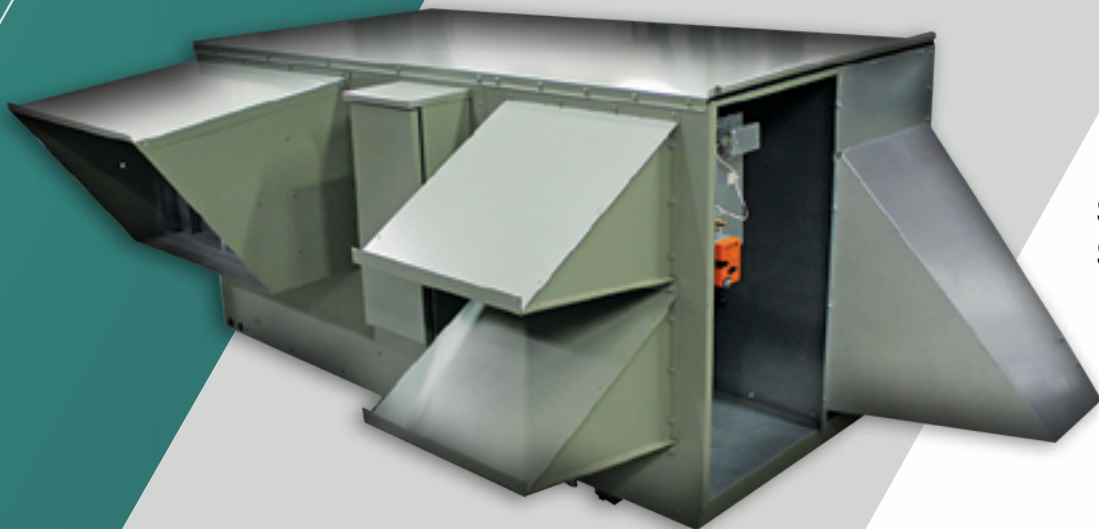


FLÄKTGROUP® SEMCO® SYNERGY PLUS® ENERGY RECOVERY MODULE OWNER'S MANUAL



SP-700
SP-2200

TABLE OF CONTENTS

FläktGroup® SEMCO® Synergy Plus® Energy Recovery Module	1
Model Description	2
Definitions	3
Dimensions	4
Receiving & Inspection	6
Storage	6
Lifting Technique	6
Installation	6
Support	8
Linkup	8
Air Flow Dampers	11
Controls	12
SP with Economizer Controls	15
Sensor & Keypad Instructions	15
BACview Keypad Display	17
1Ø Circuit Diagram, SP-700 & SP-2200	18
3Ø Circuit Diagram, SP-700	19
3Ø Circuit Diagram, SP-2200	20
3Ø Circuit Diagram, SP-2200 with Variable Speed Fans	21
3Ø Electric Preheat Frost Control Circuit Diagram	22
1Ø Electric Preheat Frost Control Circuit Diagram	22
Electric Preheat Layout	23
Segregated Exhaust Adapter Dimensions	24
Wheel Cassette	24
Maintenance	25
PowerTwist®Plus™-V-Belts	26

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FLÄKTGROUP® SEMCO® Synergy Plus® ENERGY RECOVERY MODULE

The FläktGroup® SEMCO® SynergyPLUS® (SP) Energy Recovery Module of outdoor air pre-conditioners has been specifically designed to reduce the energy required to cool or heat the outdoor air by as much as 80 percent. When mounted to the Trane® Precedent® unit, the FläktGroup SEMCO SP module also allows the Trane® Precedent® roof top air-conditioner system to effectively and economically accommodate the three-to-four fold increase in outdoor air quantities, which is recommended by the ASHRAE Standard 62, Ventilation for Acceptable Indoor Air Quality. This unique capability allows both new and existing buildings to benefit from healthy indoor environments.

A FläktGroup SEMCO SP Energy Recovery Module is designed to improve humidity control when mounted to the Trane® Precedent® rooftop unit. Because the FläktGroup SEMCO unit pre-conditions the incoming air to the packaged equipment, the required refrigeration capacity can be reduced by as much as 50 percent. Thus, the costs of the FläktGroup SEMCO SP pre-conditioner and its installation are typically offset by the reduced size of the Trane® Precedent® system. Generally, any first cost premium is paid back within the first year of operation.

The FläktGroup SEMCO SP selected with the FläktGroup SEMCO Economizer option allows compliance with ASHRAE 90.1 - 2013, providing true 100% outdoor airflow capability with low fan hp, low leak dampers

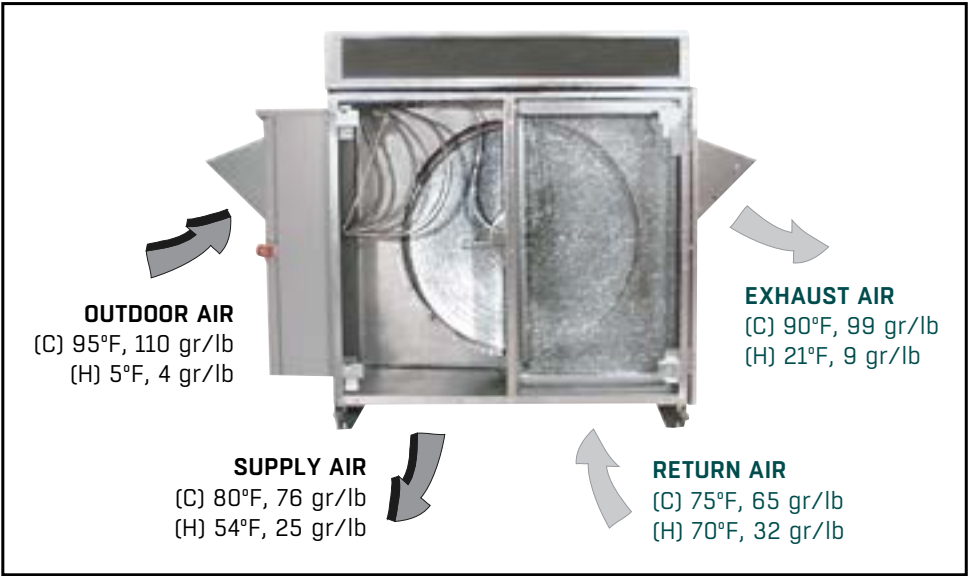
and advanced controls interlocking the compressors on the Trane® Precedent® unit to provide optimum energy savings.

The FläktGroup SEMCO SP system is a packaged system which includes supply and exhaust air fans, outdoor and return air filtration, and the FläktGroup SEMCO TEC total energy recovery wheel. The FläktGroup SEMCO TEC wheel recovers both sensible (temperature) and latent (moisture) energy. Therefore, it cools and dehumidifies the outdoor air during the cooling season, while heating and humidifying the air in the heating season.

The FläktGroup SEMCO TEC wheel utilizes a fluted aluminum sheet which is coated with a fast-acting, adsorbent desiccant. As the transfer media slowly rotates between the outdoor and exhaust air-streams, the higher temperature air gives up its sensible energy to the aluminum. This energy is then given up to the cooler air-stream during the second half of the revolution. (See **FIGURE 1.**)

Just as the temperature is captured and released, so is the moisture. The FläktGroup SEMCO TEC's desiccant coating has a strong attraction to water vapor. Since the opposing air-streams have different temperature and moisture contents, they also have different vapor pressures. This difference provides the driving force that causes the transfer of latent energy.

FIGURE 1. An inside view of the FläktGroup® SEMCO® SP Energy Recovery Module with typical operating temperatures during the cooling (C) and heating (H) season, respectively.



MODEL DESCRIPTION

On the front of the FläktGroup SEMCO SP module is an identification label. The specifications on the label correspond to the actual unit. The FläktGroup SEMCO model number SP-700 refers to the nominal air volume (in cfm) that the module is capable of supplying.

FläktGroup

SEMCO

1800 East Pointe Drive • Columbia, MO 65201 • (573) 443-1481 • (573) 886-5408 fax • www.semcohvac.com

Model:	SP-2200	ETL Intertek	9700598
Serial No.:	/		CONFORMS TO
Tag:	ERU-1		UL STD 1812
	Supply Blower Motor:	n/a HP, 0 FLA @ 480/3/60	
Line Power:	480/3/60	Exhaust Blower Motor:	n/a HP, 0 FLA @ 480/3/60
Full Load Amp:	0	Wheel Motor:	0.1666 HP, 0.31 FLA @ 480/3/60
MCA:	0	Preheater:	0 kW 0 Amps
MOCP:	15	MFG Date:	1/0/1900

Suitable For Outdoor Use

Use Time-Delay Fuses or HACR-Type Circuit Breakers

FIGURE 2.
Typical FläktGroup SEMCO SP
nameplate with electrical data.

DEFINITIONS

- 1. ADSORPTION** – The physical bonding of water vapor on the surface of the desiccant.
- 2. CASSETTE** – The framework supporting the wheel. (See also **WHEEL BELOW**)
- 3. DESICCANT** – A naturally occurring or man-made material with a high affinity for water vapor. FläktGroup SEMCO uses a total energy composite desiccant which recovers equal sensible and latent energy.
- 4. ENTHALPY WHEEL** – A common term used to describe all rotating, wheel-shaped heat transfer devices that exchange sensible (temperature) and latent (water vapor) energy from one airstream to another. The word, enthalpy, means heat content or total heat. The term, enthalpy exchanger, may also be used.
- 5. EXHAUST AIR** – The air from indoors that passed through the energy recovery wheel and is being ducted outdoors.
- 6. HEAT WHEEL** – This generally describes all rotating devices which transfer only sensible energy.
- 7. MEDIA** – The corrugated material inside the wheel.
- 8. OUTDOOR AIR** – The fresh outside air that is being drawn in the energy recovery wheel. Once it passes through the wheel it becomes the supply air.
- 9. RETURN AIR** – Air from the indoor space that is pulled through the energy recovery wheel. Once it passes through the wheel it is referred to as exhaust air.
- 10. ROTOR** – The media-filled wheel that rotates. It transfers heat energy and water vapor from one ducted airstream to the other. Often, the rotor will be referred to as a wheel.

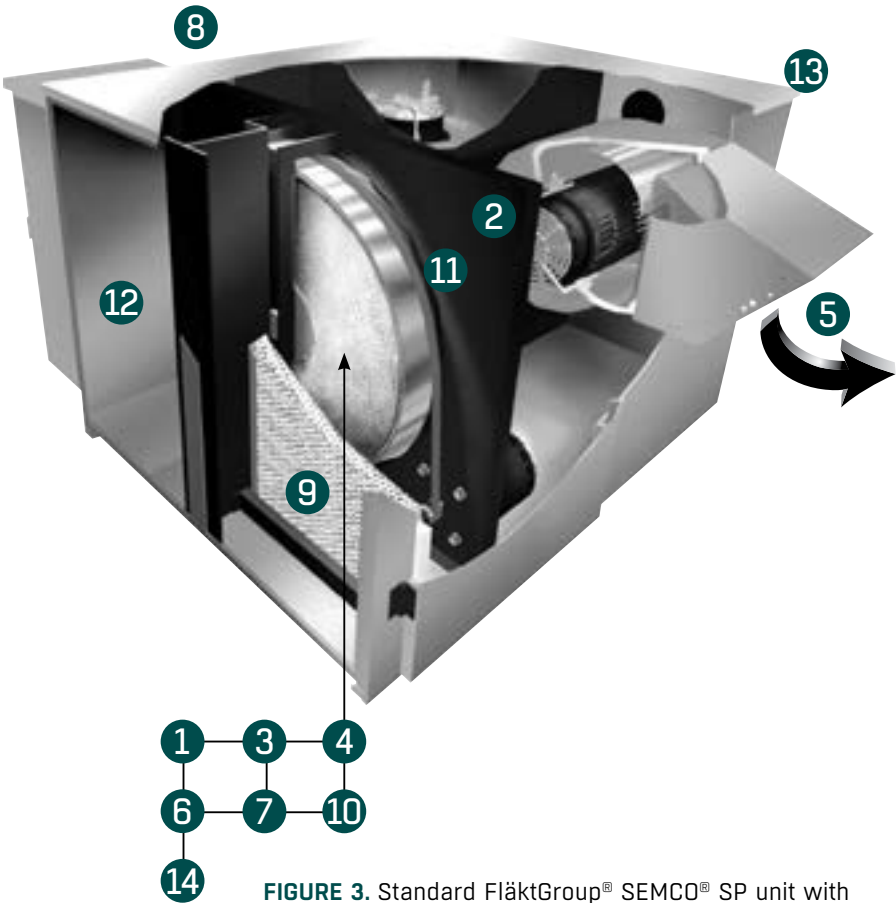
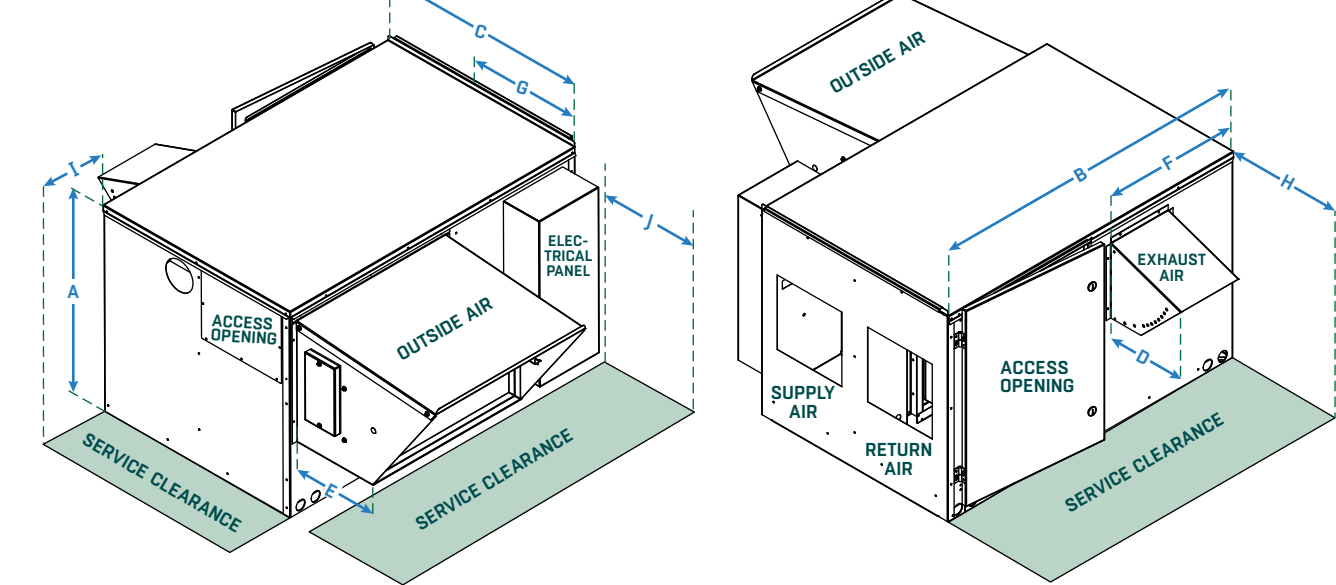


FIGURE 3. Standard FläktGroup® SEMCO® SP unit with components indicated per listed definitions.

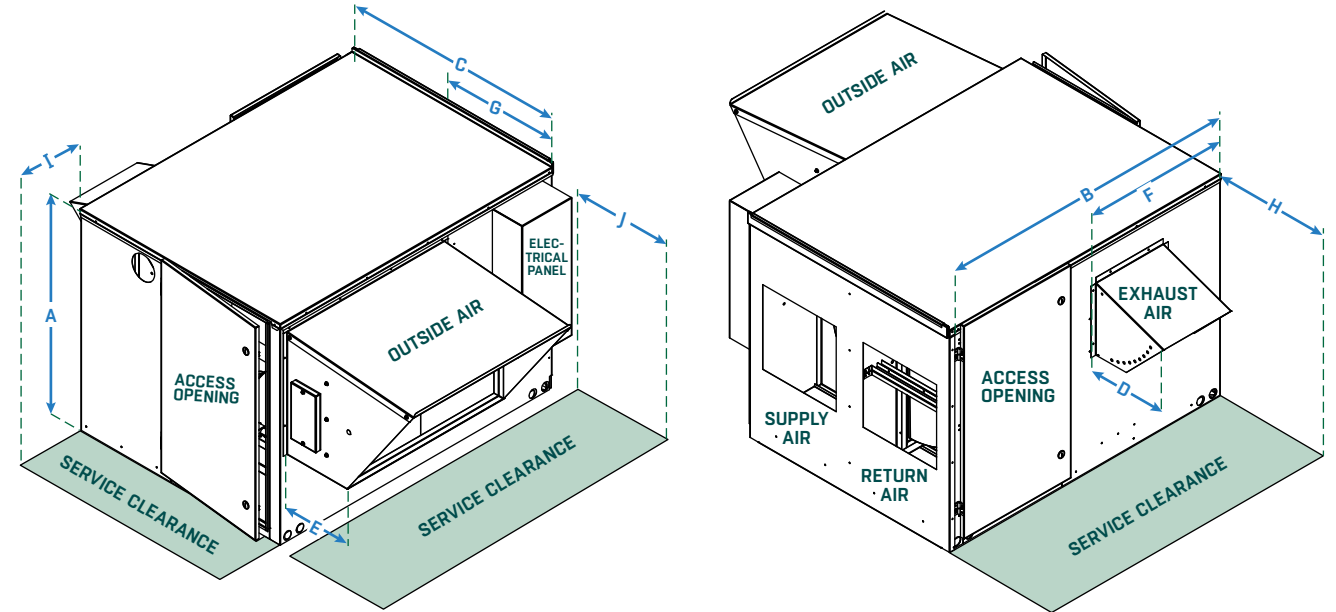
- 11. SEAL** – The soft material that closely surrounds the rotor to limit the amount of bypass air around the rotor.
- 12. SUPPLY AIR** – Air provided to the indoor space. Outside air that passes through the energy recovery wheel becomes supply air.
- 13. UNIT** – Used frequently throughout this manual to mean the FläktGroup SEMCO TEC Energy Recovery Wheel and attendant components such as cabinets, motors, fans and other parts that work together to make an effective energy recovery product.
- 14. WHEEL** – Refers to the rotating wheel containing the coated media. The stationary framework supporting the wheel is the wheel cassette.

DIMENSIONS

FLÄKTGROUP® SEMCO® SP-700



FLÄKTGROUP® SEMCO® SP-2200

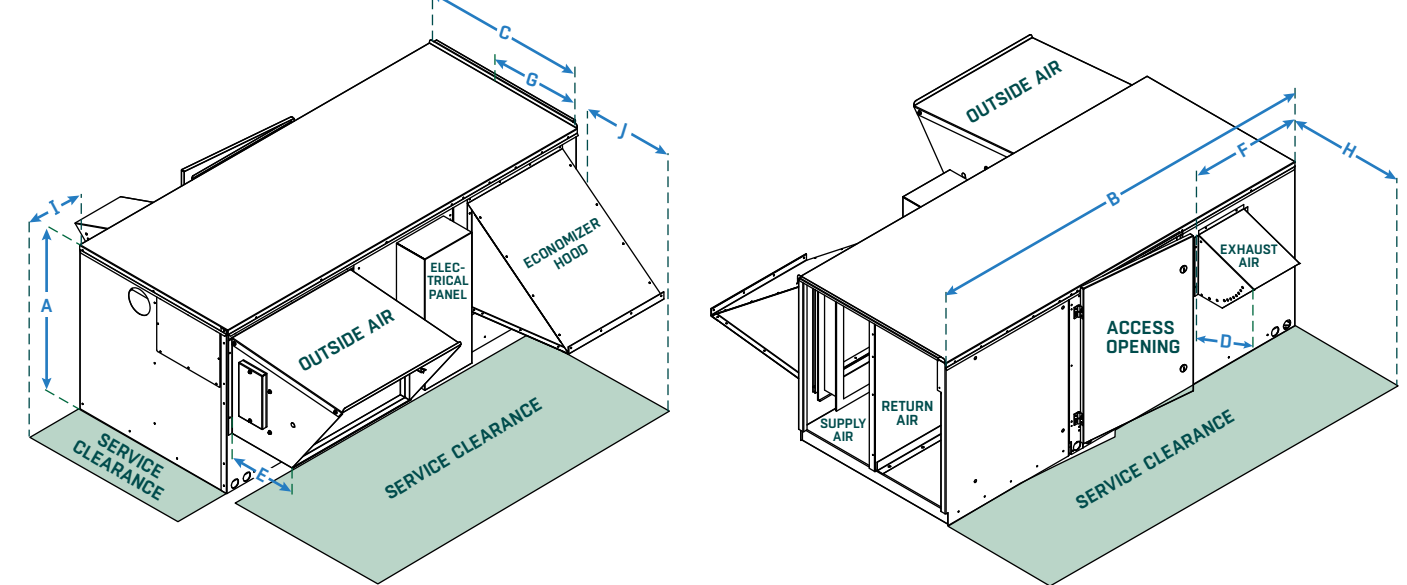


FLÄKTGROUP® SEMCO® MODEL #	NET WT. (LBS.)*	DIMENSIONS (INCHES)									
		A	B	C	D	E	F*	G*	H	I	J
SP-700	350*	30.12	47.83	31.34	11.75	23.36	25.6*	14.9*	31.375	24.0	36.0
SP-2200	475*	38.74	54.72	40.31	13.55	25.51	27.0*	21.4*	40.375	24.0	36.0

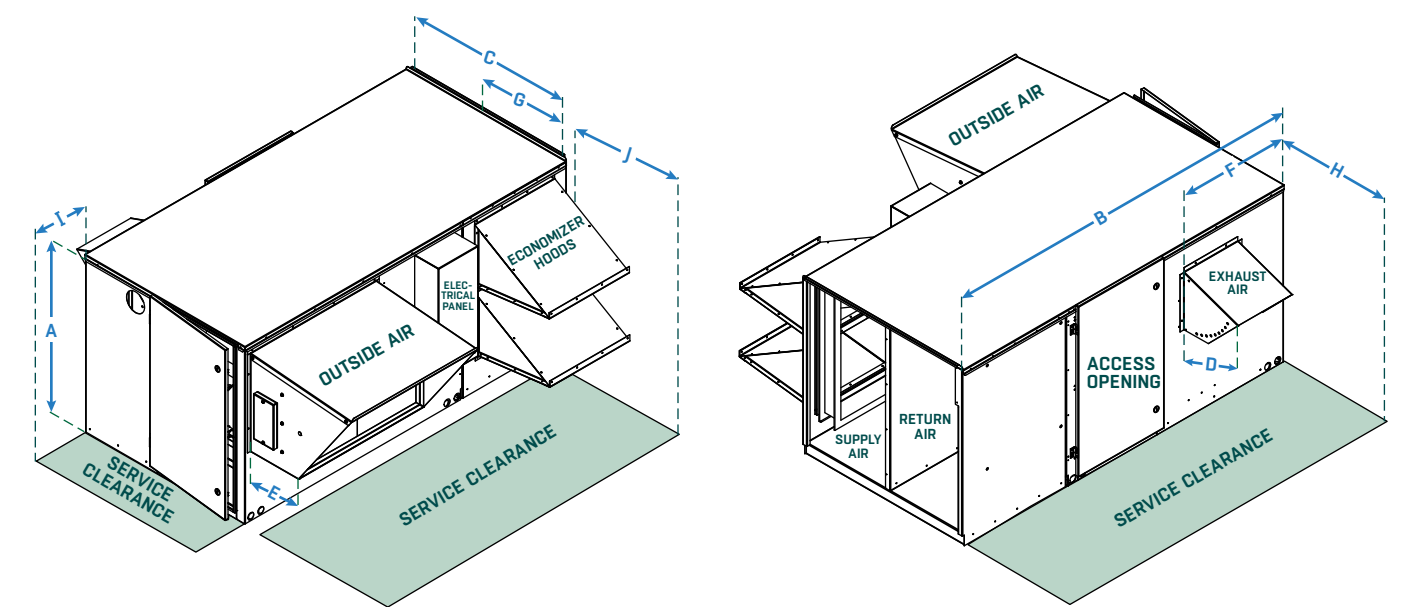
*Note: Dimensions F & G represent approximate unit center of gravity.

*The package weighs approximately 100 lbs. more than the net weight.

FLÄKTGROUP® SEMCO® SP-700 + E



FLÄKTGROUP® SEMCO® SP-2200 + E



FLÄKTGROUP® SEMCO® Model #	NET WT. (LBS.)*	DIMENSIONS (INCHES)									
		A	B	C	D	E	F*	G*	H	I	J
SP-700+E	650*	30.12	73.94	31.34	11.75	23.36	33.0*	10.0*	31.5	24.0	36.0
SP-2200+E	840*	38.78	80.83	40.31	13.55	25.51	38.0*	16.0*	40.5	24.0	36.0

*Note: Dimensions F & G represent approximate unit center of gravity.

*The package weighs approximately 100 lbs. more than the net weight.

RECEIVING & INSPECTION

Upon delivery, confirm that the quantity and model(s) received matches the Bill of Lading. If there is any discrepancy, immediately notify FläktGroup SEMCO.

Inspect the skidded FläktGroup SEMCO SP(s) for signs of damage. If damage is suspected, sign the bill of lading "damaged." If no visible damage is apparent, the unit should be properly lifted and stored until installation.

While skidded, the FläktGroup SEMCO SP can be lifted by a forklift using the skid. Once removed from the skid, lifting must only be performed with spreader bars, cable and hooks. Do not attempt to lift the FläktGroup SEMCO SP by grasping the hoods.

STORAGE

If the FläktGroup SEMCO SP is to be stored for any time before installation, it must be protected from the weather. Indoor storage is recommended. The unit has openings provided for ducting. These openings make the internal equipment (motors, belts, fans and insulation) vulnerable to inclement weather conditions (prior to installation) and can cause standing water to accumulate inside the enclosure. This is to be ABSOLUTELY avoided.

LIFTING TECHNIQUE

When rigging the SEMCO SP module, spreader bars must be used. Padding must be inserted between the straps and the unit to avoid scratching the paint. Lifting holes are provided at four points located on the base perimeter of the FläktGroup SEMCO SP unit. The weights shown on **PAGES 4** and **5** may be used as maximum weight for rigging. (See **FIGURE 4**)

INSTALLATION

Installation of the FläktGroup SEMCO SynergyPLUS® module is a relatively simple procedure, but should be undertaken in a methodical fashion, following the directions outlined in this manual.

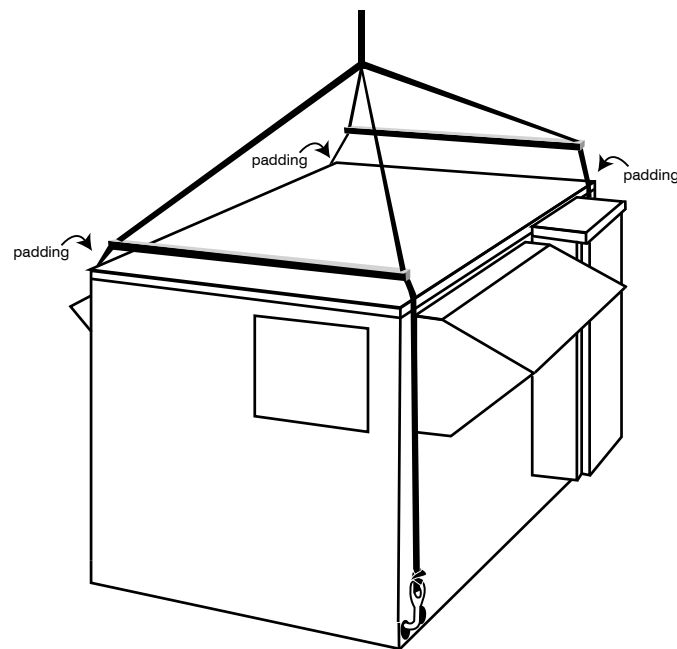


FIGURE 4. Correct lifting technique using spreader bars.

The installation location should be chosen to provide easy, convenient access. As with all mechanical equipment, routine maintenance and inspection is necessary. Avoid locations that are near or downwind of smoke, fumes or exhaust outlets of other equipment. The front access panel should have clearance space equal to the depth of the unit to allow for service.

Once the installation location is determined, the FläktGroup SEMCO SP should be un-skidded and closely examined for exterior damage. Any defects or problems should be reported to FläktGroup SEMCO immediately.

After the exterior of the FläktGroup SEMCO SP is checked for obvious damage, the front panel can be removed and the interior checked. Inspect the interior of the unit for any damage.

The FläktGroup SEMCO energy recovery wheel is mounted vertically inside the FläktGroup SEMCO SP unit. Verify that the wheel can be spun by hand, clockwise from the left. The motor and belt arrangement that turn the wheel are visible next to the wheel at the access panel opening. The motor wires running to the control panel are attached by a quick release disconnect. The quick disconnect must be separated before

sliding out the wheel cassette. The wheel cassette need not be moved for installation or hookup, but it can be pulled out for easy maintenance and inspection purposes as instructed on **PAGE 25**.

The unit identification tag is located on the electrical cabinet. It states the electrical requirements for the unit. The main power connection to the unit should be made on the control panel inside of the electrical cabinet (see the **ELECTRICAL DIAGRAMS** on **PAGES 18-22**). Make sure the power provided to the installation site matches that required by the unit. Note and verify that the voltage/phase/capacity needed and provided are the same. Actual line voltage needs to be within +/- 5% of the rated voltage for the unit to operate properly.

If the unit has been ordered with electric preheat, it is shipped installed and the unit ID tag is located on the heater. The main power connection to the unit is made at the electric coil instead of the unit control panel (see the **ELECTRICAL DIAGRAMS** on **PAGES 18-22**).

Follow the hookup instructions provided on **PAGES 8-10**. Verify that the FläktGroup SEMCO SP is supported as instructed on **PAGE 8**, if required.

If an optional economizer package has been provided, the unit is mounted and supported in much the same manner as a standard FläktGroup SEMCO SP. Changes will be noted where applicable in the following pages.

After installation, attach the outdoor air hood and the exhaust hood using the alignment holes on the unit. **NOTE:** that if the alignment holes are not used the unit may not function properly. See **FIGURE 5** for instructions on the installation of Economizer hood when Economizer option is selected. A bead of caulk must be applied to the perimeter of all hoods. Units with an electric preheat require that the outdoor air hood be centered on the heater opening. Optional controls can be set and adjusted (see instructions beginning on **PAGE 12**). The outdoor and exhaust dampers can be adjusted after the unit has been test run, as shown on **PAGES 11-12**.

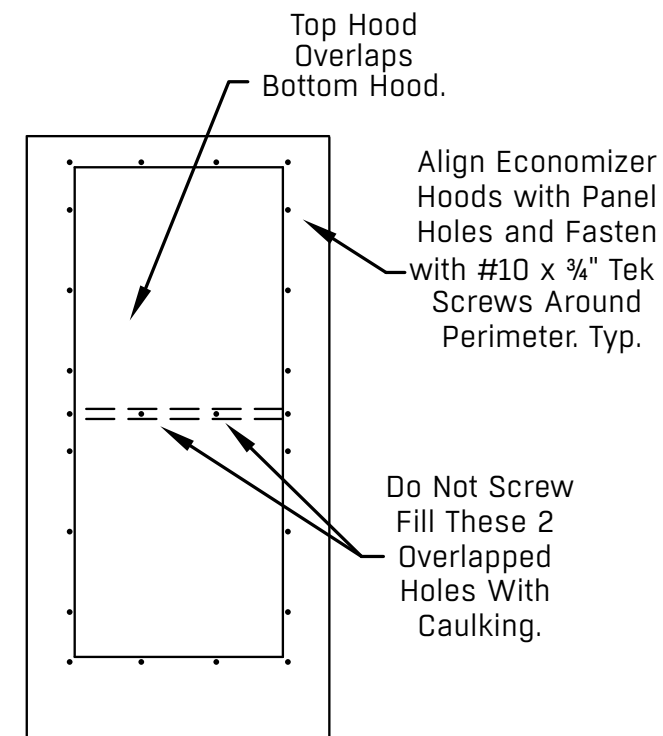


FIGURE 5. Economizer hood detail

SUPPORT

The FläktGroup SEMCO SP unit is designed to support off the end of the Trane® Precedent® unit. A required optional pedestal support is available from FläktGroup SEMCO for the FläktGroup SEMCO SP series. The SEMCO SP series should not be installed without the pedestal support (See **FIGURE 6**). This pedestal adjusts in height from 9 to 14 inches.

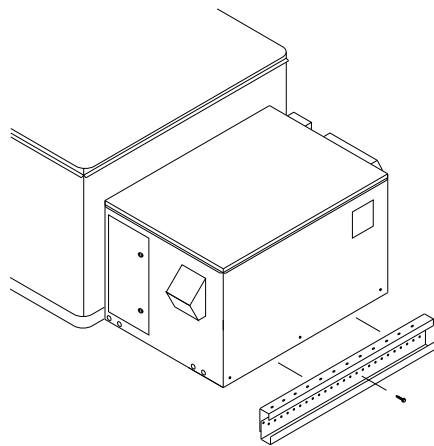


FIGURE 6. Installation of the pedestal support is on the front side of the FläktGroup SEMCO SP unit.

To install the pedestal support, position the FläktGroup SEMCO SP on the Trane® Precedent® unit. Locate the pedestal under the front of the FläktGroup SEMCO SP unit as shown. Lock the pedestal to the correct height with #12 TEK screws. Fasten the top of the pedestal to the base of the FläktGroup SEMCO SP with a minimum of 4 #12 TEK screws. (See **FIGURE 7**)



FIGURE 7. Side view of the finished installation is shown.

LINKUP

- 1) Remove screws from 3 sides of Trane® Precedent® roof over return air opening. (See **FIGURE 8**).

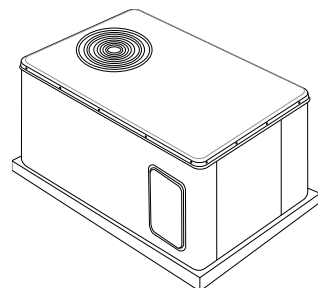


FIGURE 8. Remove screws from the sides of the roof.

- 2) Remove end panel (See **FIGURE 9**)

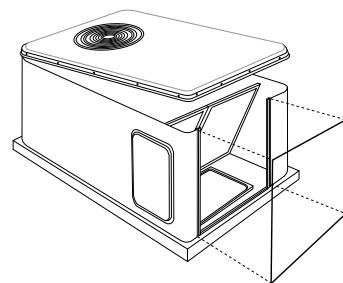


FIGURE 9. Remove end panel.

- 3) Attach gasketing (3/4" x 1/2" supplied) to the 3 gasketing surfaces on the Trane® Precedent® unit (See **FIGURE 10**).

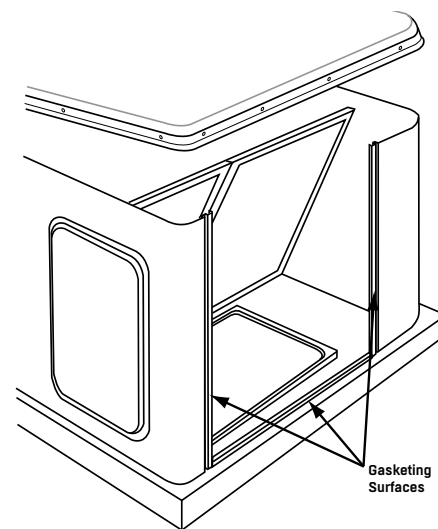


FIGURE 10. Gasketing areas on the Trane® Precedent® unit are identified above.

- 4) When the FläktGroup SEMCO Economizer section is provided, the supply air rigid averaging sensor with bracket ships loose for field installation. The sensor wiring is factory installed to the top of the Economizer damper. The sensor must be installed and then wired as shown in **FIGURE 11**. Next, the return air hood must be installed as described in **STEP 10**.

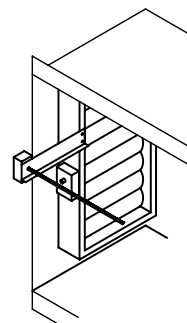


FIGURE 11. Fasten the supply air sensor installation bracket to the damper flange with #10 x 1/2" tek screws. Locate approximately 1" above the actuator. Verify screw clearance with damper blade linkage. (FläktGroup SEMCO Economizer option only.)

- 5) Use the lifting straps to move the FläktGroup SEMCO SP Unit. Place lifting straps through lifting holes in base of FläktGroup SEMCO SP. **DO NOT** use the exhaust hood as a hand hold (See **FIGURE 12**). **CAUTION:** Do not leave the FläktGroup SEMCO SP unit unsupported during installation.

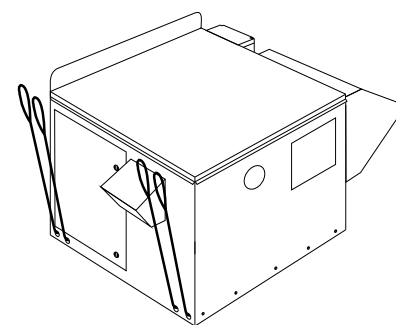


FIGURE 12. FläktGroup SEMCO SP unit should be lifted only by placing the lifting straps through lifting holes in the base of the unit.

- 6) Position the FläktGroup SEMCO SP unit next to the Trane® Precedent® unit (See **FIGURES 13** and **14**). When the FläktGroup SEMCO Economizer section is provided, fasten angle brackets to both FläktGroup SEMCO SP+Economizer and Trane® Precedent® units using #12 Tek screws as shown in **FIGURE 15**. Steps 7-9 are not required with the FläktGroup SEMCO Economizer option.

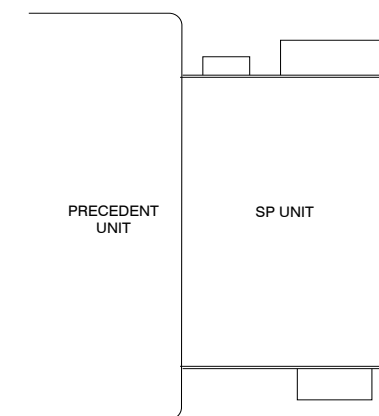


FIGURE 13. Plan view showing FläktGroup SEMCO SP and the Trane® Precedent® alignment.

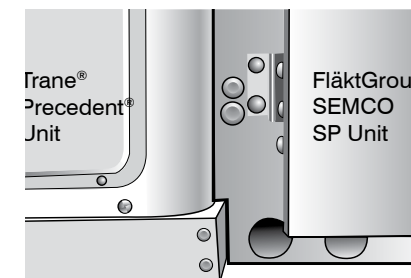


FIGURE 14. Side view showing the FläktGroup SEMCO SP and Trane® Precedent® alignment.

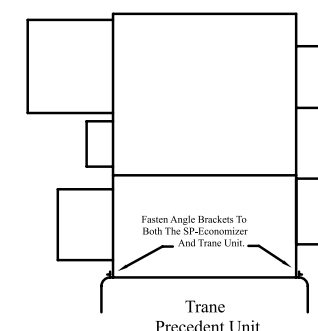


FIGURE 15. Plan view showing angle brackets

- 7) Locate the mounting brackets on the open end of the FläktGroup SEMCO SP unit. Remove each bolt and bracket and reinstall on the outside of the FläktGroup SEMCO SP unit as shown in **FIGURE 18**. Brackets should be installed so that the legs point toward the FläktGroup SEMCO SP unit. Do not tighten bolts in this step. (See **FIGURE 16, 17, 18** on **PAGE 10**).

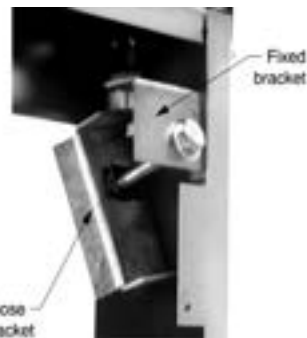


FIGURE 16 . View of bracket as shipped by factory.



FIGURE 17. Close-up view of bracket.



FIGURE 18. View of brackets installed.

- 8) Rotate the bracket so that the short leg is inside the opening flange of the Trane® Precedent® and the long leg is against the fixed bracket on the FläktGroup SEMCO SP. Tighten screws to hold the FläktGroup SEMCO SP in place. **NOTE:** The FläktGroup SEMCO SP-2200 has additional angles that should be installed between the brackets and the Trane® Precedent® corner post. These angles are required on the 6-10 ton Trane® Precedent® units with the 46-7/8" cabinet only. The angles should be installed so that one leg faces the SP. (See **FIGURE 19**)

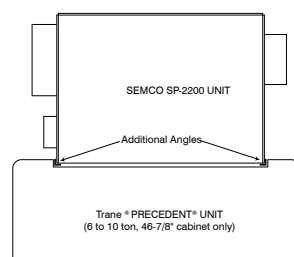


FIGURE 19 Plan view showing additional angles.

- 9) Reinstall screws on Trane® Precedent® sides first, using existing holes, then screw across end, using #12 TEK screws.
- 10) Install the return air hood on the FläktGroup SEMCO SP using the #12 TEK screws (supplied) in the alignment holes provided. The return air hood, in the Trane® Precedent®, will partially cover the return air opening (See **FIGURE 20**). When the FläktGroup SEMCO Economizer section is provided, attach return air hood before **STEP 5**.



FIGURE 20. Return air hood.

AIRFLOW DAMPERS

All FläktGroup SEMCO SP units have airflow dampers on the outdoor air intake and exhaust air outlet that are field adjustable.

SUPPLY

To adjust the Supply / Outside Air flow damper, turn the FläktGroup SEMCO SP unit off without shutting off main power.

Open the access door and observe the damper, allow it to finish moving through its stroke to the full closed position, then turn off main power to the unit.

Confirm the damper is now fully closed, but the actuator is 5° from fully closed, (1/16" to 1/8" between stop and clamp). (See **FIGURE 23**). This is called "pre-loading" the actuator. When the actuator is powered and sent to the closed position: it will put its full torque on the shaft compressing the edge and blade seals. The actuator is electronically protected from overload and will not be damaged.

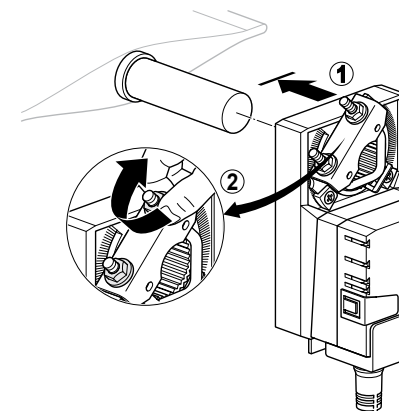


FIGURE 21.

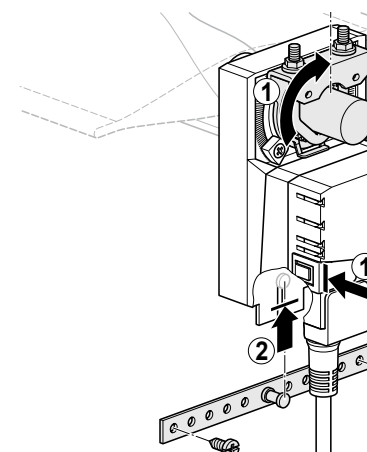


FIGURE 22.

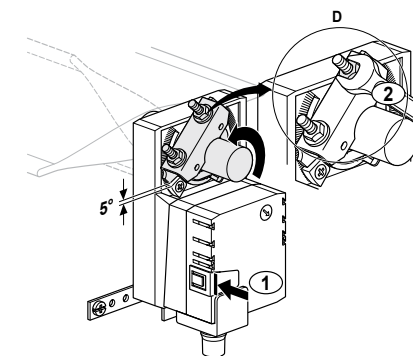


FIGURE 23.

If "pre-load" setting requires adjustment follow the two step procedure listed below, if "pre-load" is correct skip these two steps.

- 1) Turn the damper shaft until the blades are fully closed.
- 2) Loosen the nuts on the universal clamp. Press the manual override button and rotate the clamp to about 5° from the closed position (1/16" to 1/8" between stop and clamp).

Tighten the two nuts on the universal clamp with a 10 mm wrench (See **FIGURE 23**).

You have now confirmed or adjusted correctly the fully closed position of the damper.

The factory-set open damper position, is fully open against the mechanical limit screw in the frame of the damper. This limit screw must be left in place to prevent the damper blade from contacting the energy recovery wheel.

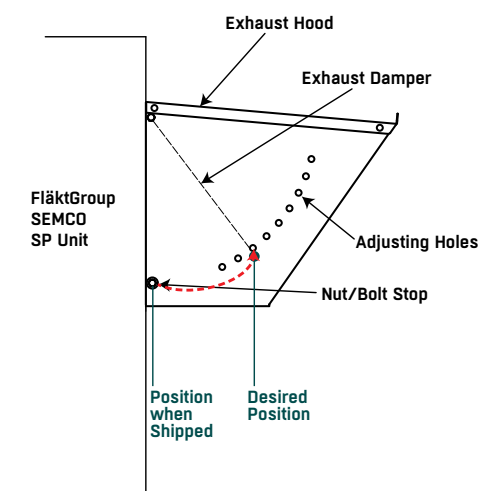


FIGURE 24 Diagram of exhaust hood damper.

TESTING THE INSTALLATION

- 1) Without Power, Disengage the gear train with the manual override button (1) and move the shaft from closed to open to closed. Ensure that there is no binding and that the damper goes fully open and closes with 5° of actuator stroke left.
- 2) Correct any problems and retest.

To adjust the exhaust airflow damper, turn the unit off and remove the nut/bolt stops on both sides of exhaust hood. Reposition the nut/bolt stops in the desired adjusting holes and retighten. Be sure to use matching adjusting hole on both sides of the exhaust hood. Readjust the stops as necessary to obtain the desired airflow. The exhaust airflow damper will automatically open to the set position when the exhaust fan is on, and close when the exhaust fan is off.

CONTROLS

BASIC PACKAGE

The standard FläktGroup SEMCO SP unit ships with no controls. The standard wiring package provides connections for the starting/stopping of the complete unit, supply fan and the energy wheel. The connections are shipped with factory jumpers installed. Remote control of any of these options can be achieved by removing the correct factory jumper and installing a contact in its place. The contact should be capable of handling 24V power at 2 amps (FläktGroup SEMCO SP-700) or 3.5 amps (FläktGroup SEMCO SP-2200). (See appropriate 1Ø or 3Ø circuit diagram on **PAGES 18** through **22**). It is strongly recommended that a remote unit start/stop contactor (supplied by others) be used to turn the unit on and off. This allows the outdoor air damper to fully close when the unit is off.

OPTIONAL ELECTRIC PREHEAT FROST CONTROL

For applications where the outdoor conditions do not exceed -10°F and where the indoor design conditions do not exceed 70°F and 25 percent RH, the energy wheel can operate at full capacity and will not frost. For colder design conditions or buildings with higher

humidity levels, frosting of the wheel can be prevented by providing a modest amount of preheat to the outdoor air. The amount of preheat required is small and is not intended to raise the outdoor air temperature above the freezing point. It is only necessary to keep the exhaust air temperature above the dew point. This prevents condensation on the wheel so that all the moisture transfer occurs in the vapor phase.

The preheat control option includes a finned tube electric coil mounted on the outdoor air intake of the unit, an SCR controller and a temperature sensor mounted in the outdoor air plenum. The temperature for the controller is set to the minimum temperature of the outdoor air required to prevent condensation at the design indoor temperature and humidity. This is done by plotting a line on the psychrometric chart from the indoor design condition down to the coldest temperature that does not cause the operating line to intersect the saturation curve on the chart. As stated above, for inside conditions of 70°F and 25 percent RH, this temperature is about -10°F.

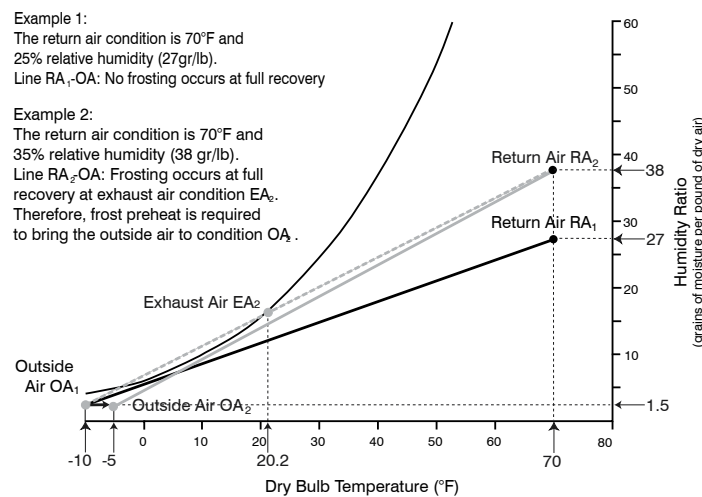


FIGURE 25. Using the psychrometric chart to determine the need for preheat frost control.

NON-VARIABLE SPEED WHEEL CONTROLS

BASIC PACKAGE

The basic FläktGroup SEMCO SP unit ships without controls. The standard wiring package provides connections for the starting/stopping of the complete unit, supply fan and the energy wheel. The connections are shipped with factory jumpers installed. Remote control of any of these options can be achieved by removing the correct factory jumper and installing a contact in its place. The contact should be capable of handling 24VAC power at 3.5 amps. It is strongly recommended that a remote unit start/stop relay (supplied by others) be used to turn the unit on and off. This allows the outdoor air damper to fully close when the unit is off.

OPTIONAL ELECTRIC PREHEAT FROST CONTROL

For applications where the outdoor conditions do not exceed -10°F and where the indoor design conditions do not exceed 70°F and 25 percent RH, the energy wheel can operate at full capacity and will not frost. For colder design conditions or buildings with higher humidity levels, frosting of the wheel can be prevented by providing a modest amount of preheat to the outdoor air. The amount of preheat required is small and is not intended to raise the outdoor air temperature above the freezing point. It is only necessary to keep the exhaust air temperature above the dew point. This prevents condensation on the wheel so that all the moisture transfer occurs in the vapor phase.

The preheat control option includes a finned tube electric coil mounted on the outdoor air intake of the unit, an SCR controller and a temperature sensor mounted in the outdoor air plenum. The temperature for the controller is set to the minimum temperature of the outdoor air required to prevent condensation at the design indoor temperature and humidity. This is done by plotting a line on the psychrometric chart from the indoor design condition down to the coldest temperature that does not cause the operating line to intersect the saturation curve on the chart. As stated above, for inside conditions of 70°F and 25 percent RH, this temperature is about -10°F (See **FIGURE 25** on **PAGE 12**).

OPTIONAL VARIABLE SPEED WHEEL CONTROL PACKAGE

- Digital reading of temperatures
- Proportional heating control

- Automatic summer/winter changeover

OPTIONAL STOP/JOG ECONOMIZER AND WHEEL FROST PROTECTION (GENERAL PURPOSE ROTATION DETECTOR)

The stop/jog economizer option is used during moderate outdoor air temperatures to stop the recovery wheel. The jog function is included to allow the wheel to rotate periodically to self-clean.

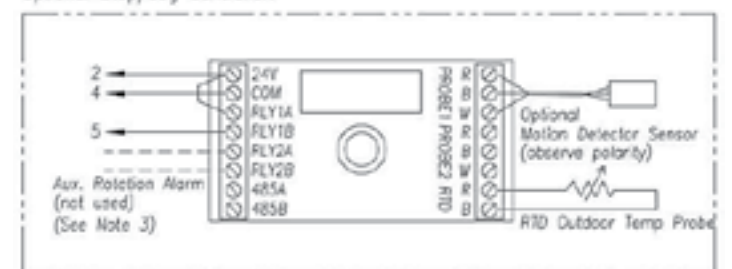
The stop/jog economizer consists of a temperature sensor and a circuit board with dip switch selection of temperature and stop/jog times. When the outdoor temperature is in the range between the two set-points, the timer relay operates the wheel for approximately 30 seconds in every 30 minutes.

The general purpose rotation detector (GPRD) board also has the ability to put the wheel in stop/jog mode when the outdoor air temperature drops below a preset value. This is a lower cost option than the electric preheat. It also has the disadvantage in supplying untreated outdoor air into the ventilation system whenever the stop/jog activates.



GPRD controller as installed on the electric panel.

Optional Stop/Jog Controller:



OPTIONAL ROTATION DETECTOR SENSOR FOR A GPRD CONTROLLER

The GPRD stop/jog economizer board is supplied with a motion detector to monitor the rotation of the energy recovery wheel (see **FIGURE 28**). The sensor is a Hall effect device that senses the passage of a small magnet on the perimeter of the rotor. When the sensor fails to register any wheel rotation - it requires a signal every 10 minutes - it energizes the alarm relay of the GPRD board. This can be used for remote indication of the alarm. The sensor will not create a false alarm when the GPRD controller is in stop/jog mode.

The alarm resets itself once the wheel begins to turn or the system is shut off and restarted.

THERMOSTAT FROST PROTECTION

A lower cost solution to frost protection is to use a thermostat to turn the entire ventilation unit off during periods when the air is below the calculated frosting temperature. This should only be used in non-critical ventilation applications as no outdoor air will be supplied when the unit is switched off by the thermostat.

FIGURE 28. GPRD Controller settings.

Default Stop/Jog Device Parameters	
Press and "double click" dial to enter parameter menu. Rotate dial to view parameters. Press & click dial to select parameter for editing. Value will flash when parameter is selected. Adjust setting by rotating dial, then press & click dial to lock in new setting. After 10secs with no activity, parameter menu will exit. Alarms can be cleared by pressing and holding the dial for 3 seconds.	
Parameter	Default Setting
MODE	3
NOE On ALARM	10
RESET SE ALARM	OFF
S-J ENABLE	On
S-J LOW TEMP	55
S-J HI TEMP	75
S-J On TIME	30
S-J OFF TIME	30
S-J FROST ENABLE	OFF
S-J FROST TEMP	0
TEMP Unit	F
RELAY 1	4
RELAY 2	1
DISPLAY	2

FLÄKTGROUP SEMCO SP WITH ECONOMIZER CONTROLS

ECONOMIZER BASIC CONTROL

On initial startup, the outdoor and return air temperatures are compared. On call for cooling, if the outdoor temperature is less than the return air and if the outdoor air dewpoint is below the space dewpoint setpoint, then the economizer operation is initiated. In economizer mode, the compressors are initially locked out and the outdoor air volume is increased and modulated to provide free cooling to the space. The economizer modulates to maintain the supply temperature set point during economizer mode. The wheel is stopped but rotated periodically during economizer mode. If the outdoor air temperature is greater than the return temperature, the economizer damper is closed and the wheel rotates at full speed in full cooling recovery mode. With call for heating or if the outdoor temperature is below the low temperature economizer outdoor override set point (adjustable), the wheel is forced to full speed to ensure maximum heat recovery.

CONDENSATION/FROST CONTROL WITH ECONOMIZER

When condensation/frost control option is selected, the wheel rotates at ¼ rpm during economizer mode. When in condensation/frost control mode, the wheel speed is limited to maintain an exhaust temperature no lower than frost set point calculated based on outdoor temperature and return relative humidity.

CO₂ DEMAND CONTROL VENTILATION WITH ECONOMIZER

A CO₂ sensor in the return airstream of the unit being attached to FläktGroup SEMCO's DDC controller allows supply and return airflows to be reduced during low occupancy.

SENSOR AND KEYPAD INSTRUCTIONS

SETPOINT ADJUSTMENT

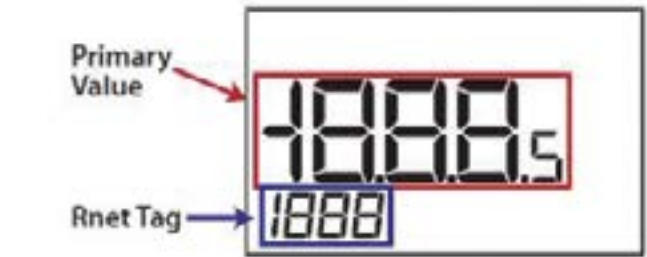
Depending on which control package was ordered with Economizer, the control setpoints may be adjusted through the return air sensor or the BACview keypad.



RETURN AIR SENSOR DISPLAY

To adjust setpoints in the return air sensor, hold the **i** button for at least three seconds. Then, tap the button to scroll through the setpoints.

Each setpoint has an Rnet tag located as shown here:



See **FIGURE 29** on **PAGE 16** for a list of all possible setpoints, their Rnet tag #, and a description.

SETPOINT	RNET TAG #	DESCRIPTION
control package	1308	enter 1 – 5 according to control package A B C D E <i>Do not change</i>
econo dewpoint limit setpoint	1309	economizer enable when outdoor dewpoint is below this limit
econo low ambient temp limit	1310	economizer enabled when outdoor temperature is above this limit
econo damper minutes to open	1311	minimum time for economizer damper full stroke
CO ₂ ramp time minutes	1312	ramp time to full fan speed for CO ₂ control
supply fan min %	1313	minimum output to supply fan VFD
supply fan max %	1314	maximum output to supply fan VFD
exhaust fan min %	1315	minimum output to exhaust fan VFD
exhaust fan max %	1316	maximum output to exhaust fan VFD
force econo conditions	1100	override forces economizer enable
clear alarm	1101	clear alarm

FIGURE 29

To make changes to these setpoints press the up or down buttons until the desired primary value is reached. After 5 seconds without user interaction the sensor display will return to the home screen.

BACVIEW KEYPAD/DISPLAY

STEP 1. Press the HOME key to take you to the standby option screen. Use the RIGHT arrow key to scroll down to see the MENU option. Pressing the ENTER key will take you to the menu option.



STEP 2. Use the LEFT and RIGHT arrow keys to scroll thru the menu. Pressing the ENTER key will take you to the selected option, indicated by the brackets [] around it.



STEP 3. After entering a selected menu option, use the LEFT and RIGHT arrow keys to scroll through the available parameters.



STEP 4. Parameters with editable settings will have brackets [] around them when selected. To change a parameter setting use the LEFT and RIGHT arrow keys to scroll to the desired selection, then press the ENTER key. For numeric settings, use the LEFT and RIGHT arrow keys to move the cursor () to the desired digit. Use the INCR and DECR keys to change the value. For non-numeric settings, use the INCR and DECR keys to scroll through the available parameter settings. Press ENTER to accept the changes, or press the cancel key to revert to the default.

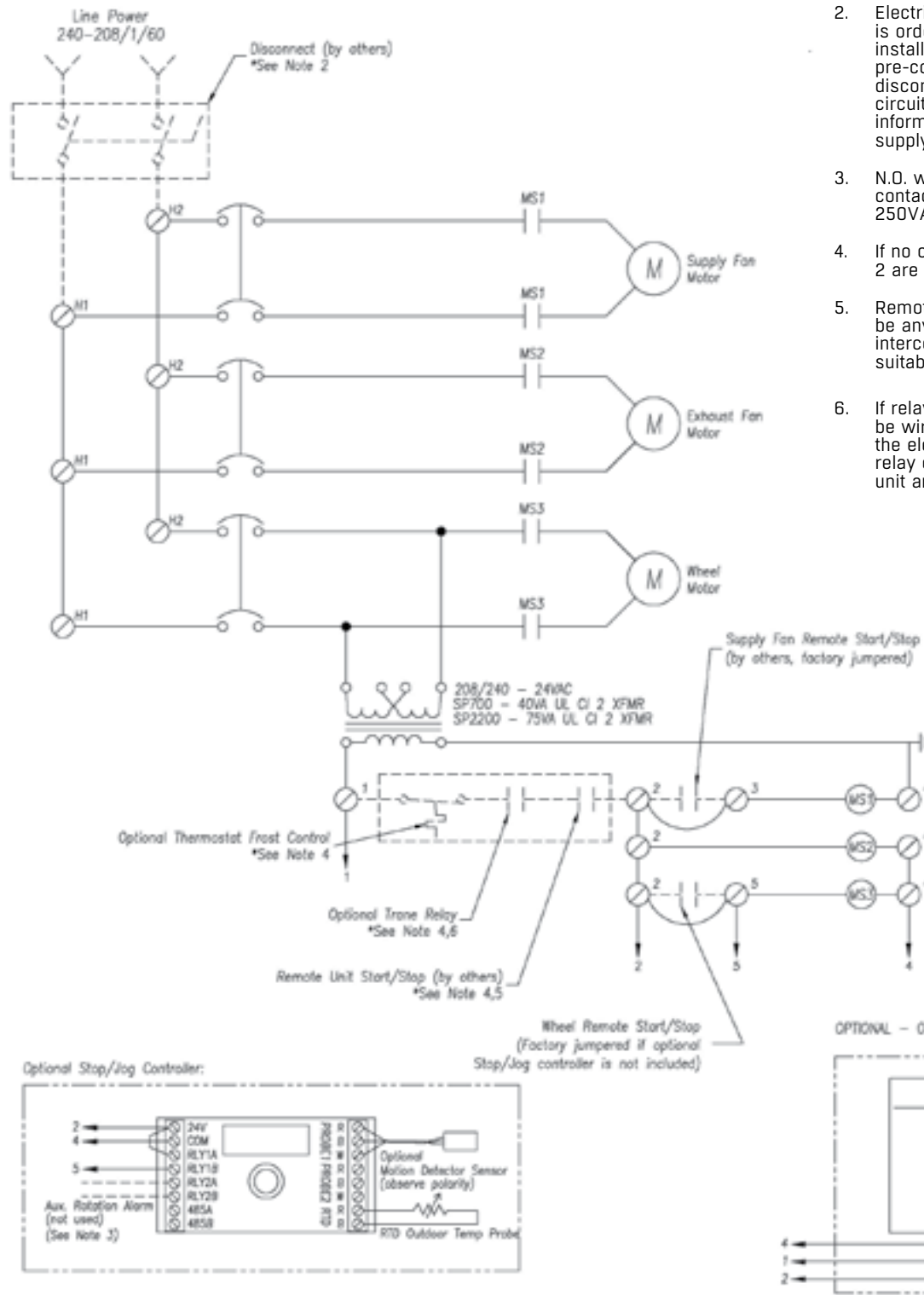


1Ø CIRCUIT DIAGRAM, SP-700 & SP-2200

Schematics for units with Economizer are provided with submittal and unit

NOTES:

1. All dashed lines indicate field wiring unless otherwise noted.
2. Electric Preheat: If electric preheater is ordered, the power wiring is factory installed from electric preheater to pre-conditioner panel and includes a disconnect. (See specifications and circuit diagram on electric preheater for information on sizing and connecting supply power.)
3. N.O. wheel rotation alarm relay contact, for use by others. Rated 8A @ 250VAC/30VDC.
4. If no options are ordered, terminals 1 & 2 are shipped with jumper installed.
5. Remote unit start/stop (by others) may be any isolated contact, to prevent interconnection of class 2 outputs, suitable for 24 VAC @ 3.5 amps.
6. If relay is ordered terminals 1 and 2 will be wired to the N.O. relay mounted on the electric panel. Power wiring for the relay coil is from the Trane® Precedent® unit and is installed by others.



TERMINAL TORQUE REQUIREMENTS	
AWG SIZE	IN-LB
18-10	20
8	25
6-4	35

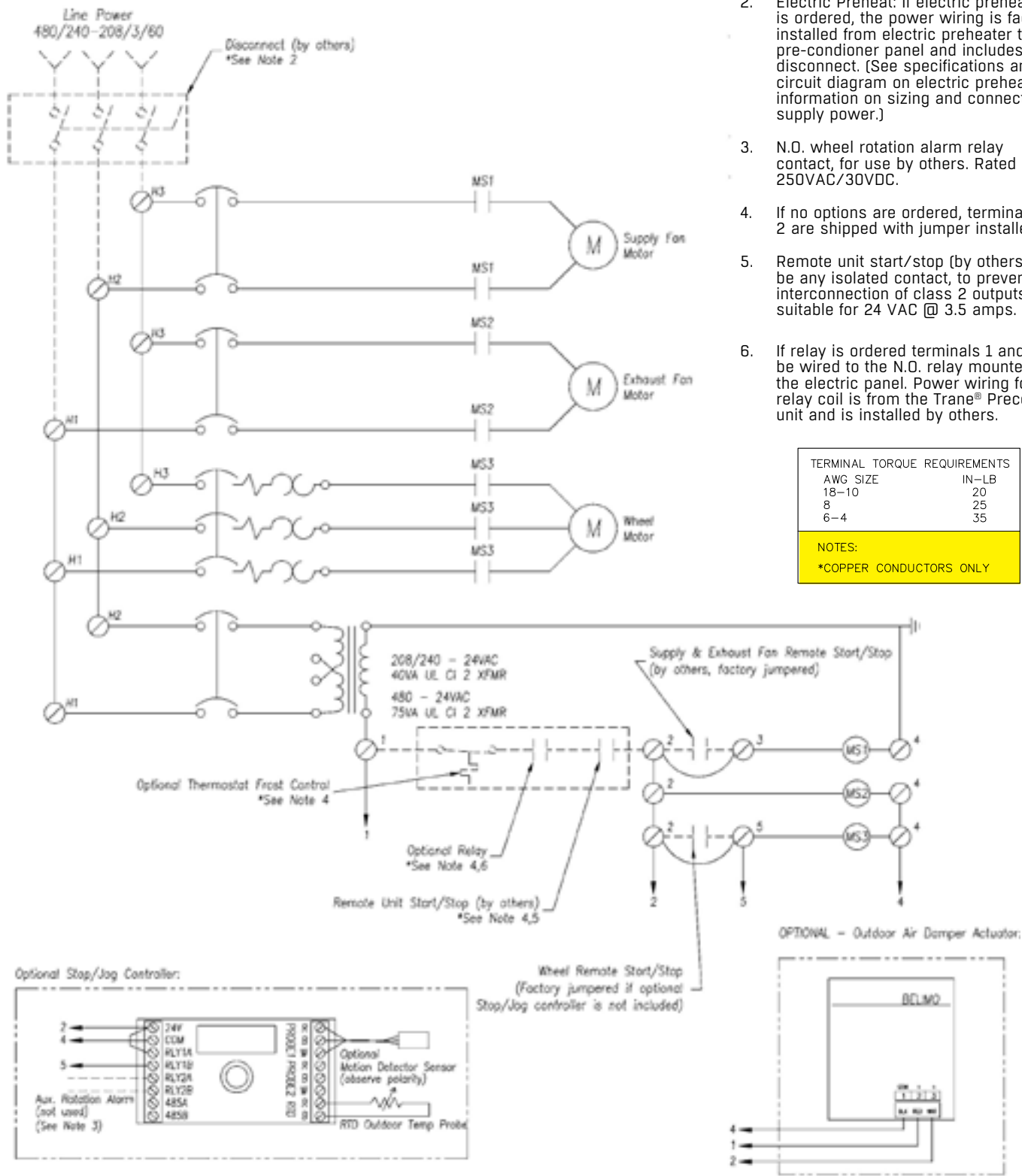
NOTES:
*COPPER CONDUCTORS ONLY

3Ø CIRCUIT DIAGRAM, SEMCO SP-700

Schematics for units with an Economizer are provided with submittal and unit

NOTES:

1. All dashed lines indicate field wiring unless otherwise noted.
2. Electric Preheat: If electric preheater is ordered, the power wiring is factory installed from electric preheater to pre-conditioner panel and includes a disconnect. (See specifications and circuit diagram on electric preheater for information on sizing and connecting supply power.)
3. N.O. wheel rotation alarm relay contact, for use by others. Rated 8A @ 250VAC/30VDC.
4. If no options are ordered, terminals 1 & 2 are shipped with jumper installed.
5. Remote unit start/stop (by others) may be any isolated contact, to prevent interconnection of class 2 outputs, suitable for 24 VAC @ 3.5 amps.
6. If relay is ordered terminals 1 and 2 will be wired to the N.O. relay mounted on the electric panel. Power wiring for the relay coil is from the Trane® Precedent® unit and is installed by others.

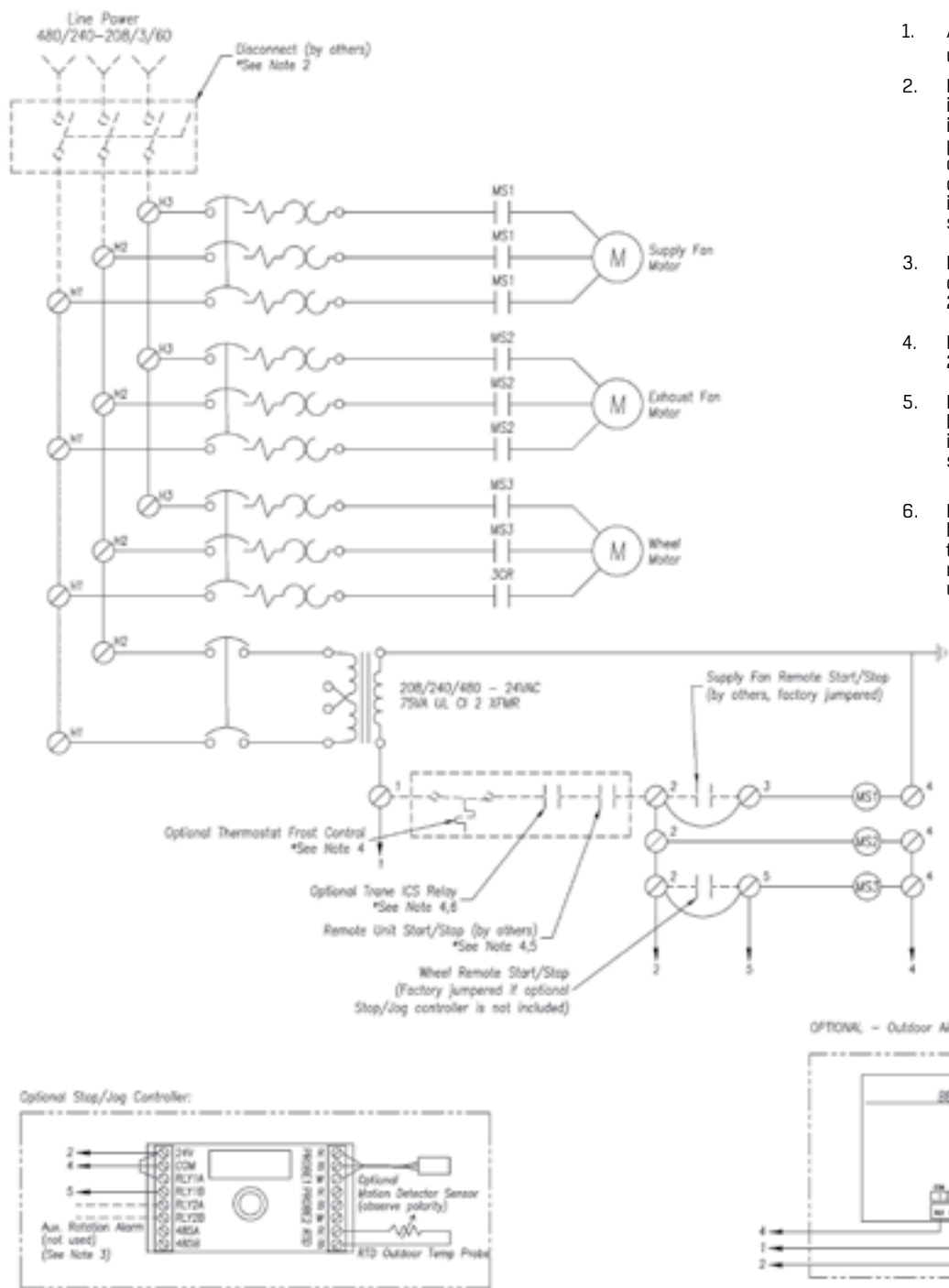


TERMINAL TORQUE REQUIREMENTS	
AWG SIZE	IN-LB
18-10	20
8	25
6-4	35

NOTES:
*COPPER CONDUCTORS ONLY

3Ø CIRCUIT DIAGRAM, SP-2200

Schematics for units with Economizer are provided with submittal and unit



NOTES:

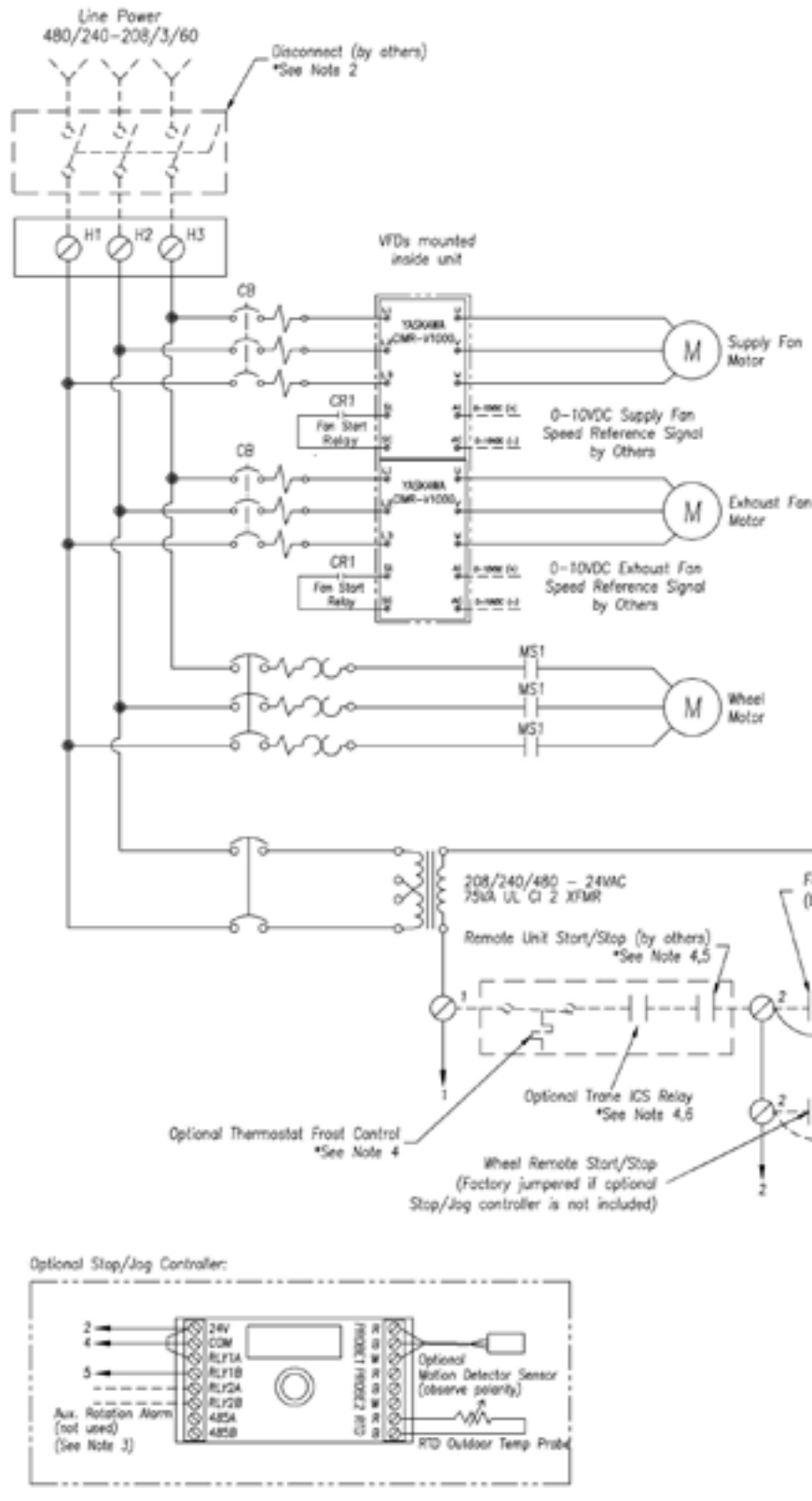
1. All dashed lines indicate field wiring unless otherwise noted.
2. Electric Preheat: If electric preheater is ordered, the power wiring is factory installed from electric preheater to pre-conditioner panel and includes a disconnect. (See specifications and circuit diagram on electric preheater for information on sizing and connecting supply power.)
3. N.O. wheel rotation alarm relay contact, for use by others. Rated 8A @ 250VAC/30VDC.
4. If no options are ordered, terminals 1 & 2 are shipped with jumper installed.
5. Remote unit start/stop (by others) may be any isolated contact, to prevent interconnection of class 2 outputs, suitable for 24 VAC @ 3.5 amps.
6. If relay is ordered terminals 1 and 2 will be wired to the N.O. relay mounted on the electric panel. Power wiring for the relay coil is from the Trane® Precedent® unit and is installed by others.

TERMINAL TORQUE REQUIREMENTS	
AWG SIZE	IN-LB
18-10	20
8	25
6-4	35

NOTES:
*COPPER CONDUCTORS ONLY

3Ø CIRCUIT DIAGRAM, SP-2200 WITH VARIABLE SPED FANS

Schematics for units with Economizer are provided with submittal and unit



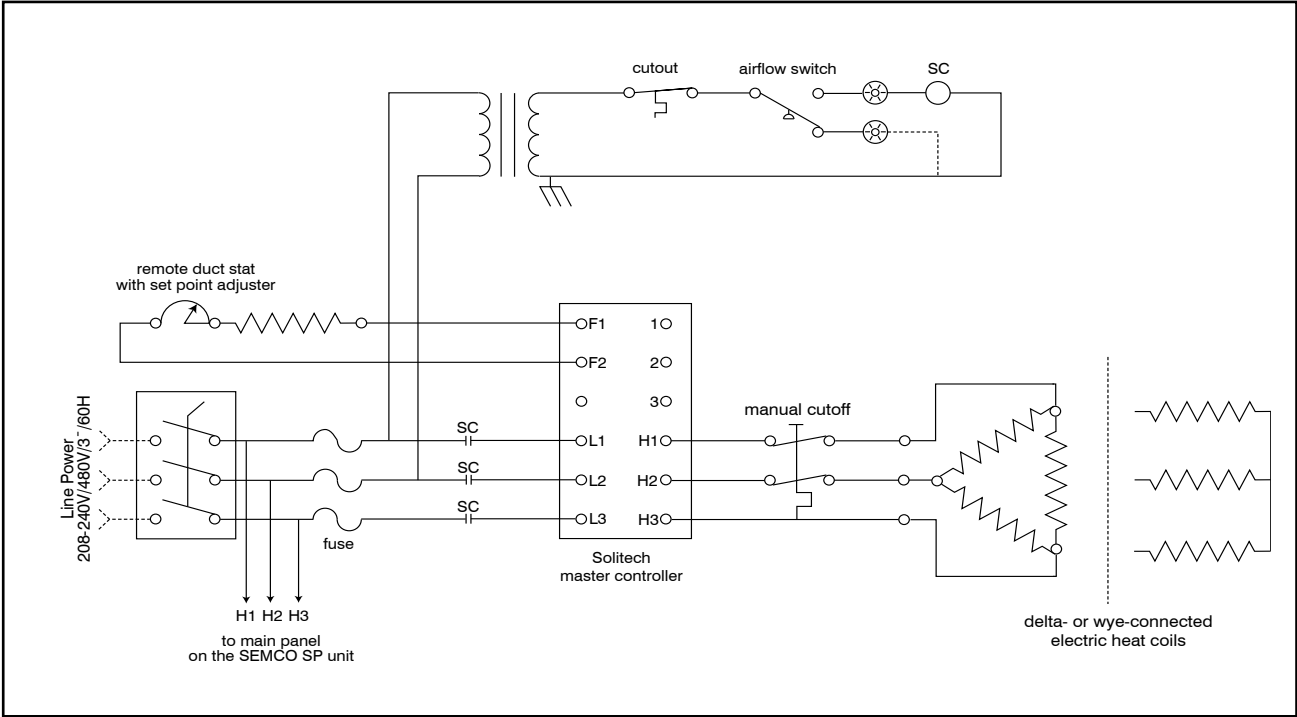
NOTES:

1. All dashed lines indicate field wiring unless otherwise noted.
2. Electric Preheat: If electric preheater is ordered, the power wiring is factory installed from electric preheater to pre-conditioner panel and includes a disconnect. (See specifications and circuit diagram on electric preheater for information on sizing and connecting supply power.)
3. N.O. wheel rotation alarm relay contact, for use by others. Rated 8A @ 250VAC/30VDC.
4. If no options are ordered, terminals 1 & 2 are shipped with jumper installed.
5. Remote unit start/stop (by others) may be any isolated contact, to prevent interconnection of class 2 outputs, suitable for 24 VAC @ 3.5 amps.
6. If relay is ordered terminals 1 and 2 will be wired to the N.O. relay mounted on the electric panel. Power wiring for the relay coil is from the Trane® Precedent® unit and is installed by others.

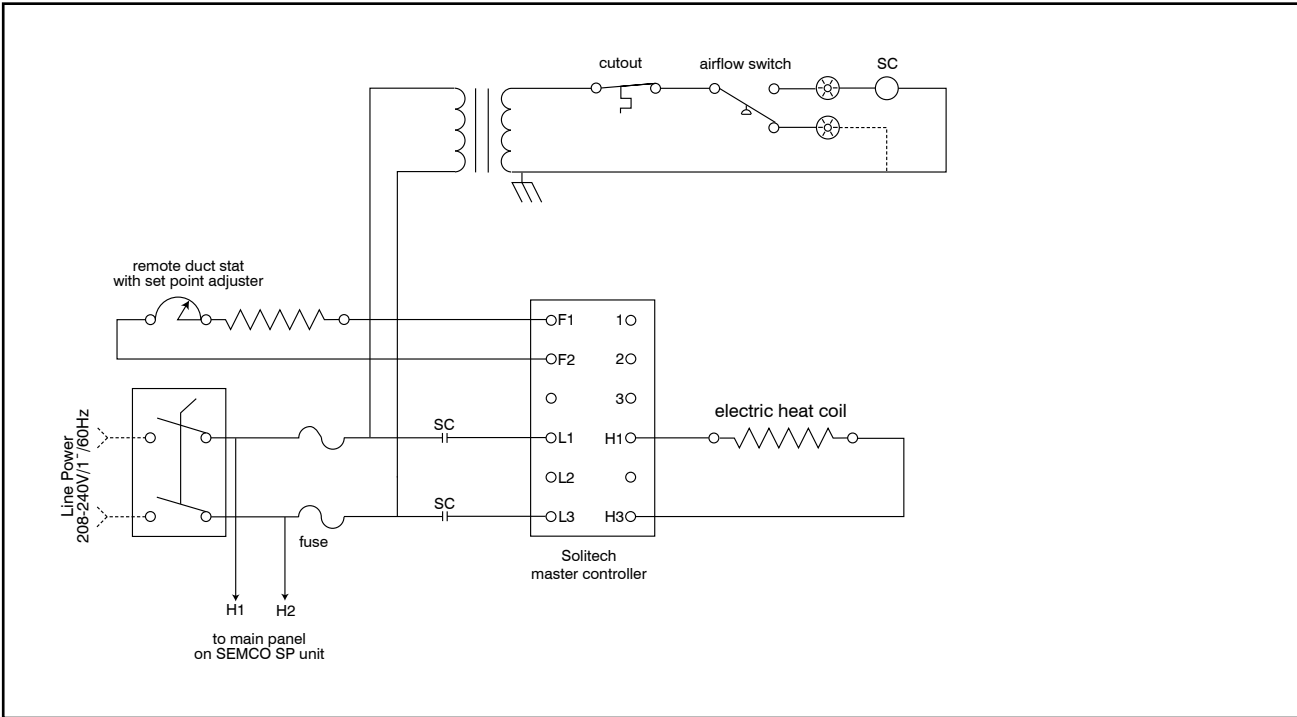
TERMINAL TORQUE REQUIREMENTS	
AWG SIZE	IN-LB
18-10	20
8	25
6-4	35

NOTES:
*COPPER CONDUCTORS ONLY

3Ø ELECTRIC PREHEAT FROST PROTECTION CIRCUIT DIAGRAM



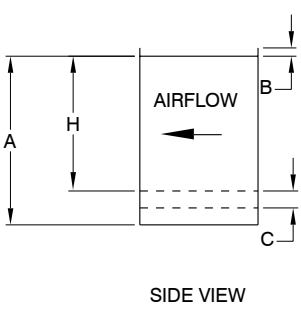
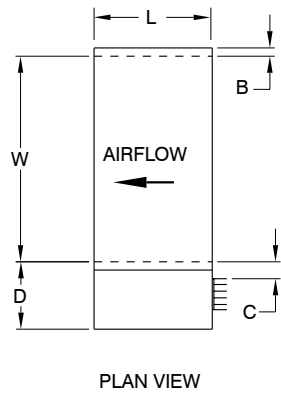
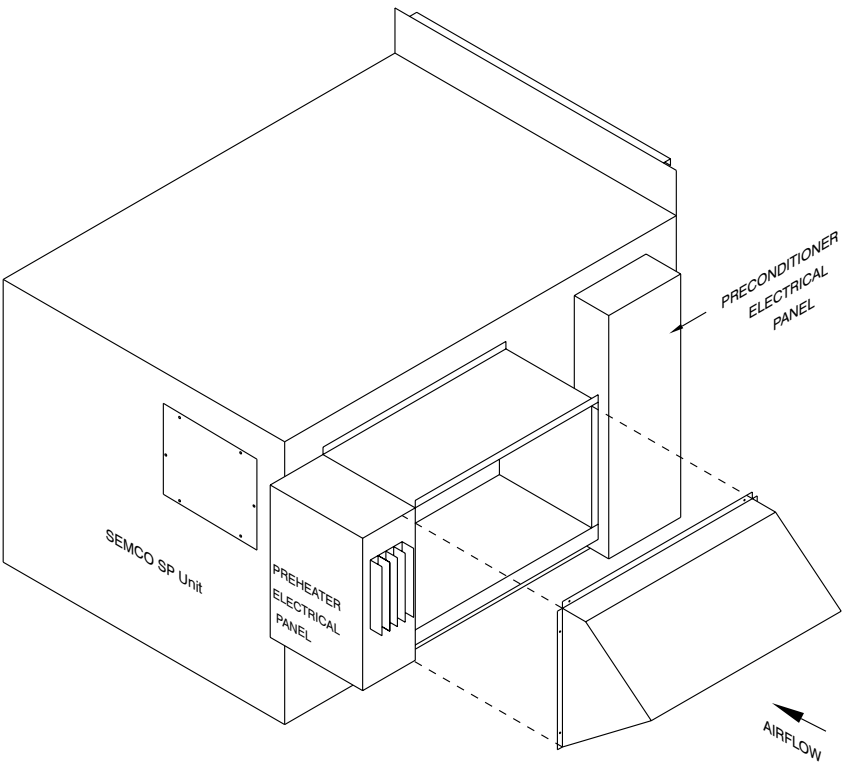
1Ø ELECTRIC PREHEAT FROST PROTECTION CIRCUIT DIAGRAM



ELECTRIC PREHEAT LAYOUT

FLÄKTGROUP SEMCO UNIT SIZE	W	H	L	A	B	C	D
SP-700	24.37	16.0	14.0	20.0	1.0	2.0	8.0
SP-2200	30.5	20.37	14.0	20.0	1.0	2.0	8.0

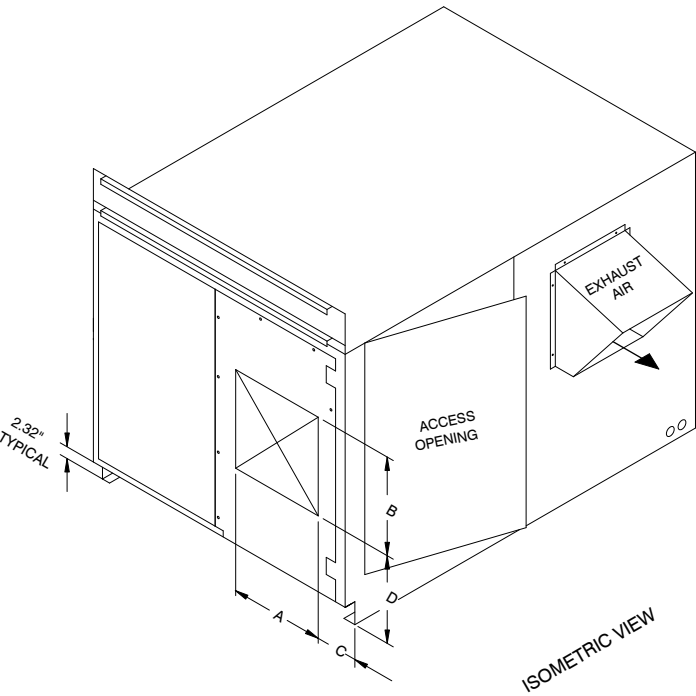
All dimensions in inches.



SEGREGATED EXHAUST ADAPTER DIMENSIONS

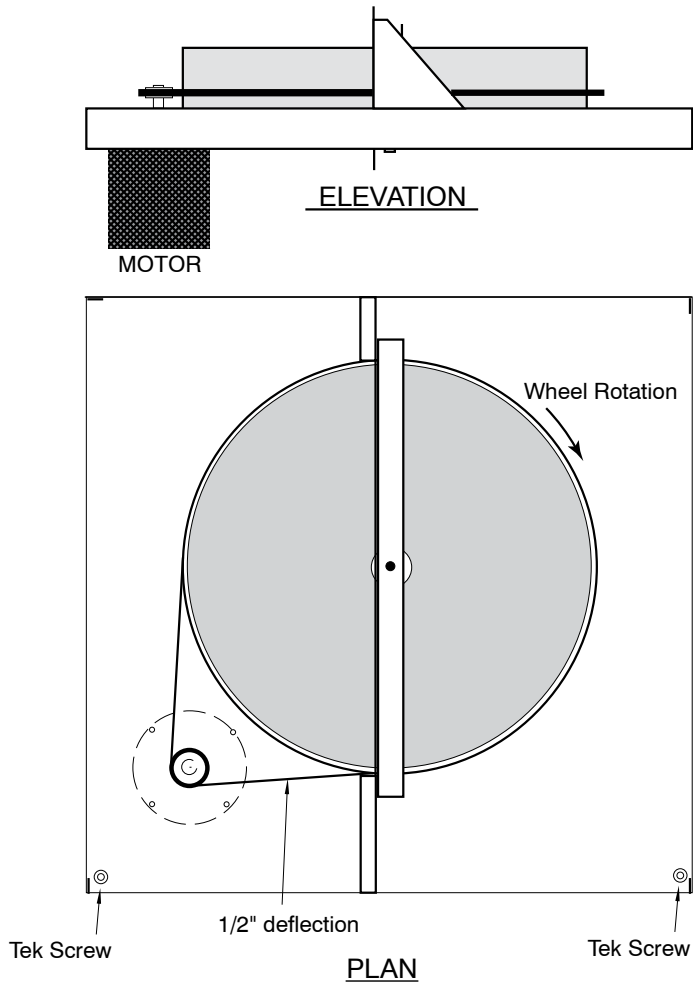
FLÄKTGROUP SEMCO UNIT SIZE	A	B	C	D
SP-700	10.83	10.83	2.52	10.83
SP-2200	14.76	14.76	3.23	13.23

All dimensions in inches.



WHEEL CASSETTE

The wheel cassette can be serviced through the front panel. The cassette can be slid out for easy access. To remove the cassette, unplug the leads to the wheel drive motor, then remove the (2) tek screws located near the opening. This will then allow you to pull the cassette out of the unit through the access door. If the unit is equipped with a rotation sensor, it must be removed prior to sliding the cassette out.



MODEL	SP-700	SP-2200
LINKBELT TYPE	4L/"A"	4L/"A"
LINKBELT BELT LENGTH	73"	106"

MAINTENANCE

FILTERS

The FläktGroup SEMCO SP utilizes one-inch deep industrial grade aluminum mesh filters and/or two inch deep pleated filters depending on the options selected. The aluminum filters can be removed and washed (See **FIGURE 30**). We suggest that the filters be washed or replaced a minimum of once every four months. Replacement filters are readily available through SEMCO or locally through HVAC supply distributors.

FLÄKTGROUP SEMCO Unit	SUPPLY AIR FILTER	RETURN AIR FILTER
SP-700	(1) 1x16x25	(1) 1x16x25
SP-2200	(2) 1x16x20	(2) 1x16x20

Dimensions in inches.



FIGURE 30. Replacing the return air filter.

SEALS

Surrounding the rim of the wheel is a brush seal. Do not tamper with this seal. No maintenance of the seal is required.

BELTS

The wheel drive system utilizes a PowerTwist Plus® belt. Periodic adjustment of the belt will be necessary.

We suggest the belt be checked for sufficient tension at a minimum of once every six months. Take care to follow the directions on **PAGES 26** and **27**.

MEDIA

For normal inspection and maintenance, the wheel cassette may be pulled out (like a drawer) of the metal enclosure of the unit (See **FIGURES 31-33**).



FIGURE 31. Prior to sliding out the wheel cassette, the wheel motor quick release must be disconnected.



FIGURE 32. After disconnecting the wheel motor quick release, the upper and lower TEK screws must be removed.



FIGURE 33. The wheel cassette is removable through the service door.

FläktGroup SEMCO wheels use laminar flow technology to resist plugging and the accumulation of dust particles, therefore cleaning is usually not necessary. Constant back flushing occurs due to Supply Air and Return Air streams that move through media flutes to help keep them clean. As the media moves constantly from one air stream to the other most dirt is either passed through or blown away.

Should your application require occasional rotor cleaning, the media may be cleaned with a vacuum, compressed air (at 50 PSI max), low-pressure steam (5 PSI max), or hot water (130 deg F, 30 PSI max). Care should be taken to avoid bending or damaging flutes. The nozzle should be no closer than 6" from the media and should be held at a right angle to the face of the wheel. A soft brush can also be used to loosen any dirt from the face of the wheel. In general, detergents or solvents are not recommended as they may degrade the materials used to bind the desiccant to the aluminum surface in the media. If it is determined that additional cleaning power is required, light duty household cleaners (such as Formula 409®, Simple Green® etc.) can be used.

HOW TO MEASURE, ASSEMBLE AND INSTALL POWERTWIST PLUS® V-BELTS

MEASURING THE BELT

- Pull belt tight around sheaves to check hand tight length, overlapping the last two tabs with two holes in matching links as shown in **FIGURE 34**.

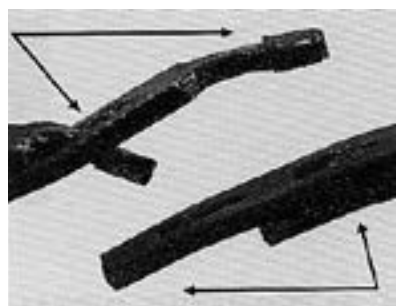


FIGURE 34. Measuring the V-Belt

- Count the number of links and remove one link for every 24 of O/3L, A/4L and B/5L sections and one link for every 20 of C section.

This gives the correct installed belt length and will ensure optimum belt tension when running.

NOTE: Every tenth link is designated with an arrow. For multiple belt drives, ensure that each belt has the same number of links.

DISASSEMBLY

- Hold belt upside down. Bend back as far as possible: hold with one hand. Twist one tab 90° parallel with slot.
- Pull end of link over tab.
- Rotate belt end with tab 90°.
- Pull belt end through two links.



ASSEMBLY

- Hold belt with tabs pointing outward.



- Place end tab through two links at once.



- Flex belt further and insert second tab through end link by twisting tab with thumb.



- Ensure tab returns to position across belt. Reverse belt so tabs run inside.



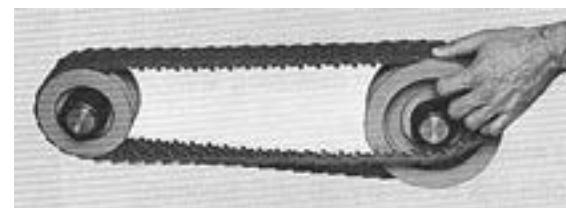
NOTE: Turn belt inside out (as shown above) to ensure easy assembly and disassembly.

INSTALLATION

- Turn belt with tabs to the inside before installing.
- Determine direction of drive rotation.
- Align belt directional arrow with drive rotation.
- Fit belt in nearest groove of smaller sheave.

Roll belt onto larger sheave, turning the drive slowly. Belt may seem very tight; this is okay. **DO NOT** jog motor.

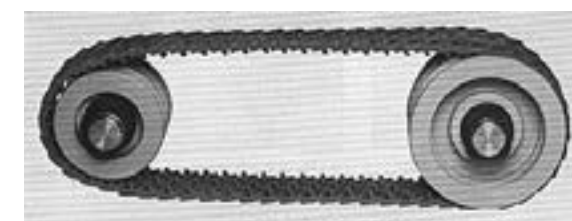
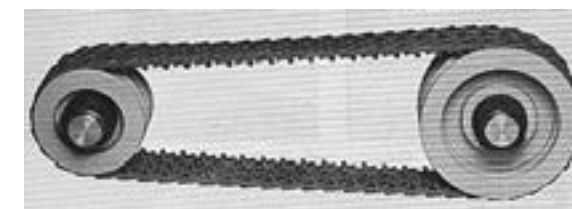
Check to see all tabs are still in their correct position and are not twisted out of alignment.



For multiple belt drives, work belt from groove to groove. On particularly wide drives, it may be easier to install half the belts from the inboard side and half from the outboard. **NOTE:** With drive ratios around 1:1, it may be necessary to add back one link to allow belts to be rolled on. This does not apply if using the alternative installation method.

ALTERNATIVE INSTALLATION METHOD

- Set motor to mid-position of adjustment range and mark base clearly.
- Determine required belt length as in "Measuring Belt Length."
- Push motor forward to minimum center distance.
- Install belts as in "Installation."
- Pull motor back to previously marked mid-position.



RETENSIONING

Like all high performance V-belts, PowerTwist Plus® V-Belts require the maintenance of correct drive tension to operate efficiently. Experience indicates that drive tension should be checked after 24 hours running at full load. A retension may be necessary depending on the severity of the drive. Any initial belt stretch is then taken up. Subsequently, belt tension should be checked periodically and adjusted when necessary.

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