



## CENTERLINE<sup>®</sup> Motor Control Centers

### **Power Factor Correction Capacitors for Bulletin 2100 MCC Starter Units**

#### Application Notes

#### **General Information**

Power factor correction capacitors are typically mounted in a separate unit with a separate door. This unit is located below the specified starter. Door interlock and three phase power fuses are included. Capacitors are factory wired to load side of the starter at the line side of the overload relay.

- Do not install capacitors in any vertical section that contains a variable frequency drive.
- Capacitors should not be used on motors subject to plugging or jogging. Disconnect capacitors when bumping motor.
- 2 kVAR through 25 kVAR in 0.5 space factor.
- 27.5 kVAR through 50 kVAR in 1.0 space factor.



**ATTENTION:** Failure to follow application notes can result in misapplications that subject the Power Factor Correction Capacitor to excessive voltage and/or current that can damage the PFCC and/or blow PFCC fuses.

#### **Application Conditions**

Power Factor Correction Capacitors (PFCCs) must **not** be subjected to:

- 1. HIGH AMBIENT TEMPERATURES IN EXCESS OF 45°C (155°F).** Be cautious of NEMA Type 3R outdoor applications that can be exposed to direct sunlight.
- 2. OPERATING VOLTAGE IN EXCESS OF 110% OF THE PFCC NAMEPLATE VOLTAGE.** PFCCs that are not switched with load, but float on the distribution system, can cause excessive voltage during periods when load is light. Floating PFCC kVAR must not exceed 25% of the distribution system transformer kVA rating.
- 3. VOLTAGE AND CURRENT WAVEFORMS OTHER THAN 60 HZ SINE WAVES.** Non-linear devices that employ solid state switching technology (AC & DC drives, AC reduced voltage controllers, arc-type lighting, programmable controllers, computers, induction furnaces, etc.) produce distorted non-sinusoidal wave forms and harmonics that can blow PFCC fuses and/or damage PFCCs due to high current because of reduced capacitive reactance and/or capacitive-inductive resonance. Do not connect a PFCC to the load side of a Bulletin 150 SMC controller or any AC Drive.

4. **VARIABLE FREQUENCY VOLTAGE THAT CAN BE PRODUCED BY A MOTOR THAT ACTS AS A GENERATOR WHEN** disconnected from power source, supplied with magnetizing current from PFCCs connected to the motor stator windings, and driven by the load at a sufficient and decreasing speed. Be wary of fan applications in particular. Also be cautious of high inertia loads such as bandsaws, centrifuges, chippers, hammer mills, etc.
5. **REPETITIVE SWITCHING DUE TO JOGGING, INCHING, RESTARTING,** etc. which can occur via two or three wire, automatic or manual control. Be cautious in the use of protective relays (B813S-V\_\_) that reset automatically. PFCC voltage must discharge to a minimum level before the PFCC is reenergized.
6. **PLUGGING.** NOTE: A standard reversing starter could inadvertently be used to plug a motor by an operator or via a control scheme by others.
7. **OPEN-TRANSITION SWITCHING** via reversing and multi-speed starters, and via open-transition type Wye-Delta and autotransformer starters.
8. **INDUCED VOLTAGES AND CURRENTS** produced via transformer action in isolated motor windings connected to a PFCC while other windings in the same motor are energized, when multispeed or part-winding motors are utilized. These conditions could be harmful to the motor and/or cause it to malfunction.

## Alternatives

Instead of energizing and de-energizing a PFCC along with a motor, a lighting contactor can be utilized to connect and disconnect a PFCC to the power circuit at a point upstream of the controller or starter at the appropriate time by an appropriate contact or contacts.

If there is no space in the starter for a lighting contactor, a separate Bulletin 2102L or 2103L lighting contactor unit could be utilized.

Each PFCC connected to the power system will add to the capacity of that power system to increase inrush current to PFCCs subsequently connected to the power system. Measures may have to be taken to reduce PFCC inrush current. PFCCs may have to be located further upstream and controlled by special PFCC switching equipment that might control PFCC inrush current and/or harmonics in the power system.

For further information, contact PCP Headquarters.

CENTERLINE is a trademark of Rockwell International Corporation or its subsidiaries.

 **Rockwell** Automation

**Allen-Bradley**

Packaged Control Products  
Milwaukee, Wisconsin 53204 U.S.A.

Publication 2100-4.3- May, 1997

© 1997 Rockwell International Corporation. All rights reserved. Printed in the USA.