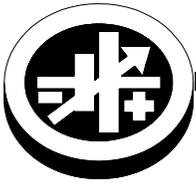


# APPLICATION NOTE



**KEPCO** An ISO 9001 Company.

**BOP**  
**007**

## Driving An Inductive Load In Current Mode

### I — INTRODUCTION

BOP power supplies in ranges of 100W, 200W and 400W with option L (L suffix) are optimized for driving large inductor loads greater than 0.5mH. They are differentiated from the standard model number, for example, BOP 20-20D, to have an L suffix such as BOP 20-20DL. Factory tests were performed with loads up to 1H, however higher values are possible.

### II — THE PROBLEM

When driving inductive loads higher than 0.5mH with standard units (without L suffix), the system may become unstable.

### III — THE SOLUTION

There are two means of eliminating oscillation in the current loop operating with moderate inductive loads and moderate voltage and current:

- 1 Add capacitance in parallel with the output (inductive load). The value of the capacitor can be from 0.1  $\mu$ F to 1.0  $\mu$ F depending on the value of the load inductance.
- 2 Add a series-connected resistor-capacitor network in parallel with the BOP output/inductive load. The value of the resistor should be in the range of 100 to 500 Ohms and the value of the capacitor should be 0.1  $\mu$ F to 0.5  $\mu$ F, depending on the load inductance value.

Both options are recommended when the BOP is used with very low frequency output into inductive loads.

**CAUTION: When driving heavy inductive loads with high currents, it is possible for the BOP and the load to be damaged by an A-C input power loss which prevents the load's stored energy from being dissipated inside the BOP.**

To avoid possible damage from the inductance kick-back voltage observe the following:

- Use a UPS to supply the BOP.
- Set BOP output current and/or voltage to zero and turn off the BOP after the output current actually reaches a zero value.
- Use properly rated (voltage and current) bipolar transorbs or a properly rated bipolar crowbar element connected directly at the output of the BOP.

An alternative is a Normally-Closed Contactor connected across the output of the BOP that will be controlled open during normal operation. The coil of the contactor will be supplied from the same input power source as the BOP. These options may also be combined.

For both standard (without L suffix) and L suffix units, if the system becomes unstable at the cross-over between voltage limit mode and current mode when driving an inductive load, the power supply can be further optimized by reducing the current loop bandwidth. This can be accomplished by connecting a ceramic capacitor across pins 16 and 18 of the Rear Programming Connector.

The value of the capacitor is correlated to the load's inductance. A value in the range of 0.0022 $\mu$ F to 0.1 $\mu$ F is recommended.