

More Information at:



smart drilling

SCANLAB's intelliDRILL[®] scan modules are optimized for laser-based material processing applications that require numerous positioning and processing steps (jump and shoot), e. g. drilling printed circuit boards or perforating foils. The modules' low-weight mirrors and digital servo electronics enable beam positioning with maximum speed and precision.

The servo jump algorithms achieve minimum travel times and precise settling performance even over the full range of distances. The intelliDRILL[®] modules are thus predestined for very high jump frequencies.

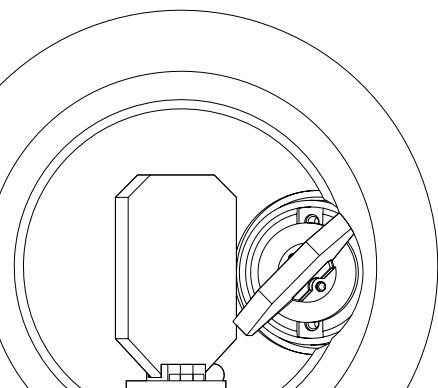
Water cooling of the products' scanners and electronics ensures reliability even under challenging operational conditions.

intelliDRILL[®] users benefit from a palette of features enabled by SCANLAB's iDRIVE[®] technology, including real-time monitoring and remote diagnosis of key operational states, internal monitoring capabilities, simulation-assisted process optimization and utilization of various dynamics tunings.

The scanners of intelliDRILL_{de}[®] scan modules are equipped with digital encoders and feature minimum drift values as well as lowest position noise.

Typical Applications:

- Drilling circuit boards
- Perforating foils
- Texturing surfaces



Optics

intelliDRILL® modules for CO₂ lasers are equipped with beryllium deflection mirrors. For beam focusing, a number of standard objectives and customer-specific solutions are available.

Control

Each intelliDRILL® module is equipped with two digital servo control boards and a digital interface board (20-bit SL2-100 interface or 16-bit XY2-100 Enhanced interface). The module can be conveniently controlled via SCANLAB's RTC®4 or RTC®5 PC interface board. Scanner control, scan head diagnosis and all essential configuration settings are achieved via software commands.

Quality

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

Option

- intelliDRILL® 20 and intelliDRILL_{de}® 20 also available with housing as a scan head

Common Specifications

(all angles are in optical degrees)

| | |
|------------------------------|--|
| Dynamic performance | |
| Repeatability (RMS) | < 2 µrad |
| Optical performance | |
| Typical scan angle | ±0.26 rad |
| Gain error | < 5 mrad |
| Zero offset | < 5 mrad |
| Power requirements | |
| | 48 V DC, max. 4 A or ±24 V DC, max. 4 A each |
| Interface | |
| | SL2-100 (20 bit) or XY2-100 Enhanced (16 bit) |
| Operating temperature | |
| | 25 °C ± 10 °C |
| Cooling water | |
| Temperature | 20 - 25 °C |
| Temperature variation | constant to ±1K |

Type-Dependent Specifications

(all angles are in optical degrees)

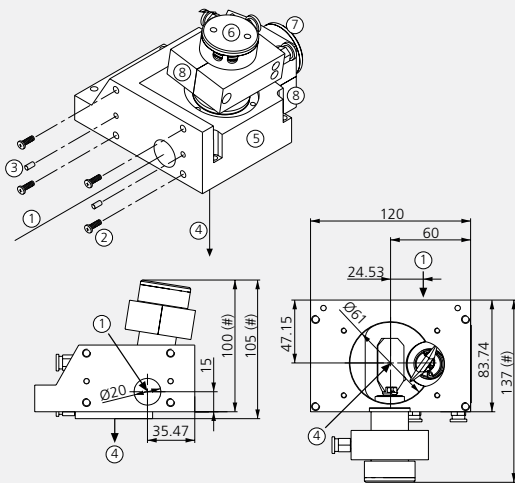
| | intelliDRILL® 20 | intelliDRILL _{de} ® 20 | intelliDRILL® 30 | intelliDRILL _{de} ® 30 |
|---|------------------|---------------------------------|------------------|---------------------------------|
| Aperture | 20 mm | 20 mm | 30 mm | 30 mm |
| Beam displacement | 24.53 mm | 24.53 mm | 37.12 mm | 37.12 mm |
| Step response ⁽¹⁾ | | | | |
| 1 mm pitch | 0.43 ms | 0.43 ms | 0.6 ms | 0.6 ms |
| 10 mm pitch | 1.5 ms | 1.5 ms | 2.0 ms | 2.0 ms |
| Via frequency for 1 mm raster ⁽¹⁾ | 2300 Hz | 2300 Hz | 1600 Hz | 1600 Hz |
| Positioning resolution ⁽²⁾ | 2.8 µrad | 1.3 µrad | 2.8 µrad | 0.83 µrad |
| Long-term drift over 8 hours ⁽³⁾ | < 0.6 mrad | < 0.1 mrad | < 0.6 mrad | < 0.1 mrad |
| Nonlinearity | < 3.5 mrad | < 0.5 mrad | < 3.5 mrad | < 0.5 mrad |
| Weight with electronics | approx. 3 kg | approx. 3 kg | approx. 4 kg | approx. 4 kg |

⁽¹⁾ positioning and settling to ±5 µm, with F-Theta objective, f = 100 mm

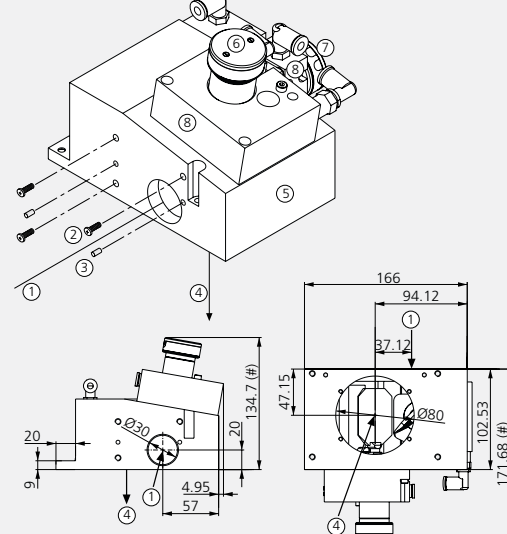
⁽²⁾ resolutions better than 11 µrad only together with SL2-100 interface

⁽³⁾ after warm-up

intelliDRILL® 20



intelliDRILL® 30



Legend

- Beam in
 - Screws *
 - Alignment pins *
 - Beam out
 - Galvanometer mounting block
 - Galvanometer 1
 - Galvanometer 2
 - Cooling blocks
- * not included

all dimensions in mm
(for intelliDRILL_{de}® modules, the dimensions marked with # are larger by up to 11 mm)