EC MOTOR SUPPLEMENTAL MANUAL

EC MOTORS FOR:
TRCe500 (IN)
TRCe800 (IN)
TRCe800V (IN)
TRCe1200 (IN)
ABOUT S&P
S&P USA operations are based in Jacksonville, Florida. This geographically strategic location allows the shipment of products throughout the U.S. 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 U.S. 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 S&P 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.

S&P Ventilation Group is the world’s leading fan manufacturer. It celebrated its 50th anniversary in 2001. S&P is able to offer a range of ventilation products benefiting from over 50 years of experience in 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 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.
EC MOTORS

S&P’s light commercial units are offered with optional electronically commutated motors (EC). EC motors have higher efficiencies with considerable energy savings over a standard permanent split capacitor motor. The EC motors offered in S&P ERVs are constant torque with a variety of speed control options. The motors operate at fixed speed or variable speed with speed inputs from fixed resistors, potentiometer, or 0-10Vdc analog signal.

OPERATING CONTROLS

A wide variety of low voltage (24VAC) control schemes may be selected to meet the ventilation needs of the facility. These include time clock, occupancy sensor, carbon dioxide sensor, and others. Building Management Systems (BMS) may also control the unit with external control by others.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Phase (unit)</th>
<th>Input Voltage</th>
<th>FLA (motor)</th>
<th>MCA (unit)</th>
<th>MOPD (unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRCe500</td>
<td>115 VAC</td>
<td>8.1</td>
<td>10.1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>208-230 VAC</td>
<td>4.8</td>
<td>6.0</td>
<td>15</td>
</tr>
<tr>
<td>TRCe800</td>
<td>115 VAC</td>
<td>8.1</td>
<td>18.2</td>
<td>25</td>
</tr>
<tr>
<td>TRCe800V</td>
<td>208-230 VAC</td>
<td>4.8</td>
<td>10.8</td>
<td>15</td>
</tr>
<tr>
<td>TRCe1200</td>
<td>115 VAC</td>
<td>8.0</td>
<td>18.0</td>
<td>20</td>
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<tr>
<td></td>
<td>208-230 VAC</td>
<td>6.2</td>
<td>14.0</td>
<td>15</td>
</tr>
</tbody>
</table>
### EC MOTOR OPTION OPERATING RANGES

#### TRCe500 EC MOTOR

<table>
<thead>
<tr>
<th>CFM</th>
<th>ESP*</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
<td>0.04</td>
<td>75</td>
</tr>
<tr>
<td>321</td>
<td>0.16</td>
<td>171</td>
</tr>
<tr>
<td>385</td>
<td>0.25</td>
<td>284</td>
</tr>
<tr>
<td>458</td>
<td>0.34</td>
<td>410</td>
</tr>
<tr>
<td>491</td>
<td>0.40</td>
<td>506</td>
</tr>
<tr>
<td>209</td>
<td>0.20</td>
<td>80</td>
</tr>
<tr>
<td>289</td>
<td>0.43</td>
<td>188</td>
</tr>
<tr>
<td>350</td>
<td>0.67</td>
<td>315</td>
</tr>
<tr>
<td>396</td>
<td>0.90</td>
<td>447</td>
</tr>
<tr>
<td>416</td>
<td>1.00</td>
<td>515</td>
</tr>
</tbody>
</table>

Note: Watts is for the entire unit.
*Inches Water Column

#### TRCe800 & TRCe800V EC MOTOR

<table>
<thead>
<tr>
<th>CFM</th>
<th>ESP*</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>324</td>
<td>0.04</td>
<td>86</td>
</tr>
<tr>
<td>446</td>
<td>0.07</td>
<td>150</td>
</tr>
<tr>
<td>647</td>
<td>0.15</td>
<td>300</td>
</tr>
<tr>
<td>794</td>
<td>0.24</td>
<td>564</td>
</tr>
<tr>
<td>929</td>
<td>0.33</td>
<td>827</td>
</tr>
<tr>
<td>1019</td>
<td>0.41</td>
<td>1042</td>
</tr>
<tr>
<td>300</td>
<td>0.11</td>
<td>91</td>
</tr>
<tr>
<td>406</td>
<td>0.20</td>
<td>160</td>
</tr>
<tr>
<td>579</td>
<td>0.42</td>
<td>359</td>
</tr>
<tr>
<td>713</td>
<td>0.65</td>
<td>599</td>
</tr>
<tr>
<td>828</td>
<td>0.89</td>
<td>871</td>
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<tr>
<td>883</td>
<td>1.00</td>
<td>1075</td>
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Note: Watts is for the entire unit.
*Inches Water Column
### EC MOTOR OPTION OPERATING RANGES

**TRCe1200 EC MOTOR**

<table>
<thead>
<tr>
<th>Sample Points</th>
<th>CFM</th>
<th>ESP*</th>
<th>Watts</th>
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<tbody>
<tr>
<td>630</td>
<td>0.07</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td>807</td>
<td>0.12</td>
<td>314</td>
<td></td>
</tr>
<tr>
<td>1014</td>
<td>0.20</td>
<td>502</td>
<td></td>
</tr>
<tr>
<td>1222</td>
<td>0.28</td>
<td>735</td>
<td></td>
</tr>
<tr>
<td>1430</td>
<td>0.39</td>
<td>1015</td>
<td></td>
</tr>
<tr>
<td>513</td>
<td>0.20</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>656</td>
<td>0.33</td>
<td>310</td>
<td></td>
</tr>
<tr>
<td>825</td>
<td>0.52</td>
<td>498</td>
<td></td>
</tr>
<tr>
<td>994</td>
<td>0.74</td>
<td>735</td>
<td></td>
</tr>
<tr>
<td>1163</td>
<td>1.01</td>
<td>1017</td>
<td></td>
</tr>
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</table>

*Note: Watts is for the entire unit.ESP* Inches Water Column
PLANNING YOUR INSTALLATION

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

CAUTION

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lockout/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.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. 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.
6. 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.
7. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
8. 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.
9. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
10. If installed indoors this unit must be properly ducted to the outdoors.

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

PRINCIPLES OF EXTERNAL CONTROL

The S&P units with EC motors are designed for control by a wide variety of low voltage (24VAC) controls to meet the ventilation needs of the facility. These include time clock, occupancy sensor, carbon dioxide sensor, building management system (BMS) and others. These devices are commonly known as 2-wire, 3-wire, and 4-wire devices. S&P offers separately the following for standalone control of the ERV:

- Digital Time Clocks
- Occupancy Sensors
- Carbon Dioxide Sensor/Controllers

TRCe800, TRCe800V & TRCe1200

The external control device connects to the S&P unit to operate each blower independently or for one blower to act as leader and the other blower to act as follower. When operating independently, a single external switch or relay calls for operation but each speed control motor can respond independently to switch or analog signal source. When acting as leader-follower, again, a single external source calls for operation and then one motor responds to the input signal. The TRCe800, TRCe800V and TRCe1200 units have the versatility that either the exhaust air (EA) motor or the fresh air (FA) motor can act as leader. Connection of an external control device to the S&P unit is simple. All external control device wires connect to a terminal block(s) in the unit’s electrical box.
TRCe500 FIXED SPEED CONTROL

TRCe500 Motor
MANUAL OFF/ON SWITCH
SPEED 1 SET BY RESISTORS
MANUAL SWITCH ACTIVATES SPEED 2
10K POTENTIOMETER SETS SPEED 2

(2) FIELD-INSTALLED SPST SWITCHES

FACTORY WIRING

TRCe500 Motor
JUMPER FOR CONSTANT READINESS TO RUN.
SPEED 1 SET BY 0-10vdc INPUT FROM BUILDING MANAGEMENT SYSTEM (BMS),
SPEED 2 UNUSED

TRCe500 0-10 VDC SIGNAL FROM EXTERNAL CONTROL OR BMS

FIELD-INSTALLED JUMPER

FACTORY WIRING
TRCe500  0-10 VDC SIGNAL FROM CO2 CONTROL

TRCe500 MOTOR
JUMPER FOR CONSTANT ON
SPEED 1 SET BY RESISTORS
TIME CLOCK ACTIVATES SPEED 2
CO2 CONTROLLER SETS SPEED 2

FACTORY WIRING
- On-board 24VAC Power
- Master ON/OFF Relay
- HIGH/LOW Relay
- Analog Signal GROUND
- Analog Signal IN
- Analog Signal REFERENCE
- To Motor Controller

DISCONNECT FACTORY-INSTALLED POTENTIOMETER FROM TERMINALS 6, 8 & 9.

Factory-installed Resistors between terminals 5, 7 & 9 determine SPEED 1

TRCe800, TRCe800V & TRCe1200  FIXED SPEED CONTROL

TRCe800 & TRCe1200 MOTOR
MANUAL OFF/ON SWITCH
SPEED 1 SET BY RESISTORS FOR EACH BLOWER
MANUAL SWITCH ACTIVATES SPEED 2 (BOTH BLOWERS)
SPEED 2 SET FOR EACH BLOWER BY SEPARATE 10K POTENTIOMETERS

FACTORY WIRING
- On-board 24VAC Power
- Master ON/OFF Relay FAN 1
- SPEED 2 Relay FAN 1
- Analog Signal GROUND FAN 1
- Analog Signal IN FAN 1
- Analog Signal REFERENCE FAN 1
- To EA Motor Controller FAN 1
- Factory-installed Jumper connects "ON" and "MODE" signals to Fan 2

Factory-installed 10K Potentiometer terminals 5, 7 & 9 set SPEED 2
Factory-installed Resistors between terminals 4, 6 & 8 set SPEED 1
TRCe800, TRCe800V & TRCe1200 0-10 VDC SIGNAL FROM EXTERNAL CONTROL OR BMS

WIRING SCHEMATICS BY CONTROL METHOD

TRCe800 & TRCe1200 MOTOR JUMPER FOR CONSTANT ON SPEED 1 SET BY 0-10vdc OUTPUTS OF BUILDING MANAGEMENT SYSTEM (BMS) SPEED 2 UNUSED

ALTERNATELY, TWO BMS OUTPUTS SEPARATELY SET SPEED 1 FOR BLOWER 1 (EA) AND SPEED 1 FOR BLOWER 2 (FA).

FIELD-INSTALLED JUMPER:
- BMS OUTPUT SETS SPEED 1 FOR BLOWER 1 (EA).
- BMS OUTPUT SETS SPEED 1 FOR BLOWER 2 (FA).

FACTORY WIRING:
- On board 240V, Power
- To EA Motor Controller FAN 1
- To FA Motor Controller FAN 2

Analog Signal GROUND FAN 1
Analog Signal IN FAN 1
Analog Signal REFERENCE FAN 1
Analog Signal GROUND FAN 2
Analog Signal IN FAN 2
Analog Signal REFERENCE FAN 2

Factory-installed jumpers pass "ON" and "NOON" signals to fan 2.

TRCe800, TRCe800V & TRCe1200 0-10 VDC SIGNAL FROM CO2 CONTROL

TRCe800 & TRCe1200 MOTOR JUMPER FOR CONSTANT UNIT ON SPEED 1 SET BY 10K POTENTIOMETER EACH BLOWER TIME CLOCK ACTIVATES SPEED 2 DURING OCCUPANCY CO2 CONTROL SETS SPEED 2

FIELD-INSTALLED JUMPER:
- TIME CLOCK TO CO2.
- FIELD-INSTALLED TIME CLOCK ACTIVATES SPEED 2.
- FIELD-INSTALLED CO2 CONTROLLER SETS SPEED 2.

FACTORY WIRING:
- On board 240V, Power
- To EA Motor Controller FAN 1
- To FA Motor Controller FAN 2

Analog Signal GROUND FAN 1
Analog Signal IN FAN 1
Analog Signal REFERENCE FAN 1
Analog Signal GROUND FAN 2
Analog Signal IN FAN 2
Analog Signal REFERENCE FAN 2

Factory-installed jumpers pass "ON" and "NOON" signals to fan 2.

Remove factory-installed resistors.

MOVES POTENTIOMETER LEADS TO TERMINALS 8 & 6.

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SC-TRCe MOTOR
MANUAL OFF/ON SWITCH
SPEED 1 SET BY RESISTORS FOR EACH BLOWER
MANUAL SWITCH ACTIVATES SPEED 2 (BOTH BLOWERS)
SPEED 2 SET FOR EACH BLOWER BY SEPARATE 10K POTENTIOMETERS

FACTORY WIRING

(2) FIELD-INSTALLED SPST SWITCHES
Field-installed SC-ECM Accessory terminals 5, 7 & 8 set SPEED 2
Factory-installed Resistors between terminals 4, 6 & 8 set SPEED 1

TRCe500 LINE VOLTAGE WIRING CONNECTIONS

KEY:
--- FACTORY WIRING
--- FIELD WIRING
**AIRFLOW PERFORMANCE**
The ERV is factory wired to operate at low fixed speed and high variable speed.

Airflows must be measured and the unit’s potentiometers adjusted so that it operates at the airflow volumes specified for the installation.

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

**CAUTION**
Very low airflow rates may result in fouling of the energy exchanger core. Do not reduce airflow to below 250 cfm per core.

**START-UP**
Dirty or clogged filters reduce airflow through the unit.