

RM-11 Metronic Primary Watthour Standard

Product Bulletin 1100



Unparalleled Accuracy

Lightweight, Portable Package

Autoranging Inputs

Watthour Display

Kh of 1 at all Ranges

VARhour/Qhour Models

Communications Port

OVERVIEW

The Radian Research RM-11 Metronic Primary Watthour Standard is by far the most accurate self-contained primary standard manufactured in the United States. The RM-11 represents the present state of the art in electronic watthour reference standards with typical accuracies in the 0.003% range and repeatabilities in the 0.001% range.

The maximum worst case accuracy of the RM-11 is conservatively specified at 0.025% guaranteed for one year. This maximum accuracy applies to all operating points between 0.2 and 50 amperes, 60 to 600 volts AC and 0.5 lag to 1.0 power factor. Note that stability is included within this maximum accuracy specification.

The RM-11 is essentially an enhanced version of the RM-10 Portable Watthour Standard which has been optimized for accuracy and stability but still retaining the same lightweight, portable package. The RM-11 also provides many of the same key operating features.

The RM-11 is totally autoranging on the potential input and current input. Totally autoranging inputs, a feature pioneered by Radian, make it impossible to damage the unit by applying a signal to the wrong input. The three summing current inputs can be used to perform closed

link testing. A maximum test current of 150 Amps can be used when paralleling the three 50 Amp rated inputs. The RM-11 provides a true watthour display with a Kh of 1 for its entire operating range. VARhour and Qhour functions as well as a communications port, are also available.

The RM-11 utilizes the following accuracy enhancing design techniques:

1. **Supermalloy Cores** are used simultaneously with the electronically compensated cores to reduce transformer errors.
2. **Burned in References** are selected for stability and checked for drift over a three month period prior to incorporation within the RM-11.
3. An **Ultra Low Noise Power Supply** reduces errors at low levels. The unit runs only at 120 to 240 VAC and is therefore not directly interchangeable with the RM-10 for field use.
4. **Fifteen Ranges** in the Autoranging Circuit are used to reduce low level errors by 50%.

RM-11 Metronic Primary Watthour Standard

RM-11 MODELS

- RM-11-01 Primary Watthour Standard
- RM-11-02 Primary Watthour 200 Amp Standard
- RM-11-03 Primary Watthour Standard with I/O Communications Port
- RM-11-06 Primary Watthour/VARhour Standard
- RM-11-07 Primary Watthour/VARhour/Qhour Standard
- RM-11-08 Primary Watthour/VARhour 200 Amp Standard
- RM-11-09 Primary Watthour/VARhour/Qhour 200 Amp Standard

*The RM-11-02, -03, -06, -07, -08 and -09 Models are provided with an I/O Communications Port.

ACCURACY

All errors are in percent of reading at any combination of the normal operating conditions. Note that stability is included within the maximum accuracy specifications for Watthours, Qhours and VARhours. *Power factor is referenced to Watthours and it is also assumed that voltage is the reference vector.

	Watthour	Qhour
AT UNITY POWER FACTOR* (0°)	± 0.003% typical, ± 0.025% maximum	± 0.05% maximum
AT 0.5 LAG POWER FACTOR* (-60°)	± 0.007% typical, ± 0.025% maximum	± 0.05% maximum
AT POWER FACTOR* P < 0.5 LAG (phi between -60° and -90°)	± 0.025%/P maximum	
VARhour		
AT 0.0 LAG POWER FACTOR* (-90°)	± 0.05% maximum	
AT 0.866 LAG POWER FACTOR* (-30°)	± 0.05% maximum	

NORMAL OPERATING CONDITIONS

INPUT VOLTAGE	60 to 600 VAC (Autoranging)
INPUT CURRENT	0.2 to 50 Amps (Autoranging) 150 Amps max. when paralleling 3 inputs
POWER FACTOR	Any (See accuracy definition)
AMBIENT TEMPERATURE	20° to 30° C (68° to 86° F)
RELATIVE HUMIDITY	0 to 95%
AUXILIARY POWER VOLTAGE	120 to 240 VAC (Autoranging)
FREQUENCY	59 to 61 Hz or 48 to 52 Hz
ORIENTATION	Any
RECALIBRATION INTERVAL	365 days
WARMUP TIME	15 minutes
SHOCK AND VIBRATION	Any which is nondestructive

INFLUENCE AFFECTING ACCURACY

TEMPERATURE	± 0.001%/°C typical, ± 0.003%/°C maximum -20° to 70° C (-4° to 158° F)
-------------	---

INPUT

INPUT TERMINAL	BNC, digital display gate
----------------	---------------------------

OUTPUT

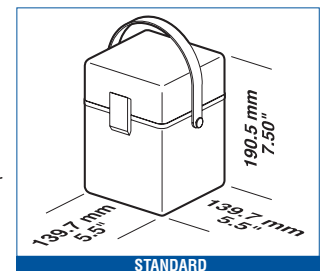
OUTPUT TERMINAL	BNC
PULSE VALUE (Wh/pulse)	0.00001 (0.00002 for 200 Amp models)

PROTECTION

ISOLATION	Complete: Input/Output/Power/Case/Control
DIELECTRIC WITHSTAND	2.3 kVrms, 60 Hz, 60 seconds
SURGE WITHSTAND	IEEE 472 and ANSI 37.90
FUSES	Schurter #0342516 or Radian #3001000 for potential input and auxiliary power

PHYSICAL DESCRIPTION

SIZE	190.5 mm (7.5") H x 139.7 mm (5.5") W x 139.7 mm (5.5") D D excluding latches and strap
WEIGHT	2.5 kg (5.5 lbs); 3.6 kg (8 lbs) shipping weight
SHIPPING DIMENSIONS	305 mm (12") H x 248 mm (9.75") W x 248 mm (9.75") D
DISPLAY	12.7 mm (0.5") LCD, 6 digits, readout in Watthours, VARhours, Qhours



ACCESSORIES AVAILABLE

RM-1S Remote Reset Switch	RM-DS Meter Disk Sensor	RM-OA Optical Adapter
RM-110 Automated Comparator	RM-KYZ Pulse Input Adapter	RM-TC Transit Container
RM-1H Optical Pickup for Infrared LED	RM-1A Photo Counter Interface	RM-PCA Computer Interface Adapter with PCA-Lab™ Software

WARRANTY

The RM-11 is warranted to be substantially stable in calibration over time. If within one year after factory calibration the RM-11 does not meet its specifications, Radian will repair and recalibrate the unit. Radian Research warrants the RM-11 to be free from defects in material and workmanship. Radian will repair or replace any instrument or component therein which, within two years after shipment, proves to be defective upon examination. For a period of ten years, Radian warrants the RM-11's autoranging feature from catastrophic failure resulting from failure to autorange.

SERVICES AVAILABLE

- Extended Warranty (5 year warranty plus 6 recertifications)
- Recertification of standards
- Certification with special calibration points

Radian Research, Inc.
3852 Fortune Drive
Lafayette, IN 47905

Phone: (765) 447-0535
Fax: (765) 448-4614