CT438 Intelligent Motor Control as a Competitive Advantage
Maximizing the Use of Smart Network Enabled Motor Control Devices

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Agenda

- Review Wire Reduction Practices to Minimize Panel Cost
- Use Data to Maximize Production Efficiency
- Use Integrated Architecture Tools to Turn Data into Information
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Review Wire Reduction Practices to Minimize Panel Cost

Use Data to Maximize Production Efficiency

Use Integrated Architecture Tools to Turn Data into Information
Wire Reduction Practices

1. 7 - 11 lb-in
2. 7 - 11 lb-in
3. 9 - 22 lb-in
4. 5 - 7 lb-in
5. 9 - 22 lb-in
6. 5 - 7 lb-in

### Replacement Contactor

<table>
<thead>
<tr>
<th>Coil Modules</th>
<th>Contactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>193-EIO-CM-C23</td>
<td>100-C09</td>
</tr>
<tr>
<td>193-EIO-CM-C55</td>
<td>100-C30</td>
</tr>
<tr>
<td></td>
<td>100-C05</td>
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</tbody>
</table>
Agenda

Review Wire Reduction Practices to Minimize Panel Cost

Use Data to Maximize Production Efficiency

Use Integrated Architecture Tools to Turn Data into Information
Smart Motor Controls Have Data

- **Real-time Data**
  - Current / %FLA
  - Voltage
  - Imbalance
  - % Thermal Capacity Utilization
  - Ground Fault Current

- **Historical Data**
  - Trip Log
  - Event Log
  - Snapshot Log

- **Operational Data**
  - Operating Hours
  - Number of Starts

- **Projected Data**
  - Time to Trip
  - Time to Reset

- **Energy Data**
  - kWh
  - kW Demand
## Understanding Real-time Data

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>% Thermal Capacity Utilization</td>
<td>the simulated heat content of a motor; overload relays trip when this value equals 100%</td>
</tr>
<tr>
<td>2</td>
<td>% Full Load Amps</td>
<td>the actual motor current compared to the motor rating; overload, jam/locked rotor, stall, and under load protection are based on this value</td>
</tr>
<tr>
<td>3</td>
<td>Ground Fault Current</td>
<td>current leaking to earth ground in a balanced 3-phase power system; due to winding break down or internal arcing</td>
</tr>
<tr>
<td>4</td>
<td>Imbalance</td>
<td>maximum deviated line voltage/current compare against the average 3-phase voltage/current; used in phase loss protection</td>
</tr>
<tr>
<td>5</td>
<td>Current / Voltage</td>
<td>magnitude of electrical energy going to the motor; fundamental values for the calculations above</td>
</tr>
</tbody>
</table>
Understanding Projected & Operational Data

1. **Time to Trip** – *the time remaining before the overload relay trips on thermal overload*

2. **Time to Reset** – *the time that the motor needs to cool before a reset command can be accepted*

3. **Operating Hours** – *the number of hours a motor has been running; can be used for proactive motor maintenance procedures*

4. **Number of Starts** – *the number times a motor has started; can be used for proactive motor maintenance procedures*
## Understanding Projected & Operational Data

1. **Snapshot Log** – *the RMS current and voltage data at the time of a trip event*

2. **Trip / Warning Log** – *a historical list of records for recent trip and warning events that are time & date stamped*

3. **Sequence of Events Log** – *a list of every event that occurred to the monitoring device (i.e. relay energized, digital input active, power up, warning event, etc…)*
1. kW, kVAR, PF – magnitude of electrical power going to the motor; reports when the electric motor is mechanically loaded

2. kWh, kW Demand, PF – the amount of electrical energy that the utility will bill you for
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Demonstration

ACME Mixing System
Thank You!