


New Features

- ✓ USB connection
- ✓ ToolKit configuration support
- ✓ Password protection to all variants
- ✓ Same look and feel
- ✓ 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 AVR's
- 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 250 Vac / 120 to 375 Vdc;
 100 to 240 Vac -15%/+10% (UL rating only)

Intrinsic consumption..... max. 10W
 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..... (/ A)

[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 V_{rated}
 Input resistance..... [1] 0.21 MOhms, [4] 0.696 MOhms

Current Rated (I_{rated})..... [1] .../1A, [5] .../5A
 Linear measuring range..... 3.0 x I_{rated}
 Burden..... < 0.15VA
 Rated short-time overcurrent (1 s)..... [1] 50 x I_{rated}, [5] 10 x 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..... ± 10V / ± 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

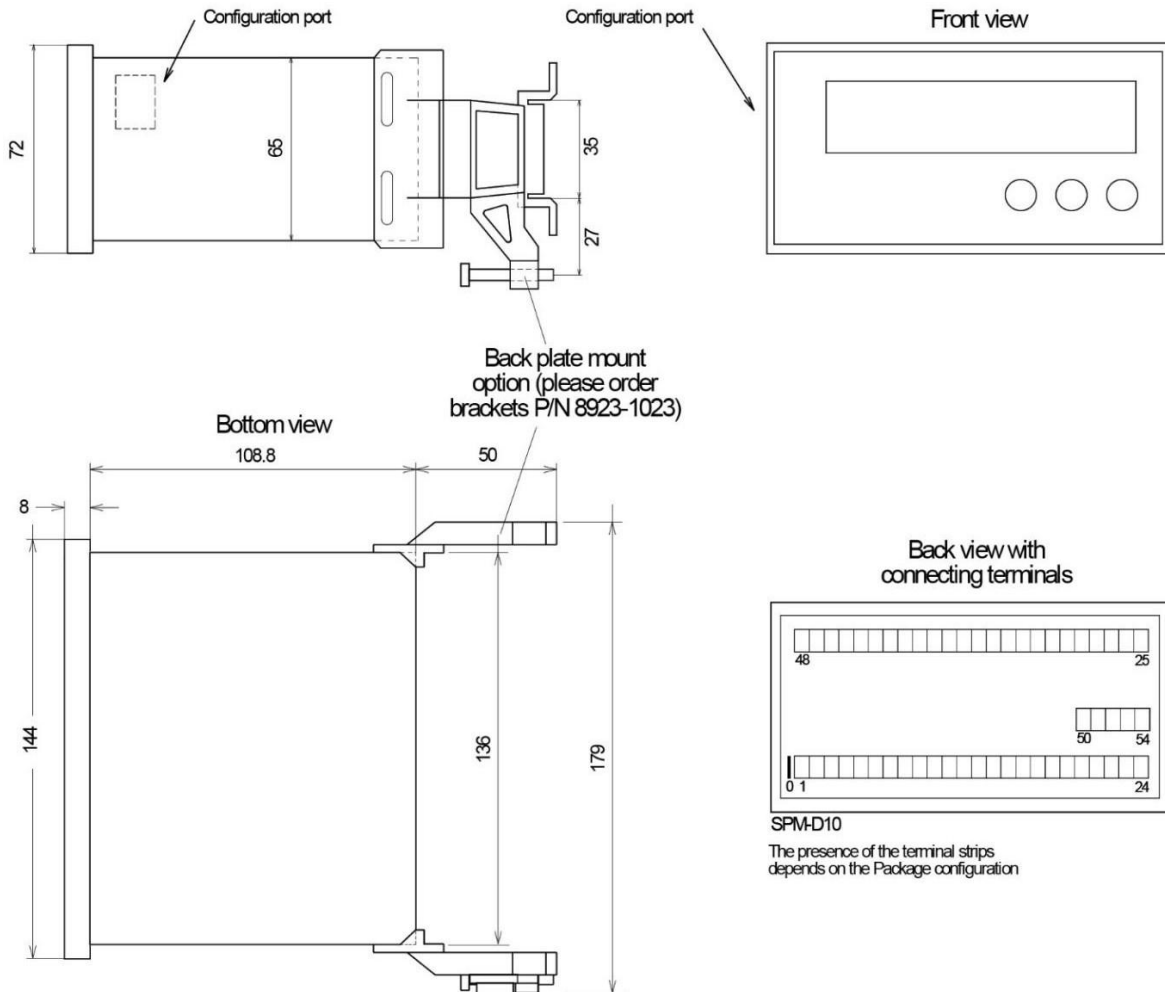
Housing Front panel flush mounting..... Type APRANORM DIN 43 700
 Dimensions WxHxD..... 144 x 72 x 122 mm
 Front cutout WxH..... 138 [+1.0] x 68 [+0.7] mm
 Connection (screw/plug terminals depending on connector)..... 1.5 mm² or 2.5 mm²
 Front..... insulating surface
 Protection System / Sealing.....
 Front..... IP42 with correct installation
 Front..... IP54 (with gasket P/N 8923-1037)
 Back..... P20

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



FEATURES OVERVIEW

SPM-D2-10 Series	Package	SPM-D2-10 Series							
		-	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	

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Subject to technical modifications.

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For more information contact:

#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 (+/-1V, +/-3V, 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