WOODWARD

Product Specification
03249E

MFR 12

Multi Function Relay Protection

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 12 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 12/CP is for independent time-overcurrent protection (TOC) with configurable tripping times for two different current values. It also includes protection for calculated ground fault.

The MFR 12/51V is designed to protect the generator for (independent time-overcurrent [TOC], calculated ground fault, inverse time-overcurrent (acc. to IEC255) and inverse time-overcurrent with voltage restraint.

The MFR 12/50-51GN package includes protection for measured ground faults via current transformer.

The compact size and multiple functions of the MFR 12 help to simplify switchgear design. The digital display offers a user-friendly interface to set up the unit as well as monitor the operation and display of alarms.

DESCRIPTION

Features

- Configurable trip set points
- Configurable delays for each alarm
- Two-line LC display

Package CP

- 3 configurable relays
- True RMS current (generator)
- Independent time-overcurrent (50/51#)
- Ground fault (calculated) (50GS/51#GS)
  $I_E = I_{L1} + I_{L2} + I_{L3}$

Package 51V

- 8 configurable relays
- True RMS current (generator)
- True RMS voltage (generator)
- Independent time-overcurrent (50/51#)
- Ground fault (calculated) (50GS/51#GS)
- Inverse time-overcurrent (IEC255)
- Inverse time-overcurrent with voltage restraint (51V)

Package 50-51GN

- 3 configurable relays
- Ground fault (measured via current transformer ../1A or 5A) (50/51GN)

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

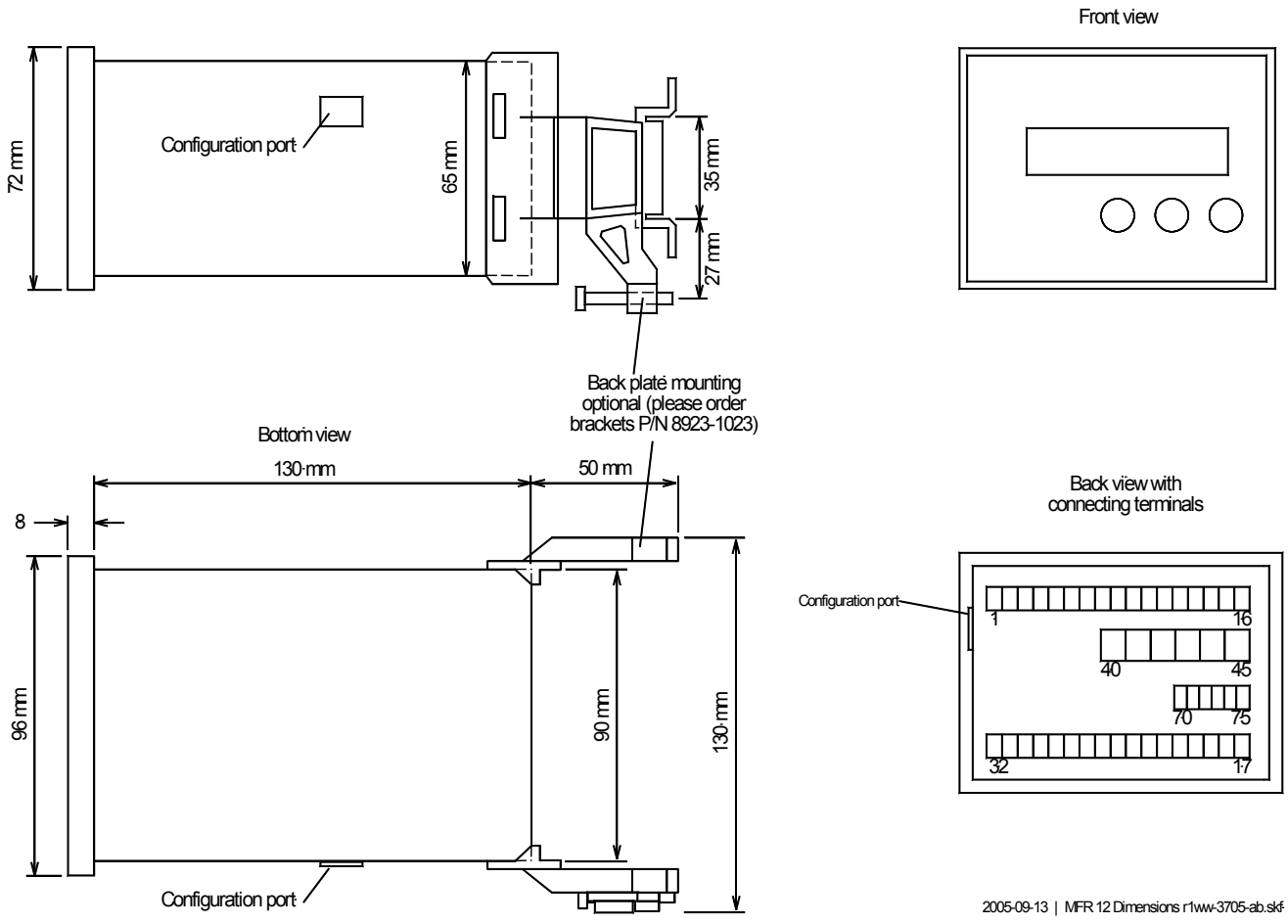
- True RMS sensing
- 3 phase independent time-overcurrent protection ($3\times I_{rated}$)
- Programmable relay outputs
- Discrete input for enabling or remote acknowledgement
- PC and front panel configurable
- Microprocessor technology for accurate, repeatable and reliable operation
- Programmable threshold setpoints with individual time delays
- CE marked
- UL/cUL Listed
- GL Approval

SPECIFICATIONS

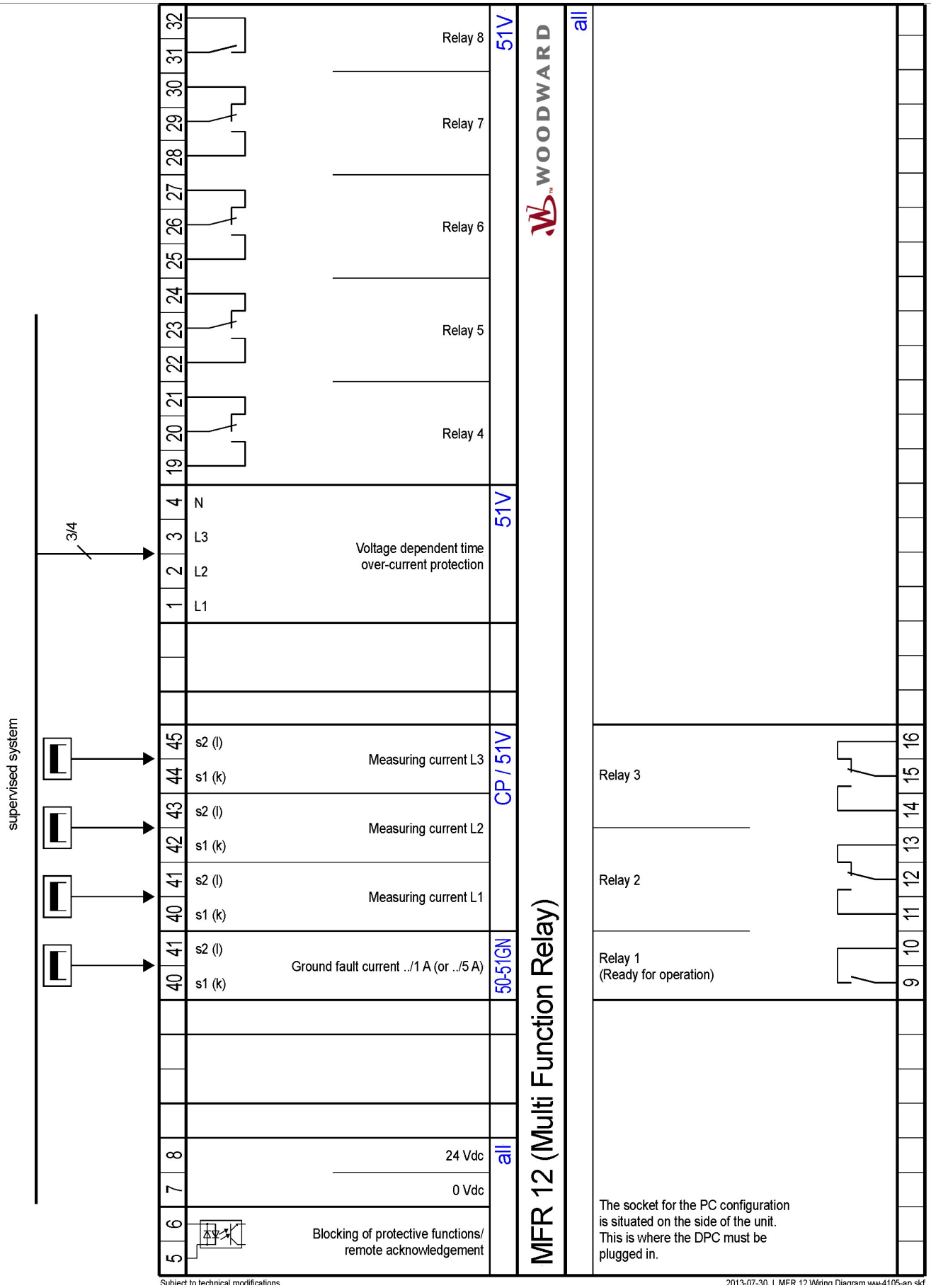
Accuracy ..... Class 1
Power supply ..... 24 Vdc (18 to 30 Vdc)
Intrinsic consumption ..... max. 12 W
Ambient temperature ..... -20 to 70 °C
Ambient humidity ..... 95 %, non-condensing
Voltage ..... Rated value ⅄/Δ: 66/115 Vac
Maximum value (V_{max}): 150 Vac
Rated voltage $V_{ph\text{-}ground}$: 150 Vac
Rated surge voltage: 2.5 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 MΩ
Max. power consumption per path ..... < 0.15 W
Current (I_{rated}) ..... [1] ../1 A or [5] ../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] $20.0 \times I_{rated}$
Discrete inputs ..... isolated
Input range ..... 18 to 250 Vac or dc
Input resistance ..... approx. 68 kΩ

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 cut-out ..... 91×67 mm
Connection ..... screw/plug terminals depending on connector 1.5 mm², 2.5 mm² or 4mm²
Front ..... insulating surface
Protection system ..... IP 21
Weight ..... depending on version, approx. 800 g
Disturbance test (CE) ..... tested according to applicable EN guidelines
Listings ..... UL/cUL listed (note: max. voltages apply) for ordinary loc., file E231544
Approvals ..... GL (Germanischer Lloyd)

DIMENSIONS



WIRING DIAGRAM



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Subject to alterations, errors excepted.

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FEATURES OVERVIEW

	ANSI	MFR 12 CP	MFR 12 51V	MFR 12 50-51GN
Measuring/Display				
Voltage			✓	
Current		✓	✓	✓
Accessories				
Configuration via PC #1		✓	✓	✓
Protection				
Independent time-overcurrent monitoring (TOC)	50/51*	✓	✓	
Inverse time-overcurrent monit. (acc. to IEC255) #2			✓	
Inverse time-overcurrent monit. with volt. restraint #3	51V		✓	
Ground fault monitoring, calculated	50GS/51GS*	✓	✓	
Ground fault monitoring, measured (1A or 5A)	50/51GN			✓
I/O's				
Output relays (configurable)	74	3	8	3
Listings/Approvals				
CE marked		✓	✓	✓
UL/cUL listed		✓	✓	✓
GL (Marine)		✓	✓	✓
Part Numbers P/N				
Measuring inputs ../1 A		8441-1106		8441-1132
Measuring inputs ../5 A		5448-883		8441-1008
Measuring inputs 100 Vac, ../1 A			8441-1082	
Measuring inputs 100 Vac, ../5 A			8441-1006	

* not according to ANSI guidelines (three-step protection instead of inverse time characteristic)
#1 Configuration software 'LeoPC' available free at www.woodward.com, connection requires Woodward DPC cable P/N 5417-1251
#2 only when inverse time-overcurrent monitoring with voltage restraint is disabled
#3 measured via 100 Vac measuring input