



MFR 13

Multi Function Relay Protection

- Complete generator protection in one unit
- True RMS sensing
- Synch-check
- Discrete inputs for enabling and remote control
- Programmable relay outputs
- PC and front panel configurable
- Microprocessor technology for accurate, repeatable and reliable operation
- Programmable threshold set-points 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 processor to measure true RMS values enables the control to have a high measuring accuracy, regardless of 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 switchgear 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 switchgear design. The digital display offers a user-friendly interface to setup the unit as well as monitor the operation and display any 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

DESCRIPTION (continued)

Protection (all)	ANSI #
• Over-/undervoltage	(59/27)
• Over-/underfrequency	(81O/U)
• Voltage asymmetry	(47)
• Zero voltage monitoring	
• Overload	(32)
• Reverse power	(32R)
• Reduced power	(32F)
• Unbalanced load	(46)
• Reactive power	
• Loss of excitation	(40Q)
• Independent time-overcurrent	(50/51)
• Inverse time-overcurrent	(IEC255)
• Inverse time-overcurr. w. volt. restraint	(51V)

Package GP

- 3 configurable relays
- Ground fault (calculated) #1 (50GS/51#2GS)

Package GPX

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

Package GPX-I

- Same as Package GPX, plus:
- RS-485 Modbus RTU Slave interface

Package K08

- Same as Package GPX-I, plus:
- Ground fault (calculated) #1 (50GS/51#2GS)

Package GPY-I

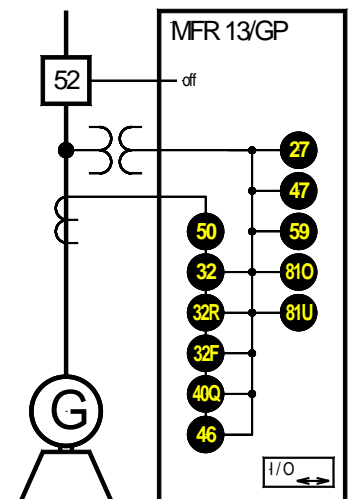
- Same as Package GPX-I, plus:
- 3 analog outputs -20/0/4 to 20 mA (configurable)
 - Pulse output for kWh

Package GPY-I-N

- Same as Package GPY-I, but:
- 90 to 265 Vac/dc power supply (no 24 Vdc)

#1 no GL approval

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

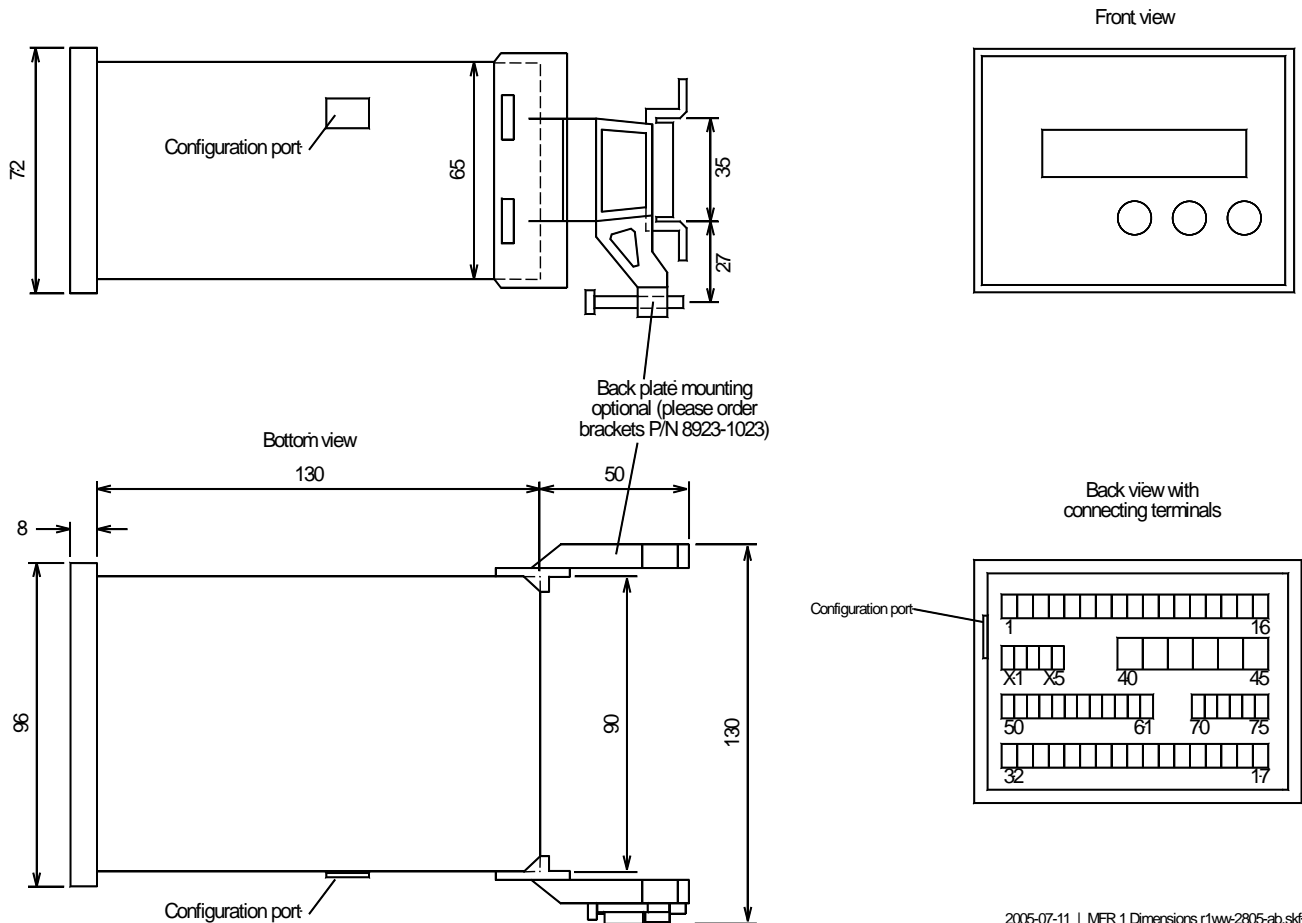


SPECIFICATIONS

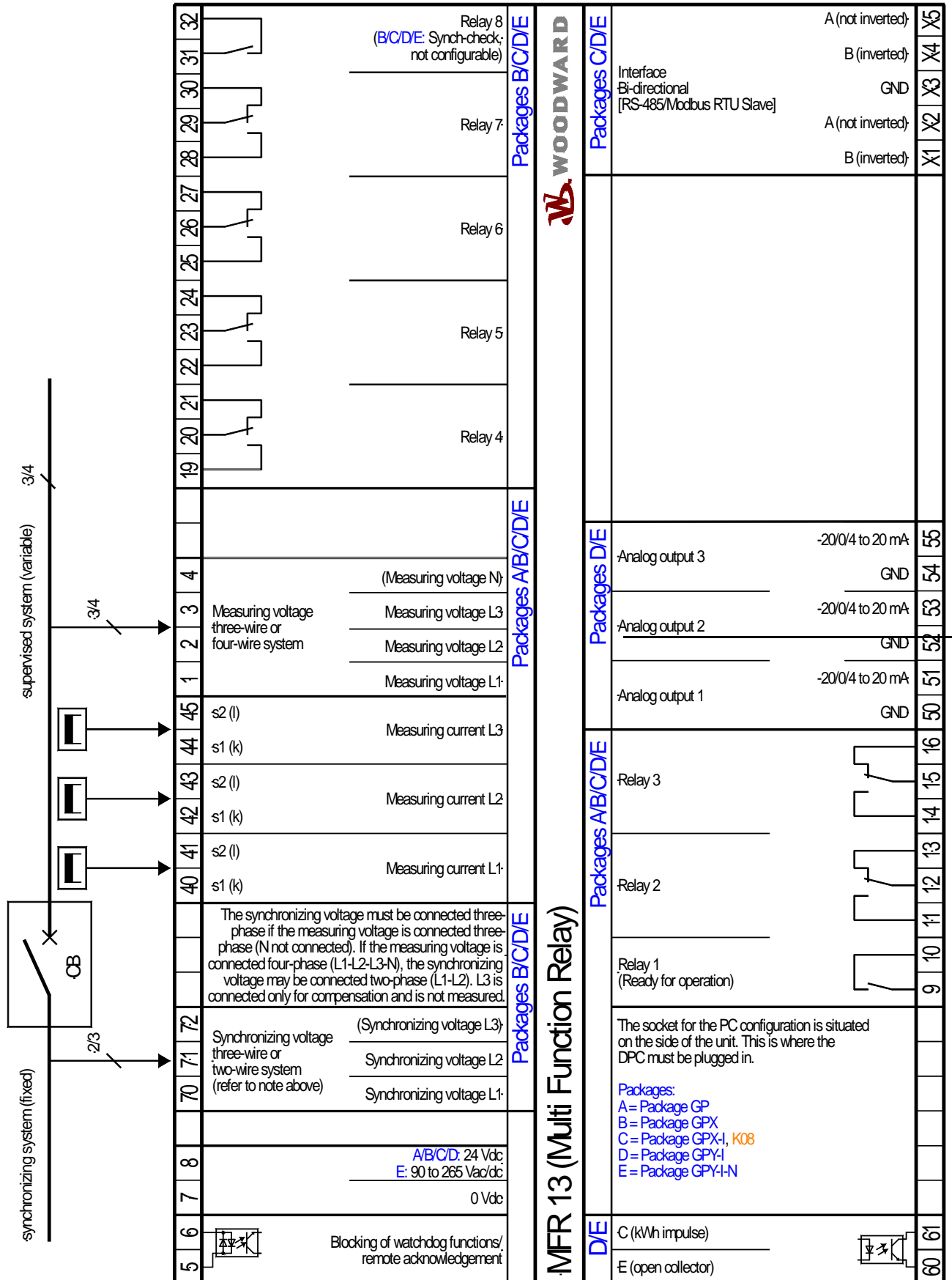
Accuracy	Class 1	
Power supply	24 Vdc (18 to 30 Vdc)	
	GPY-I-N Package: 90 to 265 Vac/dc	
Intrinsic consumption	max. 12 W	
Ambient temperature	-20 to 70 °C	
Ambient humidity	95 %, non-condensing	
Voltage	Rated value λ/D :	[1] 66/115 Vac or [4] 230/400 Vac
	Maximum value (V_{max}):	[1] 150 Vac or [4] 300 Vac
	Rated voltage $V_{ph-ground}$:	[1] 150 Vac or [4] 300 Vac
	Rated surge voltage:	[1] 2.5 kV or [4] 4.0 kV
Linear measuring range up to	$1.3 \times V_{rated}$	
Measuring frequency	50/60 Hz (40 to 70 Hz)	
Input resistance	[1] 0.21 MW, [4] 0.7 MW	
Max. power consumption per path	< 0.15 W	
Current (I_{rated})	[1] ..1 A or [5] ..1/5 A	
Linear measuring range up to	$3.0 \times I_{rated}$	
Load	< 0.15 VA	
Rated short-time cur. (1 s)	[1] $100.0 \times I_{rated}$, [5] $20.0 \times I_{rated}$	
Pulse outputs	transistor output	
Rated gate voltage	24 Vdc	
Maximum gate voltage	32 Vdc	
Minimum gate current	10 mAdc	
Maximum gate current	30 mAdc (0.5 Vdc)	

Discrete inputs	isolated
Input range	18 to 250 Vac/dc
Input resistance	approx. 68 kW
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 mm ² , 2.5 mm ² or 4mm ²
Front	insulating surface
Protection system	IP 42 from front (with correct 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



Subject to technical modifications.

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FEATURE OVERVIEW

		MFR 13						
		ANSI	GP	GPX	GPX-I	GPY-I	GPY-I-N	K08
Measuring/Display								
Voltage		Ü	Ü	Ü	Ü	Ü	Ü	Ü
Current		Ü	Ü	Ü	Ü	Ü	Ü	Ü
Accessories								
kWh counter		Ü	Ü	Ü	Ü	Ü	Ü	Ü
Configuration via PC #1		Ü	Ü	Ü	Ü	Ü	Ü	Ü
Protection								
Overvoltage	59	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Undervoltage	27	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Overfrequency	810	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Underfrequency	81U	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Voltage asymmetry	47	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Zero voltage		Ü	Ü	Ü	Ü	Ü	Ü	Ü
Overload	32	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Reduced power	32F/37	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Reverse power	32R	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Unbalanced load	46	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Re-active power		Ü	Ü	Ü	Ü	Ü	Ü	Ü
Loss of excitation	40Q	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Time-overcurrent	50/51*	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Voltage restraint time-o/c	51V	Ü	Ü	Ü	Ü	Ü	Ü	Ü
Ground fault, calculated	50GS/51*GS	Ü						Ü
Function								
Synch-check	25		Ü	Ü	Ü	Ü	Ü	Ü
I/O's								
Output relays (config.)	74	3	8	8	8	8	8	8
Analog outp. -20/0/4 to 20mA					3	3		
Pulse output for kWh					Ü	Ü		
RS-485/Modbus RTU Slave				Ü	Ü	Ü		Ü
Power supply								
24 Vdc		Ü	Ü	Ü	Ü			Ü
90 to 265 Vac/dc						Ü		
Listings/Approvals								
CE marked		Ü	Ü	Ü	Ü	Ü	Ü	Ü
UL/cUL listed		Ü	Ü	Ü	Ü			Ü
GL (Marine)		Ü	Ü	Ü	Ü	Ü		
Part numbers P/N								
Measuring inputs 100 Vac; .../1 A		-	8441-1083	8441-1075	-	-	-	-
Measuring inputs 100 Vac; .../5 A		5448-886	5448-898	8441-1009	8441-1086	8441-1092	8441-1087	
Measuring inputs 400 Vac; .../1 A		-	8441-1108	-	-	-	-	-
Measuring inputs 400 Vac; .../5 A		LR21035	8441-1033	8441-1104	8441-1095	-	-	-

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

#1 Cable incl. software necessary (DPC)