FLUKE®

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
AC Test mode		
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_T) ± 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)
DC bias		
Internal	0 to 10V (0.1V steps)	2V
External	0 to 40V	0 to 40V
DC Test mode (Optional)		
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)
Contact check (PM 6306 only)		
Pass	< 3Ω	-
Fail	≥ 3Ω (with indication of failed connection lead	
Maximum measuring ranges		
Impedance / Resistance AC (Z or R_{AC})	0.0000Ω to 200 MΩ	
Resistance DC (R_{DC})	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_X)	0.1 µV to 2.00V	
Current monitor (I_X)	0.005 µA to 10.0 mA	
Maximum resolution		
Impedance / Resistance AC (Z or R_{AC})	0.1 mΩ	
Resistance DC (R_{DC})	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_X)	0.1 µV	
Current monitor (I_X)	0.001 µA	
Circuit diagram		
Display	1 of 7 different equivalent circuit diagrams	
Auto mode		
Read-out	Dominant ***and*** secondary parameter	
Equivalent circ uit diagram	Parallel for R+C, Serial for R+L	
Manual mode		
Read-out	Dominant ***and*** secondary parameter or Z, ϕ, D, Q, V_X, I_X	
Equivalent circuit diagram	Parallel or serial selectable	
Average function		
Function	Exponential averaging in continious mode	
Levels	3 (and off)	1 (and off)
Deviation mode (PM 6306 only)		
Relative range in respect	-100% to +100%	-
Measuring modes		
Normal		
Continious	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	
Fast		
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	**IEEE-488 interface**
Control capability	All functions
Interface functions	AH1, L3, RL1, SR1, SH1, T6
Address range	1...30
Remote lock-out	Go to local by front panel key "LOCAL"
Special functions	Learn mode / device identification mode
Signals	All optically isolated
PM 9549	**RS-232 interface**
Mode	Communication mode Printing mode
Control capability	All functions
Baud rates	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200
Data bits	7 or 8
Stop bits	1 (2 for 110 baud only)
Parity	Odd, Even, None
Xon/Xoff handshake	On or Off
Hardware handshake	DSR/DTR and CTS/RTS
Signals	All optically isolated
Connector	9-pin D-connector, male
PM 9565	**DC test measurement option**
Technical specification	See "DC test mode"
PM 9566	**Handler interface**
Signals	All optically isolated
Inputs	Trigger input
Outputs	Bin 0-9 indication FAIL indication
Max. switchable current	200 mA
Max. switchable voltage	40V

	PM 6306	PM 6304
Binning		
Standard bins	9	
Special bins	Bin "0" and bin "fail"	
Bin programming via	IEEE-488 interface RS-232 interface Bin programmer (PM 6304 only)	
Bin limit programming	Absolute or relative	
Trim function		
Open circuit	Open circuit compensation Z > 100 kΩ	
Short circuit	Short circuit compensation Z < 10Ω	
Protection against charged capacitors		
C < 2 µF	$V_{max.}$ < 200 V	$V_{max.}$ < 500 V
2 µF ≤ C ≤ 2 mF	$V_{max.}$ < 47 x (C/mF)$^{-0.234}$ ($V_{max.}$ in V, C in mF)	$V_{max.}$ < 117 x (C/mF)$^{-0.234}$ ($V_{max.}$ in V, C in mF)
C > 2 mF	$V_{max.}$ < 40V	$V_{max.}$ < 100V
Stored settings (non-volatile memory)		
Front panel settings	9+1 (trim figures included)	
Bin settings	9+1	
Print measurement results	Via RS-232 interface for serial printers	
Calibration		
Calibration interval	1 year	
Environmental conditions		
Operating temperature	0°C to 50°C	
Storage temperature	-40°C to 70°C	
Power requirements	100/120/220/240 V ± 10%	
Line frequency	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
Dimensions and weight		
WxHxD	315 x 105 x 405 mm (12.4" x 4.13" x 15.9")	
Weight	5.3 kg / 11.7 lb	4.7 kg / 10.4 lb

Accessories for PM 6306, PM 6304 and PM 6303A

PM 9540 / BAN — **4-wire test cable set with Banana plugs**
DUT connection: 4 Banana plugs
Cable length: 1000 mm
Weight: 0.15 kg

PM 9540 / TWE — **SMD tweezers**
DUT connection: 2 tweezers
DUT length: max. 20 mm
Cable length: 1000 mm
Weight: 0.15 kg

PM 9541A — **4-wire test cable set with Kelvin clips**
DUT connection: 2 Kelvin clips
Cable length: 1000 mm
Weight: 0.2 kg

PM 9541B — **4-wire test cable set with heavy Kelvin clips**
DUT connection: 2 Kelvin clips
Cable length: 1000 mm
Weight: 0.3 kg

PM 9542A — **Universal test adapter**
DUT connection: Kelvin contacts in test posts
DUT length: 1000 mm
Dimensions (WxHxD): 145 x 50 x 95 mm (5.7" x 1.9" x 3.7")
Weight: 0.6 kg

PM 9542 / SMD — **Test fixture for SMDs (in combination with PM 9542A)**
DUT connection: Kelvin contacts in test posts
DUT length: min. 2 mm, max. 10 mm
DUT width: min. 1 mm
DUT height: min. 0.5 mm
Dimensions (WxHxD): 55 x 45 x 30 mm (2.2" x 1.8" x 1.2")

PM 9559 — **Infrared bin programmer (PM 6304 only)**
Distance: < 1.5m

PM 9564 — **Rack mount kit**
Height: 2E (88.5 mm)

PM 6303A		
AC test mode		
Test frequency		1 kHz
Test frequency accuracy		0.025%
Test signal level		2V via 400Ω source
Basic measurement accuracy		0.25% ± 1 digit
DC bias		
Internal		2V
Maximum measuring ranges		
Impedance / Resistance	Z or R_{AC}	0.000Ω to 200 MΩ
Capacitance	C	0.0 pF to 100 mF
Inductance	L	0,0 µH to 32 kH
Quality factor	Q	0.002 to 500
Dissipation factor	D	0.002 to 500
Phase angle	ϕ	-90,0 to +90.0 deg
Maximum resolution		
Impedance / Resistance	Z or R_{AC}	0.1 mΩ
Capacitance	C	0.1 pF
Inductance	L	0.1 µH
Quality factor	Q	0,001
Dissipationfactor	D	0,001
Phase angle	ϕ	0.1 deg
Circuit diagram		
7 different equivalent circuit diagrams		
Auto mode		
Read-out		Dominant parameter
Equivalent circuit diagram		Parallel for R+C Serial for R+L
Manual mode		
Read-out		Dominant or secondary parameter
Equivalent circuit diagram		Parallel or serial selectable
Measurement update rate		
2 measurements/s		
Trim function		
Open circuit		Open circuit compensation Z > 100 kΩ
Short circuit		Short circuit compensation Z < 10Ω
Stored settings (non-volatile memory)		
Front panel settings		1 (trim figures included)
Calibration		
Calibration interval		1 year
Environmental conditions		
Operating temparature		0°C to 50°C
Storage temparature		-40°C to 70°C
Power requirements		100/120/220/240V ± 10%
Line frequency		50 to 100 Hz
Power consumption		16 VA
EMC		According to CE regulation 89/336: Emission ccording 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
Dimensions and weight		
WxHxD		315 x 105 x 405 mm (12.4" x 4.13" x 15.9")
Weight		3.8 kg / 8.4 lb

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.

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 valuw on the RCL meter. Nothing could be faster or more convenient.

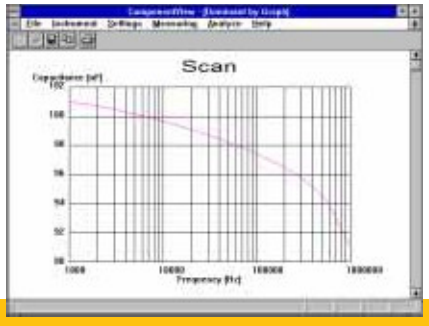
PM 9541A 4-wire test cable set with Kelvin clips
This test cable set combines convenient connection to larger components and assemblies with the accuracy of 4-wire testing.

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 direcly 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.



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, printeed-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.

FLUKE®

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
(retrofittable, 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 equiped 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

Fluke Corporation
P.O. Box 9090, Everett, WA 98206

Fluke Europe B.V.
P.O. Box 1186,
5602 BD Eindhoven,
The Netherlands

For more information call:
In the U.S.A.: (800) 443-5853
or Fax: (425) 356-5116
In Europe/M-East:
+31 (0)40 2 678 200
or Fax: +31 (0)40 2 678 222
In Canada: (905) 890-7600
or Fax: (905) 890-6866
From other countries:
+1(425) 356-5500
or Fax: +1 (425) 356-5116
Web access: http://www.fluke.com