

CEILING MOUNT FAN COIL UNIT

OPERATING AND MAINTENANCE MANUAL



**Models: 2-18-01, 2-18,02,
2-36-01, 2-36-02, 2-60-02
August 2017**



SURNA.COM



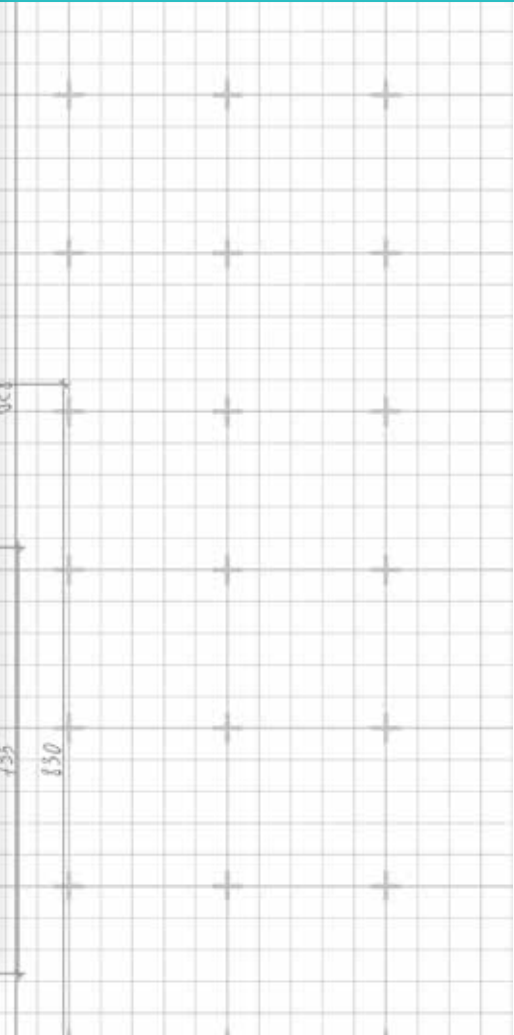
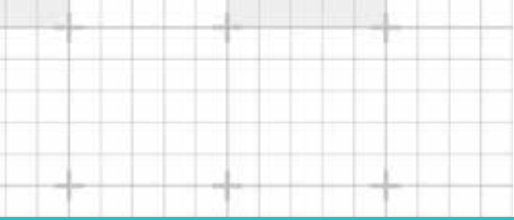
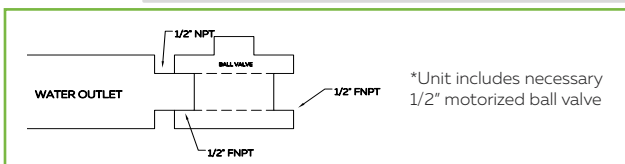
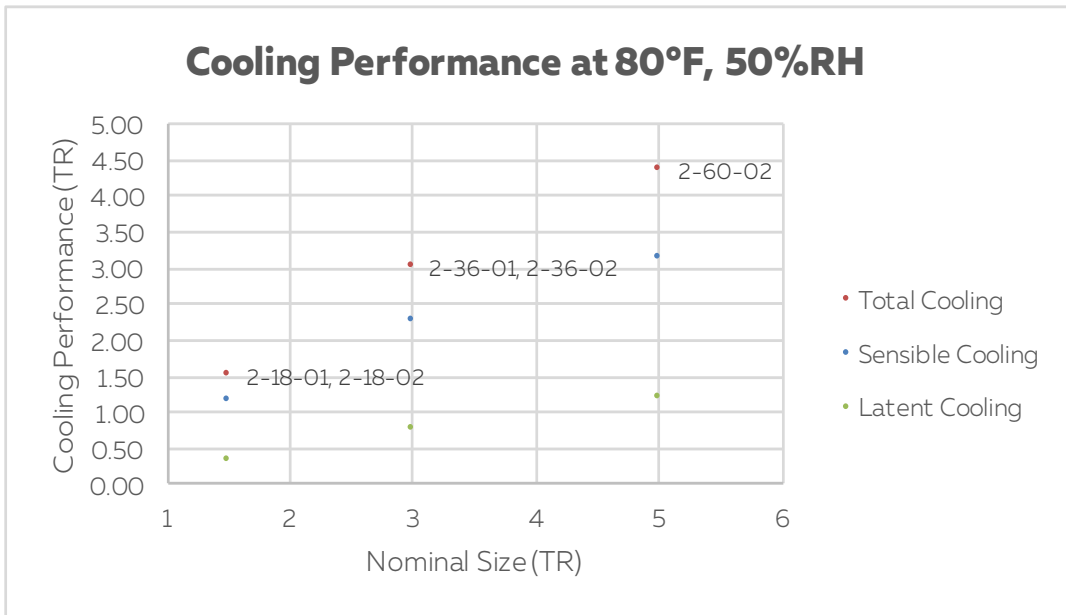


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SPECIFICATIONS

PHYSICAL	1.5 TON 2-18-01	1.5 TON 2-18-02	3 TON 2-36-01	3 TON 2-36-02	5 TON 2-60-02
Length	37.72 in		49.68 in		56.10 in
Width	21.65 in				20 in
Height	10.25 in				13.78 in
Weight	68.20 lbs		83.60 lbs		72.80 lbs
Water Inlet	1/2 in FNPT				3/4 in FNPT
Water Outlet	1/2 in FNPT	1/2 in FNPT*	1/2 in FNPT	1/2 in FNPT*	3/4 in FNPT
Condensation Drain	3/4 in NPT				3/4 in SLIP
ELECTRICAL					
Electric Heat	None	3kW	None	5kW	None
Volts - Phase	208/230V Single Phase				
Minimum Circuit Ampacity (MCA)	1.48A	20.08A	2.26A	32.84A	3.40A
Maximum Overcurrent Protection (MOP)	3A	20A	5A	35A	8A
PERFORMANCE & MECHANICAL					
Nominal Cooling Capacity	1.5 Tons	1.5 Tons	3 Tons	3 Tons	5 Tons



TECHNICAL DESCRIPTION

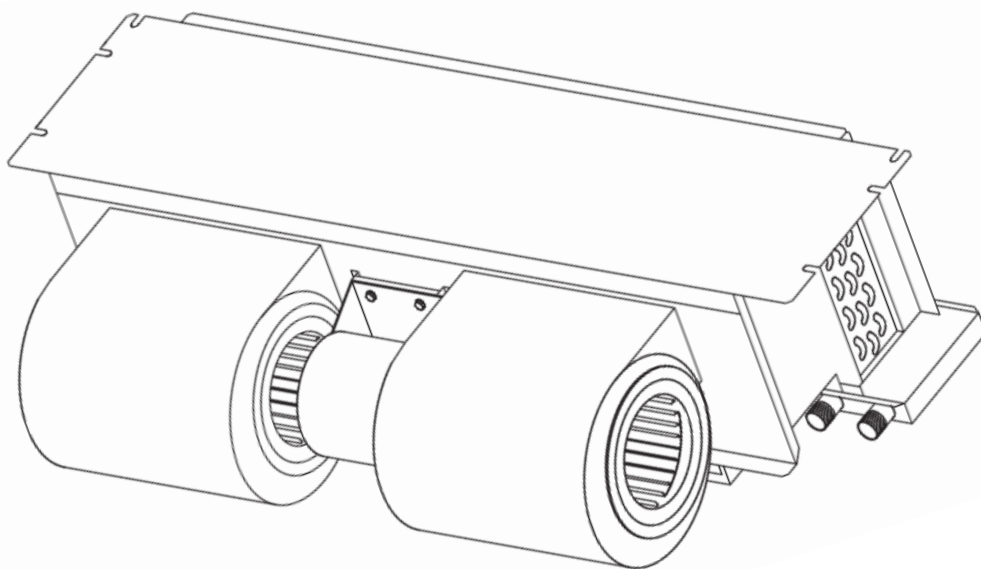


Figure 1 - Ceiling mount fan coil

The Surna ceiling mount fan coil 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, 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, reducing relative humidity. The water/glycol mix is then circulated from the heat exchanger back into the return manifold and is pumped through the chillers to reject heat outside.

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

FAN COIL SAFETY GUIDE



Please read the information in this document carefully prior to attempting the installation, operation and/or servicing of the fan coil. This document contains all information required to install and operate the Surna ceiling mount fan coil unit. Failure to follow the directions provided herein may impair the safeties provided and could cause damage to the fan coil 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.



Prior to providing power to the equipment, 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 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 fan coils in a manner not described in this manual may void its warranty and any safeties provided herein.



After installation and maintenance activities, observe the system operation to verify that the fan coil is operating normally before leaving equipment to operate unattended.



Only use Surna supplied or recommended equipment with the Surna ceiling mount fan coil.



CAUTION: 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 fan coil.



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



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

WARRANTY INFORMATION

Equipment manufactured by Surna ("Company"), the warranty shall exist for a period of twelve (12) months from initial start-up or eighteen (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 affect 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, electrical or mechanical stress; lack of proper startup 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.

FAN COIL ORDER

Below is a list of all parts provided with each Surna ceiling mount fan coil. The following are included with the order (quantities are dependent on individual order).

1. Surna ceiling mount fan coil
2. Surna ceiling mount fan coil manual
3. Flowmeter (Dwyer VFC II-143)

INSTALLATION INSTRUCTIONS

MECHANICAL



This fan coil unit is designed to be mounted in a horizontal configuration only. The weight information for each model can be found in the **specifications** section of this document; take care to ensure the supporting members are rated to support the fan coil load. When installing, clearances must be provided as a provision to allow maintenance/service of the unit. Additionally, clearance around the unit increases performance by allowing airflow.

General Installation guidelines:

1. Leave a minimum of 36 inches (91.5 cm) of horizontal clearance on intake side of the unit and 72 inches (182.8 cm) on discharge side.
2. Do not point the intake/discharge of the unit at the discharge/intake of another nearby fan coil or dehumidifier.
3. Do not mount fan coil using a unistrut trapeze. Directly mount the unit with threaded rod through the four top plate mounting holes, as shown in **figure 2**.

NOTE: Extend unistrut beyond mounting holes for more precise slope adjustments.

4. Mount sloped to drain, 0.25–0.5 in/foot. Do not exceed 5 degrees.

RETURN AND SUPPLY AIR CONNECTIONS

Surna fan coils are supplied and operated without air supply or return ducting. The unit is supplied without air filtration components. Incoming air filtration is not required; however, the condensing coils must be cleaned on a quarterly basis. Failure to clean condensing coils periodically can result in reduced cooling efficiency. See the **routine maintenance** section of this manual for the recommended cleaning schedule.

WIRING



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

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

All wiring shall comply with local and national codes. Before attempting system installation, verify that the electrical system and wiring are adequate for supplying the required ampacity to the fan coil unit (see **specifications** section of this document). High and low voltage terminal blocks are provided in the unit's electrical panel. Reference **figures 3 - 5** for wiring diagrams. Making improper electrical connections could cause damage to the equipment or harm to servicing personnel. Never perform electrical work unless properly trained and licensed and aware of relevant electrical codes and requirements.

There are different wiring configurations depending on selected options, but all units will include high and low voltage terminals as well as a ground terminal. Usual locations are shown in **figure 6**.

PLUMBING

The fan coil has a dedicated water inlet connection and a dedicated water outlet connection. When installing these connections, verify 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 is needed for the water lines in accordance with local and national building codes.

The fan coil has one condensate drain connection on either side of the drain pan for either left or right hand drain connection. The drain connection not being used must be capped off by the installing contractor. The middle drain connection is the safety condensate drain connection. Ensure that all condensate drain lines have at least 1/4 inch (6.35 mm) of fall per foot for proper drainage. Install P-Traps to avoid air lock.

The fan coil also comes with a manual air bleed and a manual coil drain fitting. They are located on the same side as the supply and return water line connections. The water supply line is connected to the coil connection furthest away from the fans. The water return line is connected to the coil connection closest to the fans. Ensure that both the supply and return water lines are insulated to prevent them from sweating.

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

IMPORTANT PLUMBING TIPS

1. All hydronic piping should be schedule 80 PVC or schedule 40 black iron pipe. All condensate piping should be schedule 40 PVC.
2. Manifold size will vary depending on size and quantity of equipment connected to it. Piping should be sized based on total flow required for all equipment being supplied by it.
3. Return manifold should be equivalent to supply manifold.
4. Install isolation valves on all supply and return manifolds near each fan coil unit inlet/outlet for ease of service. Isolation valve on fan coil unit outlet may be used to throttle flow during system balancing.
5. Install a hose end drain valve near pump inlet and upstream of wye strainer for system fill and flush.
6. Use long radius elbow fittings whenever possible to reduce flow restrictions.
7. Insulate all condensate, supply and return piping to avoid condensation outside of equipment. UV protective insulation with aluminum jacket should be used on all outdoor piping.
8. Fan coil unit flow rate requirement is 2.5 GPM per nominal ton to operate at maximum efficiency. For example, the 5-Ton fan coil unit requires 12.5 GPM.
9. Fan coil unit inlet/outlet connections are either ½ inch (1.27 cm) or ¾ inch (1.90 cm) FNPT depending on size of unit. Downsize PVC as close to inlet/outlet as possible to reduce flow restrictions.

10. The fan coil unit 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. Chiller temperature should be set at 55°F (13°C) to start. Adjust the temperature up or down depending on specific circumstances. Do not adjust the chillers set-point temperature below 45°F (7°C).
12. Colored, 95% corrosion inhibited USP grade propylene glycol and dionized or distilled water should be utilized at a minimum of 25%/75% (glycol/water) solution. This prohibits freezing and acts as a system lubricant/anti-corrosive to keep the chiller and fan coils working at peak performance. DO NOT use ethylene glycol (standard car antifreeze). Percentage of glycol will vary depending on location and should be approved by Surna.
13. Once all plumbing is complete, run clean water through the system to flush out all residue and check for leaks. Run system for approximately 5 minutes and then drain water from the system. Correct any leaks and clean wye strainer. Lastly, refill with prescribed glycol/water mixture (presented in **#12** above). When complete, turn on system and top off as necessary.
14. Install air vents at high points of all supply and return lines to reduce air in system. Install drain valves at all low points and slope piping to low points for service drainage.

MOUNTING DETAIL

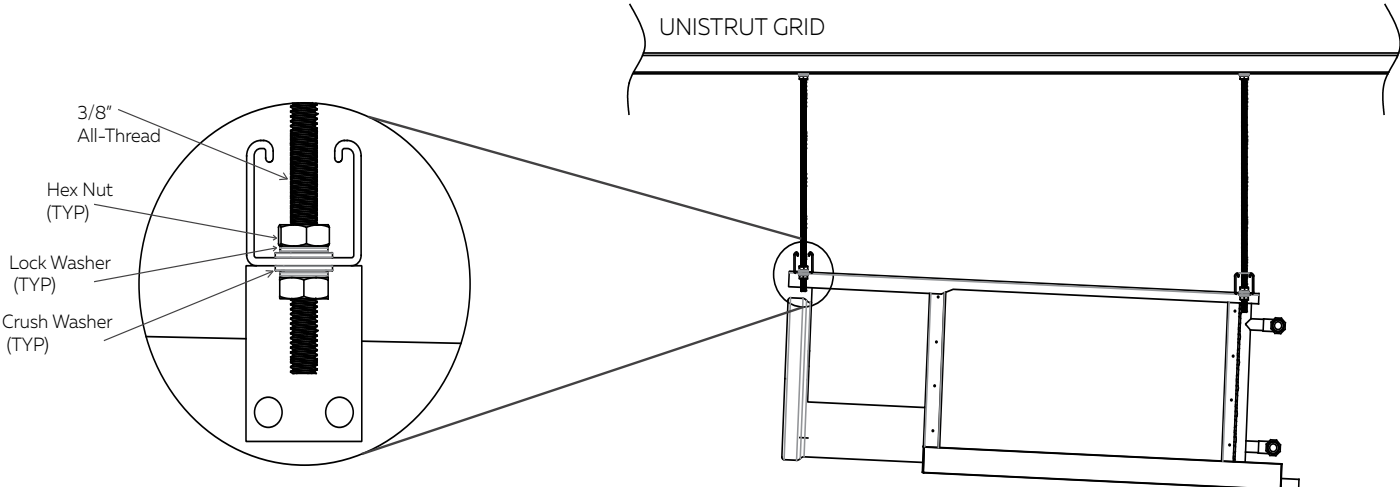
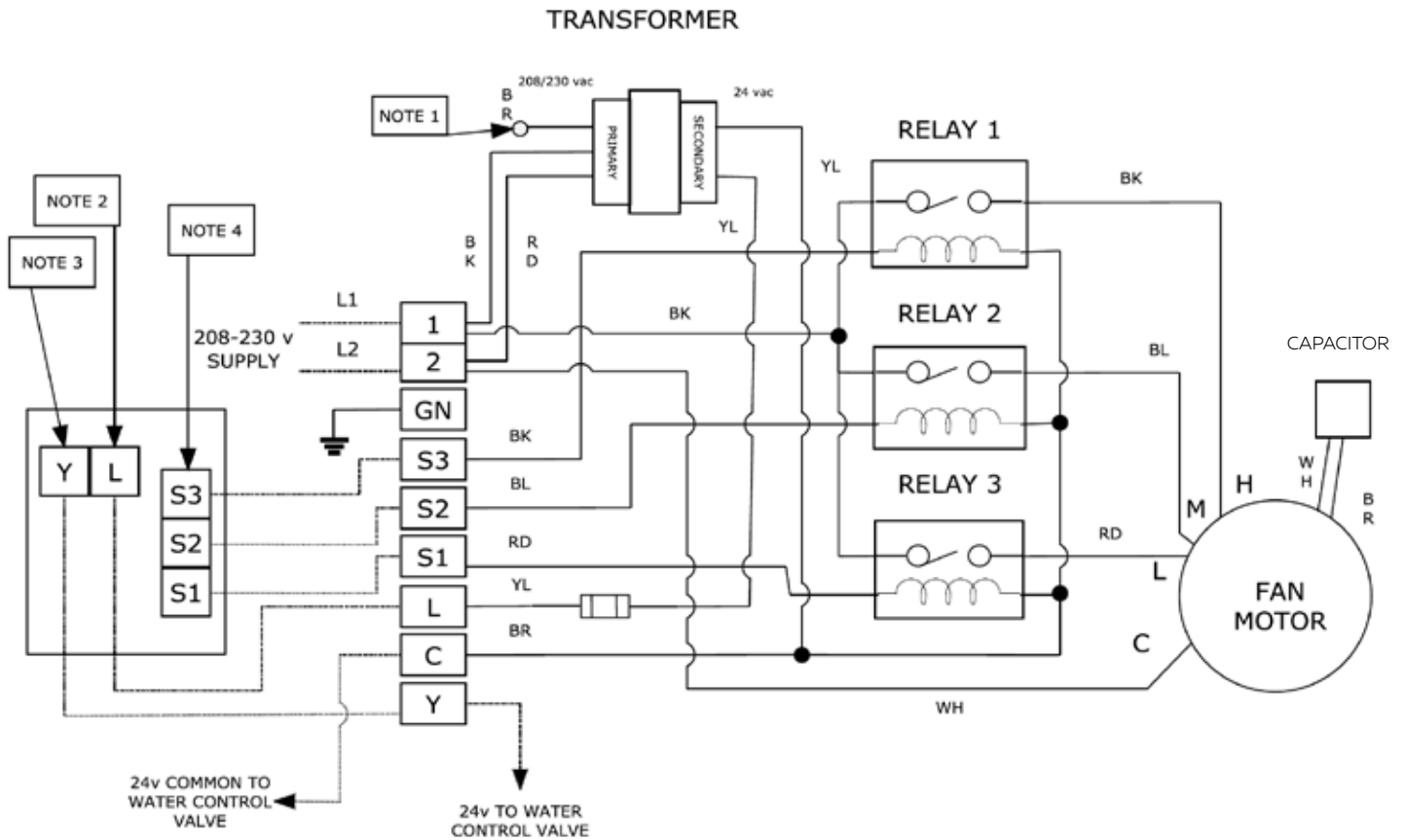








Figure 2 - Mounting detail for ceiling mount fan coil

WIRING DIAGRAM



Legend:

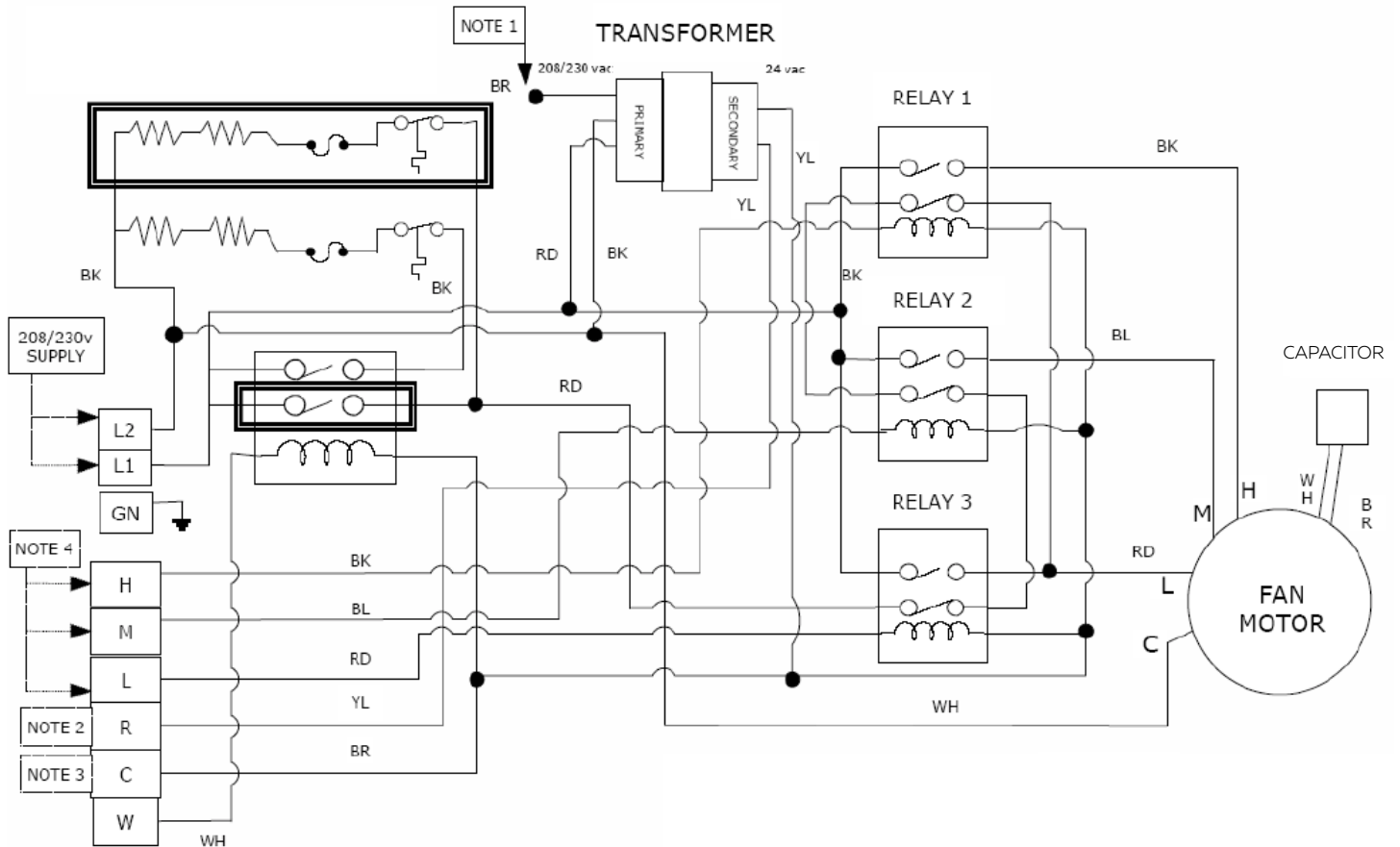
-  Factory Wiring
-  Field Wiring
-  2 Element Model
-  High Limit
-  Ground
-  Fusible Link

Notes:







1. For 208V transformer power, cap off red wire and use brown wire.
2. 24V to fan coil controls.
3. 24V common to one side of water valve. "Y" from thermostat to other side of water valve.
4. From fan speed control.

Figure 3 - Wiring diagram for Surna ceiling mount fan coils

3KW HEAT KIT WIRING DIAGRAM



Legend:

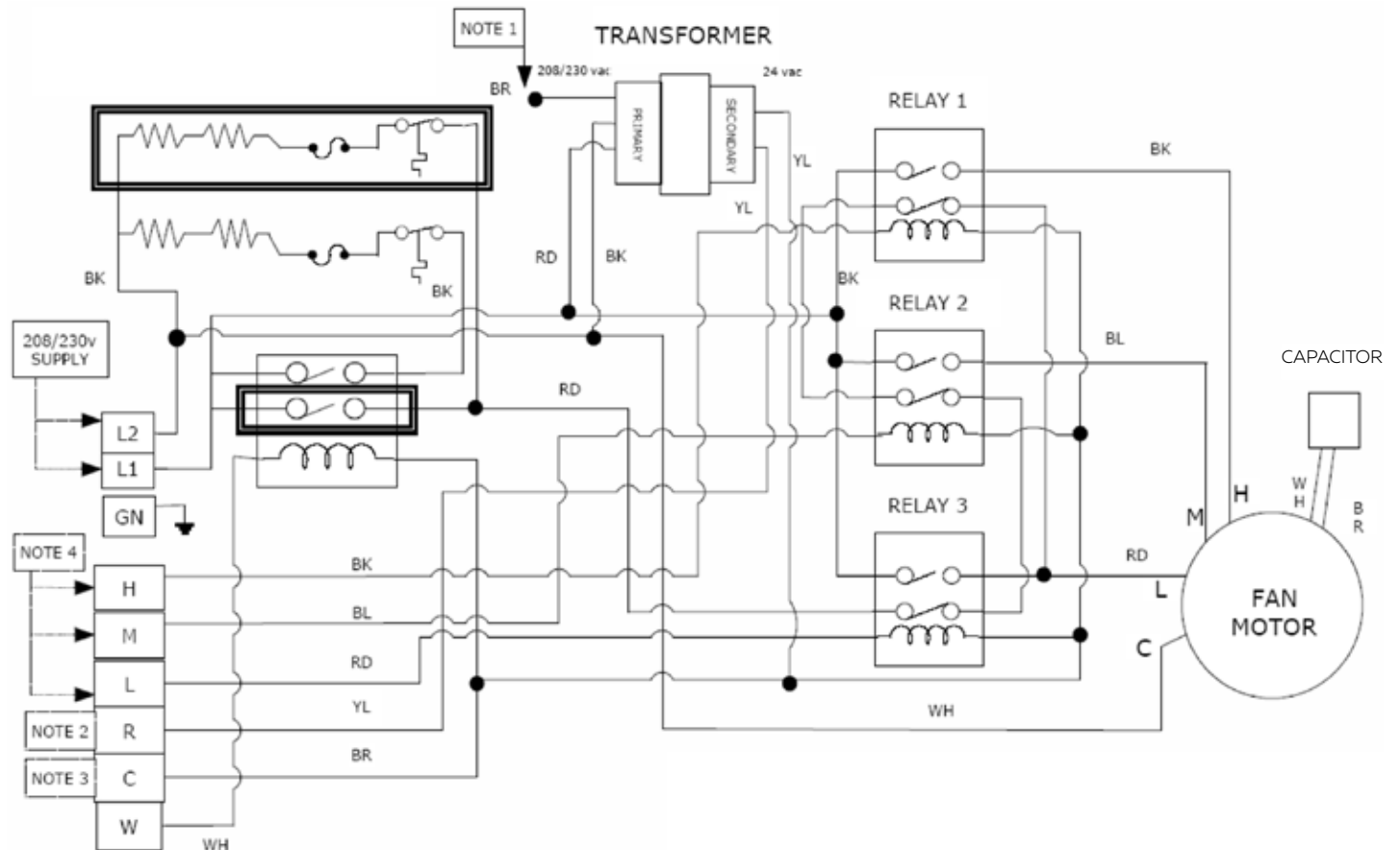
	Factory Wiring
	Field Wiring
	2 Element Model
	High Limit
	Ground
	Fusible Link

Notes:







1. For 208V transformer power, cap off red wire and use brown wire.
2. 24V to fan coil controls.
3. 24V common to one side of water valve. "Y" from thermostat to other side of water valve.
4. From fan speed control.

Figure 4 - Wiring diagram for ceiling mount fan coil with optional 3kW heat kit

5KW HEAT KIT WIRING DIAGRAM



Legend:

-  Factory Wiring
-  Field Wiring
-  2 Element Model
-  High Limit
-  Ground
-  Fusible Link

Notes:

1. For 208V transformer power, cap off red wire and use brown wire.
2. 24V to fan coil controls.
3. 24V common to one side of water valve. "Y" from thermostat to other side of water valve.
4. From fan speed control.

Figure 5 - Wiring diagram for Surna ceiling mount fan coils with optional 5kW heat kit

INSTALLATION CONNECTIONS

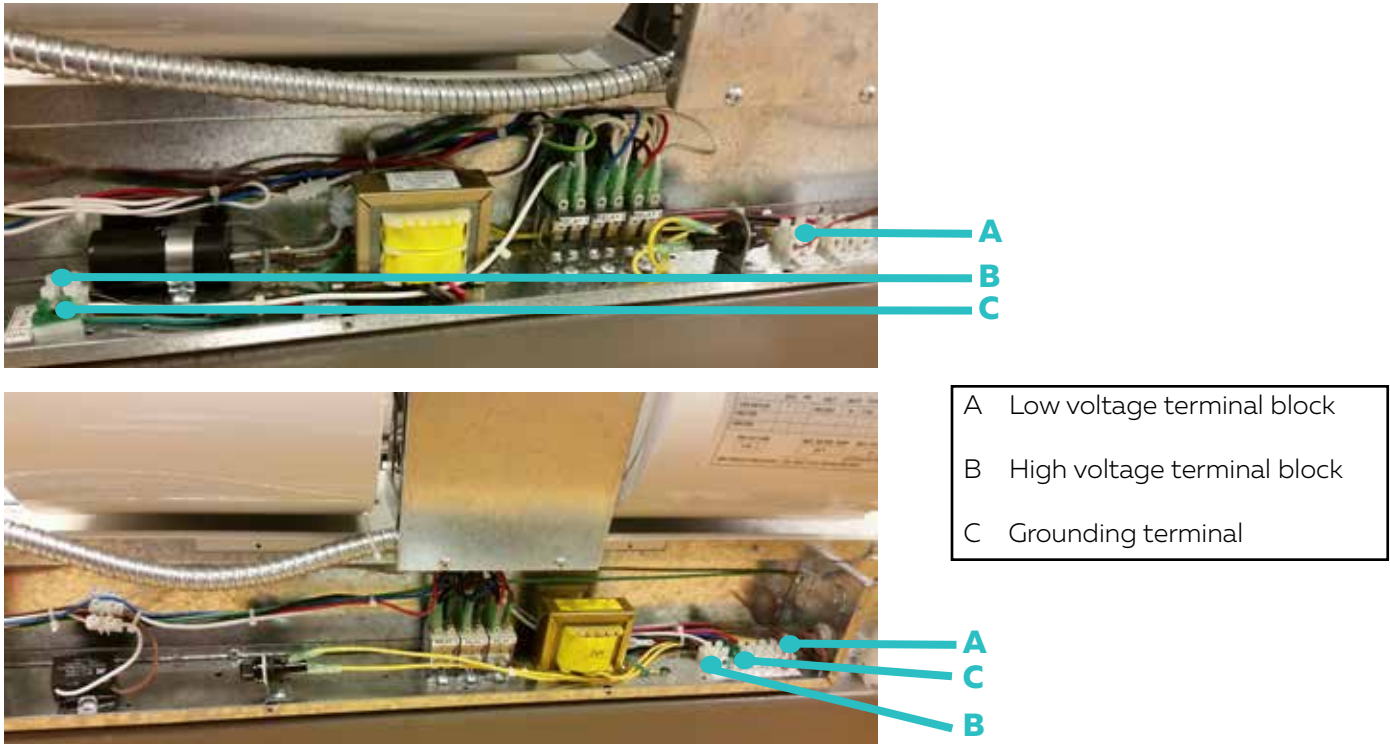


Figure 6 - Wiring installation connections- typical terminal block locations

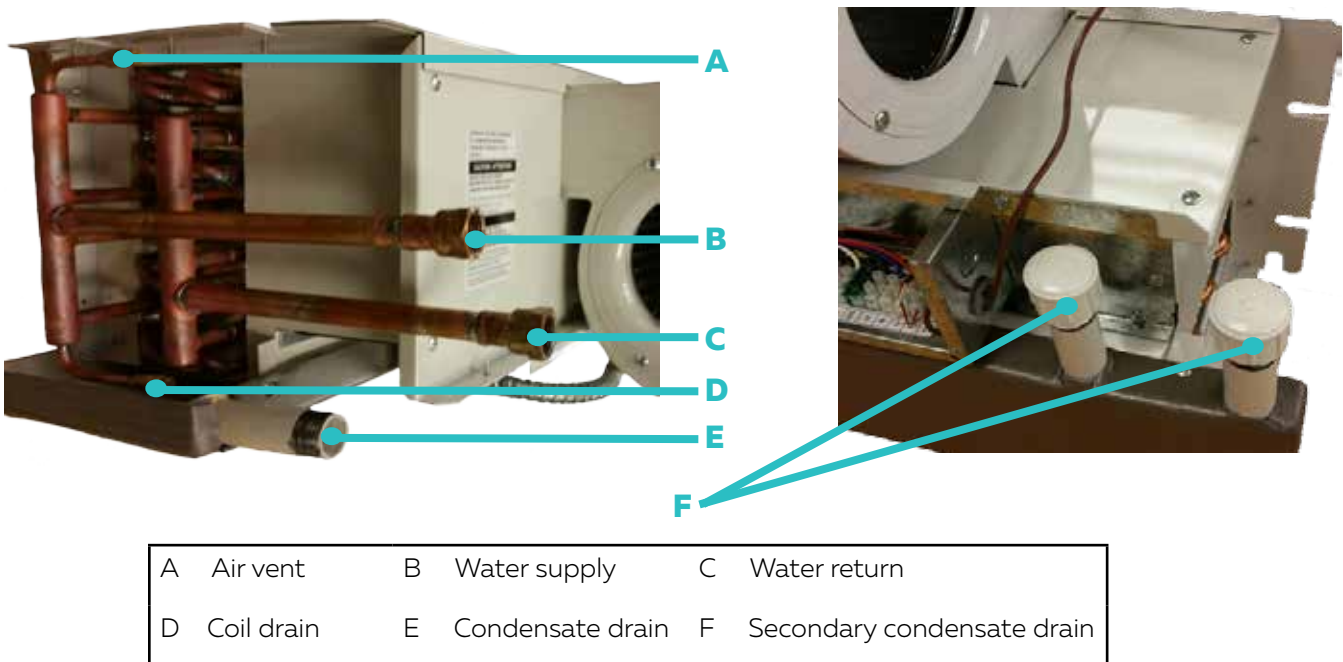


Figure 7 - Plumbing installation connections

ROUTINE MAINTENANCE

This product is designed to provide many years of dependable, trouble free comfort when properly maintained. Proper maintenance will consist of routine filter cleanings/changes, bi-annual check-ups that include (but are not limited to) filter inspections and 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.

Task Description for Fan-coil Units	Frequency*
Check condensate lines are draining and free of blockage and/or debris. Treat drains and remove any foreign debris.	Q1, SA, Q3, A
Verify condensate line meets minimum insulation requirements. Verify insulation is free of excessive moisture buildup. Advise on adjustments and/or repairs.	Q1, SA, Q3, A
Check batteries in temperature controller. Replace batteries as needed to ensure proper operation.	Q1, SA, Q3,A
Verify fan-coil unit flow rate meets manufacturer specifications. Advise on adjustments or repairs to restore flow and ensure proper operation and optimal energy efficiency.	Q1, SA, Q3, A
Check fan blade housing for signs of damage or excessive wear. Advise on repairs to ensure proper operation.	Q1, SA, Q3, A
Visually inspect coil for evidence of damage. Advise on repairs to restore proper operation.	SA, A
Check coil has appropriate airflow. Clean as needed. Advise on repairs to ensure proper airflow for optimal energy efficiency.	SA, A
Check system temperatures. If outside of recommended set points, find cause, advise on adjustments or repairs to achieve and/or maintain optimal energy efficiency.	A

Legend*	
Q1	First Quarter
SA	Semi-Annually
Q3	Third Quarter
A	Annually

CONTACT US

Contact Surna via email at support@surna.com or via phone at 303.993.5271.



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