## 1.1.2.9 IPM Industrial High Power Sensor 1.1.2.9.1 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



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% <sup>(b)</sup> Without IPM-SHUTTER10 or 10K-W/15K-W Scatter Sheild 3.5 <sup>(b)</sup>						
Maximum Average Power Density kW/cm <sup>2</sup>	See note <sup>(i)</sup> and table <sup>(1)</sup> 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 <sup>(a)</sup>						
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 <sup>2</sup>	See table (1) below						
Cooling	Water <sup>(d)</sup>						
Minimum Water Flow Rate	8 liter/min at full p	ower <sup>(d)</sup>					
Water Connectors	Quick connector f	Quick connector for 12mm OD nylon tubing (see page 102)					
Weight kg							
Connectors (®)	Interlock, M8 male, 3-pin RS232, M12 female 5-pin Flow meter – M8 female, 6-pin Power/IPM-COM, M12 male, 5-pin						
Cables <sup>(e)</sup>	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. M	Interlock cable, M8 female 3-pin to flying leads, 1.5m (not supplied)					
	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			tective shutter with built in scatter shield,		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	
			Profinet communications adapter with AIDA connectors			7Z08295 7Z08404	
	IDM COM Drofing					/ ZU04U4	
	IPM-COM-Profine IPM-COM-EtherN		EtherNet/IP comm	unications adapt		7Z08405	
Compliance	IPM-COM-EtherN CE, UKCA, China	let/IP-M		unications adapt			
Part number	IPM-COM-EtherN CE, UKCA, China 7207106	let/IP-M RoHS	EtherNet/IP comm connectors (M12 &	unications adapte & 7/8)			
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor	IPM-COM-EtherN CE, UKCA, China 7207106 rking at 10.6µm (CO2), i	let/IP-M RoHS f using the SHUTTER10 unit, t	EtherNet/IP comm connectors (M12 &	unications adapte & 7/8)			
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of be For rectangular beam please consult Ophir re Note: (d) Water temperature range 18-30°C. Water tem lower than full power but should not be below	IPM-COM-EtherN CE, UKCA, China 7Z07106 rking at 10.6µm (CO2), i IRS or CO2S setting to ed, use the NIRS setting am diameter. IMPROPE epresentative. mperature rate of chang w 3 liter/min. The respon	let/IP-M RoHS f using the SHUTTER10 unit, t compensate for slightly higher to compensate for slightly hig RLY CENTERED BEAM CAN ( e <1°C/min. Pressure drop acr	EtherNet/IP comm connectors (M12 & he window should be re reading. ther reading. When not CAUSE DAMAGE TO SE oss sensor 0.1MPa. The	unications adapte k 7/8) moved. installed, use the NIF ENSOR. Maximum ti e recommended flow	er with circular R setting. iit angle ±5 degrees. v rate can be lowered prop	7Z08405	
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of beam For rectangular beam please consult Ophime Note: (d) Water temperature range 18-30°C. Water tem	IPM-COM-EtherN CE, UKCA, China 7Z07106 IRS or CO25 setting to ed, use the NIRS setting am diameter. IMPROPE ppresentative. mperature rate of chang w 3 liter/min. The respon ir.	let/IP-M RoHS f using the SHUTTER10 unit, t compensate for slightly higher to compensate for slightly hig RLY CENTERED BEAM CAN ( e <1°C/min. Pressure drop acr	EtherNet/IP comm connectors (M12 & he window should be re reading. ther reading. When not CAUSE DAMAGE TO SE oss sensor 0.1MPa. The	unications adapte k 7/8) moved. installed, use the NIF ENSOR. Maximum ti e recommended flow	er with circular R setting. iit angle ±5 degrees. v rate can be lowered prop	7Z08405	
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of be- For rectangular beam please consult Ophir re Note: (d) Water temperature range 18-30°C. Water tem lower than full power but should not be below (tap water, non DI water), please, contact Opi	IPM-COM-EtherN CE, UKCA, China 7Z07106 IRS or CO25 setting to ed, use the NIRS setting am diameter. IMPROPE ppresentative. mperature rate of chang w 3 liter/min. The respon ir.	let/IP-M RoHS f using the SHUTTER10 unit, t compensate for slightly higher to compensate for slightly hig RLY CENTERED BEAM CAN ( e <1°C/min. Pressure drop acr	EtherNet/IP comm connectors (M12 & he window should be re reading. ther reading. When not CAUSE DAMAGE TO SE oss sensor 0.1MPa. The	unications adapte k 7/8) moved. installed, use the NIF ENSOR. Maximum ti e recommended flow ate. For solutions for	er with circular R setting. iit angle ±5 degrees. v rate can be lowered prop	7Z08405	
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of ber- For rectangular beam please consult Ophire Note: (d) Water temperature range 18-30°C. Water tem lower than full power but should not be below (tap water, non DI water), please, contact Ophirote: (e) See IPM User Manual for details of connector	IPM-COM-EtherN CE, UKCA, China 7Z07106 King at 10.6µm (CO2), i IRS or CO2S setting to ed, use the NIRS setting am diameter. IMPROPE ppresentative. mperature rate of chang w 3 liter/min. The respon hir. rs and cables Beam diameter	let/IP-M RoHS f using the SHUTTER10 unit, ti compensate for slightly higher g to compensate for slightly hig RLY CENTERED BEAM CAN ( e <1°C/min. Pressure drop acr nse time will be optimal with th Max power density	EtherNet/IP comm connectors (M12 & he window should be re- reading. ther reading. When not i CAUSE DAMAGE TO SE oss sensor 0.1MPa. The te recommended flow ra- Max energy density – 1ms PW	unications adapte 7/8) moved. installed, use the NII ENSOR. Maximum ti a recommended flow tate. For solutions for by pulse width [3ms PW]	er with circular R setting. iit angle ±5 degrees. v rate can be lowered prop prolonged usage with unt 10ms PW	7Z08405	
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of ber- For rectangular beam please consult Ophire Note: (d) Water temperature range 18-30°C. Water tem lower than full power but should not be below (tap water, non DI water), please, contact Ophire Note: (e) See IPM User Manual for details of connecto	IPM-COM-EtherN CE, UKCA, China 7207106 IKing at 10.6µm (CO2), i IRS or CO25 setting to ed, use the NIRS setting am diameter. IMPROPE ppresentative. mperature rate of chang w 3 liter/min. The respon ir. Beam diameter Beam diameter	let/IP-M RoHS f using the SHUTTER10 unit, ti compensate for slightly higher g to compensate for slightly hig RLY CENTERED BEAM CAN ( e <1°C/min. Pressure drop acr nse time will be optimal with th Max power density 10kW/cm <sup>2</sup>	EtherNet/IP comm connectors (M12 & he window should be re reading. her reading. When not DAUSE DAMAGE TO SE oss sensor 0.1MPa. The recommended flow ra Max energy density – 1ms PW 30J/cm <sup>2</sup>	unications adapte 7/8) moved. installed, use the NIF ENSOR. Maximum ti e recommended flow te. For solutions for by pulse width 3ms PW 60J/cm <sup>2</sup>	er with circular R setting. ilt angle ±5 degrees. v rate can be lowered prop prolonged usage with unt 10ms PW 150J/cm²	7Z08405	
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of ber- For rectangular beam please consult Ophire Note: (d) Water temperature range 18-30°C. Water tem lower than full power but should not be below (tap water, non DI water), please, contact Ophire Note: (e) See IPM User Manual for details of connecto	IPM-COM-EtherN CE, UKCA, China 7Z07106 King at 10.6µm (CO2), i IRS or CO2S setting to ed, use the NIRS setting am diameter. IMPROPE spresentative. INPROPE Spresentative. INPROPE Spresentative. INPROPE Spresentative. INPROPE Spres	let/IP-M RoHS f using the SHUTTER10 unit, tl compensate for slightly higher to compensate for slightly hig rRLY CENTERED BEAM CAN C e <1°C/min. Pressure drop acr nese time will be optimal with th Max power density 10kW/cm² 7kW/cm²	EtherNet/IP comm connectors (M12 & he window should be re- reading. ther reading. When not i CAUSE DAMAGE TO SE oss sensor 0.1MPa. The e recommended flow ra- Max energy density – 1ms PW 30J/cm <sup>2</sup> 20J/cm <sup>2</sup>	unications adapte & 7/8) moved. installed, use the NIF ENSOR. Maximum til e recommended flow te. For solutions by pulse width 3ms PW 60J/cm <sup>2</sup> 40J/cm <sup>2</sup>	er with circular  R setting. It angle ±5 degrees. v rate can be lowered prop prolonged usage with unt  10ms PW 150J/cm <sup>2</sup> 100J/cm <sup>2</sup>	7Z08405	
Part number Note: (a) Calibrated at 1.07µm and 10.6µm. When wor Note: (b) IPM-SHUTTER10: When installed, use the NI 10K-W / 15K-W Scatter Shield: When installe Note: (c) For circular beam centered within 25% of ber- For rectangular beam please consult Ophire Note: (d) Water temperature range 18-30°C. Water tem lower than full power but should not be below (tap water, non DI water), please, contact Ophire Note: (e) See IPM User Manual for details of connecto	IPM-COM-EtherN CE, UKCA, China 7207106 IKing at 10.6µm (CO2), i IRS or CO25 setting to ed, use the NIRS setting am diameter. IMPROPE ppresentative. mperature rate of chang w 3 liter/min. The respon ir. Beam diameter Beam diameter	let/IP-M RoHS f using the SHUTTER10 unit, ti compensate for slightly higher g to compensate for slightly hig RLY CENTERED BEAM CAN ( e <1°C/min. Pressure drop acr nse time will be optimal with th Max power density 10kW/cm <sup>2</sup>	EtherNet/IP comm connectors (M12 & he window should be re reading. her reading. When not DAUSE DAMAGE TO SE oss sensor 0.1MPa. The recommended flow ra Max energy density – 1ms PW 30J/cm <sup>2</sup>	unications adapte 7/8) moved. installed, use the NIF ENSOR. Maximum ti e recommended flow te. For solutions for by pulse width 3ms PW 60J/cm <sup>2</sup>	er with circular R setting. ilt angle ±5 degrees. v rate can be lowered prop prolonged usage with unt 10ms PW 150J/cm²	7Z08405	

\* For drawings please see page 95



IPM-10KW



