1.1.2.11 Short Exposure High Power Sensors

1.1.2.11.1 Helios Pro

100W 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
- Optional Diffuser for small beam sizes
- Field replaceable protective window
- Pulse characterization: Rise time, power at the end of the pulse, stabilization of the pulse and pulse shape

Helios Pro

The Helios Pro 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 Pro measures the energy and exposure time of this sample of the power, and from this calculates the power. Helios Pro provides additional characteristics of the pulse such as: rise time, power and level of stability of the pulse in the last 50 milliseconds and can also display the shape of the pulse. In the version with a diffuser Helios Pro can handle small beam size down to 2 mm. By keeping the pulse energy under 5kJ, 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 Pro 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 Pro 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 Pro comes with a simple PC application for easier integration into the customer's system.

Helios Pro Model Table:

Model	Description	Communication	Data connectors	Power connectors	P/N
Helios Pro - Profinet	Profinet, AIDA compatible connectors for power and data	Profinet, RS232	2x AIDA compatible RJ45 connectors, 1x RS232 - DB9 connector	2x AIDA compatible connectors	**7Z07146**
Helios Pro - Profinet, Diffuser	Profinet, AIDA compatible connectors for power and data	Profinet, RS232	2x AIDA compatible RJ45 connectors, 1x RS232 - DB9 connector	2x AIDA compatible connectors	**7Z07147**
Helios Pro - 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	**7Z07142**
Helios Pro - EtherNet/IP, Diffuser	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	**7Z07143**
Helios Pro - 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)	**7Z07140**
Helios Pro - EtherNet/IP-M, Diffuser	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)	**7Z07139**
Helios Pro - EtherCAT	EtherCAT, AIDA compatible connectors for power and data	EtherCAT, RS232	2x AIDA compatible RJ45 connectors	2x AIDA compatible connectors	**7Z07144**
Helios Pro - EtherCAT, Diffuser	EtherCAT, AIDA compatible connectors for power and data	EtherCAT, RS232	2x AIDA compatible RJ45 connectors, 1x RS232 - DB9 connector	2x AIDA compatible connectors	**7Z07145**

* For specifications please see page 102 and for drawings see page 103

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

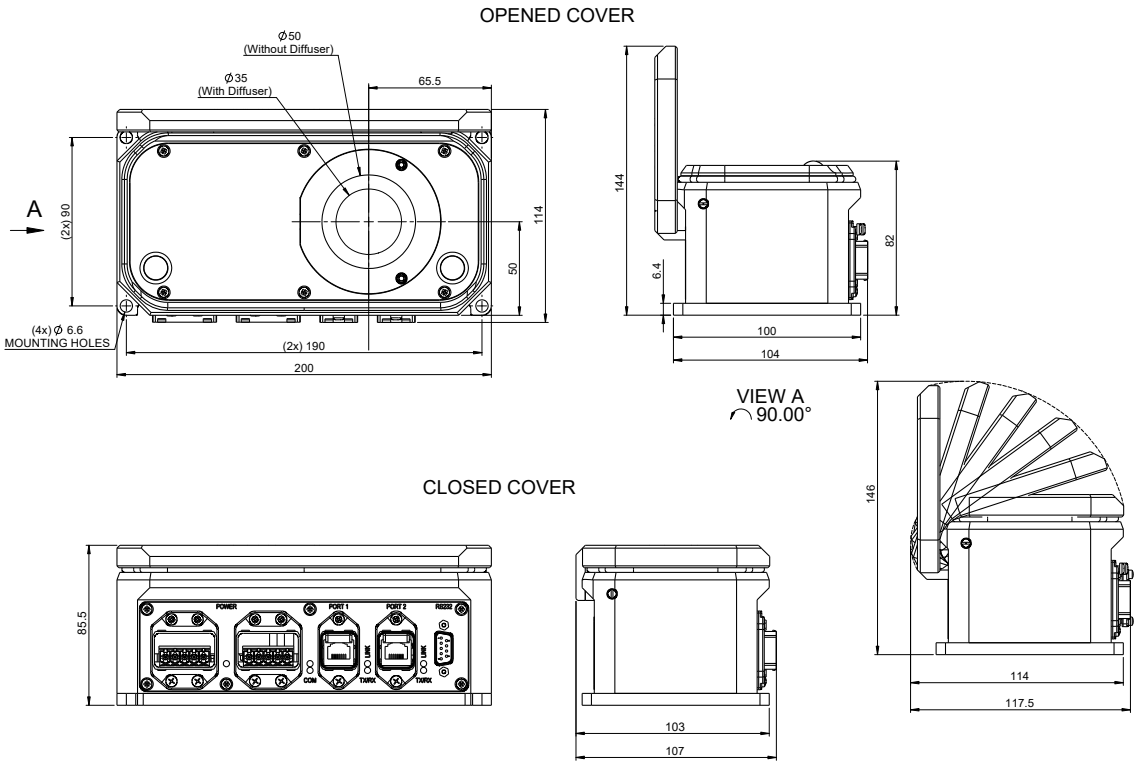
Use	High power industrial laser measurement
Absorber Type	LP2, absorption ~94%
Power Range	100W - 12kW
Energy Range	100J - 5kJ
Exposure Time (see table below)	0.3- 4s [a]
Wavelength	Without Diffuser 450 - 550nm, 900 - 1100nm With Diffuser 450-550nm, 940-1100nm
Aperture	Without Diffuser ø50mm With Diffuser ø35 mm
Max Beam Diameter	Without Diffuser 35mm With Diffuser 20mm
Calibration Uncertainty	±1.9%
Accuracy [b]	Without Diffuser: ±3% (900 - 1100nm, 532nm); ±3.5% (450 - 550nm) With Diffuser: ±3% (940 - 1100nm); ±4% (450 - 550nm)
Linearity with Energy	±1.5% [c]
Reproducibility	±1%
Response Time	3s
Waiting Time for Next Measurement	12s
Pro mode: Power range Rise time Slope Instability	 100W - 12kW [d] 0-95% % of measured (Pro Mode) power [e]
Maximum Exposure Before Cooling Down is Necessary	Maximum operating temperature of 60ºC will be reached after exposure to 30kJ (e.g. 6 shots at 5000W, 1s). 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 103 x 86 (closed); 200 x 114 x 146 (open) Model: EtherNet/IP-M - (L x W x H) mm - 200 x 125 x 86 (closed, connectors included); 200 x 135 x 146 (open, connectors included)
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 - 60ºC
Humidity	10 - 80%
Recommended exposure times and $1/e^2$ Gaussian beam diameters	Laser Power W / Recommended Exposure s / Min $1/e^2$ beam dia. Without diffuser [mm] / Min $1/e^2$ beam dia. With diffuser (max dia. is 20mm) [mm] 50 / 2 / 9 / 2 100 / 2 / 9 / 2 500 / 2 / 9 / 2 1000 / 1 / 9 / 2 2000 / 1 / 12 / 2 5000 / 1 / 18 / 6 10000 / 0.3 / 22 / 11 12000 / 0.3 / 25 / 11
Cover	Motor driven cover opens sideways
Accessories Supplied with Helios Pro	Model: Profinet, EtherNet/IP, EtherCAT - 1. Power Supply Cable, AIDA to flying leads termination 5m (P/N 7Z10458A) 2. Data Cable, Ethernet AIDA to RJ-45 5m (P/N 7E01299) Model: EtherNet/IP-M - 1. Power Supply Cable, 7/8" to flying leads termination 2m (P/N 7E01535) 2. D9F to D9M Shielded 3m RS232 Cable (P/N 7E11216A)
Optional Accessories	Model: EtherNet/IP-M - 1. Data Cable, Ethernet M12 to RJ-45 plug IP67 3m Cable (P/N 7E11211) For all Modes: - 1. D9F to D9M Shielded 3m RS232 Cable (P/N 7E11216A) 2. D9F to D9M Shielded 10m RS232 Cable (P/N 7E01209) 3. Helios Pro Window Replacement Kit (P/N 7Z08447)
Compliance	CE, UKCA, China RoHS
Part number	**See P/Ns in Helios Pro Model Table on previous page**

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.
(d) Calculated for the last 50ms before the end of the pulse, the pulse shape is obtained without noise from the 300W and up.
(e) The slope is calculated as the best fit straight line through the pulse data for the last 50ms before the end of the pulse. It is in units of percentage of the Pro Mode power measurement and the value returned is limited to max/min values of +12.8% and -12.7%, if the measured slope goes beyond any measured values beyond these values will return the max or min values.

* For drawings please see page 103

Helios Pro Drawings

Helios Pro - Profinet / Helios Pro - EtherNet/IP / Helios Pro - EtherCAT



Helios Pro - EtherNet/IP-M