

EPM and EPM-P Series Power Meters E-Series Power Sensors

Introduction

This configuration guide describes the standard configurations, options, and compatible accessories of EPM Series and EPM-P Series power meters. For full specifications, see EPM Series Power Meters E-Series and 8480 Series Power Sensors - Data Sheet (Keysight literature number 5965-6382E) or E4416A/E4417A EPM-P Series Power Meters and E-Series E9320 Peak and Average Power Sensors – Data Sheet (Keysight literature number 5980-1469E). Contact your local Keysight Technologies, Inc. representative at the offices listed on the back of this guide if you need more information.

EPM Series power meters

- N1913A power meter (single channel)
- N1914A power meter (dual channel)

EPM-P Series power meters

- E4416A power meter (single channel)
- E4417A power meter (dual channel)

E-Series power sensors

- E441xA CW power sensors (10 MHz to 26.5 GHz, sensor dependent)
- E9300 average power sensors (9 kHz to 18 GHz, sensor dependent)
- E9320 peak and average power sensors (50 MHz to 18 GHz, sensor dependent)

EPM-P Series Power Meters

The EPM-P Series power meters provide peak, peak-to-average ratio, average, and time-gated power measurements. For peak, peak-to-average ratio, and time-gated measurements, the EPM-P Series power meters must operate with the E-Series E9320 power sensors. For average power measurements only, the EPM-P Series power meters are compatible with all the 8480 Series power sensors, the E-Series CW, the E-Series E9300 average power sensors, and the E-Series E9320 power sensors.

The standard E4416A and E4417A power meters include:

- Single-channel power meter, order E4416A
- Dual-channel power meter, order E4417A
- Input sensor connector(s) on the front panel
- Reference calibrator connector on the front panel
- Power sensor cable, 1.5 m (5 ft). (One per E4416A, two per E4417A)
- Power cord (plug matches destination requirements)



EPM Series Power Meters

The EPM Series power meters provide average power measurements.

The standard N1913A and N1914A power meters include:

- Single-channel power meter, order N1913A
- Dual-channel power meter, order N1914A
- Input sensor connector(s) on the front panel
- Reference calibrator connector on the front panel
- Power sensor cable, 1.5 m (5 ft) (One per N1913A, two per N1914A)
- USB cable Type A to Mini-B, 6 ft
- Standard Calibration of Certificate
- Power cord (plug matches destination requirements)

E-Series Power Sensors

The standard E4412A and E4413A CW power sensors include:

- Power sensor 10 MHz to 18 GHz, order E4412A
- Power sensor 50 MHz to 26.5 GHz, order E4413A

The standard E9300 average power sensors include:

+20 to –60 dBm:

- Power sensor 10 MHz to 18 GHz, order E9300A
- Power sensor 10 MHz to 6 GHz, order E9301A
- Power sensor 9 kHz to 6 GHz, order E9304A

+30 to –50 dBm:

- Power sensor 10 MHz to 18 GHz, order E9300H
- Power sensor 10 MHz to 6 GHz, order E9301H

+44 to –30 dBm:

- Power sensor 10 MHz to 18 GHz, order E9300B
- Power sensor 10 MHz to 6 GHz, order E9301B

The standard E9320 peak and average power sensors include:

- Power sensor, 50 MHz to 6 GHz, 300 kHz bandwidth, order E9321A
- Power sensor, 50 MHz to 6 GHz, 1.5 MHz bandwidth, order E9322A
- Power sensor, 50 MHz to 6 GHz, 5 MHz bandwidth, order E9323A
- Power sensor, 50 MHz to 18 GHz, 300 kHz bandwidth, order E9325A
- Power sensor, 50 MHz to 18 GHz, 1.5 MHz bandwidth, order E9326A
- Power sensor, 50 MHz to 18 GHz, 5 MHz bandwidth, order E9327A

Please refer to the N1913A/14A data sheet for more average power sensor selections.

Compatibility

Power sensors compatibility

For compatibility of power meters, power sensors, and power sensor cables, please refer to the table below.

| Power sensors | Power meters | | Power sensor cables | |
|--|--------------|------------|---------------------|----------------|
| | EPM-P Series | EPM Series | 11730 (grey) | E9288 (blue) |
| E441x family | Yes | Yes | Yes | Yes |
| E9300 family | Yes | Yes | Yes | Yes |
| E9320 family | Yes | No | No | Yes |
| 8480 Series | Yes | Yes | Yes | Yes |
| N8480 Series | Yes | Yes | Yes | Yes |
| U8480, U2000 and U2040/50/60 Series (except U2049XA & U2060 Series in Average Mode only) USB | No | Yes | Not applicable | Not applicable |

Firmware compatibility

Firmware upgrade information can be accessed from the World Wide Web, free of charge.

Calibration Options

- E441xA/B-A6J - Supplies ANSI Z540 certificate of calibration with data.
- E441xA/B-1A7 - Supplies ISO 17025 certificate of calibration with data.
- N1913/4A-A6J - Supplies ANSI Z540 certificate of calibration with data.
- N1913/4A-1A7 - Supplies ISO 17025 certificate of calibration with data.
- E93xxA/B/H-A6J - Supplies ANSI Z540 certificate of calibration with data.

Hardware Options

The following options are available on the EPM and EPM-P Series power meters. All order combinations must be configured upon ordering; these options are not available for field upgrade.

EPM Series power meters

| Option | Description |
|---------------------------|--|
| N1913/4A-004 | Delete power sensor cable(s) |
| N1913/4A-101 ¹ | Single/dual-channel average power meter |
| N1913/4A-201 | Single/dual-channel average power meter with VGA, trigger in/out, one front and one rear USB ports |
| N1913/4A-B01 | Without battery (Mandatory for option 201) |
| N1913/4A-C01 | Front calibrator, front sensor (Need to order option 201) |
| N1913/4A-C02 | Front calibrator, parallel front, and rear sensor (Need to order option 201) |
| N1913/4A-C03 | Rear calibrator, parallel front, and rear sensor (Need to order option 201) |
| N1913A-200 | 436A and 437B code compatibility via GPIB interface only. 436A and 437B language modes are not compatible with LAN or USBTM remote interface. For new N1913A purchase. |
| N1914A-200 | 438A code compatibility via GPIB interface only. 438A language mode is not compatible with LAN or USBTM remote interface. For new N1914A purchase |
| N1913/4A-908 | Rack mount kit (one instrument). Can be ordered as standalone |
| N1913/4A-909 | Rack mount kit (two instruments). Can be ordered as standalone |
| BV0007B | BenchVue Power Meter/Sensor Control and Analysis app license |
| N6901A-1FP | 436A and 437B code compatibility for N1913A. Post purchase upgrade only |
| N6902A-1FP | 438A code compatibility for N1914A. Post purchase upgrade only |

1. Option 101 provides the front calibrator and the front sensor(s), and it can't be ordered with any of the options B0x/C0x.

EPM-P Series power meters

| Option | Description |
|--------------|--|
| E441xA/B-002 | Parallel rear panel sensor input connector(s) and front panel reference calibrator connector |
| E441xA/B-003 | Parallel rear panel sensor input connector(s) and rear panel reference calibrator connector |
| E441xA/B-004 | Delete power sensor cable(s) |
| E441xA/B-908 | Rack mount kit (one instrument). Can be ordered as stand-alone |
| E441xA/B-909 | Rack mount kit (two instruments). Can be ordered as stand-alone |

Service and Support Options

Calibration ¹

The following calibration options are available:

| Option | Description |
|-------------|---|
| R-50C-011-3 | Calibration Assurance Plan - Return to Keysight - 3 years |
| R-50C-011-5 | Calibration Assurance Plan - Return to Keysight - 5 years |
| R-50C-016-3 | ISO 17025 compliant calibration plan, 3 years |
| R-50C-016-5 | ISO 17025 compliant calibration plan, 5 years |
| R-50C-021-3 | ANSI Z540-1-1994 calibration plan, 3 years |
| R-50C-021-5 | ANSI Z540-1-1994 calibration plan, 5 years |

1. Options are not available in all countries.

Special Options

Special options for EPM-P Series power meters, EPM Series power meters, and E-Series sensors are available. The special options provide customized measurement capabilities to fit a wider range of applications. Contact your local Keysight representative for more information.

Orderable Documentation

| Documentation | EPM-P series power meter | EPM series power meter |
|--|--------------------------|------------------------|
| User's Guide and Installation Guide (English) | E441xA-0B1 | N1913/4A-0B1 |
| Programming Guide | E441xA-0BF | N1913/4A-0BF |
| Service Guide | E441xA-0B3 | Not available |
| Delete manual set | E441xA-0B0 | N1913/4A-0B0 |
| Add manual set, User's Guide and Programming Guide (English) | E441xA-0BK | N1913/4A-0BK |
| Printed User's Guide in Japanese | E441xA-ABJ | N1913/4A-ABJ |

| Documentation | E4412/3A | E9300 | E9320A |
|----------------------------------|--------------|------------|------------|
| Add manual set | E4412/3A-0B1 | E930xx-0B1 | E932xA-0B1 |
| Printed User's Guide in Japanese | E4412/3A-ABJ | E930xx-ABJ | — |

Available Accessories

E9288A-C power sensor cables (refer to the compatibility section):

- 1.5 meters (5 ft) E9288A
- 3 meters (10 ft) E9288B
- 10 meters (31 ft) E9288C

11730A-F power sensor cables (refer to the compatibility section):

- 1.5 meters (5 ft) 11730A
- 3 meters (10 ft) 11730B
- 6.1 meters (20 ft) 11730C
- 15.2 meters (50 ft) 11730D
- 30.5 meters (100 ft) 11730E
- 61 meters (200 ft) 11730F

Accessory pouch, 34161A

- Holds accessories supplied or ordered

Basic instrument transit case, 34131A

- Protects the power meter during transit

Soft carry/operating case, 34141A

- Power meter with battery option can be operated in soft carry case

Auxiliary Equipment

The 11683A range calibrator verifies the accuracy and linearity of the EPM-P and EPM Series power meters. Outputs corresponding to the meter readings of 3, 10, 30, 100, and 300 μW and 1, 3, 10, 30, and 100 mW are provided. Calibration uncertainty is $\pm 0.25\%$ on all ranges.

Literature References

| Publication title | Publication number |
|--|--------------------|
| <i>EPM-P Series Single and Dual-Channel Power Meters E9320 Family of Peak and Avera - Technical Overview</i> | 5980-1471E |
| <i>E4416A/E4417A EPM-P Series Power Meters and E-Series E9320 Peak and Average Power Sensors – Data Sheet</i> | 5980-1469E |
| <i>EPM-P Series Single and Dual Channel Power Meters – Data Sheet</i> | 5988-1605EN |
| <i>Choosing the Right Power Meter and Sensor - Application Note</i> | 5968-7150E |
| <i>EPM Series Power Meters E-Series and 8480 Series Power Sensors - Data Sheet</i> | 5965-6382E |
| <i>EPM Series Power Meters - Brochure</i> | 5965-6380E |
| <i>Fundamentals of RF and Microwave Power Measurements - Application Note</i> | 5965-6630E |
| <i>4 Steps for Making Better Power Measurements - Application Note</i> | 5965-8167E |
| <i>Wide dynamic range. Multiple modulation formats. One sensor. - Technical Overview</i> | 5968-4960E |
| <i>Seven Reasons to Migrate from an E4418/4419B to a Keysight N1913/1914A EPM Series Power Meter - Migration Guide</i> | 5990-4016EN |

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