LaserTurn1

Linear/Rotary Motion Platform

Highly integrated linear/rotary motion platform
Pneumatically-actuated collet closer supports 0.1 mm to 7.9 mm O.D. materials with frictionless rotary union
Clear aperture for product feed-through
Standard front and rear tooling platforms
Direct-drive linear and rotary motor technology
Configure for wet or dry cutting

The LaserTurn®1 cylindrical laser machining system supports material from 0.1 mm to 7.9 mm in diameter, making it an ideal platform for the manufacture of cardiovascular and neural stents. The system can be configured for wet or dry cutting and includes options for material advance and bushing alignment platforms. The integrated linear-rotary system combines automated material handling functionality with high performance direct-drive linear and rotary motion.

Integral Tooling Platform
The LaserTurn1 includes standard front and rear tooling platforms with M4 mounting features. The tooling platforms are bolted directly to the base of the linear stage providing a stiff, monolithic, common inertial frame of reference. Fixtures such as bushing alignment assemblies, part collection, or automated material advance functions can be attached easily.

Automated Material Handling
The LaserTurn1 is a complete motion and material handling subsystem. The system includes an automated, pneumatically activated Type D collet closer. The collet closer has a clear aperture for product feed through and can support tubing diameters from 0.1 mm (0.0039 in) to 7.9 mm (0.3125 in) in dry cutting applications and up to 3 mm (0.118 in) when configured for wet cutting operation. The collet closer is designed to minimize axial tube motion during clamping operations by keeping the collet stationary and moving the tapered mating surface during collet open/close operation.

Direct-Drive Technology
The LaserTurn1 series utilizes direct-drive noncontact motor and encoder technology for both the linear and rotary axes. Direct-drive motors exhibit significantly higher throughput and maintenance-free operation when compared to gear and screw-driven technology. Linear and rotary encoders coupled directly to the load have the highest level of system accuracy and repeatability over the operating lifetime of the stage.

Noncontacting Labyrinth Cover Design
The overlapping hard cover design protects the linear stage of the LaserTurn1 from contact with fluids used in wet cutting processes. The sloped hard covers provide robust protection from fluid and machining byproduct ingress as well as incidental operator contact that may occur during part changeover.

Advanced Control Architecture
The LaserTurn1 is available with Aerotech’s advanced A3200 control system. The A3200 is a 100% digital system with high performance FireWire® networked drives. With this fully digital architecture it is possible to optimize the current, velocity, and position servo loops for maximum performance. Advanced trajectory generation capabilities such as multi-block look-ahead minimize geometry errors in tight profiles by transparently regulating cutting speed. Aerotech’s Position Synchronized Laser Firing Output (PSO) functionality automatically adjusts the laser pulse frequency to match the current cutting speed to maintain optimal laser power coupling.
# LaserTurn1 SPECIFICATIONS

## Mechanical Specifications

<table>
<thead>
<tr>
<th></th>
<th>Linear Axis</th>
<th>Rotary Axis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel</strong></td>
<td>100 mm</td>
<td>±360 deg. continuous</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>Calibrated: ±0.5 µm</td>
<td>±121 µrad (±25 arc sec)</td>
</tr>
<tr>
<td></td>
<td>Standard: ±2 µm</td>
<td>±20 µrad (±4 arc sec)</td>
</tr>
<tr>
<td><strong>Bidirectional Repeatability</strong></td>
<td>±0.2 µm</td>
<td>±20 µrad (±4 arc sec)</td>
</tr>
<tr>
<td><strong>Straightness</strong></td>
<td>±1 µm</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Flatness</strong></td>
<td>±1 µm</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Pitch</strong></td>
<td>25 µrad (5 arc sec)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Yaw</strong></td>
<td>15 µrad (3 arc sec)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Maximum Speed</strong>(1)</td>
<td>300 m/s</td>
<td>1000 rpm</td>
</tr>
<tr>
<td><strong>Tube Capacity</strong></td>
<td>N/A</td>
<td>7.9 mm (Dry Cut) 3.0 mm (Wet Cut)(2)</td>
</tr>
<tr>
<td><strong>Maximum Force (Continuous)</strong></td>
<td>30.6 N</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Maximum Torque (Continuous)</strong></td>
<td>N/A</td>
<td>0.48 N·m</td>
</tr>
<tr>
<td><strong>Load Capacity</strong>(3)</td>
<td>Axial 2 kg</td>
<td>Radial 0.5 kg</td>
</tr>
<tr>
<td></td>
<td>Moment 0.75 N·m</td>
<td></td>
</tr>
<tr>
<td><strong>Moving Mass (Unloaded)</strong></td>
<td>6 kg</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Rotor Inertia (Unloaded)</strong></td>
<td>N/A</td>
<td>0.0005 kg·m²</td>
</tr>
<tr>
<td><strong>Stage Mass with Tooling Platforms</strong></td>
<td>12 kg</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Collet Type</strong>(4)</td>
<td>N/A Type D (Levin)</td>
<td></td>
</tr>
<tr>
<td><strong>Collet Runout</strong>(5)</td>
<td>N/A &lt;30 µm</td>
<td></td>
</tr>
<tr>
<td><strong>Minimum System Air Pressure</strong>(6)</td>
<td>100 psig</td>
<td></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Hardcoated Aluminum Stage Body; Stainless Steel Collet Chuck</td>
<td></td>
</tr>
<tr>
<td><strong>MTBF (Mean Time Between Failure)</strong></td>
<td>10,000 Hours</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Maximum speed based on stage capability. Requires selection of appropriate amplifier with sufficient voltage and current.
2. Maximum tube diameter is reduced to 6.7 mm for dry cutting with the -WCRU (wet cut) option.
3. Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech if part load requirements exceed specifications.
4. Collect chuck accepts Type D collets (Levin Lathe and Sons™).
5. Measured TIR of precision gage pin chucked with an ultra-precision Type D collet 3 mm away from collet face at 80 psig applied air pressure and no load.
6. Collet chuck mechanism is normally-open. Collet mechanism required air to open collet chuck. Air supply much be dry and oil-less OR 99.99% pure nitrogen. Air or nitrogen must be filtered to 1 microns particle size or better.

## Electrical Specifications

<table>
<thead>
<tr>
<th>Drive System</th>
<th>Direct-drive servomotor</th>
</tr>
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<tbody>
<tr>
<td>Feedback System</td>
<td>Non-contact optical encoder, 1 Vpp Sinusoidal output</td>
</tr>
<tr>
<td>Maximum Bus Voltage</td>
<td>340 VDC</td>
</tr>
</tbody>
</table>

## Recommended Controller

| A3200                  | Npaq, Ndrive HLe, Ndrive HPe, Ndrive CP |

*The low moving mass and stiff mechanical structure provide the highest throughput and dynamic tracking accuracy in the LaserTurn series.*
LaserTurn 1 DIMENSIONS

LASERTURN1
-TYPE D COLLET

FRONT TOOLING PLATFORM (-FT1)
FRONT TOOLING PLATFORM WITH GRIPPER (-FT2)
FRONT TOOLING PLATFORM WITH RIGHT HAND ALIGNMENT GRIPPER (-FT3)
FRONT TOOLING PLATFORM WITH LEFT HAND ALIGNMENT GRIPPER (-FT4)

DIMENSIONS: MILLIMETERS

MCN REV.
DESCRIPTION DATE APPROVED
- NEW DRAWING PRODUCT RENAMED INCLUDES EPICOR PRODUCT CONFIGURATIONS 07-MAR-17 JHAAG

MODEL BY:
MODEL FILENAME:
LASERTURN1-ACS

PART CODE:
STAGE LAYOUT

PART NAME:
DWG. NO. REV
LASERTURN1
LASERTURN1-CAT

SHEET 1 OF 2
08-MAR-17
DATE
MSHOUPE
DRAWN JHAAG

NAME
CHECKED
ENG APPR. 08-MAR-17

07-MAR-17
LaserTurn1 ORDERING INFORMATION

Cutting Configuration (Required)
- DCUT  Dry cutting configuration
- WCUT  Wet cutting configuration with fluid rotary union

Front Tooling (Required)
- FT1  Front tooling platform
- FT2  Front tooling platform with gripper
- FT3  Front tooling platform with right-hand alignment gripper
- FT4  Front tooling platform with left-hand alignment gripper

Gripper Jaws (Optional)
- J1  Gripper jaws for 0-8 mm tube diameters

Metrology - Linear (Required)
- PL1  Metrology, uncalibrated with performance plots
- PL2  Metrology, calibrated (halar) with performance plots
  *Metrology option applies to linear axis only.*

Integration (Required)
Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire custom integration support with your system.

<table>
<thead>
<tr>
<th>Integration - Test as system</th>
<th>Integration - Test as components</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAS</td>
<td>Testing and integration of individual items as discrete components. This is typically used for spare parts, replacement parts, or items that will not be used or shipped together (ex: stage only). These components may or may not be part of a larger system.</td>
</tr>
</tbody>
</table>

Accessories (ordered as separate items)
Collet-D-CLTxx  Levin type D collet, 0.1 mm to 8 mm part diameter sizes available
RingSeal-D-RSxx  Ring seal for wet cutting - consult with Aerotech for available sizes
CGF  *Collet and Gripper Filtration Kit*