



# Data Sheet

M Series  
140.D.101.05

## Two-Point Controller with Moving-Iron or Moving-Coil Movement 90° Dial

RW 96  
RP 96



**WEIGEL**

## Application

The two-point controllers **RW/RP 96** (M series) with one or two setpoints provide continuous surveillance of Amps and Volts. If used with transducers they monitor frequency, Watts or Vars, power factor or any other physical variable.

One or two relay outputs with change over contacts are incorporated. Options are LOW or HIGH setpoints in five different models:

– <b>Min</b>	one relay, one setpoint, LOW alarm
– <b>Max</b>	one relay, one setpoint, HIGH alarm
– <b>Min/Min</b>	two relays, two setpoints, LOW alarm plus prewarning setpoint
– <b>Min/Max</b>	two relays, two setpoints, LOW and HIGH alarm
– <b>Max/Max</b>	two relays, two setpoints, HIGH alarm plus prewarning setpoint

As standard, the relays provide closed contacts (closed circuit principle): they de-energize when the monitored signal value moves outside the chosen setpoint limits shown by adjustable red pointers or in case of power failure. As an option, the controllers can be supplied with relays having open contacts (open circuit principle). ♦

Setpoint and zero adjustment are accessible from the front.

## Functional Principle

**RW 96** Moving-iron movement with shell-type system, pivot suspension. Spring loaded jewel bearings and silicon oil damping for vibration and shock resistance.

**RP 96** Self-shielding moving-coil movement with core-type magnetic system, pivot suspension. Twin spring loaded shock absorbing jewel bearings.

Integrated comparators optically scan the selected setpoint limits and drive the potential-free relay outputs.

## Mechanical Data

case details	square case suitable to be mounted in switch-boards or mosaic grid panels, stackable
material of case	pressed steel
material of window	glass ♦
colour of bezel	black (similar to RAL 9005) ♦
position of use	vertical $\pm 5^\circ$ ♦
panel fixing	screw clamps
panel thickness	1 ... 15 mm
mounting	stackable next to each other

### terminals

voltmeters and ammeters	hexagon studs, M5 screws and wire clamps C10 ♦
relay contacts and power supply	barrier type screw clamp (up to 2.5 mm <sup>2</sup> )
protective wire	connector blade 6.3 x 0.8

### dimensions

bezel	□ 96 mm
case	□ 90 mm
depth	78 mm without dial illumination 106 mm with dial illumination ♦
panel cutout	□ 92 <sup>+0.8</sup> mm
weight approx.	0.5 kg

♦ for other ratings refer to "Options"

## Electrical Data

measuring unit	RW 96 AC voltage or current RP 96 DC voltage or current
overload capacity (according to DIN EN 60 051 - 1)	continuously 1.2 times rated voltage / current 5 s max.
voltmeters	2 times rated voltage
ammeters	10 times rated current
measurement category	CAT III
operating voltage	300 V in <b>Min</b> or <b>Max</b> model 150 V in <b>Min/Min</b> , <b>Min/Max</b> or <b>Max/Max</b> model
enclosure code	IP 40 case front side IP 00 for terminals without protection against accidental contact IP 20 for terminals protected against accidental contact

## Measuring Ranges

### For mains use

#### RW 96 AC current <sup>1)</sup> | RW 96 AC voltage

40 mA	40 V
60 mA	60 V
100 mA	100 V
150 mA	150 V
250 mA	250 V <sup>3)</sup>
400 mA	400 V <sup>3)</sup>
600 mA	500 V <sup>3)</sup>
1 A	
1.5 A	
2.5 A	
4 A	
5 A	
6 A	
10 A	
15 A	

#### RW 96 for use on current transformer <sup>1)</sup>

N/1 A  
N/5 A

#### RW 96 for use on voltage transformer

100 V sec.  
110 V sec.

Please state transformer ratio when ordering.

power consumption RW 96

voltmeters approx. 1.5 ... 3 VA  
ammeters approx. 0.5 ... 1 VA

1) full-scale value = 2 times rated current (overload scaling)  
2) full-scale value = 1.2 times rated voltage (overload scaling)  
3) only for **Min** or **Max** model  
4) all resistance values are limited to a tolerance of  $\pm 20\%$



## Two-Point Controller with Moving-Iron or Moving-Coil Movement 90° Dial

DC current RP 96	internal resistance <sup>4)</sup> voltage drop approx.	DC voltage >5 V RP 96	sensitivity <sup>4)</sup>
100 μA	5000 Ω	6 V	1 kΩ/V
150 μA	3600 Ω	10 V	1 kΩ/V
250 μA	2200 Ω	15 V	1 kΩ/V
400 μA	1300 Ω	25 V	1 kΩ/V
600 μA	260 Ω	40 V	1 kΩ/V
1 mA	60 mV	60 V	1 kΩ/V
1.5 mA	60 mV	100 V	1 kΩ/V
2.5 mA	60 mV	150 V	1 kΩ/V
4 mA	60 mV	250 V <sup>3)</sup>	1 kΩ/V
5 mA	60 mV		
6 mA	60 mV		
10 mA	60 mV		
15 mA	60 mV		
20 mA	60 mV		
25 mA	60 mV		
40 mA	60 mV		
60 mA	60 mV		
100 mA	60 mV		
150 mA	60 mV		
250 mA	60 mV		
400 mA	60 mV		
600 mA	60 mV		
1 A	60 mV		

also with rectifier incorporated for use on sinusoidal AC voltage ↗

### RP 96 for use with external shunt sensitivity<sup>4)</sup>

60 mV	1 kΩ/V
150 mV	1 kΩ/V

a total lead resistance of 0.05 Ω is considered in the calibration of the indicator for connecting leads 1 m, 2 x 0.75 mm<sup>2</sup> ↗

### Not for mains use

#### RP 96 DC voltage ≤5V sensitivity<sup>1)</sup> ↗

100 mV; 150 mV; 250 mV; 400 mV; 600 mV	1 kΩ/V
1 V; 1.5 V; 2.5 V; 4 V	1 kΩ/V

also with rectifier incorporated for use on sinusoidal AC voltage ↗

#### RP 96 for use on transducer ("live zero")

4 ... 20 mA	mechanically suppressed zero, without zero adjustment, voltage drop approx. 60 mV
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## Scaling

pointer	bar / knife-edge pointer
pointer deflection	0 ... 90°
scale characteristics	RW 96 initial scale compressed, starts at approx. 1/5 th of rated scale value
	RP 96 linear
scale division	coarse-fine
scale length	78 mm
overload scaling	
ammeters	2 times rated current
voltmeters for use on voltage transformers	1.2 times rated voltage

↗ for other ratings refer to "Options"

## Auxiliary Supply

auxiliary voltage	AC 230 V (195.5 ... 253 V), 48 ... 62 Hz ↗
power consumption	3 VA max.

Measuring input and auxiliary supply are electrically insulated.

## Accuracy at Reference Conditions

accuracy class	1.5 according to DIN EN 60 051 - 1
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### reference conditions

ambient temperature	23°C
position of use	nominal position ±1° ↗
input	rated measuring value
frequency	RW 96 50 Hz
wave form	RW 96 sinusoidal, distortion factor <5%
others	DIN EN 60 051 - 1

### influences

ambient temperature	23°C±2K
position of use	nominal position ±5°
frequency	RW 96 15 ... 100 Hz (voltage) 15 ... 400 Hz (current)
stray magnetic field	0.5 mT

## Environmental

climatic suitability	climatic class 2 ↗ according to VDE/VDI 3540 sheet 2
operating temperature range	0 ... +40°C ↗
storage temperature range	-25 ... +65°C
relative humidity	≤ 75% annual average, non-condensing
shock resistance	15 g, 11 ms ↗
vibration resistance	2.5 g, 5 ... 55 Hz ↗

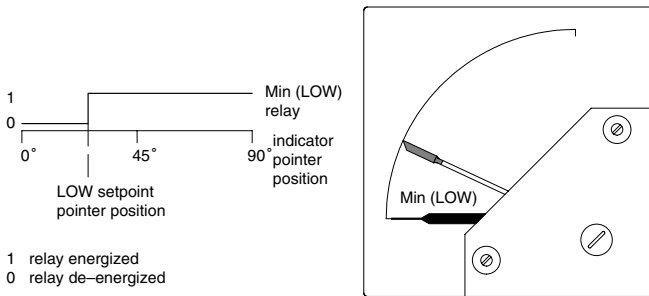
## Rules and Standards

DIN 43 718	Measurement and control; front-frames and frontpanels of measurement and control equipment; principal dimensions
DIN 43 802	Line scales and pointers for indicating electrical measuring instruments; general requirements
DIN 16 257	Nominal positions and position symbols used for measuring instruments
DIN EN 60 051	Direct acting indicating analogue electrical measuring instruments and their accessories
	-1 Part 1: Definitions and general requirements common to all parts
	-2 Part 2: Special requirements for ammeters and voltmeters
	-9 Part 9: Recommended test methods
DIN EN 60 529	Enclosure codes by housings (IP-code)
DIN EN 61 010 - 1	Safety requirements for electrical measuring, control and laboratory equipment
	Part 1: General requirements
DIN EN 61 326 - 1	Electrical equipment for measurement, control and laboratory use – EMC requirements
	Part 1: General requirements (IEC 61 000 - 4 - 3 evaluation criterion B)
DIN IEC 61 554	Panel mounted equipment – Electrical measuring instruments – Dimensions for panel mounting
VDE/VDI 3540 sheet 2	reliability of measuring and control equipment (classification of climates) (non-condensing)

# Setpoints

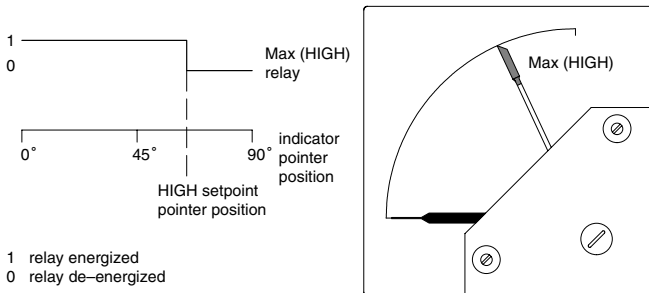
## control modes (closed circuit principle ▶)

### RW/P 96 Min



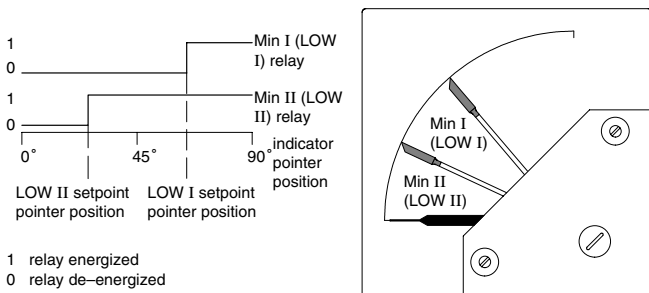
1 setpoint with Min (LOW) relay:  
relay energized with indicator pointer above chosen setpoint limit.  
setpoint adjustment 0 ... 93 % of scale length

### RW/P 96 Max



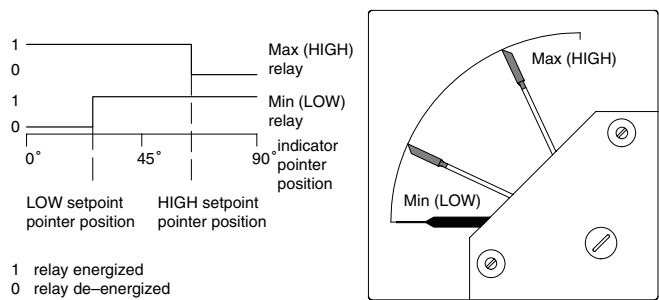
1 setpoint with Max (HIGH) relay:  
relay energized with indicator pointer below chosen setpoint limit.  
setpoint adjustment 7 ... 100 % of scale length

### RW/P 96 Min/Min



2 setpoints with 2 Min (LOW) relays:  
relays energized with indicator pointer above chosen setpoint limits.  
setpoint adjustment Min II (LOW II) 0 ... 89 % of scale length  
Min I (LOW I) 4 ... 93 % —"  
minimum span 4 % —"

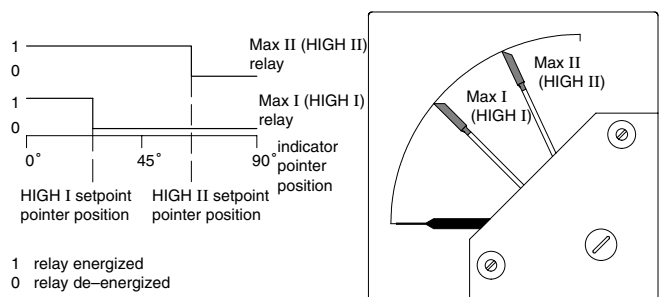
### RW/P 96 Min/Max



2 setpoints with Min (LOW) and Max (HIGH) relays:  
relays energized with indicator pointer above resp. below chosen setpoint limits.

setpoint adjustment	Min (LOW)	7 ... 91 % of scale length
	Max (HIGH)	9 ... 93 % —"
	minimum span	2 % —"

### RW/P 96 Max/Max



2 setpoints with 2 Max (HIGH) relays:  
relays energized with indicator pointer below chosen setpoint limits.

setpoint adjustment	Max I (HIGH I)	7 ... 96 % of scale length
	Max II (HIGH II)	11 ... 100 % —"
	minimum span	4 % —"

### accuracy

response value	±1% of scale length
repeatability	<0,2% of scale length
differential	<1% of scale length

### output relays

1 SPDT relay on each setpoint; maximum contact rating non-inductive:

contact voltage	230 V <sub>~</sub>
contact current	4 A
contact output	920 VA
operations	2x 10 <sup>6</sup> at above load
mech. operations	10 <sup>7</sup>



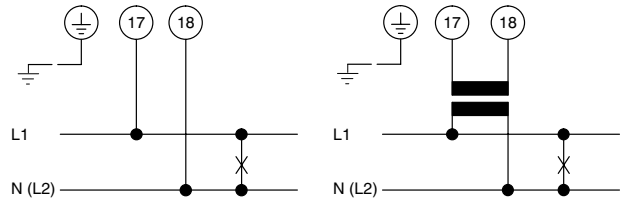
## Two-Point Controller with Moving-Iron or Moving-Coil Movement 90° Dial

### Options

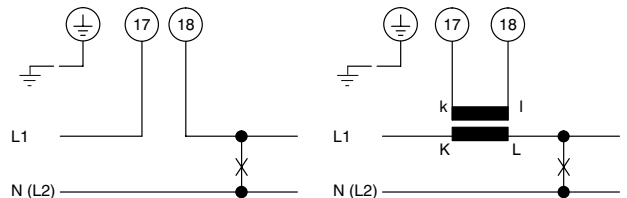
measuring range	RP 96	to include rectifier for use on sinusoidal AC voltages ranging from 0 ... 1.5 V to 0 ... 500 V (RG 96)
special measuring range		deviating from standard
adjustment of internal resistance	RP 96	to $\pm 1\%$ at 23°C
lead resistance	RP 96	calibration to $>0.05 \Omega$
relay operation		open circuit principle
auxiliary voltage		AC 115 V (97.75 ... 126.5 V), 48 ... 62 Hz, 3 VA or DC 24 V (20.4 ... 26.4 V), 1.8 VA
<b>case</b>		
window		non-glaring glass
colour of bezel		gray (similar to RAL 7037)
position of use		horizontal or to be specified 15...165°
<b>performance</b>		
increased mechanical loads		shock 30 g, 11 ms vibration 5 g, 5 ... 55 Hz
climatic suitability		limited use in the tropics climatic class 3 according to VDE/VDI 3540 sheet 2 -10 ... +55°C
with operating temperature range		
marine application		non-certified
<b>accessories</b>		
terminal protection		against accidental contact full-sized rear cover or protective sleeves
terminals (measuring input)		connector blades 6.3 x 0.8
<b>dial</b>		
blank dial		pencil marked initial and end values
scale division and figuring		0 ... 100%, linear (RP 96), full-scale values acc. to standardized series (1 - 1.2 - 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 7.5 and any decimal multiple of these numbers e.g. 150 m <sup>3</sup> /h) or deviating from standard series; special calibration from customer's non-linear graph or chart; scaling of voltmeters in ohms; captions optional
additional lettering		to be specified e.g. "generator"
additional figuring		to be specified
coloured marks		red, green or blue for important scale values
coloured sector		red, green or blue within scale division
logo on the dial		none or as specified
zero position		centre zero or off-set zero
<b>dial illumination</b>		by one 6 V, 12 V or 24 V to be installed from the rear, dial translucent

### Connections

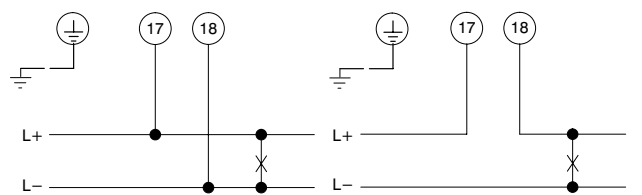
#### AC voltage



#### AC current

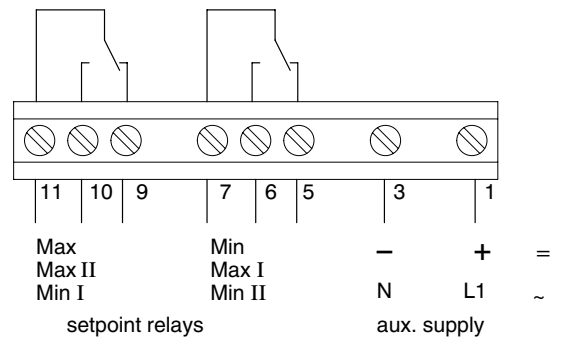


#### DC voltage



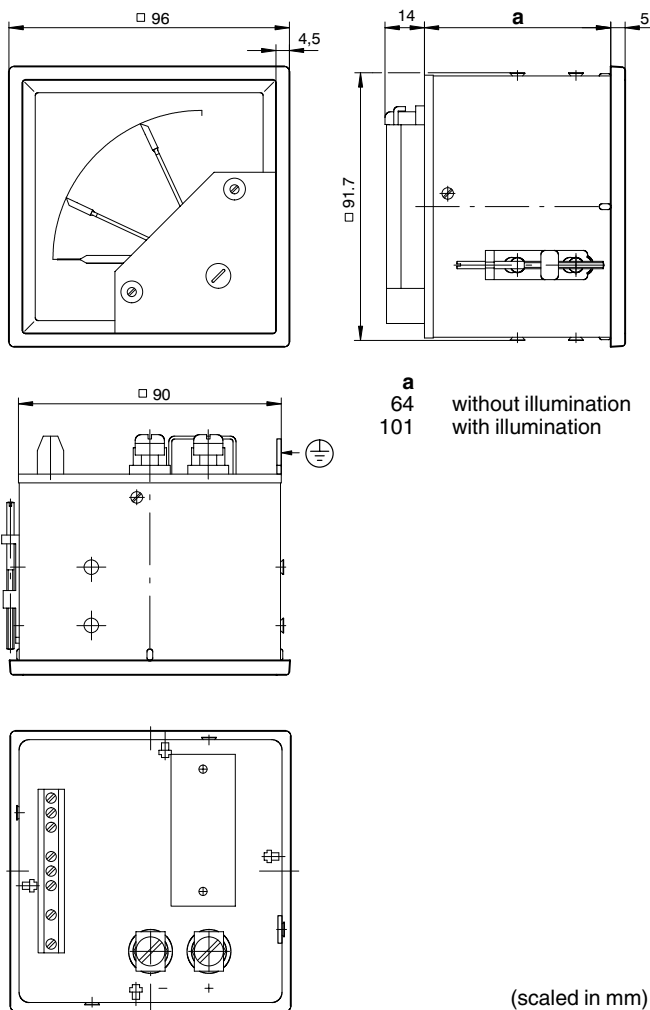
#### DC current

#### terminal markings setpoint relays, aux. supply



Relay positions shown refer to auxiliary voltage applied with indicator pointer not having passed above resp. below chosen setpoint limits (relays energized, closed circuit principle).

## Dimensions



## Ordering Information

<b>type</b> RW RP	two-point controller with moving-iron movement moving-coil movement
<b>front dimension</b> 96	96 mm x 96 mm
<b>control function</b> Min Max Min/Min Min/Max Max/Max	with Min (LOW) setpoint with Max (HIGH) setpoint with LOW & prewarning setpoint with LOW & HIGH setpoint with HIGH & prewarning setpoint

<b>measuring ranges</b>	refer to preceding table
<b>measuring range</b> RP 96	DC current or DC voltage <sup>1)</sup> sinusoidal AC voltage (RG 96)
<b>"live zero" RP 96</b>	4 ... 20 mA mechan. suppressed zero <sup>1)</sup>
<b>sp. measuring range</b>	to be specified <sup>2)</sup>
<b>adjustments RP 96</b>	internal resistance $\pm 20\%$ <sup>1)</sup> internal resistance to $\pm 1\%$ at 23 °C lead resistance $> 0.05 \Omega$
<b>relay operation</b>	closed circuit principle <sup>2)</sup> open circuit principle
<b>auxiliary supply</b>	230 V $\sim$ <sup>1)</sup> 115 V $\sim$ 24 V $\sim$
<b>window</b>	glass <sup>1)</sup> non-glaring glass
<b>colour of bezel</b>	black (similar to RAL 9005) <sup>1)</sup> gray (similar to RAL 7037)
<b>position of use</b>	vertical <sup>1)</sup> to special order 15 ... 165 ° <sup>2)</sup>
<b>mechanical loads</b>	shock 15 g, vibration 2.5 g <sup>1)</sup> shock 30 g, vibration 5 g
<b>climatic suitability</b>	class 2, 0 ... +40 °C <sup>1)</sup> class 3, -10 ... +55 °C
<b>marine application</b>	none <sup>1)</sup> non-certified
<b>terminal safety protection</b>	none <sup>1)</sup> full-sized rear cover protective sleeves SW10
<b>terminals</b> (measuring input)	screws and wire clamps <sup>1)</sup> connector blades 6.3 x 0.8
<b>dial</b>	scale division and measuring range alike resp. full-scale values acc. to standardized series for use on transformer <sup>1)</sup> blank dial scale division and figuring 0 ... 100% linear (RP 96) to standardized series <sup>2)</sup> linear (RP 96) deviating from standard <sup>2)</sup> calibration fr. non-linear graph or chart <sup>2)</sup> scaling in ohms for voltmeters <sup>2)</sup> additional lettering to be specified <sup>2)</sup> additional figuring to be specified <sup>2)</sup> coloured marks red, green or blue <sup>2)</sup> coloured sector red, green or blue <sup>2)</sup>
<b>logo</b>	WEIGEL <sup>1)</sup> none OEM logo <sup>2)</sup>
<b>zero position</b>	left hand zero position <sup>1)</sup> centre or off-set zero position <sup>2)</sup>
<b>dial illumination</b>	none <sup>1)</sup> with 1 lamp 6 V, 12 V or 24 V

<sup>1)</sup> Standard

<sup>2)</sup> Please clearly add the desired specifications.

### ordering example

RW 96 Min/Max, measuring range 0 ... 1 A, scale 0 ... 1 / 2 kA, window non-glaring glass, WEIGEL logo

– specifications subject to change without notice; date of issue 05/11 –

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