ICM455
Programmable, Three-Phase Voltage Monitor

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

Important Safety Information
HIGH VOLTAGE WARNING! – Turn off power at the main service panel before installing.

Specifications
Input
• Line Voltage: 190 – 630 VAC
• Frequency: 50 – 60 Hz
• Load Side Monitoring: Optional
• Control Voltage: 18 – 240 VAC

Output
• Type: Relay, SPDT
• Voltage Range: 240 VAC at 10A max
• Frequency: 50 – 60 Hz
• Remote Monitor Voltage: 0 – 10 VDC

Control Operating Temperature
• Operating Temperature: -40°F to 167°F (-40°C to 75°C)
• Storage Temperature: -4°F to 185°F (-40°C to 80°C)

Mechanical
• Mounting: Surface mount using two (2) #8 screws
• Terminations: Screw terminals
• Dimensions: 5.5”L x 4.5”W x 1.5”H

Parameters
Phase Unbalance Protection
• Voltage Unbalance: 2-20%, adjustable

Over/Under Voltage
• 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 if this should occur.

Delay on Break Timer
• Control Voltage: 18-240 VAC
• Time Delay: 15 seconds to 10 minutes

Fault Interrogation Delay
• Time Delay: 0 – 15 seconds, adjustable
• Provides a delay between fault detection and system shutdown—helps to eliminate nuisance trips and unnecessary shutdowns.

Installation
1. Turn off power at main service panel.
2. Using two (2) #8 screws, mount the ICM455 in a cool, dry, easily accessible location in the control panel.
3. Connect voltage as shown in “Wiring Diagram”. Leave existing line and load side connections intact on the contactor.
4. Load side monitoring is optional (unit may be used to monitor line side only). Wire the contactor and optional control voltage monitor as shown in “System Diagram”. Note: Load/line wire must be rated for 3-phase voltage rating, 20ga minimum.
5. Upon application of power, the ICM455 will be on line and will begin to monitor the system. Note: If voltage is not correct, see “Voltage Read Calibration” in Button Functions section.
6. Terminals 3 and 4 are the control signal input terminals.
7. “Control Mode” is turned ON or OFF in setup.
8. With “Control Mode” set to ON, there must be a voltage present on terminals 3 and 4 for the relay output terminals 1 and 3 to close; this voltage can be supplied from a thermostat, pressure switch, etc.
9. When the voltage on these terminals is re-applied, the unit will not re-energize until the delay on break (0-10 minutes) time has elapsed.
10. Use of terminals 3 and 4 is optional; they will be ignored if the “Control Mode” is switched to OFF.

Wiring Diagram

Typical System Diagram

Setting the Parameters
1. Press the green SETUP button to enter the setup mode. Setup LED will light.
2. Use the ▲ and ▼ buttons to change user parameters.
3. Scroll through setup by pressing and releasing the SETUP button.
4. When the last parameter has been set, the phase average will be displayed and the setup LED will automatically turn off.

Button Functions
▲ Press arrow to scroll through and select parameter settings in Setup Mode.
▼ Voltage Read Calibration: Hold down to calibrate line voltage. Fault and setup LEDs will flash. Use the ▲ and ▼ buttons to adjust. Press SETUP to exit calibration.
SETUP Press to enter Setup Mode and select user parameters. Setup LED illuminates when in Setup Mode.
Press to return to home screen, which alternates between line voltage and phase average.
Press to read faults. Hold for 5 seconds to clear faults and reset memory. Fault light will blink when fault has been added to memory.
Press and hold to reset system due to system error – this will not reset the parameters.

Output Conditions

<table>
<thead>
<tr>
<th>Output Voltage</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 VDC</td>
<td>Load Energized</td>
</tr>
<tr>
<td>2 VDC</td>
<td>Phase Imbalance</td>
</tr>
<tr>
<td>4 VDC</td>
<td>Over Voltage</td>
</tr>
<tr>
<td>6 VDC</td>
<td>Under Voltage</td>
</tr>
<tr>
<td>7 VDC</td>
<td>Phase Reversal</td>
</tr>
<tr>
<td>8 VDC</td>
<td>Phase Loss</td>
</tr>
</tbody>
</table>

To turn backlight on, press any button.
**FAVORITE BUTTONS**

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

1. **Note**: For best recommendations, consult manufacturer of equipment.

**Troubleshooting**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>LCD Readout</th>
<th>LED Status</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line voltage is not correct</td>
<td>Phase Average</td>
<td>N/A</td>
<td>Use calibration method described in &quot;Button Functions&quot;.</td>
</tr>
<tr>
<td>Load will not energize</td>
<td>Phase Average</td>
<td>All LEDs off</td>
<td>Confirm that the control input (terminals 3 and 4) 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 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 ( \langle \rangle ) to set 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 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 lockdown; 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 ( \langle \rangle ) to lengthen the delay.</td>
</tr>
</tbody>
</table>