



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_{positive/negative}
 - Reactive energy kvarh_{leading/lagging}

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 λ/Δ : [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] $>0.5 \text{ M}\Omega$
[7] $>2.0 \text{ M}\Omega$

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 $< 0.15 \text{ VA}$
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

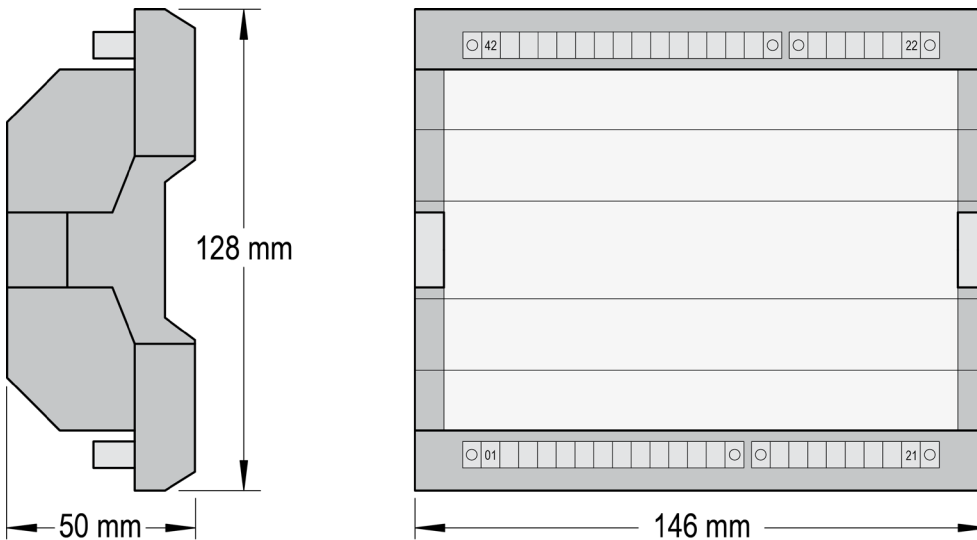
Housing Type Extrusion profile UM122
for DIN rail mounting

Dimensions 146 × 128 × 50 mm
Connection screw/plug terminals depending
on connector 2.5 mm² (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

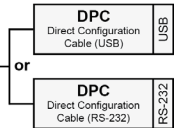


PART NUMBERS

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

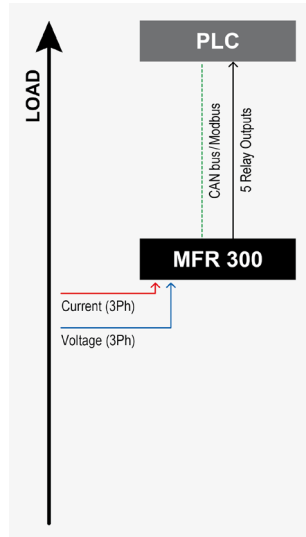
22	s2	[.1 A or .15A]	Measuring current L3 isolated	 MFR 300	Measuring voltage L1	120 Vac or 690 Vac	21	
23	s1				N/A	20		
24	s2	[.1 A or .15A]	Measuring current L2 isolated		Measuring voltage L2	120 Vac or 690 Vac	19	
25	s1				N/A	18		
26	s2	[.1 A or .15A]	Measuring current L1 isolated		Measuring voltage 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“					
39								
40			Relay [R 05] isolated Fixed to „Ready for operation“					
41								
42			Relay [R 05] isolated Fixed to „Ready for operation“					
					Service Port (USB/RS-232) Connect only with Woodward DPC cable			



Subject to technical modifications.

TYPICAL APPLICATIONS

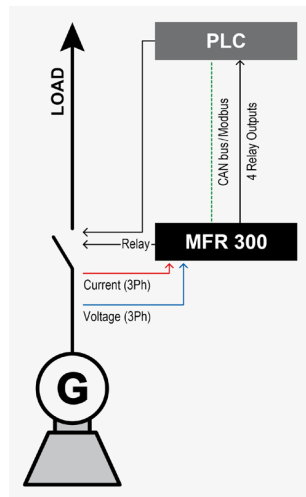
General Application



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 $V, f, I, P_{act}, P_{react}$

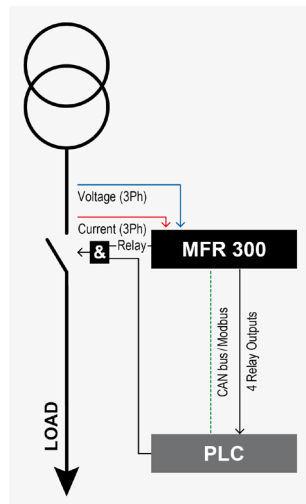
Generator Application



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 $V, f, I, P_{act}, P_{react}$

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