



# MFR 15

## Multi Function Relay Protection & Control

### 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 15 model includes a synchronizer and a load (kW) and power factor (cosphi) controller via discrete outputs to combine protection and control into one unit. The SNY-I package offers additional functionality. It has kW load sharing capability for multiple unit applications.

The compact size and multiple functions of the MFR 15 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.

### Features (all)

- True RMS voltage (generator/busbar)
- True RMS current (generator)
- Configurable trip/control set points
- Configurable delays for each alarm
- 3 configurable relays
- 3 dedicated control relay outputs
- Two-line LC display

### DESCRIPTION

#### Protection (all) ANSI #

- Over-/undervoltage (59/27)
- Over-/underfrequency (81O/U)
- Voltage asymmetry (47)
- Overload (32)
- Reverse power (32R)
- Reduced power (32F)
- Unbalanced load (46)
- Loss of excitation (40Q)
- Independent time-overcurrent (50/51)

#### Package SYN-I

- Synchronizer for 1 CB
  - Isolated operation
  - Mains parallel operation
- Speed/frequency/real power
- Voltage/power factor (cosphi)
- Remote real power set-point (0/4 to 20 mA)
- Load sharing via 0 to 4 Vdc analog line
- Interface RS-485/Modbus RTU Slave

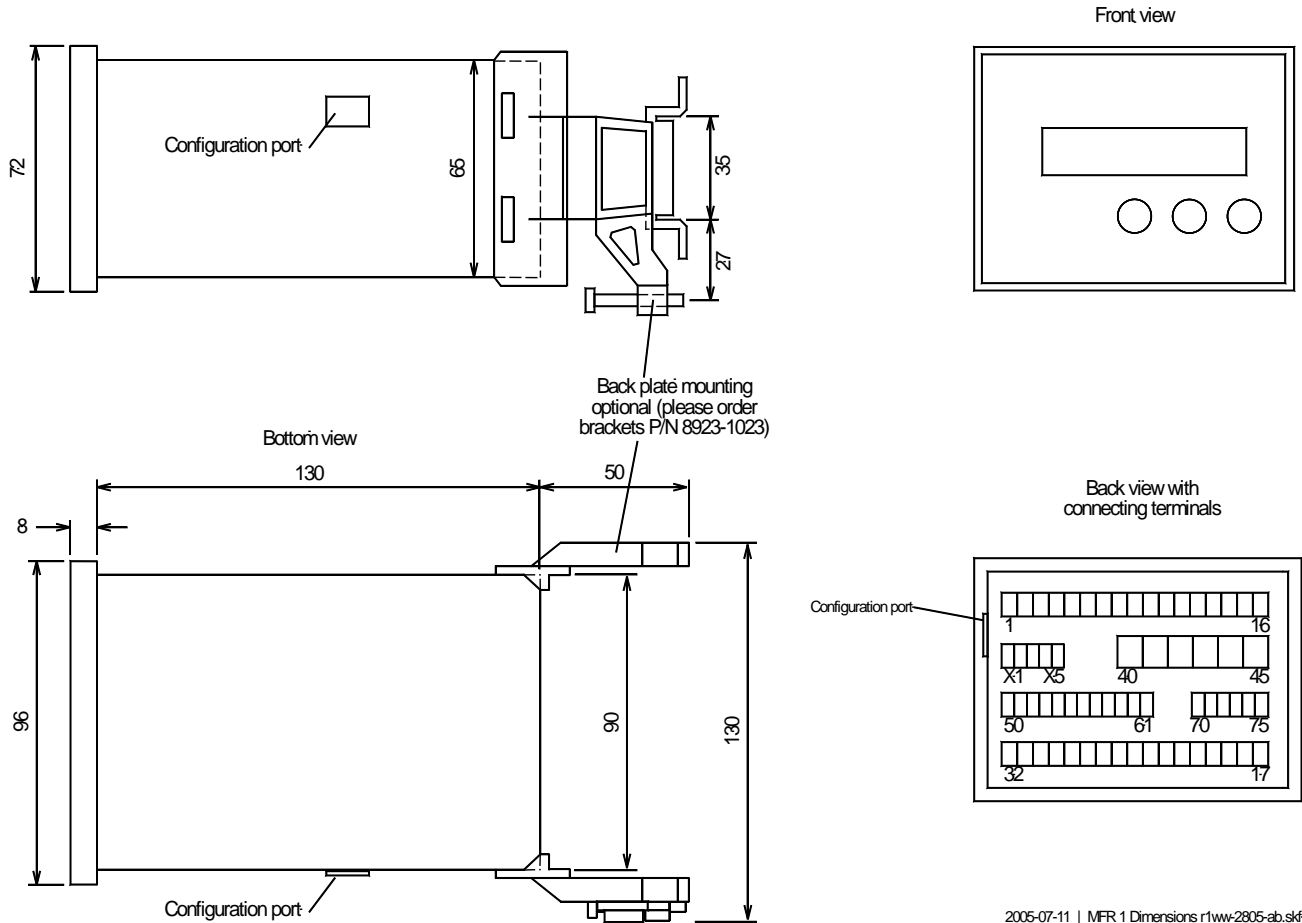
- Complete generator protection and controller in one unit
- True RMS sensing
- Synchronization for one breaker
- Load sharing
- Discrete inputs for remote control
- Programmable relay outputs
- PC and front panel configurable
- Microprocessor technology for accurate, repeatable and reliable operation
- Programmable threshold set-points with individual time delays
- CE marked
- UL/cUL Listed
- GL Approval

# SPECIFICATIONS

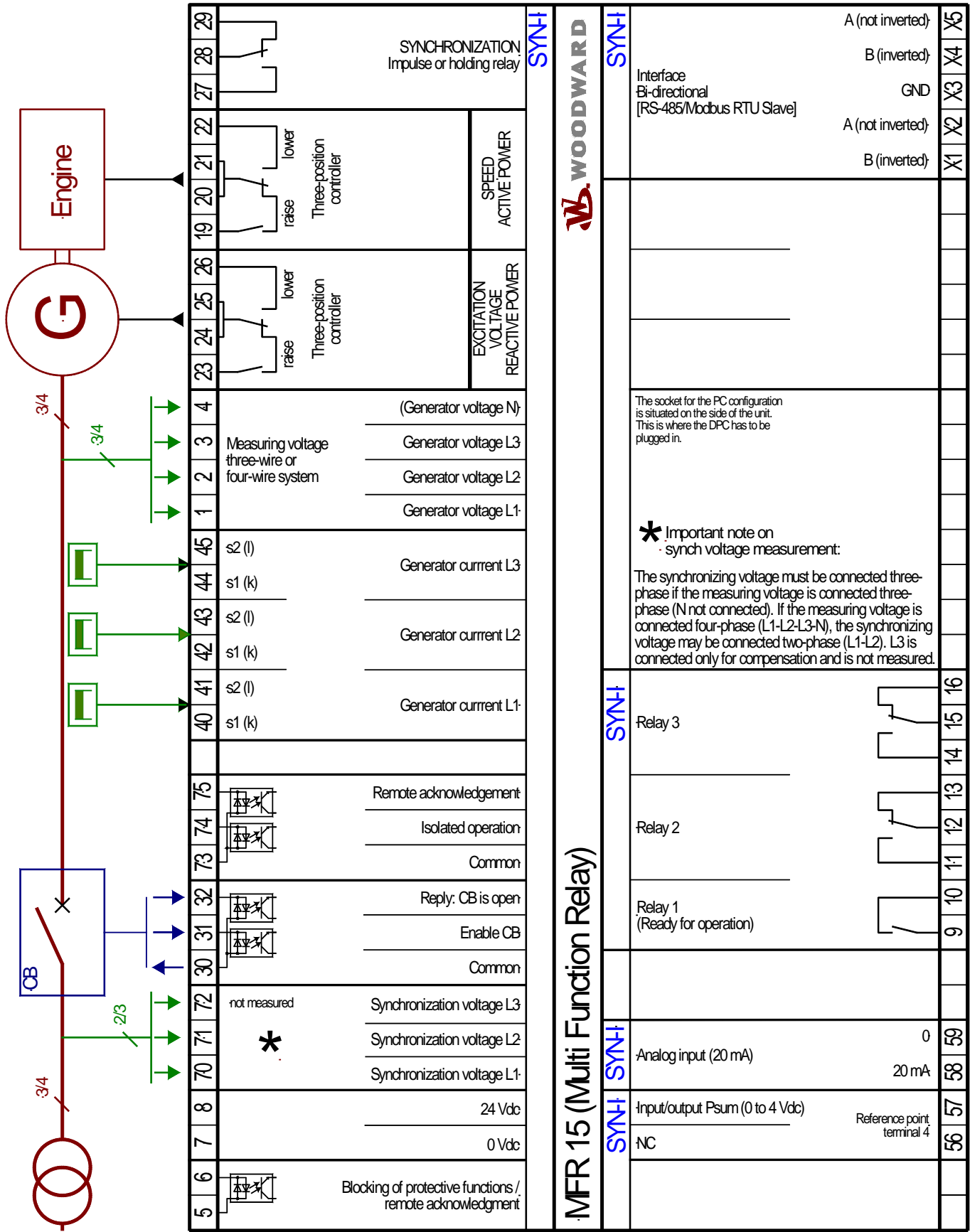
Accuracy .....	Class 1	
Power supply .....	24 Vdc (18 to 30 Vdc)	
Intrinsic consumption .....	max. 12 W	
Ambient temperature .....	-20 to 70 °C	
Ambient humidity .....	95 %, non-condensing	
<b>Voltage</b> .....	Rated value $\sqrt{D}$ :	[1] 66/115 Vac or [4] 230/400 Vac
	Maximum value ( $V_{max}$ ):	[1] 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	
<b>Current</b> ( $I_{rated}$ ) .....	[1] ..1 A or [5] ..15 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] $20.0 \times I_{rated}$	
<b>Discrete inputs</b> .....	isolated	
Input range .....	18 to 250 Vac/dc	
Input resistance .....	approx. 68 kW	

<b>Relay outputs</b> .....	isolated
Contact material .....	AgCdO
Load (GP) .....	24 Vdc@2 Adc, 250 Vac@2 Aac
Pilot duty (PD) .....	24 Vdc@1 Adc
<b>Housing</b> .....	Type APRANORM DIN 43 700
Dimensions .....	96×72×130 mm
Front cutout .....	91[+0.8]×67[+0.7] mm
Connection .....	screw/plug terminals depending on connector 1.5 mm <sup>2</sup> , 2.5 mm <sup>2</sup> or 4mm <sup>2</sup>
Front .....	insulating surface
Protection system .....	IP 21
Weight .....	depending on version, approx. 800 g
<b>Disturbance test (CE)</b> .....	tested according to applicable EN guidelines
<b>Listings</b> .....	UL/cUL listed for ordinary locations
<b>Approvals</b> .....	GL (Germanischer Lloyd)

# DIMENSIONS



# WIRING DIAGRAM



Subject to technical modifications.

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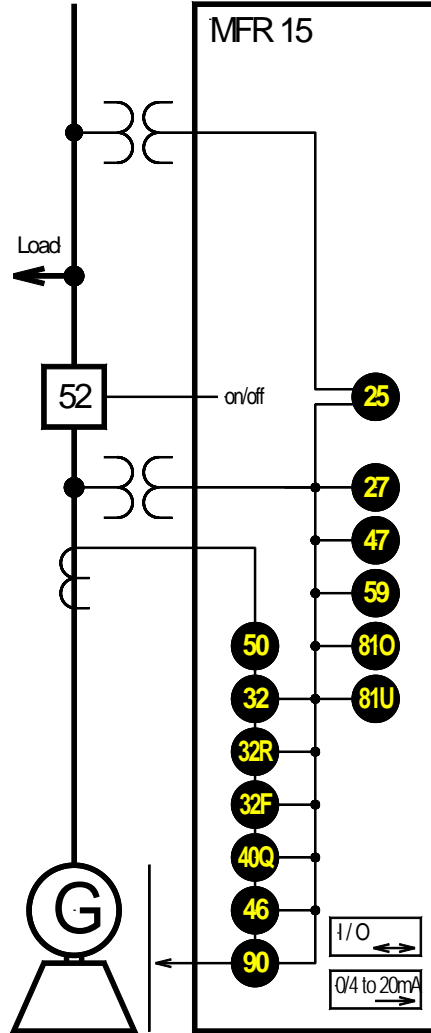
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		MFR 15
		SYN-I
		ANSI
<b>Control</b>		
Breaker control logic		1
Synchronization		ü
Isolated single-unit operation		ü
Mains parallel operation		ü
<b>Accessories</b>		
kWh counter		ü
Configuration via PC #1		ü
<b>Protection</b>		
Overvoltage	59	ü
Undervoltage	27	ü
Overfrequency	810	ü
Underfrequency	81U	ü
Voltage asymmetry	47	ü
Overload	32	ü
Reverse power	32R	ü
Reduced power	32F/37	ü
Unbalanced load	46	ü
Loss of excitation	40Q	ü
Independent time-overcurrent	50/51*	ü
<b>Controller</b>		
Discrete raise/lower: n/f & P (speed/frequency/real power)		ü
Discrete raise/lower: V & Q (voltage/power factor cosphi)		ü
Remote real power set-point (0 to 20 mA)		ü
Load sharing (0 to 4 Vdc)		ü
<b>I/Os</b>		
Analog output -20/0/4 to 20 mA (configurable, scaleable)		
Pulse output for kWh		
Relay outputs (configurable)	74	3
RS-485/Modbus RTU Slave		ü
<b>Listings/Approvals</b>		
CE marked		ü
UL/cUL listed		ü
GL (Marine)		ü
<b>Part numbers P/N</b>		
Measuring inputs 120 Vac, ..5 A		8440-1016
Measuring inputs 400 Vac, ..5 A		8440-1448

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

#1 Cable incl. software necessary (DPC, Product Number P/N 5417-557)