



### New Features

- ✓ USB connectivity to PC
- ✓ ToolKit configuration support
- ✓ Password protection to all variants
- ✓ Same look & feel as SPM-D
- ✓ Drop-In replacement

## Load Share Synchronizers for 3-ph AC Gen-Sets

### DESCRIPTION

Woodward understands the time-intensive nature of Power Generation projects. Ensuring the longevity of components is one way we can make our customers successful. Woodward has supplied and supported the well-established SPM-D line of synchronizers for 20+ years. With the state of the art Drop-In replacement successor, SPM-D2 the life of this synchronizer line is now extended. All of the SPM-D2 synchronizers are password protected and are configurable either through HMI as before or through ToolKit configuration tool with USB connectivity.

The SPM-D2-11 is a microprocessor-based synchronizers designed for use on two or three phase AC generators equipped with Woodward or other compatible speed controls and automatic voltage regulators. The SPM-D2-11 synchronizer provides automatic frequency, phase and voltage matching using either analog or discrete output bias signals. It combines synchronizing for one circuit breaker, load and power factor control, or isochronous load sharing and generator protection. This synchronizer is applied to a wide range of prime movers and generators, as its control signals may be set to fit several types of gensets - from fast reacting diesel engines to soft reacting gas turbines.

The SPM-D2-11 synchronizer is available in 1 base model:

- **SPM-D2-11 .../LSXR:** provides 1-phase / 2-wire voltage measurement with analog or discrete biasing signals, analog active and reactive load sharing lines, and generator protection.

### FEATURES

- Phase match or slip frequency synchronization with voltage matching
- Two-phase true RMS voltage sensing of generator and bus with Class I accuracy
- Selectable operating modes like SPM-A (Run, Check, Permissive, and Off)
- Synch-Check and synchronization time monitoring
- Dead bus closing of CB on demand
- Two analog load share lines for Load/var sharing
- Active power and power factor control in mains parallel operation
- Voltage and frequency control in isolated operation
- Generator real power setpoint by parameter (2 values) or via 0/4 to 20 mA analog input
- Soft unloading and power limit value with relay output
- Control outputs: Discrete raise/lower for speed and voltage in all variants, or analog signals (Voltage, Current and PWM)
- Single phase CT sensing for generator with power, overload, voltage and frequency protection
- Two line bright liquid crystal display for operation, alarm, measuring values visualization and parameterization
- Front face with synchronoscope and indication of breaker state/control activity
- Multi-level password protection of parameters
- Woodward ToolKit™ software for configuration via USB
- Two built-in languages: English, German

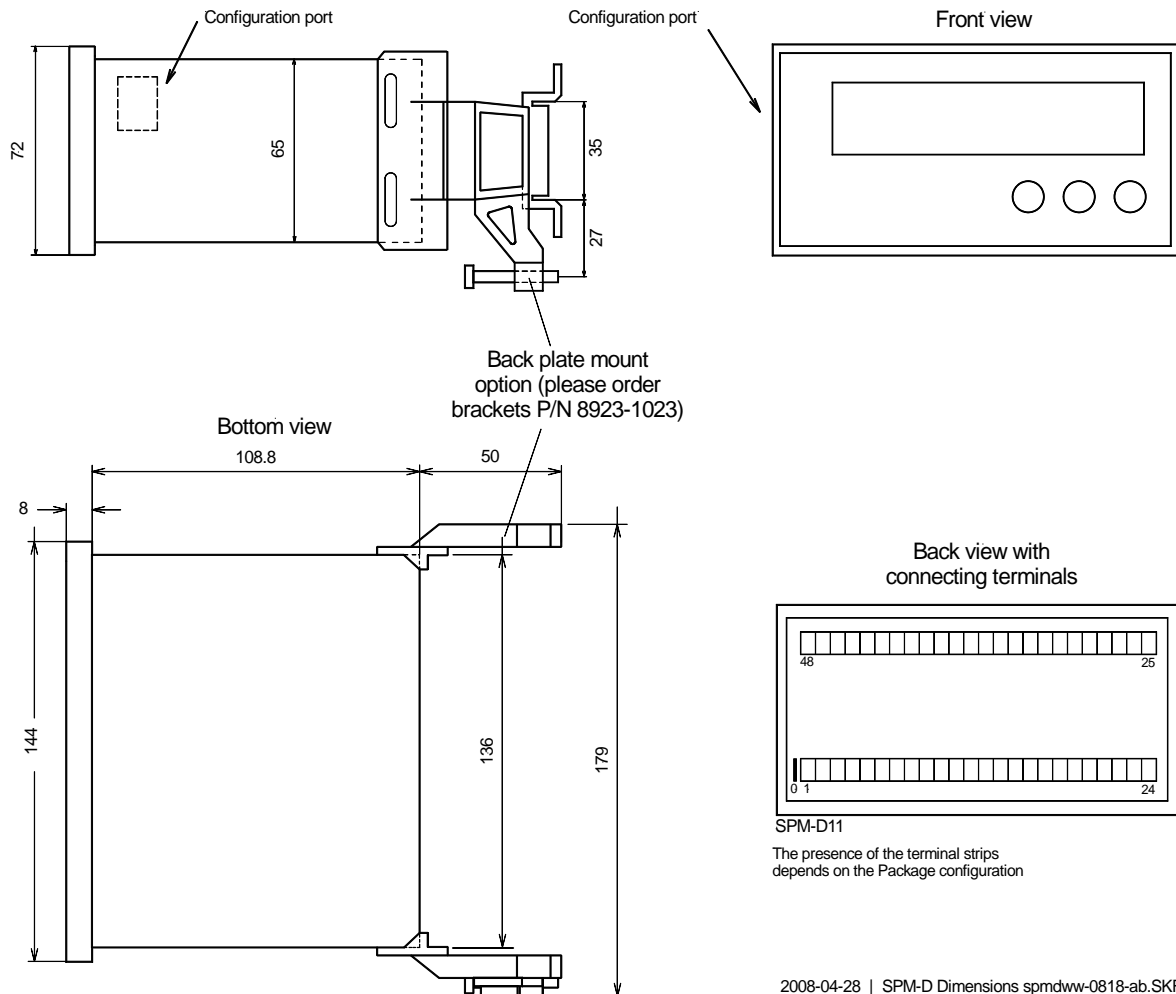
- Synchronization for one circuit breaker
- Active Power (kW) / Reactive Power (VAR) sharing (Analog)
- Generator Protection
- Active power and power factor control
- Frequency, Phase and Voltage Matching
- Compatible with a wide range of GOVs and AVR's
- Analog input to control active power set-point externally
- Circuit breaker time compensation
- Two lines bright LCD display for generator and bus values
- Front face synchronoscope for easy commissioning
- Configurable through HMI or PC
- CE Marked (RoHS2 compliant)
- UL/cUL Listed

# SPECIFICATIONS (See specific manuals for more details)

Power supply ..... 12/24 V<sub>DC</sub> (9.5 to 32 V<sub>DC</sub>)  
 Intrinsic consumption ..... max. 8 W  
 Ambient temperature (operation) ..... -20 to 70 °C  
 Ambient humidity ..... 95%, non-condensing  
**Voltage** ..... (  $\lambda/\Delta$  )  
     [1] 100 Vac Rated (V<sub>rated</sub>) ..... 63/110 V<sub>AC</sub>  
                   Max. value (V<sub>max</sub>) ..... 150 V<sub>AC</sub>  
     and [4] 400 Vac Rated (V<sub>rated</sub>) ..... 230/400 V<sub>AC</sub>  
                   Max. value (V<sub>max</sub>) ..... 300 V<sub>AC</sub>  
                   Rated surge volt. (V<sub>surge</sub>) ..... [1] 2.5 kV, [4] 4.0 kV  
 Accuracy ..... Class 1  
 Measuring frequency ..... 50/60 Hz (40 to 70 Hz)  
 Linear measuring range ..... 1.25 x V<sub>rated</sub>  
 Input resistance ..... [1] 0.21 MOhms, [4] 0.696 MOhms  
**Current** Rated (I<sub>rated</sub>) ..... [1] .../1 A, [5] ... /5 A  
 Linear measuring range ..... 3.0 x I<sub>rated</sub>  
 Burden ..... < 0.15 VA  
 Rated short-time overcurrent (1 s) ..... [1] 50 x I<sub>rated</sub>, [5] 10 x I<sub>rated</sub>  
**Discrete inputs** ..... isolated  
 Input range ..... 12/24 V<sub>DC</sub>  
 Input resistance ..... approx. 6.8 kOhms  
**Analog inputs** ..... freely scalable  
 Resolution ..... 10 Bit  
 0/4 mA to 20 mA input ..... 250 Ohms

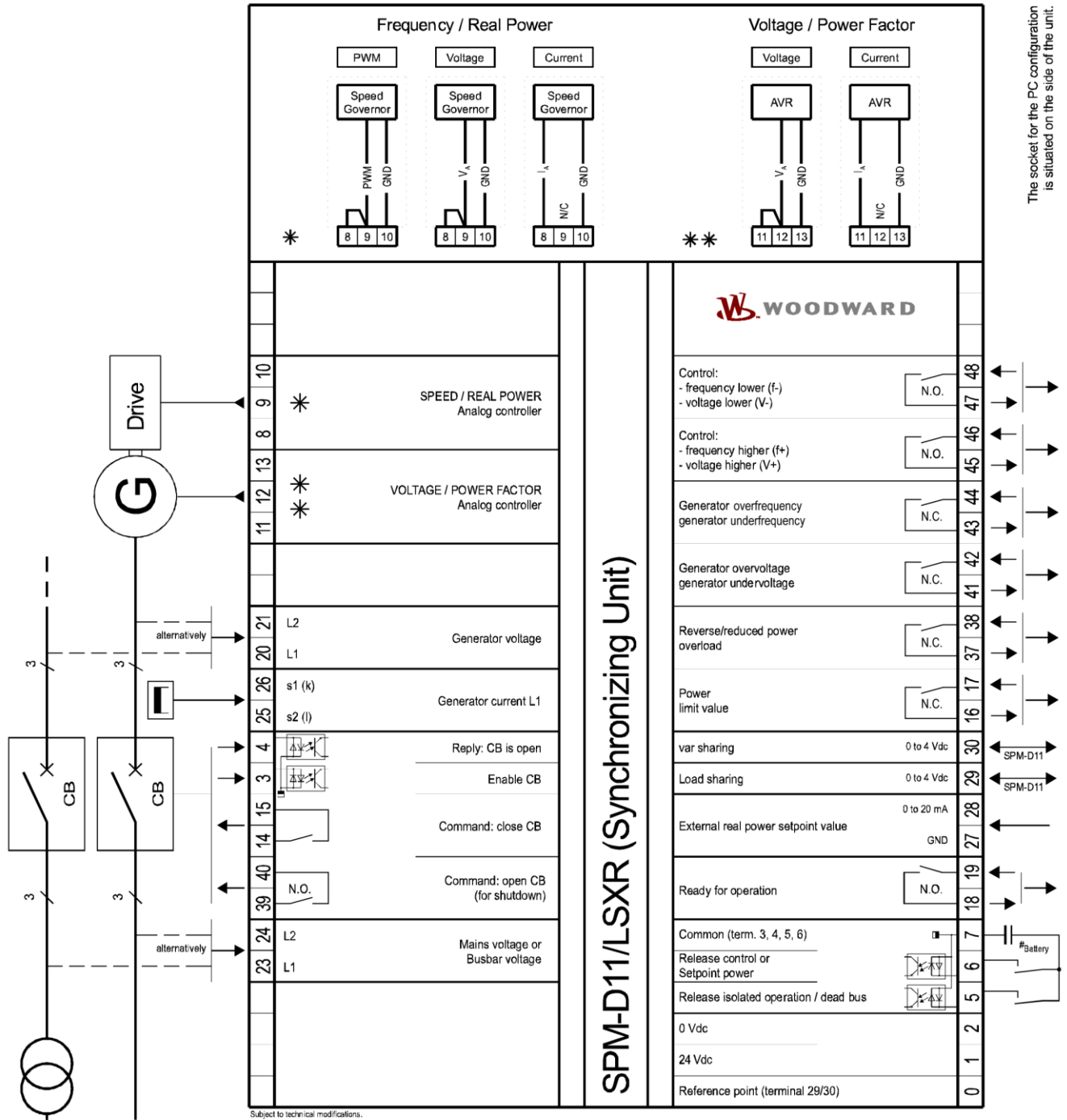
**Relay outputs** ..... isolated  
 Contact material ..... AgCdO  
 Load (GP) (V<sub>cont, relay output</sub>) AC: ..... 2.00 A<sub>AC</sub>@250 V<sub>AC</sub>  
                   DC: 2.00 A<sub>DC</sub>@24 V<sub>DC</sub> / 0.36 A<sub>DC</sub>@125 V<sub>DC</sub> / 0.18 A<sub>DC</sub>@250 V<sub>DC</sub>  
 Pilot Duty (PD) AC: ..... B300  
                   DC: 1.00 A<sub>DC</sub>@24 V<sub>DC</sub> / 0.22 A<sub>DC</sub>@125 V<sub>DC</sub> / 0.10 A<sub>DC</sub>@250 V<sub>DC</sub>  
**Analog Outputs (isolated)** ..... freely scalable  
 Type .....  $\pm 10$  V /  $\pm 20$  mA / PWM  
 Insulation voltage (continuously, AVR out) ..... 300 V<sub>AC</sub>  
 Insulation voltage (continuously, Gov out) ..... 100 V<sub>AC</sub>  
 Resolution ..... 12 Bit  
 $\pm 10$  V (scalable) ..... internal resistance  
 $\pm 20$  mA (scalable) ..... maximum load 500 Ohms  
**Housing** Front panel flush mounting ..... Type APRANORM DIN 43 700  
 Dimensions WxHxD ..... 142 x 72 x 122 mm  
 Front cutout WxH ..... 138 [+1.0] x 68[+0.7] mm  
 Connection ..... screw/plug terminals depending  
                   On connector 1.5 mm<sup>2</sup> or 2.5 mm<sup>2</sup>  
 Front ..... insulating surface  
 Protection System / Sealing ..... with correct installation  
     Front ..... IP42  
     Front ..... IP54 (with gasket P/N 8923-1037)  
     Back ..... IP20  
 Weight ..... approx. 800 g  
**Disturbance test (CE)** ..... tested according to applicable EN guidelines  
**Listings** ..... CE, UL/cUL listing for ordinary locations  
**Marine (Pending)** ..... LR (Type Approval), ABS (Type Approval)

## DIMENSIONS



SPM-D11  
 The presence of the terminal strips depends on the Package configuration

# TERMINAL DIAGRAM



## RELATED PRODUCTS

- Load Share Synchronizer **SPM-D2-10** (Product Specification # 37622)
- Digital Synchronizer and Load Control **DSL-2** (Product Specification # 37493)
- Master Synchronizer and Load Control **MSLC-2** (Product Specification # 37494)
- Load Share speed control **2301E** (Product Specification # 03404)
- Load Sharing Module **LSM** (Product Specification # 82686)
- **SPM-A** Synchronizer (Product Specification # 82383)
- **Power Generation Learning Module** (Product Specification # 03412): P/N 8447-1012

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# FEATURES OVERVIEW

SPM-D2-11 Series	SPM-D2-11/LSXR	
<b>Measuring / Display</b>		
Generator/System A voltage		2-ph
Busbar/System B voltage		2-ph
Generator/System A current		1-ph
<b>Control</b>		
Breaker		1
Synchronization		2-ph
Isolated Operation		✓
Dead bus start functionality		On-demand
SPM-A synchronization modes		✓
Maine parallel operation <sup>#1</sup>		✓
<b>Controller</b>		
Discrete raise/lower: Speed/Load		✓ <sup>#2</sup>
Discrete raise/lower: Voltage/Power Factor		✓ <sup>#2</sup>
Analog Output: Speed/Load		✓ <sup>#3</sup>
Analog Output: Voltage/Power Factor		✓ <sup>#3</sup>
PWM Output: Speed/Load		✓ <sup>#4</sup>
Active power setpoint: 0/4 to 20mA		✓
Load/var sharing		✓
<b>I/Os</b>		
Discrete alarm inputs		4
Discrete outputs		7
Analog outputs: +/- 10 V, +/- 20 mA, PWM; configurable		-
USB Serial interface		1
<b>Protection</b>		
Generator: Over-/under-voltage (59/27)		✓
Generator: Over-/under-frequency (81O/U)		✓
Generator: Overload (32)		✓
Generator: Reverse power (32R)		✓
Generator: Reduced power (32F)		✓
<b>Accessories</b>		
Configuration via PC (ToolKit)		✓
<b>Listings/Approvals</b>		
UL / cUL Listing (61010 ,6200)		✓
CE Marked		✓
<b>Part Numbers</b>		
Measuring inputs 100 V <sub>AC</sub> , .../5 A		<b>8440-2165</b>
Measuring inputs 400 V <sub>AC</sub> , .../5 A <sup>#5</sup>		<b>8440-2169</b>

- #1 Additional mains decoupling relay such as Woodward easYprotec or HighPROTEC required
- #2 Configurable to either speed/load or voltage/power factor
- #3 Analog bias outputs for voltage and speed freely configurable for all levels (+/-1 V, +/-3 V, 0 to 5 V, 0.5 to 4.5 V, +/-10 V +/-5 V, 0 to 20 mA, +/-20 mA, and much more)
- #4 Speed bias output configurable as 500 Hz PWM output with adjustable voltage level
- #5 All units with 400V measuring inputs can also be used for 100 V system voltage

Subject to technical modifications.

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