



SPM-D21 Series

Two Breaker Synchronizer / Load Control

APPLICATIONS

The SPM-D21 is a microprocessor-based synchronizer designed for use on three phase AC generators equipped with Woodward or other compatible speed controls and automatic voltage regulators. The SPM-D21 provides automatic frequency, phase and voltage matching using either analog or discrete output signals.

It combines synchronizing for a generator circuit breaker (GCB) and a mains circuit breaker (MCB), load and power factor control, and generator and mains protection.

DESCRIPTION

Synchronizing

- Separately for GCB and MCB
- Phase match or slip frequency synchronization with voltage matching
- Two-phase sensing of generator, bus, and mains
- Selectable operating modes like SPM-A (Run, Check, Permissive, and OFF)
- Synchro-check possible
- Synchronization time monitoring

Mains parallel operation

- Real power control
- True RMS power calculation
- Generator real power setpoint by parameter (2 values) or via 0/4 to 20 mA
- Soft shutdown
- Power factor control
- Power factor setpoint by parameter

Isolated operation

- Frequency control
- Voltage control

Dead bus operation

- Closing of GCB or MCB on demand

DESCRIPTION

Protection

- Three-phase sensing of mains voltage
- Mains over-/undervoltage (59/27)
- Mains over-/underfrequency (81O/U)
- Mains phase shift (78)
- Single-phase CT sensing for generator
- Two-phase sensing of generator voltage
- Generator over-/undervoltage (59/27)
- Generator over-/underfrequency (81O/U)
- Generator reverse/reduced power (32R/F)
- Generator overload (32)

ANSI

Control outputs

Standard

- Discrete raise/lower for speed/load
- Discrete raise/lower for voltage/power factor

X package

- 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 configurable)
- Speed bias output configurable as 500 Hz PWM output and adjustable voltage level
- Two raise/lower outputs configurable for either speed or voltage

Operating Features

- Two-line Liquid Crystal display for operation and alarm indication
- Synchroscope
- Indication of control activity and breaker state
- Multi-level password protection for parameters
- Configuration directly or via PC
- English or German language adjustable

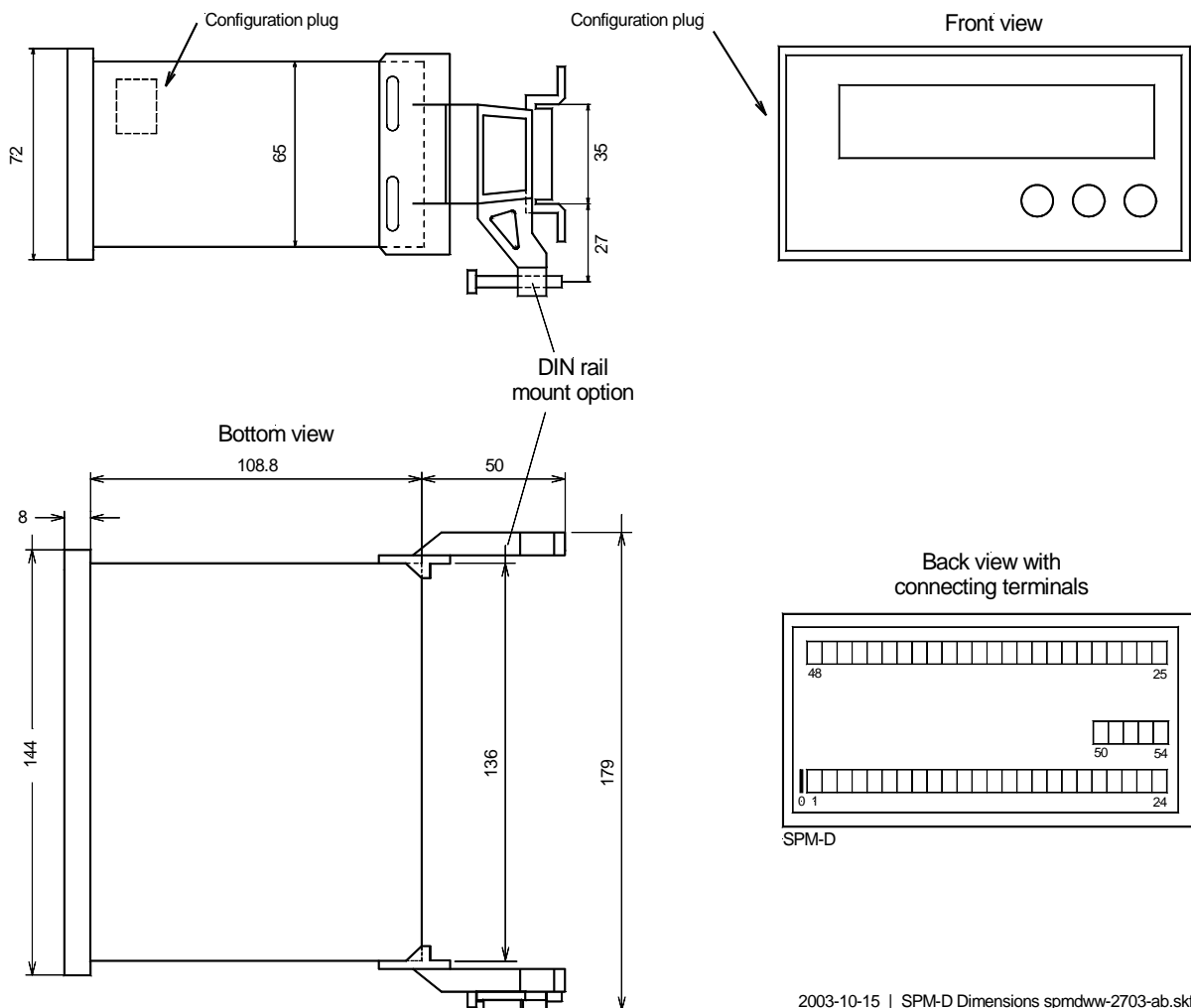
- Generator and mains protection
- Synchronization for one or two circuit breakers
- Frequency, phase, and voltage matching
- Selectable types of control output
- Digital display of generator, bus, and mains values
- Real power control
- Power factor control
- PC and front panel configurable
- Microprocessor technology for flexible and reliable operation
- CE marked
- UL/cUL Listed

SPECIFICATIONS (for more see specific manuals)

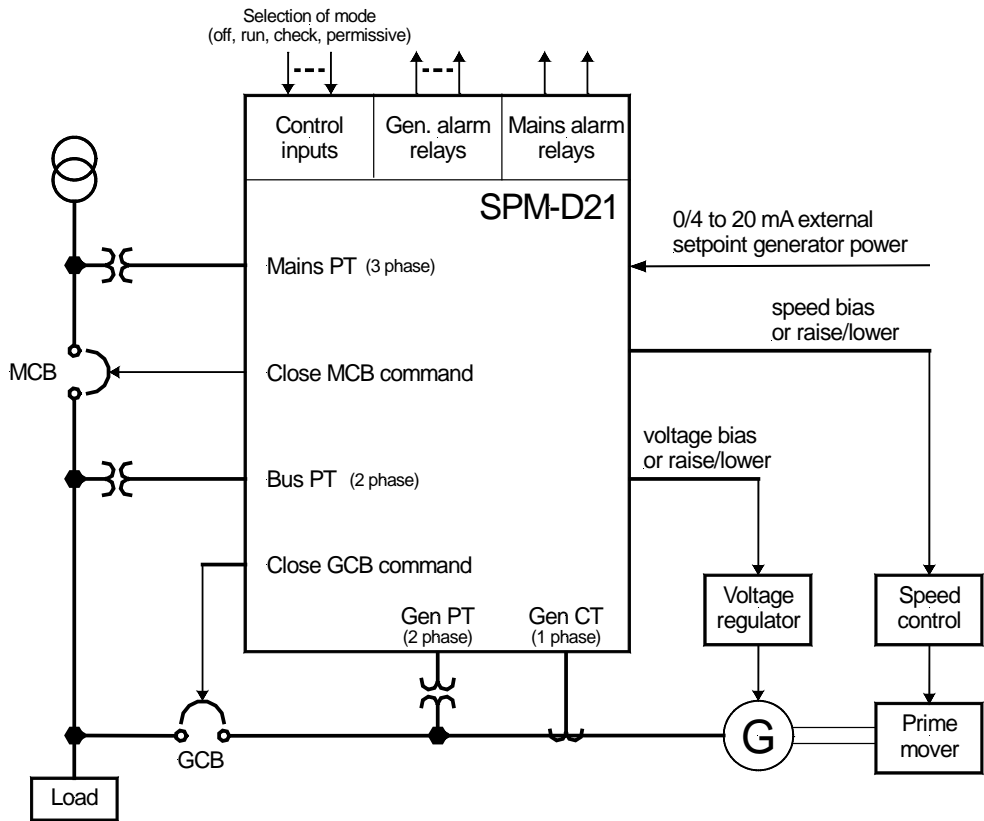
Accuracy	Class 1	
Power supply	24 Vdc (+/-25 %)	
Intrinsic consumption	max. 10 W	
Ambient temperature	-20 to 70 °C	
Ambient humidity	95 %, non-condensing	
Voltage Rated:	[1] 57/100(120) Vac	or [4] 230/400 Vac
UL:	[1] max. 150 Vac	or [4] max. 300 Vac
Setting range:	[1] 50 to 120 Vac	or [4] 50 to 400 Vac
Measuring frequency	40 to 70 Hz	
Continuous voltage input	1.3×Vn	
Input resistance	[1] 0.21 MΩ, [4] 0.696 MΩ	
Max. power consumption per path	< 0.15 W	
Current	[.1] .1 A, [.5] .5 A	
Current-carrying capacity	3.0×In	
Load	< 0.15 VA	
Rated short-time current (1 s)	[.1] 50×In, [.5] 10×In	
Discrete inputs	isolated	
Input range	max. 250 Vac or dc	
Input resistance	approx. 68 kΩ	

Relay outputs	isolated
Contact material	AgCdO
Load (GP)	2.00 Aac@250 Vac
	2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
Pilot duty (PD)	B300
	1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Housing	Type APRANORM DIN 43 700
Dimensions	144×72×122 mm
Front cutout	138[+1.0]×67[+0.7] mm
Connection	screw/plug terminals depending on connector 1.5 mm ² or 2.5 mm ²
Front	insulating surface
Protection system	with proper installation
Front	IP42
	(sealed IP54; gasket kit = P/N 8923-1037)
Back	IP21
Weight	approx. 800 g
Disturbance test (CE)	tested according to applicable EN guidelines
Listings	UL/cUL listed (voltages up to 300 Vac)

DIMENSIONS

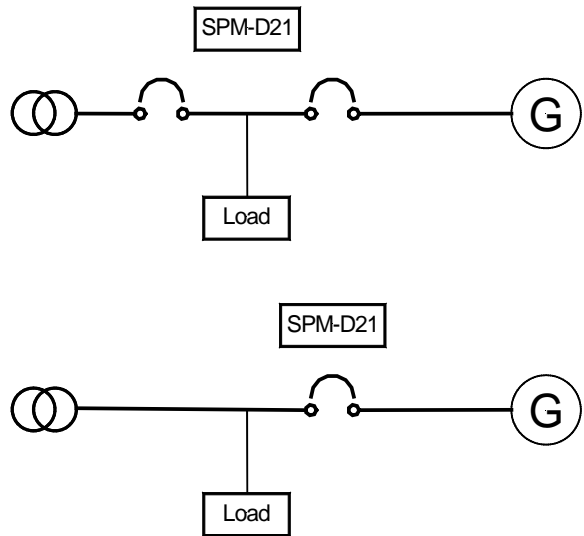


APPLICATION DIAGRAM



APPLICATION DIAGRAM

- synchronizer for generator and/or mains



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Subject to technical modifications.

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FEATURES OVERVIEW

SPM-D Series Two Breaker Synchronizer / Load Control		SPM-D21/PSV	SPM-D21/PSVX
Measuring/Display			
Generator voltage, 2phase		✓	✓
Generator current, 1phase		✓	✓
Busbar voltage, 2phase		✓	✓
Mains voltage, 3phase		✓	✓
Control			
Breaker		2	2
Synchronization, 2phase		✓	✓
Isolated operation		✓	✓
Mains parallel operation		✓	✓
SPM-A synchronization modes		✓	✓
Dead bus operation		✓	✓
Protection			
	ANSI #		
Generator: over-/undervoltage	(59/27)	✓	✓
Generator: over-/underfrequency	(81O/U)	✓	✓
Generator: overload	(32)	✓	✓
Generator: reverse power	(32R)	✓	✓
Generator: reduced power	(32F)	✓	✓
Mains: over-/undervoltage	(59/27)	✓	✓
Mains: over-/underfrequency	(81O/U)	✓	✓
Mains: phase shift	(78)	✓	✓
Alarm relays		5	5
Controller			
Discrete raise/lower: speed & load		✓	✓ #1
Discrete raise/lower: voltage & power factor		✓	✓ #1
Analog output: speed & load			✓
Analog output: voltage & power factor			✓
PMW output: speed & load			✓
Active power setpoint: 0/4 to 20 mA		✓	✓
Listings/Approvals			
CE marked		✓	✓
UL/cUL listed		✓	✓
Accessories			
Configuration via PC #2		✓	✓
Manuals (for other languages please refer to the Woodward homepage)			
	English	37249	37249
	German	GR37249	GR37249
Part numbers P/N			
	Measuring inputs 120 Vac, ..1 A	8440-1022	8440-1026
	Measuring inputs 120 Vac, ..5 A	8440-1023	8440-1027
	Measuring inputs 400 Vac, ..1 A #3	8440-1024	8440-1028
	Measuring inputs 400 Vac, ..5 A #3	8440-1025	8440-1029

#1 Configurable to either speed/load or voltage/power factor

#2 Cable incl. software necessary (DPC)

#3 All units with 400V measuring inputs can also be used for 100V system voltage