

## 3.8.2 BeamWatch Integrated - Beam Profiling System for Automated Manufacturing

BeamWatch Integrated is a fully automated laser measurement system designed to measure critical laser beam parameters on industrial production lines.

- Measures all the critical laser beam parameters of the focused beam up to 10 kW power (up to 30 kW on request)

Measured laser parameters include:

- Waist (focus spot) width and location
  - Focal shift
  - Centroid
  - M2 or K
  - Divergence
  - Beam parameter product
  - Rayleigh length
  - Beam tilt angle
  - Absolute power
- Fully automated operation
  - Trend analysis with good/bad signal
  - Detailed report with time stamp
  - Ability to work with different types of welding heads w/o changes to the measurement system
  - PROFINET /GigE interface (EtherNet/IP, CC-Link on request)
  - Rugged for industrial production environment
  - Short measurement time for frequent measurements during shift operation



Although ever more powerful cutting and welding laser equipment is being used on modern production lines, all too frequently – due either to lack of time or to the complexity – the quality of the laser beam goes unchecked during the production process. Because laser process quality is directly linked to laser quality, this can lead to large batches of defective parts in high-throughput production lines, e.g. in the automotive industry. In addition to the significantly higher risk of loss or safety issues, neglecting to monitor the quality of the laser beam consistently makes it almost impossible to detect the root cause of problems, when they occur.

To address this issue, BeamWatch Integrated was developed. Based on the patented non-contact BeamWatch measurement principle (using Rayleigh scattering), this technology provides for the simultaneous measurements of multiple profiles along the beam caustic at video rates, delivering – in mere fractions of a second – all the beam key parameters according to ISO 13694 and ISO 11146 standards. Real-time performance also allows for detection of dynamic focal shift, while a NIST-traceable power sensor assures absolute power readings.

With its shutter and rugged design, BeamWatch Integrated is a compact and self-contained system that can accommodate different types of welding heads. A variety of interfaces makes it possible to integrate the system into production networks and automated manufacturing lines to facilitate direct transfer of measurement data.

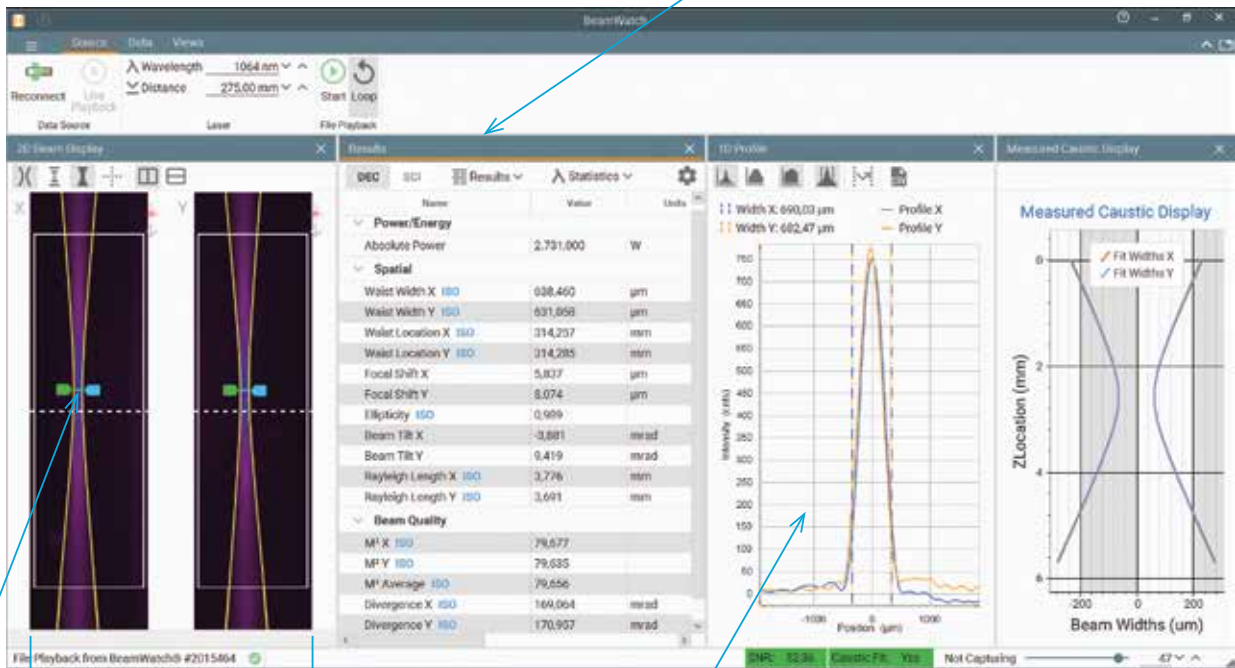
The short measurement times allow the laser beam to be checked automatically during the loading / unloading phase, as frequently as once every produced unit. Additionally, all parameters can be read out using standard interfaces and – as part of the process monitoring – consistently documented for each individual component, as desired. Since they are based on a large amount of measurement data, trend diagrams are highly accurate and can therefore deliver useful insights for predictive maintenance.

Tolerances and limit values can be set up for measured parameters to trigger corrective actions as needed. BeamWatch Integrated operates virtually without maintenance, because contactless measurement exerts no wear on the instrument.

## Specifications

Beam Profiling		
Wavelength	980 - 1080 nm	
Waist width accuracy	±5%	
Waist location accuracy	±125 µm within the BeamWatch window	
Camera field of view inside the unit	32.17 mm x 8.55 mm	
Maximum entrance/exit beam diameter	12.5 mm	
Focal shift accuracy	±50 µm	
BPP accuracy	±3.5% RMS	
Divergence accuracy	±3.5% RMS	
M <sup>2</sup> accuracy	±3.5% RMS	
Particulate purge	Clean dry gas (Air, Nitrogen, Argon), ~5-10 L/min, 6 bar	
Power Meter		
Power range	100 W - 10 kW (up to 30 kW on request)	
Maximum power density at power meter	<b>Beam diameter</b>	<b>Max power density</b>
	< 15 mm	10 kW/cm <sup>2</sup>
	15 - 20 mm	7 kW/cm <sup>2</sup>
	20 - 40 mm	5 kW/cm <sup>2</sup>
	40 - 45 mm	4 kW/cm <sup>2</sup>
Power sensor response time	2.7 s max for 10 kW (quicker for less power)	
Backscattered power	< 1 %	
Power noise level	1 W	
Linearity with power	±2%	
Power accuracy	±5%	
Software		
BeamWatch Integrated software	PROFINET, (EtherNet/IP, CC-Link on request) Webinterface or BeamWatch Software	
Output	OK/Warning/NOK values, CSV and PDF files	
Calibration Certificates		
Power Sensor	NIST traceable	
Camera	Certification	
General		
Communication	Profinet / GigE / Other interfaces on request	
Power supply	24 Volts DC, 1.67 Amps max	
Water cooling	10 L/min, 15-30 C°, 6 bar, ~4 bar pressure drop	
Weight	~20 kg	
Dimensions	19.56in x 12.48in x 6.78in 497mm x 317mm x 172mm	

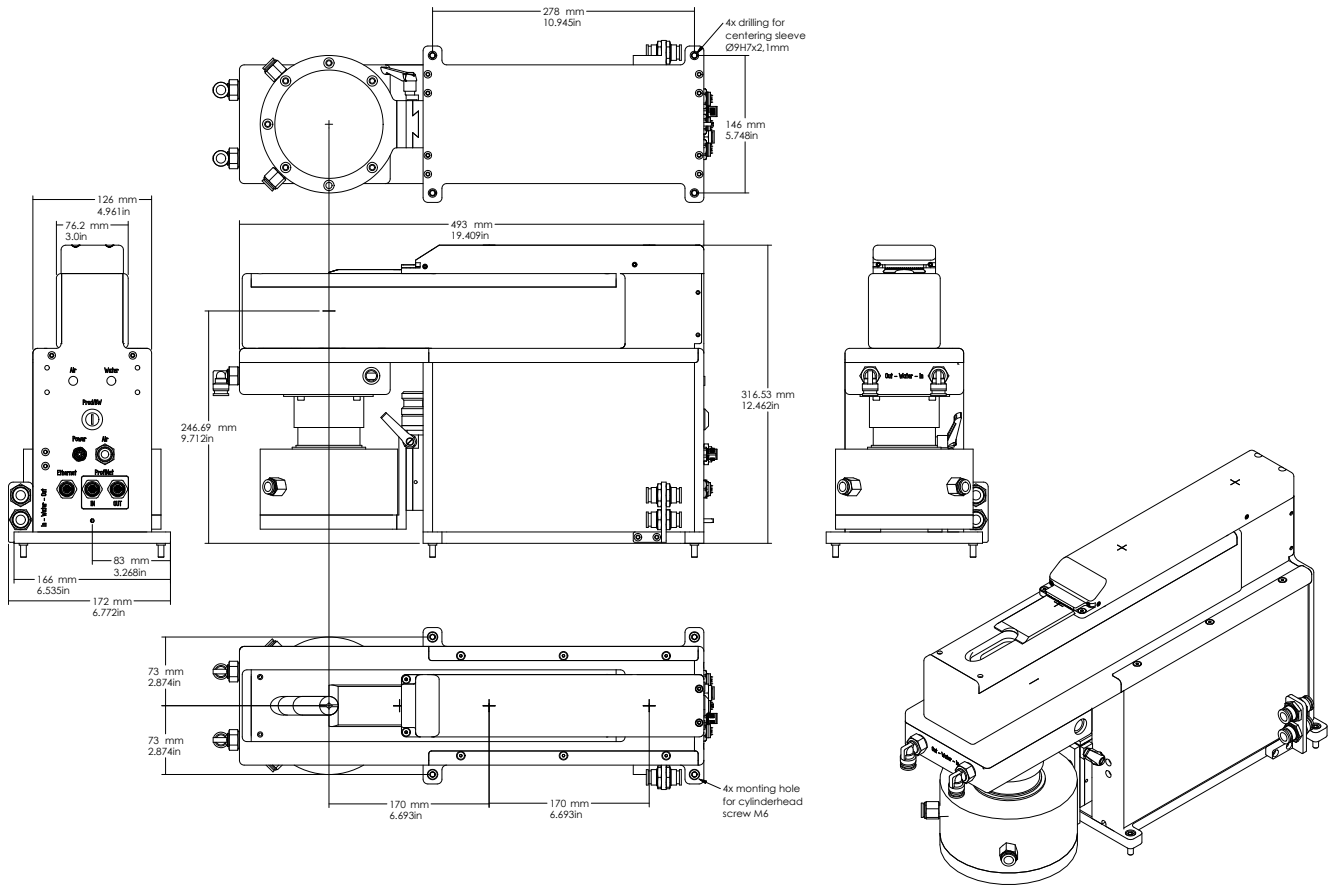
### Industry standard ISO measurements



Both X & Y views of the beam

Dynamically measure focus spot shift

1D and 2D representation of spatial distribution of the power within the beam



### Ordering Information

Item	Description	P/N
BW-NIR-2-155-Integrated	Beam profiling system for automated manufacturing	SP90512