

Observations of Faults

- Pre-observations of participant units prior to maintenance identified 9.7 faults/circuit.
- For 55 circuits, pre-faults per circuit are 10.1 ± 0.8 and post-faults per circuit are 10 ± 0.8
- The difference is not statistically significant
- Observations of 22 non-participants identified 3.3 faults/circuit due to smaller units lacking economizers, belt-drives, and only evaluating refrigerant charge on 10 units

Observed Technician Issues

- 85% perform maintenance same as before
- 92% had issues with tools or procedures
- 50% didn't have low-loss fittings or didn't purge hoses before attaching to valves
- One added contaminated refrigerant
- 55% of observed units have dampers open from 10 to 30% and 9% are fully open
- Technicians did not repair broken dampers and none repaired economizers while observed

Power Lockout Fault



*No Power Lock-out

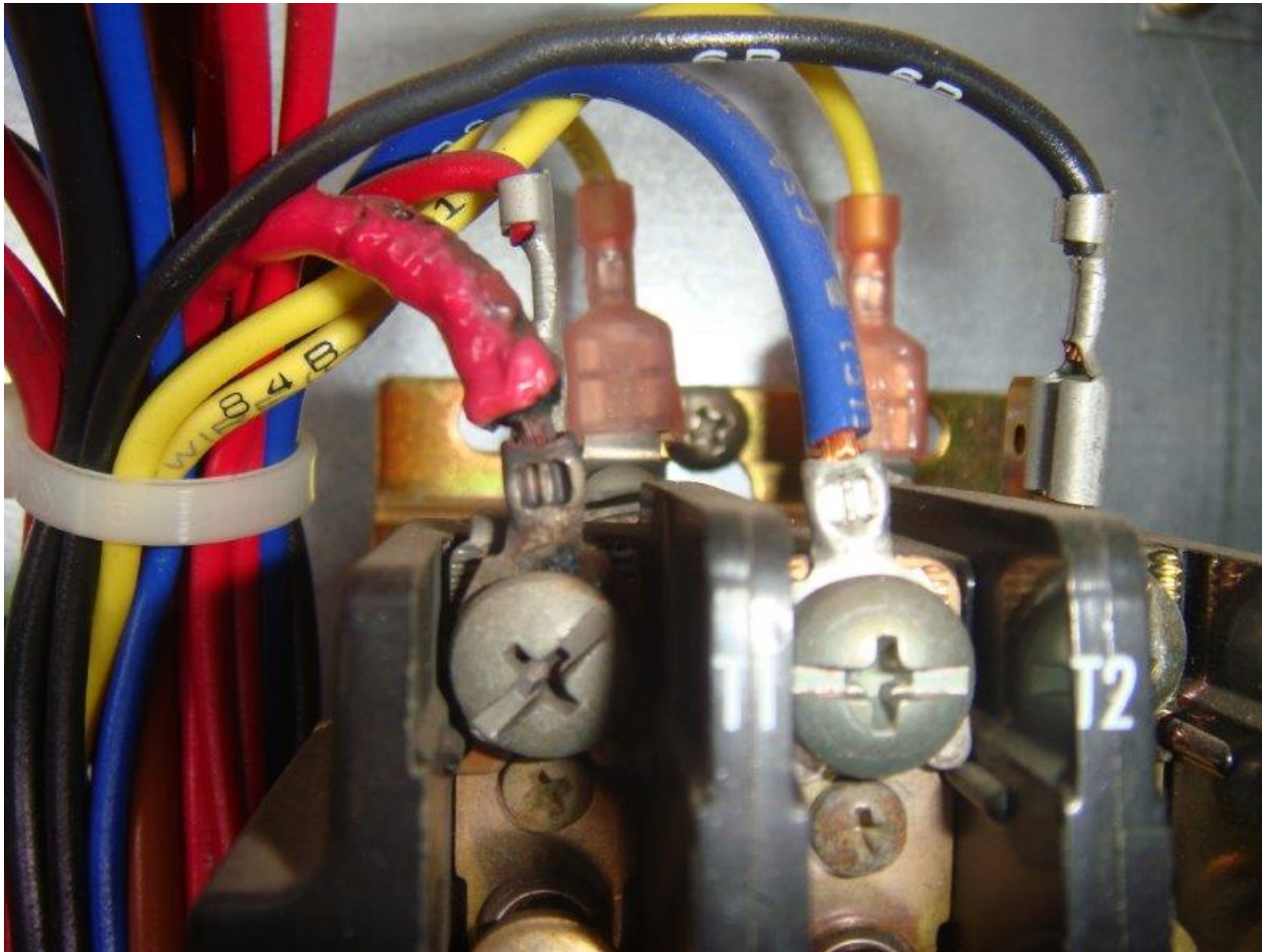
*Power Lock-out for Safety

Cabinet Missing Fastener Fault



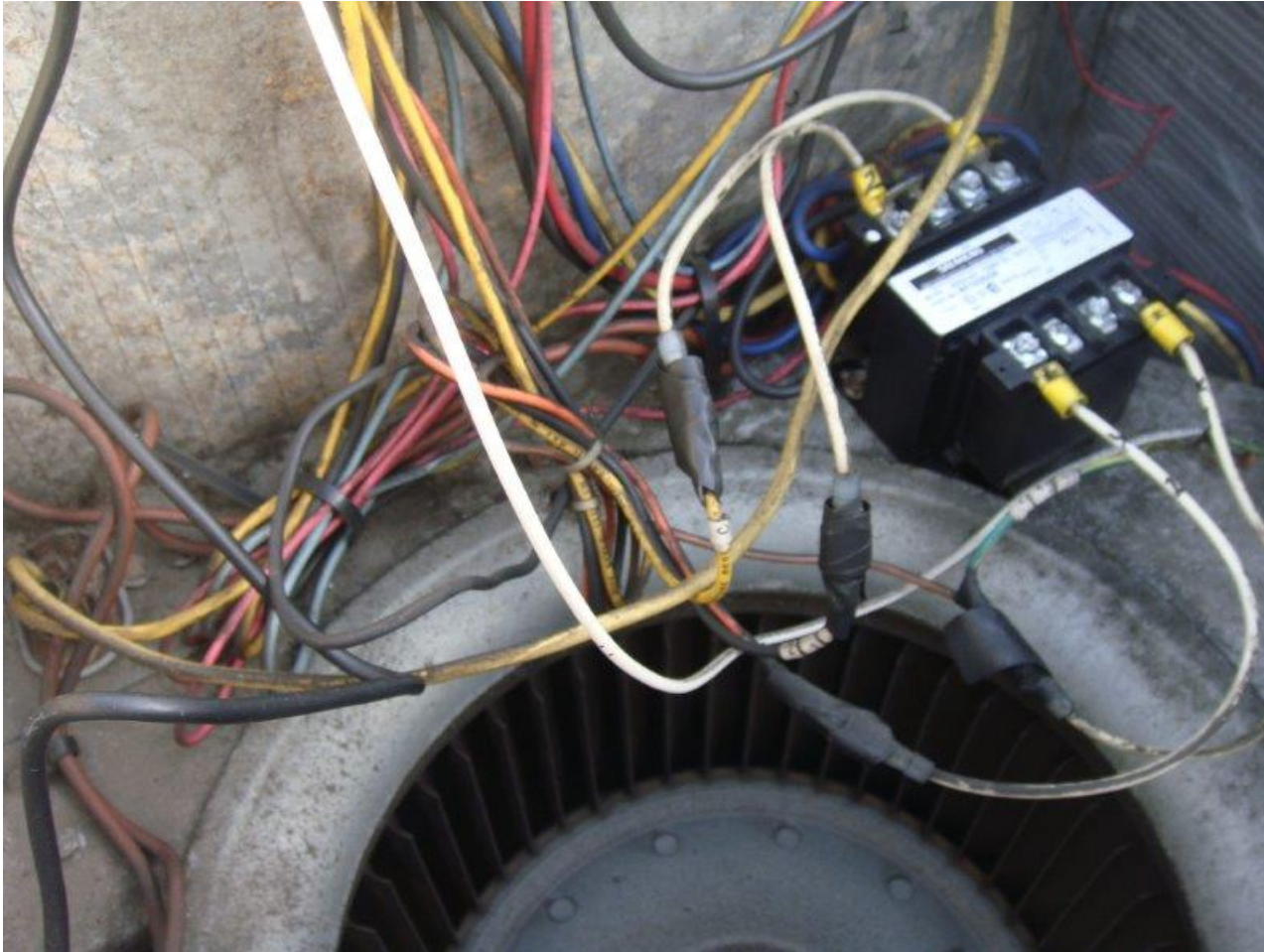
*Missing cabinet fasteners after CQM services
CPUC Work Order 32 Impact Evaluation Research Study

Contactor Burnt Wiring Fault



*Contactor burnt wiring after CQM services

Wiring Harness Fault



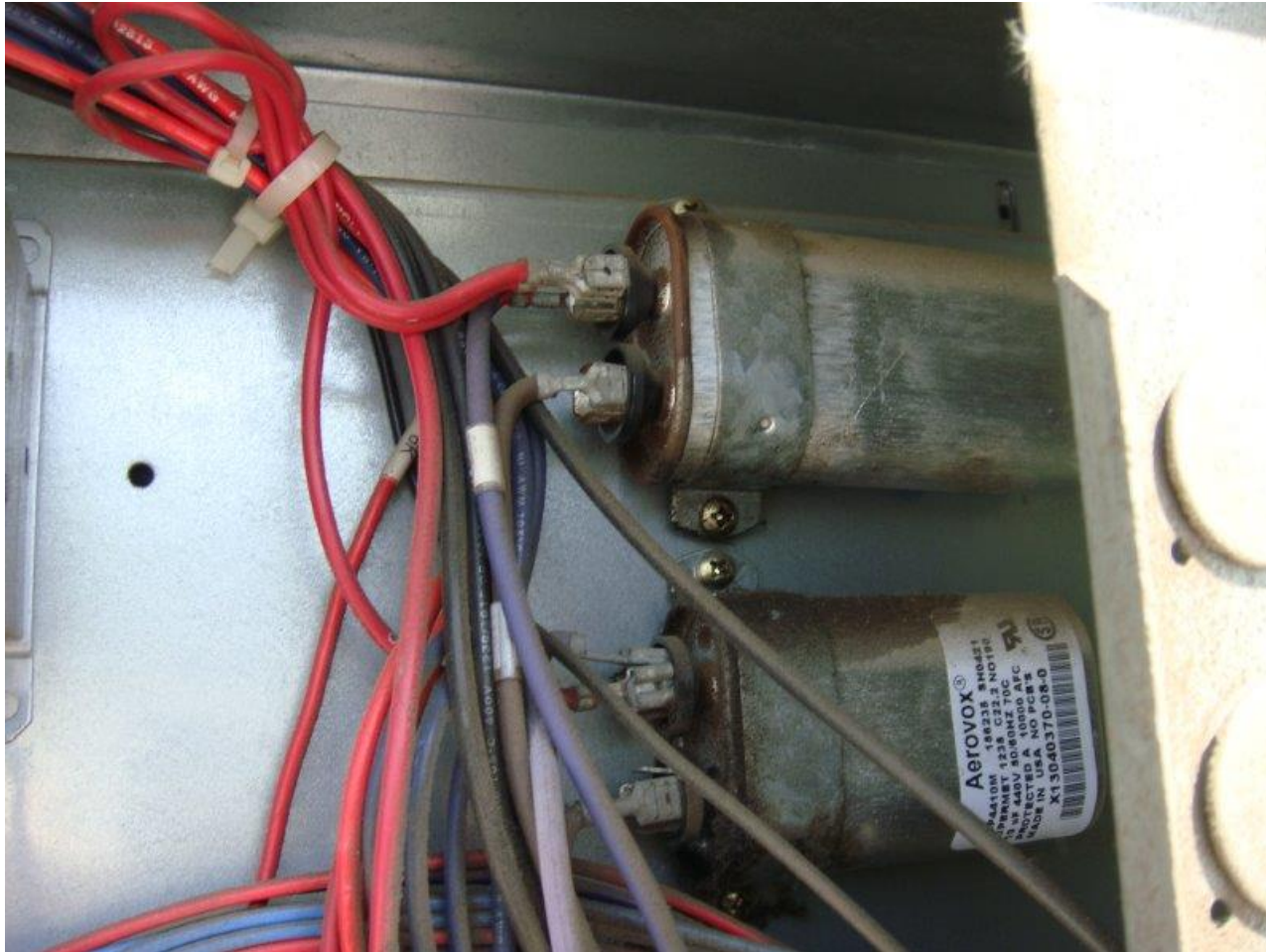
*Wiring harness fault after CQM services

Failed Capacitor Fault



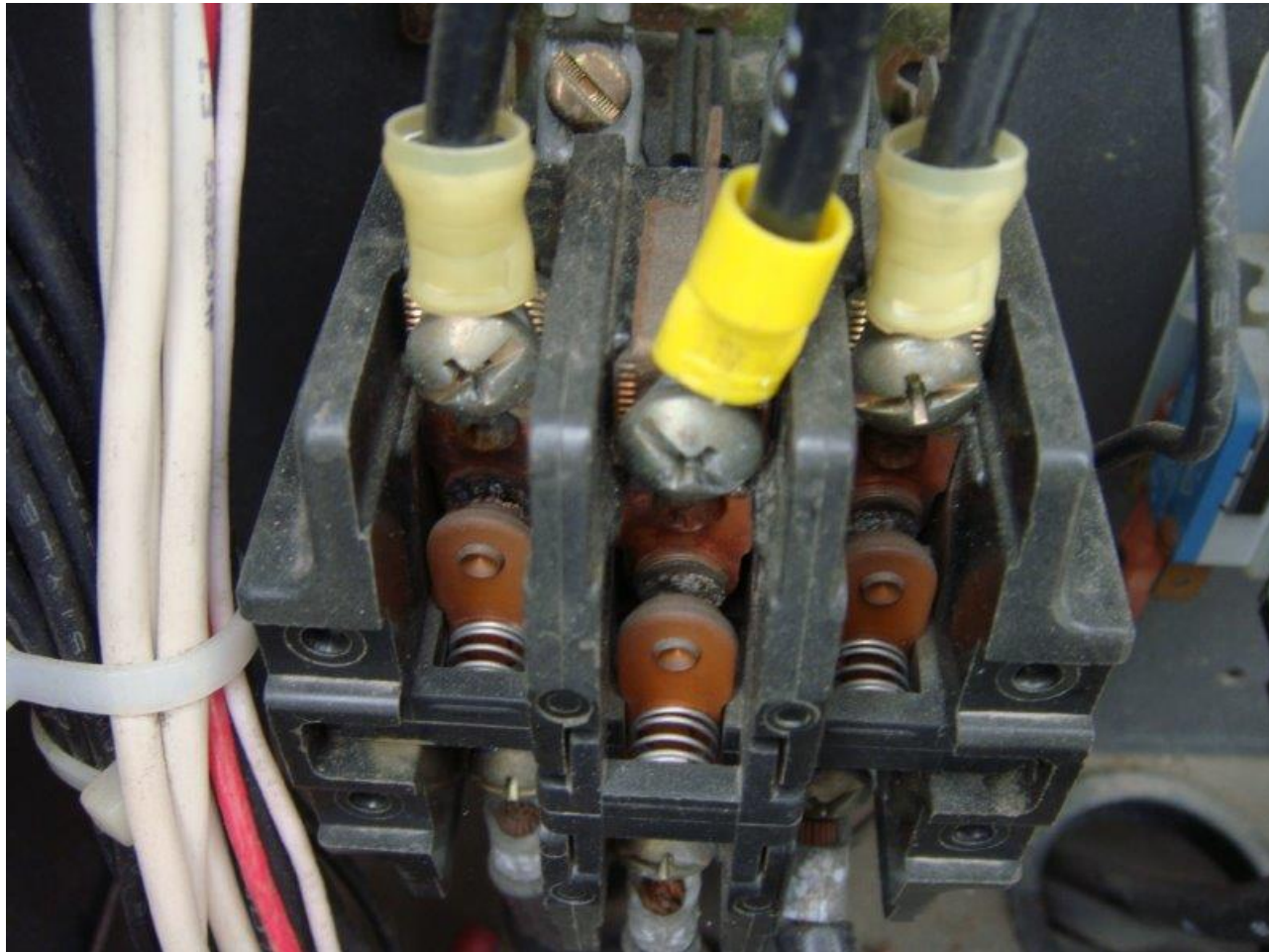
*50 μF capacitor measuring 0.012 μF after CQM services

Leaking Capacitor Fault



*Lower capacitor leaking oil after CQM services

Pitted Contactor Fault



*Pitted contactor after CQM services

Leaking Pressure Switch Fault



*Dark stain of leaked refrigerant oil after CQM services

Evaporator Coil Cleaning Fault



*Dirty evaporator after CQM services

Condenser Coil Corrosion Fault



*Corroded condenser coil after CQM (not in inventory nor plan)

Condenser Coil Cleaning Fault



*Dirty condenser coil after CQM services

Condenser Coil Cleaning Fault



*Improper coil cleaning with tools attached and no power lockout