



Large Aperture Rotary Stage

ALAR-SP

High Load Capacity & Torque for Heavy-Duty Applications

The ALAR family of direct-drive, large-aperture rotary stages provides superior angular positioning and velocity control. ALAR-SP (standard profile) is the flagship of the ALAR product line. It offers a balance of high load capability, torque and profile height and is suitable for use in both vertical and horizontal applications. Featuring a large-diameter clear aperture and a non-cogging direct-drive motor, ALAR-SP stages offer a better-performing alternative to worm-gear stages.

Key Applications

ALAR-SP stages are best suited for applications including

- ◆ Single- and multi-axis sensor testing
- ◆ Inertial navigation device qualification
- ◆ Missile seeker testing
- ◆ Antenna testing
- ◆ Photonic component alignment
- ◆ High-accuracy laser processing
- ◆ Precision wafer inspection
- ◆ Custom gimbal assemblies



KEY FEATURES:

- ◆ Offers an **IDEAL BALANCE** of load capability, torque output & profile height, with large-diameter clear aperture up to 325 mm
- ◆ Supports **LARGE PAYLOADS** & gimbal configurations thanks to high axial-, radial- & moment-load capacities
- ◆ Delivers **EXTREMELY PRECISE**, high-torque, cog-free rotation with direct-drive motor
- ◆ **INTEGRATES EASILY** into multi-axis systems & machines
- ◆ Provides **LONG SERVICE LIFE** & consistent performance over time
- ◆ Available with absolute encoder option & limited travel for **MAXIMUM PAYLOAD SECURITY**

ALAR-SP SPECIFICATIONS

Mechanical Specifications	ALAR100SP	ALAR150SP	ALAR200SP
Travel	Continuous (optional 340° max. limited travel)		
Aperture	100 mm	150 mm	200 mm
Resolution (Min. Incremental Motion) ⁽¹⁾	0.1 μrad (0.02 arc sec)	0.08 μrad (0.016 arc sec)	0.06 μrad (0.012 arc sec)
Accuracy ⁽²⁾⁽³⁾	± 9.7 μrad (± 2 arcsec)		
Bidirectional Repeatability ⁽³⁾	± 2.4 μrad (± 0.5 arc sec)		
Tilt-Error Motion	9.7 μrad (2.0 arc sec)		
Maximum Speed ⁽⁴⁾	300 rpm	250 rpm	90 rpm
Maximum Torque	23.9 N•m	42.9 N•m	126.8 N•m
Continuous Torque	6.0 N•m	10.7 N•m	19.3 N•m
Axial Load	1550 N	1950 N	4675 N
Radial Load	1350 N	1925 N	4775 N
Moment Load	250 N•m	450 N•m	1600 N•m
Shaft Inertia	0.022 kg•m ²	0.040 kg•m ²	0.320 kg•m ²
Shaft Inertia with Limits	0.026 kg•m ²	0.051 kg•m ²	0.359 kg•m ²
Stage Mass	16.3 kg	18.6 kg	40.4 kg
Stage Mass with Limits	17 kg	19.6 kg	43.1 kg

Mechanical Specifications	ALAR250SP-M1	ALAR250SP-M2	ALAR325SP-M1	ALAR325SP-M2
Travel	Continuous (optional 340° max. limited travel)			
Aperture	250 mm		325 mm	
Resolution (Min. Incremental Motion) ⁽¹⁾	0.05 μrad (0.01 arc sec)		0.04 μrad (0.009 arc sec)	
Accuracy ⁽²⁾⁽³⁾	± 9.7 μrad (± 2 arcsec)			
Bidirectional Repeatability ⁽³⁾	± 2.4 μrad (± 0.5 arc sec)			
Tilt-Error Motion	9.7 μrad (2.0 arc sec)			
Maximum Speed ⁽⁴⁾	140 rpm		150 rpm	
Maximum Torque	137.8 N•m	206.7 N•m	213.8 N•m	320.8 N•m
Continuous Torque	21.0 N•m	31.5 N•m	35.0 N•m	52.4 N•m
Axial Load	4950 N		5825 N	
Radial Load	5200 N		6650 N	
Moment Load	1825 N•m		2650 N•m	
Shaft Inertia	0.500 kg•m ²		1.010 kg•m ²	
Shaft Inertia with Limits	0.573 kg•m ²		1.2 kg•m ²	
Stage Mass	51.3 kg		61.2 kg	
Stage Mass with Limits	54.5kg		64.9 kg	

1. Resolution assumes 1 Vpp encoder with 2000x controller multiplication

2. Certified with each stage. Requires the use of an Aerotech controller.

3. Repeatability and accuracy are dependent on encoder selection. To achieve the listed specifications, the electrical resolution should be 0.2 arc sec or smaller.

4. Square-wave digital encoder options will limit maximum speed below the listed value. Contact factory for specific stage and encoder speed combination.

ALAR-SP SPECIFICATIONS

Electrical Specifications		ALAR100SP	ALAR150SP	ALAR200SP
Motor		Brushless Slotless		
Continuous Current	A_{pk}	2.7	6.2	5.3
	A_{rms}	1.9	4.4	3.8
Peak Current, Stall	A_{pk}	10.8	24.8	34.8
	A_{rms}	7.6	17.5	24.6
Bus Voltage		Up to 340 VDC		
Incremental Encoder Line Count		31,488 lines/rev	40,000 lines/rev	55,040 lines/rev
Limit Switches⁽¹⁾		5 V, normally closed		

Electrical Specifications		ALAR250SP-M1	ALAR250SP-M2	ALAR325SP-M1	ALAR325SP-M2
Motor		Brushless Slotless			
Continuous Current	A_{pk}	5.3	8.0	5.1	7.7
	A_{rms}	3.8	5.6	3.6	5.4
Peak Current, Stall	A_{pk}	34.8	52.2	31.2	46.8
	A_{rms}	24.6	36.9	22.1	33.1
Bus Voltage		Up to 340 VDC			
Incremental Encoder Line Count		64,800 lines/rev		76,800 lines/rev	
Limit Switches⁽¹⁾		5 V, normally closed			

1. Limited travel options only.



ALAR-SP stages shown as a custom azimuth/elevation assembly, ideal for testing electro-optic devices.

ALAR-SP ORDERING INFORMATION

ALAR-SP Mechanical-Bearing, Direct-Drive Rotary Stage

ALAR100SP	Mechanical-bearing, direct-drive rotary stage, 100 mm aperture
ALAR150SP	Mechanical-bearing, direct-drive rotary stage, 150 mm aperture
ALAR200SP	Mechanical-bearing, direct-drive rotary stage, 200 mm aperture
ALAR250SP	Mechanical-bearing, direct-drive rotary stage, 250 mm aperture
ALAR325SP	Mechanical-bearing, direct-drive rotary stage, 325 mm aperture

Motor (Required)

-M1	Standard motor
-M2	High-power motor

Motor options (-M1 and -M2) only apply to the ALAR250SP and ALAR325SP stages.

Travel (Required)

-	Continuous travel
-TR010	Limited travel, ± 5 degrees
-TR020	Limited travel, ± 10 degrees
-TR030	Limited travel, ± 15 degrees
-TR060	Limited travel, ± 30 degrees
-TR090	Limited travel, ± 45 degrees
-TR120	Limited travel, ± 60 degrees
-TR180	Limited travel, ± 90 degrees
-TR240	Limited travel, ± 120 degrees
-TR300	Limited travel, ± 150 degrees
-TR340	Limited travel, ± 170 degrees

Feedback (Required)

-E1	Incremental encoder, 1 Vpp
-E2	Incremental encoder, digital RS422, x4 interpolation
-E3	Incremental encoder, digital RS422, x20 interpolation
-E4	Incremental encoder, digital RS422, x40 interpolation
-E5	Incremental encoder, digital RS422, x100 interpolation
-E6	Incremental encoder, digital RS422, x200 interpolation
-E7	Absolute encoder

Integration (Required)

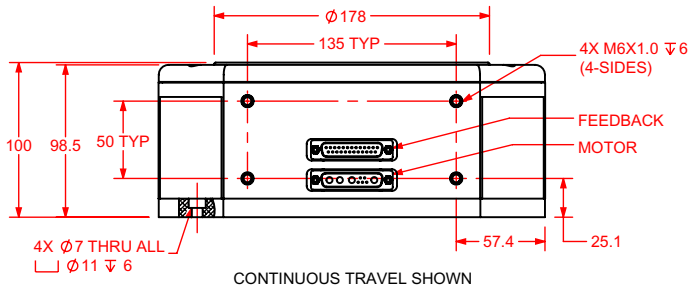
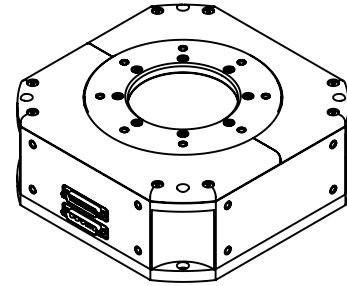
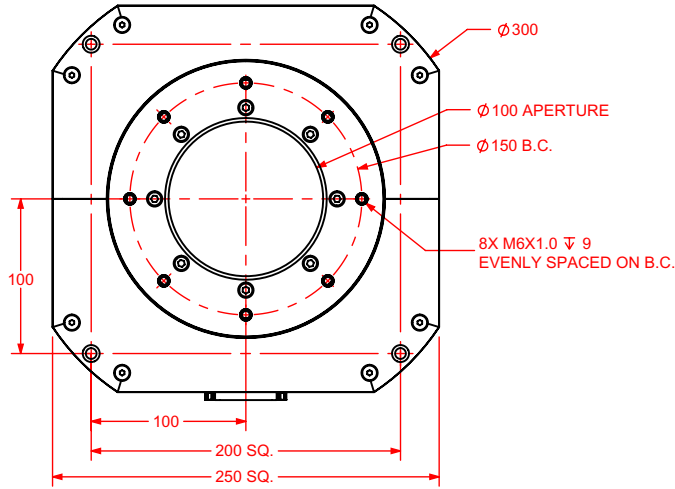
Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire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

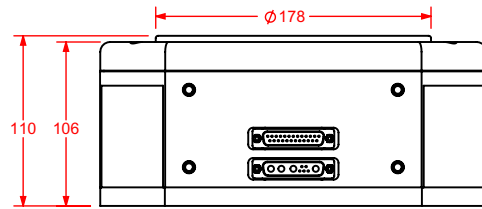
-TAC Integration - Test as components
Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

ALAR-SP DIMENSIONS

ALAR100SP

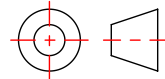


CONTINUOUS TRAVEL SHOWN



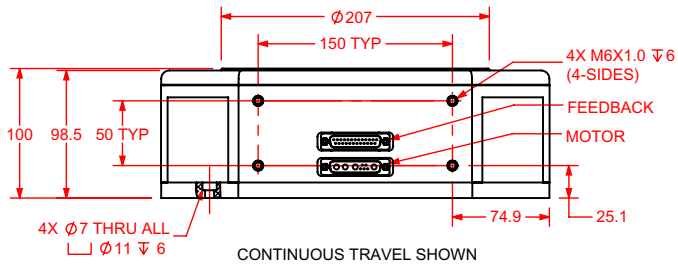
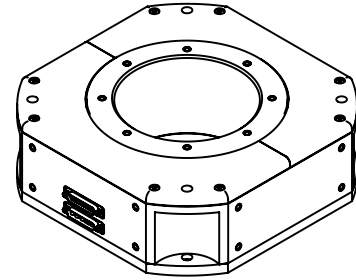
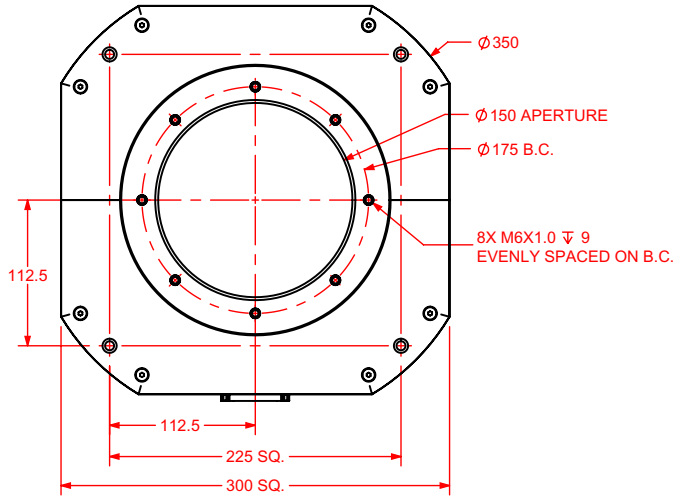
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DIMENSIONS: MILLIMETERS

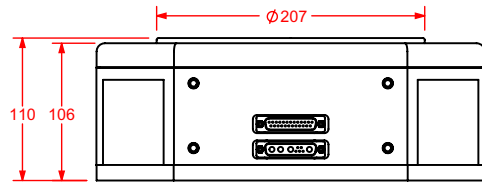


ALAR-SP DIMENSIONS

ALAR150SP

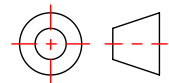


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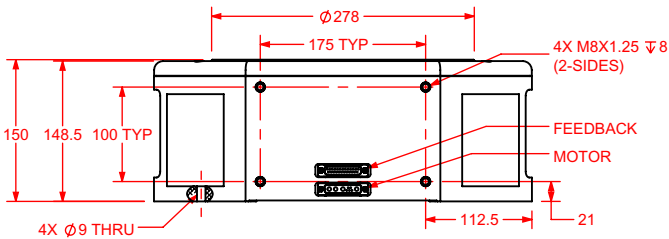
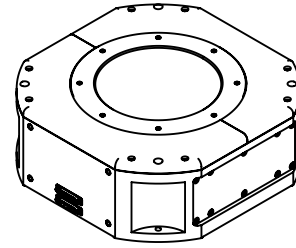
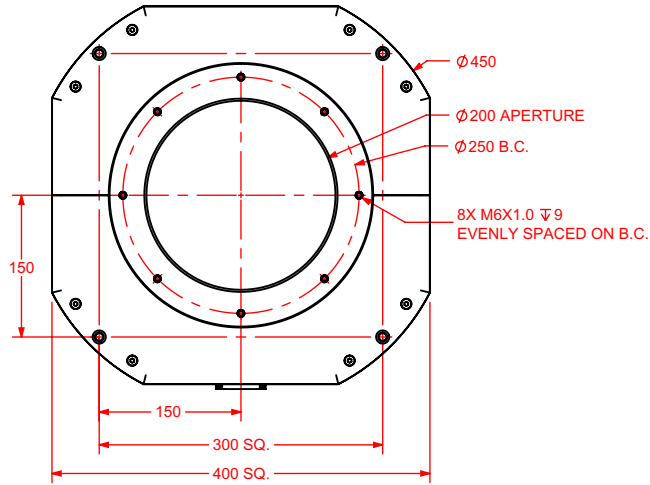
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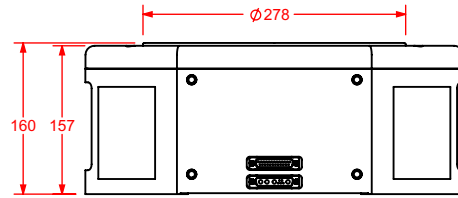


ALAR-SP DIMENSIONS

ALAR200SP

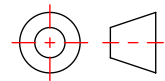


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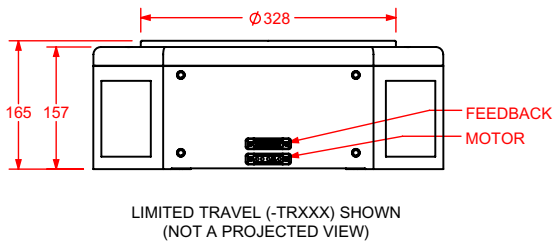
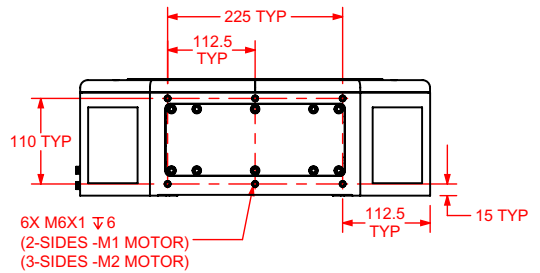
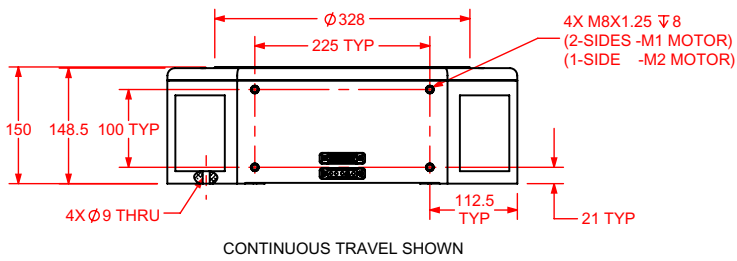
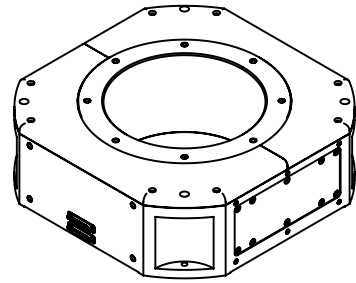
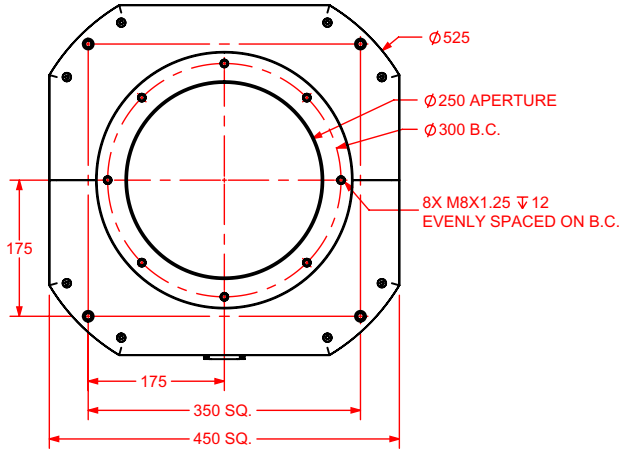
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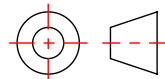


ALAR-SP DIMENSIONS

ALAR250SP

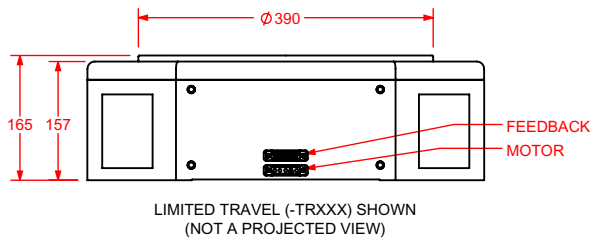
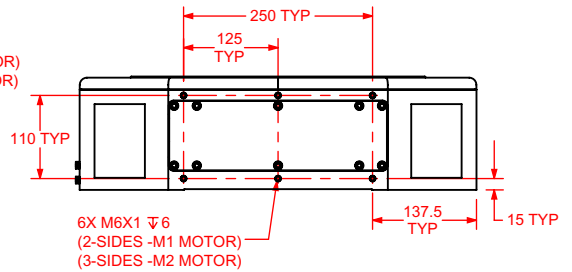
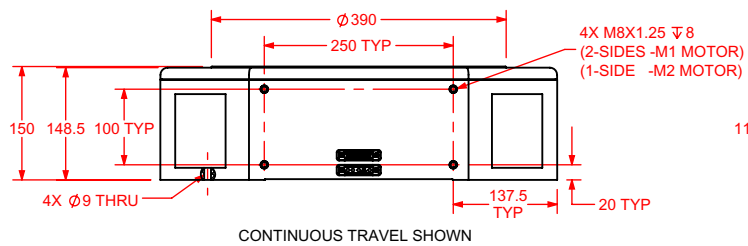
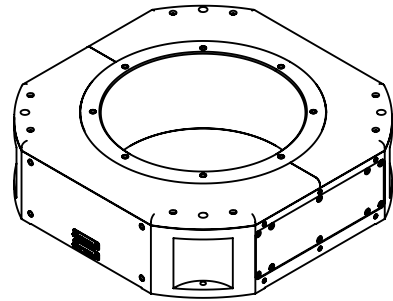
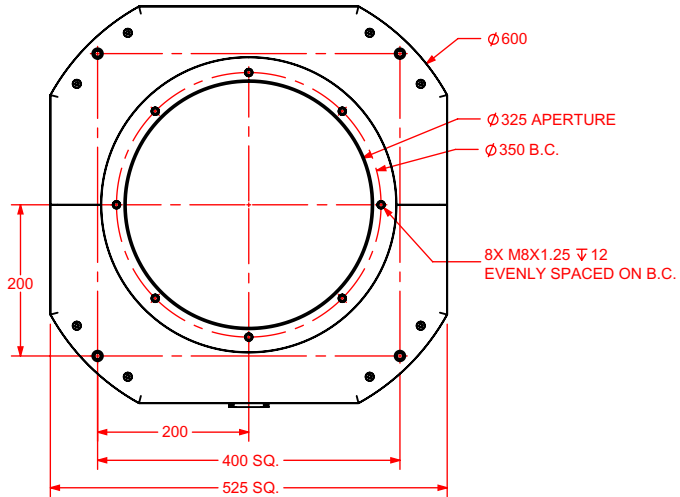


DIMENSIONS: MILLIMETERS



ALAR-SP DIMENSIONS

ALAR325SP



DIMENSIONS: MILLIMETERS

