Laser performance under control

powerobserver advanced

ENGINEERING QUALITY WORLDWIDE

plasmo

The PowerObserver advanced

An innovative measurement system for inline laser performance measurement.

Background

The powerobserver advanced is a new innovative measurement system for inline laser power measurement.Its compact construction makes it easy to integrate into a wide range of laser systems. Its design enables short repeat measurements. It is thus possible to check the laser power during the production process using a short-time measurement. Long-time measurements allow the visualisation and examination of the performance over a longer time range. These measurement programmes rate the measured performance as OK or NOK. The results and the determined performance can be displayed on the laser system monitor and made available to the device via various field bus systems.

Challenge

Various performance measurement systems are currently available in this sector. Our objective is to offer the customer a laser power measurement device which combines the flexibility of various measurement programmes and installation options with a selection of interfaces available on the market.

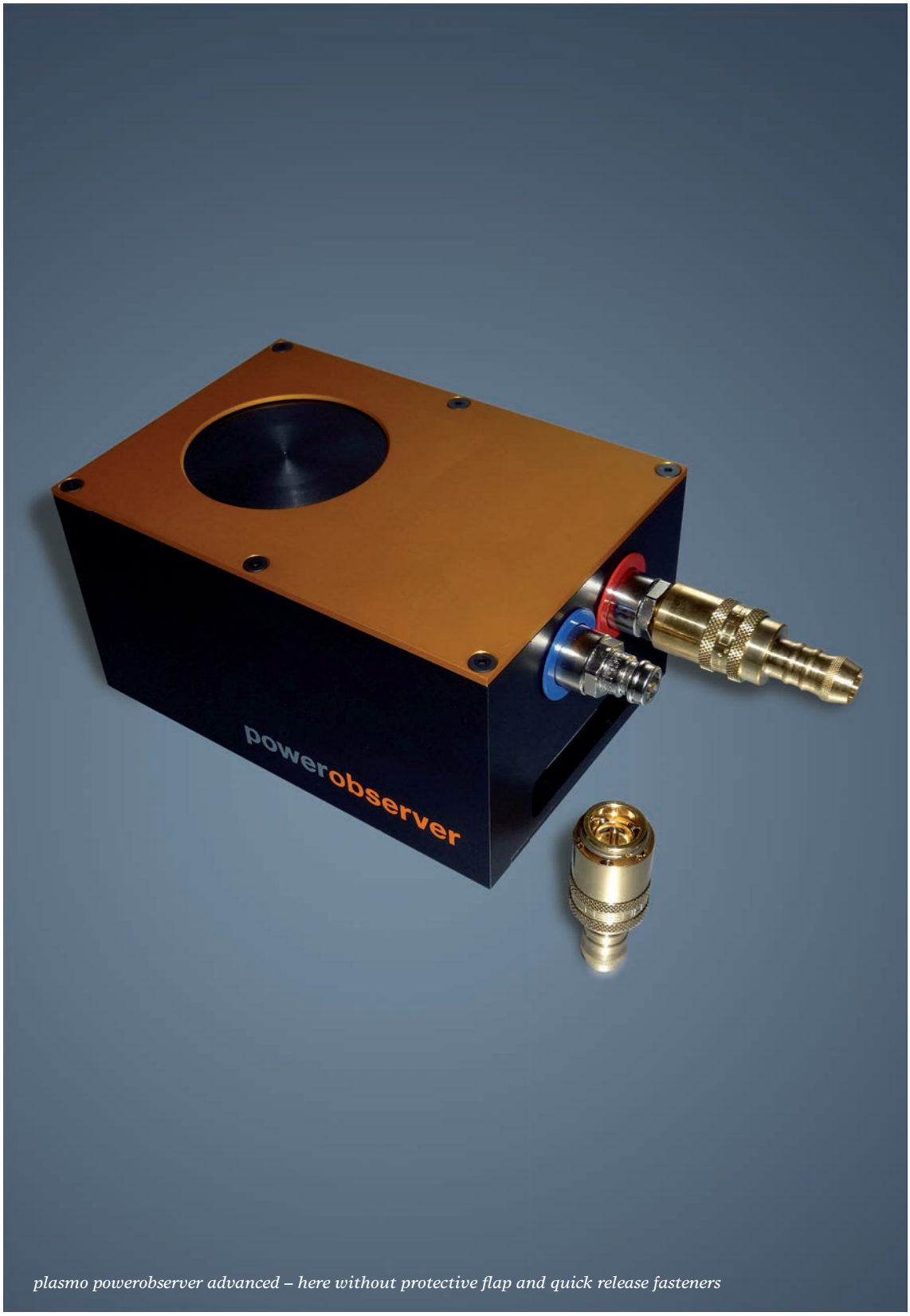
Current laser power measurement systems have only limited capabilities. The systems are therefore not suitable for performing various measurement processes, only communicate via specific interfaces or are only capable of being used in certain circumstances due to their size. A further disadvantage is the waiting time between the measurement cycles which prevents a high measurement repetition rate and thus prolongs process cycles.

With the powerobserver advanced, our customers have a laser power measurement system which allows a high measurement repetition rate and evaluates the stability of the laser power. A high degree of flexibility in terms of system integration and communication are also very important. The acquired data can be documented and displayed on the monitor on the system or robot PLC. This is made possible by the large selection of field bus systems.

The plasmo powerobserver advanced can be used for any laser power measurement.

Solution description

Auxiliary process times occur in parallel with the quick yet precise performance measurement. The compact design of the measuring head not only allows it to be integrated in laser systems with static lenses but also arranged freely in laser cells with robot-guided lenses. The water-cooled absorber plate in the measuring head can be protected against dirt and contamination by the cover flap. In an automated inspection sequence, the opening and closing processes are triggered by the control system. The PowerObserver advanced distinguishes itself



plasmo powerobserver advanced – here without protective flap and quick release fasteners

in terms of its measurement programmes and stands out in terms of its short repetition rate when making short-time measurements:

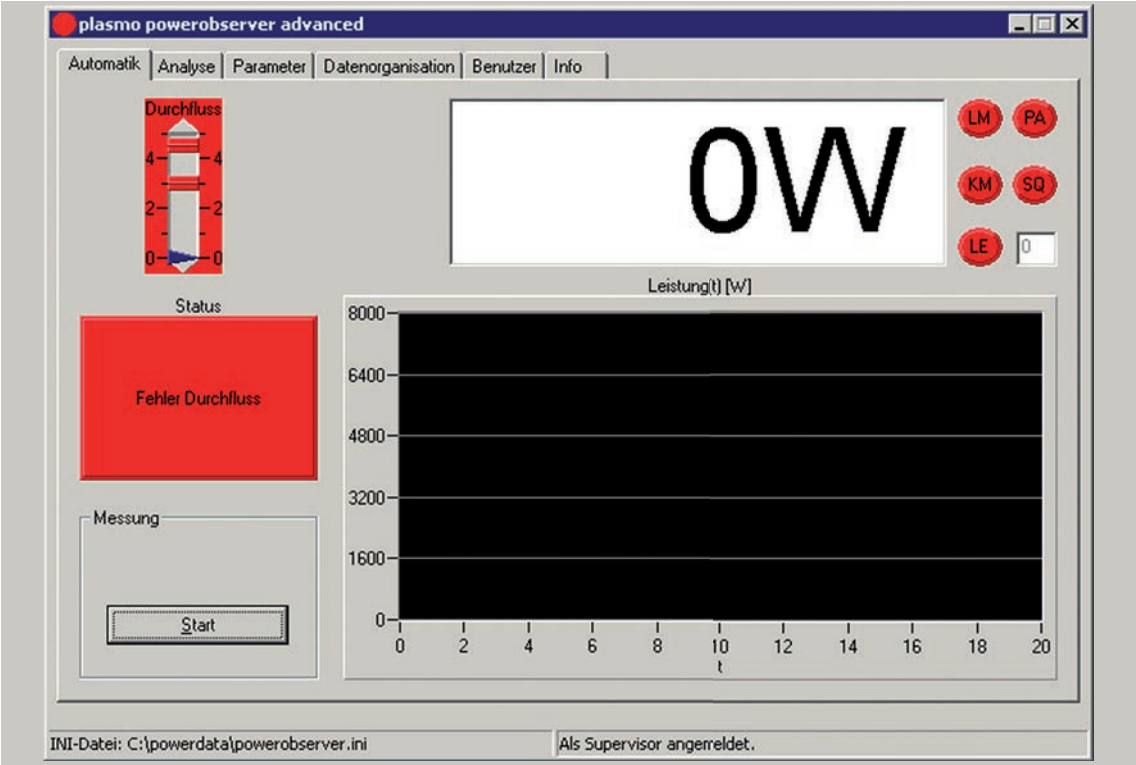
- Programme I: Calculation and documentation of the current laser power on the workpiece side (short-time measurement).Results display: Laser power in Watts

- Programme II: Recording and documentation of laser power on the workpiece side in relation to the set tolerance limits (long-time measurement). Results display: OK / NOK

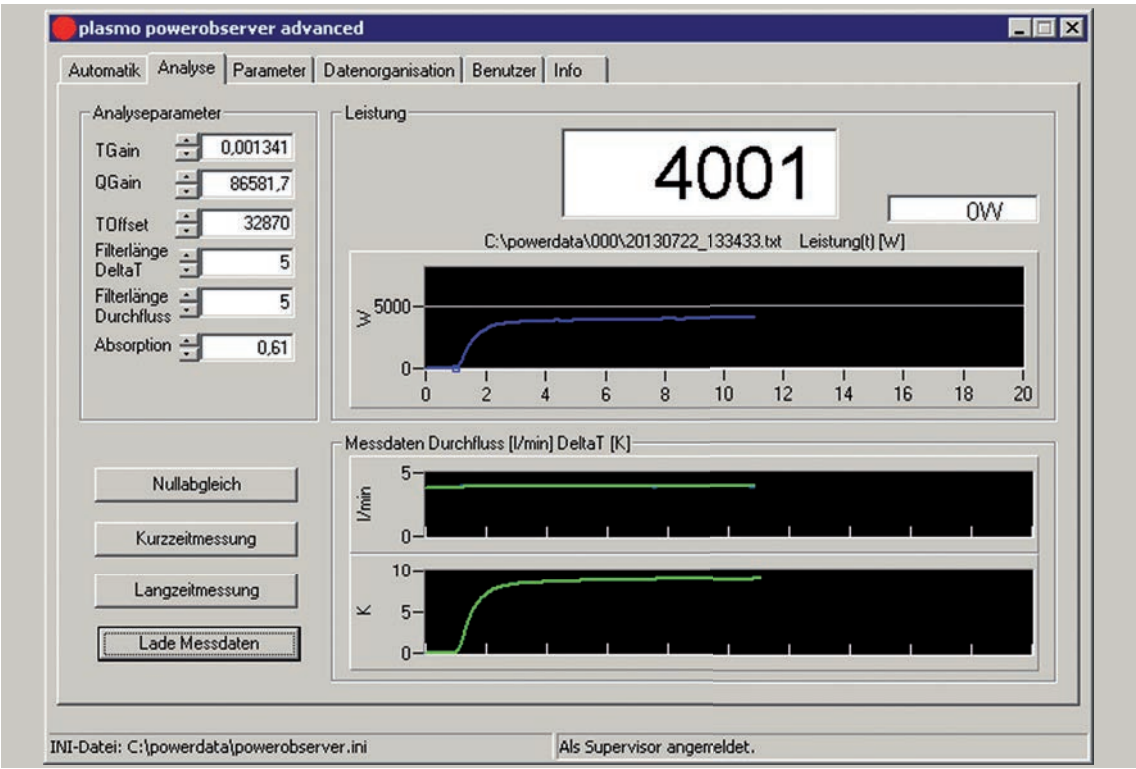
The powerobserver advanced displays the results on the laser system monitor. The powerobserver advanced is parametrised using a remote desktop via the (company) network.
Various field bus systems are available for communicating between the powerobserver advanced and the system or robot PLC (e.g. ProfiNet, Profibus, etc.)

The plasmo powerobserver advanced - features and benefits at a glance:

- Laser performance calculation
- Measurement device for inline laser performance measurement
- Independent of laser wavelength
- Visualisation of performance curve in order to identify changes in performance caused by thermal drifts, for example
- Measurement of the performance on the workpiece by short-time measurements; accuracy < 3%
- Repeat accuracy +1.5%
- High repeat accuracy
- Performance measurement parallel to auxiliary process times
- Various performance measurement cycles possible
- Adjustable performance limits with OK and NOK
- Communication via various field bus systems, e.g. Profinet, Interbus, etc.
- Results visualisation possible via the monitor on the system or robot PLC
- Quick and easy installation
- Flexible integration with additional components
- No instruments in the optical path under the lens
- Minimal contamination from process
- Every measurements is documented in a ring buffer
- Consistent process parameters thanks to consistent laser power on the workpiece
- Optical components protected against damage



Software interface powermeter/automatic mode – user side



Software interface powermeter/analysis mode – visualisation of historic data

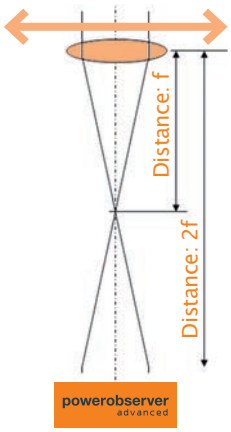
Technical specification

Evaluation unit / communication	
Evaluation unit	Embedded Control Unit
Bus-System	FeldBus (ProfiBus, ProfiNet, InterBus, etc.)

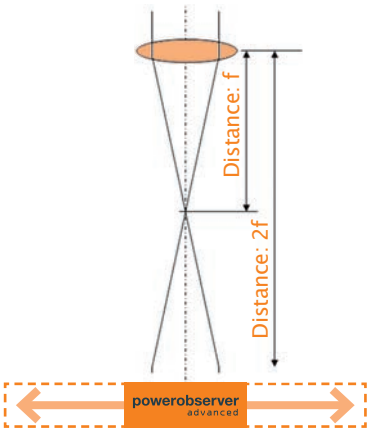
Measurement duration / -precision	
Measurement time	0,5 – 2,0s (short-time measurement)
Accuracy	< 3%
Repetition accuracy	± 1,5%

Dimensions / Weight / Power measuring head	
Dimensions (W/H/D)	120 / 92 / 175 mm
Dimensions (W/H/D) with end cap	120 / 127 / 175 mm
Weight	2.300 g
Weight with end cap	2.800 g
Power ranges (max. power of laser source))	500 – 1.000 Watt 1.000 – 3.000 Watt 3.000 – 8.000 Watt
Water flow rate	max. 5 l/min
max. Water pressure	6 bar (0,6 MPa)
Compressed air	6 bar (0,6 MPa), oil-free/waterless only if end cap is used

Ways of Possible Integration

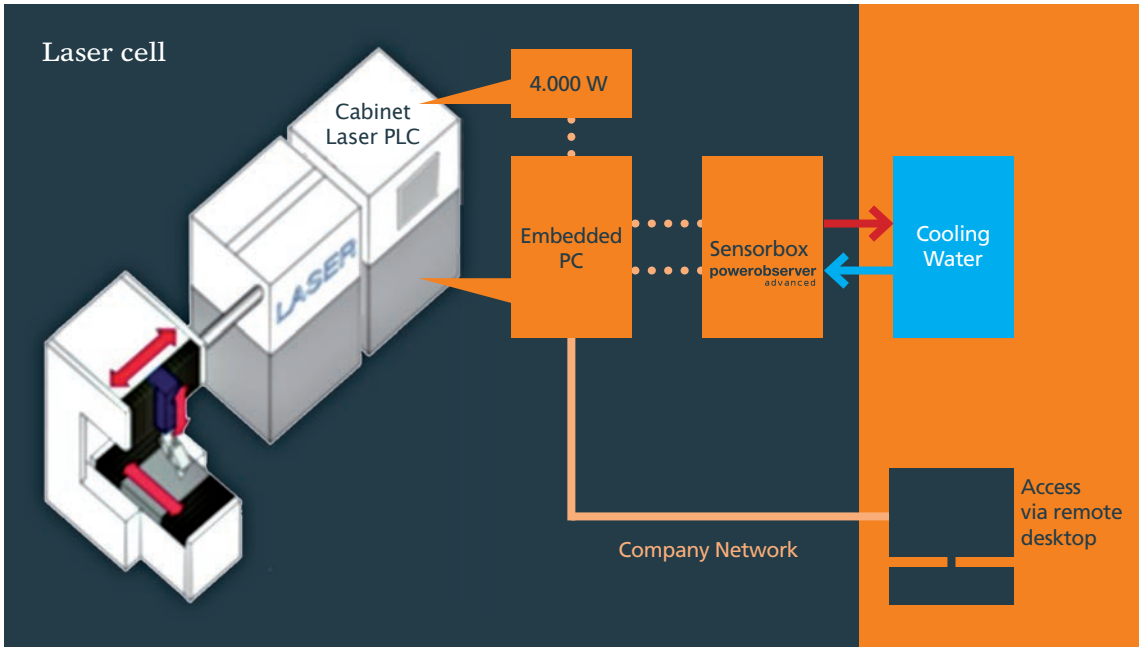


Type A: Fixed (integration on demand)
- Fast installation
- High testing frequency (e.g. after each weld or welding part)



Type B: Moveable (permanent integration)
- Integration on a moving component
- Additional components necessary
- Fixture under the optics
- Integration depending on disturbing contours in the beam path

Installation – schematically



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