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universal and compatible

These compact **scan heads** from SCANLAB provide optimal solutions for nearly all challenges found in industrial laser materials processing. The mechanically and electrically inter-compatible scan heads have apertures ranging from 7 to 30 mm and various levels of dynamics. High long-term stability and low drift values are ensured via integrated temperature stabilization.

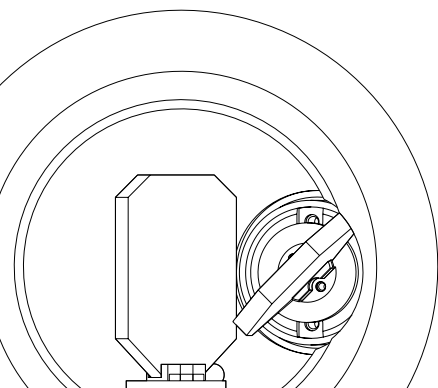
SCANLAB has products for practically every customer need. Small-aperture systems optimally combine top speed and exceptional precision along with large image fields, enabling marking speeds exceeding 1000 characters per second when used with appropriate lasers. Also available are large-aperture scan heads offering small spot size, high speed and laser-power handling up to the multi-kilowatt range.

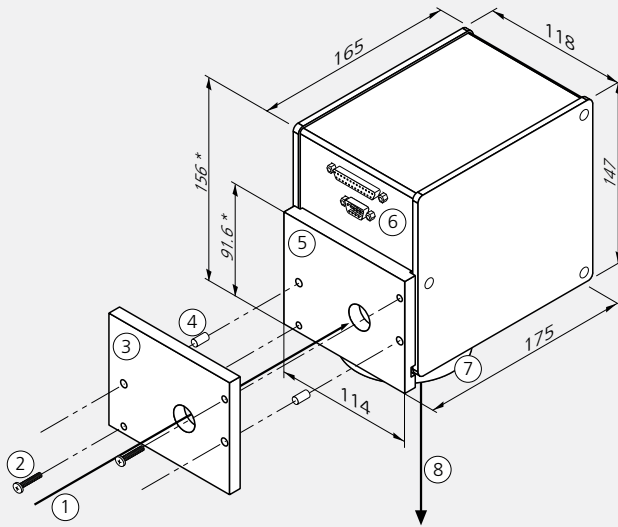
The housing concept as well as tight manufacturing and assembly tolerances bring high flexibility and certainty to the design and operation of laser materials processing systems. This also facilitates speedy adaptation to individual customer requirements.

The hurrySCAN^{® II} scan heads set high-end performance standards with their optimized combination of dynAXIS[®] galvanometer scanners, mirror designs and high-performance electronics.

Typical applications:

- Materials processing
- Marking
- Microstructuring
- Rapid manufacturing
- 3D applications
- Processing-on-the-fly





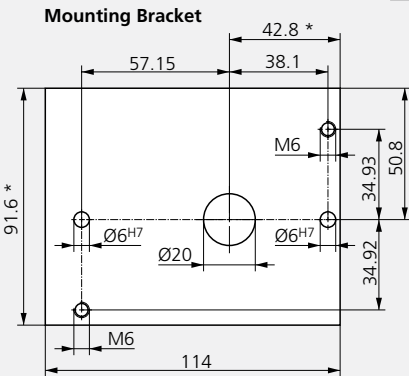
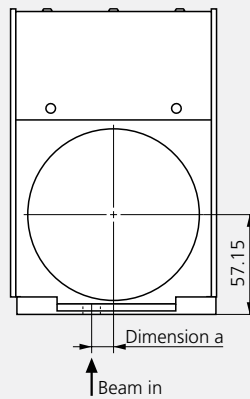
Legend

- 1 Beam in
- 2 Screws (M6 thread)^(#)
- 3 Flange^(#)
- 4 Alignment pins (6_{re})^(#)
- 5 Mounting bracket
- 6 Connectors
- 7 Objective
- 8 Beam out

^(#) not included

all dimensions in mm

Beam Exit Side with Beam Displacement



* The hurrySCAN® II 7's mounting bracket is higher (101.6 mm instead of 91.6 mm) and the bore holes are horizontally displaced (45.3 mm instead of 42.8 mm).

Optics

Scan mirrors and objectives with optimized mounts are available for all typical laser types and working fields.

To optimally utilize standard objectives, the hurrySCAN® 25's two scan axes have differing maximum scan angles. This results in an elliptical image field with the larger semi-axis perpendicular to the entrance beam axis.

Control

All scan heads of these series are equipped with either analog or digital standard interfaces and are easily controlled via SCANLAB's RTC® control boards. All scan heads are optionally available with an optical fiber data interface.

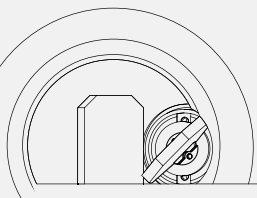
Attachment Provisions

Threaded and non-threaded holes at the housing's beam entrance side at hurrySCAN® 20, 25 and 30 facilitate mounting of the scan head and installation of fiber optic outputs. On the beam exit side, threaded holes are available for attaching add-on components such as cross jets, illumination, distance sensors or thermal shields.

Cooling

The hurrySCAN® 20, 25 and 30 scan heads provide water-cooling connections for the entrance aperture, electronics and galvanometer scanners, along with air-cooling of the deflection mirrors. This ensures constant working conditions and excellent long-term stability, thus guaranteeing reliable operation even in high-laser-power applications. Cooling is also available optionally for the hurrySCAN® 7, 10 and 14.

Dimensions	hurrySCAN® II			hurrySCAN®	
Aperture	7 mm	10 mm	14 mm	10 mm	14 mm
Beam displacement (dimension b)	9.98 mm	12.56 mm	16.42 mm	12.56 mm	15.79 mm

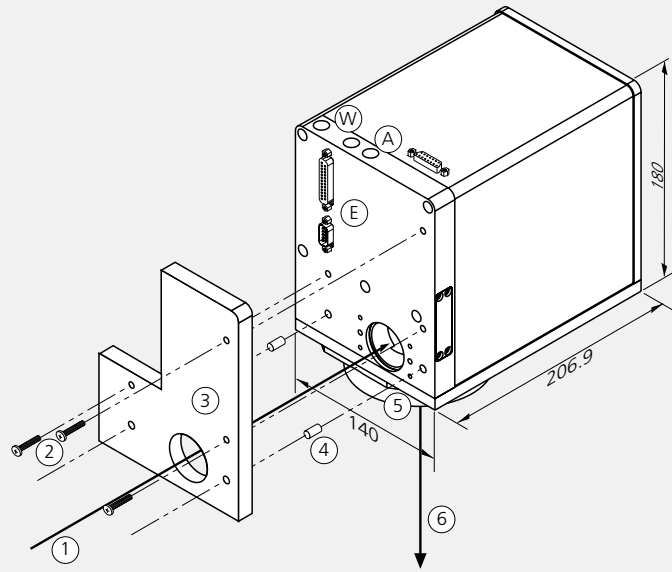


Options

- Extendable into a 3-axis scan system with varioSCAN (hurrySCAN® 20, 25 and 30 also with varioSCAN 40_{FLEX})
- Can be equipped with an additional reference sensor system (10 mm apertures and higher)
- Can be equipped with high-performance light-weight mirrors (14 mm apertures and higher)
- Available without a housing as a scan module (except hurrySCAN® 30)
- Available with water cooling (standard for hurrySCAN® 20, 25 and 30)
- For extremely conditions available with air-cooling of the deflection mirrors (standard for hurrySCAN® 20, 25 and 30)
- All scan heads can be supplemented via a camera adapter for process monitoring

Quality

The high quality of SCANLAB's scan heads is the result of years of experience in the development and manufacture of galvanometer scanners and scan systems. In addition, every scan system must first pass the SCANcheck burn-in test before it is released for shipment to the customer.



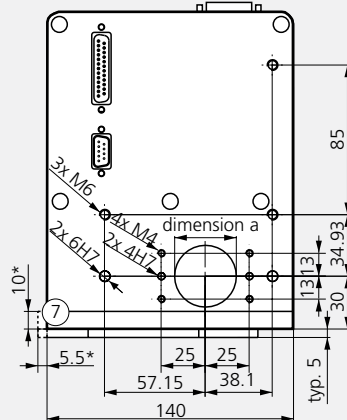
Legend

- 1 Beam in
 - 2 Mounting screws (M6 threads) (#)
 - 3 Flange (#)
 - 4 Alignment pins (6_{h6}) (#)
 - 5 Objective
 - 6 Beam out
 - 7 Wider construction (drawn dashed) only for hurrySCAN® 30
- E Electrical connectors
A Connection for cooling air
W Connections for cooling water

(#) not included

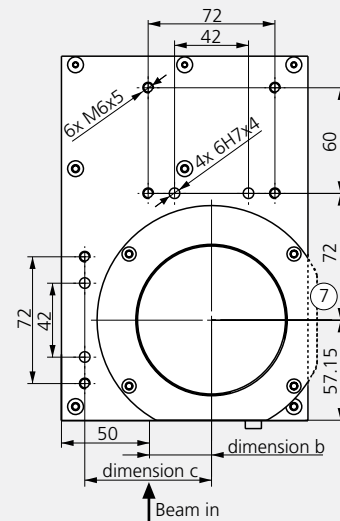
all dimensions in mm

Beam entrance side



*Dimensions only relevant for the hurrySCAN® 30

Beam exit side with beam displacement



Dimensions	hurrySCAN® 20	hurrySCAN® 25	hurrySCAN® 30
Aperture (dimension a)	20 mm	25 mm	30 mm
Beam displacement (dimension b)	25.25 mm	29.88 mm	35.53 mm
Dimension c	67.25 mm	72.00 mm	72.00 mm

Type-Dependent Specifications

(all angles are in optical degrees)

	hurrySCAN® II			hurrySCAN®				
	7 mm	10 mm	14 mm	10 mm	14 mm	20 mm	25 mm	30 mm
Aperture								
Optical performance								
Typical scan angle of scanner 1	±0.35 rad	±0.35 rad	±0.35 rad	±0.35 rad	±0.35 rad	±0.35 rad	±0.26 rad	±0.35 rad
Typical scan angle of scanner 2	±0.35 rad	±0.35 rad	±0.35 rad	±0.35 rad	±0.35 rad	±0.35 rad	±0.40 rad	±0.35 rad
Typical field size – ellipse ^{(1), (2)}	-	-	-	-	-	-	80 x 130 mm ²	-
Typical field size – square ^{(1), (2)}	110 x 110 mm ²	110 x 110 mm ²	90 x 90 mm ²	110 x 110 mm ²	90 x 90 mm ²	90 x 90 mm ²	75 x 75 mm ²	50 x 50 mm ²
Nonlinearity	< 3.5 mrad	< 3.5 mrad	< 3.5 mrad	< 3.5 mrad	< 2.1 mrad	< 3.5 mrad	< 3.5 mrad	< 3.5 mrad
Dynamic performance								
Tracking error	0.11 ms	0.14 ms	0.24 ms	0.18 ms	0.42 ms	0.35 ms	0.50 ms	0.55 ms
Long-term drift over 8 hours	< 0.3 mrad ⁽⁴⁾	< 0.6 mrad ⁽⁵⁾	< 0.6 mrad ⁽⁵⁾	< 0.6 mrad ⁽⁵⁾	< 0.6 mrad ⁽⁵⁾	< 0.6 mrad ⁽⁵⁾	< 0.6 mrad ⁽⁵⁾	< 0.6 mrad ⁽⁵⁾
Step response time								
(settling to 1/1000 of full scale)								
1 % of full scale	0.23 ms	0.25 ms	0.40 ms	0.35 ms	0.80 ms	0.80 ms	0.90 ms	1.20 ms
10 % of full scale	-	-	1.60 ms	0.90 ms	2.20 ms	2.50 ms	3.20 ms	4.50 ms
Typical speeds ⁽¹⁾								
Marking speed	3.5 m/s	2.5 m/s	1.5 m/s	2.0 m/s	1.0 m/s	1.0 m/s	0.8 m/s	0.7 m/s
Positioning speed	15.0 m/s	10.0 m/s	7.0 m/s	7.0 m/s	7.0 m/s	6.0 m/s	5.0 m/s	3.0 m/s
Writing speed ⁽³⁾								
good writing quality	1100 cps	800 cps	500 cps	640 cps	350 cps	320 cps	260 cps	220 cps
high writing quality	800 cps	500 cps	340 cps	400 cps	220 cps	210 cps	170 cps	150 cps
Weight (without objective)								
	approx. 3 kg ⁽⁶⁾	approx. 3 kg ⁽⁶⁾	approx. 3 kg ⁽⁶⁾	approx. 3 kg ⁽⁶⁾	approx. 3 kg ⁽⁶⁾	approx. 3 kg ⁽⁶⁾	approx. 5.8 kg	approx. 5.8 kg

⁽¹⁾ with F-Theta objective, f = 160 mm (hurrySCAN® II 7-14 and hurrySCAN® 10-14) or f = 163 mm (hurrySCAN® 20-30)

⁽²⁾ limited by vignetting at objective

⁽³⁾ single-stroke characters of 1mm height

⁽⁴⁾ at constant ambient conditions, plus offset drift < 30 µrad/K and gain drift < 100 ppm/K

⁽⁵⁾ after warm-up

⁽⁶⁾ with optional water cooling up to 4.7 kg

Common Specifications

(all angles are in optical degrees)

Dynamic performance

Repeatability < 22 µrad

Optical performance

Gain error < 5 mrad

Zero offset < 5 mrad

Skew < 1.5 mrad

Power requirements

±(15+1.5) V DC
max. 3 A
(max. 6 A for hurrySCAN® 20-30)

Input signals

Analog version
alternatively:
±4.8 V; ±9.6 V;
±4.8 mA; ±9.6 mA

Digital version
XY2-100 Standard, SL2-100
or optical data transfer

Output signals

3 status signals per axis
Analog version
TTL level
Digital version
XY2-100 Standard, SL2-100
or optical data transfer

Operating temperature

25 °C ± 10 °C

Typical air requirements ⁽¹⁾

clean, filtered air
20 l/min at Δp < 2 bar

Typical water requirements ⁽¹⁾

5 l/min at
Δp < 0.1 bar, p < 4 bar

⁽¹⁾ air and water cooling optional for hurrySCAN® II 7-14 and hurrySCAN® 10-14