installation, verify that the electrical system and wiring are adequate for supplying the required ampacity to the air handler unit at 120 VAC. Refer to the air handler specifications section of this document for the air handler ampacity information. Field wiring terminals are provided for power and control connections. If you aren't familiar with local building codes and standard electrical practices. You **MUST** employ the services of a qualified electrician prior to installing and operating the equipment. Making improper electrical

connections could cause damage to the equipment or servicing personnel. When installing the power wiring, verify that the line conductor is connected to the terminal marked "L", and the Neutral conductor is connected to the terminal marked "N".

A thermostat was provided installed on your unit. If you elect to use an alternate thermostat or control device, you can remove the pre-installed thermostat and easily install an alternate. With power removed from the air handler unit at the breaker or main disconnect, remove the cover of the electrical box using a screwdriver. Once open, disconnect the thermostat leads from the low voltage terminal block. Using the same routing as the factory installed thermostat, wire the new control device into the terminal blocks "COM" and "SW1" terminals.

Installation Connections



Installation Connections

- A – Ground Terminal
- B – Line Terminal
- C – Neutral Terminal
- D – Thermostat Control Terminal Block

Plumbing

The air handler units has a dedicated water inlet connection and a dedicated water outlet connection. When installing these connections, take care to verify that these connections are not reversed, or the unit will not operate properly. Refer to the Specifications section of this document for water connection sizes and types. Proper insulation shall be provided for the water lines in accordance with local and national building codes.

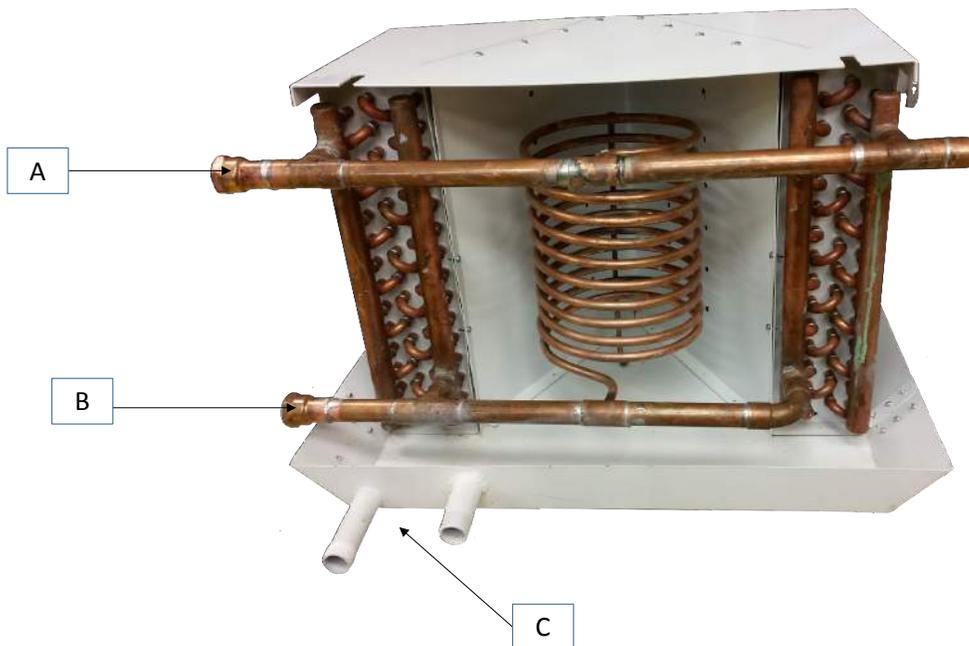
The recommended flow rate that should be supplied to each air handler is 2.5 gallons per minute, per ton of air handler capacity. The unit

will operate most efficiently with higher flow rates, while low flow rates will not provide enough cooling for the unit to perform optimally

The air handler's condensate drain has a built in slope for proper drainage. It is important to verify that the air handler mounting surface is level so that the excess condensate can be immediately drained from the unit.

Following plumbing installation, the system should be checked for leaks prior to attempting unattended operation of the system.

Plumbing Connections



Installation Connections

- A – Water Inlet
- B – Water Outler
- C – Condensate Drains

Important Plumbing Tips

1. Total manifold size and length will vary depending on specific circumstances, number of air handlers, etc. Choose a supply size that is sufficient for the flow rates of all equipment supplied by the manifold.

2. The return manifold should be sized a minimum of ¼" larger than the supply manifold.

3. Install shut off valves at the main supply manifold and a shut off valve at each air handler. This allows you to take individual air handlers out of the cooling loop should servicing be necessary , and allows adjustment of flow rates.

4. Install a fresh water bypass on the main supply manifold. This allows you to use a municipal water supply for cooling should your chiller require servicing.

5. Use only long turn 90's whenever possible to avoid restriction of the water supply.

6. Insulate all supply and return lines to avoid condensation outside the air handler(s).

7. Flow rate requirements for these air handlers is 2.5 GPM (Gallons Per Minute) per ton. For example, a 5-Ton air handler requires 12.5 GPM to operate efficiently. A higher flow rate in this range will increase the cooling efficiency of the unit.

8 The air handler water inlet and outlets are ¾" NPT.

9. The air handler is marked with "IN" and "OUT" water connections for proper direction of flow. The unit will not operate properly if these connections are reversed.

11. Propylene Glycol should be utilized at a minimum of 30%/70% (glycol/water) solution. This prohibits freezing and acts as a system lubricant/anti-corrosive to keep the chiller and air handlers working at peak performance. DO NOT use Ethylene Glycol (standard car antifreeze). If ambient conditions are below 20° F (-7° C), a 50/50 solution should be used.

12. Once all plumbing is complete, start the system with clean water to flush out all residue from the system and to check the water circuit(s) for leaks. Do not power the chiller on at this time. After running water through the plumbing for roughly 5 minutes, drain the water from the system, correct leaks/retest the plumbing as necessary, and refill with the prescribed glycol/water mixture (see mixture requirements above). Turn on the system and top off the reservoir as needed.

System Specifications

Dimensional and Electrical Data

| Dimensional Data | | | | | | | | | |
|------------------|-------------|-------------|------------|-------------|--------------------|-----------------|-------------|--------------|------------|
| Model Number | Height (in) | Length (in) | Width (in) | Weight (lb) | Cooling Rows (FPI) | Copper Diameter | Water Inlet | Water Outlet | Drain |
| SCMAHV-42 | 15.15 | 44.0 | 23.87 | 121.0 | 4-15 | 3/8 | 3/4in FNTP | 3/4in FNTP | 3/4in MNPT |

| Electrical Data | | | | | | | |
|-----------------|-------------|-------------------------|----------|--------------------|--------|--------------------------|--------------------------------|
| Model Number | Nominal CFM | Voltage - Hertz - Phase | Motor HP | Full Load Ampacity | Power | Minimum Circuit Ampacity | Maximum Overcurrent Protection |
| SCMAHV-42 | 1600 | 115V - 60Hz - 1PH | 1/2 | 6.3A | 0.49kW | 7.9A | 14.1A |

Elevation and Glycol Derating

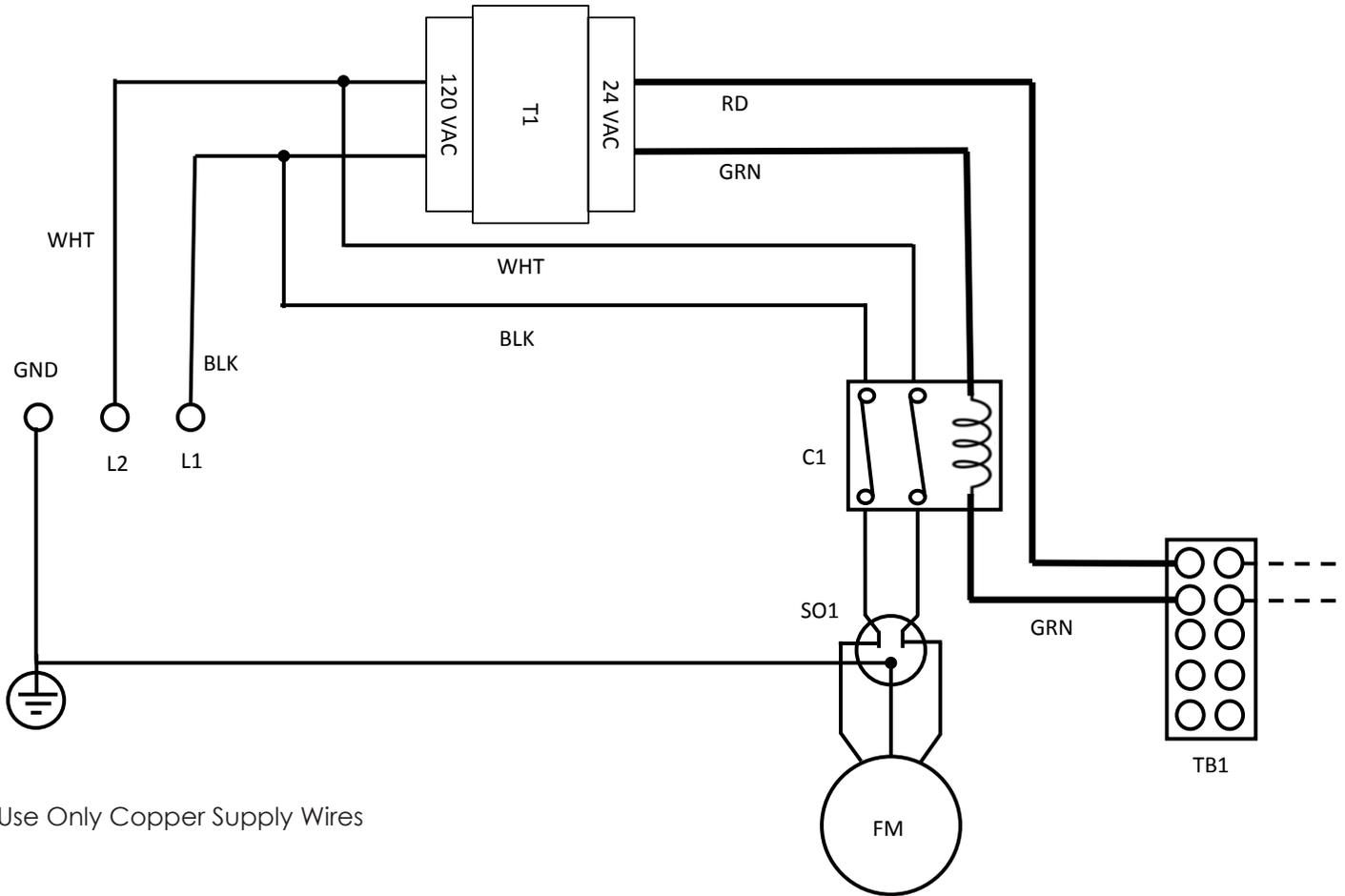
| Elevation Derating | | | | | | | | | | |
|--------------------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Elevation | Sea Level | 1,000 ft | 2,000 ft | 3,000 ft | 4,000 ft | 5,000 ft | 6,000 ft | 7,000 ft | 8,000 ft | 9,000 ft |
| SC Multiplier | 1.000 | 0.969 | 0.937 | 0.908 | 0.879 | 0.851 | 0.824 | 0.796 | 0.770 | 0.744 |

| Glycol Derating | | | | | | |
|----------------------|-------|-------|-------|-------|-------|-------|
| Glycol Concentration | 0% | 10% | 20% | 30% | 40% | 50% |
| SC Multiplier | 1.000 | 0.986 | 0.957 | 0.926 | 0.890 | 0.872 |

Cooling Data

| Cooling Data: SCMAHV-42 | | | | | | | |
|-------------------------|-------------|-----------|---------------------------|--------------------------|---------------------|---------------------|---------------------|
| EWT | Nominal CFM | Design dT | | Entering Air Temperature | | | |
| | | | | 80°F DB /69°F WB | 80°F DB /64°F WB | 77°F DB /69°F WB | 77°F DB /64°F WB |
| 42 | 1600 | 10°F | SC (MBh) | 52.2 | 51.6 | 47.6 | 47.0 |
| | | | TC (MBh) | 93.2 | 66.2 | 93.6 | 66.6 |
| | | | WPD (psi) | 1.32 | 0.74 | 1.33 | 0.74 |
| | | | Condensation Rate (lb/hr) | 38.0 | 14.2 | 42.8 | 17.4 |
| | | | Flow Rate (GPM) | 18.5 | 13.2 | 18.6 | 13.2 |
| 45 | 1600 | 10°F | SC (MBh) | 47.2 | 46.4 | 42.6 | 41.8 |
| | | | TC (MBh) | 82.0 | 54.6 | 82.4 | 55.0 |
| | | | WPD (psi) | 1.04 | 0.52 | 1.06 | 0.53 |
| | | | Condensation Rate (lb/hr) | 31.6 | 7.8 | 36.4 | 12.6 |
| | | | Flow Rate (GPM) | 16.4 | 10.9 | 16.4 | 11.0 |
| 48 | 1600 | 10°F | SC (MBh) | 42.0 | 42.0 | 37.4 | 37.4 |
| | | | TC (MBh) | 70.0 | 43.8 | 70.4 | 41.8 |
| | | | WPD (psi) | 0.79 | 0.36 | 0.79 | 0.20 |
| | | | Condensation Rate (lb/hr) | 12.7 | 0.8 | 15.0 | 2.3 |
| | | | Flow Rate (GPM) | 13.9 | 8.7 | 14.0 | 8.3 |

Wiring Diagram



Use Only Copper Supply Wires

| Legend | |
|---|--------------------------------------|
| Device | Description |
| FM1 | Fan Module 1 |
| T1 | Transformer |
| C1 | Contactor 1 |
| SO1 | Socket Outlet 1 |
| TB1 | Low Voltage Terminal Block |
| L1 | Phase Conductor Connection |
| L2 | Neutral Conductor Connection |
| GND | Ground Connection |
|  | Primary Circuit Conductors |
|  | Class 2 Secondary Circuit Conductors |
|  | Thermostat Switch Connections |



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