LASCON® - infrared pyrometer system for measurement & closed loop control

Controller with ultra fast, built in pyrometer with 100µs sampling rate

Industrial I/O terminal with 24V digital and analog 0-10V I/O for integration in automation lines and connection to plc`s

Powerfull software package for
- temperature measurement
- closed loop control
- data storage and visualization
- up to 255 different process scripts allow handling of complex tasks
- for OS Linux® and Windows®

Ethernet connectivity

24V power supply optional 90-260VAC

Glas fiber cable with lenght up to 120 ft

LASCON®

Visible pilot laser beam

Various optics with spots down to 200µm diameter and temperature ranges from 100°C - 2200°C

Dr. Mergenthaler GmbH & Co. KG

LASCON is a unique temperature measurement and control system, which provides powerfull possibilities to handle complex tasks in industry and science.
LASCON is market leader with over 500 sold units in laser material processing since 10 years,

The main field of applications are :

- Laser material processing as laser plastic welding, laser soldering, laser hardening and all laser processes, where fast temperature rises have to be handeled safely.
- Industrial processes with induction heaters for inductive soldering or hardening
- Sientific applications with ultrafast laser heater to process wafers Or simply monitoring of temperature behaviour of samples during processing

LASCON offers a complete solution of :

- Built in, ultrafast, fiber coupled infrared pyrometer with sampling rates down to 100µs – blocked against laser light. Glas fiber coupling for high immunity against electromagnetic interference.
- Infrared pyrometer or 2 colour pyrometer with visible pilot laser beam for aiming. 2 colour pyrometer can be switched to 1 colour mode.
- Various optics to handle different distances and spot sizes
- Ultra fast adaptive closed loop control for high speed laser processing in unmatched quality
- Rugged controller with realtime operating system and 4 GB flash disk to store data with a rate up to 10kHz
- Industrial I/O terminal (analog and digital) for integration into machines and connection to plc. For example digital start/stop/error signals or analog temperature and control out
- The system can monitor and supervise laser processes and can create an error signal, if the temperature process does not follow the predefined parameters. This parameters can be defined by a simple programming language in so called „scripts“.
- Up to 255 different script can be stored on the system and can be activated within milliseconds. In case of laser soldering, thus up to 255 individual laser joints can be processed and supervised.
- The flash disk can store up to 500.000 processes.
- A separate software task checks, whether the flash disk is full, gives a warning and starts deleting of old processes
- All features are supported by our powerfull PROCESS MANAGER SOFTWARE (LPM) . The software can run on the controller itself or can be installed on any Windows® pc, which is connected by ethernet with the controller
- Easy calibration of the pyrometer can be done with the LPM software. This allows, that the pyrometer can always be leaded back to NIST standards.
- System builders and integrators can use the programing handbook to develope and create own software

	Infrared pyrometer	**2 colour pyrometer**
Temperature ranges	from 100°C to 2200°C in different ranges, depending on response time and optics	from 300°C to 2200°C in different ranges, depending on response time and optics
Subrange	Any subrange is selectable by changing parameters with LPM software	
Spectral range	1.65 – 2µm	1.65 – 2µm, devided into 2 ranges
Accuracy (e=1, t90=1s, T=25°C)	Below 1500°C: 0.3% of measured value in °C or +-2°C,	Below 1500°C: 0.5% of measured value in °C or +-2°C,
Repeatability	0.1% or +-1°C	
Resolution	0.1°C	
Response time (t90)	< 0.2ms	
Max. sampling rate	0.1ms (10kHz)	
Emissivity	Adjustable from 0.01 to 1 by LPM software	Emissivity independant (see literature)
Analog output	Linear 0-10V or optional: 0-20mA, 4-20mA, PWM, 12 Bit resolution	
Power supply	24V DC, 3Amax or with optional wide range power supply 90-260VAC	
Sighting	Laser targeting light, coaxial with pyrometer	
Interfaces and bus control	VGA, keypad, mouse. Ethernet connectivity	
IO terminal	6 analog IN, 2 analog OUT (0-10V , 12 Bit) , 16 dig IN, 8 dig OUT (24V), update rate : 10kHZ	
Parameters and Software	Powerfull software package for measurement, closed loop control, storage, visualization, calibration curves for different optics selectable, customer can calibrate	
Glas fiber lenght	5m, 10m, 20m, 40m ,other lenghts on request	
Ambient temperature	For controller max. 40°C, for optical head 60°C	
Dimensions	Controller 105 x 146 x 276mm, Optics diameter 30.6mm, Lenght typ. 100mm other small sized optics available	

Examples for typical pyrometer performance

Note: If the pyrometer is integrated in a customer specific application, for example in a customer specific laser head by beamsplitter, or in a custom specific setup with window material, the calibration of the pyrometer will be altered. A recalibration will be necessary, which can lead to a result, that the minimum accesable temperature can be lifted to a higher level.

Infrared pyrometer – low temperature:

Example: Mini optic dia=20mm,f=36mm, temp.range 130°C -700°C

Pyrometer temperature noise peak-to-peak [°C] vers. target temperature

Target temperature [°C] Pyrometer response time [ms]	130	140	160	170
0.1	-	30	13	10
1	6	5	2	1
2	4	3	1	1
5	3	2	1	1

2 colour pyrometer – low temperature:

Example: Standard optic dia=30.6mm,f=150mm, temp.range 300°C -1000°C

Pyrometer temperature noise peak-to-peak [°C] vers. target temperature

Target temperature [°C] Pyrometer response time [ms]	300	350	400	450
0.1	30	10	4	2
1	5	2	1	1
2	3	1	1	1
5	2	1	1	1
10	1	1	1	1

– high temperature:

Example:Standard optic dia=30.6mm,f=150mm, with high temp. filter, temp.range 350°C -2340°C

Pyrometer temperature noise peak-to-peak [°C] vers. target temperature

Target temperature [°C] Pyrometer response time [ms]	350	400	450	500
0.1	31	14	7	4
1	7	3	2	1
2	5	2	1	1
5	3	1	1	1

- high temperature:

Example: Standard optic dia=30.6mm,f=150mm, with high temp. filter, temp.range 550°C -2340°C

Pyrometer temperature noise peak-to-peak [°C] vers. target temperature

Target temperature [°C] Pyrometer response time [ms]	500	550	600	650
0.1	40	22	16	10
1	8	4	13	2
2	6	3	2	1
5	4	2	1	1
10	2	1	1	1

Tables show rapid improvement of signal to noise ratio for higher target temperatures and lower response time. The response time can be set by the LPM software. Please ask us for the temperature range for your application.

Reference numbers :

Order code	Item	Order code	Item
550 - 001	LASCON controller with built in fiber coupled 2 colour pyrometer		
550 - 002	LASCON controller with built in fiber coupled infrared pyrometer		
500 - 566	Glas fiber cable, metal armored, core dia. 600 µm, lenght 5 m	500 - 625	Glas fiber cable, metal armored, core dia.400 µm, lenght 5 m
500 - 083	Glas fiber cable, metal armored, core dia. 600 µm, lenght 10 m	500 - 298	Glas fiber cable, metal armored, core dia 400 µm, lenght 10 m
500 - 381	Glas fiber cable, metal armored, core dia. 600 µm, lenght 20 m	500 - 573	Glas fiber cable, metal armored, core dia. 400 µm, lenght 20 m
500 - 339	Glas fiber cable, metal armored, core dia. 600 µm, lenght 40 m	500 - 694	Glas fiber cable, metal armored, core dia. 400 µm, lenght 40 m
500 - 536	Optical head, diameter=30,6 mm f=50 mm, with laser blocking filter		
500 - 529	Optical head, diameter=30,6 mm f=150 mm, with laser blocking filter		
xxx-xxx	Custom specific optical head – same price as standard heads		
550 - 005	Set of keypad, mouse, monitor	500 - 629	High Temperature Filter HT
500 - 641	Power supply, 90-260VAC, output 24V, 3A – for LASCON controller only	500 - 438	Additional pyrometer calibration
500 - 665	3 HU mounting plate for LASCON controller with power supply		
500 - 681	3 HU mounting plate for LASCON controller only		

Order example: 550-001 + 500–083 + 500-529 + 500-629 + 500-438

LASCON controller with built in 2 colour pyrometer + Glas fiber cable, core dia=600µm, Lenght 10m + Optical head with focus distance 150mm, laser blocking filter + High temperature filter + Second calibration curve necessary (if you want to use the pyrometer with (high temperature version) and without (low temperature version) filter
Included in delivery of the LASCON controller is the software package LPM, which is installed on the controller and can also be installed on an additional pc, which is connected with the controller by ethernet.

Calculation of the minimum spot diameter (msd) :

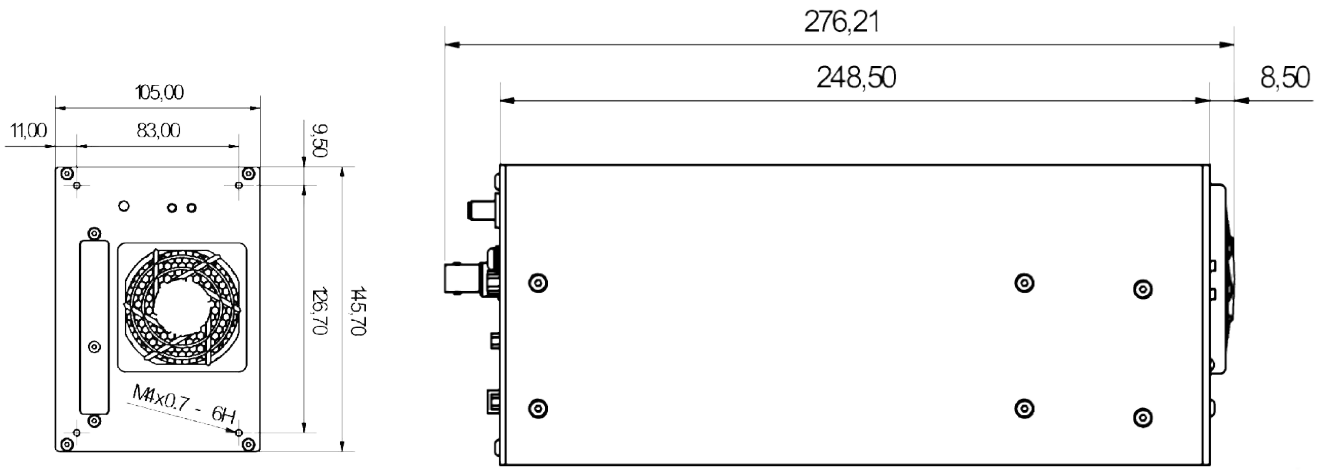
msd = (focus distance of optical head) / 50 * (glas fiber core diameter)

Example : focus distance of optical head = 150mm , glas fiber core diameter = 0.6mm

msd = 150 / 50 * 0.6 [mm] = 1.8mm

The minimum spot diameter is 1.8mm. A larger spot can be easily achieved by simply defocusing the pyrometer .

Dimensions of the LASCON controller :



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