

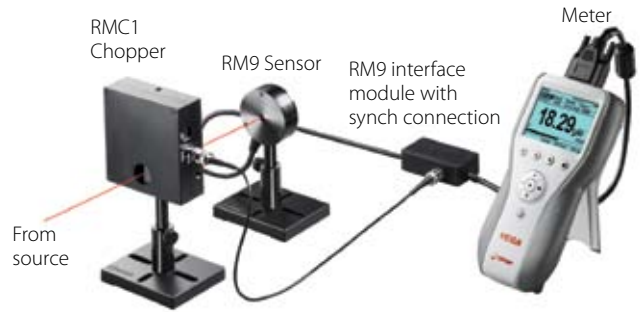
# 1.1.2 Thermal Power Sensors

## 1.1.2.1 Low Noise Lock In Power Sensors

### 300fW to 100mW

#### Features

- Chopper and lock in amplifier for lowest noise and drift
- Wavelength range from UV to deep IR
- RM9 pyro is not sensitive to background radiation



The RM9 series Radiometers use a pyroelectric or photodiode sensor in conjunction with chopped CW or quasi CW radiation, using a digitally synthesized lock-in amplifier to reduce external noise to a minimum. The signal is passed through the 18Hz chopper and the chopped signal is detected by the sensor. All signals not at this 18Hz frequency are suppressed. The output of the sensor is displayed on a standard Ophir meter or PC interface. The chopper may be placed at any convenient location but preferably close to the signal source so as to eliminate interference from all unchopped radiation.

#### Specifications

Model	RM9 Sensor	
Use	Very low level signals	
Model	RM9	RM9-PD
Absorber Type	Pyroelectric	Si Photodiode
Spectral Range $\mu\text{m}$	0.15 - 12 (a)	0.2 - 1.1 (b)
Aperture mm	$\varnothing 8\text{mm}$	$\varnothing 8\text{mm}$
Surface Reflectivity % approx.	50	50
Power Range (c)	100nW – 100mW	300fW – 300nW
Power Scales	100mW to $3\mu\text{W}$	300nW to 3pW
Power Noise Level (d)	$\sim 30\text{nW}$	30fW
Minimum Frequency for Pulsed Sources	200Hz	200Hz
Thermal Drift (20min) (e)	$\sim 30\text{nW}$	N.A.
Power Accuracy (a) (b)	$\pm 5\%$	$\pm 5\%$
Damage Threshold $\text{W}/\text{cm}^2$	5	5
Response Time with Display (0-95%) s	3.5	3.6
Linearity with Power	$\pm 2\%$	$\pm 2.5\%$

#### Connections:

- 1.5 meter cable hard wired to interface module.
- BNC connector on module for connection to chopper (2 meter BNC to BNC cable included). Perform zeroing with BNC cable removed.
- 0.5 meter cable from module terminated in DB15 connector.

Cooling	convection	convection
Weight kg	0.37	0.37
Version		

Part Number for RM9/RM9-PD with RMC1 Chopper (f)	7Y70669	7Y70672
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Part Number for RM9/RM9-PD Sensor	7Z02952	7Z02953
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Notes: (a) At calibrated wavelengths 500 – 1100nm. At other wavelengths, there is an additional error as follows: <500nm add  $\pm 8\%$ , 1100 – 3000nm add  $\pm 5\%$ ,  $10.6\mu\text{m}$  add  $\pm 15\%$

Notes: (b) At calibrated wavelengths 200 – 1100nm. For <700nm add  $\pm 2\%$  additional error

Notes: (c) For LaserStar, Pulsar, USBi, Quasar and Nova/Orion, upper limit is 1mW for RM9 and 90nW for RM9-PD.

For these models, accuracy may also be less than values given above

Notes: (d) Averaged over 10s

Notes: (e) In a typical laboratory environment

Notes: (f) The RMC1 or another chopper unit that can be set to 18Hz is required for operation of the RM9 sensors

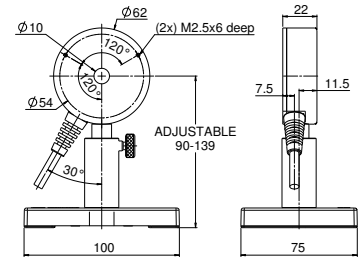
Model	RMC1 Chopper
Use	Chopper for RM9/RM9-PD
Aperture	$\varnothing 22\text{mm}$
Chopping frequency (a)	18Hz
Power consumption	85mA

#### Connections:

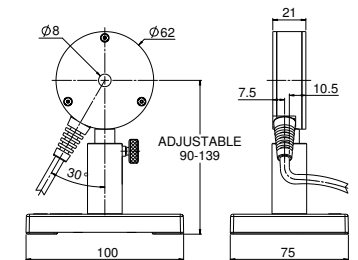
- BNC to interface module
- 12V wall cube power supply (included)
- Mini USB connector (factory use only)

Notes: (a) not adjustable by user.

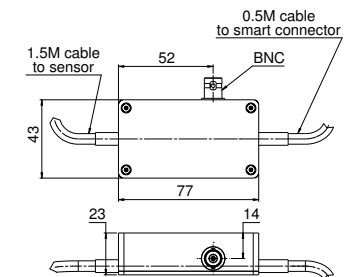
#### RM9-PD Sensor



#### RM9 Sensor



#### Interface Module



#### Radiometer-Chopper

