

WEG Automation Catalog

Electronic Relays
(RTW17, RMW17,
and RNW series)

Motors
Automation
Energy
Transmission & Distribution

**Timing Relays RTW17 Series – Protection Relays RMW17 Series
Level Relays RNW Series**

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Driving efficiency and sustainability



Electronic Relays

Timing Relays RTW17 and ERWT

Protection Relays RMW17, RPW and ERWM

Level Relays RNW



UL File No. E189202

WEG comprises three different series under the category Electronic Relays:

- Timing Relays (RTW17 and ERWT)
- Protection Relays (RMW17, RPW and ERWM)
- Level Relays (RNW)

These Electronic Relays of the Modular Line are manufactured in a compact 17.5 mm wide frame with 2 “form C” output relay. All units utilize high precision electronic circuits with line noise immunity, low energy consumption and are equipped with reliable LEDs for status indication. The units can be directly mounted on DIN rail 35mm or with screws. They are effective and a safe solution for industrial, commercial and residential applications. The line offers many timing options for applications of motor control and starting, industrial and commercial automation, as well as specific functions for lighting system control and voltage monitoring.

Standard Features:

- High precision electronic circuit with noise immunity
- Low energy consumption
- LED status indication
- Compact 17.5 mm wide size frame
- Direct mounting on DIN rail 35 mm or fixed with screws
- Applications in industrial or residential environments
- Suitable for installation in distribution boards, industrial panels and motor starters
- Designed according to the following standards:
 - o IEC / EN 60947-1
 - o IEC / EN 60947-5-1
 - o IEC / EN 61812
 - o UL 508 CAN / CSA C22.2

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Timing Relay RTW17 and ERWT

WEG timing relays allow switching of an output signal according to the timing function and selected time. Setting time ranges from 0.1s to 10 days. The relays come in a compact 17.5 mm wide frame and can be mounted directly on DIN rail 35 mm or fixed by screws. Available with 2 “form C” output relay.

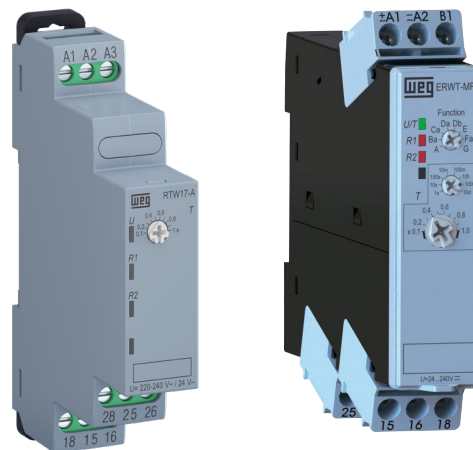
Ideal for applications such as industrial processes, automation and motor starters. The relays can also be used in residential and commercial applications.

Timing Functions

- RTW17-A - ON-delay
- RTW17-E - Impulse ON
- RTW17-G - Star-Delta
- RTW17-Ba - OFF-delay with external command
- RTW17-Da - Symmetrical flasher, starts with pulse ON
- RTW17-Db - Symmetrical flasher, starts with pulse OFF
- RTW17-Dc - Asymmetrical flasher, starts with pulse ON
- RTW17-Dd - Asymmetrical flasher, starts with pulse OFF

Multifunction Timer Features

- Multifunction Timers – 2 different types
- Up to 8 functions in one timer
- Multi-Voltage, 24-240 Vac/Vdc



Timing Relay Catalog Number Sequence

RTW17 - A 02 - U001S - E05

RTW17	Single or multiple timing relay
ERWT ^{2,3)}	Multifunction timing relay

Selection of the function

A	ON-delay ^{1,3)}
E	Impulse ON ^{1,3)}
G	Star-Delta ^{1,3)}
Ba	OFF-delay with external command ³⁾
Da	Symmetrical flasher, starts with pulse ON ³⁾
Db	Asymmetrical flasher, starts with pulse OFF ³⁾
Dc	Asymmetrical flasher, starts with pulse ON
Dd	Asymmetrical flasher, starts with pulse OFF
MF1	8 configurable functions^{2,3)}
	ON-delay
	ON-delay with control signal
	ON-delay and OFF-delay with control signal
	Symmetric flasher, start ON
	Asymmetric flasher, Start OFF
	Impulse ON with control signal
	Star-delta
MF2	8 configurable functions^{2,3)}
	Asymmetric flasher, Start ON
	Asymmetric flasher, Start OFF
	Percentage flasher, start ON
	Percentage flasher, start OFF
	Flasher for motor reversing
	ON-delay and OFF-delay with control signal and independent settings
	Delayed adjustable-length pulse
	Bistable

Power Supply

E05	24-240 Vac / Vdc
D90	208-480 Vac ¹⁾

Timing

U001S	0.1 to 1 second
U003S	0.3 to 3 seconds
U010S	1 to 10 seconds
U030S	3 to 30 seconds
U060S	6 to 60 seconds
U100S	10 to 1,000 seconds
U300S	30 to 300 seconds
U010M	1 to 10 minutes
U030M	3 to 30 minutes
U060M	6 to 60 minutes
MAT ³⁾	0.1s to 10 days ^{1,2)}

Number of contacts

02	DPDT (2 NO/NC)
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- 1) D90 - 208-480 Vac only for functions RTW17-A, E and G
- 2) MF1 and MF2 available only for ERWT multifunction relays
- 3) MAT multiple timing models available only for RTW17-A, E, G, Ba, Da, Db models.
- 4) Multiple timing models available only at voltage E05 - 24-240 Vac / Vdc.

Timing Relays - Multi-Voltage & Multi-Timing

Function / Description	Output Contacts	Voltage	Timing	Catalog Number	List Price	Multiplier
On-Delay	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	RTW17-A02MATE05	\$103	Z7
Off-Delay with external command	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	RTW17-BA02MATE05	\$103	
Impulse ON	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	RTW17-E02MATE05	\$103	
Star-Delta	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	RTW17-G02MATE05	\$90	
Symmetrical Flasher - Pulse (Start ON)	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	RTW17-DA02MATE05	\$90	
Symmetrical Flasher - Pulse (Start OFF)	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	RTW17-DB02MATE05	\$90	
Multifunction - MF1						
ON-delay	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	ERWT-MF1-02MT1E05	\$175	Z7
ON-delay with control signal						
ON-delay and OFF-delay with control signal						
Symmetric flasher, start ON						
Asymmetric flasher, Start OFF						
Impulse ON with control signal						
Star-delta						
Multifunction - MF2						
Asymmetric flasher, Start ON	DPDT (2NO/NC)	24-240 Vac 50Hz/60Hz 24-240 Vdc	0.1 sec - 10 days	ERWT-MF2-02MT1E05	\$175	Z7
Asymmetric flasher, Start OFF						
Percentage flasher, start ON						
Percentage flasher, start OFF						
Flasher for motor reversing						
ON-delay and OFF-delay with control signal and independent settings						
Delayed adjustable-length pulse						
Bistable						

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RTW17 - A02

RTW17 - BA02

RTW17 - BE02

RTW17 - G02

RTW17 - DA02

RTW17 - DB02

Timing Relays

Operation Modes

Single Timing Models (RTW17) or Multiple Timing (RTW17-MAT)

Operating mode	Timing diagram
<p>RTW17-A (ON – Delay) – Connecting a supply voltage on terminals A1-A2 / A3-A2, the selected time delay begins with the output relay remaining de-energized and LED (power supply “U”) pulses green during the time delay. After the end of the delay time, the output relay energizes (red LED R1 and R2 turns on) and remains energized until the supply voltage is removed. This can be repeated as often as required.</p> <p>Reset: Removing supply voltage resets the time delay and the output</p>	
<p>RTW17-E (Impulse ON) – Connecting a supply voltage on terminals A1-A2 / A3-A2, the green LED (power supply “U”) pulses and the output relay energizes without delay (red LED R1 and R2 turns on). The output remains energized until the selected pulse time elapse, the red LED R1 and R2 turns off and the green LED (power supply “U”) goes solid. This can be repeated as often as required.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	
<p>RTW17-Ba (OFF-delay with external command) – This function requires continuous supply voltage on terminals A1-A2 / A3-A2, the green LED (power supply “U”) turns on and timing is controlled by a command contact at terminals A2-B1. If the command contact is removed the selected time delay begins. When the selected time elapse the output relay is de-energized (red LED R1 and R2 turns off). This can be repeated as often as required.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	
<p>RTW17-Da (symmetrical flasher, starts with pulse ON) – Connecting a supply voltage on terminals A1-A2 / A3-A2 the green LED (power supply “U”) pulses and the output relay (R1 and R2) are activated. After the time set in the selector switch has elapsed, the output relay is deactivated. This continues with in symmetric ON/OFF cycles. The single dial presets a fixed ON and OFF time.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	

Operation Modes

Single Timing Models (RTW17) or Multiple Timing (RTW17-MAT)

Operating mode	Timing diagram
<p>RTW17-Db (symmetrical flasher, starts with pulse OFF) – Connecting a supply voltage on terminals A1-A2 / A3-A2 the green LED (power supply “U”) pulses and the output relay (R1 and R2) is energized. After the time set in the selector switch has elapsed, the output relay is activated. This continues with symmetric OFF/ON cycles. The single dial presets a fixed ON and OFF time.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	
<p>RTW17-Dc (asymmetrical flasher, starts with pulse ON) – Connecting a supply voltage on terminals A1-A2 / A3-A2 the green LED (power supply “U”) pulses and the output relay (R1 and R2) is energized. The timer starts to pulse with adjustable ON/OFF cycles. The upper dial presets the ON time (red LED R1 and R2 turns on and output relay are energized) and the lower dial selects the OFF time when the output relay is de-energized.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	
<p>RTW17-Dd (asymmetrical flasher, starts with pulse OFF) – Connecting a supply voltage on terminals A1-A2 / A3-A2 the green LED (power supply “U”) pulses and the output relay (R1 and R2) remain de-energized. The timer starts to pulse with adjustable ON/OFF cycles. The upper dial presets the ON time (red LED R1 and R2 turns on and output relay are energized) and the lower dial selects the OFF time when the output relay is de-energized.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	
<p>RTW17-G (star-delta) – Connecting a supply voltage on terminals A1-A2 / A3-A2 the output contact for the star-connection energizes and the adjusted time starts (red LED R1 turns on and output contact is energized). When the start-up time elapses, a fixed star-delta changeover time of 100ms starts and this star-delta changeover time elapses the output contact for the star-connection (R1) de-energizes and the delta-connection (R2) energizes and stayed energized until supply is disconnected.</p> <p>Reset: Removing supply voltage resets the time delay and the output.</p>	

Note: MAT multiple timing functions available only for RTW17-A, E, Ba, Da, Db, G models.

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Timing Relays

Wiring Diagram

Timing Relays RTW17 - Single Timing and Multiple Timing

Reference		RTW17-A			
Contacts		SPDT (1NO/NC)	DPDT (2NO/NC)	SPDT (1NO/NC)	DPDT (2NO/NC)
Terminal position					
		18 15 16	28 25 26 18 15 16	18 15 16	28 25 26 18 15 16
Wiring diagram					
		24-240 V ac / V dc		208-480 V ac	
Circuit		-	-	-	-
		-	-	-	-
Terminals	15-16-18	Output 1	Output 1	Output 1	Output 1
	25-26-28	-	Output 2	-	Output 2

Reference		RTW17-Da	
Contacts		SPDT (1NO/NC)	DPDT (2NO/NC)
Terminal position			
		18 15 16	28 25 26 18 15 16
Wiring diagram			
		24-240 V ac / V dc	
Circuit		-	-
		-	-
Terminals	15-16-18	Output 1	Output 1
	25-26-28	-	Output 2

Catalog Number		RTW17-Ba	
Contacts		SPDT (1NO/NC)	DPDT (2NO/NC)
Terminal position			
		18 15 16	28 25 26 18 15 16
Wiring diagram			
		24-240 V ac / V dc	
Circuit		-	-
		-	-
Terminals	15-16-18	Output 1	Output 1
	25-26-28	-	Output 2

Reference		RTW17-Dd		RTW17-G	
Contacts		SPDT (1NO/NC)	DPDT (2NO/NC)	DPDT (2NO/NC)	DPDT (2NO/NC)
Terminal position					
		18 15 16	28 25 26 18 15 16	28 25 26 18 15 16	28 25 26 18 15 16
Wiring diagram					
		24-240 V ac / V dc		208-480 V ac	24-240 V ac / V dc
Circuit		-	-	-	-
		-	-	-	-
Terminals	15-16-18	Output 1	Output 1	Output 1	Output 1
	25-26-28	-	Output 2	Output 2	Output 2

Wiring Diagram

Timing Relays RTW17 - Single Timing and Multiple Timing

Catalog Number		RTW17-E			
Contacts		SPDT (1NO/NC)	DPDT (2NO/NC)	SPDT (1NO/NC)	DPDT (2NO/NC)
Terminal position					
		RTW17-E	RTW17-E	RTW17-E	RTW17-E
Wiring diagram					
		24-240 V ac / V dc		208-480 V ac	
Terminals	15-16-18	Output 1	Output 1	Output 1	Output 1
	25-26-28	-	Output 2	-	Output 2

Catalog Number		RTW17-Db		RTW17-Dc	
Contacts		SPDT (1NO/NC)	DPDT (2NO/NC)	SPDT (1NO/NC)	DPDT (2NO/NC)
Terminal position					
		RTW17-Db	RTW17-Db	RTW17-Dc	RTW17-Dc
Wiring diagram					
		24-240 V ac / V dc		24-240 V ac / V dc	
Terminals	15-16-18	Output 1	Output 1	Output 1	Output 1
	25-26-28	-	Output 2	-	Output 2

Multifunction Models ERWT (MF1-MF2)

Functions	ERWT-MF1 / MF2	Supply voltage	Wiring diagram	Control voltage
		A1-A2 24-240 V ac / cc		B1-A2 24-240 V ac / cc
			15 - 16 / 18 - output contact 1	
			25 - 26 / 28 - output contact 2	

- Notes: 1) In models with two supply voltages, only one must be connected;
 2) The same potential must be applied to A1 and B1, polarized.

Relays

Timing Relays

Technical Data

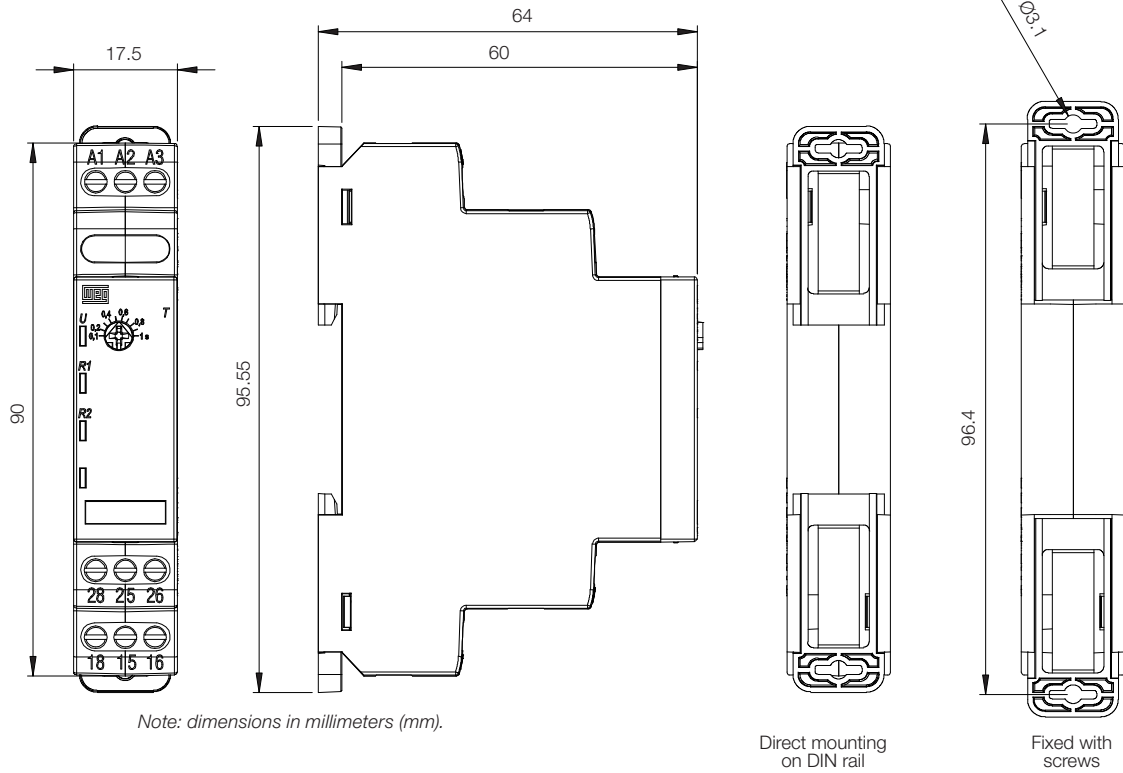
			Model				
			RTW17-xxx-UxxxxE05	RTW17-xxxx-MATE05	RTW17-xxx-UxxxxD90	ERWT-MFx-02MT1E05	
Input	Power supply(Ue)	A1-A2	24-240 Vac / Vdc	24-240 Vac / Vdc	24-240 Vac / Vdc	24-240 Vac / Vdc	
	Operation range		0.85 to 1.10 x Us				
	Frequency		50/60 Hz				
	Maximum consumption (Us)		70 mA at 240 Vac (Us)			80 mA at 240 Vac (Us)	
	Rated insulation voltage (Ui)		300 V	300 V	600 V	300 V	
Time Adjustment	Minimum time for reset		100ms				
	Minimum period of the command pulse		50ms				
	Scale precision (full scale)		± 5%			± 5% ¹	
	Repeatability precision (full scale)		± 2%				
	Switching time Y - D (star-delta function)		50ms ± 20%			100ms ± 20%	
Output	Capacity of the output contacts (Ie)		AC-13 (resistive) at 250 Vac: 5A		AC-12 (resistive) at 250 V ac: 5 A		
			AC-15 at 230 Vac: 1A		AC-15 at 230 Vac: 1A		
			DC-13 at 24 Vdc: 1A		DC-13 at 24 Vdc: 1A		
			DC-13 at 48 Vdc: 0.45A		DC-13 at 48 Vdc: 0.45A		
			DC-13 at 60 Vdc: 0.35A		DC-13 at 60 Vdc: 0.35A		
			DC-13 at 125 Vdc: 0.2A		DC-13 at 125 Vdc: 0.2A		
			DC-13 at 250 Vdc: 0.1A		DC-13 at 250 Vdc: 0.1A		
	Rated thermal current (Ith)		5A for AC		10A for AC / 1A for DC		
	Fuse (class gL/gG)		4A				
	Mechanical life		30 x 10 ⁶ switching cycles				
Characteristics	Ambient temperature	Operation	-5 °C to +60 °C				
		Storage	-40 °C to +85 °C				
	Protection rating		Enclosure: IP20				
			Terminals: IP20				
	Connection section (min. to max.)	Cable without end sleeves	2 x 0.5 mm ²		1 x (0.5 to 2.5) mm ²		
			2 x 1 mm ²		2 x (0.5 to 1.5) mm ²		
		Cable with terminal	1 x (0.5 to 1.5) mm ²		1 x (0.5 to 1.5) mm ²		
			2 x (0.5 to 0.75) mm ²		2 x (0.5 to 1.5) mm ²		
	Wire AWG ²		2 x (28 to 18) AWG		2 x (20 to 14) AWG		
	Tightening torque		0.4 N·m		0.8 to 1.2 N·m		
	Terminal screw		3.5 Lb·in		7 to 10.6 Lb·in		
	Mounting position		Any position				
	Shock resistance		15 g / 11 ms				
	Vibration resistance		10 to 55 Hz / 0.35 mm				
	Weight		0.08 kg - models with SPDT (1N0/NC)				
0.095 kg - models with DPDT (2N0/NC)							
Pollution degree		2					
Overvoltage category		III			II		
Certification		CE / UL					

1) For the ERWT models, under extreme voltage and temperature conditions, the scale accuracy may vary up to +/- 10% (full scale)

2) For solid conductors, use gauges of the same diameter

Dimensions (mm)

RTW17 /RMW17



Note: dimensions in millimeters (mm).

Direct mounting on DIN rail

Fixed with screws

Altitudes - Ratio-Corrector Factor

Altitude above sea level - h	Voltage ratio-corrector factor (U_v) / V	Current ratio-corrector factor (I_w) / A
$h \leq 2,000$ m	1	$1 \times I_n$
$2,000 < h \leq 3,000$ m	0.87	$0.95 \times I_n$
$3,000 < h \leq 4,000$ m	0.77	$0.90 \times I_n$
$4,000 < h \leq 5,000$ m	0.67	$0.85 \times I_n$

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Protection Relays RMW17, RPW and ERWM

WEG protection relays are designed to supervise and monitor three-phase and single-phase power supplies, interrupting the process of operation whenever an anomaly occurs. They can switch off circuits and activate safety devices and alarms in order to protect machines and equipment against faults on the power supply according to the settings.

Some anomalies in electric installations that could occur are overvoltage, undervoltage, phase loss, and phase sequence. Overvoltage or phase loss can overheat machinery and motors, thus reducing the lifetime. Phase sequence inversion can cause machinery to run in the wrong way, possibly destroying the entire system. Undervoltage may occur causing machinery to run in an undefined range, which could cause some parts of the system to run properly while others cease operating.



Protection Functions

- RMW17-FF – Phase Loss Relay
- RMW17-SF – Phase Sequence Relay
- RMW17-FSF – Phase Loss and Sequence Relay
- RMW17-SS – Three-Phase Undervoltage and Overvoltage Relay
- RMW17-SSM – Single-Phase Undervoltage and Overvoltage Relay
- RPW-PTC – Thermistor Relay

RMW17-FF – The [Phase Loss Relay](#) is used to monitor three-phase networks against phase failure.

RMW17-SF – The [Phase Sequence Relay](#) is used to monitor three-phase networks against incorrect phase sequence.

RMW17-FSF – The [Phase Loss and Phase Sequence Relay](#) is used to monitor three-phase networks against phase loss and incorrect phase sequence.

RMW17-SS – The [Three-Phase Undervoltage and Overvoltage Relay](#) is used to monitor the maximum and minimum variations that three-phase power supplies are able to work. The RMW17-SS also protects the circuit against phase unbalance (asymmetry) of 20% or higher between phases.

RMW17-SSM – The [Single-Phase Undervoltage and Overvoltage Relay](#) is used to monitor the maximum and minimum variations that single-phase power supplies are able to work. The RMW17-SSM also protects the circuit against phase unbalance (asymmetry) of 20% or higher between phases.

RPW-PTC – The [Thermistor Relay](#) is used to measure the motor temperature by using PTC sensor inside of the motor. When the motor temperature rises above the PTC sensor class, the output relay is de-energized avoiding damages to the motor.



RMW17-FF

RMW17-FSF

RMW17-SS

RPW-PTC

ERWM-VM1/VM2

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Protection Relay Catalog Number Sequence

RMW17 - FF - 01 - D65

RMW17	Single or multiple protection relay
RPW	Thermistor relay
ERWM	Multifunction protection relay

Number of contacts	
01	SPDT (1NO/NC)

Selection of the function	
FF	Phase loss
SF	Phase Sequence
FSF	Phase loss and Phase Sequence
SS	Three-phase undervoltage and overvoltage
SSM	Single-phase undervoltage and overvoltage
PTC	Thermistor Relay
VM1	5 configurable functions¹
	Phase loss
	Phase Sequence
	Oversvoltage/Undervoltage
	Asy-Unbalance
	Neutral Detection
VM2	4 configurable functions¹
	Phase loss
	Oversvoltage/Undervoltage
	Asy-Unbalance
	Neutral Detection

Power supply	
D23	220 Vac
D39	480 Vac
D65	200-240 Vac
D77	208 Vac
D90	208-480 Vac
D97	380-480 Vac
E05 ²	24-240 Vac / Vdc

1) VM1 and VM2 available only for ERWM multifunction relays
 2) E05 power supply available only for ERWM multifunction relays

Function / Description	Output Contacts	Voltage	Catalog Number	List Price	Multiplier
Phase loss	SPDT (1NO/NC)	200-240 Vac 50Hz/60Hz	RMW17-FF01D65	\$93	27
		380-480 Vac 50Hz/60Hz	RMW17-FF01D97	\$93	
Phase Sequence	SPDT (1NO/NC)	200-240 Vac 50Hz/60Hz	RMW17-SF01D65	\$84	
		208-480 Vac 50Hz/60Hz	RMW17-SF01D90	\$84	
Phase loss and Phase Sequence	SPDT (1NO/NC)	200-240 Vac 50Hz/60Hz	RMW17-FSF01D65	\$94.50	
		380-480 Vac 50Hz/60Hz	RMW17-FSF01D97	\$94.50	
Three-phase undervoltage and overvoltage	SPDT (1NO/NC)	208 Vac 50Hz/60Hz	RMW17-SS01D77	\$99.75	
		220 Vac 50Hz/60Hz	RMW17-SS01D23	\$99.75	
		480 Vac 50Hz/60Hz	RMW17-SS01D39	\$99.75	
Single-phase undervoltage and overvoltage	SPDT (1NO/NC)	220 Vac 50Hz/60Hz	RMW17-SSM01D23	\$99.75	
Thermistor Relay		24-240 Vac 50Hz/60Hz 24-240 Vdc	RPW-PTCE05	\$105	
Multifunction - VM1	SPDT (1NO/NC)	208-480 Vac 50Hz/60Hz	ERWM-VM1-01D90	\$230	
Phase loss					
Phase Sequence					
Oversvoltage/Undervoltage					
Asy-Unbalance					
Neutral Detection					
Multifunction - VM2	SPDT (1NO/NC)	208-480 Vac 50Hz/60Hz	ERWM-VM2-01D90	\$230	
Phase loss					
Oversvoltage/Undervoltage					
Asy-Unbalance					
Neutral Detection					

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Electronic Relays

Protection Relays

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Operating mode	Timing diagram
<p>RMW17-FF: Connected directly to the supply voltage to be monitored. The output relay switched the contacts to the operation position (closing terminals 15-18), and the red LED (relay "R") and green LED (power supply "U") will turn on. Adjust the sensitivity of the line voltage. If one of the phases drop down below the percentage limit set on the selector switch, the coil output contacts will be powered down. This will open contacts 15-18 and the red LED will turn OFF</p>	<p style="text-align: center;">Phase Loss Function</p> <p style="text-align: center;">Phase loss L2</p>
<p>RMW17-SF: Connected directly to the supply voltage to be monitored. If the phase sequence at the terminal L1-L2-L3 is correct, the output relay will energize (closing the 15-18 terminals) and the red LED (relay "R") will turn ON. In case of an incorrect phase sequence, the output relay will de-energize (closing 15-16 terminals) and the red LED (relay "R") will turn OFF.</p>	<p style="text-align: center;">Phase Inversion</p>
<p>RMW17-FSF: Connected directly to the supply voltage to be monitored. If the phase sequence at the terminals L1-L2-L3 is correct and balanced with values higher than the selected on the dial, the output relay energizes (closing the 15-18 terminals) and the red LED (relay "R") turns ON. In case of an incorrect phase sequence or a phase falls below the threshold value, the output relay remains de-energized (closing 15-16 terminals) and the red LED (relay "R") turn OFF.</p>	<p style="text-align: center;">Phase Inversion</p>
	<p style="text-align: center;">Phase Loss Function</p> <p style="text-align: center;">Phase Loss L2</p>

Operation Modes

Single Protection Models (RMW17/RPW)

Operating mode	Timing diagram
<p>RMW17-SS/S5M: Connected directly to the supply voltage to be monitored. Connected to terminals A1 and A2 (for the single-phase version) or terminals L1-L2-L3 (for the three-phase version) with phase amplitudes within the selected values and asymmetry between them below the threshold (20%), the output relay energizes (closing the 15-18 terminals) and the red LED (relay "R") turns ON. In case of a phase loss, asymmetry between phases higher than 20% or under and over-voltage, the output relay remains de-energized (closing the 15-16 terminals) and the red LED (relay "R") is turns OFF.</p>	
<p>RPW-PTC: Connected directly to the supply voltage and in series to the PTC (Positive Temperature Coefficient) sensor (maximum of 3 sensors). The output relay is automatically energized (closing the 15-18 terminals) and turns on the red LED (relay "R") indicating that the temperature is within acceptable values. If an over temperature occurs, the probe resistance is rapidly increase and the output relay is de-energized (closing the 15-16 terminals) and the red LED (relay "R") turns OFF, remaining on this situation until the temperature decreases at a normal value. The RPW PTC is able to evaluate if the PTC sensor has a fault (not caused by an over temperature) or if it is not connected (open circuit). In such situations, the green LED will start flashing.</p>	

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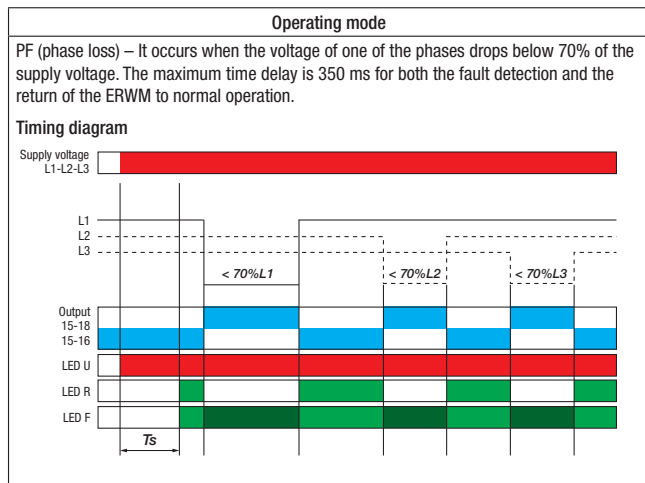
Terminal Blocks

Power Factor Correction

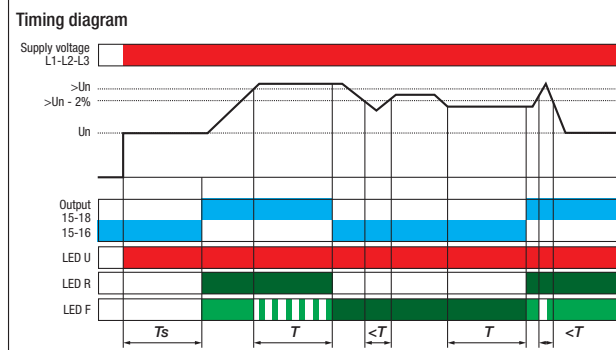
Appendix A

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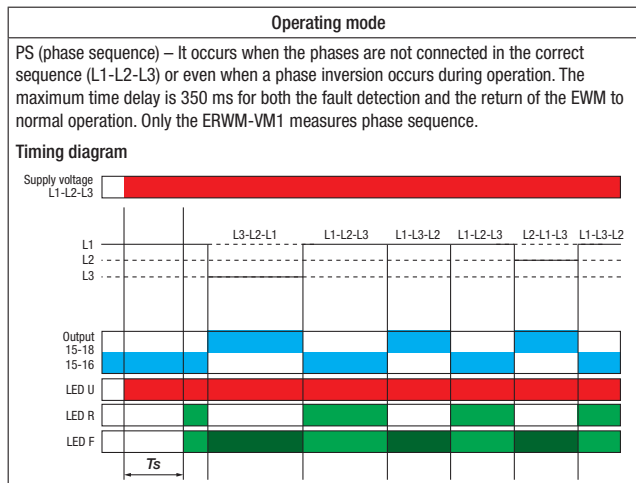
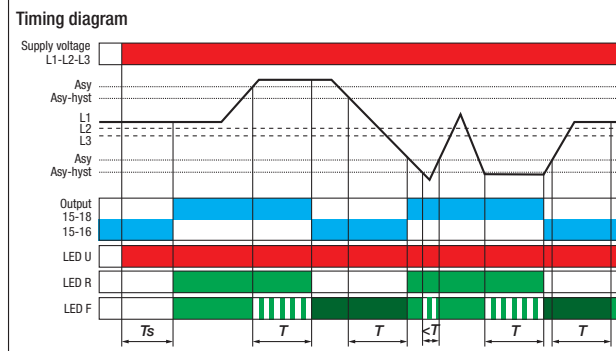
Appendix C



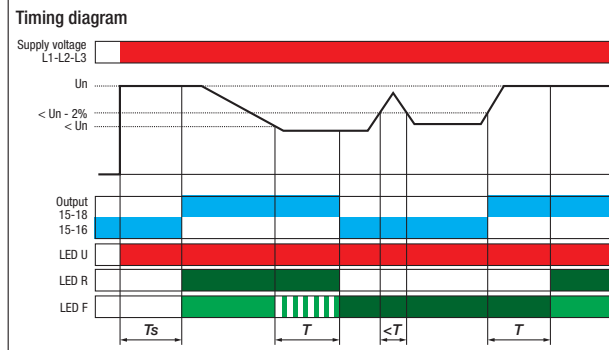
>Un (overvoltage) – It occurs after the rated tripping voltage (U_n) (208 to 480 V) and the tripping overvoltage percentage (>Un) (3 to 15%) are selected. The time delay is defined by the time scale (1 to 30 s) or disabled (OFF) acting in a maximum of 350 ms. The selected time delay is for both the fault detection and the return of the ERWM to normal operation.



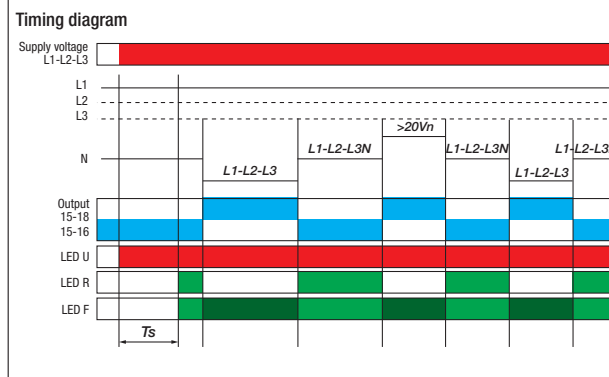
Asy (unbalance) – It occurs when the voltage of one, two or three of the phases vary, calculating the average value of the three phases and also the greatest voltage variation value by the average value. The worst voltage variation case is taken into account in the unbalance calculation. The time delay is defined by the time scale (1 to 30 s) or disabled (OFF) acting in a maximum of 350 ms. The selected time delay is for both the fault detection and the return of the ERWM to normal operation.



<Un (undervoltage) – It occurs after the rated tripping voltage (U_n) (208 to 480 V) and the tripping undervoltage percentage (<Un) (-3 to -15%) are selected. The time delay is defined by the time scale (1 to 30 s) or disabled (OFF) acting in a maximum of 350 ms. The selected time delay is for both the fault detection and the return of the ERWM to normal operation.



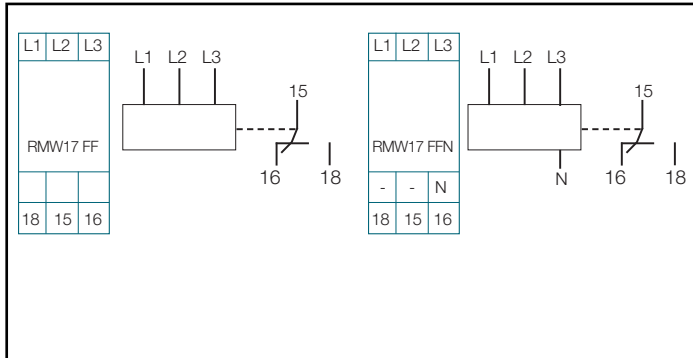
ND (neutral detection) – It occurs when the Neutral is not connected or it is disconnected during operation, or also when the voltage rises above 20 V (due to unbalance in the power grid). The maximum time delay is 350 ms for both the fault detection and the return of the ERWM to normal operation. For neutral detection, it is necessary to provide a bridge between terminals A and B; otherwise, the neutral will not be monitored.



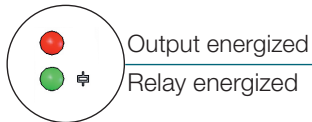
Wiring Diagram

RMW17-FF - Phase Loss

Wiring Diagram

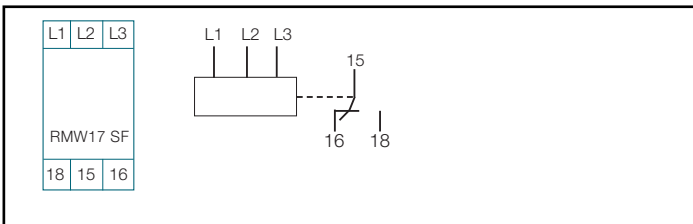


The RMW17 protector relay has state indication LEDs, as shown below:

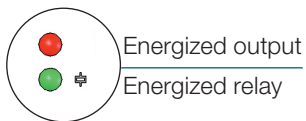


RMW17-SF - Phase Sequence Function

Wiring Diagram



The RMW17 protector relay has state indication LEDs, as shown below:



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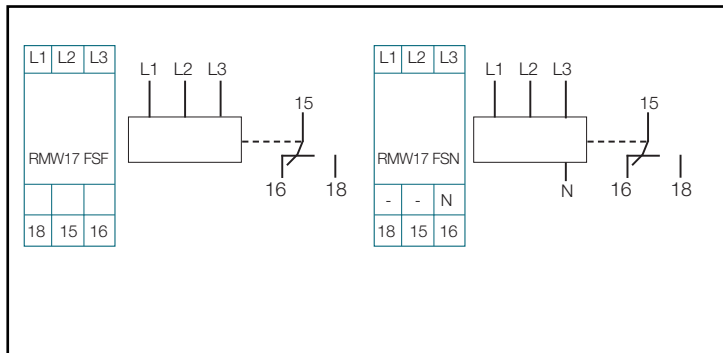
Electronic Relays

Protection Relays

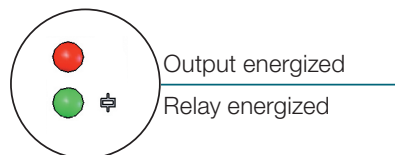
Wiring Diagram

RMW17-FSF - Phase Loss and Sequence

Wiring Diagram

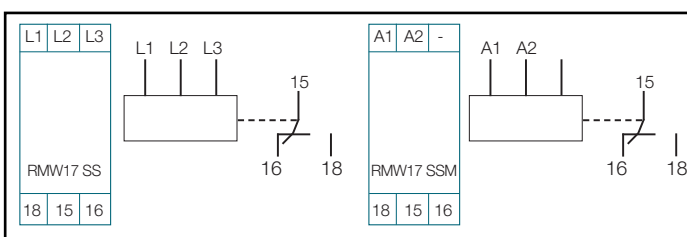


The RMW17 protector relay has state indication LEDs, as shown below:



RMW17-SS/SSM - Three-Phase and Single-Phase Undervoltage and Overvoltage Function

Wiring Diagram



	ON	Normal operation
	OFF	Under, overvoltage and phase loss
	ON	Fed
	OFF	Not fed

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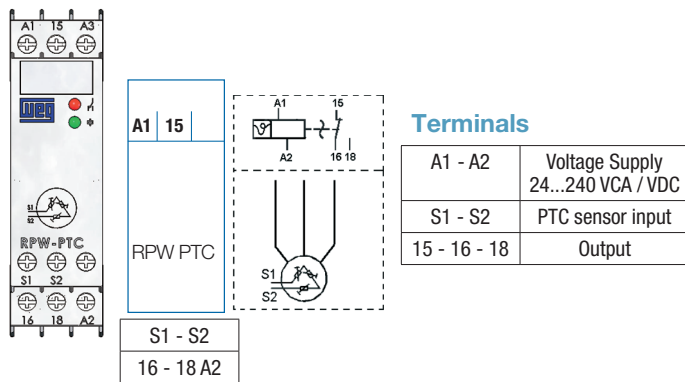
Appendix B

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Wiring Diagram

RPW-PTC - Thermistor Relay

Wiring Diagram

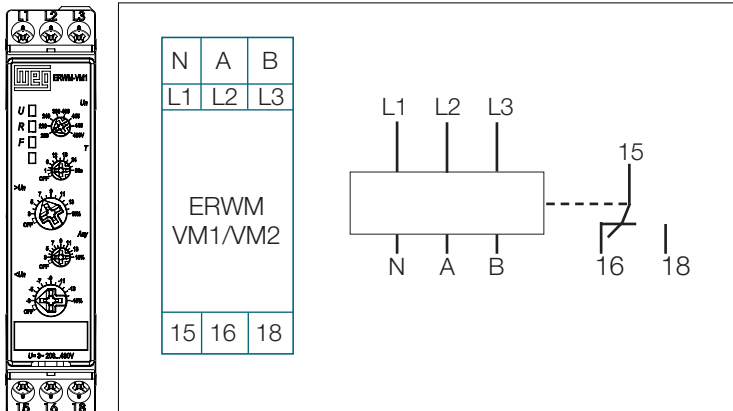


Protection Relay RPW is provided with LED's for status indication.

- Output energized (Red LED)
- Protector energized (Green LED)

Multifunction Models (VM1 - VM2)

Wiring Diagram



Electrical connection (VM1 / VM2)	
L1 - L2 - L3	Supply voltage
N - A - B	Voltage and neutral detection
15 - 16 / 18	Output contact

Supply voltage
208-480 V ac 50/0 Hz (L1-L2-L3)

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Technical Data

	Technical Data	Model			
		RWM17	RPW-PTC	ERWM	
Input	Power supply (Us) L1 - L2 - L3 /A1-A2	208 V / 220-240 V / 220 V / 230 V / 240 V / 208-480 V / 380 V / 380-480 V / 400 V / 415 V / 440 V / 460 V / 480 V	24-240 Vac 24-240 Vdc	208-480 Vac	
	Frequency	50/60 Hz			
	Sensitivity setting	± 3 TO 15 %	-	± 3 TO 15 %	
	Operation range	0.85 TO 1.1 X Us for Vac			
	Maximum consumption (Us)	80 mA / 1 W			
	Maximum voltage allowed on the neutral	20 V ac	-	20 V ac	
	Scale precision (full scale)	± 10 %	± 5 %		
Outputs	Repeatability precision	± 1 %			
	Maximum output contact capacity (Ie)	5 A (resistive load)			
		3 A (AC-15)			
	Fuse (class gL/gG)	4A			
Mechanical lifespan	30 x 106 operating cycles				
Characteristics	Electrical lifespan	10 x 105 operating cycles			
	Ambient temperature allowed	In operation	-5 to +60 °C / 23 to 140 °F		
		Stored	-40 to +85 °C / -40 to 185 °F		
	Degree of protection	Enclosure IP20 / Terminals IP20			
	Connection section (min. to max.)	Cable without end sleeves	1 x (0.5 to 2.5) mm ²	1 x (0.5 to 2.5) mm ²	
			2 x (0.5 to 1) mm ²	2 x (0.5 to 1.5) mm ²	
		Cable with terminal	1 x (0.5 to 1.5) mm ²	1 x (0.5 to 1.5) mm ²	
			2 x (0.5 to 0.75) mm ²	2 x (0.5 to 1.5) mm ²	
	Wire AWG ¹⁾	2 x (28 to 18) mm ²		2 x (20 to 16) mm ²	
	Tightening torque	0.4 N·m		0.8 to 1.4 N·m	0.8 to 1.2 N·m
3.5 Lb·in		7.1 to 12.3 Lb·in	7 to 10.6 Lb·in		
Terminal screw	M3				
Mounting position	Any position				
Shock resistance	15g / 11ms				
Vibration resistance	10 to 55 Hz / 0.35 mm				
Weight	0.1 kg				
Pollution degree	2				
Overvoltage category	III				
Certification	CE / UL				

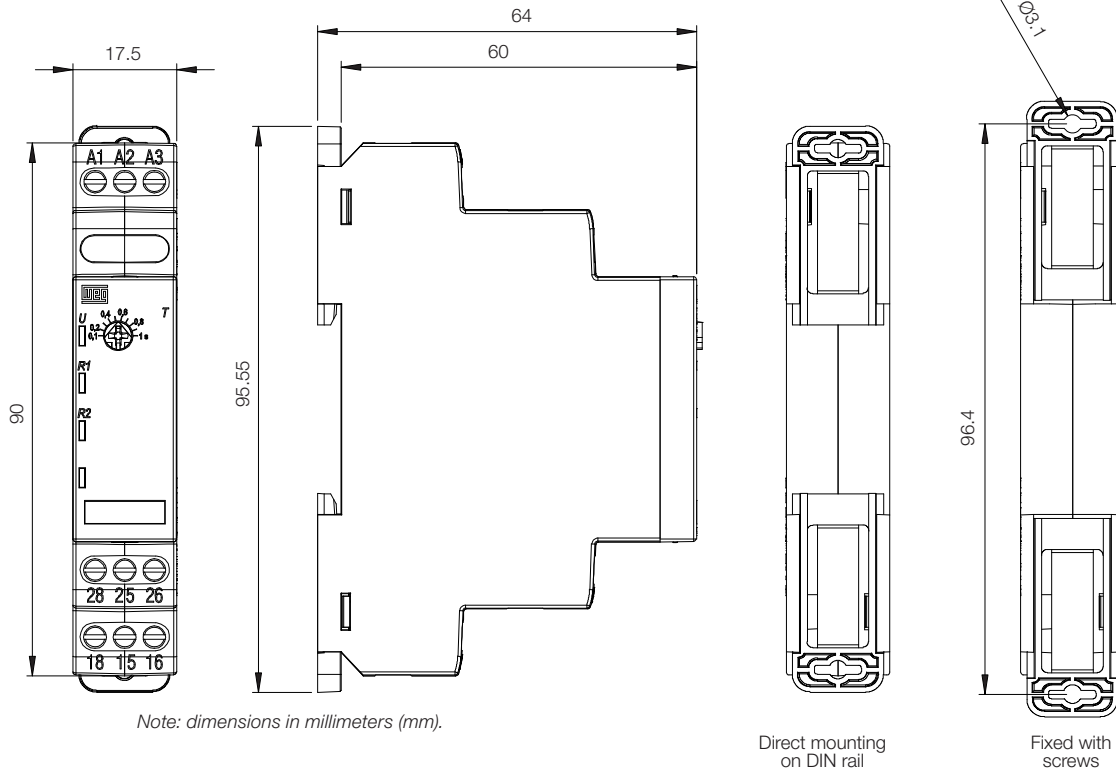
1) For wires, use gauges of the same diameter

Altitudes - Ratio-Corrector Factor

Altitude above sea level - h	Voltage ratio-corrector factor (U _v) / V	Current ratio-corrector factor (I _v) / A
h ≤ 2,000 m	1	1 x I _n
2,000 < h ≤ 3,000 m	0.87	0.95 x I _n
3,000 < h ≤ 4,000 m	0.77	0.90 x I _n
4,000 < h ≤ 5,000 m	0.67	0.85 x I _n

Dimensions (mm)

RTW17/RMW17



Altitudes - Ratio-Corrector Factor

Altitude above sea level - h	Voltage ratio-corrector factor (U_n) / V	Current ratio-corrector factor (I_n) / A
$h \leq 2,000$ m	1	$1 \times I_n$
$2,000 < h \leq 3,000$ m	0.87	$0.95 \times I_n$
$3,000 < h \leq 4,000$ m	0.77	$0.90 \times I_n$
$4,000 < h \leq 5,000$ m	0.67	$0.85 \times I_n$

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Level Relay RNW

WEG Level Relays are electronic control devices that enable the monitoring and automatic adjustment of levels in electric current liquid conductors. Widely used in general reservoir automation, the RNW relays can also be utilized in several applications such as prevention of dry pump operation, monitoring against filling tank overflow, activation of solenoids or alarms / lighting.

The operating principle is based on measuring the electrical resistance of the reservoir liquid through electrodes that work as liquid presence / absence sensors. To optimize their performance, the relay has a sensitivity DIAL enabling the electronic circuit to be adjusted to the liquid resistance.

Available in 2 functions, RNW-EN filling and RNW-ES draining, the level relay offers digital electronics that provide high precision, repeatability and noise resistance. The supply system is isolated from the electronic circuit therefore ensuring greater user safety. Designed in accordance with international standards, the RNW offers a safe and compact solution, in 22,5mm wide housing for assembly on 35mm DIN rail, with 1 output reversible contact(C form) and voltage supply range of 100-240 VAC/VDC.

Available in the following functions:

- RNW EN -> Filling
- RNW ES -> Draining



Level Relay RPW-Series Catalog Number Sequence



Table intended for reference only and not to create part numbers.

Product Selection

Function / Description	Output Contacts	Voltage	Catalog Number	List Price	Multiplier
Draining Relay	SPDT (1NO/NC)	100-240 Vac 50Hz/60Hz 100-240 Vdc	RNW-ESE09	\$125	Z7
Filling Relay	SPDT (1NO/NC)	100-240 Vac 50Hz/60Hz 100-240 Vdc	RNW-ENE09	\$125	
Pendulum Type Electrode	-	-	EPW	\$25	
Shaft Type Electrode	-	-	EHW	\$92	Z4
Push-in-Lugs	-	-	PLMP	\$0.50	

SPDT - Single Pole Double Throw = 1N.O./1N.C. changeover contact set

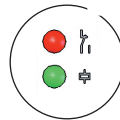
Sensitivity Adjustment

Liquid resistance can vary according to the liquid in question and the position of the electrodes. To adapt the electronic circuit to the liquid used, sensitivity must be adjusted through the DIAL located in the front part of the RNW, which has a graded scale without values.

To perform the sensitivity adjustment, all electrodes must be submersed into the reservoir liquid and the DIAL positioned at its limit anti-clockwise (less resistance). With the relay energized, the DIAL must be turned clockwise (greater resistance) until the relay output switches its contacts (the red LED must change status). To confirm the adjustment, the reference electrode C must be disconnected and then quickly reconnected, the relay must return to its previous status. If this not happen, a new adjustment must be performed. By doing this, the RNW will be adjusted to the ideal sensitivity point.

Relay Light Indications

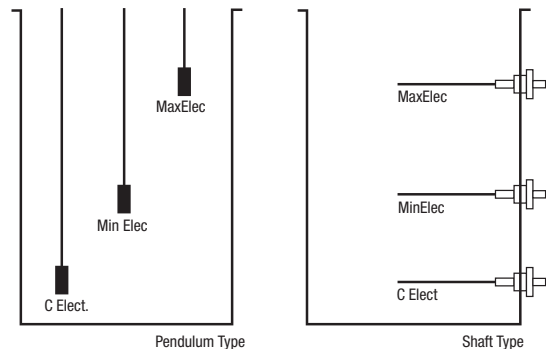
The RNW Level Relay is equipped with indicator LEDs as shown on the right:



Energized Output
Energized Relay

Functional Diagram

The electrodes are fixed in the reservoir according to desired control levels, minimum or maximum. The reference electrode (C) must be positioned in the lower part, below the maximum and minimum level electrodes. When the system is energized, an alternating current is applied to the reference electrode and, once the liquid comes into contact with the level electrodes, a path is established for the circulation of electrical current between the electrodes. An electronic current compares the current and switches the relay output contacts according to the chosen model (RNW ES or RNW EN). The electrodes are available in 2 versions, shaft (EHW) or pendulum (EPW), the difference between them is the assembly type. The RNW is available in two distinct functions, draining and filling.



Note: The EHW shaft sensors can be fixed both horizontally and vertically

Electronic Relays

Level Relays

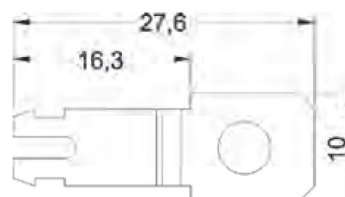
Level Relays-RNW Series

Accessories

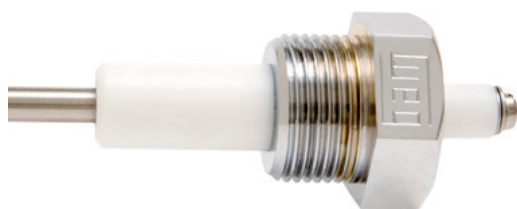
Adaptor for screw fixing - PLMP



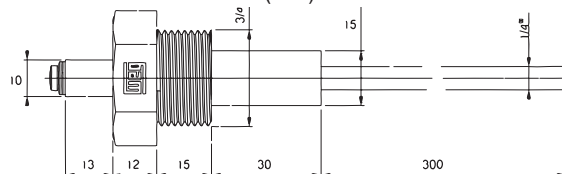
Dimensions (mm)



Shaft electrode - EHW



Dimensions (mm)

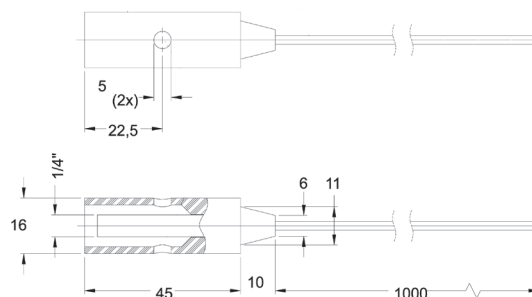


Teflon coated stainless steel shaft
 1 1/4" chrome hex screw
 Length: 300 mm
Note: Other lengths upon request
Maximum sensor cable 100m (110yd)

Pendulum electrode - EPW



Dimensions (mm)



Body in natural black polypropylene
 Stainless steel sensor shaft
 1x10 mm² gauge flexible connection cable
 Cable length: 1000 mm
Note: Maximum sensor cable 100m (110yd)

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RNW Series Technical Data

	Product		RNW ES/RNW EN	
Inputs	Supply (Un)	A1	VAC	100-240 50 /60 Hz
		A2	VDC	100-240
	Isolated Rated Voltage (Ui)		V	300
	Operating Limits			0.85 to 1.1 x Ue
	Maximum Consumption		VA / W	2 / 1
Outputs	Contacts	15 - 16 / 18		1 SPDT (1 NO/NC)
	Output Contact Capacity (Ie)			5 (resistive load)
	AC-15 in 230 Vca			3
	DC-13 in 24 VDC			1
	DC-13 in 48 VDC			0.45
	DC-13 in 60 VDC		A	0.35
	DC-13 in 125 VDC			0.2
	DC-13 in 250 VDC			0.1
	A300 : AC-15			
	R300 : DC-13			
	Rated thermal current (Ith)		A	10 (for AC) 2.5 (for DC)
	Fuse (class gL / gG)		A	4
	Mechanical Lifespan		operations	30 x 10 ⁶
Characteristics	Temperature	Operation	°C (F)	-5 to +60 (23...140)
		Storage		-40 to +85 (-40...185)
	Degree of Protection			IP20
	Terminal Capacity	Rigid or flexible Cable	mm ²	1 x (0.5 to 2.5)
				2 x (0.5 to 1.5)
	Cable with Terminal	Rigid or flexible Cable/Terminal	mm ²	1 x (0.5 to 2.5)
				2 x (0.5 to 1.5)
	Tightening torque	AWG Solid conductor	AWG	2 x (30 to 14)
				N.m
			lb.in	7 to 10.6
	Terminal Screws			M3
	Assembly Position			Any
	Resistance to Impacts		g / ms	15 / 11
	Resistance to Vibration		Hz / mm	10 to 500 / 10
	Weight		kg	0.08
	Pollution			2
	Over voltage category			II
Sensitivity Adjustment		kΩ	0 to 100	
Electrode Voltage		VCA	7	
Electrodes	Electrode Current		mA	0.05
	Maximum length of sensor cable		m	100 (Maximum cable capacitance 2.2nF)
	Detector operating temperature	- Shaft	°C (F)	0 to + 260 (32...500)
		- Pendulum		0 to + 60 (32...140)
	Allowable detector pressure	- Shaft	kgf / cm ²	3
		- Pendulum		-
	Detector Weight	- Shaft	kg	0.230
- Pendulum		0.012		

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Electronic Relays

Level Relays

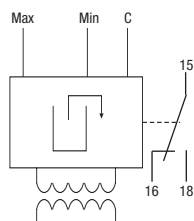
Level Relays-RNW Series

RNW EN (Filling)

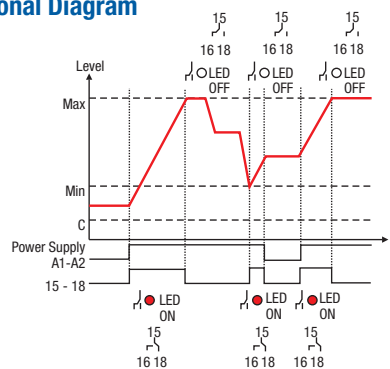


Controls 2 levels using 3 electrodes: the reference electrode (C), the maximum level electrode (Max) and the minimum level electrode (Min). Once powered, the RNW EN start monitoring the liquid level in the reservoir. With the electrode being uncovered at minimum level Min, the output relay will energize (terminals 15-18 closed) causing the liquid level to rise. When the reservoir liquid covers the Max level electrode, the output relay de-energize (terminals 15-18 open) and remains de-energized until the Min level electrode is discovered again. If there is a supply failure, the RNW EN will restart its initial logic.

Wiring Diagrams



Functional Diagram

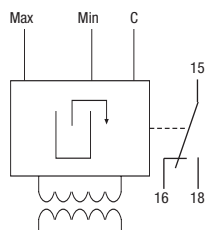


RNW ES (Draining)

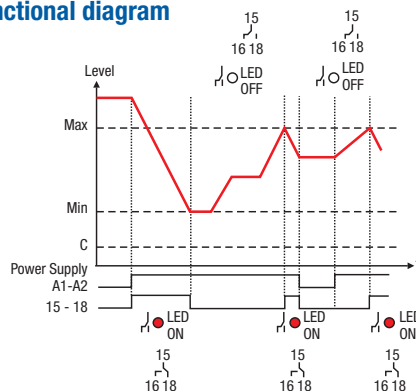


Controls 2 levels using 3 electrodes: the reference electrode (C), the maximum level electrode (Max) and the minimum level electrode (Min). Once powered, the RNW ES start monitoring the liquid level in the reservoir. With the liquid being in contact with the Max level electrode, the relay will energize (terminals 15-18 closed), causing the reservoir liquid level begin to drop. Once the Min level electrode is uncovered by the liquid the relay will energize (terminals 15-18 open) and will remain energized until the liquid enters into contact again with the Max level electrode, restarting the process. If there is a supply failure, the RNW ES will restart its initial logic.

Wiring Diagram



Functional diagram



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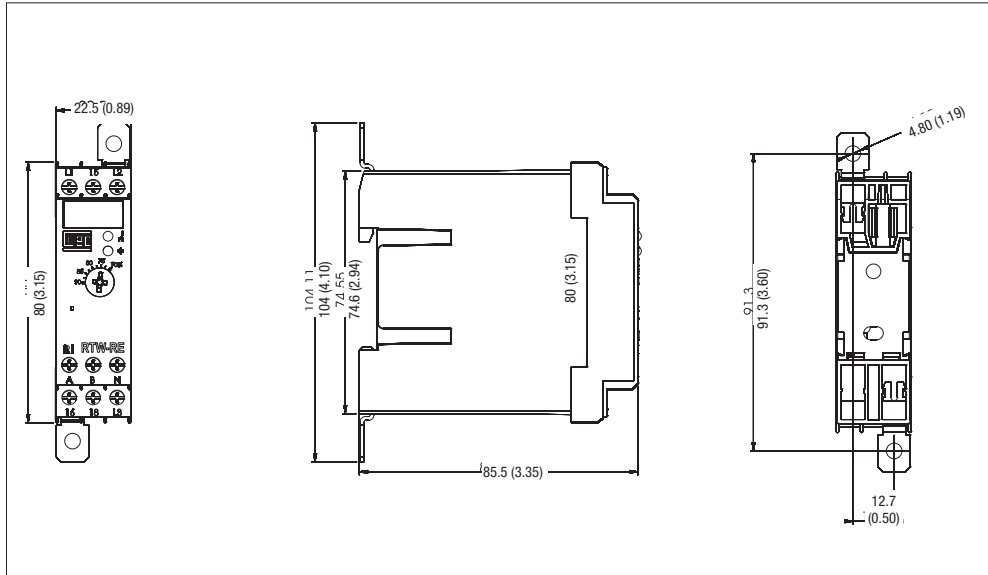
Appendix B

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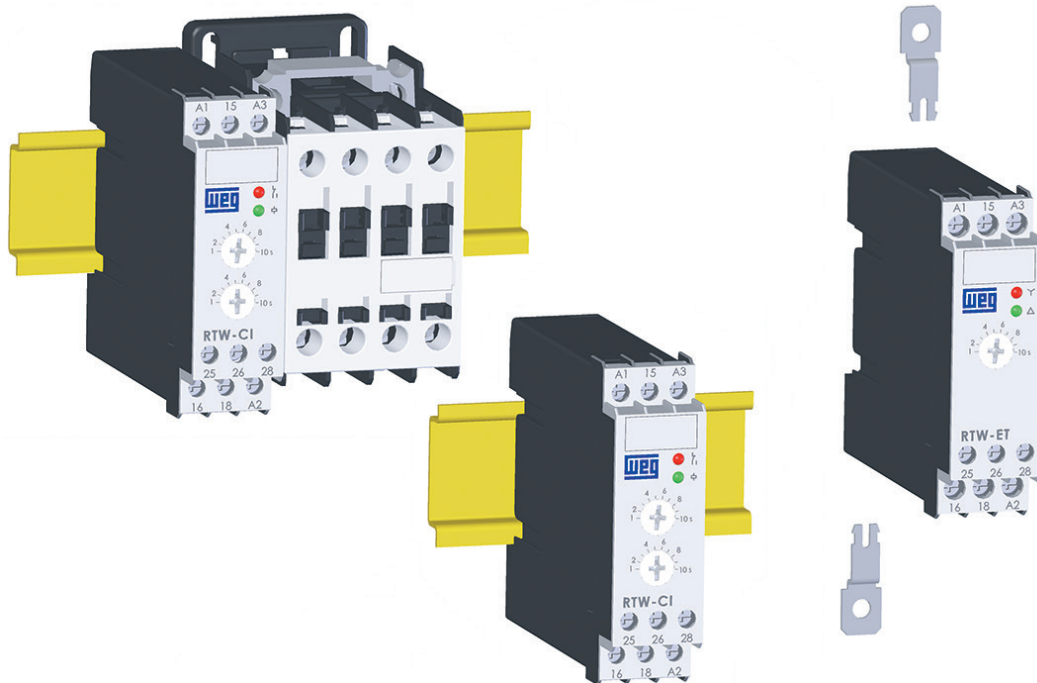
RNW Series

Electronic Relay Technical Data

Dimensions mm (in)



Relay Assembly



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