

ADR175/240 Series

Mechanical-Bearing Rotary Stage



Direct-drive brushless servomotor

Cog-free design for outstanding velocity stability

Outstanding wobble and runout

Direct coupled, high-accuracy rotary encoder

High-accuracy angular contact bearings



Aerotech's ADR series direct-drive rotary stages provide superior angular positioning and velocity control. Applications range from high-speed laser machining to precision wafer inspection.

Superior Mechanical Design

Large diameter, matched-set ABEC-7 angular contact bearings are used to maximize performance with respect to wobble, moment stiffness, and rotating friction. A thick-walled, precision-ground shaft further minimizes wobble. The large diameter bearings permit large payloads without compromising performance.

Brushless Direct Drive

To maximize positioning performance, the ADR series utilizes Aerotech's S-series brushless, slotless motor. This motor has all the advantages of a brushless direct-drive motor – no brushes to wear, no gear trains to maintain, and high acceleration and high speeds. Since it is a slotless, ironless design, there is zero cogging, meaning that there is absolutely no torque ripple. This makes the ADR ideal for applications requiring outstanding contoured motion, smooth scan velocity, or precise incremental steps.

With its low inherent inertia and high power output, the ADR is capable of speeds and accelerations that are an order of magnitude greater than typical direct-drive devices or worm-driven stages.

The low inertia and zero backlash makes the ADR the ideal solution for applications requiring frequent directional changes.

Accurate Positioning

A wide range of performance feedback grades is available. Typical line counts range from 3600 to 36000 lines per revolution. When coupled with Aerotech's MX series resolution multipliers, resolutions can be as fine as 0.036 arc sec.

The motor and high-performance rotary encoder are directly coupled to a common shaft. The absence of gear trains and mechanical couplings means no position errors caused by hysteresis, windup, or backlash. As a result, absolute accuracies of ± 1 arc sec are attainable.

Flexible Configurations

Options include large through-hole apertures, over-travel limits, and adjustable hardstops. Larger diameter stages with larger motors are available, as are AZ-EL gimbal mounts (see AOM360D).

Aerotech manufactures a wide range of servo amplifiers and advanced controllers to provide a complete integrated package.

ADR175/240 Series SPECIFICATIONS

ADR175/240 Series		ADR175-9	ADR175-15	ADR240-22	ADR240-59
Table Diameter		175 mm (7 in)		240 mm (9.5 in)	
Total Travel		±360° Continuous			
Drive System		Direct-Drive Brushless Servomotor			
Feedback		Directly-Coupled Rotary Encoder (RE)			
Resolution		0.17-63.1 μrad (0.036-13.0 arc sec; 0.00001 - 0.0036°)			
Repeatability		±1 arc sec			
Maximum Rotary Speed ⁽¹⁾		200 rpm			
Maximum Load	Axial	30 kg (66 lb)		150 kg (330 lb)	
	Radial	25 kg		90 kg	
Torque Output	Peak	11.7 N-m (8.6 lb-ft)	21.2 N-m (15.6 lb-ft)	30.0 N-m (22.1 lb-ft)	80.0 N-m (59.0 lb-ft)
	Continuous	2.8 N-m (2.1 lb-ft)	5.2 N-m (3.8 lb-ft)	7.4 N-m (5.5 lb-ft)	19.9 N-m (14.7 lb-ft)
Inertia (unloaded)		0.0083 kg-m ² 0.0061 lb-ft-s ²	0.0099 kg-m ² 0.0073 lb-ft-s ²	0.039 kg-m ² 0.029 lb-ft-s ²	0.056 kg-m ² 0.041 lb-ft-s ²
Acceleration (Unloaded)		1050 rad/s ²	1575 rad/s ²	577 rad/s ²	1069 rad/s ²
Tilt Error Motion		24.3 μrad (5 arc sec; 0.0014°)		9.7 μrad (2 arc sec; 0.00056°)	
Axis Error Motion	Axial	1.0 μm (40 μin)		0.5 μm (20 μin)	
	Radial ⁽²⁾	2.0 μm (80 μin)		1.0 μm (40 μin)	
Nominal Stage Weight		11.0 kg (24.3 lb)	14.0 kg (30.9 lb)	24.0 kg (52.9 lb)	35.0 kg (77.2 lb)
Finish	Table	Hardcoat			
	Stage	Black Anodize			

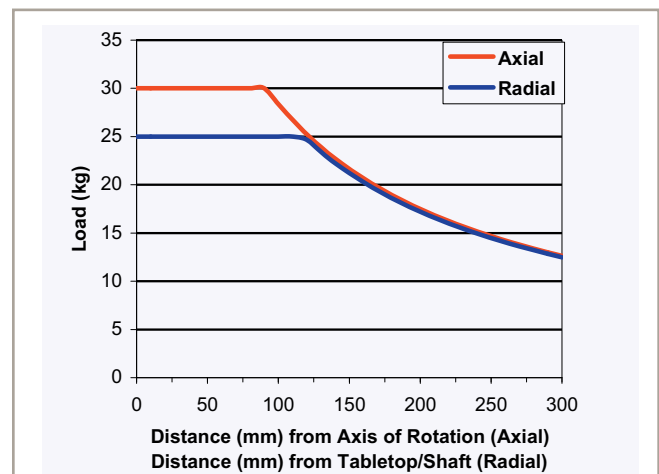
Notes:

1. Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.

2. Measured 50 mm (2 in) above tabletop; includes wobble and eccentricity components.

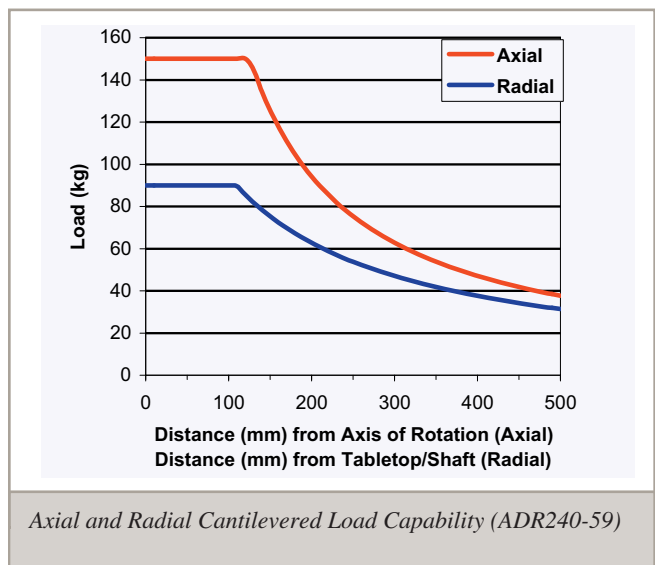
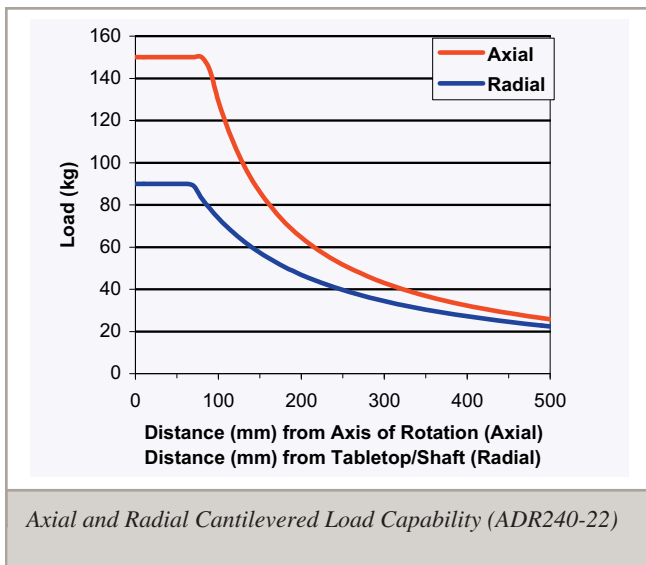
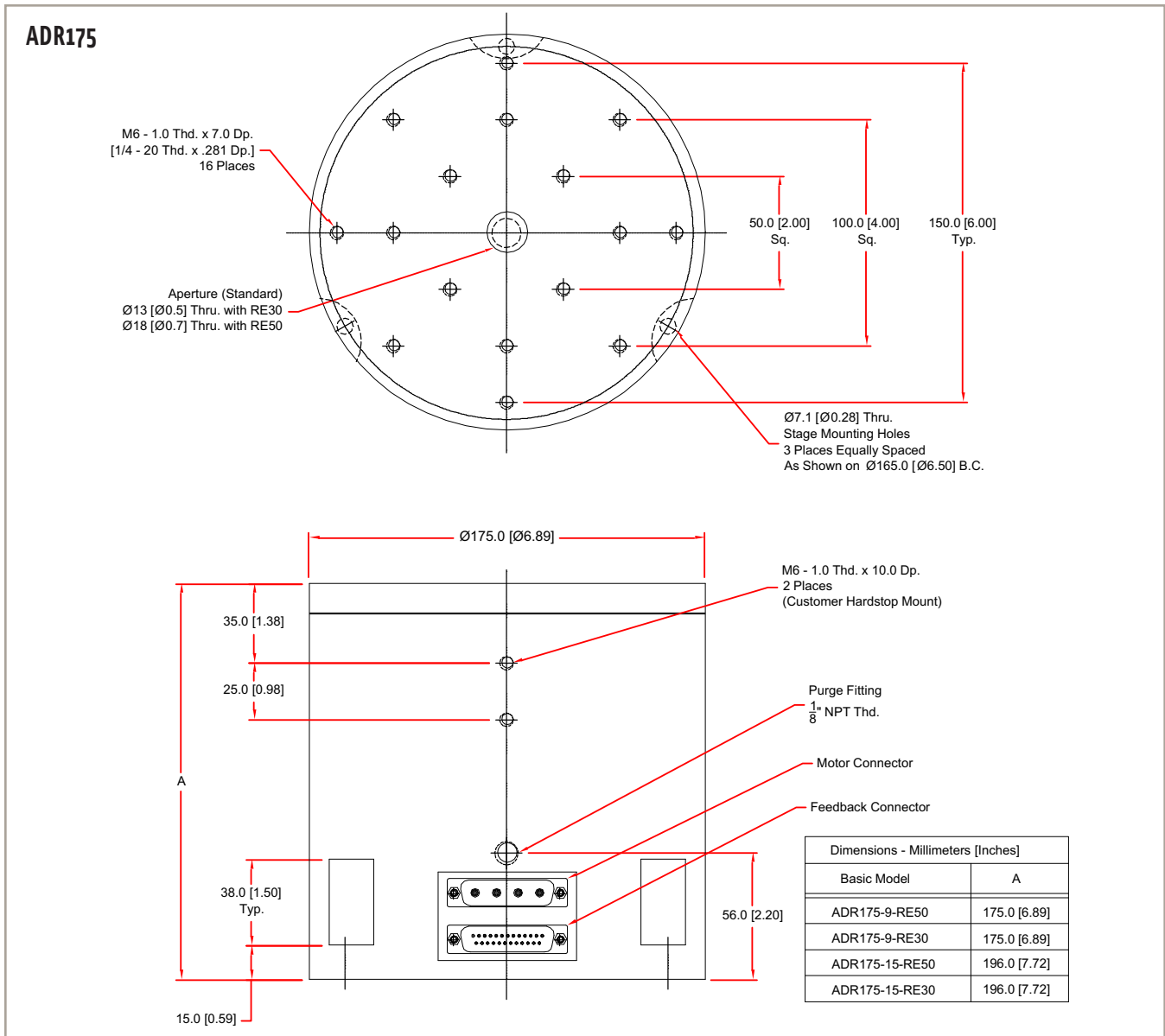


High-speed, high-resolution, direct-drive inspection machine includes integral vacuum lines for wafer chuck.



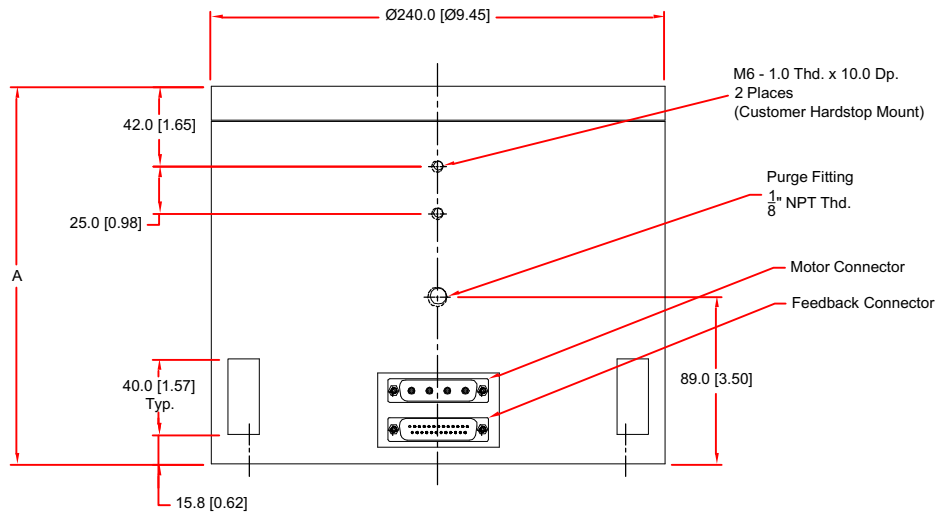
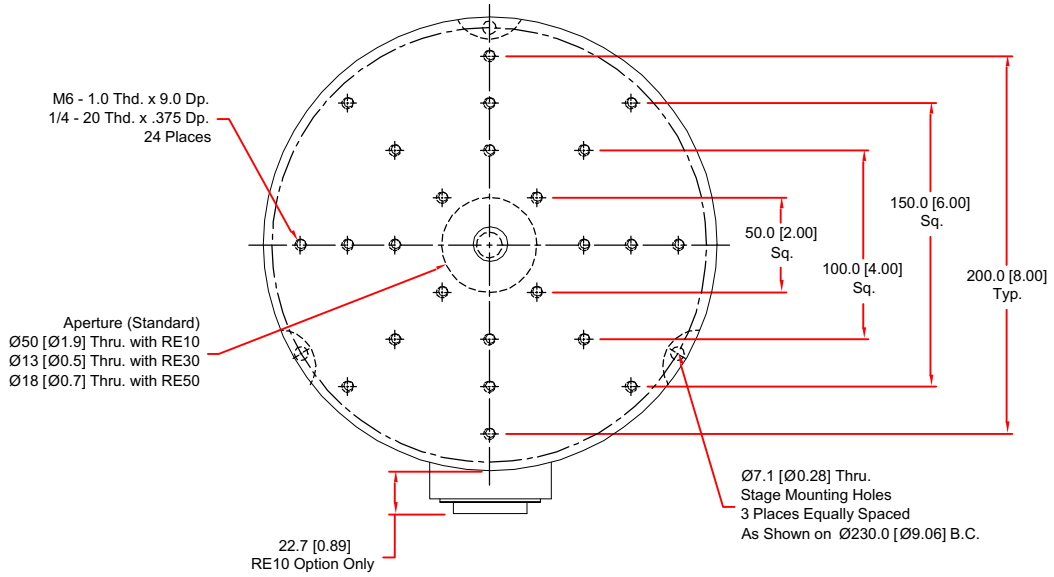
Axial and Radial Cantilevered Load Capability (ADR175)

ADR175/240 Series DIMENSIONS



ADR175/240 Series DIMENSIONS

ADR240



Dimensions - Millimeters [Inches]	
Basic Model	A
ADR240-22-RE50	200.0 [7.87]
ADR240-22-RE30	200.0 [7.87]
ADR240-22-RE10	200.0 [7.87]
ADR240-59-RE50	250.0 [9.84]
ADR240-59-RE30	250.0 [9.84]
ADR240-59-RE10	250.0 [9.84]

ADR175/240 Series ORDERING INFORMATION

Ordering Example

ADR	-240	-M	-22	-RE10AS	-NC
Series	Table Diameter (mm)	Mounting and Grid Pattern	Motor	Position Transducer	Limits
	175	-M	-9	-RE50AS	
	240	-U	-15	-RE30X5	-NC
		-U/RE10AS	-22	-RE30AS	-NO
		-M/RE10AS	-59	-RE10AS	

ADR Series Direct-Drive Rotary Stage

ADR175	175 mm (7 in) diameter direct drive rotary stage
ADR175	175 mm (7 in) diameter direct drive rotary stage
ADR240	240 mm (9.5 in) diameter direct drive rotary stage
ADR240	240 mm (9.5 in) diameter direct drive rotary stage

Mounting and Grid Pattern

-M	Tabletop with metric-dimension mounting pattern and holes
-U	Tabletop with English-dimension mounting pattern and holes
-U/RE10AS	Tabletop with English-dimension mounting pattern and holes, for ADR240 with RE10AS encoder
-M/RE10AS	Tabletop with metric-dimension mounting pattern and holes, for ADR240 with RE10AS encoder

Motor Options

-9	9 ft-lb (12 N-m) motor for ADR175 (standard)
-15	15 ft-lb (21 N-m) motor for ADR175
-22	22 ft-lb (30 N-m) motor for ADR240 (standard)
-59	59 ft-lb (80 N-m) motor for ADR240

Position Transducer

-RE50AS	Incremental encoder, 5000 ppr
-RE30X5	Incremental encoder, 90000 ppr (18000 line with integral X5 multiplier)
-RE30AS	Incremental encoder, 18000 ppr
-RE10AS	Incremental encoder, 36000 ppr (ADR240 only)

Stage Construction Option

/VAC3	Vacuum preparation of stage to 10^{-3} torr
/VAC6	Vacuum preparation of stage to 10^{-6} torr

Limits

-NC	Normally closed home limit
-NO	Normally open home limit