

HIGH POWER WELDING MODULE



2-AXIS SOLUTION WITH COLLIMATOR INTEGRATION AND SENSORS

FOR DEMANDING INDUSTRIAL WELDING APPLICATIONS

**DIGITAL
CONTROL**



- 3 deflection unit types available: "Economical", "High speed", "Full digital high precision"
- Fiber collimator for all standard fibers and beam parameter products
- On-axis camera and/or sensors for monitoring weld seam parameters and protective glass monitoring
- Wide range of mirror substrates and coatings for diverse applications
- Laser power up to 6 kW (8 kW, 75 % duty cycle)

INSERT FIBER AND WELD

TYPICAL APPLICATIONS

Welding battery cell covers is a typical application for the HP welding module, as is welding cell contact surfaces made of aluminum or copper plates in order to electrically connect the individual cells to a battery block. The module is also a perfect solution for welding steel plates using the "remote welding" method, mounted on axis gantries or robot arms. In addition to the deflection unit with 30 mm aperture, deflection units with 20 mm aperture are available for plastics welding.

ADVANTAGES TO YOU

Whether you choose "Economical" or "High Level", the optimum 2-axis deflection unit is available for every application: the low-cost, analog controlled SUPERSCAN SS-II-E-30, the extremely fast, versatile and digitally controlled SUPERSCAN-IV-30 and the high precision fully digital SUPERSCAN-V-30. The robust, water-cooled master block design, combined with optional air flushing, enables laser power of up to 6 kW (8 kW, 75 % duty cycle).

TAILORED CONFIGURATION

A wide choice of lenses with different focal lengths and working fields, various collimators, and mirror substrates and coatings are available for all standard fibers and laser wavelengths. The high power camera adapter allows on-axis process monitoring using a camera, photo diode or pyrometer for keyhole monitoring and weld seam quality control. Up to 2 sensors can be connected in parallel using an additional adapter. Available options include an "air knife" and stainless steel components to protect cooling circuits against corrosion without the use of additives.

INNOVATION AND QUALITY

Innovation and maintaining high product quality standards are our priorities at RAYLASE. All our products are developed, built and tested in our own laboratories and production facilities. Through our world-wide support network we can offer best maintenance and rapid service for our customers.

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GENERAL SPECIFICATIONS

Power supply	Voltage	± 15 V to ± 18 V (SS-IIe) +30 V or +48 V (SS-IV / V)
	Current	3 A RMS, max. 10 A (SS-IIe) 2 A RMS, max. 5 A (SS-IV / -V)
	Ripple/ Noise	Max. 200 mVpp, @ 20 MHz bandwidth
Ambient temperature		+15°C to +35°C
Humidity		≤ 80 % non-condensing
Interface signals	Digital	XY2-100 protocol (SS-IIe) XY2-100-Enhanced protocol (SS-IV / V) SL2-100 protocol (SS-IV / V)
	Typical collimator focal length d25 ⁴	f70, f85, f100 (in mm)
Typical collimator focal length d50 ⁴		f120, f160 (in mm)
Fiber sockets		QB (QBH,RQB) QD (LLK-D), Q5 (LLK-B)
High power camera adapter		Laser reflective to 6 kW (8 kW, 75 % d.c.) Mechanics water-cooled

Typical deflection		± 0.393 rad	
Resolution XY2-100-E 16 Bit		12 µrad	
Resolution SL2-100-20 Bit		0.76 rad	
Repeatability (RMS)	SS-IIe / SS-IV	< 2.0 µrad	
	SS-V	< 0.4 µrad	
Position noise (RMS)	SS-IIe	< 10.0 µrad	
	SS-IV	< 3.2 µrad	
	SS-V	< 2.0 µrad	
Temperature drift	Max. Gaindrift ¹	SS-IIe / SS-IV	15 ppm/K
	Max. Offsetdrift ¹		10 µrad/K
	Max. Gaindrift ¹	SS-V	8 ppm/K
	Max. Offsetdrift ¹		15 µrad/K
Long-term drift 8 h without water tempering ^{1, 3}		< 150 / 60 / 50 µrad	
Long-term drift 8 h with water tempering ^{1, 2, 3}		< 100 / 40 / 30 µrad	

¹ Angles optical. Drift per axis, after 30 min warm-up, at constant ambient temperature and process stress. ² After 30 min warm-up, under varying process loads, with water temperature control set for ≥ 2 l/min and 22°C water temperature. ³ SS-IIe / SS-IV / SS-V. ⁴ d25 / d50 = Diameter output lens of collimator. Fiber collimators can also be added by customer. Adaptions are available for established types.

APERTURE DEPENDENT SPECIFICATIONS – MECHANICAL DATA

Deflection unit	SUPERSCAN IIE / IV / V
Input aperture [mm] ¹	30
Beam displacement [mm]	36.0 (SI, SC), 35.4 (QU)
Weight [kg] ²	approx. 8 – 10
Dimension (L x W x H) [mm] ³	approx. 360 x 163 x 355

¹ For plastics welding applications deflection units with 20 mm input aperture are available. ² Weight and dimension without objective, air knife and process monitoring. ³ Height is depending of collimator.

MIRROR VARIATIONS

Wavelengths	Substrate
420 nm – 480 nm (≤ 3 kW)	QU
780 nm – 980 nm + AL (≤ 3 kW)	QU
900 nm – 1,100 nm + AL (≤ 3 kW)	QU, SC
1,064 nm (≤ 3 kW)	SC
1,020 nm – 1,040 nm (high power coating > 3 kW)	QU
1,060 nm – 1,080 nm (high power coating > 3 kW)	QU

TYPE DEPENDENT SPECIFICATIONS – TUNING

Tuning	Description
SS-IIe – Rapid	Tuning optimized for a wide application range
SS-IV – Vector	Optimized tuning for a wide range of applications with emphasis on processing speed
SS-IV – Fast Vector	Optimized tuning for the best combination of high dynamic performance and high speed
SS-V – Microstructuring	Optimized tuning for high precision beam deflection with sharp corners and minimized tracking error

For further technical data on the dynamic properties of the deflection units, please refer to the corresponding data sheets.

Mirrors and Lenses

Scan mirrors and objectives with optimized mounts are available for all typical laser types, wavelengths, power densities, focal lengths and working fields. Customer specific configurations are also possible. For On-Axis camera monitoring are dedicated developed camera lenses with C-Mount-Connector and cameras available. Please contact the RAYLASE support team for specific information and possible combinations on +49 8153 9999 699 or support@raylase.de.

Options

The SUPERSCAN deflection units provide water temperature control (W) for the electronic components and galvanometer scanners along with air-cooling (A) of the deflection mirrors. This ensures constant working conditions and excellent long-term stability, thus guaranteeing reliable operation even in high power laser applications.

All water-conducting components of the SS-IV and SS-V deflection units as well as the high-power camera adapter are optionally also available in stainless steel.

This is to be considered in the case of cooling circuits without additives against corrosion, in particular when using DI water in order to protect aluminum and copper parts.

The SUPERSCAN deflection units can also be operated without water-tempering. In consequence the drift values may increase.

Air Knife for compressed air to protect the lens from high-spraying workpiece particles is optionally available. The air knife can be mounted to the welding module.

WATER TEMPERATURE CONTROL

Specifications	
Water ¹	Clean tap water with additives
Temperature	22°C – 28°C
Pressure	2 bar – 3 bar

Flow rate	Pressure drop
2 l/min	0.3 bar
4 l/min	0.4 bar
6 l/min	0.7 bar

¹ **Caution:** When using cooling water including deionised water, suitable additives must be used to prevent the growth of algae and protect the aluminium parts against corrosion.

Additive recommendations (Please consult your additive supplier for dosage information):

Standard industrial applications: Products of company NALCO, e.g. CCL105 (Premix) oder TRAC105A_B (Additiv)

Food & beverage, packaging applications: Polypropylene glycol of company Dow Chemical, e.g. DOWCAL N

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