SPM-D2-10 Series

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

Synchronizers for 2/3-phase 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-D2-10 series are 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-D2-10 synchronizers provide automatic frequency, phase and voltage matching using either analog- or discrete output bias signals. These synchronizers are 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-D2-10 synchronizers are available in 3 base models:
- **SPM-D2-10 …** : provides 1-phase / 2-wire voltage measurement with options for analog and/or discrete biasing signals and wide range power supply
- **SPM-D2-10 …/YB**: provides 3-phase / 4-wire voltage measurement with discrete biasing signals and option for wide range power supply
- **SPM-D2-10 …/PSY5**: provides 1-phase / 2-wire voltage measurement with discrete biasing signals, option for wide range power supply and 2 sets of switchable parameter set.

FEATURES

- Phase match or slip frequency synchronization with voltage matching
- Two-Phase or three-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
- 2 setting blocks, each containing 7 configurable parameters (in PSY5 variants) selectable through DI: Frequency/Voltage control dead-band, Frequency/Voltage control time pulse, Frequency/Voltage control gain, Circuit breaker time compensation
- Control outputs: Discrete raise/lower for speed and voltage in all variants, | X and XN variants: also configurable analog signals (Voltage, Current and PWM)
- Voltage and frequency control in isolated operation
- Two line bright liquid crystal display for operation, alarm, measuring values visualization and parametrization
- 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

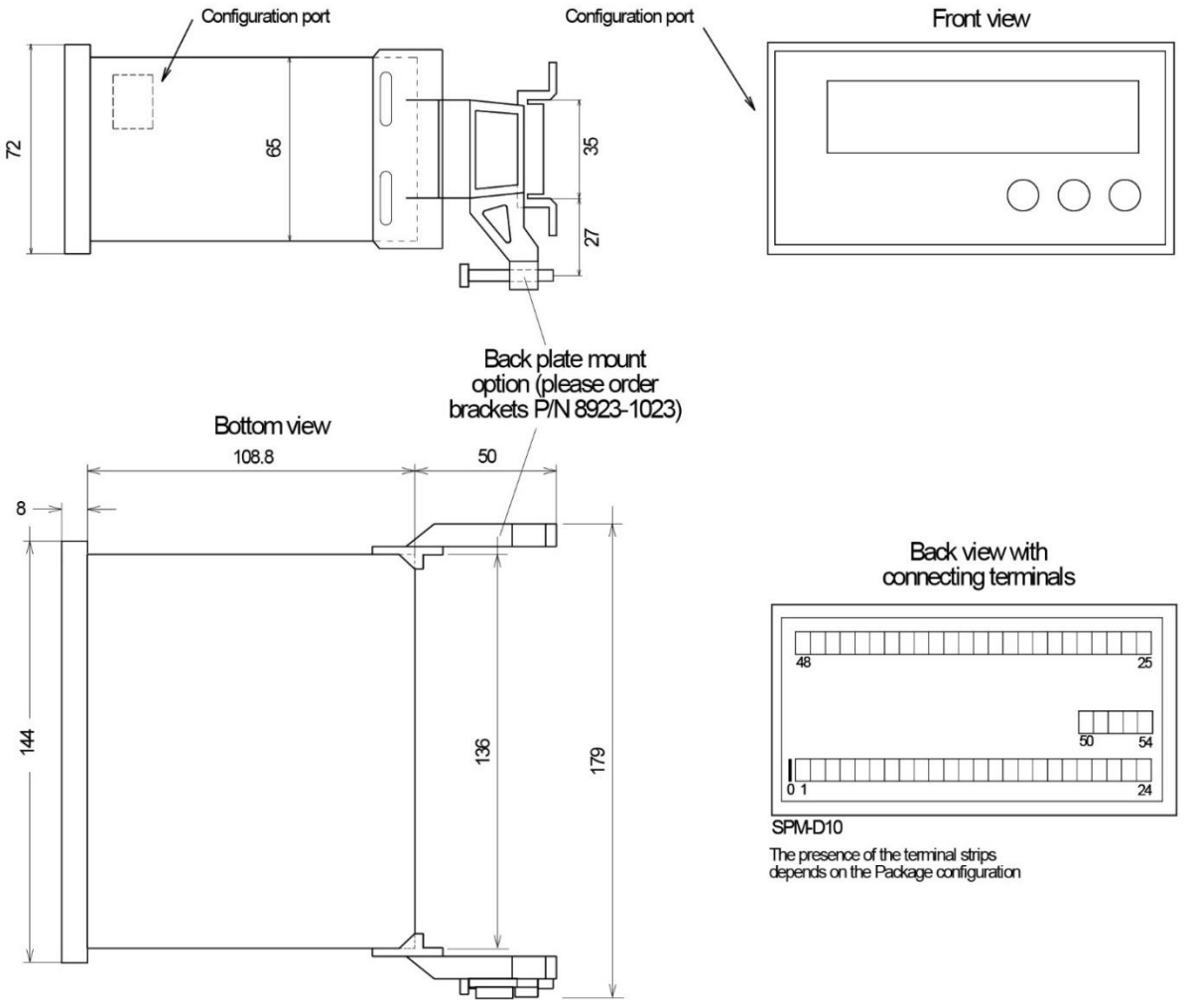
- **Synchronization for one or two circuit breakers**
- **Frequency, Phase and Voltage Matching**
- **Selectable control outputs for speed and voltage biasing**
- **Compatible with a wide range of GOVs and AVRs**
- **Circuit breaker time compensation**
- **Two lines bright LCD display for generator and bus values**
- **Front face synchronoscope for easy commissioning**
- **True RMS measurement for reliable operation**
- **Configurable through HMI or PC**
- **Wide range power supply available**
- **Switchable parameter sets available**
- **CE Marked (RoHS 2 compliant)**
- **UL/cUL Listed**

SPECIFICATIONS

Power supply
[Standard] ..... 12/24 V_{DC} (9.5 to 32 V_{DC})
[N, XN and NYB Packages] ..... 90 to 250Vac / 120 to 375 Vdc;
..... 100 to 240 Vac -15%/+10% (UL rating only)
Intrinsic consumption ..... max. 10 W
Ambient temperature (operation) ..... -20 to 70 °C
[N, XN and NYB Packages] -20 to 60 °C
Ambient temperature (storage) ..... -30 to 80 °C
Ambient humidity ..... 95%, non-condensing
Voltage ..... (人/Δ)
[1] *100 Vac* Rated (V_{rated}) ..... 66/115 V_{AC}
Max. value (V_{max}) ..... 150 V_{AC}
or [4] *400 Vac* Rated (V_{rated}) ..... 230/400 V_{AC}
Max. value (V_{max}) ..... 300 V_{AC}
Rated surge volt. (V_{surge}) ..... [1] 2.5kV, [4] 4.0 kV
Accuracy ..... Class 1
Measuring frequency ..... 50/60 Hz (40 to 70 Hz)
Linear measuring range ..... 1.3 x Vrated
Input resistance ..... [1]0.21 MOhms, [4]0.696 MOhms
Current Rated (I_{rated}) ..... [1]…/1A, [5] … /5A
Linear measuring range ..... 3.0×I_{rated}
Burden ..... < 0.15 VA
Rated short-time overcurrent (1 s) ..... [1] 50×I_{rated}, [5] 10×I_{rated}
Discrete inputs ..... isolated
Input range ..... 12/24 V_{DC} or 18 to 250 Vac/dc
Input resistance ..... approx. 6.8 kOhms or 68 kOhms

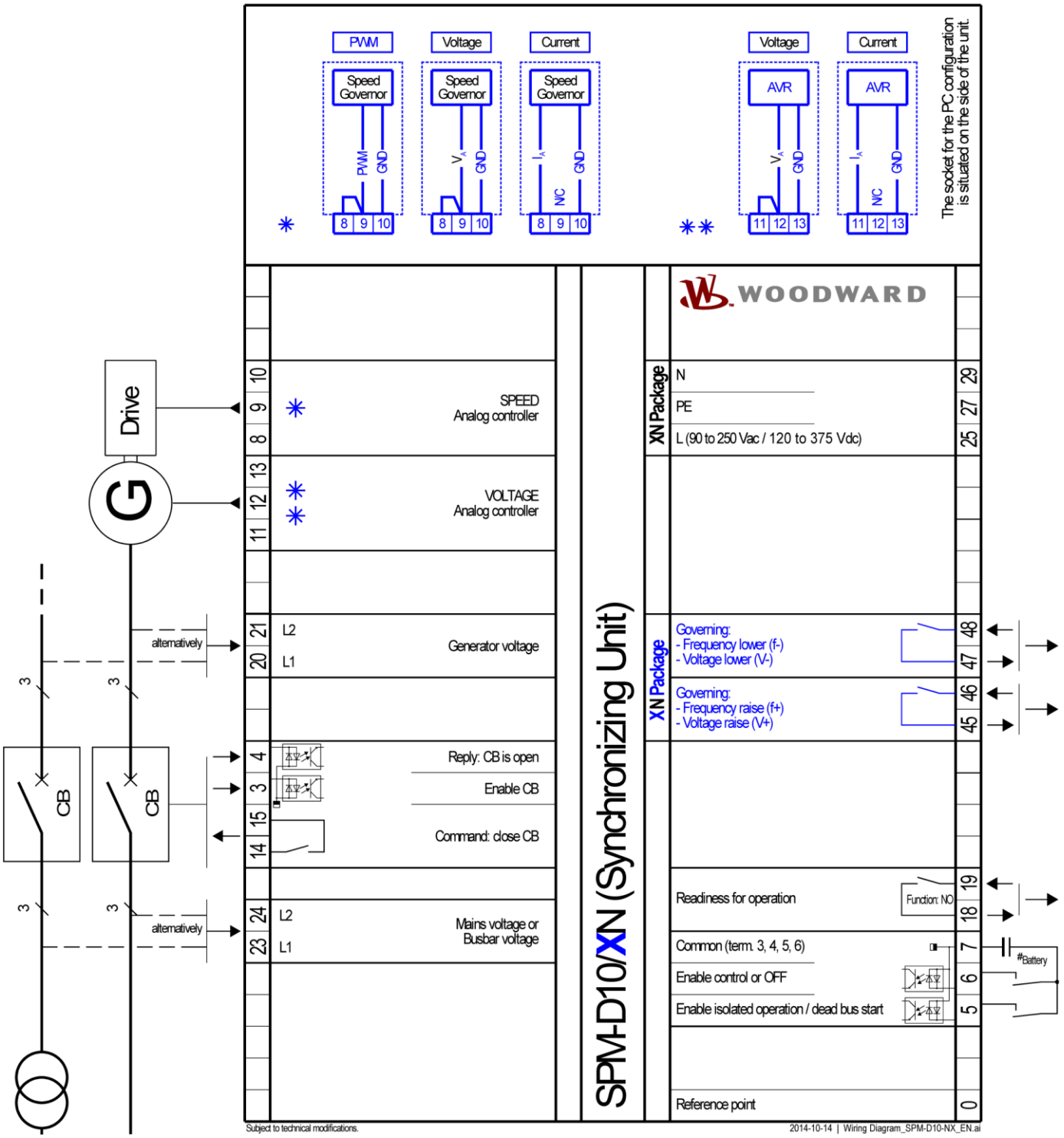
Relay outputs ..... isolated
Contact material ..... AgCdO
Load (GP) ($V_{cont, relay output}$) *AC:* ..... 2.00 A_{AC}@250 V_{AC}
DC: 2.00 A_{DC}@24 V_{DC} / 0.36 A_{DC}@125 V_{DC} / 0.18 A_{DC}@250 V_{DC}
Pilot Duty (PD) *AC:* B300
DC: 1.00 A_{DC}@24 V_{DC} / 0.22 A_{DC}@125 V_{DC} / 0.10 A_{DC}@250 V_{DC}
Analog Outputs (isolated) ..... freely scalable
Type ..... ± 10 V / ± 20 mA / PWM
Insulation voltage (continuously, AVR out) ..... 300 V_{AC}
Insulation voltage (continuously, Gov out) ..... 100 V_{AC}
Resolution ..... 12 Bit
± 10 V (scalable) ..... internal resistance 500 Ohms
± 20 mA (scalable) ..... maximum load 500 Ohms
Housing Front panel flush mounting ..... Type APRANORM DIN 43 700
Dimensions WxHxD ..... 144 × 72 × 122 mm
Front cutout WxH ..... 138 [+1.0] × 68 [+0.7] mm
Connection (screw/plug terminals depending on connector) .. 1.5 mm² or 2.5 mm²
Front ..... insulating surface
Protection System / Sealing .....
Front ..... IP42 with correct installation
Front ..... IP54 (with gasket P/N 8923-1037)
Back IP20
Weight ..... approx. 800 g
Listings tested according to applicable IEC standards .....
..... CE, UL/cUL listing for ordinary locations
Marine (Pending) ..... LR (Type Approval), ABS (Type Approval)

DIMENSIONS



TERMINAL DIAGRAM

NOTE The terminals used for connection depend on the implemented functionality of each package.
The drawing below gives an overview with sample package **XN** – for details please see the dedicated Technical Manual listed in the features table at the rear page.



RELATED PRODUCTS

- Load Share Synchronizer **SPM-D2-11** (Product Specification # 37623)
- Digital Synchronizer and Load Control **DSLC-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

WOODWARD

FEATURES OVERVIEW

SPM-D2-10 Series	SPM-D2-10 Series							
Package	-	X	N	XN	PSY5	PSY5...W	YB	NYB
Measuring / Display								
Generator/System A voltage	2-ph	2-ph	2-ph	2-ph	2-ph	2-ph	3/2-ph	3/2-ph
Busbar/System B voltage	2-ph	2-ph	2-ph	2-ph	2-ph	2-ph	3/2-ph	3/2-ph
Control								
Breaker	1	1	1	1	1 or 2	1 or 2	1	1
Synchronization	2-ph	2-ph	2-ph	2-ph	2-ph	2-ph	3/2-ph	3/2-ph
Isolated Operation	✓	✓	✓	✓	✓	✓	✓	✓
Dead bus start functionality#1	On-demand	On-demand	On-demand	On-demand	Enhanced	Enhanced	Enhanced	Enhanced
Switchable parameter#2	-	-	-	-	✓	✓	-	-
Controller								
Discrete raise/lower: Speed	✓	✓#3	✓	✓#3	✓	✓	✓	✓
Discrete raise/lower: Voltage	✓	✓#3	✓	✓#3	✓	✓	✓	✓
Analog Output: Speed#4	-	✓	-	✓	-	-	-	-
Analog Output: Voltage#4	-	✓	-	✓	-	-	-	-
PWM Output: Speed#5	-	✓	-	✓	-	-	-	-
I/Os								
Discrete alarm inputs	4	4	4	4	4	4	5	5
Discrete outputs	2	2	2	2	3	3	3	3
Analog outputs: +/- 10 V, +/- 20 mA, PWM; configurable	-	2	-	2	-	-	-	-
USB Serial interface	1	1	1	1	1	1	1	1
Power Supply								
24 Vdc	✓	✓	-	-	✓	-	✓	-
Wide Range: 90 to 250 V_{AC} / 120 to 375 V_{DC}	-	-	✓	✓	-	✓	-	✓
Accessories								
Configuration via PC (ToolKit)	✓	✓	✓	✓	✓	✓	✓	✓
Listings/Approvals								
UL / cUL Listing (61010, 6200)	✓	✓	✓	✓	✓	✓	✓	✓
CE Marked	✓	✓	✓	✓	✓	✓	✓	✓
Part Numbers								
Measuring inputs 100 Vac: **8440-…**	**…-2166**	**…-2168**	**…-2174**	**…-2172**	**-**	**-**	**…-2167**	**…-2177**
Measuring inputs 400 Vac#6: **8440-…**	**…-2164**	**…-2171**	**…-2175**	**…-2190**	**…-2170**	**…-2173**	**…-2176**	**…-2189**
Technical Manual	B37615				B37616		B37617	

#1 Dead bus start functionality
On-Demand: Closing of CB on demand
Enhanced: Black start (closing to de-energized second side of a breaker for following conditions):
- dead system 1 - live system 2
- live system 1 - dead system 2
- dead system 1 - dead system 2

#2 Switch from Parameter set #A to #B by activating DI #6
#3 Configurable to either speed or voltage
#4 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)
#5 Speed bias output configurable as 500 Hz PWM output with adjustable voltage level
#6 All units with 400 V measuring inputs can also be used for 100 V system voltage

For more information contact:

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