PEP™ High Efficiency Motors
Uses up to 15% fewer watts than standard PSC motors.
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Troubleshooting

• If the motor is running
  • Noisy operation, limit or safety faults, frozen coils
  • Motor may not be the problem
    • Check airflow settings with HVAC OEM guide
    • Check for dirt load on air distribution system components
    • Check for closed dampers, registers and grilles
    • Measure total external static pressure (ESP)
    • Make repairs if total ESP is above HVAC OEM recommended

• If the motor is not running
  • Diagnose motor
  • Always disconnect the power to the HVAC system before disconnecting or reconnecting any connectors to these motors.
  • Two inputs needed for motor operation
    • High voltage constant power source
      • Voltage can be ±10% of rating
      • Always check for proper grounding
  • Communication (Low Voltage)
Troubleshooting

- With power back confirm voltage from control board to motor via motor leads
  - High voltage input
    - 115VAC systems
    - 115VAC required at all times between terminals (L) and (N)
Troubleshooting

• With power back confirm voltage from control board to motor via motor leads
  • High voltage input
    • 230VAC systems
    • 230VAC required at all times between terminals (L) and (N)
Troubleshooting

• With power back confirm voltage from control board to motor via motor leads
  • Low voltage input
    • Check for proper low voltage signals 18-30 VAC
    • Always check voltage between taps 1-5 and (C)
      • Check all modes of operations, only one tap will be energized per mode of Operation (Give time for Delays)
Troubleshooting

- Check the voltage between position 4 and 5 of the power cord connector. Contact HVAC manufacturer if system is rated for 120 VAC power, and the measured voltage between positions 4 and 5 is not 120 VAC.

- Contact HVAC manufacturer if system is rated for 240 VAC power, and the measured voltage between positions 4 and 5 is not 240 VAC.

- Contact HVAC manufacturer if system is rated for 277 VAC power, and the measured voltage between positions 4 and 5 is not 277 VAC.

- If the measured voltages are correct between positions 4 and 5 for the 120 VAC, 240 VAC or 277 VAC system.
Troubleshooting

• Refer to the OEM Service Guide to determine correct supply layout
• With power back on check the voltage between common(s) supply(s) of the power cord connector and the respective signal(s)
• If voltage is not detected recheck at the board.
• In this illustration the commons are at the 1 and 3 positions.

• Check for 24V between a common and the stage being called for.

• Example: for single stage heat you should detect 24V between 1 and 13.

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<tr>
<th></th>
<th>BLACK - common</th>
<th>RED - delay programmed input</th>
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<tr>
<td>9</td>
<td>“O” - ORANGE</td>
<td>“R” - RED</td>
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<tr>
<td>10</td>
<td>“HUM” - BLACK</td>
<td>“W1” - BROWN</td>
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<td>11</td>
<td># input - BROWN</td>
<td>“Y2” - YELLOW</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>“G” - GREEN</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>YELLOW - “Y1”</td>
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<tr>
<td>14</td>
<td></td>
<td>PURPLE - adjust programmed input</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>YELLOW/ BLACK</td>
<td></td>
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16x4 Wire Low Voltage Check
• Specific to US Motors 16 Pin

**Reconnect line voltage to motor module**
  • Turn off power to system before reconnecting line voltage

• Check the voltage between positions 1 and 4 of the communication cable connector

• Voltage between positions 1 and 4 should be 9-15 Vdc

• Recheck 16 pin connections

• Note: Based on space limitations, the Interface Control Module may be remotely located.
• Check the voltage between positions 1 and 4 of the communication cable connector
• Voltage between positions 1 and 4 should be 9-15 vdc
• Repeat steps for each mode of operation (Heat, Cool, Fan/Circ, etc.).
Motor Troubleshooting

• Remove Control Module from motor based on manufacturers’ instructions

Control Module
• Make sure the motor shaft spins freely, without effort, manually in both directions
  • Replace motor if the shaft does not spin freely without effort manually.

• Inspect connector on back side of motor for bent, damaged, or recessed wires and terminals

• Check phase to phase resistance between each of the three phase terminals in the motor connector
  • Resistance levels between any two contacts should be equal (less than 20 ohms)
    • Resistance between lead 1 and lead 2
    • Resistance between Lead 1 and Lead 3
    • Resistance between Lead 2 and Lead 3
  • If resistance levels are equal the motor is functioning properly
  • Replace motor if the resistance levels are not equal
  • Replace motor if the resistance levels are open circuited or short circuited

Test pin to pin resistance
< 20 ohms +/-10%

Motor Connector
• Inspect the magnets through the back side of motor for broken or chipped magnets on the rotor core
• Replace motor if magnets on the rotor core are broken or chipped
• Disconnect the three-wire motor-to-control harness from the control and remove control unit
  • Inspect for bent, damaged, or recessed wires and terminals inside of connector
  • Replace control unit if 3 pin connector contains bent, damaged or recessed terminals
Control Unit Verification

- Check phase to phase resistance between each of the three phase pins in the harness connector
- Check the resistance between any 2 of the 3 pins
- If the multi-meter indicates resistance levels greater than 100K ohms Motors, Control unit is functioning properly
- If the multi-meter indicates resistance levels are less than 100K ohms for US Motors, others by be different (refer to OEM manual for correct reading)
- Replace control unit
• **Inspect capacitors inside of control unit**
  - Replace control unit if capacitors are bulging or swollen
  - Control unit may have 2 or 4 Capacitors

**Example of damaged capacitors**
• Inspect the NTC thermistor
  • Inside of control unit for any cracks or breakage
  • Not all control units have a NTC Thermistor
  • Replace control unit if NTC thermistor is cracked or broken
Final Checks

- Check mounting and fastening of motor and control
  - Make sure control unit and motor are securely attached together and mounted tightly in HVAC system
- Check control unit connectors
  - Inspect for shorts, detached wiring, or loose connections.
- Check power cord and signal connections
  - Make sure both are securely connected to control unit connectors.
- Check blower motor and verify wheel rotation
  - Make sure it spins freely manually without effort or assisted means in both directions
- Check circuit breakers
The First Multi-Brand ECM Replacement.

RESCUE Select™ is the new EC motor engineered to replace the X13® or SelecTech® OEM motors. Preprogrammed with the option of programming to match the OEM profile. If you need a replacement, 
ASK US — we’ve got your motor.

Rely on US

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