

SURNA[®]

www.surna.com
303.993.5271

Surna Air Handler Unit Operating & Maintenance Manual

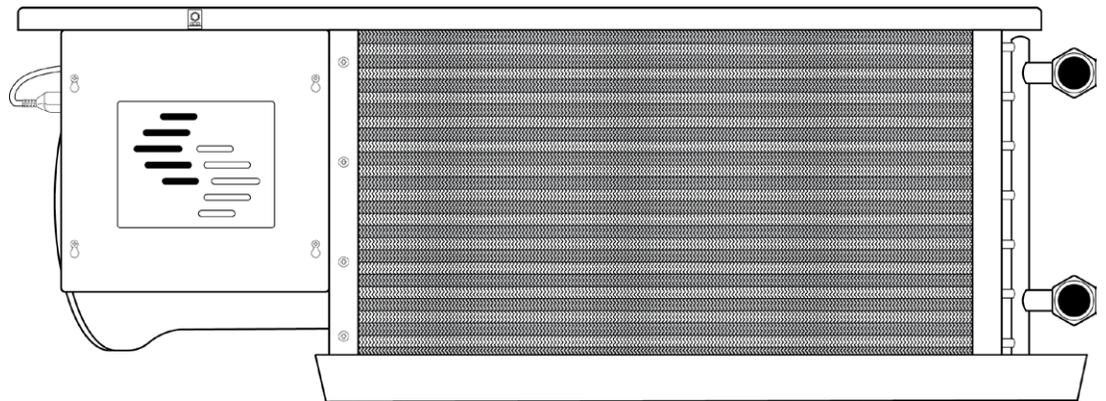




Table of Contents

Warranty Information	4
Parts List	5
Intended Application	5
Safety Guide	6
Technical Description	8
Specifications	9
Installation Instructions	10
Normal Operation	16
Routine Maintenance	17
Troubleshooting	18
Wiring Diagram	19

Warranty Information

Equipment manufactured by Surna ("Company"), the warranty shall exist for a period of twelve (12) months from initial start-up or 18 months from date of shipment, whichever period is shorter, against failure due to defects in material and / or manufacturing and warranted to the capacities and ratings set forth in Company's catalogs and bulletins ("Warranty").

Equipment, material, and or parts that are not manufactured by Company are not warranted by Company and carry such warranties as may be extended by the respective manufacturer.

Exclusions from this Warranty include damage or failure arising from: wear and tear; corrosion, erosion, deterioration; modifications made by others to the Equipment; repairs or alterations by a party other than Company that adversely affects the stability or reliability of the Equipment; vandalism; neglect; accident; adverse weather or environmental conditions; abuse or improper use; improper installation; commissioning by a party other than Company; unusual physical or electrical or mechanical stress; lack of proper start-up or maintenance as recommended by Company; operation with any accessory, equipment or part not specifically approved by Company; and or refrigerant not recommended or supplied by Company.

Company shall not be obligated to pay for the cost of lost refrigerant or lost product or any other direct, indirect, or consequential damages. Company's obligations and liabilities under this Warranty are limited to furnishing replacement equipment or parts, at its option, FCA (Incoterms 2000) factory or warehouse (f.o.b. factory or warehouse for US domestic purposes) at Company-designated shipping point, freight-allowed to Company's warranty agent's stock location, for all non-conforming Company-manufactured Equipment which have been returned by Customer to Company.

Returns must have prior written approval by Company and are subject to restocking and replacement charges where applicable.

No warranty liability whatsoever shall attach to Company until Customer's complete order has been paid for in full and Company's liability under this

Warranty shall be limited to the purchase price of the Equipment shown to be defective.

Additional warranty and service protection is available on an extra-cost basis and must be in writing and agreed to by an authorized signatory of the Company.

The warranty excludes: (a) labor, transportation and related costs incurred by the Dealer or Customer; (b) re-installation costs of repaired equipment; (c) re-installation costs of replacement equipment; (d) removal costs of equipment; (e) consequential damages of any kind; and, (f) reimbursement for loss caused by interruption of service.

EQUIPMENT MANUFACTURED BY COMPANY THAT INCLUDES A REQUIRED START-UP AND SOLD IN NORTH AMERICA WILL NOT BE WARRANTED BY COMPANY UNLESS COMPANY OR ITS AUTHORIZED AGENT PERFORMS THE EQUIPMENT STARTUP.

COMPANY MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, REGARDING PREVENTION OF MOLD/MOULD, FUNGUS, BACTERIA, MICROBIAL GROWTH, OR ANY OTHER CONTAMINATES.

EXCEPT FOR COMPANY'S WARRANTY EXPRESSLY SET FORTH HEREIN, COMPANY DOES NOT MAKE, AND HEREBY EXPRESSLY DISCLAIMS, ANY WARRANTIES, EXPRESS OR IMPLIED CONCERNING ITS PRODUCTS, EQUIPMENT OR SERVICES, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF DESIGN, MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR OTHERS THAT ARE ALLEGED TO ARISE FROM COURSE OF DEALING OR TRADE.

Air Handler Parts

Below is a list of all parts provided with each Surna Air Handler Unit.

1. Surna IsoStream air handler unit
2. Surna IsoStream air handler unit product manual
3. Flow meter
4. 15 ft of Thermostat Wire
5. Thermostat (only on models without Surna Parallel Module)

Intended Application

The Surna IsoStream (SCMAHV-42) air handler unit is a critical component of the chilled water cooling system. The AHU not only helps maintain stable air temperatures throughout the garden environment, it also helps control humidity in the garden.

Surna's climate control system circulates water, not air, eliminating the need for ducting. Instead, Surna's air handlers recirculate air already in the garden. The Surna SCMAHV-42 is easy to install and maintain, and will provide years of trouble-free operation.

Warnings

Definitions

CAUTION: Risk of minor/moderate injury if precaution not taken.

WARNING: Risk of death/serious injury if warning isn't heeded.

DANGER: Risk of death/serious injury if danger isn't avoided.

Safety Symbols Used



CAUTION: Important information, read the provided instructions carefully.



WARNING: Potential electric shock hazard.



WARNING: High voltage



WARNING: Cut / Crush 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 air handler unit. Failure to follow the directions provided could cause damage to the air handler unit 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 electrical and mechanical jurisdictional codes. Using the Surna air handler unit in a manner not described in this manual may void unit warranty.



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. Be sure to provide secure wire and cable routing to protect personnel from shock hazards.



Only operate the equipment with an appropriately sized switch or circuit breaker in place. Only operate equipment with adequate wire sizes and current carrying capacity. Consult with a licensed electrician and the specifications section of this manual before attempting electrical installation. The switch or circuit breaker shall be accessible without the use of a tool, shall be easily accessible to users, shall be clearly marked with "ON" and "OFF" positions, and shall disconnect all current carrying conductors simultaneously.



DO NOT use an extension cord or plug adaptors. These actions may result in a fire hazard or electric shock.



DO NOT operate this unit with damaged power wires. If the power wires are damaged it must be replaced by the manufacturer or a qualified/licensed service technician.



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



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 unit. Doing so presents an electric shock hazard to users and service personnel.



To reduce the risk of injury to persons, mount the air handler unit with moving parts at least 2.1 meters (7feet) above floor.



DO NOT use this unit as a bench or table.



This device is intended for indoor use only and should be protected from rain and flooding.



This equipment is not meant for connection to a ducting system.



Only use parts provided with, or specified for use in this document for use with the dehumidifier equipment, installation, and servicing.



A minimum clearance of 36" shall be provided around on the intake and 72" on the exhaust sides of the air handler unit to ensure proper air flow, and servicing. After installation, service and maintenance personnel shall be able to access the power supply, coil connections, and condensate drain.



Prior to installation, care must be taken to ensure the structural integrity of the supporting members when mounting air handling units. Verify that the load bearing capacity of any mounting surface is rated for the load of the air handler unit.



DO NOT use ethylene glycol with this system. Only propylene glycol is to be used.

Technical Description

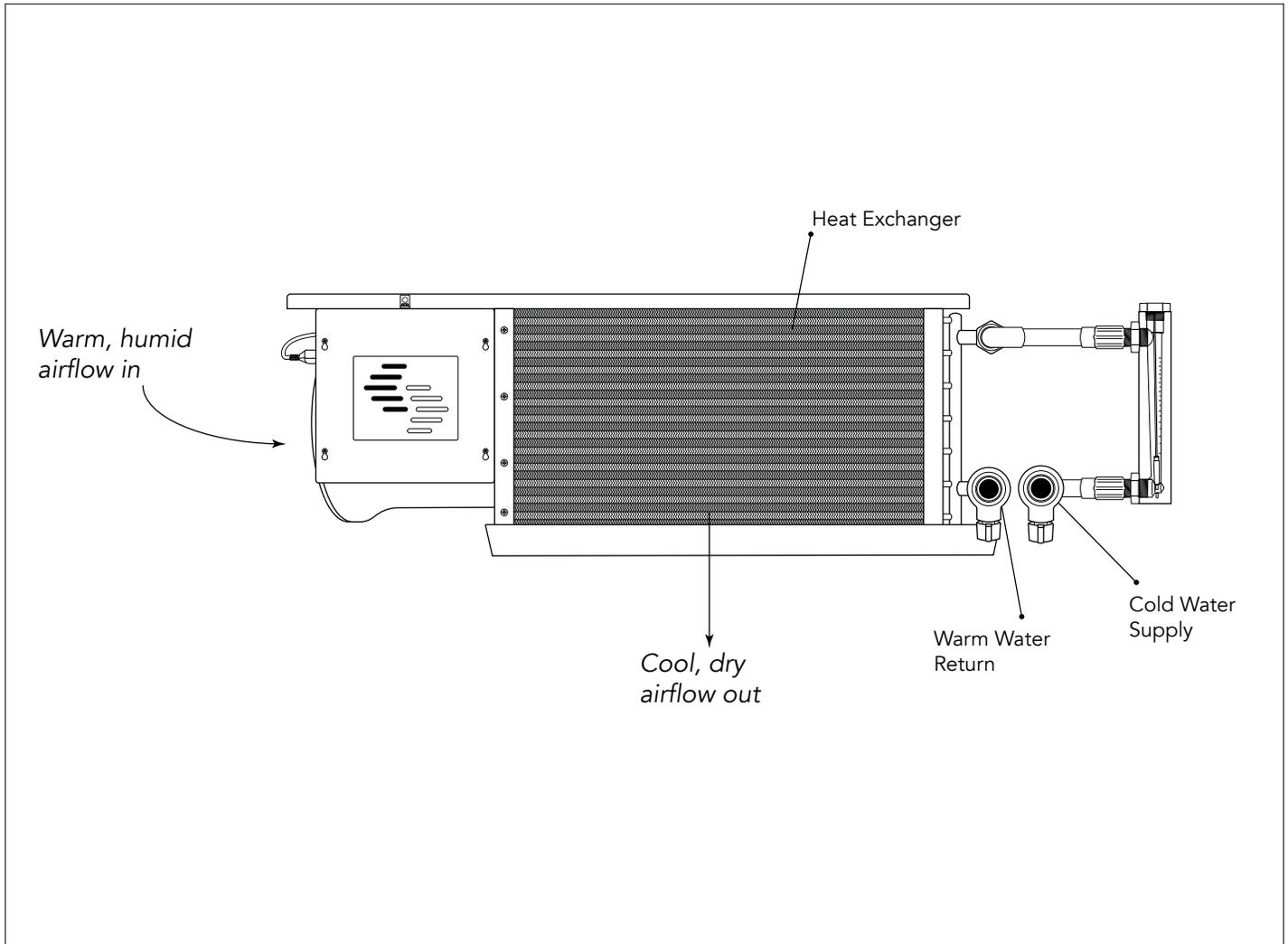


Figure 1 - Air Handler Unit System Overview

The Surna IsoStream air handler unit uses a chilled water system to remove heat and moisture from the environment. The water/glycol mixture flows from the supply plumbing through the heat exchanger/coil, where warm air is passed across the heat exchanger via the fan. As the fan pulls warm, humid air from the room and passes it across the copper heat exchanger, where heat is transferred from the incoming air to the water/glycol solution. The large temperature difference between the hot air and chilled water leads to condensation of water out of the air, reducing relative humidity. The water/glycol mix is circulated from the heat exchanger back into the return manifold and is pumped through the chillers to reject heat to the outside.

Specifications

Model Number	Height (inches)	Length (inches)	Width (inches)	Weight (lbs)	Cooling rows	Fins per inch	Copper diameter	Water outlet	Drain
SCMAHV-42	15.125	44.0625	24	124 (with coil) 122 (without coil)	4	15	3/8"	3/4" FNPS	3/4" NPS

Operating Characteristics

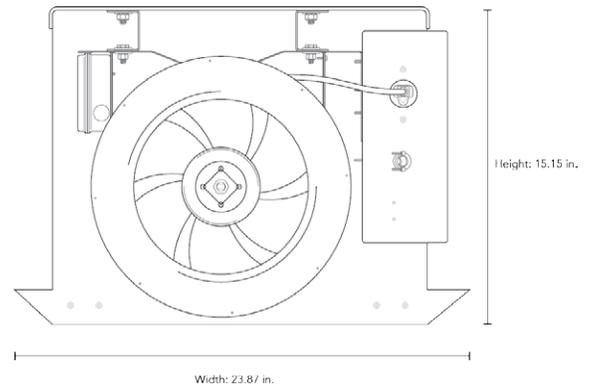
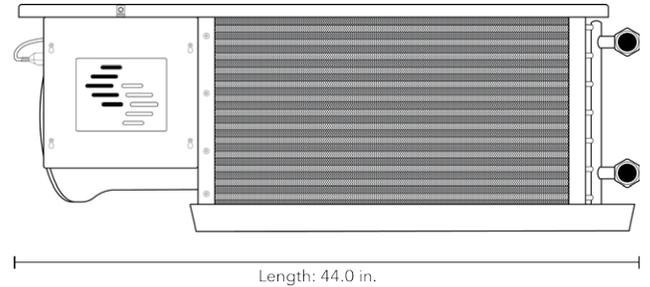
- Nominal Capacity: 60,000 BTU/hr
- Fan Motor: 12" Max Fan
- Fan Airflow: 1600 Nominal

Electrical Data

- Voltage/Phase: 115V Single Phase
- Nominal Current Draw: 6.3A
- MOP: 14A
- MCA: 7.9A

Condensate Connection

- Drain: 3/4" NPS



Installation Instructions

Mechanical

Mounting details are shown in Figures 2-5.

This air handler unit is designed for installation with a tilt (up to 5 degrees or 1/2" per foot) sloping towards the condensate drain outlet connections.

The unit must be securely supported in compliance with local codes. Generally, 14G unistrut is used to suspend and support the unit. Using 3/8" stainless steel bolts and washers, hang the air handler from its 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.

Equivalent support methods are acceptable, provided structural members have sufficient load bearing capacity to support the AHU weight (including piping), 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. Unistrut supports should be mounted to the ceiling or support structure using a minimum size of 3/8" all-thread and appropriate spring nuts and washers per Unistrut OEM installation procedures.

When installing, service clearances must be provided to maximize performance (proper airflow is critical), and allow servicing of the unit. Ensure that a minimum of 72" of clearance is provided on exhaust sides of unit, and a minimum of 36" of clearance on the intake side of the unit. Allow adequate space to facilitate servicing of the electrical box, coil connections, and condensate drain.

NOTE: Be sure that the air handler is not exhausting into a Surna dehumidifier.

Electrical

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

All wiring shall comply with local and national codes. A knockout is provided in the cabinet for the routing of field wiring.

High and low voltage terminal blocks are provided in the unit's electrical panel. The high voltage terminal block should be connected to your incoming 115V power wires. The low voltage block is connected to a fan relay to allow the unit to be controlled remotely via 24V signal.

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: 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 115 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. Always employ the services of a qualified electrician prior to installing and operating the equipment. Making improper electrical wiring 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".

For Units Manufactured Prior to October 2016:

These AHU's are controlled via a thermostat included with the unit. For use with an alternate thermostat or control device, remove the pre-installed thermostat, isolate the unit from the power by switching off the breaker. 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.

For Units Manufactured Post October 2016:

A Surna's Parallel Module, installed within the electrical box. The Surna Parallel Module allows multiple air handlers to be controlled by a single thermostat. Use the connections on the low voltage terminal block (TB2 per figure __).

Wiring Diagram

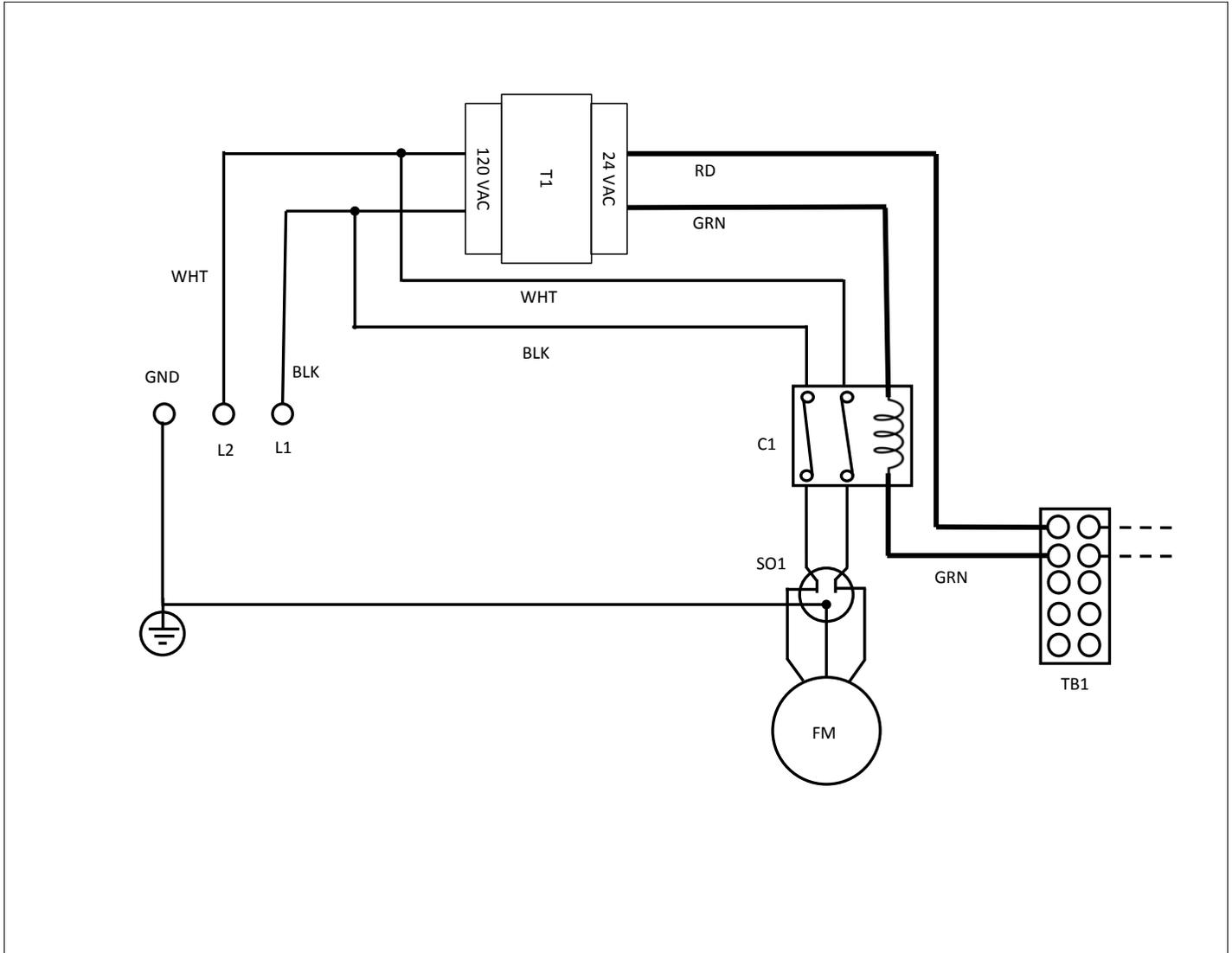


Figure 8 - Wiring Diagram

For Units Manufactured Prior to October 2016: These AHU's are controlled via a thermostat included with the unit. For use with an alternate thermostat or control device, remove the pre-installed thermostat, isolate the unit from the power by switching off the breaker. 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.

Wiring Diagram

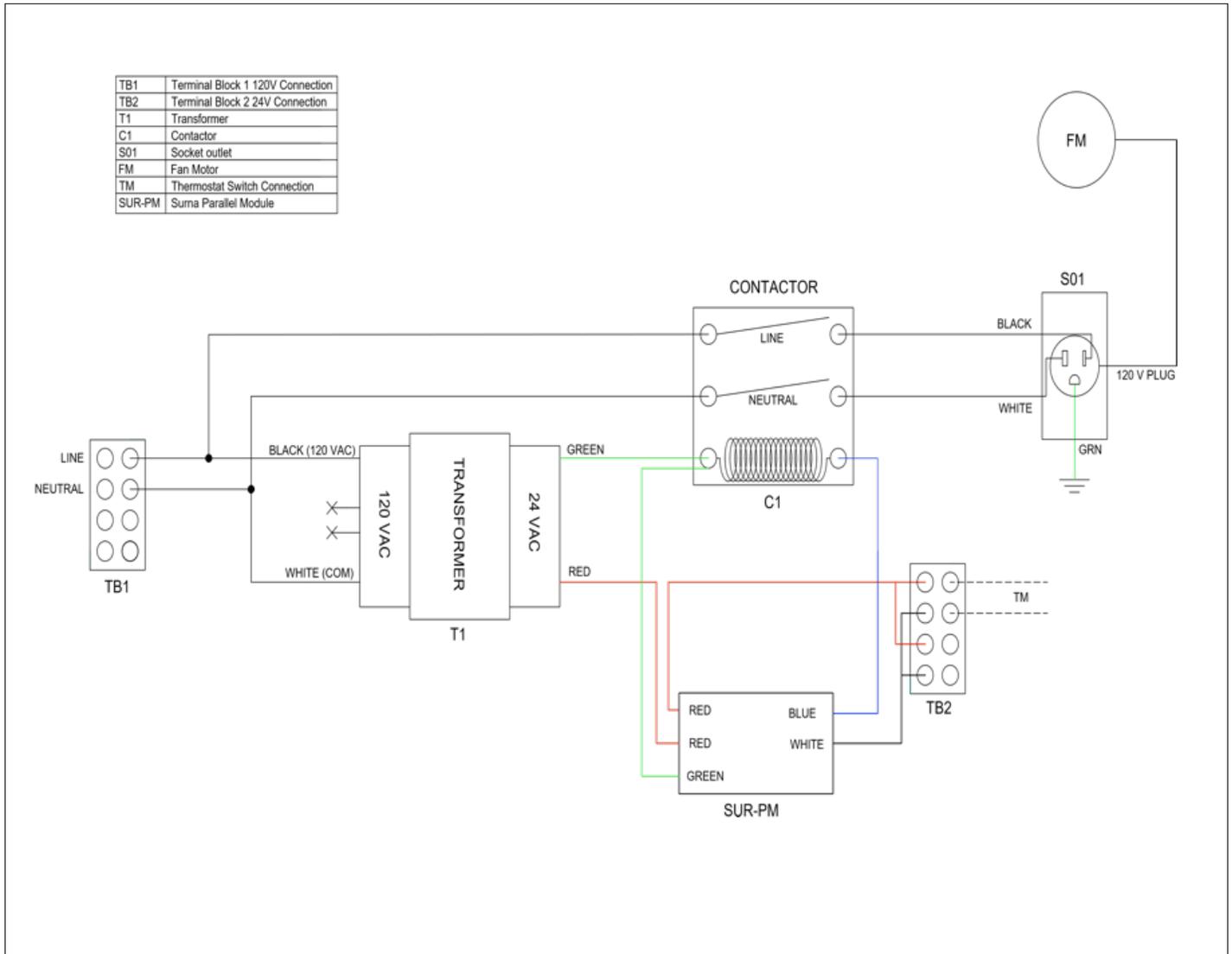


Figure 8 - Wiring Diagram

For Units Manufactured Post October 2016: A These units are controlled via Surna's Parallel Module, installed within the electrical box. The Surna Parallel Module allows multiple air handlers to be controlled by a single thermostat. Use the connections on the low voltage terminal block.

Plumbing

The air handler units have dedicated water inlet (CWS) and outlet connections (CWR). When plumbing CWS/CWR piping, verify that these connections are not reversed, or the unit will not operate properly. The upper water connection on the air handler is the "IN" connection and the lower water connection is the "OUT" water connection for proper direction of flow. The unit will operate at a lower efficiency if these connections are reversed. Refer to the Specifications section of this document for water connection sizes and types. After plumbing be sure to properly insulate for all water lines in accordance with local and national building codes, to prevent condensation from forming on the pipes.

The recommended water flow rate to be supplied to each air handler is 2.5 gallons per minute (GPM), per ton of air handler capacity. The 5TR AHU will operate most efficiently when supplied with 12-14 GPM. Flow rates too high or too low will cause significant decreases in performance.

Prior to commissioning, the system must be flushed and checked for leaks. New systems are typically coated with oil, grease or a protective film during fabrication, storage, or construction. Dirt, solder flux, and welding and pipe scale can also cause problems. Therefore, a thorough cleaning of new systems is recommended. A solution of 1 to 2 percent trisodium phosphate can be used with water for flushing the system. Other commercially available cleaning products may also work. During the flush out, you can check the water circuit(s) for leaks. Do not power the chiller/s on at this time.

1. Run your flush through the plumbing for a minimum of several hours and up to 24 hours, please be sure you are checking/cleaning your Y-strainers every couple of hours during this period to remove any debris from the system.

2. Next, drain the flush from the system, clean all Y-strainers, correct leaks/retest the plumbing as necessary.

3. Once all Y-strainers are clean and all leaks are corrected, drain the system, and fill with the proper glycol-to-water ratio.

4. Turn on the system and top off the reservoir as needed in an open loop system, or purge air from a closed loop system and add glycol/water mix as needed to complete fill.

NOTE: Do not add glycol or start circulating chilled water until steps #1 and #2 above have been completed.

Important Plumbing Tips

1. Pipe diameters and length will vary depending on number and size of system components. If in doubt on the proper size of pipe, stop and contact Surna engineering prior to continuing.

2. Install isolation valves at the main supply/return manifold and on each AHU. This allows individual air handlers to be isolated from the cooling loop for maintenance or service, and aids in adjustment of flow rates.

3. Use long radius elbows whenever possible to reduce piping restrictions.

4. Insulate all chilled water supply and return lines to minimize condensation on pipe outer diameters. Insulate condensate plumbing a minimum of 6 feet from each unit, or as needed if experiencing condensation.

5. All condensation lines require a ¼" drop per linear foot slope to ensure proper drainage.

6. Inhibited propylene glycol must be utilized at a minimum of 30% glycol. To reduce the freezing point and act as a system lubricant/anti-corrosive. DO NOT use ethylene glycol (automobile antifreeze). When advised by Surna, a 50/50 ratio solution should be used.

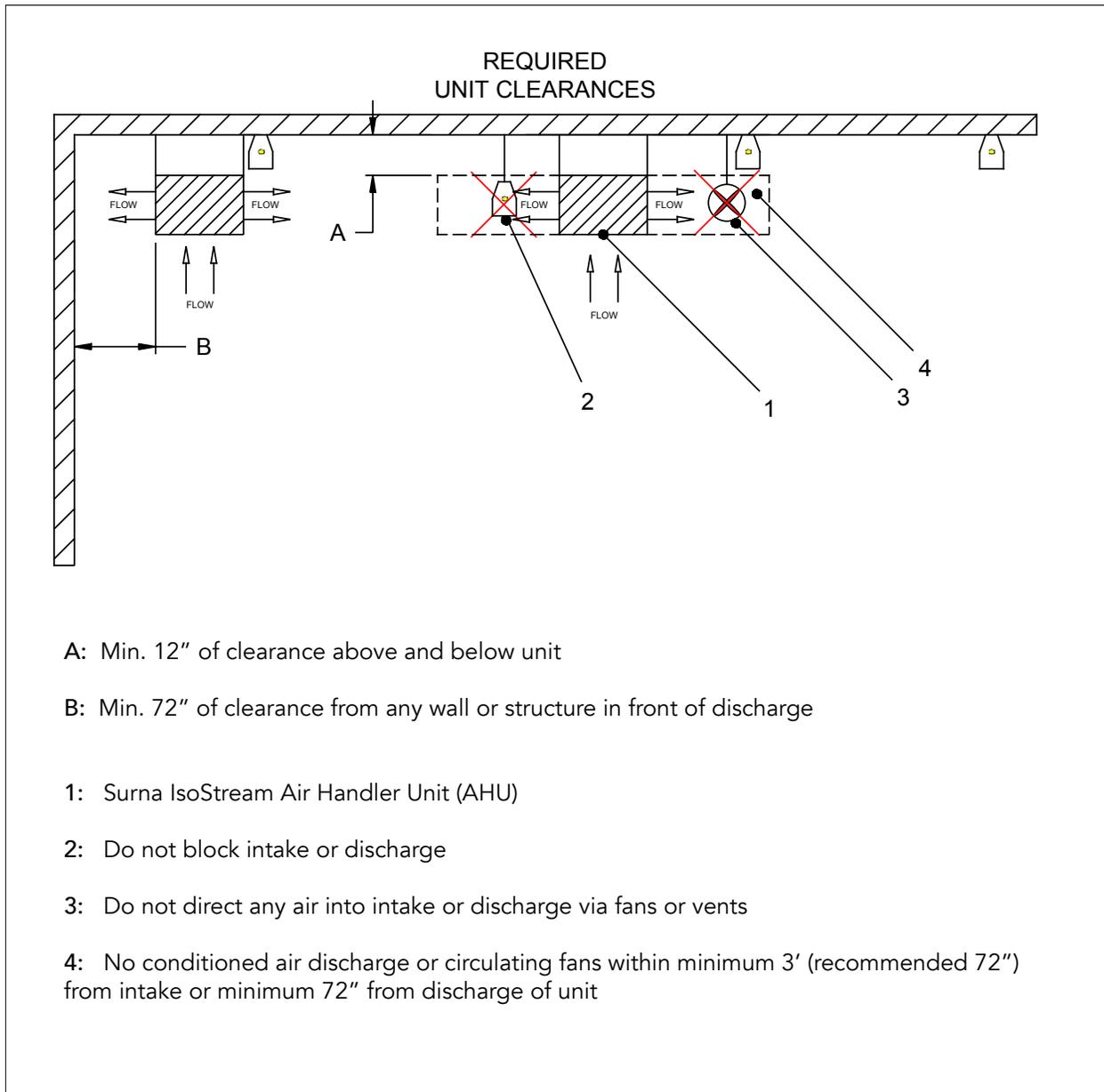


Figure 3 - Required Minimum Clearances

Figure 3 shows proper clearances for the Surna IsoStream AHU.

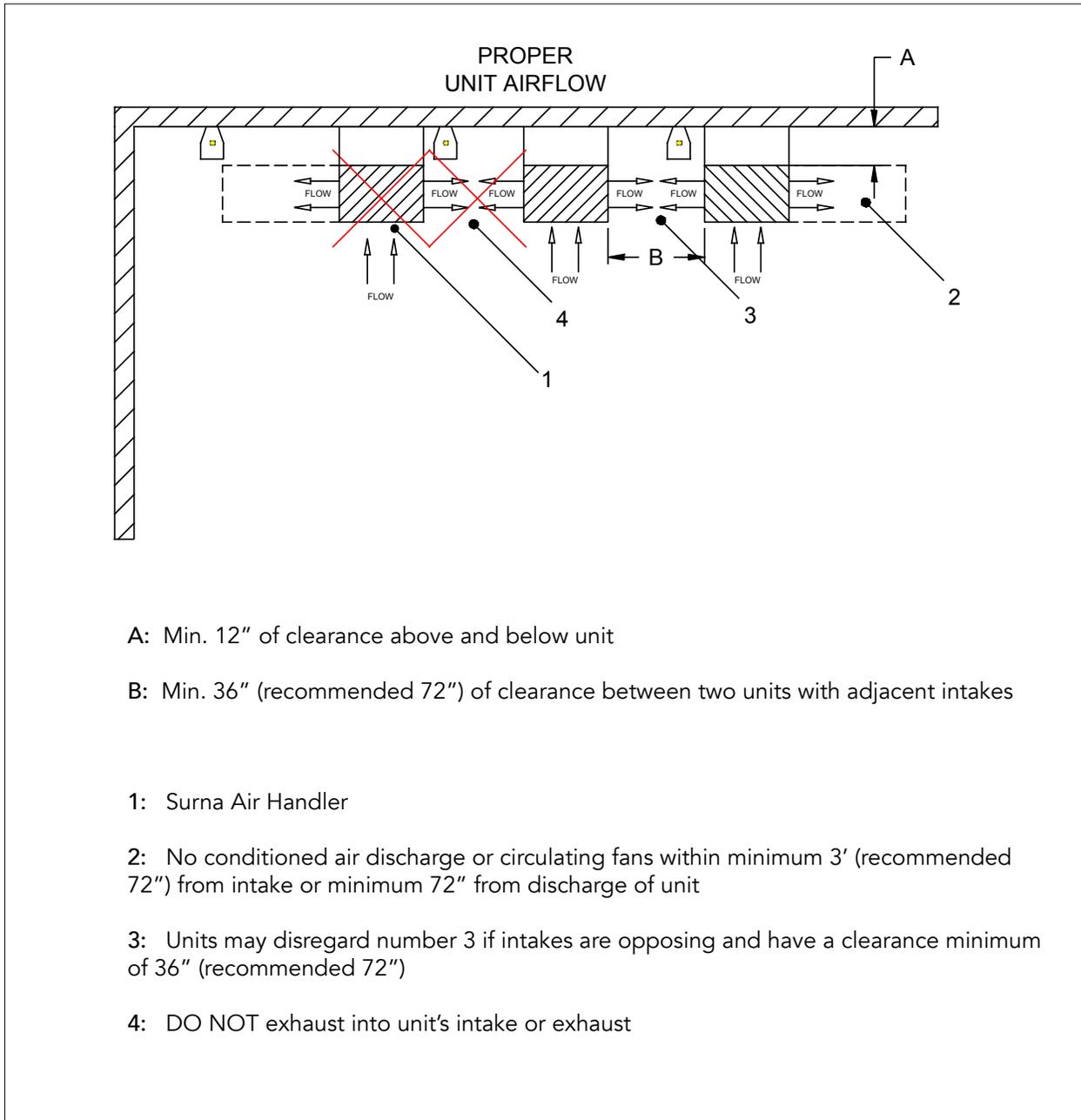


Figure 4 - Proper Unit Airflow

Figure 4 shows proper positioning of your Surna IsoStream AHU with regard to airflow.

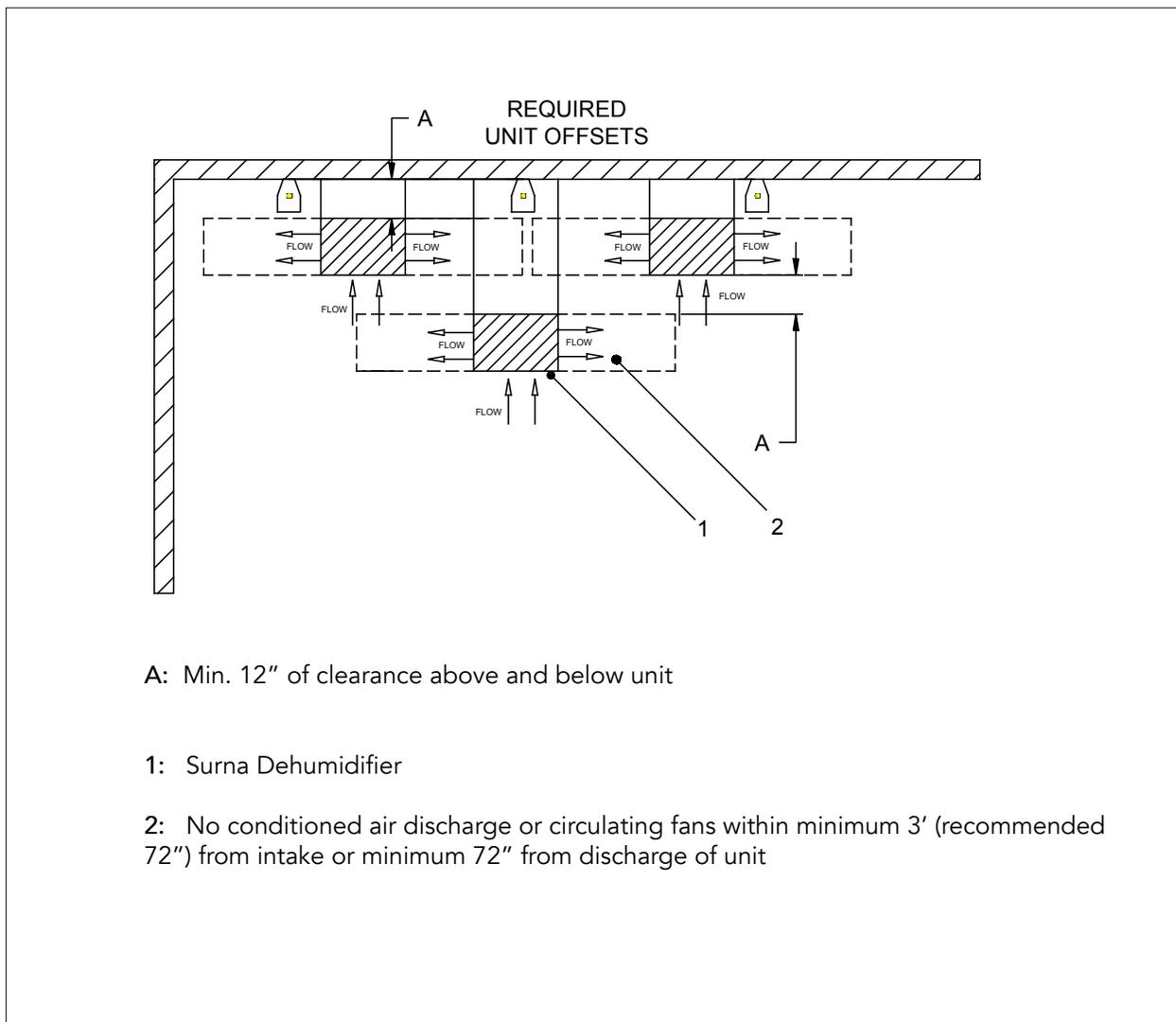


Figure 5 - Proper Vertical Offset

Figure 5 illustrates correct operational offsets for the Surna IsoStream AHU if linear space is limited in the room to provide proper unit and airflow clearances between units.

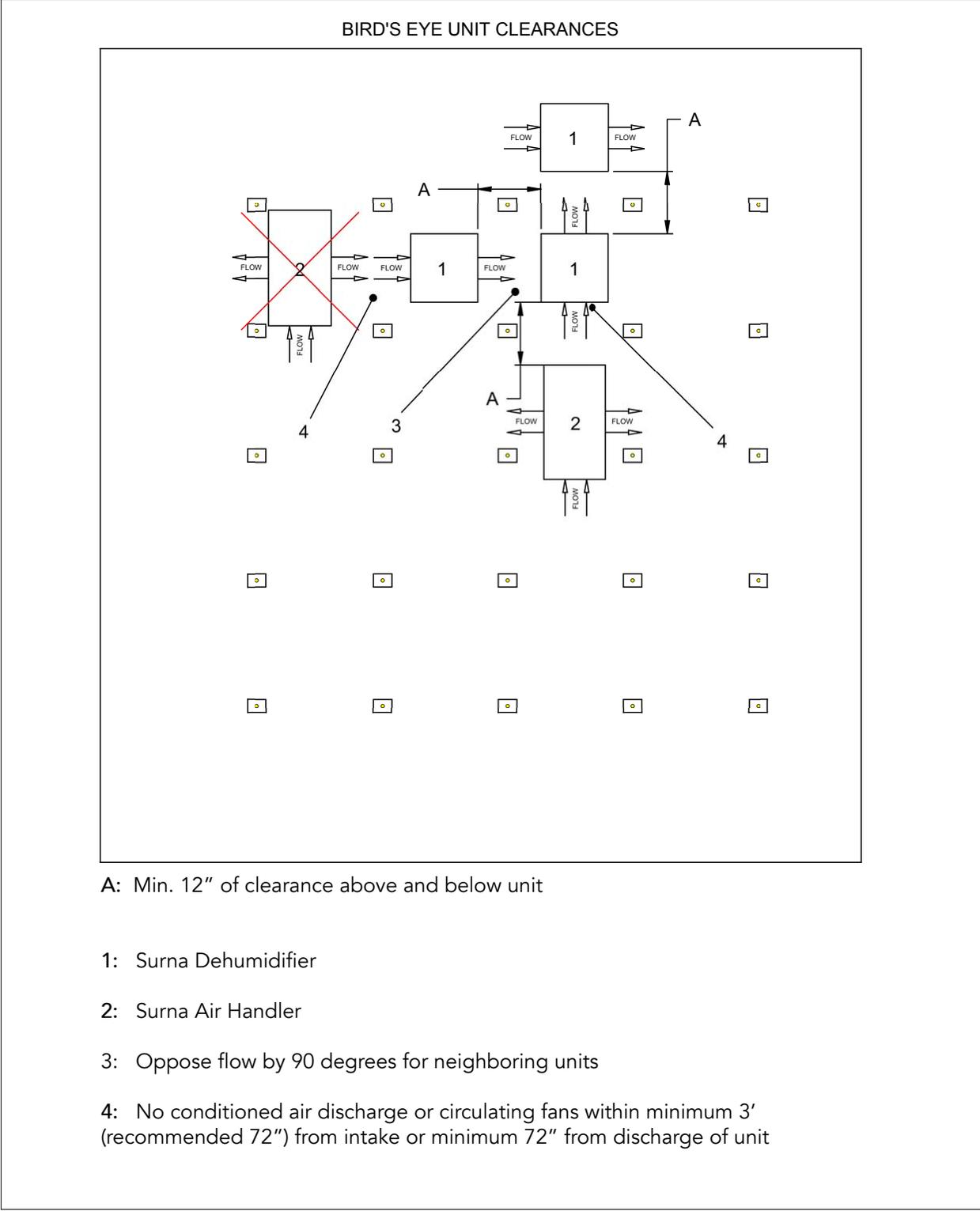


Figure 6 - Bird's Eye View of Clearances

Figure 6 provides a Bird's Eye View of proper installation of the Surna IsoStream AHU, with recommended clearances.

Normal Operation

To start normal operation, flip the breaker that supplies power to the unit to the "ON" position and set the thermostat to "COOL", and set the temperature to the desired setting for the space. This applies to the basic thermostat that is supplied by Surna.

Routine Maintenance

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

The Surna Isostream Air Handler does not come with a filter, so it is recommended to clean the coils once per six months, or more frequently if any decrease of airflow or performance occurs.



WARNING: Before performing any maintenance or servicing, verify unit is disconnected from power source. **DO NOT** attempt maintenance or repairs unless you are properly trained to do so.

Cleaning the Coil

1. Remove power from the unit

2. Remove light accumulations of dirt and other material using compressed air as follows:

A. Direct compressed air across the coil in the opposite direction of normal airflow, from the cleaner to the dirtier side. If using high pressure air, direct it either at a 90-degree angle or directly through the fins. This will prevent damage to the fins.

B. Maintain consistent airflow across the coil for a minimum of 2 minutes.

WARNING: Avoid blowing dust, dirt and debris into the system or into your garden. Wear eye protection to keep the material out of your eyes. If necessary, use a shop vacuum cleaner to collect material as it is dislodged.

3. Use a mild detergent and warm water to clean the coils as follows:

A. Mix warm water and a simple detergent (that is non-corrosive to aluminum or copper), such as Cal-Green or Evap-Green, in a spray bottle, hand sprayer or garden sprayer.

B. Apply the water and detergent solution to the evaporator coils.

C. Let the solution soak in and loosen debris for 5-10 mins. Reapply as needed.

D. Wash the coils clean, being careful to direct runoff into the AHU condensate drain pan.

NOTE: If the air handler coils are heavily soiled or are dirty enough to seriously affect air handler function, remove the fan completely to gain access to the inner walls of the heat exchanger.

Troubleshooting

Prior to calling Surna technical support, follow these troubleshooting steps.

To avoid voiding the warranty, please contact Surna via email at support@surna.com or via phone at 303.993.5271 x127 before having a technician perform work.

Customer

Problem: The unit will not turn on

1. Verify thermostat has power (change out batteries if necessary).
2. Verify that thermostat is set to "Cool" and "Auto" with a setpoint below current room temperature, or set to "Cool" and "On".
3. Ensure breaker has not tripped.
4. Verify the unit is supplied with proper power of 115V.
5. Remove power from unit, and check for loose wires, burned/charred wires or components.
6. Verify incoming power wires are wired to terminal block (TB1), and not wired directly to contactor.

Problem: Unit is no producing enough heat

1. Verify proper flow rate of 12.5 GPM (gallons per minute).
2. Measure incoming and outgoing water temperature. (Should have approximately a 10 degree differential)
3. Check that the air handler coil is clean. If not, clean the coil. (See Routine Maintenance Section)
4. Verify proper minimum clearance is provided around the unit. (Recommended minimum of 72" of clearance be provided on exhaust sides of unit, and a minimum of 36" of clearance on the intake side of the unit).
5. Check fan operation by plugging fan directly into

an extension cord with 115V power.

Problem: Unit is not draining condensate properly

1. Ensure unit has been mounted with adequate tilt (1/4" drop per linear foot or approximately 5 degrees) for proper condensate draining.
2. Check condensate plumbing for any clogs, kinks, or breaks and ensure proper slope of condensate lines to drain or reclamation system.



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