

1.1.2.9 All-in-One Sensors

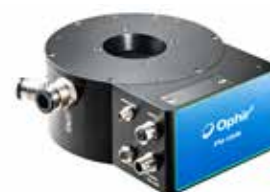
1.1.2.9.1 IPM Industrial High Power Sensor


1.1.2.9.1.1 IPM-10KW – Industrial Sensor

Features

- ISO/IEC 17025:2017, NIST traceable calibration
- Measure up to 11kW
- Modular architecture
- Heavy duty design with industrial interface and connectors
- Interlock to protect from overpower or cooling water failure
- Real time visibility, traceability and logging for predictive maintenance

IPM-10KW



Model	IPM-10KW					
Use	Laser power measurement in industrial environment up to 11kW					
Control	RS232					
Absorber Type	Beam deflector + broadband absorber					
Spectral Range μm ^(a)	0.9-1.1, 10.6					
Aperture mm	Ø45mm					
Power Mode						
Power Range	100W – 11kW					
Power Scales	11kW / 6kW / 600W					
Power Noise Level W	5					
Backscattered Power	With IPM-SHUTTER10 or 10K-W/15K-W Scatter Sheild, ~1% ^(b) Without IPM-SHUTTER10 or 10K-W/15K-W Scatter Sheild 3.5 ^(b)					
Maximum Average Power Density kW/cm ²	See note ^(c) and table ⁽¹⁾ below					
Response Time with Meter (0-95%) typ. s	2.7					
Response Time with Meter (0-99%) typ. s	10					
Calibration Uncertainty ±%	1.9					
Power Accuracy ±%	5 ^(a)					
Repeatability ±%	0.4					
Linearity with Power ±% (0-100% range)	2					
Linearity with Power ±% (0-90% range)	1.5					
Energy Mode						
Energy Range	60J – 10kJ					
Energy Scales	10kJ / 5kJ / 500J					
Energy Accuracy	Additional 2% error to power accuracy					
Minimum Energy J	60					
Maximum Energy Density J/cm ²	See table ⁽¹⁾ below					
Cooling	Water ^(d)					
Minimum Water Flow Rate	8 liter/min at full power ^(d)					
Water Connectors	Quick connector for 12mm OD nylon tubing (see page 116)					
Weight kg	5					
Connectors ^(e)	<div></div> Interlock, M8 male, 3-pin RS232, M12 female 5-pin Flow meter – M8 female, 6-pin Power/IPM-COM, M12 male, 5-pin					
Cables ^(e)	Part					P/N
	RS232 cable, M12 male 5-pin to D9 female, 1.8m (supplied with sensor)					7Z10532
	Power cable, M12 female 5-pin to flying leads, 1.5m (supplied with sensor)					7E01519
	Interlock cable, M8 female 3-pin to flying leads, 1.5m (not supplied)					7E01513
	Water Flow Meter cable, M8 male 6-pin to flying leads, 1.5m (not supplied)					7E01536
Related Products ^{(a) (b)}	Name		Description			P/N
	IPM-SHUTTER10		Combined protective shutter with built in scatter shield, IP62 rated			7Z08409
	IPM-SHUTTER10 Window replacement kit		Replacement anti reflective coated window			7Z08411
	10K-W / 15K-W Scatter Shield		Scatter Shield for mounting on front flange			7Z08295
	IPM-COM-Profinet		Profinet communications adapter with AIDA connectors			7Z08404
	IPM-COM-EtherNet/IP-M		EtherNet/IP communications adapter with circular connectors (M12 & 7/8)			7Z08405
Compliance	CE, UKCA, China RoHS					
Part number	7Z07106					
Note: (a) Calibrated at 1.07μm and 10.6μm. When working at 10.6μm (CO2), if using the SHUTTER10 unit, the window should be removed. IPM without the IPM-SHUTTER10: For other wavelengths in the ranges of 0.8 - 0.95μm and 1.1 - 2μm, add up to ±2% to the calibration error.						
Note: (b) IPM-SHUTTER10: When installed, use the NIRS or CO2S setting to compensate for slightly higher reading. 10K-W / 15K-W Scatter Shield: When installed, use the NIRS setting to compensate for slightly higher reading. When not installed, use the NIR setting.						
Note: (c) For circular beam centered within 25% of beam diameter. IMPROPERLY CENTERED BEAM CAN CAUSE DAMAGE TO SENSOR. Maximum tilt angle ±5 degrees. For rectangular beam please consult Ophir representative.						
Note: (d) Water temperature range 18-30°C. Water temperature rate of change <1°C/min. Pressure drop across sensor 0.1MPa. The recommended flow rate can be lowered proportionately at lower than full power but should not be below 3 liter/min. The response time will be optimal with the recommended flow rate. For solutions for prolonged usage with untreated water (tap water, non DI water), please, contact Ophir.						
Note: (e) See IPM User Manual for details of connectors and cables						
Table (1)	Beam diameter	Max power density	Max energy density – by pulse width			
			1ms PW	3ms PW	10ms PW	100ms PW
	<15mm	10kW/cm ²	30J/cm ²	60J/cm ²	150J/cm ²	1350 J/cm ²
	15 – 20mm	7kW/cm ²	20J/cm ²	40J/cm ²	100J/cm ²	900 J/cm ²
	20 – 40mm	5kW/cm ²	15J/cm ²	30J/cm ²	70J/cm ²	600 J/cm ²
	40 – 45mm	4kW/cm ²	12J/cm ²	25J/cm ²	60J/cm ²	500 J/cm ²

* For drawings please see page 101

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