

Chapter 1. General Information

Introduction

This manual covers the installation, theory of operation, and calibration of the SPM-A Synchronizers. The synchronizers are used in generator applications for speed and phase matching of the generator before paralleling with other generators or the utility bus. These synchronizers have adjustable dynamics to match the dynamics of the engine. Small- to medium-size diesel engines require a synchronizer with fast dynamics. Turbomachinery, large diesel, gas or gasoline engines, and steam and gas turbines require slower dynamics.

Two versions of SPM-A Synchronizers are available, with or without voltage matching. Both versions are designed for a wide range of generator applications.

For additional information on adjusting SPM-A Synchronizers used on lean-burn spark-ignited gas engines, see Application Note 01301.

Description

The SPM-A Synchronizer biases the speed of an off-line generator set so that the frequency and phase match those of another generator or the utility bus. Then it automatically issues a contact closure signal to close the circuit breaker between the two when frequency and phase are matched within limits for a specified match-up time.

The SPM-A is a phase-locked-loop synchronizer and strives for a perfect match of frequency and phase. The SPM-A Synchronizer with voltage matching generates additional raise and lower signals (relay contact closures) to the generator's voltage regulator. Voltages must match within the SPM-A's tolerance before breaker closure occurs.

For single-unit synchronization, installation of one synchronizer on each generator allows each unit to be individually paralleled to the bus. For multiple-unit synchronization, one synchronizer can synchronize up to seven paralleled generator units simultaneously to another bus.

Both synchronizers versions have three output options: high impedance, low impedance, and EPG. Select the high impedance output for single-unit synchronization when the engine is controlled by a Woodward 2301 control. Select the low impedance output for single-unit synchronization when the engine is controlled by a Woodward 2301A, 2500, or Electrically Powered Governor (EPG) control through a Generator Load Sensor. Use the EPG output when using a Woodward EPG control without load sensing. Both units have the following features:

- 120 or 208/240 Vac input
- 10 degree phase window
- 1/8, 1/4, 1/2, or 1 second dwell time (internally switch selectable, factory set for 1/2 second)

The SPM-A Synchronizer with voltage matching has a 1% voltage match as standard. See the part number chart for other options.