

LARGE-APERTURE ROTARY STAGES **ALAR-XP SERIES**



With clear apertures up to 325 mm, ALAR-XP direct-drive stages provide smooth, precise motion with the highest torque output.

Aerotech's ALAR family of direct-drive rotary stages provides superior angular positioning and velocity control. ALAR-XP offers extremely high torque output, high load capability, and smooth, precise rotation. It is suitable for use in both vertical and horizontal applications. Other members of the ALAR series include the ALAR-LP, with an ultra-low profile, and the ALAR-SP, which offers a balance of load capability, torque, and form factor.

Advantage: ALAR

ALAR-XP offers numerous advantages over worm-drive stages. Because ALAR stages use direct-drive torque motors, they are free from backlash, vibration, and excessive wear commonly associated with gear-driven stages, and they are also capable of much higher speeds and accelerations. These advantages translate to higher system accuracy, repeatability, and longevity, as well as greater throughput. Users can more precisely manufacture, inspect, or process more parts in less time, leading to lower operating costs and higher profits.

Brushless, Slotless Direct-Drive Motors

Aerotech's brushless, direct-drive motors are featured in all ALAR stages. Because there are neither brushes to wear, nor gear

trains or couplings to maintain, ALAR stages are capable of high speeds and accelerations, plus consistent, stable performance over time with zero backlash, windup, or hysteresis. Further, ALAR motors are both slotless and ironless, thereby eliminating cogging and torque ripple to deliver exceptionally smooth motion. ALAR stages are ideal for applications requiring outstanding contoured motion, smooth scan velocities, and precise incremental steps.

Extreme Torque, Precision Rotation

ALAR-XP motors are based on Aerotech's powerful BLMX-series, which deliver the highest force output of any commercially-available brushless, slotless, ironless motor. Traditional higher-torque solutions typically involve either gear trains or slotted, iron-core motors, which are both detrimental to achieving high-precision positioning and velocity performance. ALAR-XP is a game-changer because it enables users to achieve high torque output without compromising the quality of motion. Eliminating the need to make the trade-off between torque and precision allows systems designers to focus their attention on process optimization.

— PRODUCT HIGHLIGHTS —

High torque output up to 1100 N•m

Excellent accuracy, repeatability, and minimum incremental motion

Clear-aperture diameters of 250 mm or 325 mm

Direct-drive torque motor delivers extremely precise, smooth, cog-free rotation

Long service life and consistent performance over time

High axial-, radial-, and moment-load capacities support large payloads and gimbal configurations

Engineered for easy integration into multi-axis systems and machines

Incremental and absolute encoder options contribute to excellent accuracy and repeatability

Flexible Configurations for Simplified Integration

ALAR-XP is offered with features and options that facilitate easy integration into multi-axis motion systems and subsystems. It is available with clear-aperture diameters of 250 mm or 325 mm, and also a variety of feedback options including analog 1 Vpp, digital RS422, and absolute encoders. Continuous 360-degree travel is standard, with available limited-travel options ranging from 10 degrees to 340 degrees. For each model, there are two motor options depending on the amount of torque needed. ALAR-XP stages can even be adapted for use in vacuum environments.

Applications

Common applications for ALAR-XP stages include single- and multi-axis sensor testing, missile seeker testing, antenna testing, inertial navigation device testing, opto-electronics alignment and testing, and high-accuracy laser machining. ALAR-XP stages can also be configured as multi-axis gimbals. The large-diameter clear aperture and powerful direct-drive motor make ALAR-XP a better-performing alternative to more traditional worm-gear stages or even direct-drive stages with slotted iron-core motors, especially for applications requiring both high torque output and ultra-precise motion.

ALAR-XP Specifications

Mechanical Specifications	ALAR250XP-M1	ALAR250XP-M2	ALAR325XP-M1	ALAR325XP-M2
Travel	Continuous (optional 340° max. limited travel)			
Aperture	250 mm		325 mm	
Resolution (Min. Incremental Motion) ¹	0.05 μ rad (0.01 arc sec)		0.04 μ rad (0.009 arc sec)	
Accuracy ²	$\pm 9.7 \mu$ rad (± 2 arcsec)			
Bidirectional Repeatability	$\pm 2.4 \mu$ rad (± 0.5 arc sec)			
Tilt-Error Motion	9.7 μ rad (2.0 arc sec)			
Maximum Speed ^{3,4}	180 rpm		100 rpm	
Maximum Acceleration	500 rad/s ²	700 rad/s ²	400 rad/s ²	550 rad/s ²
Maximum Torque	548.6 N•m	731.5 N•m	833.0 N•m	1110.7 N•m
Continuous Torque	64.2 N•m	85.6 N•m	107.4 N•m	143.1 N•m
Axial Load	4950 N		5825 N	
Radial Load	5200 N		6650 N	
Moment Load	1825 N•m		2650 N•m	
Shaft Inertia	0.89 kg•m ²		1.71 kg•m ²	
Shaft Inertia with Limits	0.96 kg•m ²		1.82 kg•m ²	
Stage Mass	100 kg	104 kg	125 kg	130 kg
Stage Mass with Limits	104 kg	108 kg	129 kg	134 kg

1 Resolution assumes -AS encoder with 2000x controller multiplication.

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

3 Maximum speed assumes a bus voltage of 320 VDC.

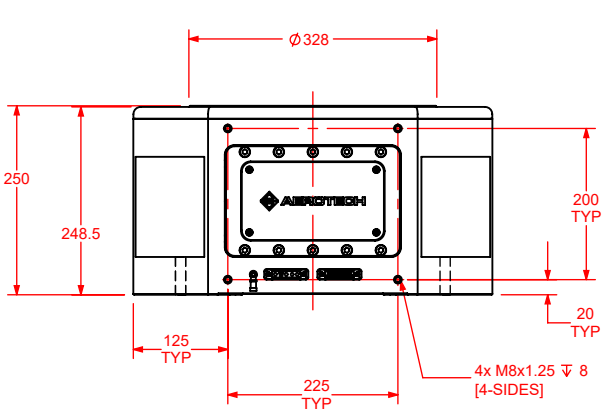
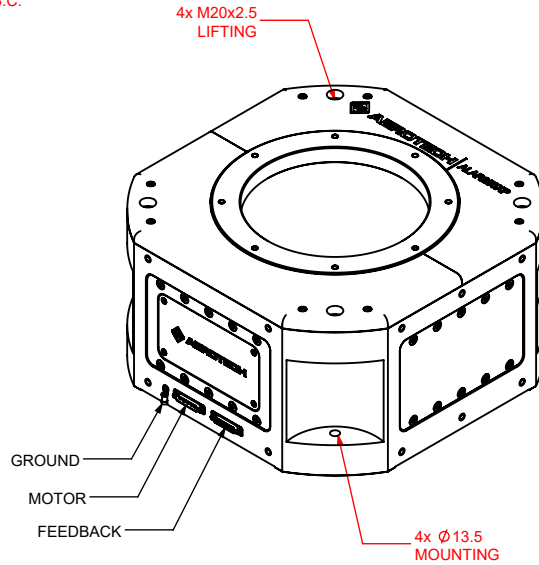
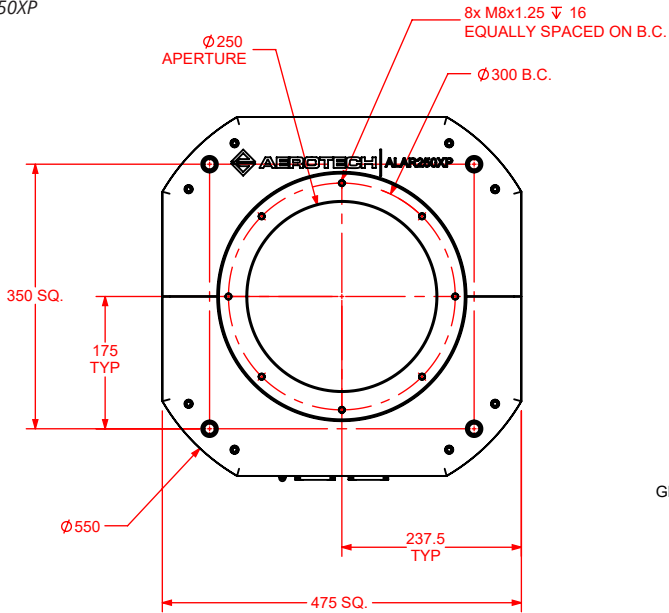
4 Digital RS422 encoder options will limit maximum speed below the listed value. Contact factory for specific stage and encoder speed combination.

Electrical Specifications	ALAR250XP-M1	ALAR250XP-M2	ALAR325XP-M1	ALAR325XP-M2	
Motor	Brushless Slotless				
Continuous Current	A _{pk}	11.2	14.9	11.3	15.1
	A _{rms}	7.9	10.6	8.0	10.7
Peak Current, Stall	A _{pk}	95.7	127.6	87.8	117.1
	A _{rms}	67.7	90.2	62.1	82.8
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				

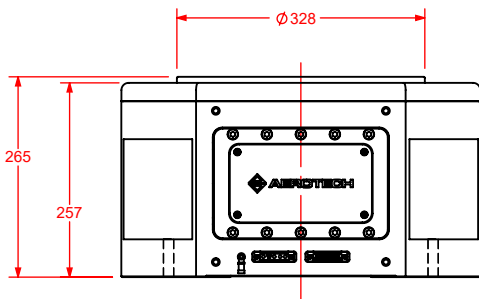
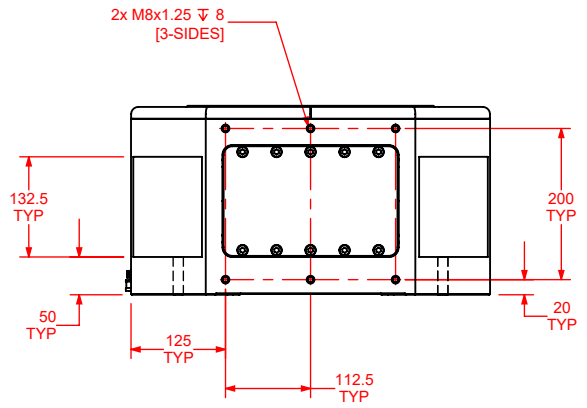
1 Limited travel options only.

ALAR-XP Dimensions

ALAR250XP

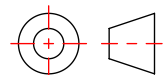


CONTINUOUS TRAVEL



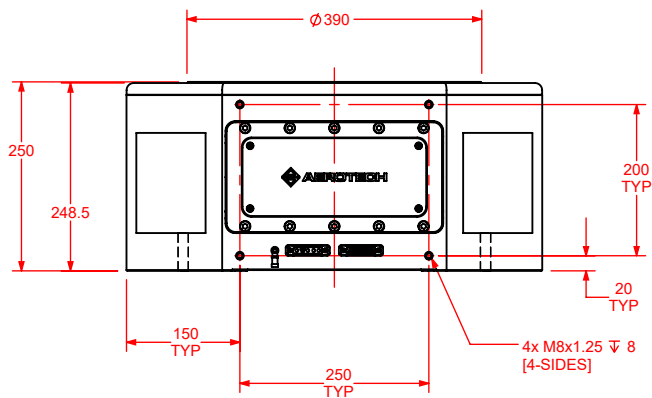
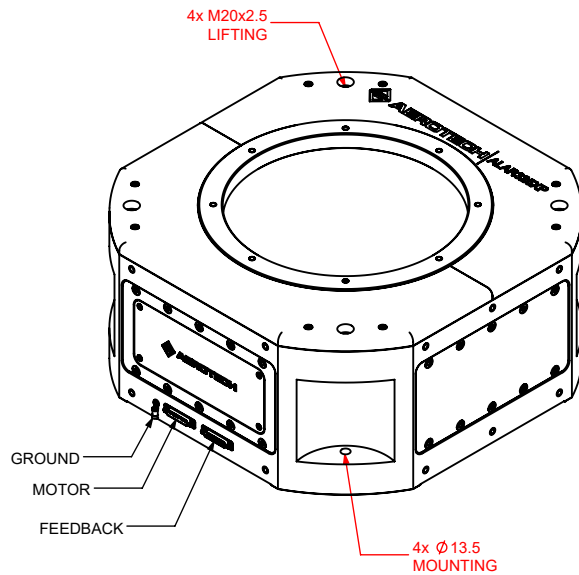
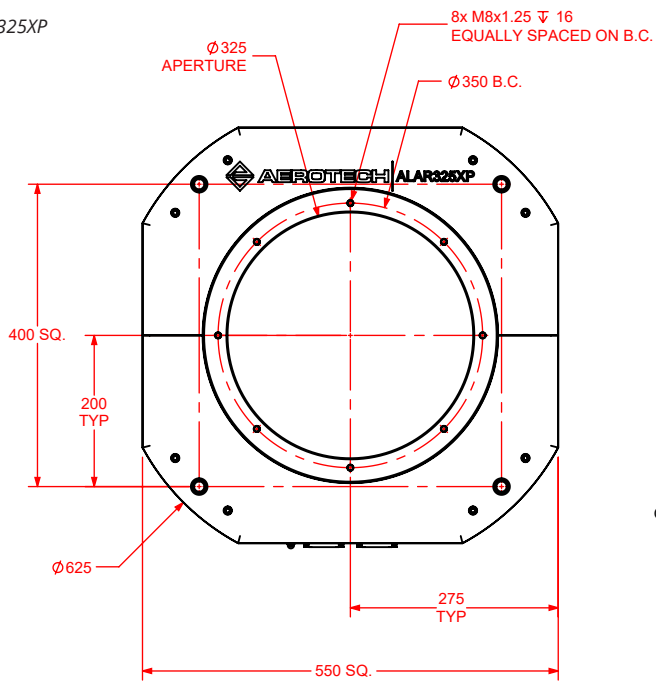
LIMITED TRAVEL (-TRxxx)
(NOT A PROJECTED VIEW)

DIMENSIONS: MILLIMETERS

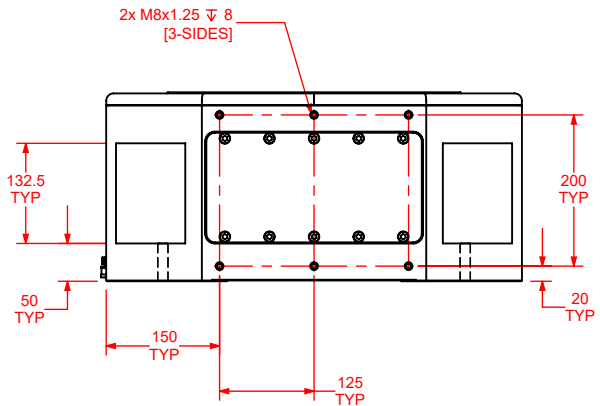


ALAR-XP Dimensions

ALAR325XP

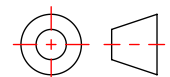


CONTINUOUS TRAVEL



LIMITED TRAVEL (-TRxxx)
(NOT A PROJECTED VIEW)

DIMENSIONS: MILLIMETERS



ALAR-XP Ordering Information

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

ALAR250XP	Mechanical-bearing, direct-drive rotary stage, high torque, 250 mm aperture
ALAR325XP	Mechanical-bearing, direct-drive rotary stage, high torque, 325 mm aperture

Motor (Required)

-M1	Standard motor
-M2	High-power motor

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
-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. 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.