**ICM450**

Programmable Three Phase Voltage Monitor with 25-Fault Memory

Protects motors from premature failure and burnouts

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**Installation, Operation & Application Guide**

For more information on our complete range of American-made products – plus wiring diagrams, troubleshooting tips and more, visit us at: www.icmcontrols.com

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**Specification**

**Input**
- Line Voltage: Universal, 190-630 VAC
- Frequency: 50-60 Hz
- Load Side Monitoring: Optional
- Control Voltage: 18-240 VAC
- Frequency: 50-60 Hz

**Output**
- Type: Relay, SPDT
- Voltage Range: 240 VAC @ 10A maximum
- Frequency: 50-60 Hz

**Control Operating Temperature**
- Operating Temperature: -40°F to +167°F (-40°C to +75°C)
- Storage Temperature: -4°F to +167°F (-20°C to +75°C)

**LCD Operating Temperature**
- Operating Temperature: -4°F to +167°F (-20°C to +75°C)

**Mechanical**
- Mounting: Surface mount using (2) #8 screws
- Terminations: Screw terminals
- Weight: 12 ounces (341 grams)

**Dimensions**
- 6 1/2” L, 4 1/4” W, 1 3/8” H (16.5 cm. L, 10.8 cm. W, 3.5 cm. H)

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**Parameters**

**Phase Unbalance Protection**
- Voltage Unbalance: 2-20% adjustable

**Over/Under Voltage Protection**
- Under Voltage: 2-25% adjustable
- Over Voltage: 2-25% adjustable

**Phase Loss Protection**
- Phase Loss Condition: Equals 25% of nominal for any given phase; system will shut down and a fault will be recorded should this occur

**Delay on Break Timer**
- Control Voltage: 18-240 VAC
- Time Delay: 0 to 10 seconds adjustable

**Fault Interrogation Delay**
- Time Delay: 0 to 15 seconds adjustable

**Installation**

1. Using (2) #8 screws, mount the ICM450 in a cool, dry, easily accessible location in the control panel.
2. Connect voltage as shown in Figure 1 (below). Leave existing line and load side connections intact on the contactor.
3. Load side monitoring is optional (unit may be used to monitor line side only). Wire the contactor and optional control voltage monitoring as in Figures 2 and 3 (below).
4. Upon application of power, the ICM450 will be on line and will begin to monitor the system.

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**Button Functions**

- **Press arrows to scroll through and select user parameter settings in Setup mode. HOLD down for fast edit.**
- **Press to enter Setup mode and select user parameters.**
- **Hold for voltage display a b c a c (simultaneously).**
- **Press to read faults. Hold for 5 seconds to clear faults and reset memory.**

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**Caution**

Installation of the ICM450 shall be performed by trained technicians only. Adhere to all local and national electric codes.

Disconnect all power to the system before making any connections.
**Fault Conditions**

Press and release fault button to scroll through all saved faults.

*Note: For initial setup, press and hold FAULT for 5 seconds to remove any previously stored faults.*

<table>
<thead>
<tr>
<th>Fault Conditions</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fault</strong></td>
<td><strong>Problem</strong></td>
</tr>
</tbody>
</table>
| Back Phase Loss  | Not all three of the phases on the load side are present | 1. Re-energize the contactor.  
2. If the fault reappears after the load energizes:  
   a. Turn all power OFF  
   b. Check all load side connections  
   c. Check the contacts of the contactor for debris or excess carbon. |
| Back Phase Rev   | Loads 1, 2, or 3 are not in sequence (not 120° phase shifted) | 1. Turn OFF all power.  
2. Swap any 2 phases on the load side of the ICM450 only (example: swap load 1 and load 2) *  
3. Re-apply power. |
| Back Phase Unbalance | A voltage unbalance between the three load phases exceeds the unbalance setpoint | 1. Press the READ button to observe the present load voltages. Check system for unbalance cause.  
2. Increase the fault interrogation time if necessary.  
3. Increase the percent unbalance setting if necessary. |
| Front Over Voltage | Average phase-phase voltage exceeds the maximum percentage | 1. Check system for over-voltage cause.  
2. Increase the percent over-voltage setting if necessary.  
3. Increase the fault interrogation time if necessary. |
| Front Phase Loss  | Not all three of the phases on the line side are present | 1. Press and hold the READ button on the phase monitor or use an AC voltmeter to carefully measure all three phase-phase line voltages (example: Line 1 ➔ Line 2, Line 2 ➔ Line 3, Line 3 ➔ Line 1).  
2. Repair the missing phase. |
| Front Phase Reversal | Lines 1, 2, or 3 are not in sequence (not 120° phase shifted) | 1. Turn OFF all power.  
2. Swap any 2 phases on the line side of the ICM450 (example: swap Line 1 and Line 2)*  
3. Re-apply power. |
| Front Phase Unbalance | A voltage unbalance between the three line phases exceeds the unbalance setpoint | 1. Press the READ button to observe the present load voltages. Check system for unbalance cause.  
2. Increase the fault interrogation time if necessary.  
3. Increase the percent unbalance setting if necessary. |
| Front Under Voltage | Average phase-phase voltage is below the minimum percentage | 1. Check system for under-voltage cause.  
2. Increase the percent under-voltage setting if necessary.  
3. Increase the fault interrogation time if necessary. |

* Only swap phases during initial setup, not after the ICM450 has been in operation without errors.*

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**Troubleshooting**

<table>
<thead>
<tr>
<th>Problem</th>
<th>LCD Readout</th>
<th>LED Status</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load will not energize</td>
<td>Phase Average</td>
<td>All LEDs Off</td>
<td>Confirm that the control input (terminals 1 &amp; 3) is properly connected and configured</td>
</tr>
<tr>
<td>Load will not energize</td>
<td>Phase Average</td>
<td>Load LED Off, Fault LED Blinking</td>
<td>Press FAULT once to observe the current fault; correct the condition of the first fault that appears (see Fault Conditions above, for a list of corrective actions)</td>
</tr>
<tr>
<td>Fault LED blinks repeatedly while load is energized</td>
<td>Phase Average</td>
<td>Fault LED Blinking, Load LED On</td>
<td>Indicates there are faults saved in the memory; press FAULT rapidly to scroll through saved faults; to clear the faults, press and hold FAULT for more than 5 seconds</td>
</tr>
<tr>
<td>Load will not de-energize when control voltage is OFF</td>
<td>Phase Average</td>
<td>Load LED On, Control LED Off</td>
<td>The control mode setting is OFF; press SETUP to get to the control mode. Press to set the control mode ON</td>
</tr>
<tr>
<td>Setup LED is on while load is being energized</td>
<td>Anything Other Than Phase Average</td>
<td>Setup LED On, Load LED On</td>
<td>To exit the setup mode, press either READ or FAULT</td>
</tr>
<tr>
<td>Load will not energize</td>
<td>Reset</td>
<td>Fault LED Blinking</td>
<td>Unit in lockout; maximum number of retries in manual reset mode has been reached; to reset unit, press FAULT and hold for more than 5 seconds</td>
</tr>
<tr>
<td>Load turns ON and OFF repeatedly</td>
<td>Readout is Irrelevant</td>
<td>Fault LED Blinking</td>
<td>Fix load side fault; press FAULT to observe condition; the delay on break period may be too short; press SETUP to enter the delay on break mode; press to lengthen the delay</td>
</tr>
</tbody>
</table>

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**ONE-YEAR LIMITED WARRANTY**

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