1.1.2.11 Short Exposure High Power Sensors

1.1.2.11.1 Helios Plus

50W to 12,000W

Features

- No water cooling, up to 12,000W
- Profinet / EtherNet/IP / EtherCAT and RS232 interfaces
- Remote actuated protective cover
- Dual wavelength range IR & visible spectrum
- Field replaceable protective window



The Helios Plus measures high power industrial lasers of up to 12kW by measuring the energy of a short time exposure to this power. The laser is set to a pulse of from 0.3 to several seconds. The Helios Plus measures the energy and exposure time of this sample of the power, and from this calculates the power. By keeping the pulse energy under 5 kJ, there is no need for water cooling and the sensor can be kept to a compact size. It works in two wavelength ranges: 900-1100nm (Near IR) and 450-550nm (Blue-Green). The sensor is housed in a dust-resistant industrial body to keep the Helios Plus in clean working order even under harsh

factory conditions. Its protective cover can be opened and closed remotely to protect the sensor when not in use. Its protective window is antireflection coated to reduce back reflection from high power beams. The Helios Plus offers three industrial communication protocols: Profinet, EtherNet/IP and EtherCAT, with an additional RS232 interface. It is equipped with two power and two data ports for easy integration into existing line or ring topologies as well as an RS232 connection. The Helios Plus comes with a simple PC application for easier integration into the customer's system.

Helios Plus Model Table:

Model	Description	Communication	Data connectors	Power connectors	P/N
Helios Plus - Profinet V1	Profinet, AIDA compatible connectors for power and data	Profinet, RS232	2x AIDA compatible RJ45 connectors, 1x RS232 - DB9 connector	2x AIDA compatible connectors	7 Z 07134
Helios Plus - EtherNet/IP	EtherNet/IP, AIDA compatible connectors for power and data	EtherNet/IP, RS232	2x AIDA compatible RJ45 connectors, 1x RS232 - DB9 connector	2x AIDA compatible connectors	7 Z 07101
Helios Plus - EtherNet/IP-M	EtherNet/IP, M12 connector for data, Mini 7/8" connector for power	EtherNet/IP, RS232	2x M12 D - coded connectors, 1x RS232 - DB9 connector	2x Mini 7/8" connectors (male / female)	7 Z 07104
Helios Plus - EtherCAT	EtherCAT, AIDA compatible connectors for power and data	EtherCAT, RS232	2x AIDA compatible RJ45 connectors, 1x RS232 - DB9 connector	2x AIDA compatible connectors	7 Z 07105

 $^{^{\}star}$ For specifications please see page 102 and for drawings see page 103 $\,$

Specifications of Helios Plus (following the Model Table on page 101)

Maximum Exposure Before Cooling Down is Necessary	Use	High power industrial laser measurement								
Energy Range	Absorber Type	LP2, absorption ~94%								
Exposure Time (see table below)	Power Range									
Agerture	Energy Range	100J - 5kJ								
Aperture Aperture Aperture Assume Diameter Assume Energy Density 4kJ/cm² 4tJ/cm²	Exposure Time (see table below)	0.3- 4s (a)								
Max Beam Diameter 35mm Maximum Energy Density 4KJ/cm² Calibration Uncertainty ±1.9% Accuracy № ±3% (900 - 1100nm) ±3% (900 - 1500nm) ±3.5% (450 - 550nm) Linearity with Energy ±1.5% № Response Time 3s Waiting Time for Next Measurement Maximum Exposure Before Cooling Down is Necessary Maximum before another 5kJ shot, 3min. Power Supply 24 VDC ±5%, max 2A (for dasky-chaining) Power Consumption 4.8W Dimensions Model: Profinet, EtherNet/IP, EtherCAT - (L x W x H) mm - 200 x 100 x 84 (closed); 200 x 123 x 144 (open) - (L x W x H) mm - 200 x 122 x 84 (closed); 200 x 145 x 144 (open) Position of Mounting Holes 6.6 mm holes spaced at 90x190 mm Weight Model: Profinet, EtherNet/IP, EtherCAT - 2.5kg, EtherNet/IP-M - 2.7 kg Indicators 7 indicator LEDs Operating Temperature 10 - 60°C Humidity 10 - 80% Recommended exposure times and 1/e² Gaussian beam diameters 2 9 2000 1 1 12 100 2 9 5000 1 1 18 18 500 2 9 9 10000 0 3 22 22 Cover Moter: EtherNet/IP-M -1. Dever Sup	Wavelength									
Maximum Energy Density	Aperture	ø50mm								
Calibration Uncertainty	Max Beam Diameter	35mm								
Accuracy b 23% (900 - 1100nm) 23.5% (450 - 550nm)	Maximum Energy Density	4kJ/cm ²								
Linearity with Energy	Calibration Uncertainty	±1.9%								
Reproducibility	Accuracy (b)									
Response Time 3s	Linearity with Energy	±1.5% (c)								
Waiting Time for Next Measurement 12s Maximum Exposure Before Cooling Down is Necessary Maximum Exposure Before Cooling down time before another 5kJ shot, 3min. Power Supply 24 VDC ±5%, max 2A (for daisy-chaining) Power Consumption 4.8W Dimensions Model: Profinet, EtherNet/IP, EtherCAT - (L x W x H) mm - 200 x 100 x 84 (closed); 200 x 123 x 144 (open) Position of Mounting Holes Model: EtherNet/IP-M - (L x W x H) mm - 200 x 102 x 84 (closed); 200 x 145 x 144 (open) Weight Model: EtherNet/IP-M - (L x W x H) mm - 200 x 122 x 84 (closed); 200 x 145 x 144 (open) Weight Model: EtherNet/IP-M - 2.7 kg Indicators 7 indicator LEDs Operating Temperature 10 - 60°C Humidity 10 - 80% Recommended exposure times and 1/e² Gaussian beam diameters 50 2 9 2000 1 12 Cover Motor driven cover opens sideways Accessories Supplied with Helios Plus Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7210458A), 2. Data Cable - Profinet & EtherCAT (7E01298), EtherNet/IP (P/N 7E01299) Optional Accessories Model: Profinet, EtherNet/IP-M - 1. Deer Supply Cable (P/N 7E01209), 2. Helios Plus Window Replacement K	Reproducibility									
Maximum Exposure Before Cooling Down is Necessary	Response Time									
Down is Necessary down time before another 5kJ shot, 3min.	Waiting Time for Next Measurement	12s								
Power Supply		Maximum operating temperature of 60°C will be reached after exposure to 30kJ (e.g. 6 shots at 5000W, 1s). Cooling down time before another 5kJ shot, 3min.								
Nodel										
Dimensions Model: Profinet, EtherNet/IP, EtherCAT - (L x W x H) mm - 200 x 100 x 84 (closed); 200 x 123 x 144 (open)		, , , , ,								
Model: Profinet, EtherNet/IP, EtherCAT - 2.5kg, EtherNet/IP-M - 2.7 kg Indicators										
Indicators	Position of Mounting Holes									
Departing Temperature	Weight									
Humidity	Indicators									
Laser Power W Exposure s Min 1/e² beam dia. mm Laser Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Min 1/e² beam dia. mm Power W Exposure s Dia. mm Power W Exposure s Dia. mm Power W Exposure s Dia. mm Power W Pow	Operating Temperature	10 - 60°C								
Power W Exposure s dia. mm Power Supor Subscite s Power Subsc	Humidity	10 - 80%								
1/e² Gaussian beam diameters 100 2 9 5000 1 18 500 2 9 10000 0.3 22 1000 1 9 12000 0.3 25 Cover Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7Z10458A), Accessories Supplied with Helios Plus Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7Z10458A), 2. Data Cable - Profinet & EtherCAT (7E01298), EtherNet/IP (P/N 7E01299) No accessories included Model: Profinet, EtherNet/IP, EtherCAT - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7Z08369) No 2. Helios Plus Window Replacement Kit (P/N 7Z08369), 2. Helios Plus Window Replacement Kit (P/N 7Z08369), 3. Power Supply Cable, 7/8" to flying leads termination 2m (P/N 7E01535), 4. Data Cable, EtherNet/IP M12 to RJ45 plug IP67 3m Cable (P/N 7E11211)										
Solid Soli	Recommended exposure times and	50	2	9	2000	1	12			
Cover Motor driven cover opens sideways Accessories Supplied with Helios Plus Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7Z10458A), 2. Data Cable - Profinet & EtherCAT (7E01298), EtherNet/IP (P/N 7E01299) Nodel: Profinet, EtherNet/IP, EtherCAT - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7Z1045869) Optional Accessories Optional Accessories Optional Accessories CE, UKCA, China RoHS	1/e ² Gaussian beam diameters	100	2	9	5000	1	18			
Cover Motor driven cover opens sideways Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7Z10458A), 2. Data Cable - Profinet & EtherCAT (7E01298), EtherNet/IP (P/N 7E01299) Model: EtherNet/IP-M - No accessories included Model: Profinet, EtherNet/IP, EtherCAT - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7Z08369) Model: EtherNet/IP-M - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7Z08369), 3. Power Supply Cable, 7/8" to flying leads termination 2m (P/N 7E01535), 4. Data Cable, EtherNet/IP M12 to RJ45 plug IP67 3m Cable (P/N 7E11211) Compliance CE, UKCA, China RoHS		500	2	9	10000	0.3	22			
Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7Z10458A), 2. Data Cable - Profinet & EtherCAT (7E01298), EtherNet/IP (P/N 7E01299) No accessories included Model: Profinet, EtherNet/IP, EtherCAT - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7Z08369) Nodel: EtherNet/IP-M - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7Z08369), 3. Power Supply Cable, 7/8" to flying leads termination 2m (P/N 7E01535), 4. Data Cable, EtherNet/IP M12 to RJ45 plug IP67 3m Cable (P/N 7E11211) Compliance CE, UKCA, China RoHS		1000	1	9	12000	0.3	25			
Accessories Supplied with Helios Plus Model: EtherNet/IP-M	Cover	Motor driven cover opens sideways								
Optional Accessories Model: EtherNet/IP-M -1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7E01209), 3. Power Supply Cable, 7/8" to flying leads termination 2m (P/N 7E01535), 4. Data Cable, EtherNet/IP M12 to RJ45 plug IP67 3m Cable (P/N 7E11211) Compliance CE, UKCA, China RoHS	Accessories Supplied with Helios Plus	Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable (P/N 7Z10458A), 2. Data Cable – Profinet & EtherCAT (7E01298), EtherNet/IP (P/N 7E01299)								
2. Helios Plus Window Replacement Kit (P/N 7Z08369) Optional Accessories Model: EtherNet/IP-M -1. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209), 2. Helios Plus Window Replacement Kit (P/N 7Z08369), 3. Power Supply Cable, 7/8" to flying leads termination 2m (P/N 7E01535), 4. Data Cable, EtherNet/IP M12 to RJ45 plug IP67 3m Cable (P/N 7E11211) Compliance CE, UKCA, China RoHS		Model: Profinet. EtherNet/IP. EtherCAT - 1. D9F to D9M Shielded 10m RS232 Cable (P/N 7F01209)								
Compliance CE, UKCA, China RoHS	2. Helios Plus Window Replacement Kit (P/N 7Z08 Optional Accessories Addel: EtherNet/IP-M 2. Helios Plus Window Replacement Kit (P/N 7Z08 2. Helios Plus Window Replacement Kit (P/N 7Z08 2. Helios Plus Window Replacement Kit (P/N 7Z08						69) 1209), 69).			
	Compliance									
	Part number			e on previous pa	ge 101					

Notes: (a) Repetitive pulses can also be measured as long as the total exposure time is within this range.

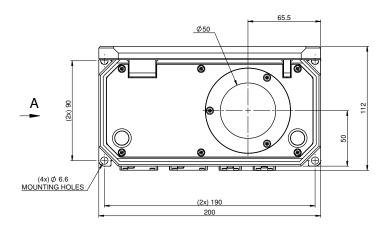
(b) The power is calculated by measuring the energy and exposure time. The laser pulse is assumed to be rectangular for this calculation.

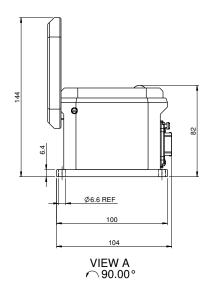
(c) For pulse widths in the range 0.3 – 4s.

^{*} For drawings please see page 103

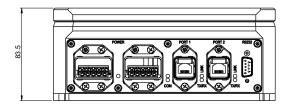
Helios Plus Drawings

Helios Plus - Profinet / Helios Plus - EtherNet/IP / Helios Plus - EtherCAT with Cover Open

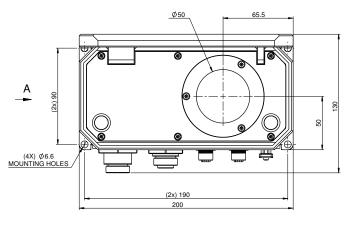


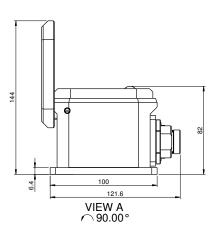


Helios Plus - Profinet / Helios Plus - EtherNet/IP / Helios Plus - EtherCAT with Cover Closed



Helios Plus - EtherNet/IP-M with Cover Open





Helios Plus - EtherNet/IP-M with Cover Closed

