TRANE

Installation ERS-IOM-1

Library	**Service Literature**
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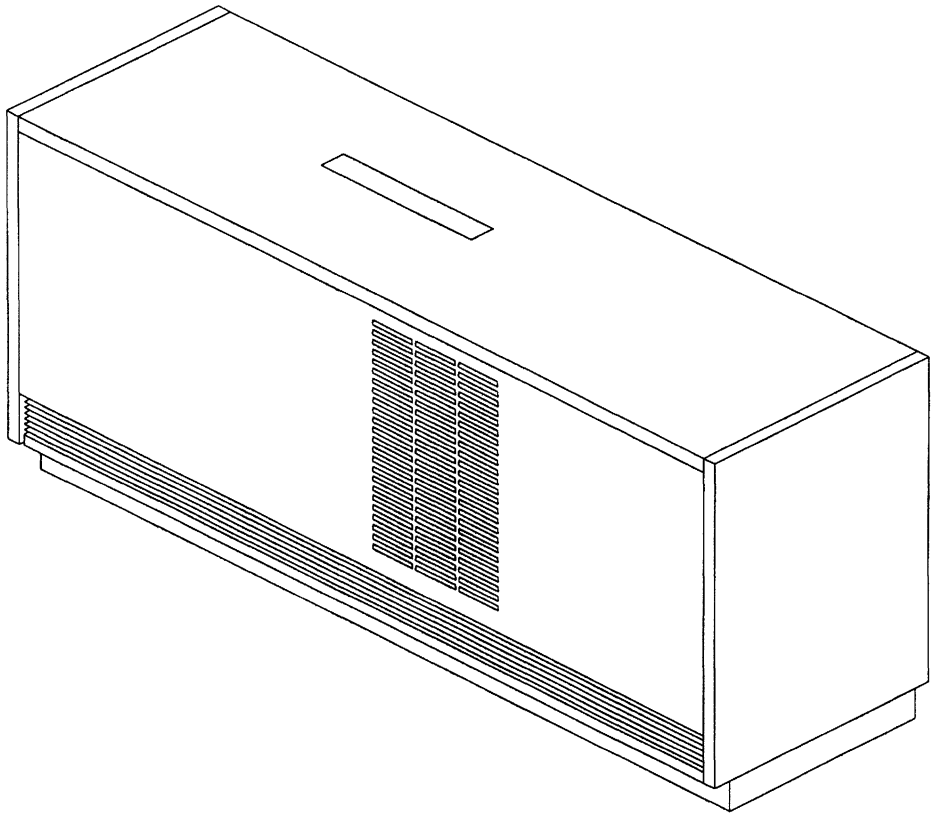
VERTICAL FLOOR ENERGY RECOVERY SYSTEM



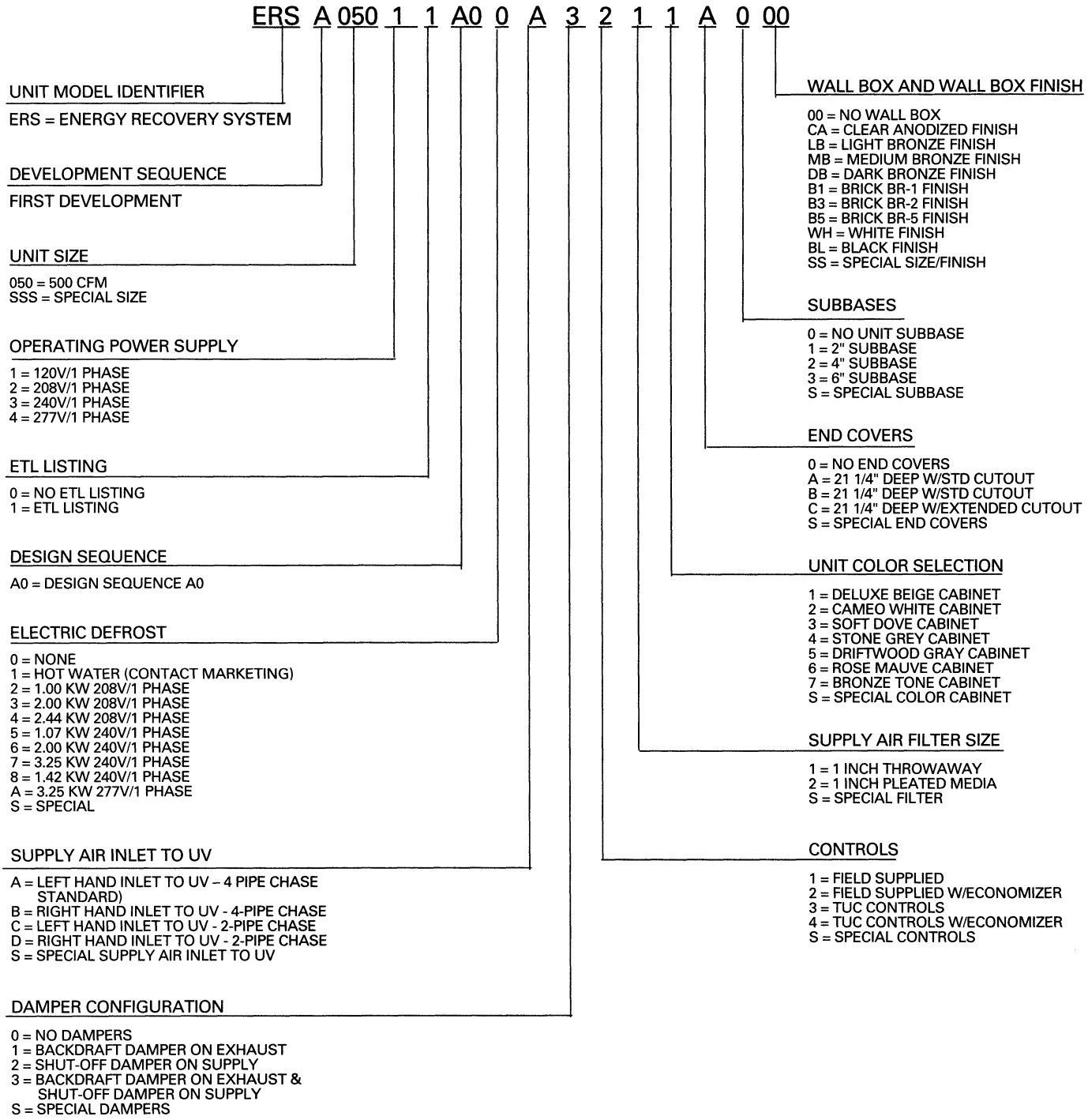
Model ERS Direct Drive, Size 050

Table of Contents

SECTION 1
RECEIVING AND HANDLING

MODEL NUMBER DESCRIPTION

Trane products are identified by a multiple character model number that precisely identifies a particular type of unit. An explanation of the multiple character number is shown below. It will enable the owner or Service Engineer to define operation, components and accessories.



RECEIVING AND HANDLING

Energy Recovery System (ERS) units are packaged in a protective top panel, rugged corner posts, and stretch wrapped for shipping, as illustrated in Figure 1.

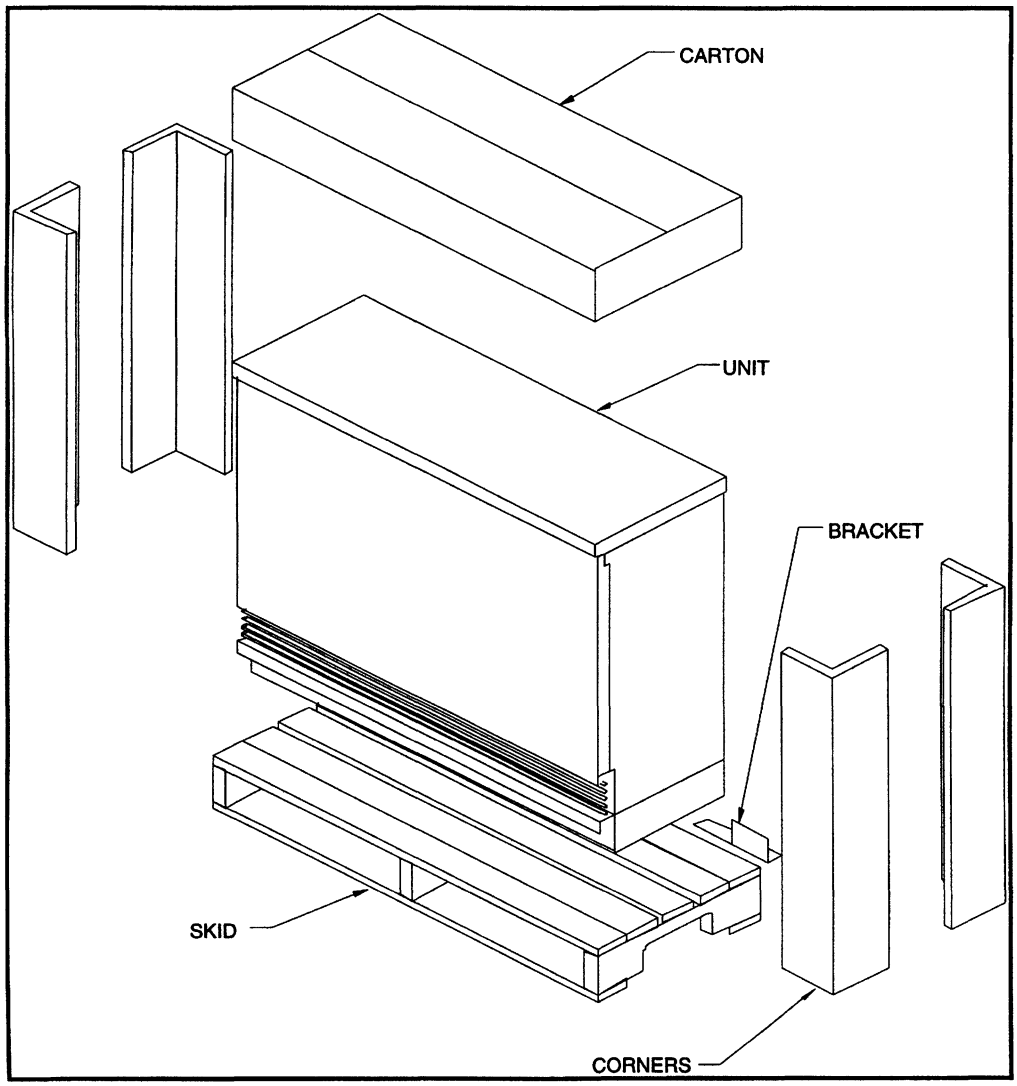


FIGURE 1 - Shipping Carton

Inspect the unit carefully for shipping damage. Claims must be made with the delivery carrier.

Before installing the unit, complete the following checks and procedures:

1. Remove shipping brackets from skid.
2. Remove the front access panel. Using an Allen wrench included with the unit, turn the panel camlocks counter-clockwise.
3. Rotate the fans manually. Wheels should move freely and be in proper alignment. Visually inspect the fan area for obstructions or shipping damage.
4. Move all dampers in the unit to be sure they modulate freely.
5. Remove all applicable electrical connection knockouts. See Figure 2, page 7 for their location.

SECTION 2
GENERAL INFORMATION

GENERAL INFORMATION

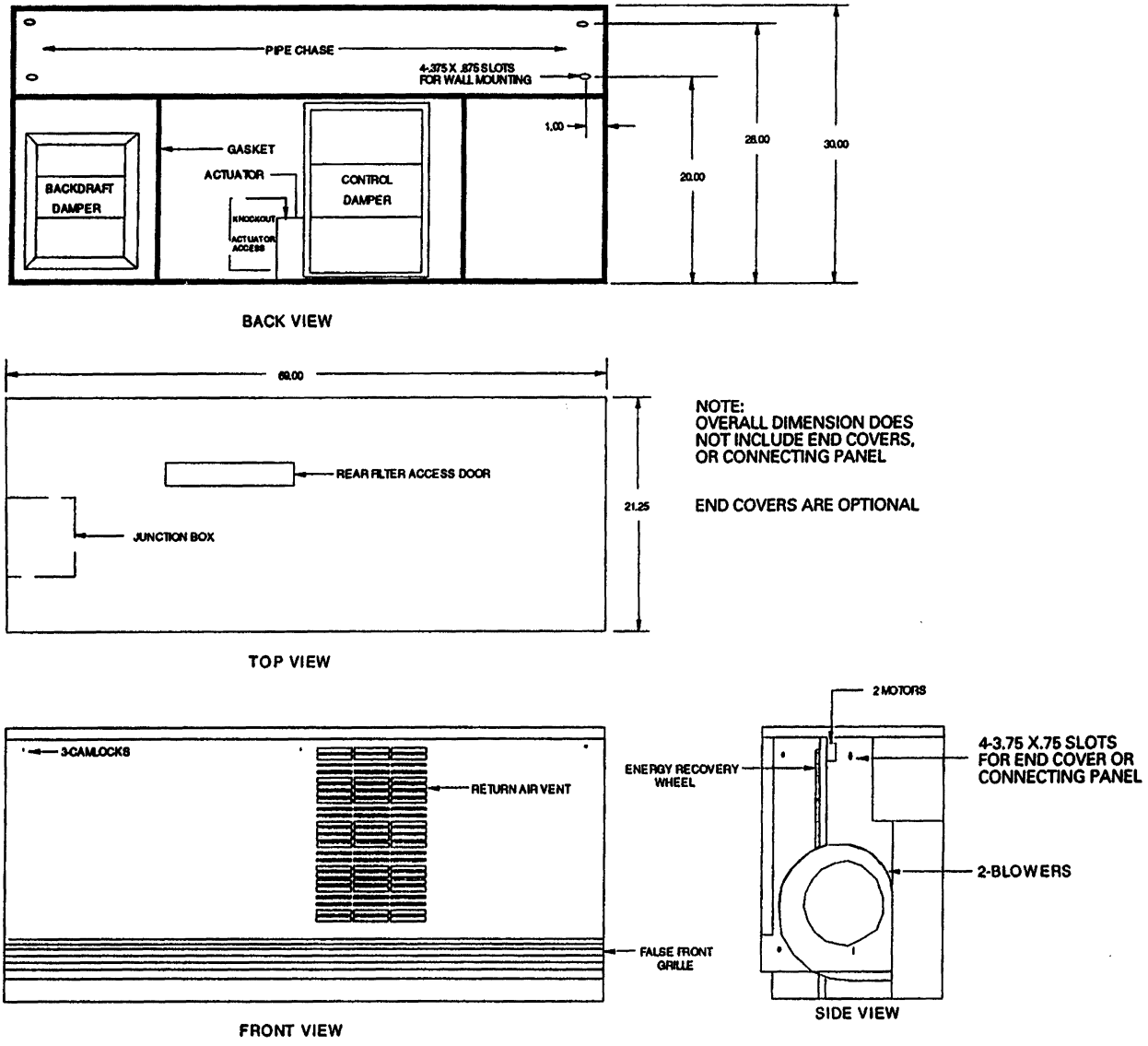


FIGURE 2 - UNIT DIMENSIONS

SECTION 3
INSTALLATION

ENERGY RECOVERY SYSTEM

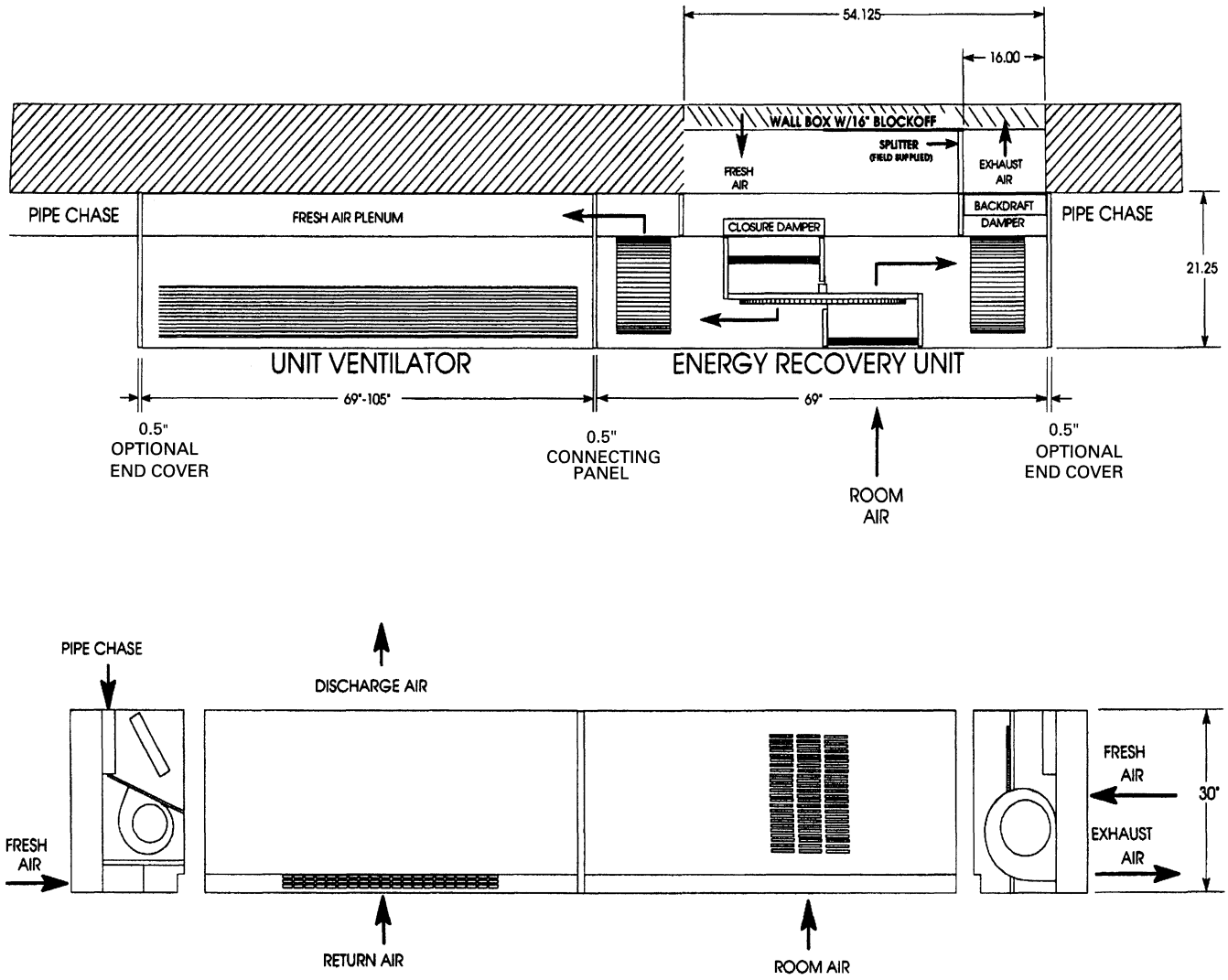


FIGURE 3 - TANDEM UNIT INSTALLATION (LEFT HAND UNIT DEPICTED)

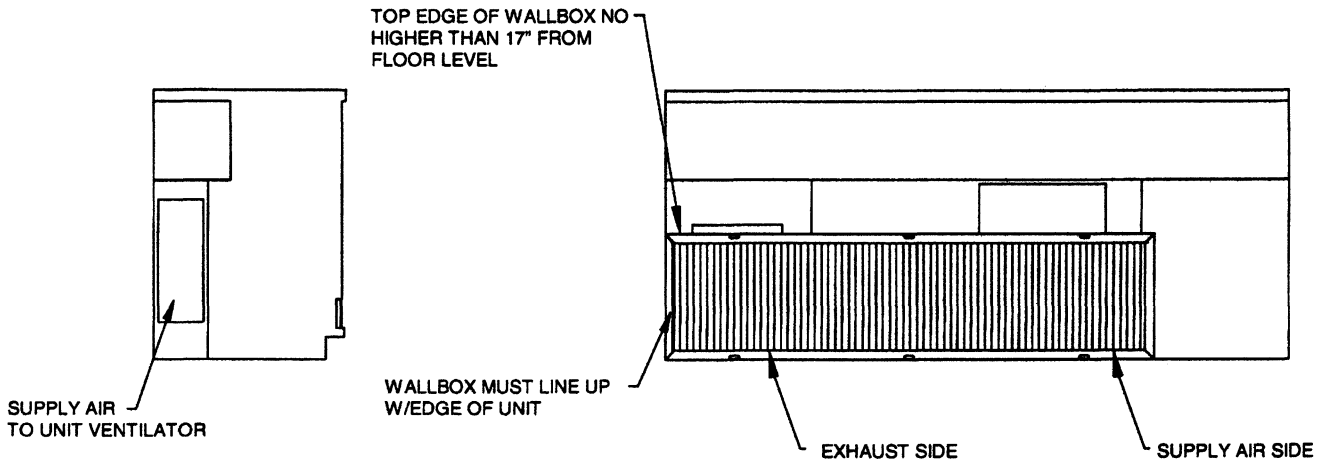
UNIT MOUNTING

Wall boxes are to be installed prior to mounting the Energy Recovery System unit. Refer to the installation instructions provided with the wall boxes, TUV-IN-3.

NOTE: For mounting with Unit Ventilator, please refer to page 12, Figure 6 & 7.

Figure 2, page 7 illustrates the .375 x .875 slots in the back of the unit. Two mounting slots are provided at each end of the unit. All mounting fasteners are to be furnished by the installer.

1. Set the Unit Vent in place and pull tightly against the wall to compress the gasket on the back edge of the unit. Anchor the unit to the wall using the mounting holes in both end pockets.
2. When tightening the mounting fasteners, keep the unit level and resting evenly on the floor.
   NOTE: Unit must be level.
3. Before starting the unit refer to **START-UP in SECTION 5.**



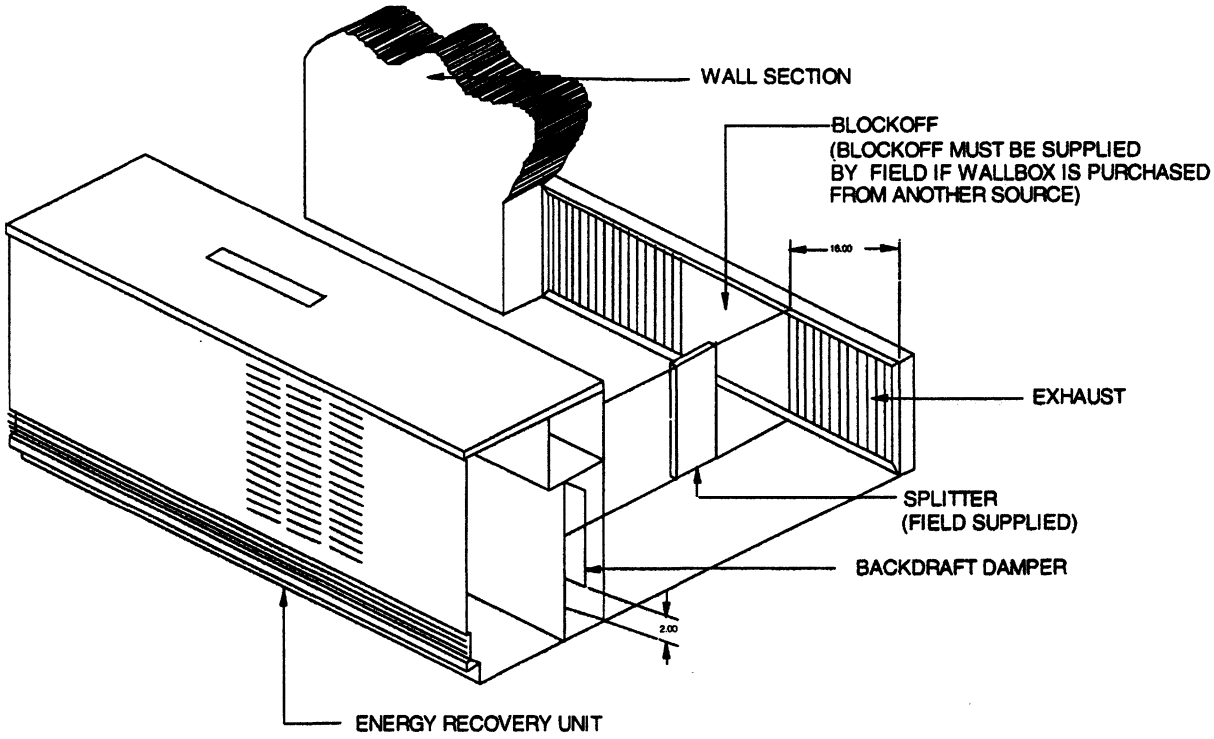


FIGURE 4 - UNIT / WALLBOX

UNIT AND WALLBOX MOUNTING

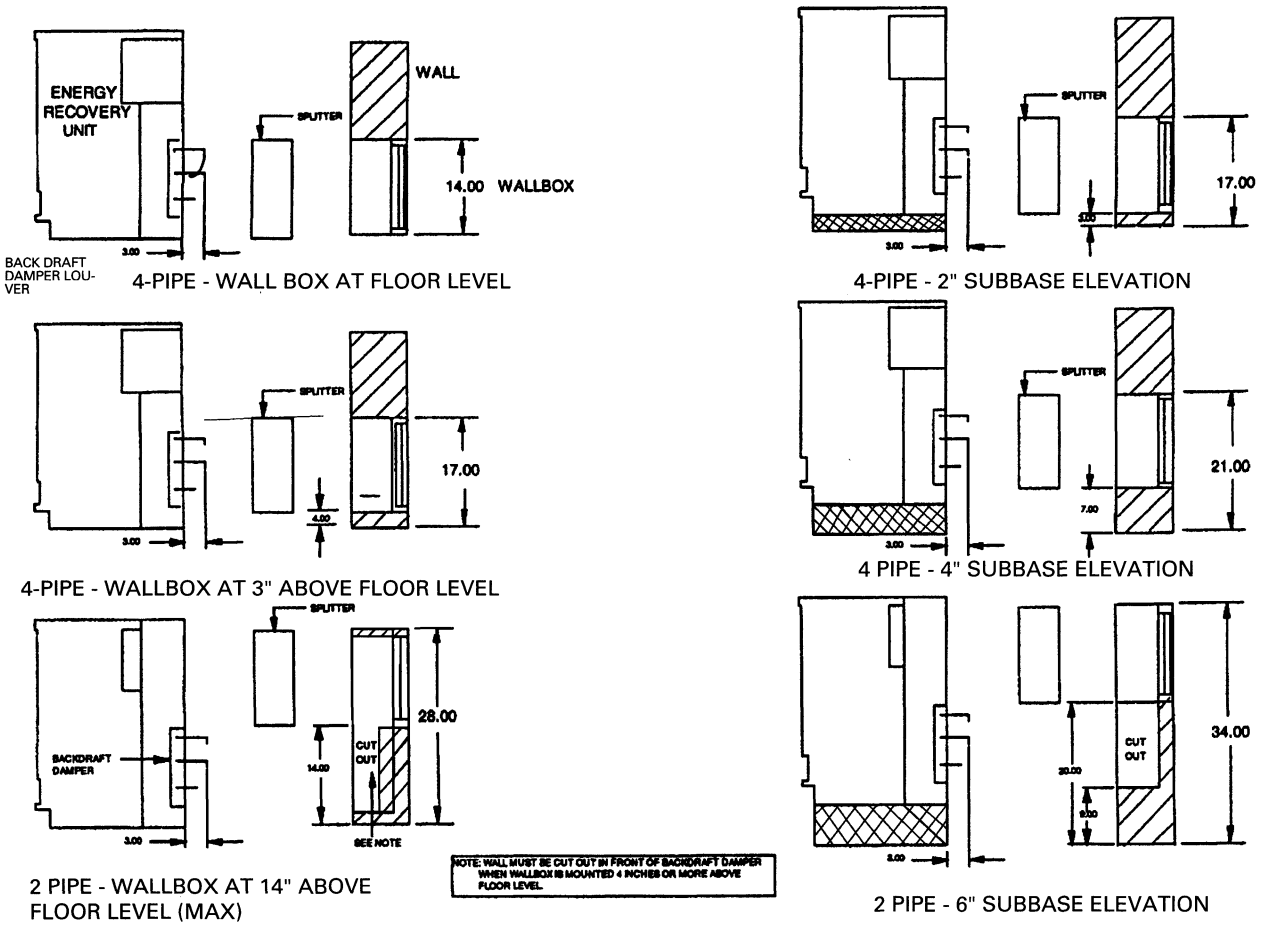


FIGURE 5 - WALLBOX INSTALLATION (ALL POSSIBLE INSTALLATIONS NOT SHOWN)

INSTALLATION NOTES:

1. SPLITTER IS TO BE FIELD SUPPLIED AND COMPLETELY BLOCK EXHAUST AIR FROM FRESH AIR TO PREVENT CROSS CONTAMINATION. WALL BOXES ARE NOT SLEEVED. WALL BOX OPENING MUST BE DUCTED OR FINISHED OUT BY FIELD INSTALLERS.
2. WALLBOX END SHOULD LINE UP WITH ERS EXHAUST END AND BOTTOM OF WALL BOX SHOULD BE BETWEEN FLOOR LEVEL AND 3 INCHES MAXIMUM ABOVE FLOOR LEVEL FOR 4 PIPE ENERGY RECOVERY SYSTEM.
3. **2 PIPE ENERGY RECOVERY SYSTEM WITH OR WITHOUT SUBBASE MUST HAVE A CUT OUT IN FRONT OF BACKDRAFT DAMPER IN ORDER FOR BLADES AND AIR FLOW TO MOVE FREELY.**

UNIT MOUNTING WITH UNIT VENTILATOR

To fasten the Energy Recovery Unit to the Unit Ventilator, use 1/4 - 20 x 2.000 bolts and 1/4 x 20 spin nuts (Figure 7) from the plastic hardware bag provided with shelf unit. Put fasteners only in the two front holes. Do not tighten.

After all units are fastened together in this manner, recheck for proper alignment and leveling.

When properly aligned and level, tighten all fasteners. Attach end opposite from Unit Ventilator to the wall.

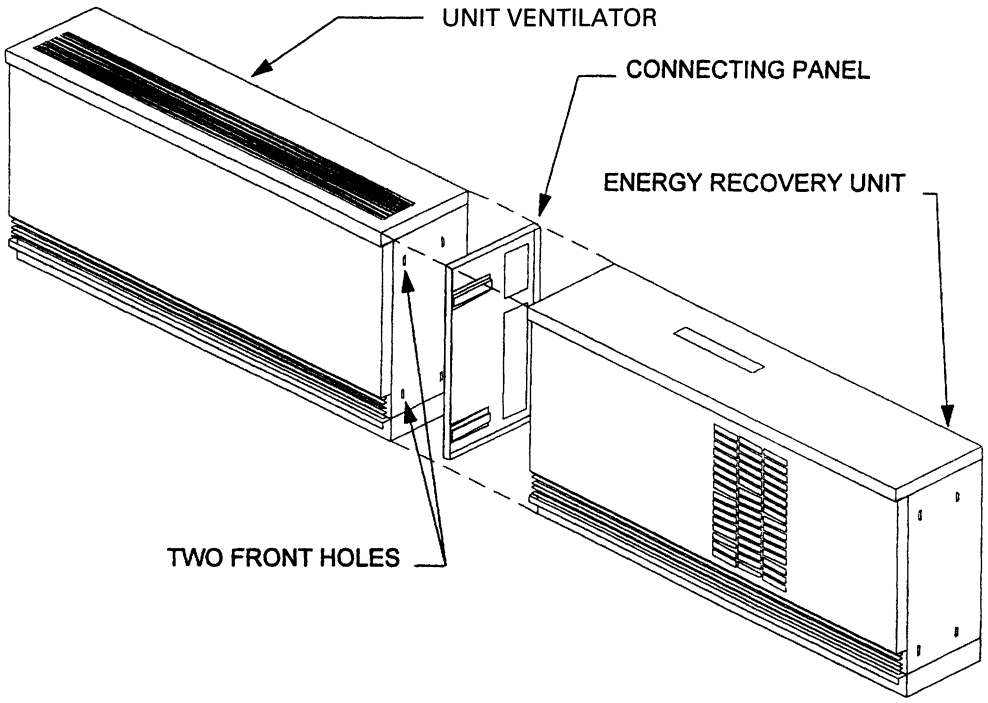


FIGURE 6 - UNIT VENTILATOR ENERGY RECOVERY SYSTEM ALIGNMENT

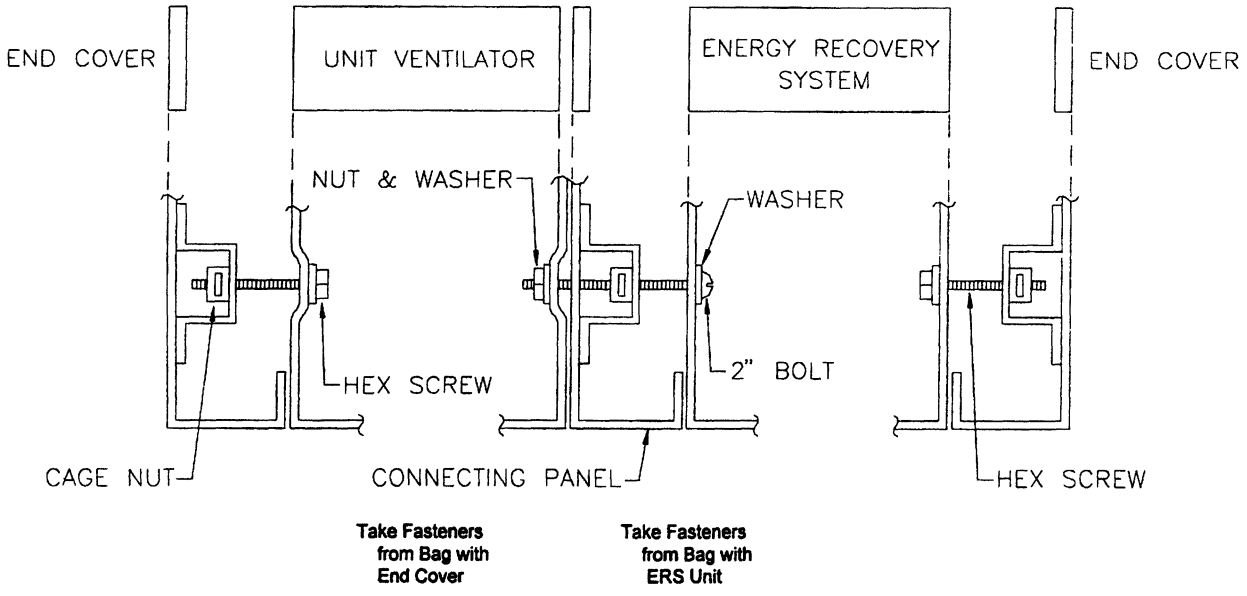


FIGURE 7 - FASTENING THE SECTIONS

END COVERS

End covers must be installed on the Energy Recovery System unit after all piping, wiring and accessory installation is complete. With the unit front access panel removed, set the end covers against the ends of the unit and attach with 1/4-20 x .88" machine screws shipped with the end covers. Cage nuts are provided on the inside of the end cover flanges.

NOTE: Align top and back edges of the covers and unit before tightening screws.

CAUTION: DO NOT RUN UNITS FOR ANY LENGTH OF TIME WITHOUT ALL PANELS PROPERLY INSTALLED. FAILURE TO DO SO WILL RESULT IN EVENTUAL EQUIPMENT FAILURE.

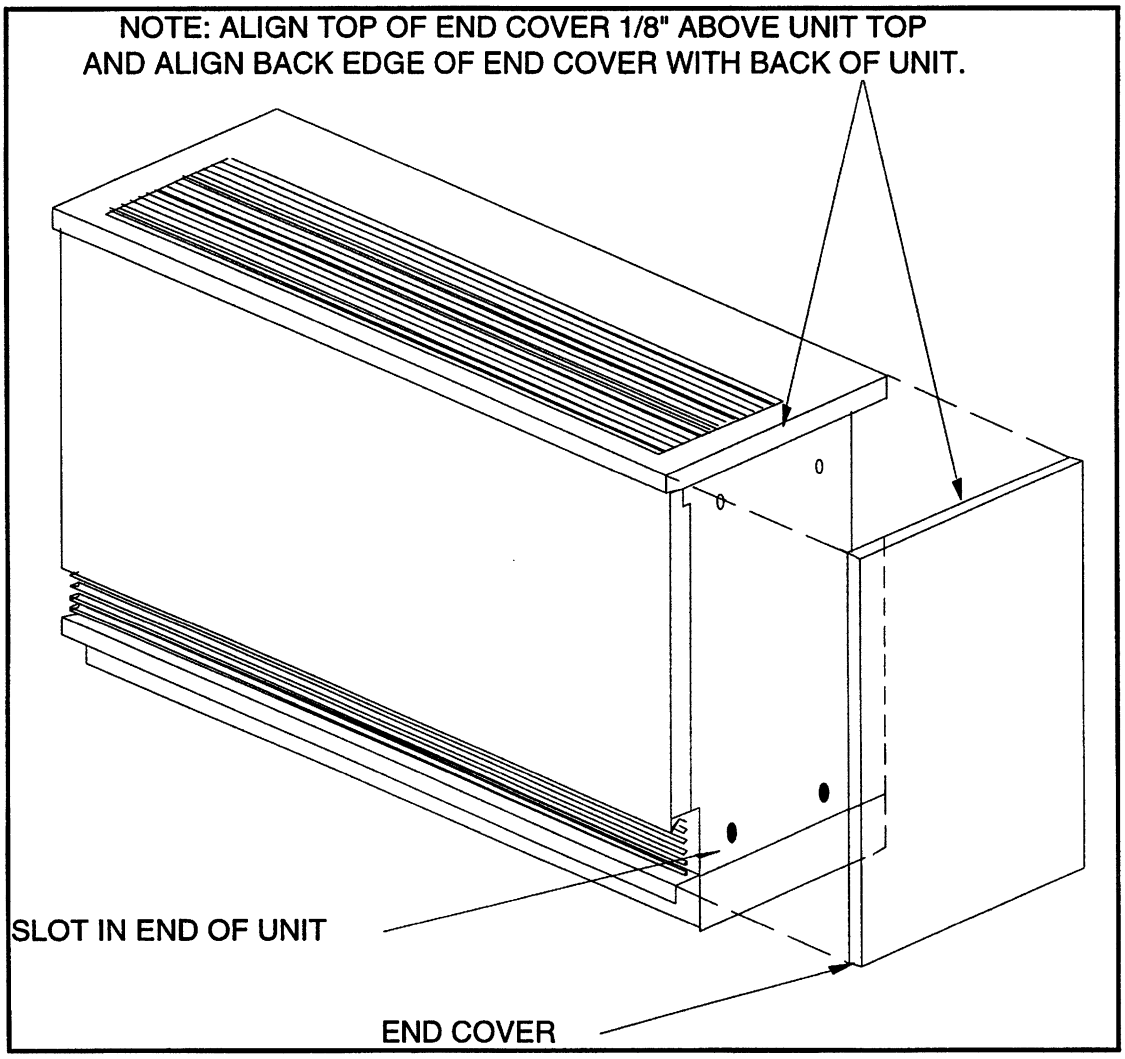


FIGURE 8 - END COVER INSTALLATION

SECTION 4
ELECTRICAL INFORMATION

WIRING - 120V/1 PHASE

SUPPLY POWER

Power supply wiring is to be connected to Terminals 1 and 2 at the junction box in the left hand end pocket.

CAUTION: Use copper conductors only. Unit terminals are not designed to accept other type wiring. Use of aluminum wiring may cause galvanic corrosion, overheating, and result in equipment failure.

ELECTRICAL

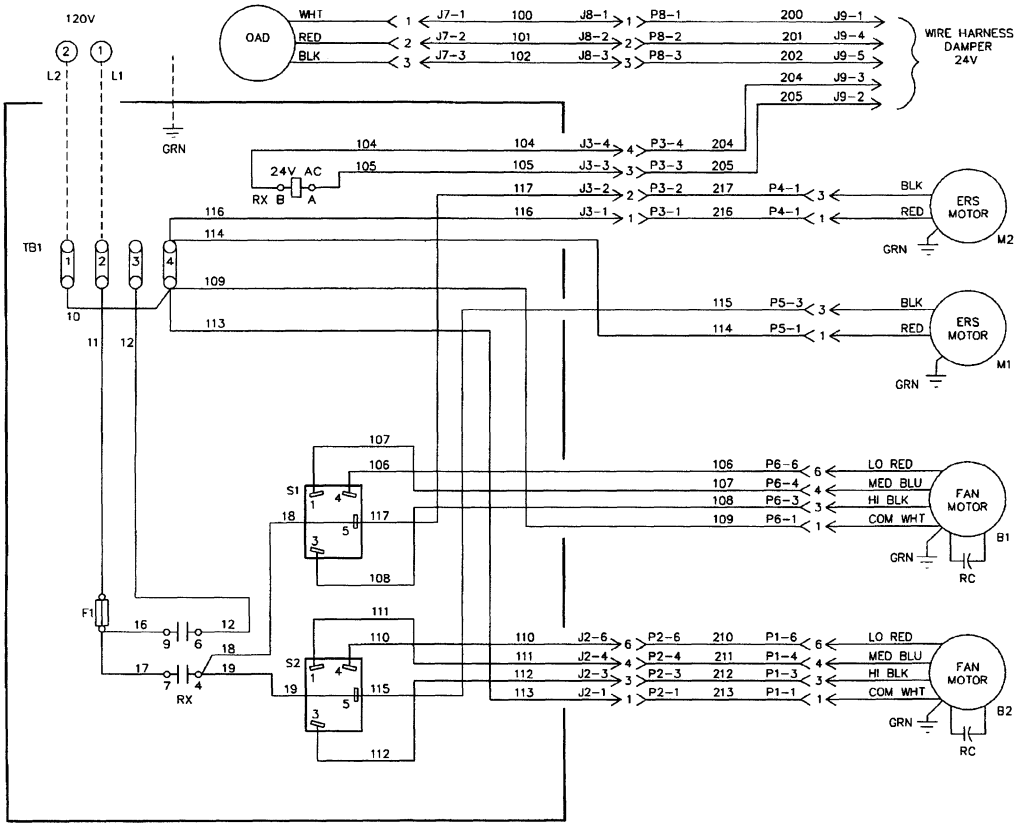
WARNING: DISCONNECT ALL ELECTRICAL POWER SWITCHES AND SECURE IN THAT POSITION BEFORE SERVICING THE UNIt. FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY OR DEATH FROM ELECTRICAL SHOCK.

SUPPLY POWER

Power supply wiring is to be connected to the following line terminals:

1. 1 Phase, 2 Wire - L1, L2 from TB1 Unit Vent.

NOTE: The supply neutral wire must be connected to the neutral terminal block.



NOTE: TB1-3 IS USED FOR ELECTRIC HEAT & FAN INTERLOCK

B1	BLOWER MOTOR LH
B2	BLOWER MOTOR RH
F1	FUSE
M1	HEAT WHEEL MOTOR
M2	HEAT WHEEL MOTOR
RX	RELAY
S1	FAN SPEED SWITCH
S2	FAN SPEED SWITCH
OAD	OUTSIDE AIR DAMPER
RC	RUN CAPACITOR

⚠ WARNING
DISCONNECT ELECTRIC POWER SUPPLY BEFORE SERVICING TO PREVENT INJURY OR DEATH DUE TO ELECTRICAL SHOCK.

⚠ CAUTION
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

FIGURE 9 - WIRING DIAGRAM FOR 3-SPEED MOTOR

WIRING - 208/240/277V/1 PHASE

SUPPLY POWER

Power supply wiring is to be connected to Terminals 1 and 2 at the junction box in the left hand end pocket.

CAUTION: Use copper conductors only. Unit terminals are not designed to accept other type wiring. Use of aluminum wiring may cause galvanic corrosion, overheating, and result in equipment failure.

ELECTRICAL

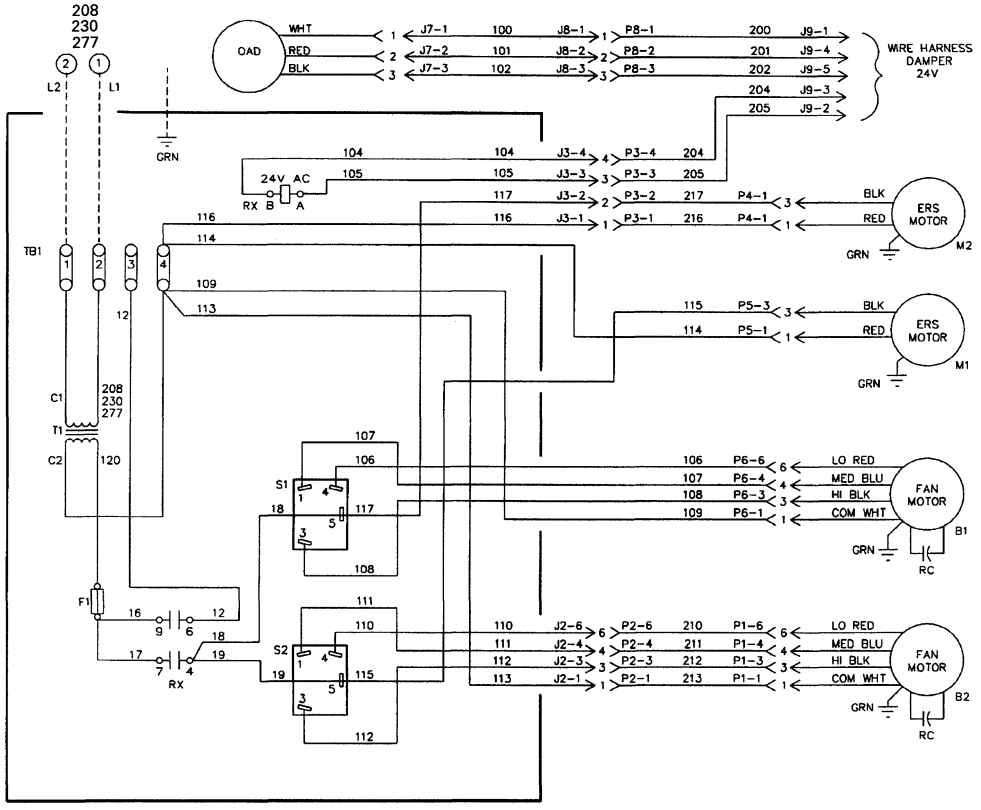
WARNING: DISCONNECT ALL ELECTRICAL POWER SWITCHES AND SECURE IN THAT POSITION BEFORE SERVICING THE UNIT. FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY OR DEATH FROM ELECTRICAL SHOCK.

SUPPLY POWER

Power supply wiring is to be connected to the following line terminals:

1. 1 Phase, 2 Wire - L1, L2 from TB1 Unit Vent.

NOTE: The supply neutral wire must be connected to the neutral terminal block.



NOTE: TB1-3 IS USED FOR ELECTRIC HEAT & FAN INTERLOCK

B1	BLOWER MOTOR LH
B2	BLOWER MOTOR RH
F1	FUSE
M1	HEAT WHEEL MOTOR
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OAD	OUTSIDE AIR DAMPER
RC	RUN CAPACITOR

⚠ WARNING
DISCONNECT ELECTRIC POWER SUPPLY BEFORE SERVICING TO PREVENT INJURY OR DEATH DUE TO ELECTRICAL SHOCK.

⚠ CAUTION
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

FIGURE 10 - WIRING DIAGRAM FOR 3-SPEED MOTOR

WIRING - ELECTRIC DEFROST

SUPPLY POWER

Power supply wiring is to be connected to Terminals 1 and 4 at the junction box in the left hand end pocket.

CAUTION: Use copper conductors only. Unit terminals are not designed to accept other type wiring. Use of aluminum wiring may cause galvanic corrosion, overheating, and result in equipment failure.

ELECTRICAL

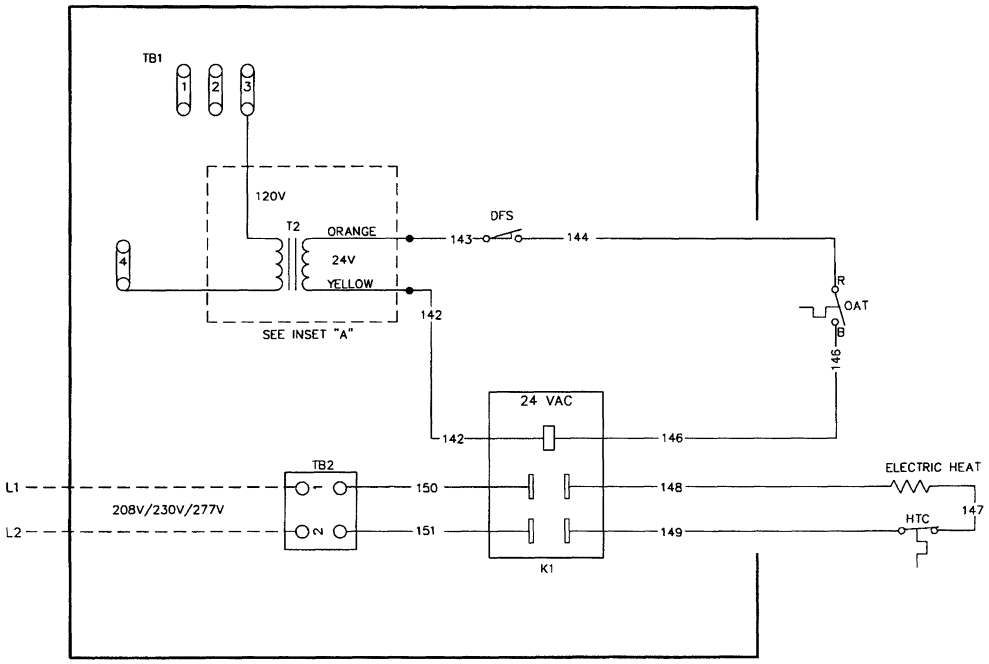
WARNING: DISCONNECT ALL ELECTRICAL POWER SWITCHES AND SECURE IN THAT POSITION BEFORE SERVICING THE UNIT. FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY OR DEATH FROM ELECTRICAL SHOCK.

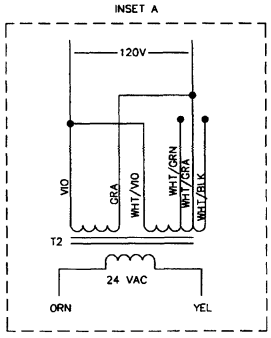
SUPPLY POWER

Power supply wiring is to be connected to the following line terminals:

1. 1 Phase, 2 Wire - L1, L2 from TB1 Unit Vent.

NOTE: The supply neutral wire must be connected to the neutral terminal blocks.





	CONTACTOR
DFS	DEAD FRONT SWITCH
HTC	HIGH TEMP CUTOUT
OAT	OUTSIDE AIR THERMOSTAT
TB1	ERS TERMINAL BLOCK
TB2	TERMINAL BLOCK FIELD CONTROLS

⚠ WARNING
DISCONNECT ELECTRIC POWER SUPPLY BEFORE SERVICING TO PREVENT INJURY OR DEATH DUE TO ELECTRICAL SHOCK.

⚠ CAUTION
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

FIGURE 11 - WIRING DIAGRAM

Unit Electrical Data (Without Electric Defrost)

Supply Volts		115	208	240	277
Minimum Circuit Amps		5.54	3.06	2.65	2.30
Fuse Size - Amps		15	15	15	15

Electrical Data Electric Defrost Option

Element KW	0.08	2.00	2.44	1.07	2.00	3.25
Supply Volts	208	208	208	240	240	240
Minimum Circuit Amps	4.88	12.00	14.63	5.63	10.8	16.88
Fuse Size - Amps	15	20	25	15	20	35

Electrical Data Electric Defrost Option

Element KW	1.42	2.73	3.25			
Supply Volts	277	277	277			
Minimum Circuit Amps	6.38	12.38	14.63			
Fuse Size - Amps	15	25	25			

TABLE 1 - ELECTRICAL DATA

SECTION 5
START-UP

Start-Up and Operation of the Energy Recovery System

General

Inspect the fit up of the energy recovery unit to make sure it is attached snugly to the wall so that the seal gasket on the back of the unit is compressed. Inspect the connection of the recovery unit to the unit ventilator to make sure that the two units are aligned and gasketing is compressed. Improper fit up or seal will result in a loss of ventilation capacity. Check unit wiring to make sure it is correct per the diagram.

Field Installed Controls

The power relay in the energy recovery unit control box energizes the fresh air fan, the exhaust fan and the energy recovery wheel motors. Field supplied controls should energize the 24 volt coil on the relay to bring energy recovery unit on at the same time or after the unit ventilator fan is started during occupied periods. If an outdoor air damper has been provided, the outdoor air damper will open when the power relay is energized. It takes approximately 180 seconds for the damper to reach full open.

ICS Controls

The energy recovery system has been design specifically to work with Terminal Unit Controller (TUC). When the TUC option is ordered on the unit ventilator and the energy recovery unit, connection is made easy by the factory supplied connection, J9 plug on wire diagrams and factory supplied crossover wires.

The TUC mounted in the unit ventilator will be factory configured for the appropriate control sequence if it was ordered with the "energy recovery unit option." If the energy recovery unit is being installed as a retrofit, the TUC will have to be reconfigured.

The general configuration of the TUC is as follows:

- The exhaust fan output is enabled and used as the input for the power relay on the energy recovery unit.
- Exhaust fan on point should be set to 10 percent.
- The Outdoor Air (OA) damper stroke time is set to 180 seconds and is used to operate the OA damper in the Energy recovery unit when present.
- Minimum OA damper position should be set to 100 percent.

The operating sequence for the unit when configured as above should follow these steps:

1. On power up the TUC goes through an auto calibration.
2. The unit ventilator fan comes on.
3. The OA damper starts to open if present.
4. The energy recovery unit fans come on.
5. When the unit ventilator goes unoccupied or, the system switch on the zone sensor is switched off, the energy recovery fans go off and the damper closes if present.

Economizer Control

If this option has been provided, a economizer control relay will be found in the energy recovery control box. This relay breaks the flow of electricity to the heat wheel motors. On a call for cooling a 24 VAC signal should be supplied to the relay coil to disable energy recovery. If this TUC option has been selected the signal will come from the TUC (Rev. 14.0 or later) in the unit ventilator. The energy recovery fans will continue to run in the economizer mode only the wheel motors will be stopped. With the field supplied controls option an outdoor air thermostat will be supplied. The thermostat is located inside the energy recovery unit and is used to set the economizing outdoor air temperature below which economizing will be allowed. With the TUC option this setting will be factory configured and will be field adjustable with the service tool or TRACER.

Electric Defrost Control

Frost may form on the surface of the energy recovery wheel during times of very low outside air temperatures. Frost will interrupt the air flow reducing or stopping ventilation. The electric defrost option is available to prevent frost from coating the wheel. The electric defroster is located in front of the fresh air section of the energy recovery wheel. When the defroster is energized it raises the air temperature before it enters the wheel. Refer to Figure 12, page 22 to determine the frost threshold for applicable conditions. Frost threshold is determined by the relationship of indoor relative humidity to outdoor air temperature. The purpose of the defroster is to just get the incoming air temperature above the threshold. Inside the energy recovery unit is a defrost thermostat. The thermostats setting should be determined from the graph in Figure 12, page 22. Care should be taken in this temperature selection and setting. Setting the setpoint higher than necessary wastes energy. Typical defrost thermostat settings are between 20°F to -30°F.

Fan Air Balancing

The air balancing of the fans is necessary to maintain proper room pressurization and to assure proper ventilation rate. The performance of the fans will be determined by the external static pressures present in the installation. Each fan has a three speed motor switch to allow for capacity modulation. To balance the system you may follow these steps:

1. Table 2, page 22 is a chart of air flow rates at the different fan speeds for the energy recovery unit. These flow rates are to be used as a reference to speed start-up. From Table 2, page 22 select the fan speeds that are equal to or greater than the design ventilation rate.
2. With the unit ventilator and the energy recovery unit operating measure the intake air at the outside air wallbox with a flow hood.
3. Measure the exhaust air being discharged with a flow hood.
4. If the air flow is too low and the energy recovery unit is not set to high speed, set it to a higher speed and repeat steps 2 and 3.

If the system has been equipped with the TUC and the damper option, fine adjustment of the ventilation air can be made with the minimum outside air damper position. For example, if on start-up the outside air fan is blowing 490 CFM and only 450 is required, the outside air damper could be used to restrict the air flow down to 450. Using the service tool or TRACER the minimum outside air damper position can be adjusted down until the correct air flow is achieved.

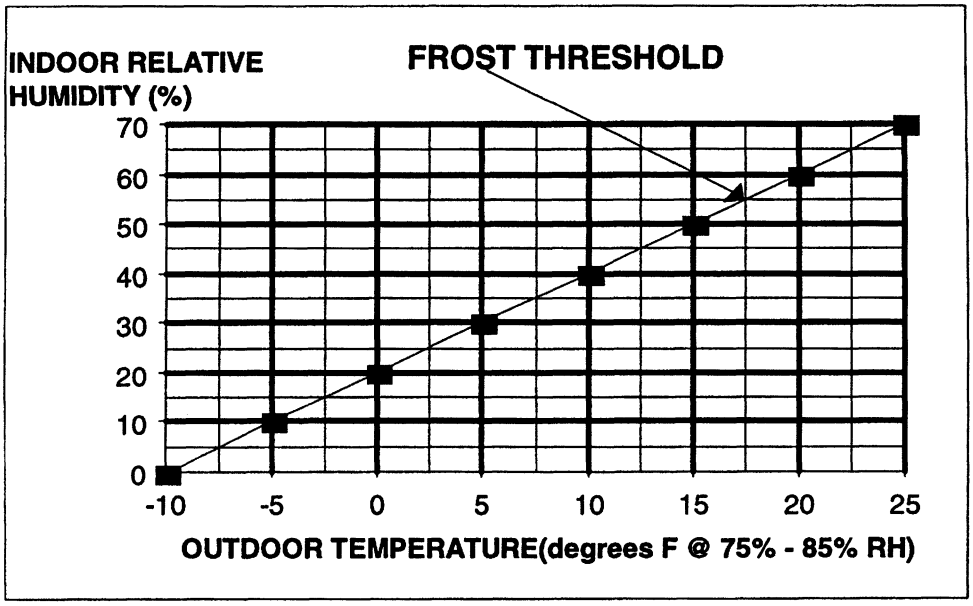


FIGURE 12 - FROST THRESHOLD

	Fan Speed		
	Low	Med	High
CFM	350	390	490

TABLE 2 – TYPICAL AIR FLOWS

Typical air flows for the energy recovery unit in a typical installation with the wallbox and 1 inch filters. REFERENCE ONLY STATIC PRESSURES WILL VARY.

SECTION 6
TROUBLESHOOTING

Troubleshooting

Symptom	***Possible Problem***
ERS fans will not run	Supply Voltage too low (min. 90% nominal). Crossover wire plug between unit vent and ERS misconnected. Fuse in the ERS unit control box blown. TUC not allowing exhaust fan operation i.e. not configured or not allowed because of deviation from setpoint too great.*
Energy recovery wheel not turning	Seal brushes too tight restricting wheel motion. Wheel drive belt is off. Economizer relay, erroneously energized.*
Ventilation capacity not to rating	Wall box misaligned. Wall box restricting air flow. ERS improperly sealed to wall. ERS unit not properly sealed to unit ventilator. Splitter missing or improperly installed. Damper not opening, check crossover wire plug connection.* Damper wiring reversed.* Filter blocked.
Exhaust capacity not to rating	Wall box misaligned. Wall box restricting air flow. ERS improperly sealed to wall. Splitter missing or improperly installed. Damper not opening, cut out in wall not allowing damper to open.* Filter blocked.
Electric Defrost not operating	Front Panel must be in place.* Fan interlock switch not making.* Outdoor air temp. too high.*
Humidity problems	Assure that Energy Recovery unit is off during unoccupied periods. Assure that Energy Recovery is off during morning warm up / cool down to within ±3°F of setpoint.

*Refers to optional equipment that may not be on all units.

SECTION 7
MAINTENANCE

MAINTENANCE

MOTOR BEARINGS

Trane uses permanently lubricated sleeve type bearings. **DO NOT OIL MOTOR - IT CAN CAUSE PREMATURE FAILURE**.

ENERGY RECOVERY WHEEL REMOVAL AND INSTALLATION

The wheel is removable for cleaning and should be cleaned every 6 months.
Tools required: flat blade screwdriver(suitable for #6-32 screw).

A. REMOVAL
1. Remove the front panel with the allen key provided with the unit.
2. Remove the center support by loosening the fasteners located at the top and bottom of the unit. **See Figure 13 on this page.**
3. Loosen the bolt in the center of the wheel. Remove the bolt and cover plate.
4. Remove the belts on front of the wheel.
5. Grasp the wheel at locations diametrically opposite each other. Pull wheel straight off the shaft.
6. Wheel may be cleaned with water only. (The wheel is immersible.)

B. INSTALLATION
1. Install #6-32 slotted screw into end of wheel shaft (DO NOT INSTALL PLATE AT THIS TIME).
2. Install wheel in the same fashion that it was removed. The pin in the hub sleeve must line up with the flat on the shaft. Using a flat bladed screwdriver in the #6-32 screw in the shaft end. The shaft can be rotated until the matching of the pin and flat is insured. The wheel will then slip into final position.
3. Remove #6-32 screw from end of shaft. Slip screw through hole in cover plate and install assembly to shaft.
4. Reinstall the two wheel belts. Turn the wheel by hand to confirm that the belts are tracking parallel to each other and no binding can be felt.

C. AIR SEAL ADJUSTMENT

Pile type air seals are located in the front and rear of the energy wheel. Air seals are factory adjusted for close clearance to prevent cross contamination of air flows. Removal of the wheel for maintenance will require readjustment as follows:
1. Loosen the four screws on the adjustment angle located on the front center support.
2. Adjust air seal to wheel and slightly tighten screws.
3. Check seal clearance by placing two pieces of paper (typically .004" thick) against the face of the wheel.
   Rotate wheel to confirm free movement.
4. Retighten screws.
5. Apply power and confirm rotation.

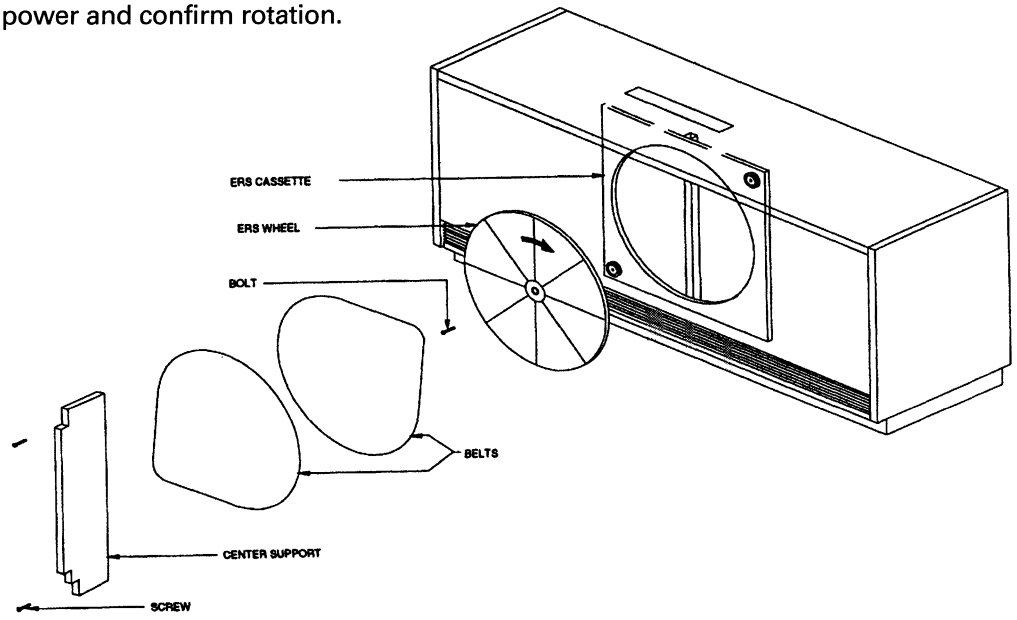


FIGURE 13 – ENERGY RECOVERY WHEEL MAINTENANCE

FILTERS

Each unit is equipped with 2 filters. The outside air filter is a 1-inch thick throwaway filter which can be easily removed from the top of the unit. The energy recovery unit also has a 1-inch thick throwaway filter located in the door panel.

Filter sizes:	14 x 20 x 1 only	– Front panel exhaust
	14 x 25 x 1	– Rear supply

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An American Standard Company

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