

INSTALLATION, OPERATION & MAINTENANCE MANUAL ENERGY RECOVERY VENTILATOR

TRC500







ABOUT S&P

S&P USA operations are based in Jacksonville, Florida. This geographically strategic location allows the shipment of products throughout the US and Canada. The Jacksonville manufacturing facility has more than 150,000 square feet of warehouse space for the stocking of a comprehensive range of products. This permits the overnight delivery of many popular model sizes to anywhere in the US and Canada.

At S&P USA we take pride in the fact that our customers receive only the very highest levels of customer service and care. Our internal and external technical and customer service teams are on-hand to provide professional and experienced application advice to enable our customers to apply our products to their particular ventilation and air movement applications. As the USA sales, marketing and distribution division of the Soler & Palau Ventilation Group of companies we are committed to providing only the very highest levels of customer service. Our commitment in providing only the very highest standards of customer service is key to our company strategy.

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Soler & Palau Ventilation Group is the world's leading fan manufacturer. It celebrated its 50th anniversary in 2001. Soler & Palau is able to offer a range of ventilation products benefiting from over 50 years of experience within the industry. The company's impressive, long-term growth is the result of one simple philosophy -- develop an air-moving product that effectively and efficiently meets the needs of the customer, supported by unparalleled engineering, distribution and service.

In 1951 Eduard Soler and Josep Palau, both born in Ripoll, Spain, founded the company Soler & Palau (S&P). From the very start the business proved to be their vocation. Together they combined their extensive knowledge and flair to ensure the successful start of their business project. There is continual in-house product development with state-of-the-art technology, and a continued program of in-house laboratory certifications.

Currently S&P's R&D, manufacturing and distribution facilities occupy a total of 1.1 million square feet, with offices and locations around the globe. S&P products can be found in virtually any commercial or residential application, ranging from innovative, quiet and reliable room ventilators to large diameter, high capacity exhaust systems designed for critical applications in some of the world's toughest environments.



TRC500 INFO

INDOOR UNIT



SPECIFICATIONS

Ventilation Type: Static Plate, Heat and Humidity Transfer

Typical Airflow Range: 200-540 CFM

AHRI 1060 Certified Core: One L85-G5

Number Motors: One, 0.6 hp (Single Phase)

Standard Features:

Non-fused disconnect 24 VAC Transformer/Relay Package

Two total, MERV 8, 2" pleated, 14" x 20" nominal size

Weight:

134 lbs (unit), 153 lbs (in carton) 193 lbs (on pallet), up to 3 units on 40 lb

pallet

Shipping Dimensions: 48" L x 41" W x 18" H (in carton) 55" L x 42" W x 22" H (on pallet)

MOTOR PERFORMANCE

Volts	HZ	Phase	FLA	Min. Cir. Amps	Max. Overcurrent Protection Device	
115	60	Single	7.2	9.0	15	
208-230	60	Single	3.9-3.6	4.9	15	

CORE PERFORMANCE

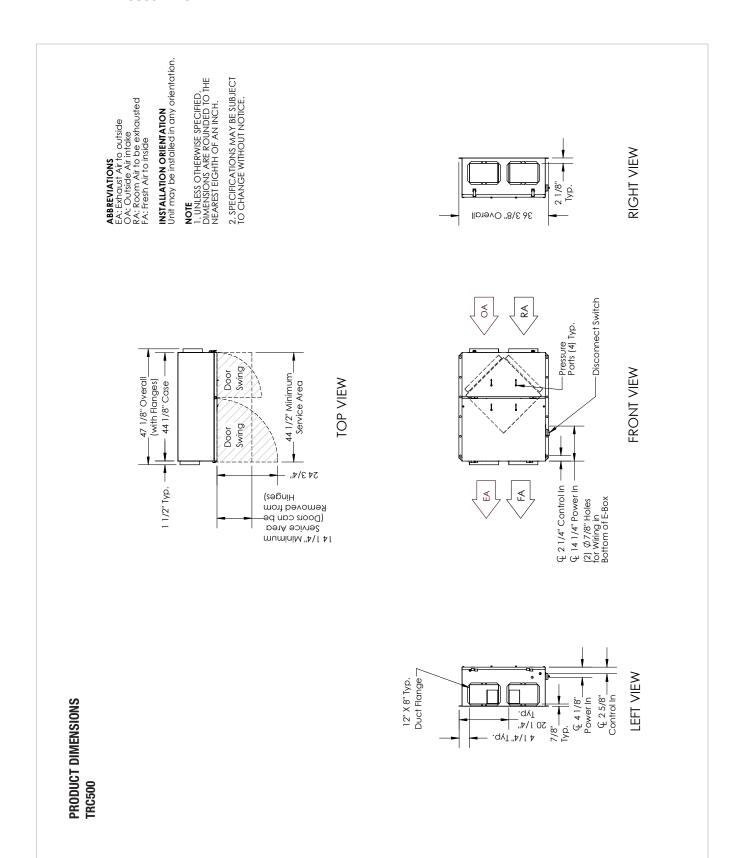
Airflow CFM	ESP in H ₂ 0	Watts 1P Temp EFF%		Total EFF% Winter/Summer
225	1.25	335	79	75/64
338	1.00	420	75	70/59
380	0.90	470	74	69/58
450	0.65	550	72	66/55
540	0.25	640	69	62/51
575	0.00	690	68	61/50

Note: Airflow performance ratings include effect of clean, standard filter supplied with unit.

*At AHRI 1060 standard conditions. Note: Watts is for the entire unit.



TRC500 INFO

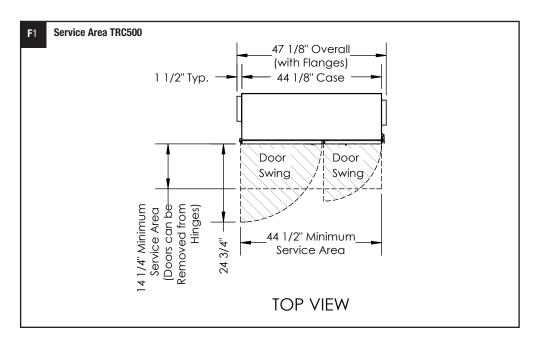


PLACEMENT OF THE TRC500

The TRC500 is designed for installation indoors. Select a location that is central to the inside duct runs, and close to both the exhaust duct (to the outside) and the fresh air duct (from the outside). The unit can be installed in any orientation but the contractor is responsible for safe installation of the unit.

For maximum air performance minimize the number of elbows, and do not place elbows within three feet of the TRC500's discharges. For applications where duct noise is a critical issue, use noise attenuating techniques such as duct isolation, insulation, and proper duct design per SMACNA or ASHRAE standards.

PLANNING YOUR INSTALLATION



CAUTION

Provide Adequate Service Access for Maintenance. The TRC500 will require regular filter and core inspections. Install the TRC500 where you can remove the doors for cleaning the core and replacing the filters, and where you can get at the wiring for installation and service.



PLANNING YOUR INSTALLATION

DUCTS TO THE OUTSIDE

The TRC500 requires four ducts:

- Exhaust Air Duct (insulated duct from unit to outside);
- Outside Air Duct (insulated duct from outside to unit);
- Room Air Duct (from room to unit);
- Fresh Air Duct (from unit to room).

Ducts from unit to the outside must be insulated with sealed vapor barrier on both inside and outside of the insulation or with closed-cell foam insulation.

(4) 8" x12" duct flanges come standard with the TRC500 unit. They are shipped loose in the box and can be installed with screws provided. Holes are provided on the inlet and outlet side of the unit.

The exhaust outlet and fresh air inlet on the outside of the building should be at least ten feet apart to avoid cross-contamination. The exhaust outlet should not dump air into an enclosed space or any other structure. The inlets and outlets should be screened against insects and vermin and shielded from the weather to prevent the entry of rain or snow.

USING FLEX DUCT TO CONNECT TRC500 TO OUTSIDE

Duct need not be flexible, but must have continuous vapor barrier on both inner and outer face of insulation. Position the duct adapters over the openings. Install them with supplied self-drilling screws.

Keep insulated duct runs as short and direct as possible. Suspend or support duct per manufacturer's instructions.

CAUTION

Tape both inner and outer vapor barriers of insulated duct to collars on duct adapters and on wall caps. This is critical to prevent migration of moisture into insulation. Build-up of moisture can result in failure of the duct system and/or frost in the insulation. Make sure any tears in the inner and outer vapor barriers are sealed.

CAUTION

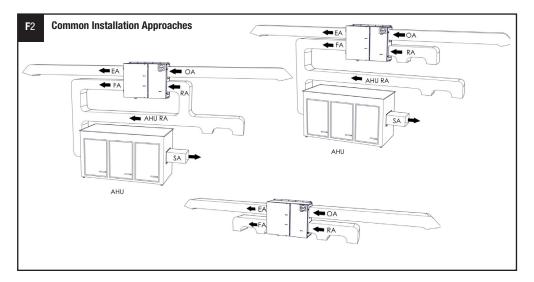
Do not vent exhaust duct up through roof. Condensate will form in cold weather and run back into unit. Instead, slope duct slightly downhill to a horizontal-discharge wall cap, which will allow any condensate to drain to the outside.

NOTE: To prevent the entry of rain through the outside air inlet duct, observe the following:

- 1. velocity at face of inlet hood should not exceed 500 feet per minute (fpm)
- 2. inlet duct must be at least 12" inside diameter
- 3. centerline length along duct from weather hood to unit inlet must be at least 48"
- 4. centerline of inlet hood must be at least 18" below the centerline of the unit inlet
- 5. outlet duct must pitch downward to the outside with a slope of at least 1/4" to the foot

APPLICATIONS

See figure F2 for examples of some common installation approaches.





INSIDE DUCTWORK SYSTEM

Use standard (shipped in box) 8" X 12" duct flange to connect 8" X 12" duct to Room Air and Fresh Air Ports on unit. Position duct flanges over openings. Install with supplied screws.

Or fabricate equivalent, by forming a flange on the first duct section and screw it to the TRC500. Make sure appropriate duct sealant or tape is used to provide an air tight seal.

NOTE: If the inside ducts run through un-conditioned spaces they must be insulated with a sealed vapor barrier on both inside and outside of insulation. In a heated space, uninsulated duct is acceptable, but insulated duct resists break out noise better. Duct sealing improves ventilation performance.

Most installations will not require complicated duct systems to provide good ventilation performance. If ventilating several spaces, evaluate whether the air in the spaces is regularly mixed by the heating/cooling system; if not, provide a room air pick-up and fresh air supply in each space. If air is regularly mixed by the heating/cooling system, one room air pick-up and one fresh air supply may be all that is needed.

Connecting to an existing air-circulation system It is often convenient and effective to connect the Fresh Air duct from the TRC500 to a return duct of an existing heating/cooling system. This way, whenever the heating/cooling system is running, fresh air from the TRC500 is distributed throughout

the area served by the heating/cooling system.

Connect the Fresh Air duct to a branch return duct at some distance from the heating/cooling system's air handler. This minimizes the amount of air that the air handler can pull through the TRC500 when outside air ventilation is not desired.

If the TRC500 is running when the main air handler is not, fresh air will flow into the space through the branch's return grille. Choose the return branch for your connection accordingly (see next paragraph).

Ducting Fresh Air Directly into Space

In cold or hot weather, the fresh air will be somewhat cooler or warmer than the room air (though always much closer to room temperature than the outside air!). Avoid complaints by locating the Fresh Air supplies where they will not blow directly on occupants.

See Figure F2 for examples of some common installation approaches.

PLANNING YOUR INSTALLATION



PLANNING YOUR INSTALLATION

⚠ WARNING

RISK OF FIRE, ELECTRIC SHOCK, OR INJURY. OBSERVE ALL CODES AND THE FOLLOWING:

- Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lock-out/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
- This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
- Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
- 4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
- 5. This unit must be grounded.
- Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment.

- If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
- Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
- This unit is intended for general ventilating only.
 Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
- When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities
- This unit must be properly ducted to the outdoors.

SOUND ATTENUATION

Take these simple steps to attenuate noise from the unit.

OUTSIDE THE BUILDING

Exhaust velocity noise is the primary cause of unitrelated noise outside the building. Size the exhaust duct and grille for less than 1000 fpm air velocity. When practical, orient the exhaust air hood to point away from houses or public areas.

DUCTS

Make sure the ductwork at the unit outlets is stiff enough to resist the flexure and resulting booming associated with system start-up and shut-off, as well as the turbulent flow conditions at the blower outlets. In general, provide smooth transitions from the ERV's outlets to the duct. The ducts connecting to the outlets should be straight for a sufficient distance, with gradual transitions to the final duct size.

These guidelines are consistent with SMACNA recommended duct layout practices for efficient and quiet air movement. Follow SMACNA quidelines.

RADIATED NOISE

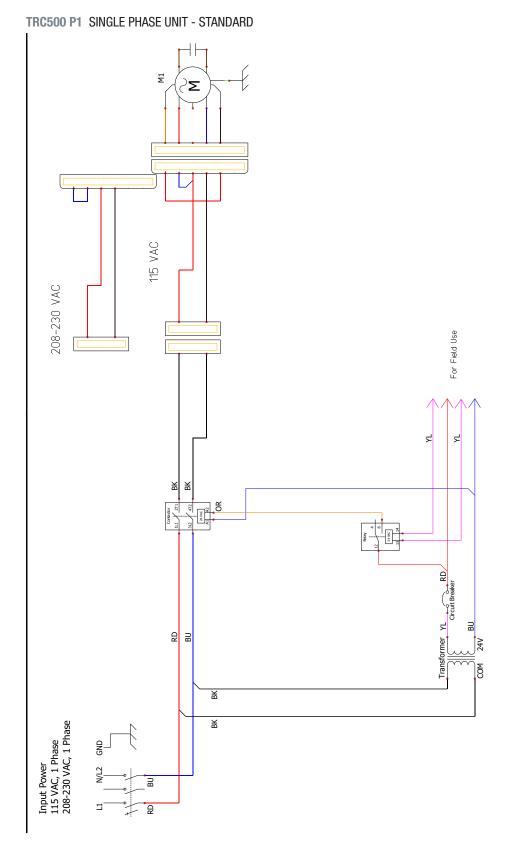
The outlet ducts can be significant sources of radiated sound as well. The FA and EA ducts (outlet ducts) should be insulated for sound control. This insulation should start at the unit. At a minimum the first ten feet of duct should be insulated. All parts of the FA and EA ducts located in the mechanical space should be insulated for sound control, both to minimize sound radiation out of these ducts and also to control sound radiation into the ducts.

AERODYNAMIC (VELOCITY) NOISE

When sound attenuation is a design concern, the primary consideration is velocity noise at the unit's Fresh Air blower outlet. The average velocity at the blower outlets is 1100 FPM when the unit is operating at 600 CFM.



WIRING SCHEMATICS





INSTALLATION INSTRUCTION

CAUTION

The TRC500 weighs approximately 135 lbs. It is the installer's responsibility to make sure that the screws or bolts used for securing the units are properly selected for the loads and substrates involved. Secure the TRC500 so that it cannot fall or tip in the event of accident, structural failure or earthquake.

MOUNTING THE UNIT

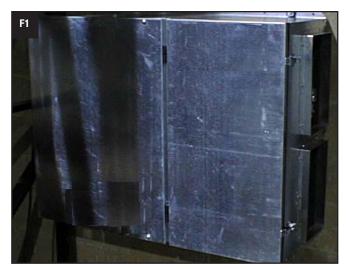
- 1. The TRC500 has integral flanges for mounting to a wall (Figure 1) or hanging from a ceiling (Figure 2).
- 2. Please note that the threaded rod, bolts, nuts, or other fasteners are not included. If hanger bolts or threaded rod are used each must be capable of carrying the weight of the unit and must be no less than 3/8" diameter.
- 3. Figures 3 and 4 show the rubber door keepers. In order to remove doors these keepers must be removed.

CAUTION

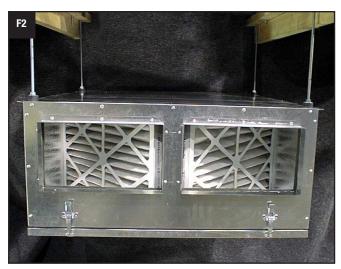
Do not stand on the unit. Do not stack or store items on the unit when installed.

To avoid motor bearing damage and noisy and/ or unbalanced blowers, keep drywall spray, construction dust, etc., out of unit.

See drawing below for examples of some common installation approaches:



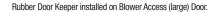
Unit mounted to wall using integral mounting flanges.



Unit hung from ceiling using integral mounting flanges.









Rubber Door Keeper installed on Filter Access (small) Door.

INSTALLATION **INSTRUCTION**

ACCESSORIES

These ERVs may be ordered with factory-installed features including Electronically Commutated Motors. Consult the supplemental Installation and Operation Manual(s) for these features if supplied.

NOTE: Standard TRC500 with single phase original equipment motors are suitable for use with solid state speed control.

Le TRC500 avec moteurs d'équipement d'origine monophasés sont adaptés pour une utilisation avec regulateur de vitesse electronique.

⚠ WARNING

Three phase motors are NOT suitable for use with solid state speed control.

Single phase ECM motors are NOT suitable for use with solid state speed control. They already have speed control built into the motor electronics.

Moteurs de trois phase ne convient pas pour utilisation avec regulateur de vitesse electronique.

Moteurs d'une phase de l'ECM ne conviennent pas pour une utilisation avec regulateur de vitesse electronique. Ils ont déjà le contrôle de vitesse intégré dans le moteur électronique.



INSTALLATION INSTRUCTION

ELECTRICAL SPECIFICATIONS

NOTE: If your unit is equipped with EC Motors, please refer to "EC Motor Manual Supplement" for more detail.

Use conduit, strain reliefs, etc. as required by code to secure the field wiring.

Electrical Options are identified on the Unit Label located near electrical box on the outside of the unit. Find the complete Unit Model Number in the lower left corner of the Unit Label. Use the configuration chart on the page 2 to determine motor power and voltage installed in your TRC500.

⚠ WARNING

Danger of Electrical Shock when servicing an installed unit.

ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required.

Proper Wiring Size Selection and Wiring Installation are the Responsibility of the Electrical Contractor.

CAUTION

Before bringing power to the unit check unit nameplate to confirm it matches the voltage and phase of the power you are supplying.

Remember that your field connections need to be accessible for inspection.

You must make sure to provide the correct voltage and phase power supply. Installing the incorrect voltage and phase will destroy the motor and possibly lead to injury!

Follow these steps:

- 1. Confirm the voltage of the power supply matches the unit.
- 2. Remove both unit access panels, i.e., the larger motor door and small filter door.
- 3. Remove electrical box cover by removing two or three screws. Connect the units power field wiring to the terminals of the disconnect switch
- 4. Connect service ground to ground wire pigtail.
- 5. Connect the control system to the pigtails in the control voltage compartment of the units electrical box. Make sure you are connecting the correct voltage, 24VAC, to the control pigtails. See Control Wiring Schematics.



LOW VOLTAGE CONTROL SYSTEM

This ERV is provided with a Class II 24VAC power supply system that operates the unit's contactor for TRC500. The ERV's 24VAC Power Supply can also be used to power the externally-installed controls system: up to 8VA of power is available.

The unit's power supply system includes an isolation relay so you can use external controls whose contact ratings are as low as 50mA (1.2VA). Also, it is possible to operate the isolation relay with 24VAC power from an external source (with proper wiring connections).

A built-in circuit-breaker prevents damage to the transformer and other low-voltage components in the event of a short-circuit or overload. In extreme cases, the transformer itself is designed to fail safely.

SPECIFICATIONS

- Nominal Output Voltage under load: 24VAC
- Typical Output Voltage at no load: 29-31V
- · Minimum contact rating for connected control device: (50mA (1.2VA)
- · Circuit Breaker Trip Point: 3A

INSTALLATION **INSTRUCTION**

CAUTION

- 1. Connect only to components intended for use with 24VAC power.
- 2. Do not undersize the low-voltage wires connected to this device. Observe the wire length and gauge limits indicated in this manual.
- 3. Do not overload this unit's 24VAC power supply system. Confirm that the power requirements of devices you connect to this power supply system do not exceed 8VA in total.
- 4. If an external source of 24VAC power is used to control the unit, consult the wiring schematics and connect the external power only to the specified terminals in order to avoid damaging the unit or external controls. Connect only CLASS II power to the control terminals of this unit.
- 5. Unit is not equipped to receive analog signals (such as 1-10vdc or 4-20mA).
- 6. Unit is not equipped to communicate directly with Building Management Systems (such as BACNET, LONWORKS, etc.). However, the unit can be controlled by powered or non-powered contacts operated by any kind of control system.

HOW TO RESET THE 24VAC CIRCUIT BREAKER

If the transformer is subjected to an excessive load or a short circuit, the circuit breaker will trip to prevent the failure of the transformer. When it trips the circuit breaker's button pops up. Shut off the primary-side power to the unit, and remove the excessive load or the short. The circuit breaker can be reset about fifteen seconds after it trips by pressing in the button.

LIMITS OF POWER OUTPUT

If limits on wire gauge and length are observed, you may connect control devices that draw up to 8VA to the blue and red wires. More than one device can be connected as long as total steady-state load does not exceed 8VA.

OBSERVE THESE LIMITS TO WIRE LENGTH AND GAUGE in order to ensure reliable operation of the control system.									
Wire Gauge	#22	#20	#18	#16	#14	#12			
Circuit Length	100'		250'	400'	700'	1000'			
"Circuit Length" is distance from ERV to Control Device.									

INSTALLATION NOTES

If primary-side voltage is 230VAC, move black primary-side lead from transformer's "208V" terminal to the transformer's terminal marked "240V" ("230V" in some units). Do not move the black primaryside lead that is connected to the transformer's "COM" terminal.



CONTROL WIRING SCHEMATICS

NOTE: The simplified schematics below show only the relevant portions of the low-voltage control circuit in the ERV unit and representational external control approaches. See the complete unit schematics elsewhere in this manual.

CAUTION

Be careful if the external control system provides 24VAC power at its control output: make sure blue and red leads are separately capped and not connected to any other wires.

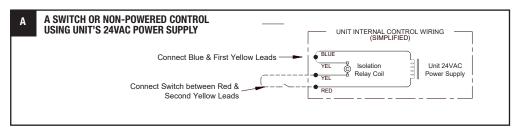
CONTROL WIRING EXAMPLES BY TYPE OF APPLICATION

A. Single 2-wire Control: Use this schematic if the control requires no power to operate and acts like a simple on/off switch. The control must not supply any power to the ERV unit. Connect the blue lead to one yellow lead. Connect the control's contacts to the red lead and the remaining yellow lead.

Control on separate Power Supply, no power present at Control Output: Wire as shown for the Single 2-wire control.

CAUTION

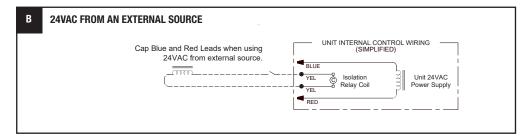
Make sure the control provides no voltage or current at its output terminals.



B. Control Sending 24VAC "On" Signal (from an external power source) to ERV: Make sure the blue and red leads are separately capped and not connected to any other wires. Now you safely can apply 24VAC to the two yellow leads to operate the ERV's isolation relay.

CAUTION

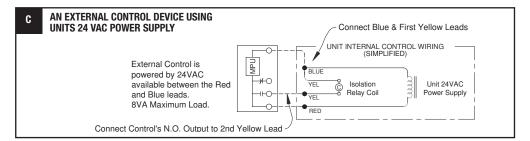
Supply only 24VAC (not VDC) from a Class II Power Source.



C. Control operating on Unit's 24VAC Power Supply: 24VAC power is available at the blue and red leads. Connect one of the yellow leads to the blue lead. Connect the switched output of the Control to the red lead to operate the ERV's isolation relay.

CAUTION

External control system should not draw more than 8VA.





START-UP

EQUIPMENT REQUIRED

- · A magnehelic gauge or other device capable of measuring 0 to 1.0 in. water of differential pressure.
- 2 pieces of natural rubber latex tubing, 1/8" ID, 1/16" Wall works the best.

NOTE: Be sure to remove cap from pressure port before inserting tubing. Insure tubing is well seated in pressure ports.

NOTE: The tubing should extend in the pressure port approx. 1 inch.

MEASURING AIR FLOW

CROSS CORE STATIC PRESSURE MEASUREMENT INSTRUCTIONS

The individual differential static pressures (DP) are measured using the installed pressure ports located in the front of the units core access doors.

NOTE: These ports are carefully located on the unit to give the most accurate airflow measurement. Do not relocate pressure ports.

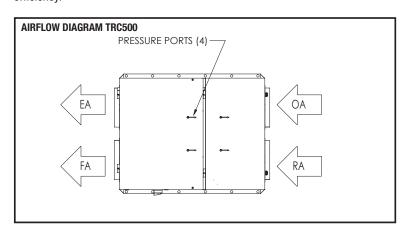
- To read SCFM of Fresh Air (FA) install the "high" pressure side (+) of your measuring device to the Outside Air (OA) port and the "low" pressure side (-) to the Fresh Air (FA) port.
- To read SCFM of Room Air (RA) install the "high" pressure side (+) of your measuring device to the Room Air (RA) port and the "low" pressure side (-) to the Exhaust Air (EA) port.
- · Use the reading displayed on your measurement device to cross reference the CFM output using the conversion chart.

CAUTION

Make sure clean filters are installed before balancing air flow. Dirty or clogged filters reduce airflow through the unit.

NOTE: Be sure to replace cap into pressure port when airflow measuring is completed.

NOTE: For best performance the airflow rate for both the Fresh Air and the Exhaust Air should be roughly equal ("balanced"). In some facilities a slight positive or negative pressure in the building is desired. RenewAire energy recovery ventilators can generally operate with a flow imbalance of up to 20% without significant loss in energy recovery efficiency.



DIFFERENTIAL STATIC ACROSS CORE DSP VS. CFM												
	DP (H ₂ 0)	DSP	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65
TRC500	Fresh Air (FA)	CFM	190	230	275	315	360	400	445	485	530	570
	Room Air (RA)	CFM	190	230	275	315	360	400	445	485	530	570

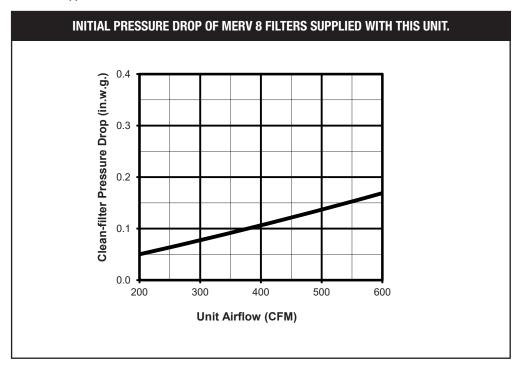


START-UP

MEASURING AIR FLOW

FILTER SPECIFICATIONS

- (2) 14" x 20" x 2" (nominal) pleated filters. Actual size: 13.5" x 19.5" x 1.75"
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

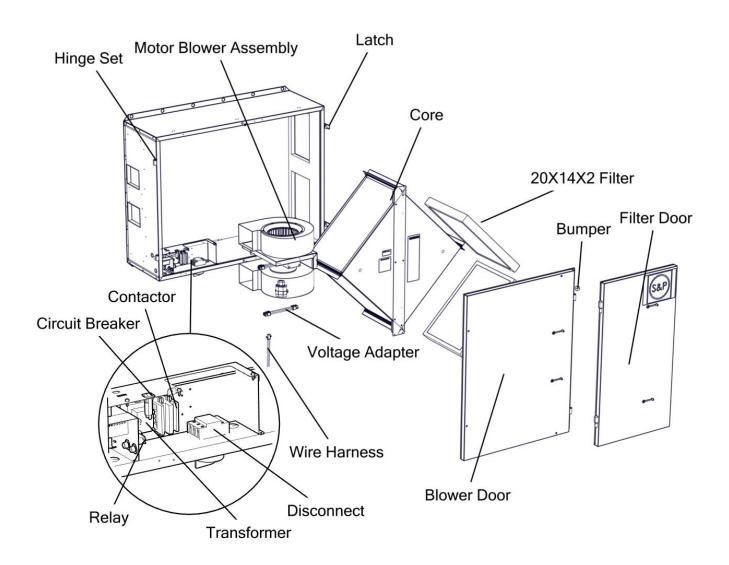




MAINTENANCE

SERVICE PARTS

TRC500





MAINTENANCE

REQUIREMENTS

⚠ WARNING

Danger of injury from un-guarded blower in unit. Disconnect power to unit before opening door. Danger of injury if unit starts unexpectedly. Switch power off at service disconnect. Lock-out/tag-out the disconnect.

CAUTION

DO NOT WASH THE ENERGY EXCHANGE CORE.

Keep it away from water or fire to avoid damaging it. Always handle the core carefully.

Keep your ERV performing at its best by cleaning it as described below:

TO CLEAN THE ENERGY EXCHANGE ELEMENT

Vacuum the face of the energy exchange element yearly. Dust collects only on the entering face of the energy exchange element, right where the filter sits. The interior of the energy exchange element stays clean even if the element faces are dust covered.

- 1. Remove the filters (see below)
- 2. Vacuum the exposed faces of the energy exchange element with a soft brush attachment
- 3. Vacuum out dust from the rest of the unit case
- 4. Install new filters

INSPECT AND CHANGE THE FILTERS REGULARLY.

Inspect and/or replace filters every two or three months when the TRC500 is in regular use, or as needed. Filters must be used or the energy exchange core will become blocked by dust and the unit will not do its job. In extreme cases components may be damaged.

- 1. To access the filters unlatch the access doors. The access doors may be removed.
- 2. Pull the dirty filters out and replace with new filters.

NOTE: The filters supplied in the unit are usually able to keep the energy exchange core clear for several months. Finer filters can be used but must be cleaned more often. If using finer filters, their increased resistance to flow must be allowed for in the system design.

MOTOR MAINTENANCE

The motor needs no lubrication. If necessary vacuum clean the blower wheels at the same time you clean the face of the energy exchange element (annually).

⚠ WARNING

RISK OF INJURY OR DAMAGE.

Motor may have a manual reset thermal protector. Disconnect power before servicing or resetting motor thermal protector. Use caution, motor may be hot. Allow the motor to cool before resetting the thermal protector.

If the motor thermal protector tripped, correct the issue that caused the motor to overheat (e.g. over motor rated amperage or locked rotor).

If the motor has a manual reset thermal protector, the red thermal protector reset button is located on the motor body, on or near the lead end of the motor. If the button does not reset, the motor may still be too hot. Allow the motor to fully cool to reset the thermal protector, you should feel or hear a click when the thermal protector resets while pushing the reset button.



NOTES





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