

# LaserTurn2 and LaserTurn5

## Linear/Rotary Motion Platform

High integration linear/rotary motion platform

Pneumatically actuated 3-jaw gripper or ER collet

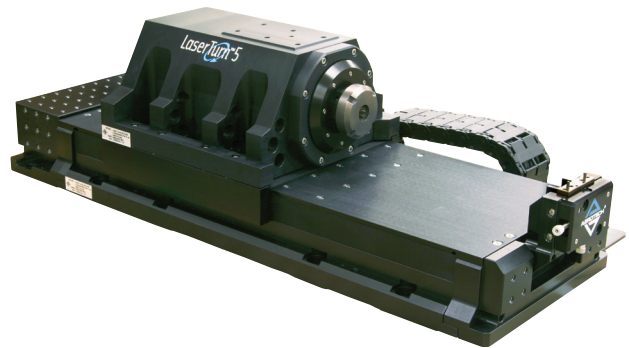
Clear aperture for product feedthrough

Optional front and rear tooling platforms

Direct-drive linear and rotary motor technology

Configure for wet or dry cutting

High-speed rotary option for rotational speeds up to 2000 rpm



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 and wet cutting operation with high performance direct-drive linear and rotary motion. The pneumatically actuated 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, while the ER collet supports tubing diameters from 0.5 mm to 30 mm.

### 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 0.5 mm (0.020 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

Three platforms – the LaserTurn™1, 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.

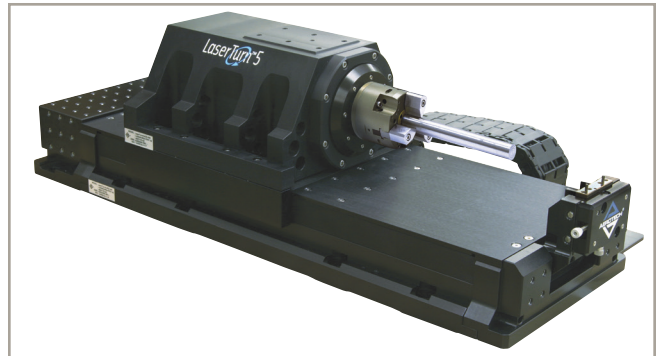
The LaserTurn™5's deeper cross section and larger bearings provide higher throughput and dynamic tracking accuracy for a given load when compared to the LaserTurn™ 2.

### Advanced Control Architecture

The LaserTurn™ is available with a powerful, yet intuitive Aerotech's advanced control system, with which a user can conveniently optimize the current, velocity, and position servo loops for maximum performance. Advanced

## LaserTurn2/LaserTurn5

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.



*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.*

## LaserTurn2 SPECIFICATIONS

Mechanical Specifications		Linear Axis		Rotary Axis
Travel		200 mm	300 mm	±360 deg. continuous
Accuracy	With -E2 Encoder Option	Calibration: ±1 µm Uncalibrated: ±5 µm		±73 µrad (±15 arc sec)
	With -E1 Encoder Option	Calibrated: ±1 µm Uncalibrated: ±8 µm	Calibrated: ±1 µm Uncalibrated: ±12 µm	
Bidirectional Repeatability		±0.5 µm		±15 µrad (±3 arc sec)
Straightness		±4 µm	±6 µm	N/A
Flatness		±4 µm	±6 µm	N/A
Pitch		39 µrad (8 arc sec)	58 µrad (12 arc sec)	N/A
Yaw		39 µrad (8 arc sec)	58 µrad (12 arc sec)	N/A
Maximum Speed <sup>(1)</sup>		2 m/s		800 rpm 2000 rpm (-HS option)
Tube Capacity		N/A		10 mm (ER16, Dry Cut) 5.8 mm (ER16, Wet Cut)
Maximum Force (Continuous)		106.7 N		N/A
Maximum Torque (Continuous)		N/A		2.3 N·m (Dry Cut) 1.6 N·m (Wet Cut)
Load Capacity <sup>(2)</sup>	Axial	3.0 kg		
	Radial	2.0 kg		
	Moment	3 N·m		
Moving Mass (Unloaded)		10 kg		N/A
Rotor Inertia (Unloaded)		N/A		0.0006 kg·m <sup>2</sup>
Stage Mass with Tooling Platforms		26 kg	30 kg	N/A
Collet Type <sup>(3)</sup>		N/A		ER16
Collet Runout <sup>(4)</sup>		N/A		<25 µm
Minimum System Air Pressure <sup>(5)</sup>		100 psig		
Material		Hardcoated Aluminum Stage Body; Stainless Steel Collet Chuck		
MTBF (Mean Time Between Failure)		10,000 Hours		

## Notes:

1. Maximum speed based on stage capability. Requires selection of appropriate amplifier with sufficient voltage and current.
2. Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech if part load requirements exceed specifications.
3. Collet chuck accepts Rego-fix ER collets manufactured to DIN6499 specifications only.
4. Measured TIR of precision gage pin chucked with an ultra-precision ER collet (DIN6499) 10 mm away from collet face.
5. Collet chuck mechanism is normally-closed. Collet mechanism required air to open collet chuck. Air supply must 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	
Drive System	Direct-drive servomotor
Feedback System	Non-contact optical encoder, 1 Vpp Sinusoidal output
Maximum Bus Voltage	340 VDC

Recommended Controller	
A3200	Npaq Ndrive HLe Ndrive HPe Ndrive CP

## LaserTurn5 ASR SPECIFICATIONS

Mechanical Specifications		Linear Axis		Rotary Axis
Travel		200 mm	300 mm	±360 deg. continuous
Accuracy	With -E2 Encoder Option	Calibrated: ±1 µm Uncalibrated: ±5 µm		±73 µrad (±15 arc sec)
	With -E1 Encoder Option	Calibrated: ±1 µm Uncalibrated: ±8 µm	Calibrated: ±1 µm Uncalibrated: ±12 µm	
Bidirectional Repeatability		±0.5 µm		±15 µrad (±3 arc sec)
Straightness		±2 µm	±3 µm	N/A
Flatness		±2 µm	±3 µm	N/A
Pitch		39 µrad (8 arc sec)	49 µrad (10 arc sec)	N/A
Yaw		39 µrad (8 arc sec)	49 µrad (10 arc sec)	N/A
Maximum Speed <sup>(1)</sup>		2 m/s		800 rpm 2000 rpm (-HS option)
Tube Capacity		N/A		10 mm (ER16, Dry Cut) 5.8 mm (ER16, Wet Cut)
Maximum Force (Continuous)		197.2 N		N/A
Maximum Torque (Continuous)		N/A		2.3 N·m (Dry Cut) 1.6 N·m (Wet Cut)
Load Capacity <sup>(2)</sup>	Axial	3.0 kg		
	Radial	2.0 kg		
	Moment	3 N·m		
Moving Mass (Unloaded)		18 kg		N/A
Rotor Inertia (Unloaded)		N/A		0.0006 kg·m <sup>2</sup>
Stage Mass with Tooling Platforms		65 kg	69 kg	N/A
Collet Type <sup>(3)</sup>		N/A		ER16
Collet Runout <sup>(4)</sup>		N/A		<25 µm
Minimum System Air Pressure <sup>(5)</sup>		100 psig		
Material		Hardcoated Aluminum Stage Body; Stainless Steel Collet Chuck		
MTBF (Mean Time Between Failure)		10,000 Hours		

## Notes:

1. Maximum speed based on stage capability. Requires selection of appropriate amplifier with sufficient voltage and current.
2. Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech if part load requirements exceed specifications.
3. Collect chuck accepts Rego-fix ER collets manufactured to DIN6499 specifications only.
4. Measured TIR of precision gage pin chucked with an ultra-precision ER collet (DIN6499) 10 mm away from collet face.
5. Collet chuck mechanism is normally-closed. Collet mechanism required air to open collet chuck. Air supply must 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	
Drive System	Direct-drive servomotor
Feedback System	Non-contact optical encoder, 1 Vpp Sinusoidal output
Maximum Bus Voltage	340 VDC

Recommended Controller	
A3200	Npaq Ndrive HLe Ndrive HPe Ndrive CP

## LaserTurn5 ACS Series SPECIFICATIONS

Mechanical Specifications		Linear Axis		Rotary Axis
Travel		200 mm	300 mm	±360 deg. continuous
Accuracy	With -E2 Encoder Option	Calibrated: ±1 µm Uncalibrated: ±5 µm		Calibrated <sup>(1)</sup> : ±24 µrad (±5 arc sec) Uncalibrated: ±146 µrad (±30 arc sec)
	With -E1 Encoder Option	Calibrated: ±1 µm Uncalibrated: ±8 µm	Calibrated: ±1 µm Uncalibrated: ±12 µm	
Bidirectional Repeatability		±0.5 µm		±15 µrad (±3 arc sec)
Straightness		±2 µm	±3 µm	N/A
Flatness		±2 µm	±3 µm	N/A
Pitch		39 µrad (8 arc sec)	49 µrad (10 arc sec)	N/A
Yaw		39 µrad (8 arc sec)	49 µrad (10 arc sec)	N/A
Maximum Speed <sup>(2)</sup>		2 m/s		300 rpm
Tube Capacity		N/A		0.5-16 mm (ER25, Dry Cut) 1-12 mm (ER25, Wet Cut) 16-30 mm (ER40)
Maximum Force (Continuous)		197.2 N		N/A
Maximum Torque (Continuous)		N/A		5.06 N·m
Load Capacity <sup>(3)</sup>	Axial	10 kg (ER25), 15 kg (ER40)		
	Radial	5 kg (ER25), 10 kg (ER40)		
	Moment	6 kg (ER25), 12 kg (ER40)		
Moving Mass (Unloaded)		23 kg		N/A
Rotor Inertia (Unloaded)		N/A		0.006 kg·m <sup>2</sup>
Stage Mass with Tooling Platforms		70 kg	75 kg	N/A
Collet Type <sup>(4)</sup>		N/A		ER25, ER40
Collet Runout <sup>(5)</sup>		N/A		<25 µm
Minimum System Air Pressure <sup>(6)</sup>		100 psig		
Material		Hardcoated Aluminum Stage Body; Stainless Steel Collet Chuck		
MTBF (Mean Time Between Failure)		10,000 Hours		

## Notes:

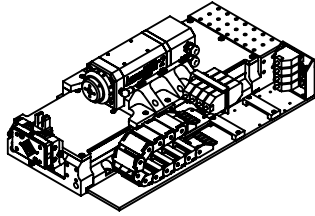
- Requires Aerotech controller and part programming as a rotary axis.
- Maximum speed based on stage capability. Requires selection of appropriate amplifier with sufficient voltage and current.
- Maximum loads are mutually exclusive. Loading limits are due to the collet chuck mechanism. Contact Aerotech if part load requirements exceed specifications.
- Collet chuck accepts Rego-fix ER collets manufactured to DIN6499 specifications only.
- Measured TIR of precision gage pin chucked with an ultra-precision ER collet (DIN6499) 10 mm away from collet face.
- Collet chuck mechanism is normally-closed. Collet mechanism required air to open collet chuck. Air supply must 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	
Drive System	Direct-drive servomotor
Feedback System	Non-contact optical encoder, 1 Vpp Sinusoidal output
Maximum Bus Voltage	340 VDC

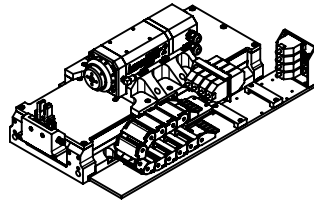
Recommended Controller	
A3200	Npaq Ndrive HLe Ndrive HPe Ndrive CP

# LaserTurn 2 ASR DIMENSIONS

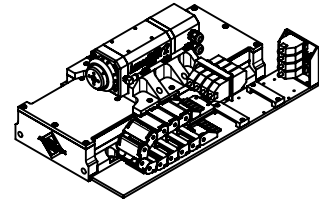
## LaserTurn2 (ER16 COLLET)



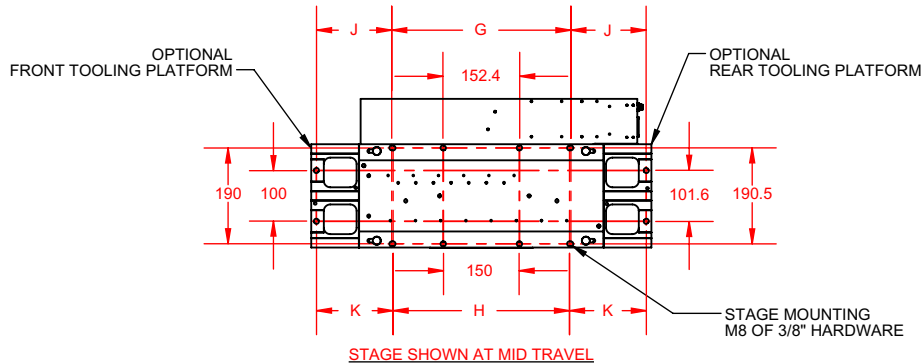
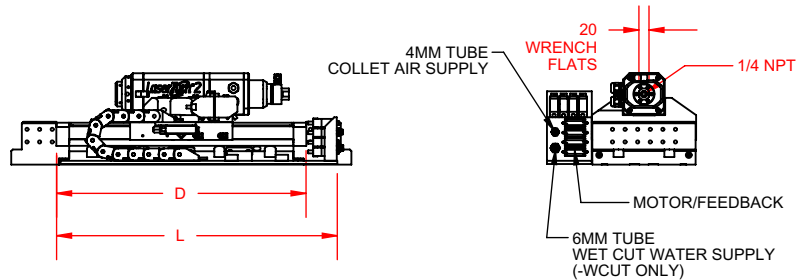
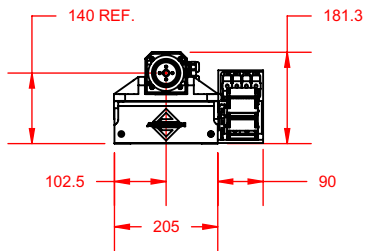
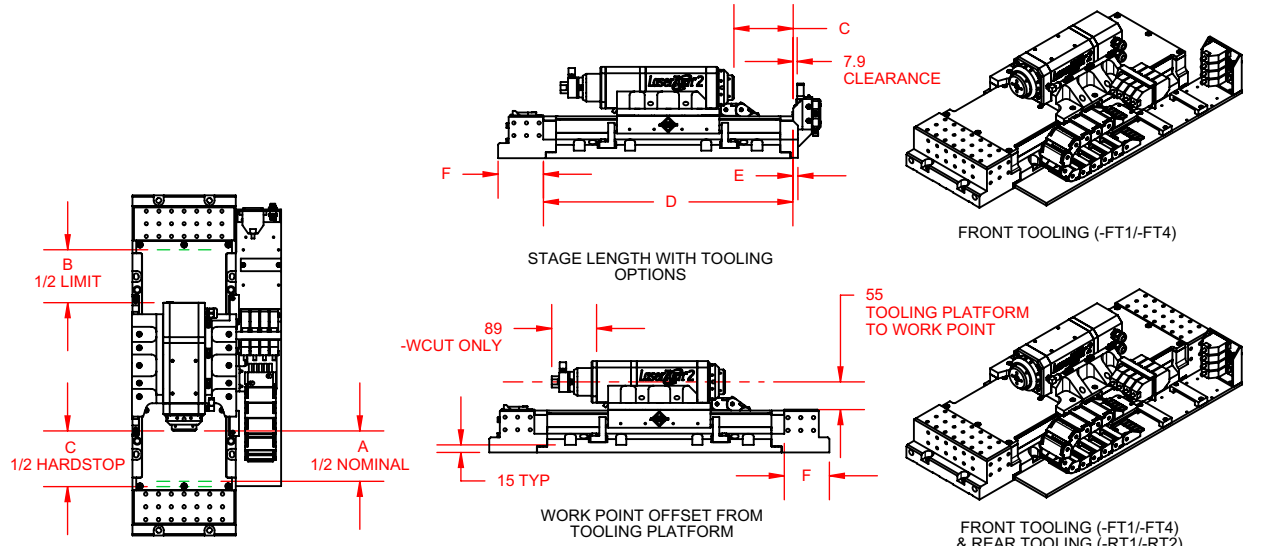
FRONT ALIGNMENT GRIPPER (-FT3/-FT6)  
W/ REAR TOOLING PLATFORM (-RT1/-RT2)



FRONT GRIPPER (-FT2/-FT5)

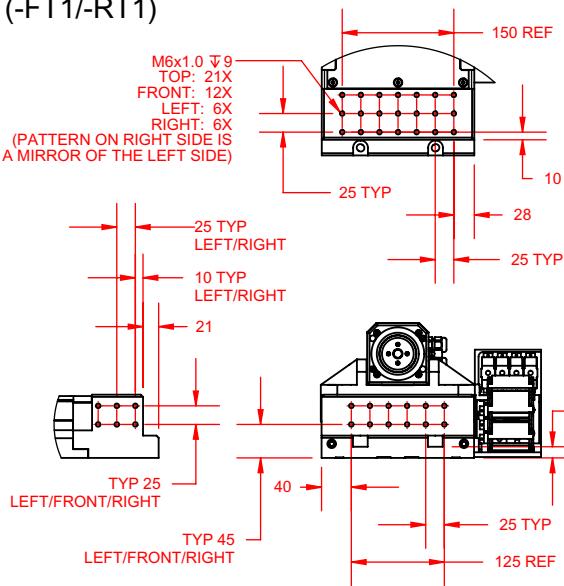


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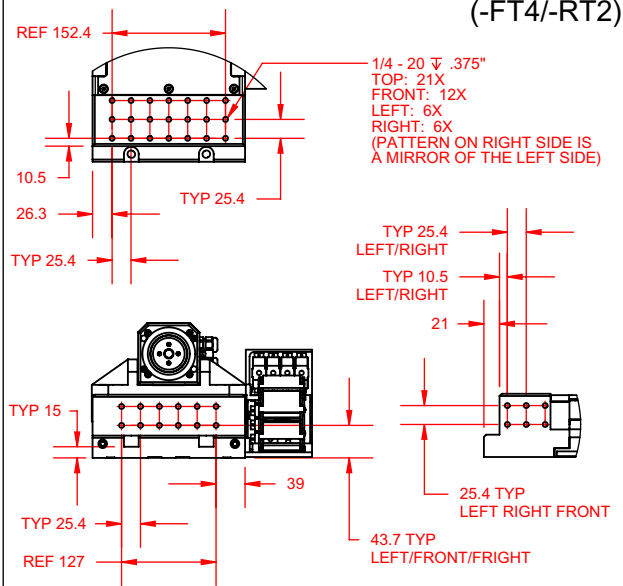


BASE MODEL	TRAVEL	A	B	C	D	E	F	G	H	J	K	L
LaserTurn2-200	200	100	105	110	495	12.5	89.5	355.6	350	149.2	152.5	557
LaserTurn2-300	300	150	155	160	595	12.5	89.5	457.2	450	148.4	152.5	657

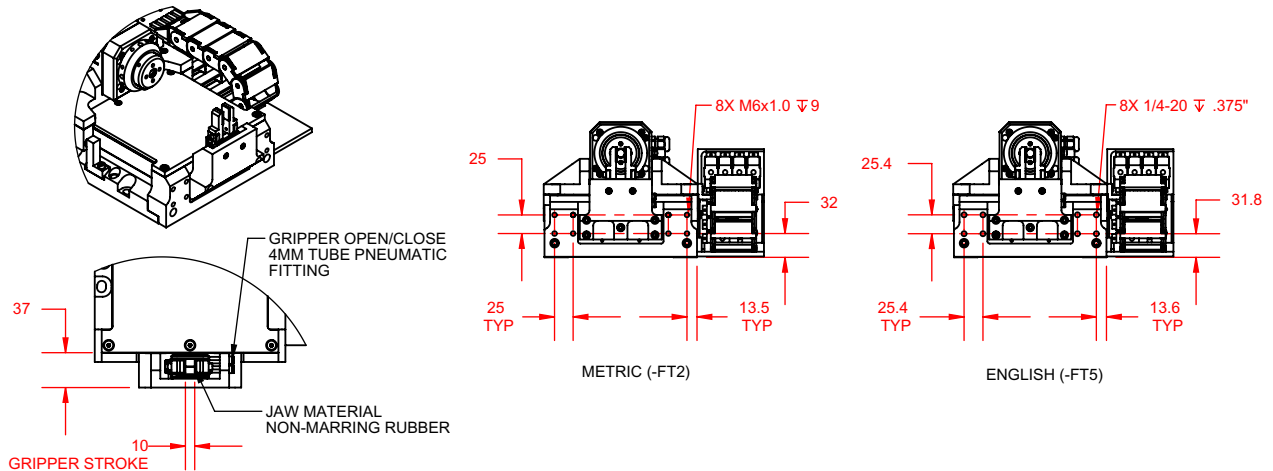
TOOLING PLATFORM, *METRIC*  
(-FT1/-RT1)



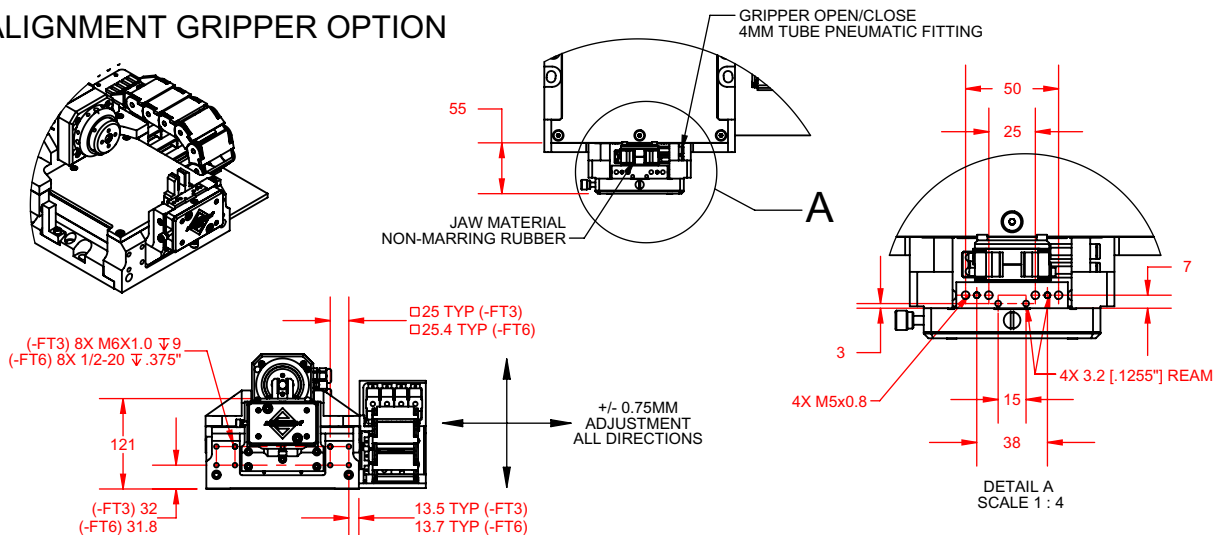
TOOLING PLATFORM, *ENGLISH*  
(-FT4/-RT2)



GRIPPER OPTION

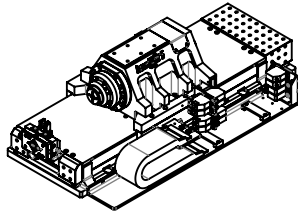


ALIGNMENT GRIPPER OPTION

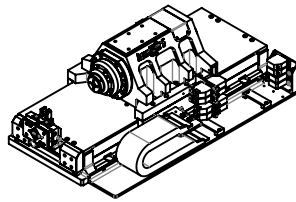


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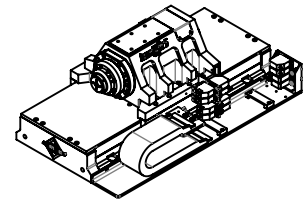
## LaserTurn5-ASR ER16 COLLET



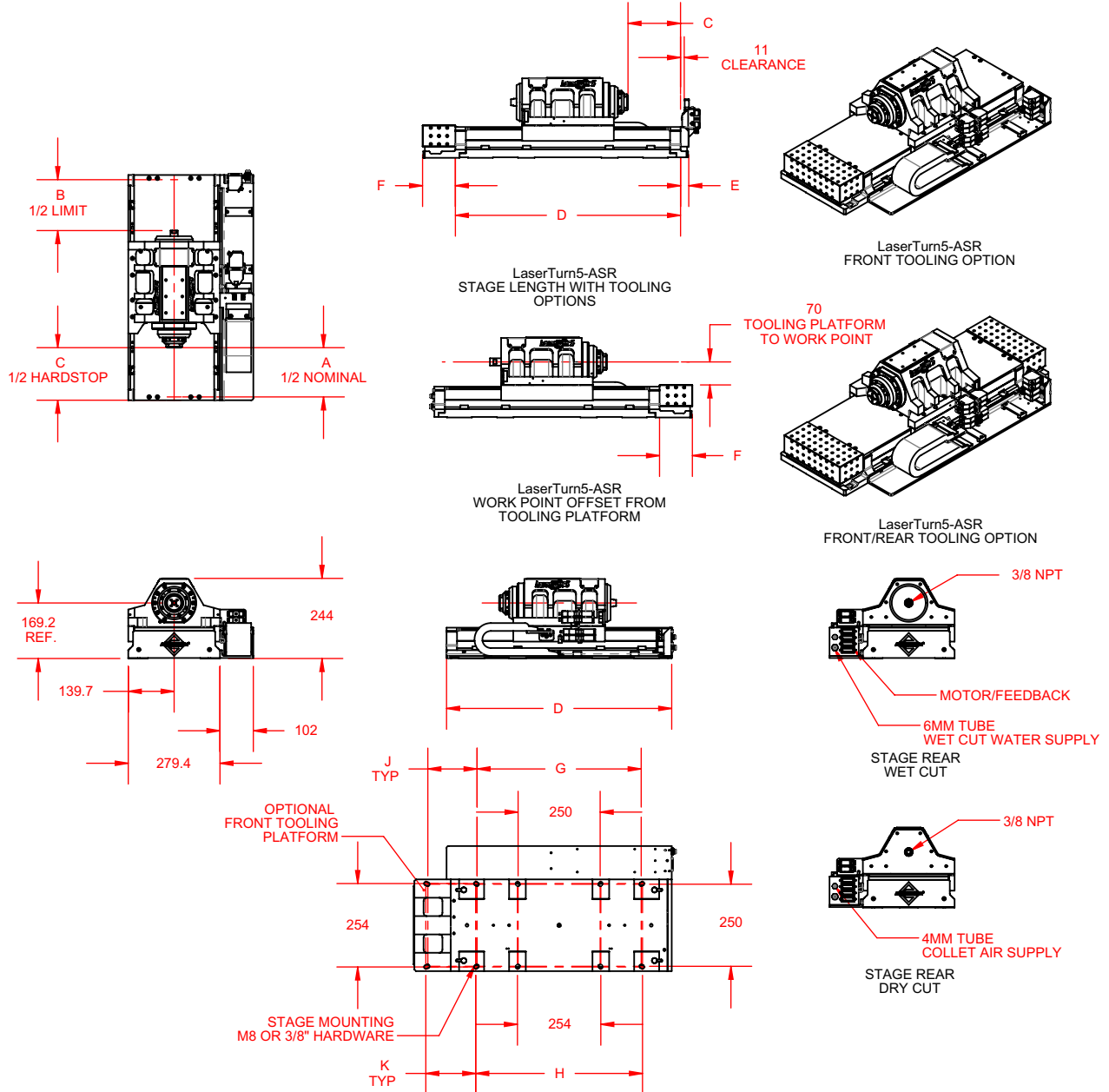
LaserTurn5-ASR  
FRONT GRIPPER w/ REAR TOOLING OPTION



LaserTurn5-ASR  
FRONT GRIPPER TOOLING OPTION



LaserTurn5-ASR  
NO TOOLING OPTION

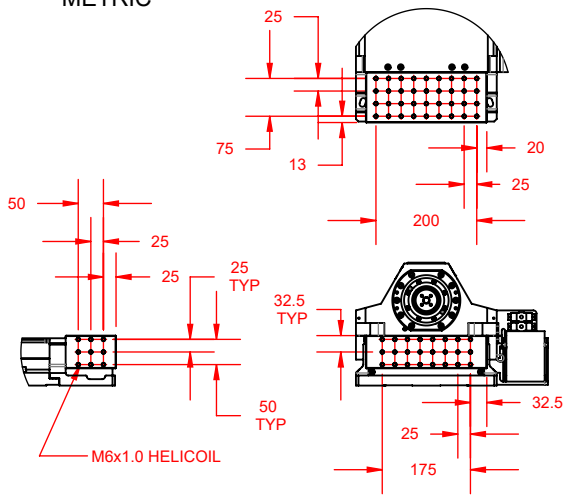


DIMENSIONS - MILLIMETER

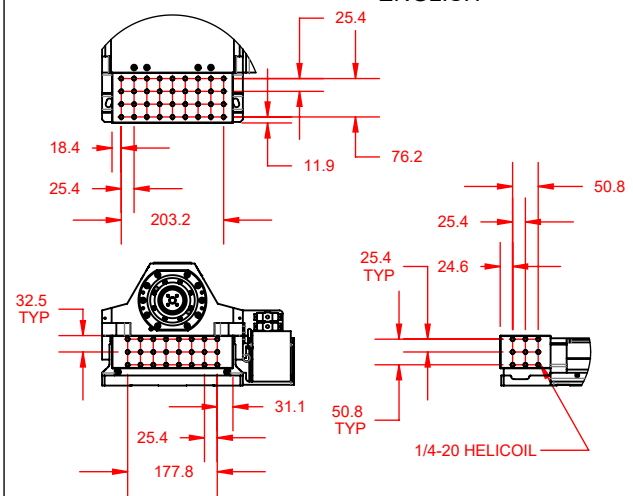
BASE MODEL	TRAVEL	A	B	C	D	E	F	G	H	J	K
LaserTurn5-ASR-200	200	100	105	110	586	25	100	450	457.2	125	127
LaserTurn5-ASR-300	300	150	155	160	686	25	100	500	508	150	152.4



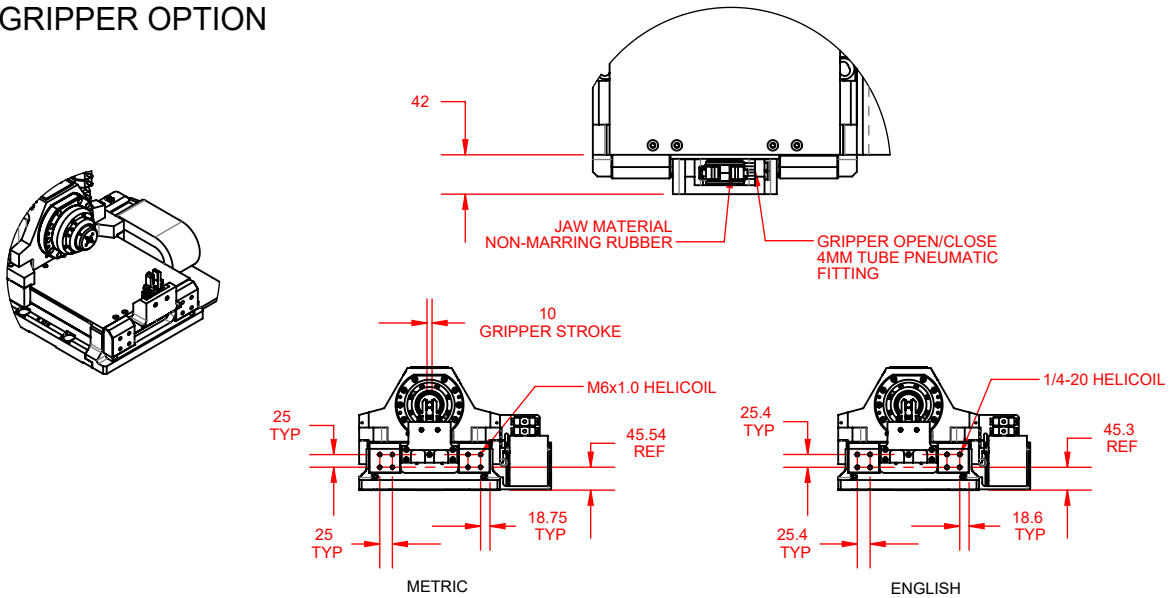
TOOLING PLATFORM  
METRIC



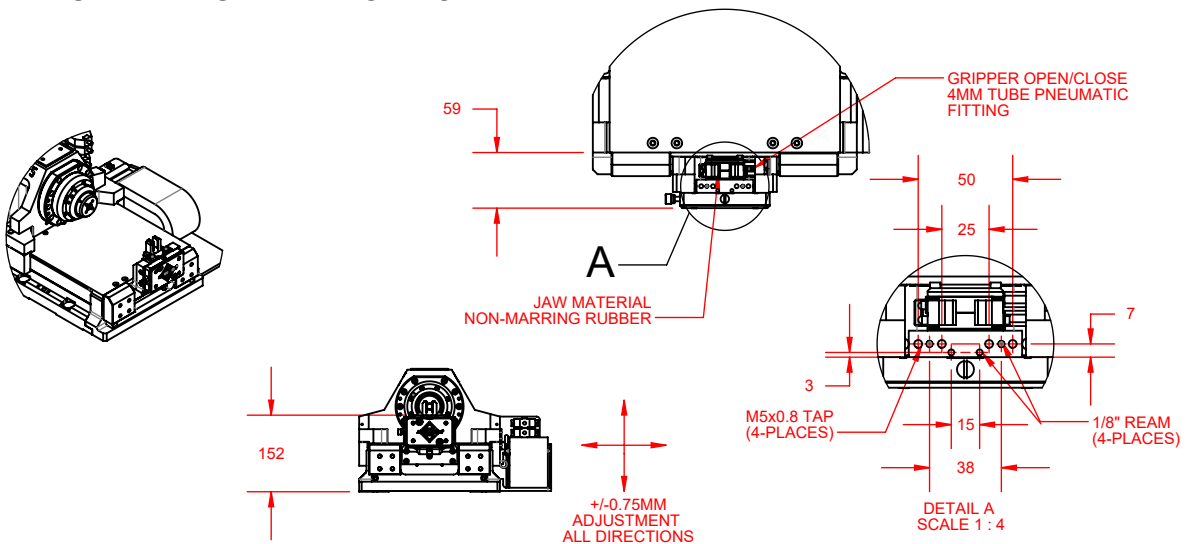
TOOLING PLATFORM  
ENGLISH



GRIPPER OPTION

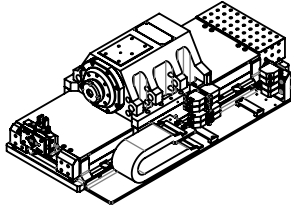


ALIGNMENT GRIPPER OPTION

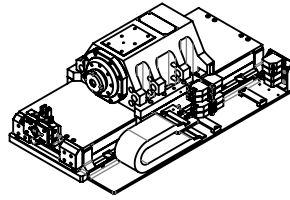


# LaserTurn 5 ACS DIMENSIONS

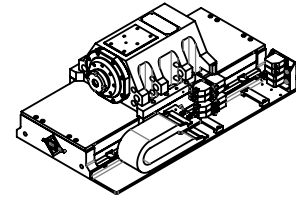
## LaserTurn5-ACS -ER25 & -ER40 COLLET



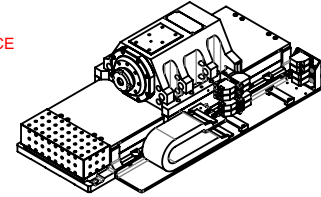
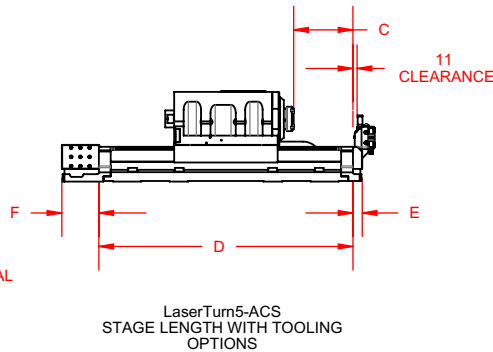
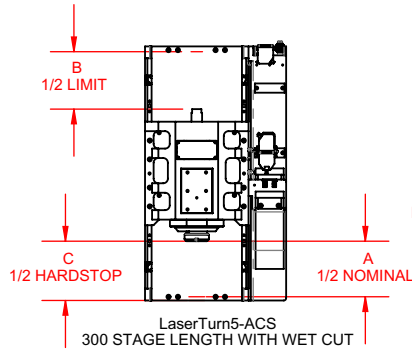
LaserTurn5-ACS  
FRONT GRIPPER w/ REAR TOOLING OPTION



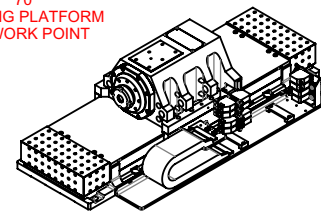
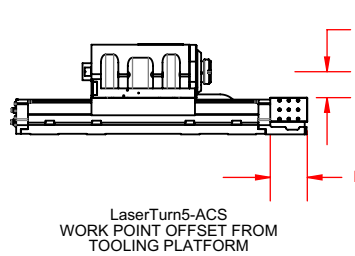
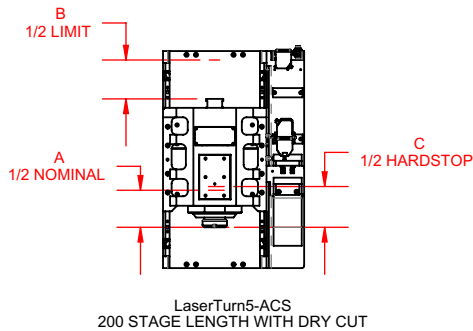
LaserTurn5-ACS  
FRONT GRIPPER TOOLING OPTION



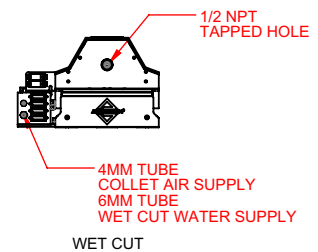
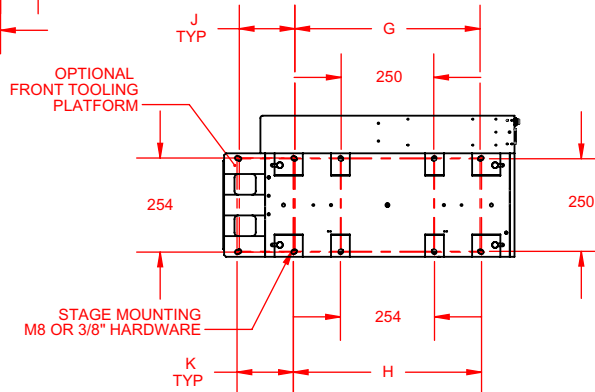
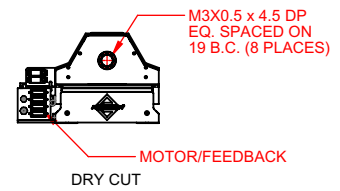
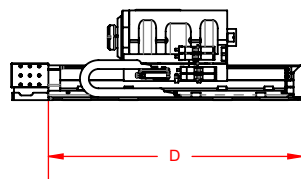
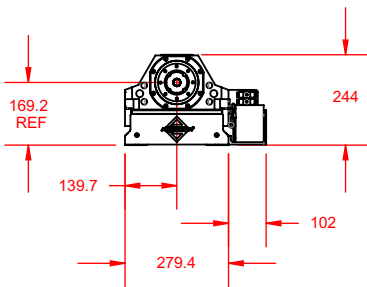
LaserTurn5-ACS  
NO TOOLING OPTION



LaserTurn5-ACS  
FRONT TOOLING OPTION



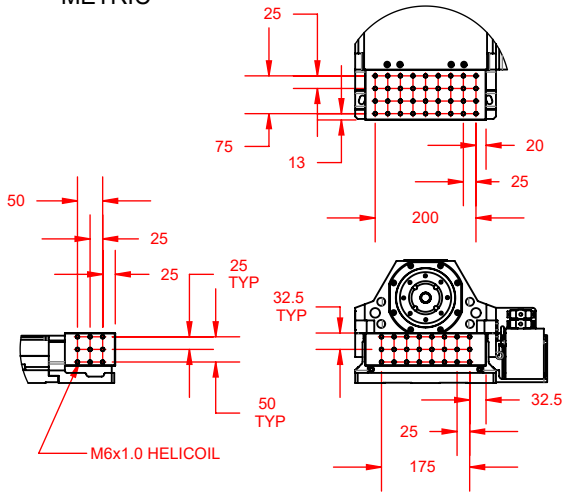
LaserTurn5-ACS  
FRONT/REAR TOOLING OPTION



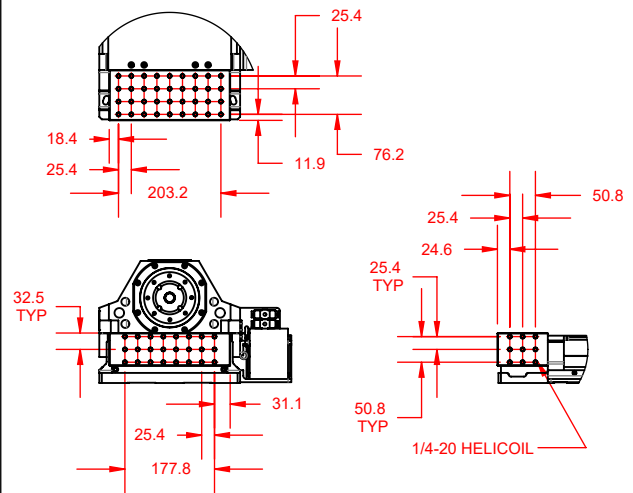
DIMENSIONS - MILLIMETER

BASE MODEL	TRAVEL	A	B	C	D	E	F	G	H	J	K
LaserTurn5-ACS-200	200	100	105	110	586	25	100	450	457.2	125	127
LaserTurn5-ACS-300	300	150	155	160	686	25	100	500	508	150	152.4

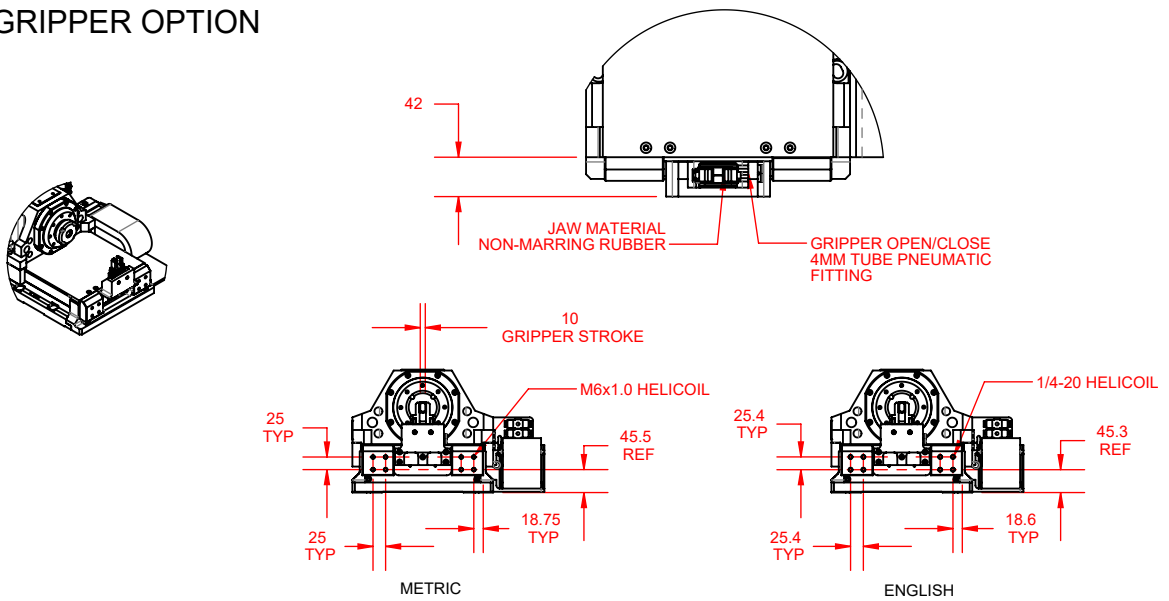
TOOLING PLATFORM  
METRIC



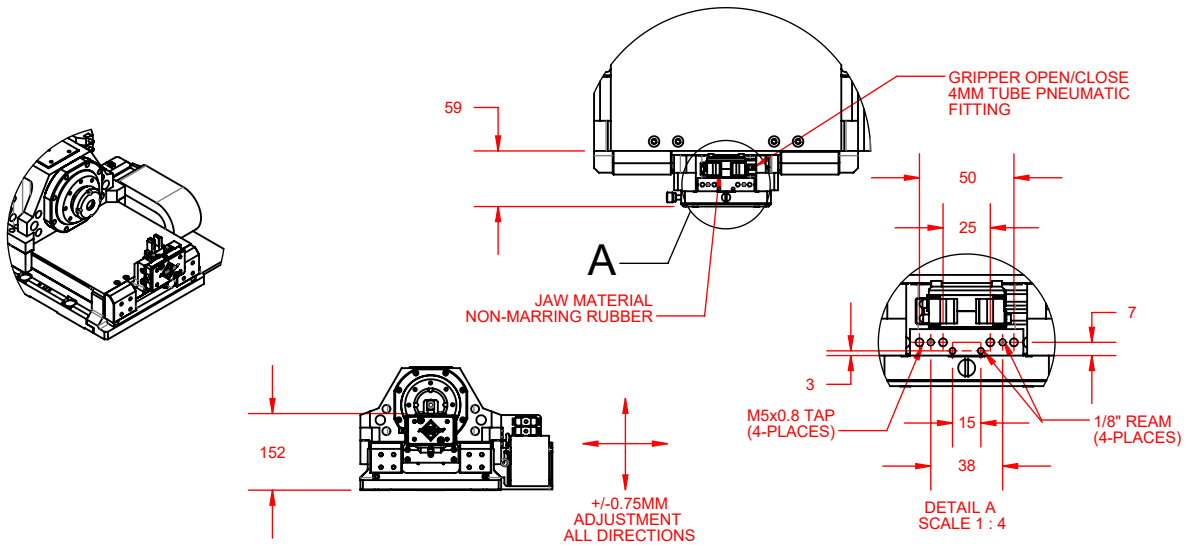
TOOLING PLATFORM  
ENGLISH



GRIPPER OPTION



ALIGNMENT GRIPPER OPTION



## LaserTurn2 Linear/Rotary Motor Platform ORDERING INFORMATION

### Travel (Required)

-200	200 mm linear axis travel
-300	300 mm linear axis travel

### Feedback (Required)

-E1	Incremental linear encoder, 1 Vpp (linear axis)
-E2	High-accuracy incremental linear encoder, 1 Vpp (linear axis)

### Rotary Speed (Required)

-SS	Standard speed rotary axis
-HS	High speed rotary axis

### Cutting Configuration (Required)

-DCUT	Dry cutting configuration
-WCUT	Wet cutting configuration with fluid rotary union

### Front Tooling (Optional)

-FT1	Metric front tooling platform
-FT2	Metric front tooling platform with gripper
-FT3	Metric front tooling platform with alignment gripper
-FT4	English front tooling platform
-FT5	English front tooling platform with gripper
-FT6	English front tooling platform with alignment gripper

### Gripper Jaws (Optional)

-J1	Gripper jaws for 0-10 mm tube diameters
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### 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.

-TAS	Integration - Test as system Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller, and stage). This includes parameter file generation, system tuning, and documentation of the system configuration.
-TAC	Integration - Test as components Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

### Accessories (to be ordered as separate line item)

Collet-ER16-CLTxxx	ER16 collet - consult with Aerotech for available sizes
RingSeal-ER16-RSxx	Ring seal for wet cutting - consult with Aerotech for available sizes
CGF	<a href="#">Collet and Gripper Filtration Kit</a>

## LaserTurn5-ASR Linear/Rotary Motion Platform ORDERING INFORMATION

### Travel (Required)

-200	200 mm linear axis travel
-300	300 mm linear axis travel

### Feedback (Required)

-E1	Incremental linear encoder, 1 Vpp (linear axis)
-E2	High-accuracy incremental linear encoder, 1 Vpp (linear axis)

### Rotary Speed (Required)

-SS	Standard speed rotary axis
-HS	High speed rotary axis

### Cutting Configuration (Required)

-DCUT	Dry cutting configuration
-WCUT	Wet cutting configuration with fluid rotary union

### Front Tooling (Optional)

-FT1	Metric front tooling platform
-FT2	Metric front tooling platform with gripper
-FT3	Metric front tooling platform with alignment gripper
-FT4	English front tooling platform
-FT5	English front tooling platform with gripper
-FT6	English front tooling platform with alignment gripper

### Gripper Jaws (Optional)

-J1	Gripper jaws for 0-10 mm tube diameters
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### Rear Tooling (Optional)

-RT1	Metric rear tooling platform
-RT2	English rear tooling platform

### 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.

-TAS	Integration - Test as system Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller, and stage). This includes parameter file generation, system tuning, and documentation of the system configuration.
-TAC	Integration - Test as components Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

### Accessories (to be ordered as separate line item)

Collet-ER16-CLTxxx	ER16 collet - consult with Aerotech for available sizes
RingSeal-ER16-RSxx	Ring seal for wet cutting - consult with Aerotech for available sizes
CGF	<a href="#">Collet and Gripper Filtration Kit</a>

## LaserTurn 5 ACS Series ORDERING INFORMATION

### Travel (Required)

-200	200 mm linear axis travel
-300	300 mm linear axis travel

### Feedback (Required)

-E1	Incremental linear encoder, 1 Vpp (linear axis)
-E2	High-accuracy incremental linear encoder, 1 Vpp (linear axis)

### Collet Style (Required)

-ER25	ER25 ultra-precision collet chuck
-ER40	ER40 ultra-precision collet chuck

### Cutting Configuration (Required)

-DCUT	Dry cutting configuration
-WCUT	Wet cutting configuration with fluid rotary union

### Front Tooling (Optional)

-FT1	Metric front tooling platform
-FT2	Metric front tooling platform with gripper
-FT3	Metric front tooling platform with alignment gripper
-FT4	English front tooling platform
-FT5	English front tooling platform with gripper
-FT6	English front tooling platform with alignment gripper

### Gripper Jaws (Optional)

-J1	Gripper jaws for 0-10 mm tube diameters
-J2	Gripper jaws for 8-18 mm tube diameters
-J3	Gripper jaws for 16-26 mm tube diameters
-J4	Gripper jaws for 24-34 mm tube diameters

### Rear Tooling (Optional)

-RT1	Metric rear tooling platform
-RT2	English rear tooling platform

### Metrology - Linear (Required)

-PL1	Metrology, uncalibrated with performance plots
-PL2	Metrology, calibrated (halar) with performance plots

Metrology option applies to linear axis only.

### Metrology - Rotary (Required)

-PL1	Metrology, uncalibrated with performance plots
-PL2	Metrology, calibrated (halar) with performance plots

Metrology option applies to linear axis only

## LaserTurn 5 ACS Series ORDERING INFORMATION

### Integration (Required)

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-TAS	Integration - Test as system Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller, and stage). This includes parameter file generation, system tuning, and documentation of the system configuration.
-TAC	Integration - Test as components Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

### Accessories (to be ordered as separate line item)

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Collet-ER25-CLTxxx	ER25 Collet - Consult with Aerotech for available sizes
Collet-ER40-CLTxxx	ER40 Collet - Consult with Aerotech for available sizes
RingSeal-ER25-RSxx	Ring Seal for Wet Cutting, ER25 Collet - Consult with Aerotech for available sizes
RingSeal-ER40-RSxx	Ring Seal for Wet Cutting, ER40 Collet - Consult with Aerotech for available sizes
CGF	Collet and Gripper Filtration Kit (add link to data sheet)