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**SELECTIONIX, INC.**  
WOODINVILLE, WA

**SUPERSTEP SERIES 4000**  
**SEQUENCING STEP**  
**CONTROLLERS**

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**INSTALLATION & OPERATING**

**SLC4000 TECH NOTE 07**

**PWM Vernier SSR-Compatible**

## Introduction

This addendum provides a description of a Series 4000 model with a Solid State Relay (SSR) compatible PWM 10V dc vernier output.

## Description of the PWM Vernier Operation

The vernier output is switched either Full On (10 V dc) or Full Off (0V dc) with the pulse width being modulated. The time base period is approximately 800 milliseconds with an 8 millisecond pulse width, which provides a 1% resolution. The output is 10 ma minimum with a 30 ma typical output, compatible with several off-the-shelf solid state relays. This modulating control provides virtual continuous and bumpless load control, even when using discrete relay stages.

When all the relays are off, and the input demand increases, the controller adjusts the vernier output from 0 to 100% of the total period. When the command is at maximum, and all relay stages are on, the vernier is commanded to full on, as well. The SLC4000-8-11 is for a 1x vernier load, while the SLC4000-8-21 is for a 2x vernier load. The difference for a 2x vernier load is that the output is on a maximum of 50%, or 1 unit load, when the demand is between steps and modulates to full on when all the relay steps are on.

## Features

- LED, DS10, indicates the time-varying proportional output.
- Hysteresis is included with both increasing and decreasing demand to prevent hunting.
- Pulse width modulated 0/10 V dc output @ 30 ma typical/10 ma minimum
- 800 millisecond period with 1% resolution
- Models for 1x or 2x unit loads, SLC4000-8-11 (1x load) or SLC4000-8-21 (2x load)

### **See the SLC4000 Installation and Maintenance manual for general information.**

- A compatible solid state relay should have the following characteristics:
  - Input signal is compatible with 10V dc
  - Zero Voltage Turn-On
- A compatible SSR is Crouzet GN Series