



# MFR 300

## Multifunction Relay / Measuring Transducer with CANopen / Modbus Communication

### APPLICATIONS

The MFR 300 is a measuring transducer for monitoring single- and three-phase power systems. The MFR 300 has both voltage and current inputs for measuring an electrical power source. A digital processor makes it possible to accurately measure true RMS values, regardless of harmonics, transients or disturbing pulses. The primary measured and calculated values are transmitted via CANopen / Modbus protocol to a supervisory control system.

The MFR 300 performs monitoring functions for mains decoupling, including four freely configurable time-dependent undervoltage monitoring functions for FRT (fault ride-through).

The primary measured values of voltage and current are used to calculate the real, reactive, and apparent power and the power factor (cosphi) values.

The list of measured values includes

- Measured
  - Voltage
    - Wye:  $V_{L1N} / V_{L2N} / V_{L3N}$
    - Delta:  $V_{L12} / V_{L23} / V_{L31}$
  - Frequency  $f_{L123}$
  - Current  $I_{L1} / I_{L2} / I_{L3}$
- Calculated
  - Average voltage  $V_{\emptyset L123} / V_{min} / V_{max}$
  - Average current  $I_{\emptyset L123} / I_{min} / I_{max}$
  - Real power  $P_{total} / P_{L1} / P_{L2} / P_{L3}$
  - Reactive power  $Q_{total}$
  - Apparent power  $S_{total}$
  - Power factor ( $\cos\phi_{L1}$ )
  - Active energy kWh<sub>positive/negative</sub>
  - Reactive energy kvarh<sub>leading/lagging</sub>

### DESCRIPTION

#### Features

- 3 true RMS voltage inputs
- 3 true RMS current inputs
- Class 0.5 accuracy for voltage, frequency and current
- Class 1 accuracy for real and reactive power or energy
- Configurable trip/control setpoints
- Configurable delay timers for individual alarms (0.02 to 300.00 s)
- 4 configurable relays (change-over)
- 1 "Ready for operation" relay
- Switchable relay logic
- 2 kWh counters (max.  $10^{12}$  kWh)
- 2 kvarh counters (max.  $10^{12}$  kvarh)
- CANopen / Modbus communication
- Configurable via CAN bus / RS-485 / Service Port (USB/RS-232)
- 24 Vdc power supply

Protection (all)	ANSI #
• Over-/undervoltage	(59/27)
• Over-/underfrequency	(81O/U)
• Voltage asymmetry	(47)
• Overload	(32)
• Positive/negative load	(32R/F)
• Unbalanced load	(46)
• Phase shift	(78)
• Overcurrent	(50/51)
• df/dt (ROCOF)	
• Ground fault	
• QV monitoring	
• Voltage increase	
• Freely configurable time-dependent undervoltage monitoring for:	
○ FRT (fault ride-through)	



- True RMS sensing
- Class 0.5 accuracy for voltage, frequency and current
- Class 1 accuracy for real and reactive power or energy
- Programmable relay outputs
- Configurable via CAN bus / RS-485 / Service Port
- Programmable threshold setpoints with individual time delays
- Optional wiring configurations for either single phase, three phase, or a combination of both
- CANopen / Modbus communication
- UL/cUL Listed
- CE marked

## SPECIFICATIONS

Accuracy ..... Class 0.5  
Power supply ..... 12/24 Vdc (8 to 32 Vdc)  
Intrinsic consumption ..... max. 5 W  
Ambient temperature (operation) ..... -20 °C (-4 °F) / 70 °C (158 °F)  
Ambient temperature (storage) ..... -40 °C (-40 °F) / 85 °C (185 °F)  
Ambient humidity ..... 95 %, non-condensing

**Voltage** ..... Rated value  $\lambda/\Delta$ : [1] 69/120 Vac or [7] 400/690 Vac  
Rated voltage  $V_{ph-ground}$ : [1] 150 Vac or [7] 600 Vac  
Max. cont. voltage  $V_{ph-ph}$ : [1] 150 Vac or [7] 862 Vac  
Rated surge voltage: [1] 2.5 kV or [7] 6.0 kV

Measuring frequency ..... 45 to 65 Hz  
Linear measuring range .....  $1.25 \times V_{rated}$   
Input resistance ..... [1] >0.5 M $\Omega$   
[7] >2.0 M $\Omega$

Max. power consumption per path ..... 0.15 W  
**Current** ( $I_{rated}$ ) ..... [1] ..1 A, [5] ..15 A  
Linear measuring range .....  $3 \times I_{rated}$   
Max. power consumption per path ..... < 0.15 VA  
Rated short-time current (1 s) ..... [1] 10 Aac, [5] 50 Aac

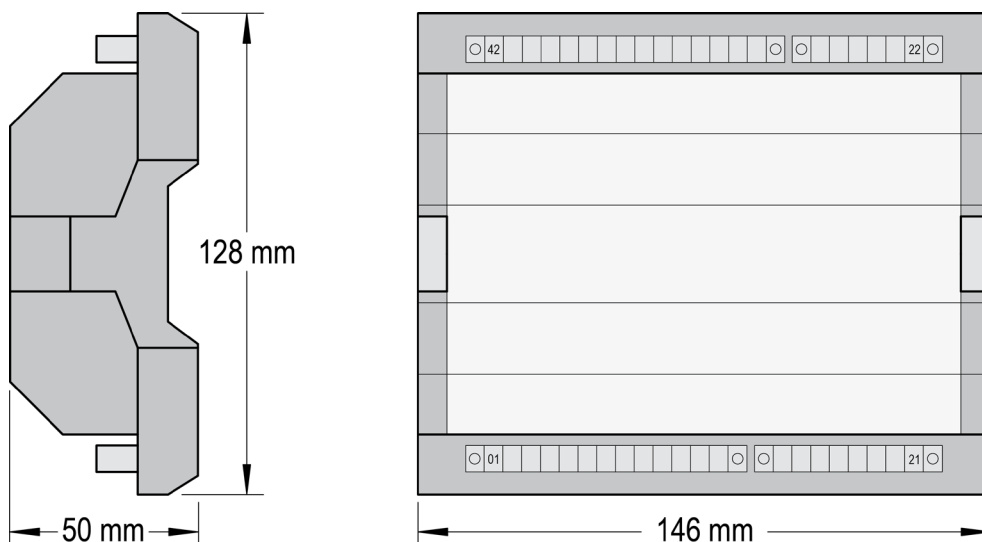
**Relay outputs** ..... isolated  
Contact type ..... Form C (change-over)  
Contact material ..... AgCdO  
Load (GP) ..... 2.00 Aac@250 Vac  
..... 2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc  
Pilot duty (PD) .....  
..... 1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc

**Housing** ..... Type Extrusion profile UM122  
for DIN rail mounting  
Dimensions ..... 146 × 128 × 50 mm  
Connection ..... screw/plug terminals depending  
on connector 2.5 mm<sup>2</sup> (14 AWG)

Protection system ..... IP20  
Weight ..... approx. 300 g

**Disturbance test** (CE) ..... tested according to applicable EN guidelines  
**Listings** ..... UL/cUL listed (File No.: E231544), GOST-R











## DIMENSIONS

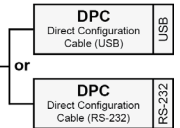


## PART NUMBERS

Model	Rated PT secondary	Rated CT secondary	Mounting	Part Number (P/N)
MFR300-11M	100 Vac [1]	..1 A [1]	DIN rail [M]	8444-1089
MFR300-15M	100 Vac [1]	..15 A [5]	DIN rail [M]	8444-1090
MFR300-71M	690 Vac [7]	..1 A [1]	DIN rail [M]	8444-1091
MFR300-75M	690 Vac [7]	..15 A [5]	DIN rail [M]	8444-1092
MFR300-75M/SU03	690 Vac [7]	..15 A [5]	DIN rail [M]	8444-1093
MFR300-75M/K28	690 Vac [7]	..15 A [5]	DIN rail [M]	8444-1094

# WIRING DIAGRAM

22	s2	[.1 A or .15A]	Measuring current L3 isolated	 <b>MFR 300</b>	Measuring voltage L1	120 Vac or 690 Vac	21	
23	s1				N/A	20		
24	s2	[.1 A or .15A]	Measuring current L2 isolated		Measuring voltage L2	120 Vac or 690 Vac	19	
25	s1				N/A	18		
26	s2	[.1 A or .15A]	Measuring current L1 isolated		Measuring voltage L3	120 Vac or 690 Vac	17	
27	s1				N/A	16		
28			Relay [R 01] isolated		Measuring voltage N	120 Vac or 690 Vac	15	
29					N/A	14		
30			Relay [R 02] isolated		Power supply	12/24 Vdc	13	
31					8 to 32 Vdc	0 Vdc	12	
32			Relay [R 03] isolated		RS-485 interface isolated	RS-485-B	08	
33						RS-485-A	07	
34			Relay [R 04] isolated		CAN bus isolated	CAN-H	04	
35						CAN-L	03	
36			Relay [R 05] isolated Fixed to „Ready for operation“				02	
37							01	
38			Relay [R 05] isolated Fixed to „Ready for operation“				01	
39							01	
40			Relay [R 05] isolated Fixed to „Ready for operation“				01	
41							01	
42			Relay [R 05] isolated Fixed to „Ready for operation“				01	
							01	
						Service Port (USB/RS-232) Connect only with Woodward DPC cable		



Subject to technical modifications.

**International**  
 Woodward  
 PO Box 1519  
 Fort Collins CO, USA  
 80522-1519  
 1000 East Drake Road  
 Fort Collins CO 80525  
 Ph: +1 (970) 482-5811  
 Fax: +1 (970) 498-3058

**Europe**  
 Woodward GmbH  
 Handwerkstrasse 29  
 70565 Stuttgart, Germany  
 Ph: +49 (0) 711 789 54-0  
 Fax: +49 (0) 711 789 54-100  
 email: stgt-  
 info@woodward.com

**Distributors & Service**  
 Woodward has an international network of distributors and service facilities. For your nearest representative, call the Fort Collins plant or see the Worldwide Directory on our website.

[www.woodward.com/power](http://www.woodward.com/power)

For more information contact:

Subject to technical modifications.

This document is distributed for informational purposes only. It is not to be construed as creating or becoming part of any Woodward Governor Company contractual or warranty obligation unless expressly stated in a written sales contract.

We appreciate your comments about the content of our publications. Please send comments including the document number below to stgt-doc@woodward.com

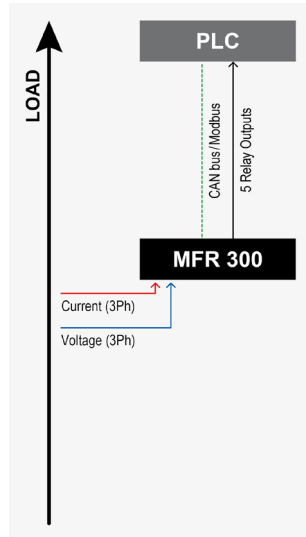
© **Woodward**

**All Rights Reserved**

37406B - 2012/3/Stuttgart

## TYPICAL APPLICATIONS

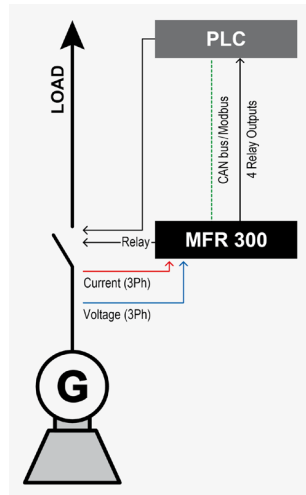
### General Application



In this general application the device is used as a transducer with monitoring functions. The control does not operate any breaker.

- PLC measuring data  $V, f, I, P_{act}, P_{react}$
- Monitoring  $V, f, I, P_{act}, P_{react}$

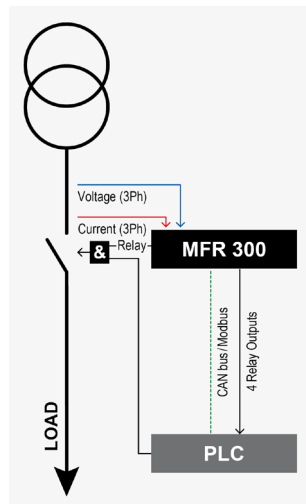
### Generator Application



In this generator related application the device is used as a transducer with monitoring functions. The control can be used to open a breaker.

- Generator measuring data  $V, f, I, P_{act}, P_{react}$
- Monitoring  $V, f, I, P_{act}, P_{react}$

### Mains Application



In this mains related application the device is used as a transducer with monitoring functions. The control can be used to open a breaker.

- Mains measuring data  $V, f, I, P_{act}, P_{react}$
- Monitoring  $V, f, I, P_{act}, P_{react}$