The ARGES scan head product line is available with a variety of apertures, mirror coatings and f-theta lenses as complete scan solution for industrial system manufacturers and integrators.

The electronic design in state of the art surface mount technology maximizes thermal stability, static and dynamic optical performance in robust housings.

The compact scan head series can be purchased with various interfaces: standard analog inputs, standard XYZ-100 protocol but with up to 4 axes simultaneously or the ARGES proprietary interface implementing new features and Plug&Play operation.

The new ARGES scan heads are putting class leading performance into a series of functional designed and ultra compact housings.

For achromatic vision applications flat field lenses exhibit reduced performance and are very expensive or not available at all, e.g. for apertures higher than 31 mm.

The effective aperture of the FIBER ELEPHANT is up to 48 mm.

The FIBER ELEPHANT is a scan system integrating a fast, precise and tilt-free galvanometer controlled beam expander. The FIBER ELEPHANT is capable of adjusting the laser spot size on the target and lancing new emerging 3D applications.

The beam expander is mounted on an industry standard precision optical rail. Off-the-shelf optical elements can easily be added for beam shaping.

The FIBER ELEPHANT is specially designed for coupling fibers. The fiber mount is customized to the laser type. The FIBER ELEPHANT features a built in collimator with a focal length of 77 or 150 mm (other focal lengths on request). The distance between fiber end and collimator can be changed by a motorized axis.
### Specifications

<table>
<thead>
<tr>
<th>Fiber Elephant</th>
<th>Aperture (mm)</th>
<th>24</th>
<th>36</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step response time 1% of full scale (ms)</td>
<td></td>
<td>0.65</td>
<td>1.00</td>
<td>2.50</td>
</tr>
<tr>
<td>10% of full scale (ms)</td>
<td></td>
<td>0.55</td>
<td>1.00</td>
<td>2.25</td>
</tr>
<tr>
<td>100% of full scale (ms)</td>
<td></td>
<td>1.05</td>
<td>2.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Typical tracking error (µrad)</td>
<td></td>
<td>0.50</td>
<td>0.90</td>
<td>1.50</td>
</tr>
<tr>
<td>Repeatability (µrad)</td>
<td></td>
<td>&lt;0.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Interfaces

- **Digital**
  - 16 bit unidirectional
  - 16 bit bidirectional
  - Standard XY2-100 protocol
  - SPDIF protocol

<table>
<thead>
<tr>
<th>Mirror Coatings</th>
<th>Nd:YAG Laser 1064/532/355 nm</th>
<th>Co2 10600 nm, dielectric or enhanced Au on silicon substrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co2 10600 nm, dielectric or enhanced Au on silicon substrate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical Dimensions

- **aperture Ø A (mm)**
  - 6
  - 12
  - 18
  - 24
  - 36
- **Beam displacement X (mm)**
  - 6.8
  - 12.6
  - 18.4
  - 24.2
  - 35.7

#### Flat Field Lens

- Available for apertures up to 36 mm. For typical flat field lenses see data sheet RHINO. The FIBER ELEPHANT is a scan system substituting the flat field lens by a galvanometer controlled internal beam expander. The position of the small beam expansion lens is controlled fast and precisely with a galvanometer.

#### Options

- Vision box (1.5 kg) with c-mount or cs-mount
- Watercooled (0.3 kg)
- Thermal stability (50 g)
- High dynamic 31/28 and 45/42 mirror set
- Beryllium mirrors
- Protection window
- Extension box with:
  - Beam expander
  - Ultra fast attenuator
  - Polarisation angle control
  - Water cooled beam dump shutter

#### Mechanical Dimensions in mm [inches]

- ELEPHANT 6, 12, 18, 24, 36
- 1.05 [0.41]
- 2.50 [0.98]
- 12 [4.72]
- 18 [7.09]
- 24 [9.45]
- 36 [14.18]
- 1.00 [0.39]
- 1.65 [0.65]
- 4.00 [1.58]
- 18 [7.09]
- 30 [11.81]
- 60 [23.62]
- 3.50 [1.38]
- 6.00 [2.36]
- 2.00 [0.79]
- 3.50 [1.38]
- 6.00 [2.36]

#### Typical Internal Beam Expander Configurations

- Flat field lenses are available for apertures up to 36 mm. For typical flat field lenses see data sheet RHINO. The FIBER ELEPHANT is a scan system substituting the flat field lens by a galvanometer controlled internal beam expander. The position of the small beam expansion lens is controlled fast and precisely with a galvanometer.
REMOTE WELDING ELEPHANT Scan Head

The REMOTE WELDING ELEPHANT is a scan head using post objective scanning. The objective is a fast, precise and tilt-free galvanometer controlled beam expander with diffraction limited design is capable of adjusting the laser spot size on the target and laning new emerging 3D applications.

The scan heads 50 mm aperture dedicates it for high power fiber or fiber coupled lasers. The standard QBH fiber coupling module can be easily replaced by others.

A new feature for heavy duty use is the cross jet nozzle. It significantly reduces contamination and debris on the protection windows prolonging the service interval, thus reducing running cost. Auxiliary nozzles help to remove fume from the working area. Additionally the protection window is now mounted in a removable drawer for fast replacement.

To improve the teach-in procedures the scan head can be equipped with up to two camera devices. One camera provides an overall view of the scan field, the other one delivers a magnified picture of the processing area and can be used for precise aligning. An additional aiming cross laser assists in targeting the focal plane.

The easily detachable robot flange is available for robots of all major manufacturers.

Typical setups for remote welding with 600 μm focus diameter

other setups on request

<table>
<thead>
<tr>
<th>wavelength</th>
<th>nm</th>
<th>1020</th>
<th>1080</th>
</tr>
</thead>
<tbody>
<tr>
<td>fiber coupling</td>
<td>Optoskand QBH (others on request)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>transmission</td>
<td>%</td>
<td>&gt; 97</td>
<td></td>
</tr>
<tr>
<td>laser power</td>
<td>kW</td>
<td>3</td>
<td>4, 5, 6</td>
</tr>
<tr>
<td>min. feeding fiber</td>
<td>μm</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>XY-field *)</td>
<td>mm</td>
<td>4000 × 4000</td>
<td>1600 × 1600</td>
</tr>
<tr>
<td>Z-stroke *)</td>
<td>mm</td>
<td>925</td>
<td>370</td>
</tr>
<tr>
<td>working distance</td>
<td>mm</td>
<td>5000</td>
<td>2000</td>
</tr>
<tr>
<td>min. processing fiber</td>
<td>μm</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>XY-field *)</td>
<td>mm</td>
<td>1800 × 1800</td>
<td>900 × 900</td>
</tr>
<tr>
<td>Z-stroke *)</td>
<td>mm</td>
<td>400</td>
<td>200</td>
</tr>
<tr>
<td>working distance</td>
<td>mm</td>
<td>2200</td>
<td>1100</td>
</tr>
</tbody>
</table>
Dynamical Performance

positioning time *)
- 1% of XY-field
- 10% of XY-field
- 100% of XY-field
- 1% of Z-stroke
- 10% of Z-stroke
- 100% of Z-stroke

typical tracking error
repeatability
long term offset drift **)
typical scan angle
gain drift
offset drift
skew
linearity

all angles in optical degrees *) settling accuracy 0.1% of full scale **) constant ambient and load over 8 hours

Dimensions and Supply

width × depth × height *) mm³
weight *) kg
electrical
pneumatics
cooling **)
- water flow rate l/min
- temperature °C
- control

*) approximately, depending on configuration **) avoiding condensation