

LaserTurn Series

Laser Machining System

High integration linear/rotary motion platform

Pneumatically actuated 3-jaw gripper or ER collet

Clear aperture for product feedthrough

Optional front and rear tooling platforms

Direct-drive linear and rotary motor technology



The LaserTurn™ series of products are the first dedicated motion subsystems targeted directly at cylindrical laser processing applications. The integrated linear-rotary system combines automated material handling functionality with high performance direct-drive linear and rotary motion.

Integral Tooling Platform

The LaserTurn™ series can be equipped with front and rear tooling platforms that include tapped holes on four surfaces for various fixture mounting. The tooling platform is bolted directly to the base of the linear stage providing a stiff, common inertial frame of reference. Custom fixtures such as bushing alignment, part collection, or automated material advance assemblies can easily be attached. Metric or English-based hardware and hole patterns are available as are custom configurations with application specific features.

Automated Material Handling

The LaserTurn™ is a complete motion and material handling subsystem. The system includes an automated, pneumatically activated 3-jaw gripper or ER collet for part holding. The 3-jaw gripper has a clear aperture for product feedthrough and can be configured for O.D., I.D., or odd form gripping with various jaw geometries. The ER collet chuck also has a clear aperture for product feedthrough and can support tubing diameters from 1 mm (0.039 inch) to 30 mm (1.18 inch).

Direct-Drive Technology

The LaserTurn™ 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.

Scalable Product Solutions

Two platforms, the LaserTurn™ 2 and the LaserTurn™ 5, are available to provide support for different price and performance requirements. Each product features the automated material handling capabilities and modular tooling platforms. The LaserTurn™ 2 has a smaller overall footprint and reduced load carrying capability while providing similar accuracy and repeatability to the larger LaserTurn™ 5.

The LaserTurn™ 5's deeper cross section and larger bearings provide higher throughput and dynamic tracking accuracy for a given load when compared to the LaserTurn™ 2.

Advanced Control Architecture

The LaserTurn™ 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.

LaserTurn 2 ASR Series SPECIFICATIONS



Standard and custom tooling platforms available at the front and rear for simple integration of application specific fixtures. Shown with optional 3 jaw gripper for large diameter or odd-form materials.

LaserTurn™ 2 ASR Series		Linear Axis		Rotary Axis
Travel		200 mm	300 mm	360° Continuous
Maximum Speed ⁽¹⁾		2 m/s		600 rpm
Collet Type ⁽²⁾		ER16		
Maximum Aperture		10.0 mm (ER16-Dry Cut); 5.8 mm (ER16-Wet Cut)		
Accuracy	LN	±5.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾		±15.0 arc sec
	LT	±8.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾	±12.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾	
Repeatability	LN	±0.5 µm		±3.0 arc sec
	LT	±0.5 µm		
Straightness/Flatness (Max Deviation)	HALSF	±1.5 µm	±2.0 µm	NA
	Standard	±4.0 µm	±6.0 µm	
Pitch		8.0 arc sec	12.0 arc sec	NA
Yaw		8.0 arc sec	12.0 arc sec	NA
Pin/Collet Runout ⁽⁴⁾		NA		<25 µm
Max Load ⁽⁵⁾		30 N (Axial); 20 N (Radial)		
Stage Mass With Tooling Platforms		26 kg	30 kg	NA
Minimum System Air Pressure ⁽⁶⁾		120 psig		
Finish		Black Hardcoat/Black Anodize (Stage/Body); Hardened 440C Stainless Steel/NiCoTef (Collet Chuck)		

Note:

1. Maximum speed is based on stage capability. Actual speed may be limited by system data rate, resolution, or amplifier selection.
2. LaserTurn™ 2 ASR collet chuck accepts Rego-Fix ER collets manufactured to DIN6499 specifications only.
3. Available with Aerotech controllers.
4. Measured TIR of precision gage pin chucked with an ultraprecision ER collet (DIN6499) 10 mm away from collet face.
5. Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech directly if part load requirement exceeds specifications.
6. Collet chuck mechanism is normally-closed. Collet mechanism requires air to open collet chuck. Air supply must be dry (0° F dew point) oil-less air OR 99.99% pure nitrogen. Air or nitrogen must be filtered to 0.25 micron particle size or better.

LaserTurn 5 ASR/ACS Series SPECIFICATIONS

LaserTurn™ 5 ASR Series		Linear Axis		Rotary Axis
Travel		200 mm	300 mm	360° Continuous
Maximum Speed ⁽¹⁾		2 m/s		600 rpm
Collet Type ⁽²⁾		ER16		
Maximum Aperture		10.0 mm (ER16-Dry Cut); 5.8 mm (ER16-Wet Cut)		
Accuracy	LN	±5.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾		±15.0 arc sec
	LT	±8.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾	±12.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾	
Repeatability	LN	±0.5 µm		±3.0 arc sec
	LT	±0.5 µm		
Straightness/Flatness (Max Deviation)	HALSF	±1.0 µm	±1.5 µm	NA
	Standard	±2.0 µm	±3.0 µm	
Pitch		8.0 arc sec	10.0 arc sec	NA
Yaw		8.0 arc sec	10.0 arc sec	NA
Pin/Collet Runout ⁽⁴⁾		NA		<25 µm
Max Load ⁽⁵⁾		30 N (Axial); 20 N (Radial)		
Stage Mass With Tooling Platforms		65 kg	69 kg	NA
Minimum System Air Pressure ⁽⁶⁾		120 psig		
Finish		Black Hardcoat/Black Anodize (Stage/Body); Hardened 440C Stainless Steel/NiCoTef (Collet Chuck)		

Note:

- Maximum speed is based on stage capability. Actual speed may be limited by system data rate, resolution, or amplifier selection.
- LaserTurn™ 5 ASR collet chuck accepts Rego-Fix ER collets manufactured to DIN6499 specifications only.
- Available with Aerotech controllers.
- Measured TIR of precision gage pin chucked with an ultraprecision ER collet (DIN6499) 10 mm away from collet face.
- Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech directly if part load requirement exceeds specifications.
- Collet chuck mechanism is normally-closed. Collet mechanism requires air to open collet chuck. Air supply must be dry (0° F dew point) oil-less air OR 99.99% pure nitrogen. Air or nitrogen must be filtered to 0.25 micron particle size or better.

LaserTurn™ 5 ACS Series		Linear Axis		Rotary Axis
Travel		200 mm	300 mm	360° Continuous
Maximum Speed ⁽¹⁾		2 m/s		300 rpm
Collet Type ⁽²⁾		ER25, ER40		
Maximum Aperture		0.05-16.0 mm (ER25); 16.0-30.0 mm (ER40)		
Accuracy	LN	±5.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾		±30.0 arc sec (standard); ±5.0 arc sec (HALAR) ^{(3),(4)}
	LT	±8.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾	±12.0 µm (standard); ±1.0 µm (HALAR) ⁽³⁾	
Repeatability	LN	±0.5 µm		±6.0 arc sec (standard); ±3.0 arc sec (HALAR) ^{(3),(4)}
	LT	±0.5 µm		
Straightness/Flatness (Max Deviation)	HALSF	±1.0 µm	±1.5 µm	NA
	Standard	±2.0 µm	±3.0 µm	
Pitch		8.0 arc sec	10.0 arc sec	NA
Yaw		8.0 arc sec	10.0 arc sec	NA
Pin/Collet Runout ⁽⁵⁾		NA		<25 µm
Max Load ⁽⁶⁾		100 N (Axial); 50 N (Radial); 20 N (Moment)		
Stage Mass With Tooling Platforms		70 kg	75 kg	NA
Minimum System Air Pressure ⁽⁷⁾		120 psig		
Finish		Black Hardcoat/Black Anodize (Stage/Body); Hardened 440C Stainless Steel/NiCoTef (Collet Chuck)		

Note:

- Maximum speed is based on stage capability. Actual speed may be limited by system data rate, resolution, or amplifier selection.
- LaserTurn™ 5 ACS collet chuck accepts Rego-Fix ER collets manufactured to DIN6499 specifications only. The collet type (ER25 or ER40) must be specified at the time of order.
- Available with Aerotech controllers.
- Requires HALAR and part programming as rotary axis.
- Measured TIR of precision gage pin chucked with an ultraprecision ER collet (DIN6499) 10 mm away from collet face.
- Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech directly if part load requirement exceeds specifications.
- Collet chuck mechanism is normally-closed. Collet mechanism requires air to open collet chuck. Air supply must be dry (0° F dew point) oil-less air OR 99.99% pure nitrogen. Air or nitrogen must be filtered to 0.25 micron particle size or better.

LaserTurn 2/5 ORDERING INFORMATION

Ordering Example

LaserTurn	-5	-ACS	-300	-LT30AS	-NC	-3JC	-FNTP	-RNTP	-J0-10		
Series	Stage	Rotary Axis	Travel	Linear Encoder	Limit	Chuck	Front Tooling	Rear Tooling	Gripper Jaws	Pneumatics (Optional)	Wet Cut (Optional)
	-5	-ASR	-200	-LT20AS		-ER16	-FNTP		-J0-10		
	-2	-ACS	-300	-LN20AS	-NC	-ER25	-FMTP	-RNTP	-J8-18	-PNG	
				-LT30AS		-ER40	-FUTP	-RMTP	-J16-26	-PN	-WC
				-LN30AS		-3JC	-FMTP-AG	-RUTP	-J24-34		
							-FUTP-AG		-J32-40		
							-FUTP-G				

LaserTurn™ Laser Machining System

Stage Configuration

-5	LaserTurn 5 Series base linear axis
-2	LaserTurn 2 Series base linear axis

Rotary Axis Configuration Option

-ASR	Rotary axis based on ASR1100/ASR1200 equivalent stage
-ACS	Rotary axis based on ACS-150 equivalent stage

Travel Options

-200	200 mm (7.87 in) linear axis travel
-300	300 mm (11.81 in) linear axis travel

Linear Encoder

-LT20AS	Linear encoder for 200 mm travel LaserTurn; amplified sine output
-LN20AS	High accuracy, high-resolution linear encoder for 200 mm travel LaserTurn; amplified sine output
-LT30AS	Linear encoder for 300 mm travel LaserTurn; amplified sine output
-LN30AS	High accuracy, high-resolution linear encoder for 300 mm travel LaserTurn; amplified sine output

Limit Configuration

-NC	Normally-closed end of travel limit switches
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Chuck Options

-ER16	ER16 collet chuck; supports 0.5 mm to 10 mm tubing; available on LaserTurn 2 ASR and LaserTurn 5 ASR
-ER25	ER25 collet chuck; supports 0.5 mm to 16 mm tubing; only available on LaserTurn 5 ACS
-ER40	ER40 collet chuck; supports 16 mm to 30 mm tubing; only available on LaserTurn 5 ACS
-3JC	3-jaw gripper with 8 mm jaw stroke and 20 mm clear aperture; only available on LaserTurn 5 ACS

LaserTurn 2/5 ACS/ASR Series ORDERING INFORMATION

Front Tooling Options

-FNTP	No front tooling platform
-FMTP	Front tooling platform; metric hole pattern
-FUTP	Front tooling platform; English hole pattern
-FMTP-AG	Front tooling platform; metric hole pattern; alignment and gripper assembly
-FMTP-G	Front tooling platform; metric hole pattern; with gripper assembly
-FUTP-AG	Front tooling platform; English hole pattern; alignment and gripper assembly
-FUTP-G	Front tooling platform; English hole pattern; with gripper assembly

Rear Tooling Options

-RNTP	No rear tooling platform
-RMTP	Rear tooling platform; metric tooling pattern
-RUTP	Rear tooling platform; English tooling pattern

Gripper Jaws for Material Advance (Optional)

-J0-10	Parallel gripper jaws; 0-10 mm diameter
-J8-18	Parallel gripper jaws; 8-18 mm diameter
-J16-26	Parallel gripper jaws; 16-26 mm diameter
-J24-34	Parallel gripper jaws; 24-34 mm diameter
-J32-40	Parallel gripper jaws; 32-40 mm diameter

Pneumatics (Optional)

-PNG	Air dryer/filter, regulators, solenoid valves and relays for gripper and collet actuation
-PN	Air dryer/filter, regulator, solenoid valve and relay for collet actuation

Wet Cut (Optional)

-WC	LaserTurn 2 and LaserTurn 5 wet cut option; valid only with ER16 and ER25 collets
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LaserTurn CADs

Contact Aerotech factory for CADs