

MFR 13

Multi Function Relay Protection

- Complete generator protection in one unit
- True RMS sensing
- Synch-check
- Discrete inputs for arming and remote control
- Programmable relay outputs
- PC and front panel configurable
- Microprocessor technology for accurate, repeatable and reliable operation
- Programmable threshold setpoints with individual time delays
- CE marked
- UL/cUL Listed
- GL Approval

APPLICATIONS

The MFR 1 Series is a family of industrial grade protective relays that offer multiple protective features in a single package.

Using a digital processing to measure true rms values enables the control to have a high measuring accuracy, that is insensitive to harmonics, transients or disturbing pulses.

The MFR 13 model is a complete generator protection unit packaged into one compact device. Typical applications are generators and switch-gear equipment that require independent protection architecture. Different packages offer additional functionality.

The MFR 13/GP is for generator protection use while the MFR 13/GPX adds synch-check functionality for one breaker. A MOD bus RTU Slave interface for communication is added for the MFR 13/GPX-I package.

The compact size and multiple functions of the MFR 13 help to simplify switch-gear design. The digital display offers a user friendly interface to setup the unit as well as monitor the operation and display any of the alarms.

DESCRIPTION

Features (all)

- True RMS generator voltage measuring
- True RMS generator current measuring
- Configurable trip/control set points
- Configurable delays for each alarm
- Two-line LC display
- Programmable relay outputs to annunciate alarms
- kWh metering
- Front panel and PC configurable
- Multi level password protection
- Language manager (English/German switchable)
- 12/24 Vdc power supply

^{#1} not according to ANSI guidelines (three-step protection instead of inverse time characteristic)
^{#2} no GL approval

DESCRIPTION (continued)

Protection (all)	ANSI #
• Over-/undervoltage	(59/27)
• Over-/underfrequency	(81O/U)
• Voltage asymmetry	(47)
• Zero voltage	
• Phase/vector shift	(78)
• Overload	(32)
• Reverse power	(32R)
• Reduced power	(32F)
• Load unbalance	(46)
• Re-active power	
• Loss of excitation	(40Q)
• Time-overcurrent	(50/51)
• Voltage restraint time-overcurrent	(51V)

Package GP

- 3 configurable relays (configurable)
- Ground fault (calculated) (50GS/51#1GS)

Package GPX

- 8 configurable relays (configurable)
- True RMS busbar voltage measuring
- Synch-check

Package GPX-I

- 8 configurable relays (configurable)
- True RMS busbar voltage measuring
- Synch-check
- RS485/MOD bus RTU slave interface

Package K08

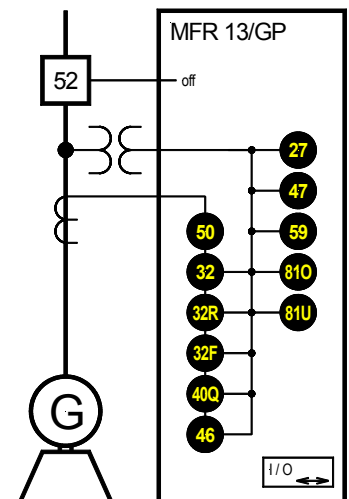
- same as Package GPX-I plus
- Ground fault (calculated) ^{#2} (50GS/51#1GS)

Package GPY-I

- same as Package GPX-I plus
- 3 analog outputs -20/0/4 to 20 mA (configurable)
 - Impulse output

Package GPY-I-N

- same as Package GPY-I but
- 75 to 265 Vac & 90 to 300 Vdc power supply (no 24 Vdc)

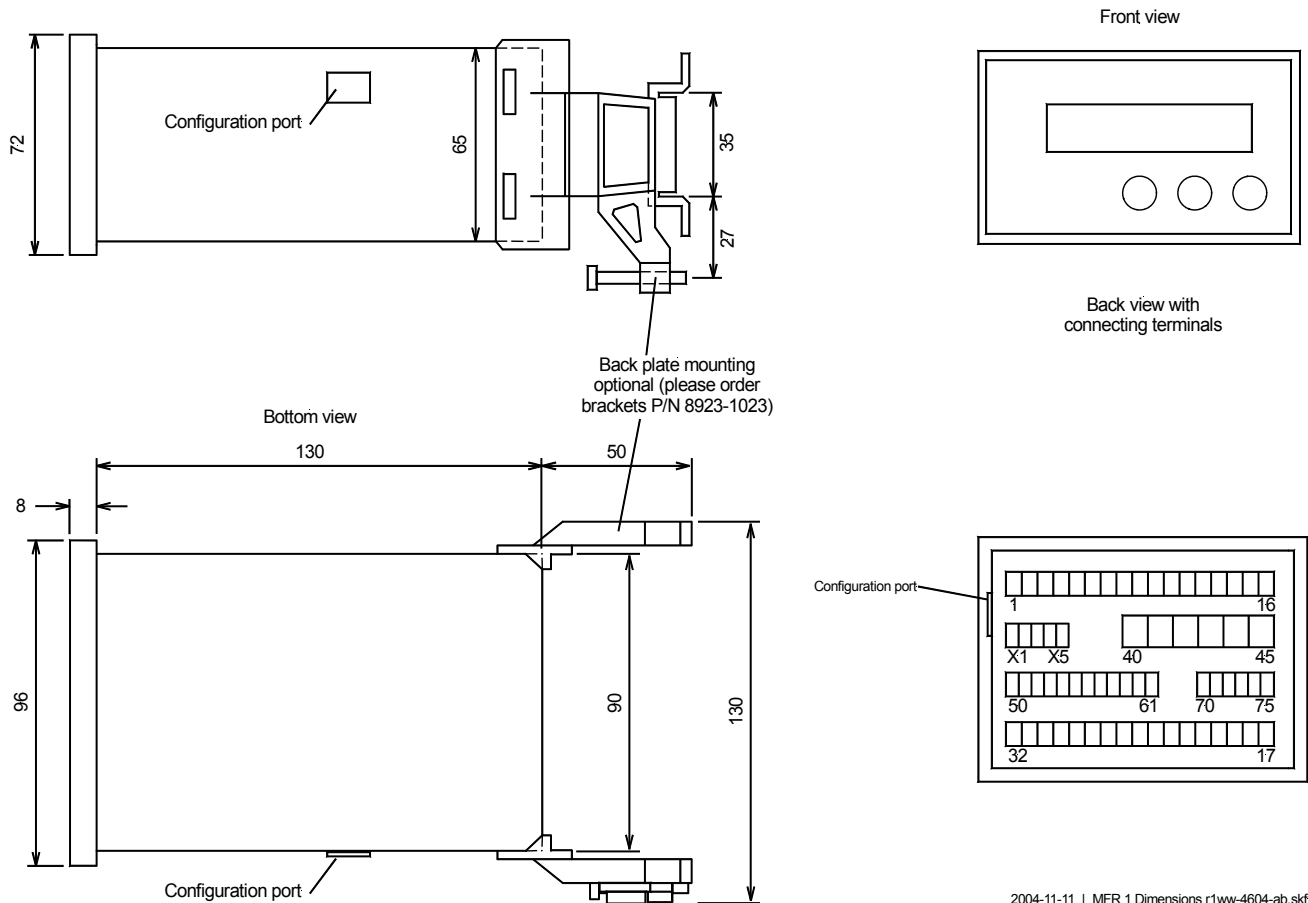


SPECIFICATIONS

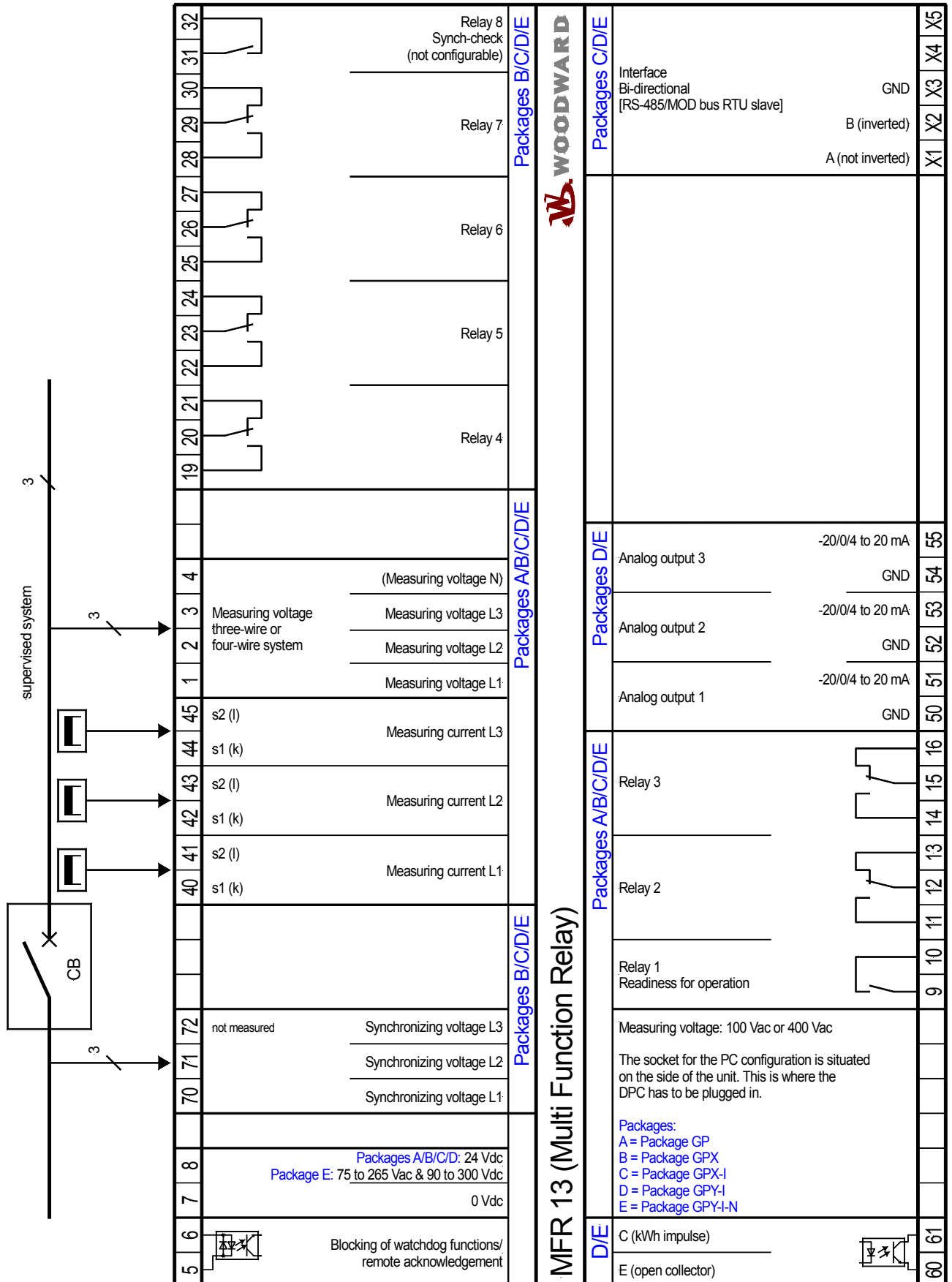
Accuracy Class 1
 Power supply 24 Vdc (18 to 32 Vdc)
 Intrinsic consumption max. 12 W
 Ambient temperature -20 to 70 °C
 Ambient humidity 95 %, non-condensing
Voltage Rated: [1] 57/100(120) Vac or [4] 230/400 Vac
 VL: [1] max. 150 Vac or [4] max. 300 Vac
 Setting range: [1] 50 to 125 Vac or [4] 200 to 440 Vac
 Measuring frequency 50/60 Hz (40 to 70 Hz)
 Linear measuring range up to $1.3 \times V_{rated}$
 Input resistance [1] 0.21 M Ω , [4] 0.7 M Ω
 Max. power consumption per path < 0.15 W
Current [./1] ..1 A or [./5] ..5 A
 Current-carrying capacity $3.0 \times I_{rated}$
 Load < 0.15 VA
 Rated short-time cur. (1 s) [./1] $50.0 \times I_{rated}$, [./5] $10.0 \times I_{rated}$
Discrete inputs isolated
 Input range 18 to 250 Vac/dc
 Input resistance approx. 68 k Ω

Relay outputs isolated
 Contact material AgCdO
 Load (GP) 24 Vdc@2 Adc, 250 Vac@2 Aac
 Pilot duty (PD) 24 Vdc@1 Adc
Housing Type APRANORM DIN 43 700
 Dimensions 96 × 72 × 130 mm
 Front cutout 91 [+1.0] × 67 [+1.0] mm
 Connection screw/plug terminals depending on connector 1.5 mm², 2.5 mm² or 4mm²
 Front insulating surface
 Protection system IP 42 from front (with proper installation)
 Weight depending on version, approx. 800 g
Disturbance test (CE) tested according to applicable EN guidelines
Listings ...UL/cUL listed for ordinary locations (note: max. voltages apply)
Approvals GL (Germanischer Lloyd)

DIMENSIONS



WIRING DIAGRAM



MFR 13 (Multi Function Relay)



Subject to technical modifications.

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FEATURE OVERVIEW

		MFR 13						
		ANSI	GP	GPX	GPX-I	K08	GPY-I	GPY-I-N
Measuring/Display								
Voltage			✓	✓	✓	✓	✓	✓
Current			✓	✓	✓	✓	✓	✓
Accessories								
kWh meter			✓	✓	✓	✓	✓	✓
Configuration via PC #1			✓	✓	✓	✓	✓	✓
Protection								
Overvoltage	59		✓	✓	✓	✓	✓	✓
Undervoltage	27		✓	✓	✓	✓	✓	✓
Overfrequency	81O		✓	✓	✓	✓	✓	✓
Underfrequency	81U		✓	✓	✓	✓	✓	✓
Voltage asymmetry	47		✓	✓	✓	✓	✓	✓
Zero voltage			✓	✓	✓	✓	✓	✓
Overload	32		✓	✓	✓	✓	✓	✓
Reduced power	32F/37		✓	✓	✓	✓	✓	✓
Reverse power	32R		✓	✓	✓	✓	✓	✓
Load unbalance	46		✓	✓	✓	✓	✓	✓
Re-active power			✓	✓	✓	✓	✓	✓
Loss of excitation	40Q		✓	✓	✓	✓	✓	✓
Time-overcurrent	50/51*		✓	✓	✓	✓	✓	✓
Voltage restraint time-o/c	51V		✓	✓	✓	✓	✓	✓
Ground fault, calculated	50GS/51*GS		✓			✓		
Function								
Synch-check	25			✓	✓	✓	✓	✓
I/O's								
Output relays (config.)	74		3	8	8	8	8	8
Analog outp. -20/0/4 to 20mA							3	3
Impulse output							✓	✓
RS485/MODbus RTU slv.					✓	✓	✓	✓
Power supply								
24 Vdc			✓	✓	✓	✓	✓	
75 to 265 Vac & 90 to 300 Vdc								✓
Listings/Approvals								
CE marked			✓	✓	✓	✓	✓	✓
UL/cUL listed			✓	✓	✓	✓	✓	
GL (Marine)			✓	✓	✓		✓	✓
Part numbers P/N								
Measuring inputs 120 Vac; ..1 A				8441-1083	8441-1075			
Measuring inputs 120 Vac; ..5 A		5448-886	5448-898	8441-1009	8441-1087	8441-1086	8441-1092	
Measuring inputs 400 Vac; ..1 A		8441-1114	8441-1108					
Measuring inputs 400 Vac; ..5 A		LR21035	8441-1033	8441-1104	8441-1099	8441-1095	8441-1119	

* not according to ANSI guidelines (three-step protection instead of inverse time characteristic)

#1 Cable incl. software necessary (DPC)