

# Versatile, Automatic RCL Meters

**Technical Specifications**  
PM 6306 / PM 6304 / PM 6303A

## PM 6306 and PM 6304

**Versatile component measurement  
and testing**

- **Easy to use, at-a-glance display**
- **Test frequencies, from 50 Hz to 1 MHz (100 kHz for PM 6304)**
- **0.1 % basic accuracy (0.05 % for PM 6304C)**
- **RS-232 and IEEE-488 interfaces**
- **AC test levels from 50 mVrms to 2 Vrms**
- **Internal or external bias**
- **DC test measurement (optional)**
- **9 front panel set-ups**
- **Actual component test voltage/current readback**
- **Automatic zero trimming**
- **Contact check and deviation mode (PM 6306 only)**
- **Front-panel test posts for immediate 4-wire measurements**

## PM 6303A

**Effective, economic testing  
that's quick and easy to use**

- **Easy-to-use, at-a-glance display of relevant information**
- **0.25 % basic accuracy**
- **2V DC internal bias**
- **Automatic zero trimming**
- **Front-panel test posts for immediate 4-wire measurements**

	PM 6306	PM 6304
<b>AC Test mode</b>		
Test frequency	50, 60, 100, 120 Hz 200 Hz to 100 kHz (100 Hz steps) 100 kHz to 1 MHz (1 kHz steps)	50, 60, 100, 120 Hz 200 Hz to 20 kHz (100 Hz steps) 100 kHz
Test frequency accuracy	0.01%	0.01%
Test signal levels	50 mV to 2V (10 mV steps) via 100Ω	50 mV via 100Ω 1V via 100Ω 2V via 400Ω
Basic measurement accuracy at normal measurement mode	0.1% ± 1 digit (for ≥ 0.25V, ≤ 50 kHz) 0.1% * (f / 50 kHz) ± 1 digit (for ≥ 0.25V, > 50 kHz) 0.1% * (0.25V/V <sub>r</sub> ) ± 1 digit (for < 0.25 V, ≤ 50 kHz)	0.05% ± 1 digit (for PM 6304C, ≤ 2 kHz) 0.1% ± 1 digit (for ≤ 20 kHz) 0.4% ± 1 digit (100 kHz) 0.5% ± 1 digit (for 50 mV, ≤ 20 kHz) 2.0% ± 1 digit (for 50 mV, 100 kHz)
<b>DC bias</b>		
Internal	0 to 10V (0.1V steps)	2V
External	0 to 40V	0 to 40V
<b>DC Test mode (Optional)</b>		
Test signal levels	50 mV to 2 V (10 mV steps) via 100Ω	300 mV via 100Ω 1 V via 100Ω 2 V via 400Ω
Basic measurement accuracy at normal measurement mode	0.1% ± 1 digit (for ≥ 0.25V)	0.1% ± 1 digit (for 1V)
<b>Contact check (PM 6306 only)</b>		
Pass	< 3Ω	-
Fail	≥ 3Ω (with indication of failed connection lead)	
<b>Maximum measuring ranges</b>		
Impedance / Resistance AC Z or R <sub>AC</sub>		0.0000Ω to 200 MΩ
Resistance DC R <sub>DC</sub>		0.0000Ω to 50 MΩ
Capacitance C		0.00 pF to 31.8F
Inductance L		0.00 μH to 637 kH
Quality factor Q		0.000 to 1000
Dissipation factor D		0.000 to 1000
Phase angle φ		-179 to +180 deg
Voltage monitor V <sub>X</sub>		0.1 μV to 2.00V
Current monitor I <sub>X</sub>		0.005 μA to 10.0 mA
<b>Maximum resolution</b>		
Impedance / Resistance AC Z or R <sub>AC</sub>		0.1 mΩ
Resistance DC R <sub>DC</sub>		0.1 mΩ
Capacitance C		0.01 pF
Inductance L		0.01 μH
Quality factor Q		0.001
Dissipation factor D		0.001
Phase angle φ		0.1 deg
Voltage monitor V <sub>X</sub>		0.1 μV
Current monitor I <sub>X</sub>		0.001 μA
<b>Circuit diagram</b>		
Display	1 of 7 different equivalent circuit diagrams	
<b>Auto mode</b>		
Read-out	Dominant <b>and</b> secondary parameter	
Equivalent circuit diagram	Parallel for R+C, Serial for R+L	
<b>Manual mode</b>		
Read-out	Dominant <b>and</b> secondary parameter or Z, φ, D, Q, V <sub>X</sub> , I <sub>X</sub>	
Equivalent circuit diagram	Parallel or serial selectable	
<b>Average function</b>		
Function	Exponential averaging in continuous mode	
Levels	3 (and off)	1 (and off)
<b>Deviation mode (PM 6306 only)</b>		
Relative range in respect	-100% to +100%	-
<b>Measuring modes</b>		
<b>Normal</b>		
Continuous	2 measurements/s	
Single	Triggered via "TRIG" key, Triggered via handler interface Triggered via IEEE-488 or RS-232	
Test frequency	50, 60, 100, 120 Hz 200 Hz to 100 kHz (100 Hz steps) 100 kHz to 1 MHz (1 kHz steps) DC (optional)	50, 60, 100, 120 Hz 200 Hz to 20 kHz (100 Hz steps) 100 kHz DC (optional)
Read-out	Display or via IEEE-488 or RS-232 interface	
<b>Fast</b>		
Max. speed	10 measurements/s	
Test frequency	200 Hz to 100 kHz (200 Hz steps) 100 kHz to 1 MHz (1 kHz steps) DC (optional)	200 Hz to 20 kHz (200 Hz steps) 100 kHz DC (optional)
Single	Triggered via handler interface Triggered via IEEE-488 or RS-232	
Read-out	Via IEEE or RS-232 interface (display blanked)	

## Options for PM 6306 and PM 6304

### PM 9548

Control capability  
Interface functions

Address range  
Remote lock-out

Special functions

Signals

### PM 9549

Mode

Control capability  
Baud rates

Data bits  
Stop bits  
Parity  
Xon/Xoff handshake  
Hardware handshake  
Signals  
Connector

### PM 9565

Technical specification

### PM 9566

Signals  
Inputs  
Outputs

Max. switchable current  
Max. switchable voltage

### IEEE-488 interface

All functions  
AH1, L3, RL1, SR1, SH1, T6  
1...30  
Go to local by front panel key "LOCAL"  
Learn mode / device identification mode  
All optically isolated

### RS-232 interface

Communication mode  
Printing mode  
All functions  
110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200  
7 or 8  
1 (2 for 110 baud only)  
Odd, Even, None  
On or Off  
DSR/DTR and CTS/RTS  
All optically isolated  
9-pin D-connector, male

### DC test measurement option

See "DC test mode"

### Handler interface

All optically isolated  
Trigger input  
Bin 0-9 indication  
FAIL indication  
200 mA  
40V

	PM 6306	PM 6304
<b>Binning</b> Standard bins Special bins Bin programming via  Bin limit programming	9 Bin "0" and bin "fail" IEEE-488 interface RS-232 interface Bin programmer (PM 6304 only) Absolute or relative	
<b>Trim function</b> Open circuit Short circuit	Open circuit compensation $Z > 100 \text{ k}\Omega$ Short circuit compensation $Z < 10\Omega$	
<b>Protection against charged capacitors</b> $C < 2 \mu\text{F}$ $2 \mu\text{F} \leq C \leq 2 \text{ mF}$  $C > 2 \text{ mF}$	$V_{\text{max}} < 200 \text{ V}$ $V_{\text{max}} < 47 \times (C/\text{mF})^{-0.234}$ ( $V_{\text{max}}$ in V, C in mF) $V_{\text{max}} < 40\text{V}$	$V_{\text{max}} < 500 \text{ V}$ $V_{\text{max}} < 117 \times (C/\text{mF})^{-0.234}$ ( $V_{\text{max}}$ in V, C in mF) $V_{\text{max}} < 100\text{V}$
<b>Stored settings (non-volatile memory)</b> Front panel settings Bin settings	9+1 (trim figures included) 9+1	
<b>Print measurement results</b>	Via RS-232 interface for serial printers	
<b>Calibration</b> Calibration interval	1 year	
<b>Environmental conditions</b> Operating temperature Storage temperature Power requirements Line frequency	0°C to 50°C -40°C to 70°C 100/120/220/240 V $\pm 10\%$ 50/60 Hz	
Power consumption	44 VA	31 VA
EMC	According to CE regulation 89/336: Emission according to EN 55011 Group 1 Class B, respectively CISPR 11. Immunity according to EN 50082-1, inclusive IEC 801-2,-3,-4	
Safety	According to CE-regulation 73/23 EN61010-1 CAT II, Pollution Degree 2, CSA C22.2 No. 231	
Warm-up time	30 minutes	5 minutes
<b>Dimensions and weight</b> WxHxD Weight	315 x 105 x 405 mm (12.4" x 4.13" x 15.9") 5.3 kg / 11.7 lb      4.7 kg / 10.4 lb	

**Accessories for PM 6306, PM 6304 and PM 6303A**

<b>PM 9540 / BAN</b> DUT connection Cable length Weight	<b>4-wire test cable set with Banana plugs</b> 4 Banana plugs 1000 mm 0.15 kg
<b>PM 9540 / TWE</b> DUT connection DUT length Cable length Weight	<b>SMD tweezers</b> 2 tweezers max. 20 mm 1000 mm 0.15 kg
<b>PM 9541A</b> DUT connection Cable length Weight	<b>4-wire test cable set with Kelvin clips</b> 2 Kelvin clips 1000 mm 0.2 kg
<b>PM 9541B</b> DUT connection Cable length Weight	<b>4-wire test cable set with heavy Kelvin clips</b> 2 Kelvin clips 1000 mm 0.3 kg
<b>PM 9542A</b> DUT connection DUT length Dimensions (WxHxD) Weight	<b>Universal test adapter</b> Kelvin contacts in test posts 1000 mm 145 x 50 x 95 mm (5.7" x 1.9" x 3.7") 0.6 kg
<b>PM 9542 / SMD</b> DUT connection DUT length DUT width DUT height Dimensions (WxHxD)	<b>Test fixture for SMDs (in combination with PM 9542A)</b> Kelvin contacts in test posts min. 2 mm, max. 10 mm min. 1 mm min. 0.5 mm 55 x 45 x 30 mm (2.2" x 1.8" x 1.2")
<b>PM 9559</b> Distance	<b>Infrared bin programmer (PM 6304 only)</b> < 1.5m
<b>PM 9564</b> Height	<b>Rack mount kit</b> 2E (88.5 mm)

PM 6303A	
<b>AC test mode</b> Test frequency Test frequency accuracy Test signal level Basic measurement accuracy	1 kHz 0.025% 2V via 400Ω source 0.25% $\pm 1$ digit
<b>DC bias</b> Internal	2V
<b>Maximum measuring ranges</b> Impedance / Resistance $Z$ or $R_{AC}$ Capacitance Inductance Quality factor Dissipation factor Phase angle	0.000Ω to 200 MΩ C 0.0 pF to 100 mF L 0.0 μH to 32 kH Q 0.002 to 500 D 0.002 to 500 φ -90.0 to +90.0 deg
<b>Maximum resolution</b> Impedance / Resistance $Z$ or $R_{AC}$ Capacitance Inductance Quality factor Dissipation factor Phase angle	0.1 mΩ C 0.1 pF L 0.1 μH Q 0.001 D 0.001 φ 0.1 deg
<b>Circuit diagram</b>	7 different equivalent circuit diagrams
<b>Auto mode</b> Read-out  Equivalent circuit diagram	Dominant parameter Parallel for R+C Serial for R+L
<b>Manual mode</b> Read-out  Equivalent circuit diagram	Dominant or secondary parameter Parallel or serial selectable
<b>Measurement update rate</b>	2 measurements/s
<b>Trim function</b> Open circuit  Short circuit	Open circuit compensation $Z > 100 \text{ k}\Omega$ Short circuit compensation $Z < 10\Omega$
<b>Stored settings (non-volatile memory)</b> Front panel settings	1 (trim figures included)
<b>Calibration</b> Calibration interval	1 year
<b>Environmental conditions</b> Operating temperature Storage temperature Power requirements  Line frequency Power consumption EMC	0°C to 50°C -40°C to 70°C 100/120/220/240V $\pm 10\%$ 50 to 100 Hz 16 VA According to CE regulation 89/336: Emission according to EN 55011 Group 1 Class B, respectively CISPR 11. Immunity according to EN 50082-1, inclusive IEC 801-2,-3,-4
Safety	According to CE-regulation 73/23 EN61010-1 CAT II, Pollution Degree 2
Warm-up time	5 minutes
<b>Dimensions and weight</b> WxHxD Weight	315 x 105 x 405 mm (12.4" x 4.13" x 15.9") 3.8 kg / 8.4 lb



**Accessories PM 6306, PM 6304 and PM 6303A**

**PM 9540 / BAN 4-wire test cable set with Banana plugs**

Optimum calibrator contact or connections to other instruments or accessories is ensured by the PM 9540 / BAN test cable set.

**PM 9540 / TWE SMD tweezers**

The PM 9540 / TWE SMD tweezers make picking up, testing and general handling of small components fast, convenient and accurate. They allow 4-wire measurements up to the tweezer tips. With the PM 9540 / TWE, all that is required is to simply grasp the component with the tweezers and read-out the measured value on the RCL meter. Nothing could be faster or more convenient.

**PM 9541A 4-wire test cable set with Kelvin clips**

This test cable set combines convenient connection to larger components and assemblies with the accuracy of 4-wire testing.

**PM 9541B 4-wire test cable set with heavy Kelvin clips**

This test cable set combines convenient connection to larger components and assemblies with the accuracy of 4-wire testing.

**PM 9542A Universal test adapter**

The PM 9542A adapter allows easy 4-wire testing of components, which can be inserted directly into the Kelvin contacts of the test posts. In combination with the 9542 / SMD the testing of miniature SMDs is also covered.

**PM 9559 Infrared bin programmer (PM 6304 only)**

The infrared bin programmer is a compact handheld unit programs the PM 6304's component sorting function.

**PM 9564 Rack mount kit**

The PM 6306, PM 6304 and PM 6303A RCL meters can be built into a system rack by using the PM 9564 Rack mount kit.

**Options PM 6306 and PM 6304**

**PM 9548 IEEE-488 interface**

With this IEEE-488 interface, the PM 6306 or PM 6304 RCL meter can be used as part of a fully automated component test environment for applications at up to 10 measurements/s.

**PM 9549 RS-232 interface**

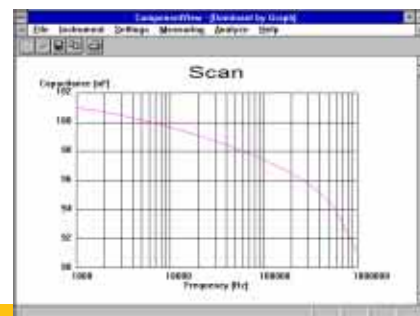
The RS-232 interface allows the PM 6304 or PM 6306 to be connected directly to a PC, for automated operation including selection of test set-ups and downloading measurement data. The RS-232 interface can also be connected to a serial printer for printing the test results.

**PM 9565 DC test measurement**

The DC test measurements add test capabilities to the standard AC measurements, like comparison of AC and DC behavior.

**PM 9566 Handler interface**

The handler interface allows component sorting to be automated by providing output signals to control placement of tested components into up to 11 bins according to the measured value.



**Windows® Test Software PM 6306 and PM 6304**

The SW63W ComponentView PC software adds extra versatility to automated testing. This Windows® software package provides powerful functions for the analysis of test results downloaded via the RS-232 or IEEE interface. It also allows all functions of the RCL meter and bus parameters to be controlled remotely from the PC. Test results can be stored on disk, printed-out in report form or exported to spreadsheet programs. An additional powerful function is the scan mode. This mode allows components or devices under test to be measured automatically at different frequencies or voltages.

## Ordering information

### PM 6306 models

Type number	IEEE-488 interface	RS-232 interface	DC test	Handler interface
PM 6306/02n	•			
PM 6306/03n		•		
PM 6306/06n	•		•	
PM 6306/07n		•	•	
PM 6306/52n	•			•
PM 6306/53n		•		•
PM 6306/56n	•		•	•
PM 6306/57n		•	•	•

### PM 6304 models

Type number	IEEE-488 interface	RS-232 interface	DC test	Handler interface
PM 6304/00n				
PM 6304/02n	•			
PM 6304/03n		•		
PM 6304/04n			•	
PM 6304/06n	•		•	
PM 6304/07n		•	•	
PM 6304/50n				•
PM 6304/52n	•			•
PM 6304/53n		•		•
PM 6304/54n			•	•
PM 6304/56n	•		•	•
PM 6304/57n		•	•	•

### PM 6303A models

PM 6303A/00n Automatic RCL meter

### Power options

The last digit of the type number is the indication for the local line voltage and local line cord. Following line voltage settings plus line cords are available.

- n = 1 Universal European 220V
- n = 3 Standard North American 120V
- n = 4 United Kingdom 240V
- n = 5 Switzerland 220V
- n = 8 Australia 240V

Example: PM 6304/573

Programmable RCL meter PM 6304 with "handler interface", "DC measurement unit" and "RS 232 interface" installed, Standard North American line cable.

### Options for PM 6306 and PM 6304

(retrofitable, service center installable)

- PM 9548 IEEE-488 interface kit
- PM 9549 RS-232 interface kit
- PM 9565 DC measurement option kit
- PM 9566 Handler interface

Remark: PM 6306 is equipped with either an IEEE-488 or RS-232 interface (see models).

### Accessories PM 6306, PM 6304 and PM 6303A

- PM 9540/BAN 4-wire test cable set with Banana plugs
- PM 9540/TWE SMD Tweezers
- PM 9541A 4-wire test cable set with Kelvin clips
- PM 9541B 4-wire test cable set with heavy Kelvin clips
- PM 9542A Universal test adapter
- PM 9542SMD Test fixture for SMDs (in combination with PM 9542A)
- PM 9564 Rack mount kit

### Windows® Test Software PM 6306 and PM 6304

- SW63W ComponentView test software (for instruments with interface)
- Y8021 Shielded IEEE-488 Cable, 1m
- Y8022 Shielded IEEE-488 Cable, 2m
- PM 9536/041 RS-232 cable 3 m, 9 pin female / 9 pin female



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