

AMG-GR Series

Gear-Driven Gimbals

Economical, high-accuracy, two-axis gimbal design

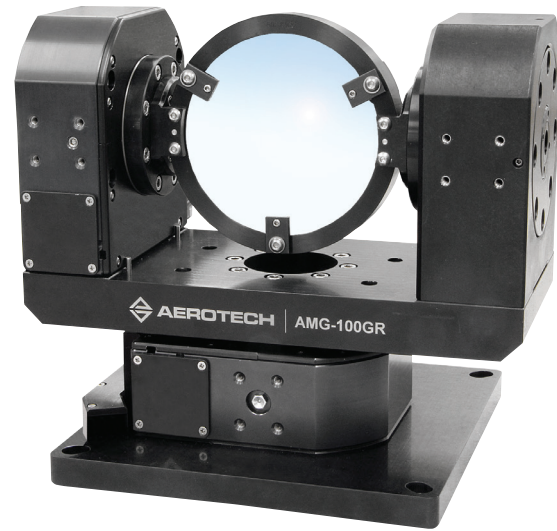
Travels from 90 degrees to continuous rotation available

Circular (100 to 300 mm) and custom cells available

Front surface reflecting and centered cell options

Direct encoder option for increased accuracy/repeatability

Servo and stepper motors available



Aerotech's AMG100GR gear-driven gimbal stage. The AMG-GR series are available in a wide variety of cell sizes and motor options.

The AMG-GR series of gear-driven motorized gimbal mounts provides economical, high-accuracy elevation-over-azimuth positioning. These gimbal mounts are built using the primary positioning elements of the robust and economical AGR-series. The AMG-GR is available in a variety of standard travel ranges. Due to the flexibility of the design, customized travels are easily accommodated. A variety of accuracy grades, motor types, and cell designs make this the ideal stage series for applications ranging from sensor calibration to laser beam steering.

Cell Design Versatility

The AMG-GR comes standard with circular cells ranging from 100 mm to 300 mm diameter. Cell mounting options include a centered (balanced) cell or a front-surface reflection option where the front of the optic is located on the axes of rotation. Special configurations are available

to accommodate non-circular optics, cameras, sensors, and round optics larger than 300 mm in diameter. Due to a modular-design approach, each gimbal mirror cell can be easily modified or replaced with different shaped cells to accommodate sensors or other asymmetrically-shaped payloads.

Flexible Options

The AMG-GR can be outfitted with brushless servo or stepper motors. A full range of matching drives and controls is available for a complete single-source solution.

For applications that require high-accuracy and repeatability, a direct-encoder mounted to the cell and yoke is available. Vacuum-compatible versions are also available.

AMG-GR Series SPECIFICATIONS

Mechanical Specifications		AMG100GR	AMG150GR	AMG200GR	AMG300GR
Travel ⁽¹⁾		180°, Continuous rotation (Azimuth), 90°, 315°, and Continuous rotation (Elevation)			
Clear Aperture		100 mm	150 mm	200 mm	300 mm
Accuracy ⁽²⁾	Uncalibrated	Azimuth: 0.87 mrad (180 arc sec) Elevation: 0.87 mrad (180 arc sec)		Azimuth: 0.58 mrad (120 arc sec) Elevation: 0.58 mrad (120 arc sec)	
	Calibrated	Azimuth: 0.29 mrad (60 arc sec) Elevation: 0.29 mrad (60 arc sec)		Azimuth: 0.24 mrad (50 arc sec) Elevation: 0.24 mrad (50 arc sec)	
	Uncalibrated with Direct Encoder	Azimuth: 97 µrad (20 arc sec) Elevation: 97 µrad (20 arc sec)			
	Calibrated with Direct Encoder	Azimuth: 58 µrad (12 arc sec) Elevation: 58 µrad (12 arc sec)		Azimuth: 49 µrad (10 arc sec) Elevation: 49 µrad (10 arc sec)	
Repeatability (Bi-Directional) ⁽²⁾	Without Direct Encoder	Azimuth: 0.22 mrad (45 arc sec) Elevation: 0.22 mrad (45 arc sec)			
	With Direct Encoder	Azimuth: 39 µrad (8 arc sec) Elevation: 39 µrad (8 arc sec)		Azimuth: 29 µrad (6 arc sec) Elevation: 29 µrad (6 arc sec)	
Tilt Error Motion		49 µrad (10 arc sec)			
Orthogonality		73 µrad (15 arc sec)			
Gear Ratio		Azimuth: 51:1 Elevation: 51:1	Azimuth: 51:1 Elevation: 51:1	Azimuth: 85:1 Elevation: 67:1	Azimuth: 117:1 Elevation: 85:1
Maximum Speed ⁽³⁾	Servomotor	180°/s			
	Stepper Motor	60°/s		40°/s (Azimuth) 60°/s (Elevation)	40°/s
Azimuth Aperture, (Available with 180-degree azimuth travel only)		50 mm	50 mm	100 mm	150 mm
Max. Load Capacity		12 kg	15 kg	25 kg	45 kg
Maximum Torque Load to AZ/EL Shaft for Offset Loading		2.5 N·m	2.5 N·m	3.5 N·m	12 N·m
Mass (with BMS servomotor)	Standard	9.7 kg	11.9 kg	18.7 kg	32.2 kg
	Direct Encoder	11.1 kg	13.3 kg	20.8 kg	35.1 kg
Material		Aluminum			

Notes:

1. Custom travels available upon request.
2. Certified with each stage. Specifications are per axis.
3. Maximum speed is load dependent. Contact and Aerotech Application Engineer if imbalanced loads are present. Requires the selection of an appropriate amplifier with sufficient voltage and current.

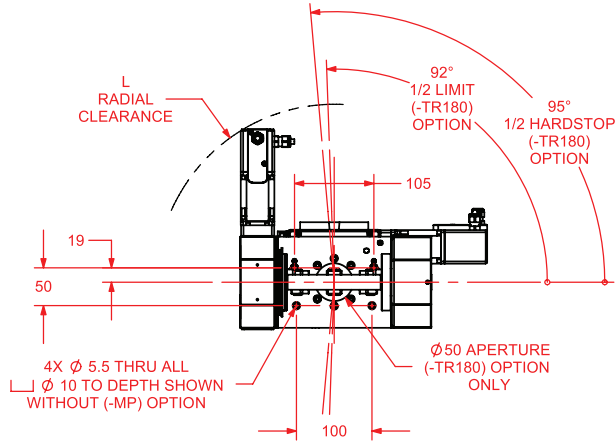
Electrical Specifications		AMG100GR	AMG150GR	AMG200GR	AMG300GR
Drive System		Precision Worm-Gear with Brushless or Stepping Motor			
Feedback	Standard	Rotary Servomotor Feedback: Choose Between TTL Digital Encoder or 1 Vpp Analog Encoder (See Ordering Options Table)			
	Direct Encoder	Noncontact Rotary Encoder Directly Mounted to AZ/EL Stage Shaft			
Maximum Bus Voltage	BM	80 VDC		80 VDC (Elevation) 340 VDC (Azimuth)	340 VDC
	BMS	340 VDC			
	SM ⁽¹⁾	40 VDC			
Limit Switches		5 V, Normally Closed			
Home Switch		Near Limit (for Limited Travel Stage Version)			

Note:

1. For SM motors with Aerotech controllers, amplifier bus voltages are 2X values listed.

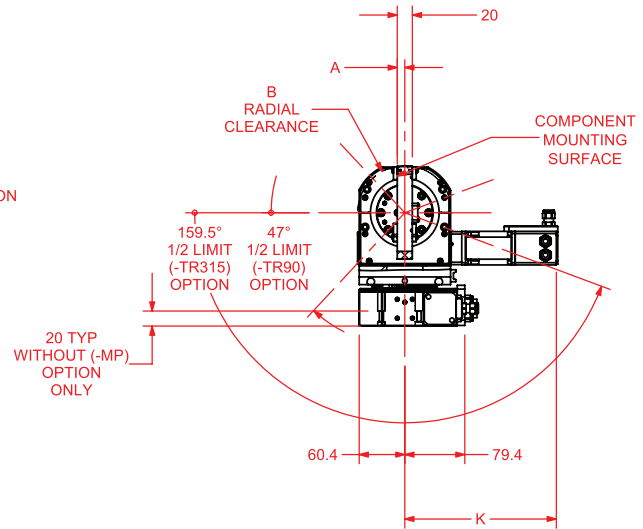
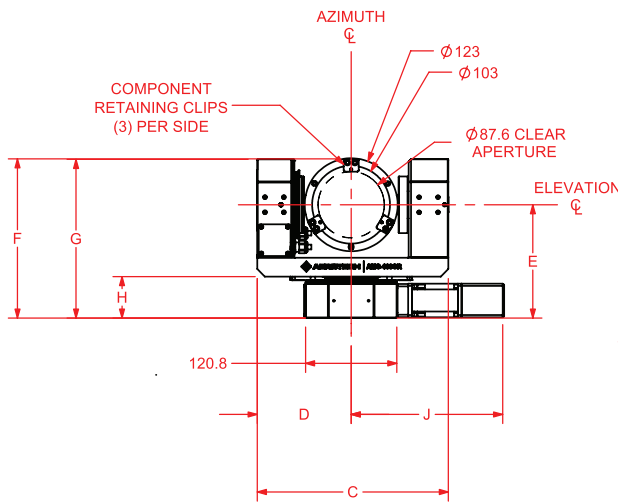
Recommended Controller		
Multi-Axis	A3200	Ndrive MP/Ndrive CP/Npaq
	Ensemble	Ensemble MP/Ensemble CP/Epaq
Single-Axis	Soloist	Soloist MP/Soloist CP

AMG100GR Series DIMENSIONS



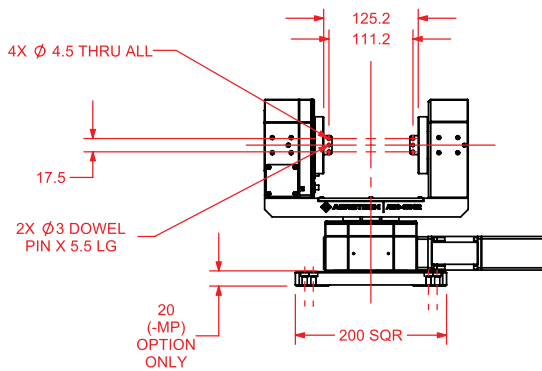
DIMENSIONS: MILLIMETERS [INCHES]

AZIMUTH MOTOR	J	ELEVATION MOTOR	K	L
-M1 -M3	200.4	-M1 -M3	200.4	244.4
-M2 -M4	228.4	-M2 -M4	228.4	267.8
-M5	166.5	-M5	166.5	215.1
-M6	203.4	-M6	203.4	244.7
-M7	202.3	-M7	202.3	246.4

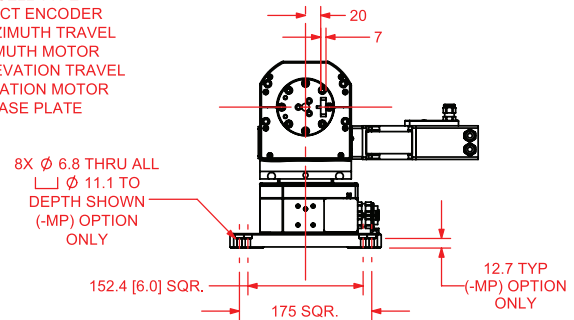


CELL TYPE	A	B
-CL1	0	131.4
-CL2	10	121.2

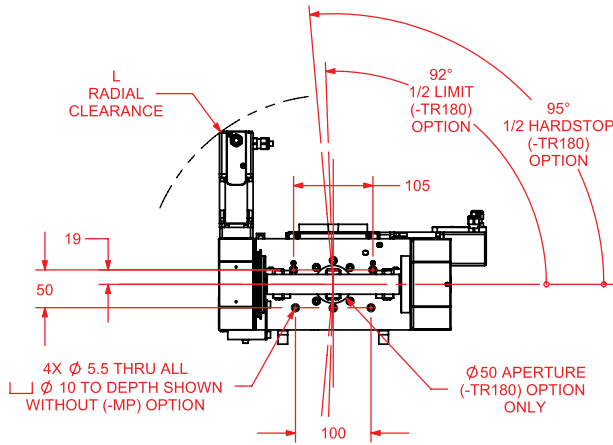
OPTION	C	D	E	F	G	H
WITH DIRECT ENC	269.2	140.6	166.4	227.9	226.8	71.4
WITHOUT DIRECT ENC	252.8	124.2	150	211.5	210.4	55.0



(-CL0) CELL TYPE
(-E1) DIRECT ENCODER
(-TRCNT) AZIMUTH TRAVEL
(-M2) AZIMUTH MOTOR
(-TRCNT) ELEVATION TRAVEL
(-M2) ELEVATION MOTOR
(-MP) BASE PLATE

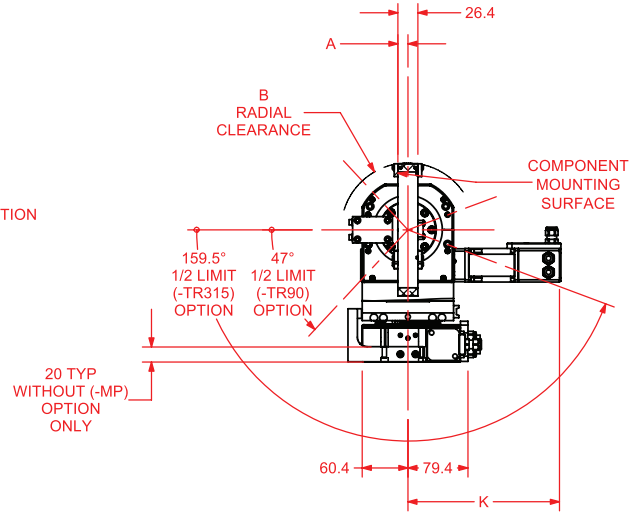
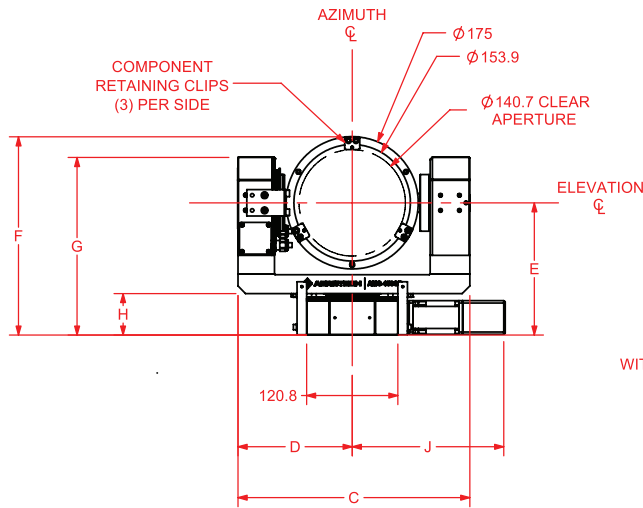


AMG150GR Series DIMENSIONS



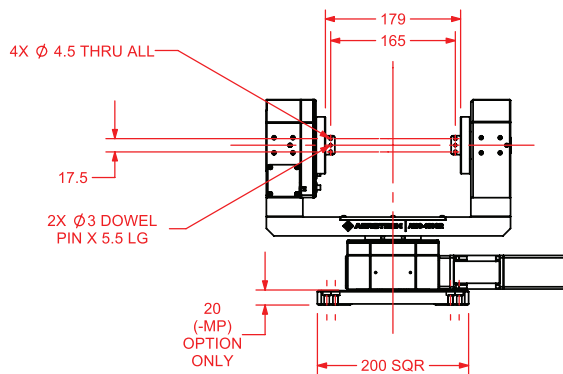
DIMENSIONS: MILLIMETERS [INCHES]

AZIMUTH MOTOR	J	ELEVATION MOTOR	K	L
-M1 -M3	200.4	-M1 -M3	200.4	260.8
-M2 -M4	228.4	-M2 -M4	228.4	282.8
-M5	166.5	-M5	166.5	233.0
-M6	203.4	-M6	203.4	260.7
-M7	202.3	-M7	202.3	262.7

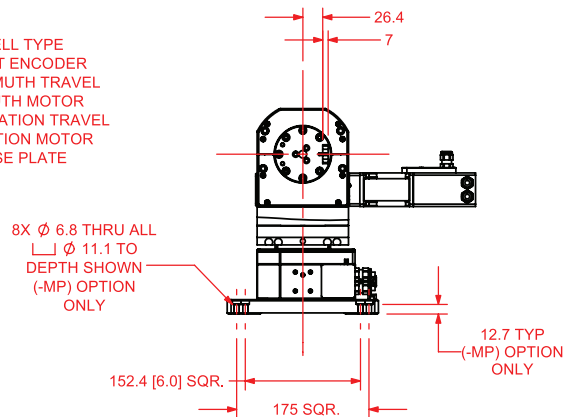


CELL TYPE	A	B
-CL1	0	92.8
-CL2	13.2	89.3

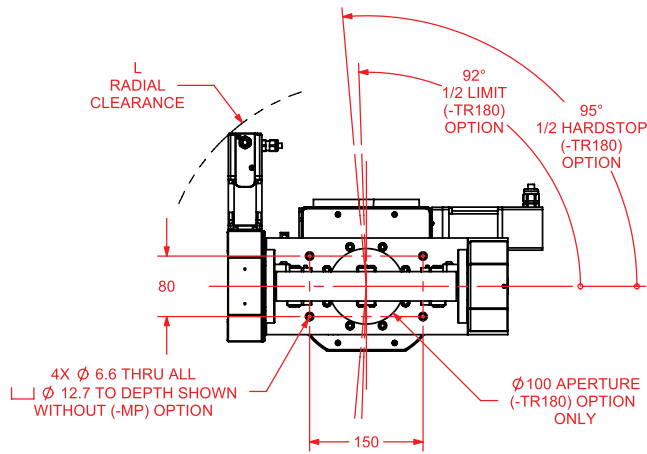
OPTION	C	D	E	F	G	H
WITH DIRECT ENC	323.0	167.5	191.4	278.9	251.8	71.4
WITHOUT DIRECT ENC	306.6	151.1	175	262.5	235.4	55.0



- (-CL0) CELL TYPE
- (-E1) DIRECT ENCODER
- (-TRCNT) AZIMUTH TRAVEL
- (-M2) AZIMUTH MOTOR
- (-TRCNT) ELEVATION TRAVEL
- (-M2) ELEVATION MOTOR
- (-MP) BASE PLATE

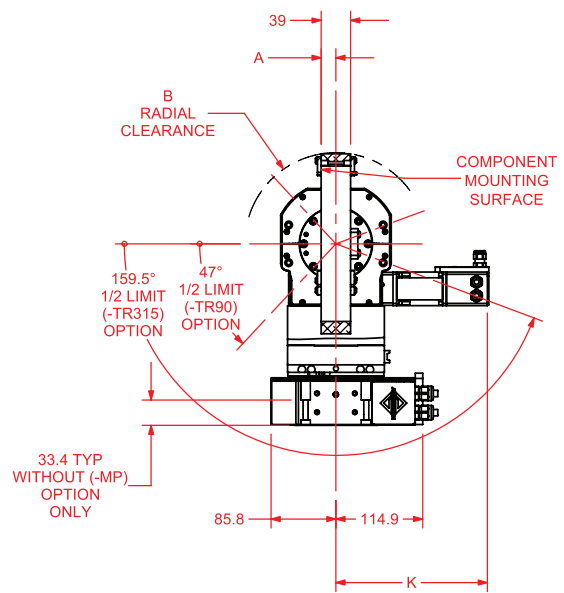
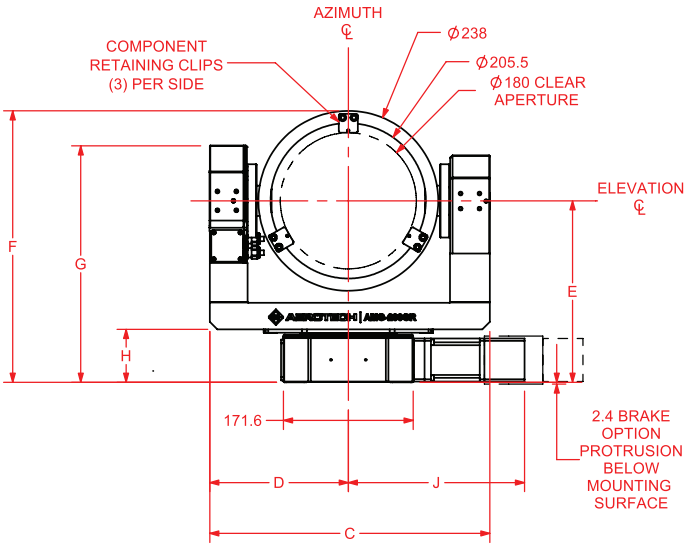


AMG200GR Series DIMENSIONS



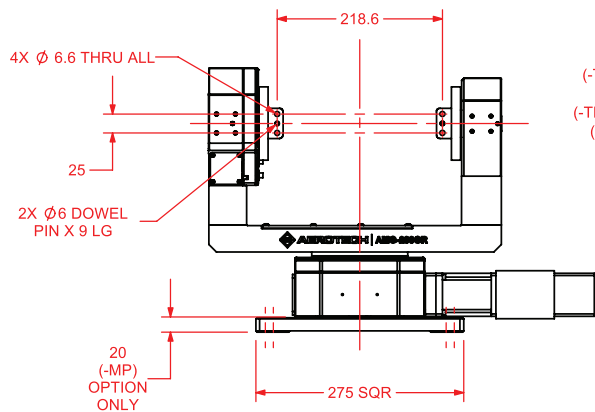
DIMENSIONS: MILLIMETERS [INCHES]

AZIMUTH MOTOR	J	ELEVATION MOTOR	K	L
-M1 -M3	233.1	-M1 -M3	200.4	282.4
-M2 -M4	310.3	-M2 -M4	228.4	302.9
-M5 -M7	233.1	-M5	166.5	256.6
-M6 -M8	310.3	-M6	203.4	281.9
-M9	211.7	-M7	202.3	284.3



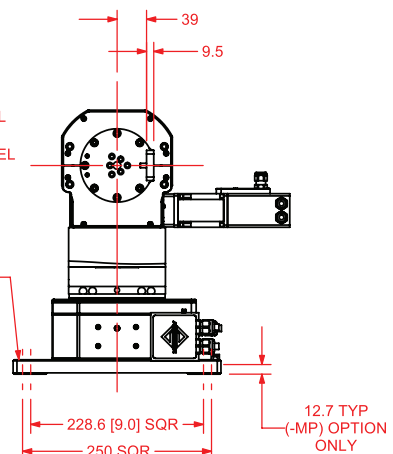
CELL TYPE	A	B
-CL1	0	250.5
-CL2	19.5	241.2

OPTION	C	D	E	F	G	H
WITH DIRECT ENC	387.0	199.7	256.0	375	329.1	86
WITHOUT DIRECT ENC	370.6	183.3	240.0	359	313.1	70

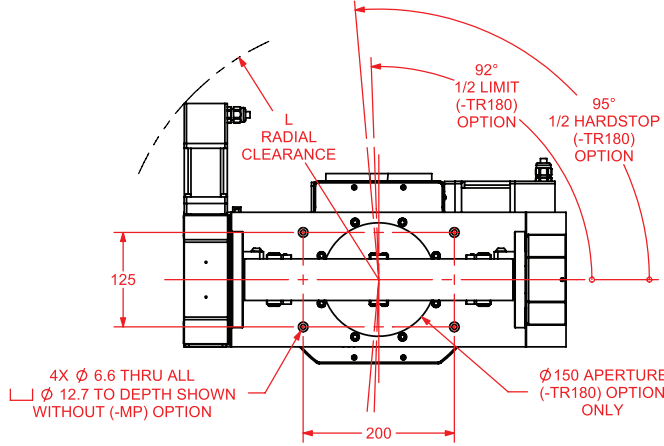


(-CL0) CELL TYPE
(-E1) DIRECT ENCODER
(-TRCNT) AZIMUTH TRAVEL
(-M2) AZIMUTH MOTOR
(-TRCNT) ELEVATION TRAVEL
(-M2) ELEVATION MOTOR
(-MP) BASE PLATE

8X Ø 6.8 THRU ALL
Ø 11.1 TO DEPTH SHOWN
(-MP) OPTION ONLY

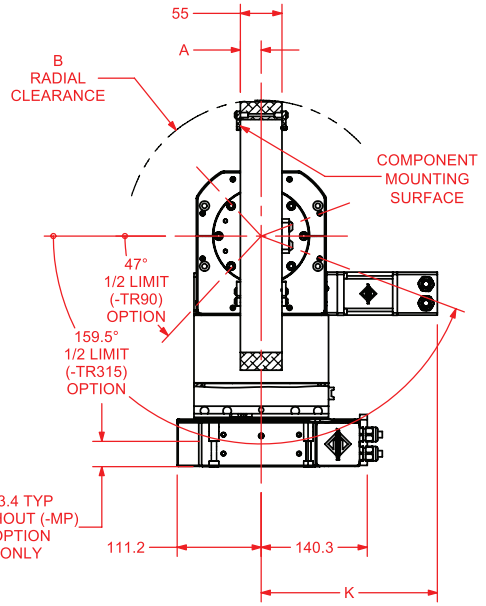
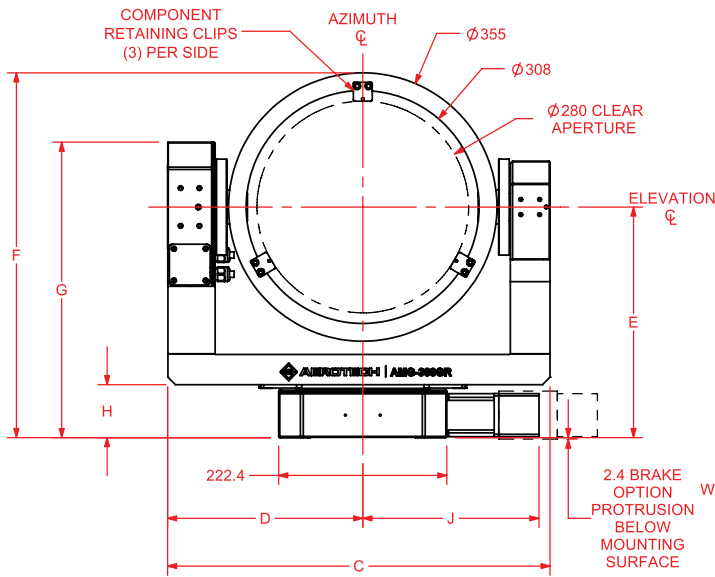


AMG300GR Series DIMENSIONS



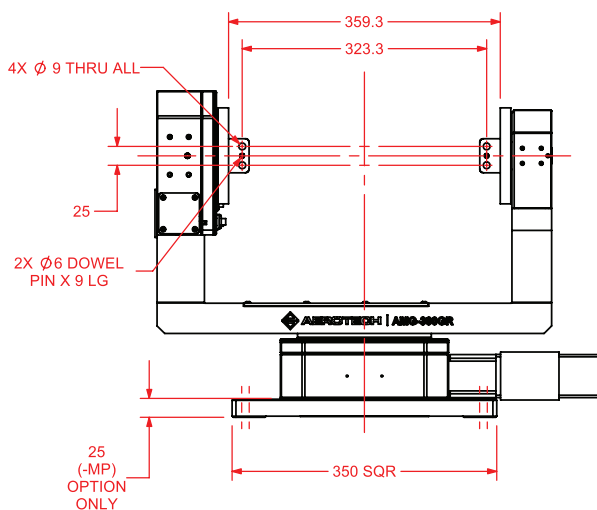
DIMENSIONS: MILLIMETERS [INCHES]

AZIMUTH MOTOR	J	ELEVATION MOTOR	K	L
-M1 -M3	233.1	-M1 -M3	233.1	359.6
-M2 -M4	310.3	-M2 -M4	310.3	413.8
-M5 -M7	233.1	-M5 -M7	233.1	359.6
-M6 -M8	310.3	-M6 -M8	310.3	413.8
-M9	211.7	-M9	211.7	346.9



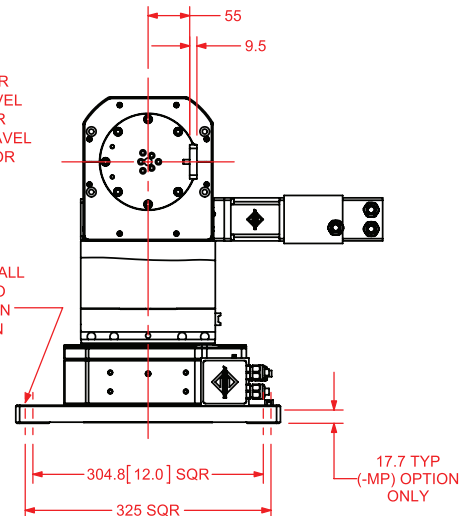
CELL TYPE	A	B
-CL1	0	185.8
-CL2	27.5	179.6

OPTION	C	D	E	F	G	H
WITH DIRECT ENC	522.4	274.7	321	498.5	406.8	86
WITHOUT DIRECT ENC	506	258.3	305	482.5	390.8	70



(-CL0) CELL TYPE
(-E1) DIRECT ENCODER
(-TRCNT) AZIMUTH TRAVEL
(-M2) AZIMUTH MOTOR
(-TRCNT) ELEVATION TRAVEL
(-M2) ELEVATION MOTOR
(-MP) BASE PLATE

8X Ø 6.8 THRU ALL
Ø 11.1 TO DEPTH SHOWN
(-MP) OPTION ONLY



AMG300GR Series ORDERING INFORMATION

AMG-GR Gear-Driven Gimbal

AMG100GR	AMG100GR gear-driven gimbal with 100 mm diameter clear aperture
AMG150GR	AMG150GR gear-driven gimbal with 150 mm diameter clear aperture
AMG200GR	AMG200GR gear-driven gimbal with 200 mm diameter clear aperture
AMG300GR	AMG300GR gear-driven gimbal with 300 mm diameter clear aperture

Cell (Required)

-CL0	No cell
-CL1	Front surface reflecting cell
-CL2	Centered cell

Direct Rotary Feedback (Optional)

-E1	Incremental encoders, 1 Vpp, one per axis
-E2	Incremental encoders, digital TTL output, x5 multiplication, one per axis
-E3	Incremental encoders, digital TTL output, x50 multiplication, one per axis

Azimuth Travel (Required)

-TR180	Limited travel, ± 90 degrees
-TRCNT	Continuous travel

Azimuth Motor (Required)

-M0	No motor
-M1	BMS35 brushless servomotor with 2000-line TTL encoder (AMG100GR, AMG150GR) BMS60 brushless servomotor with 2500-line TTL encoder (AMG200GR, AMG300GR)
-M2	BMS35 brushless servomotor with 2000-line TTL encoder and brake (AMG100GR, AMG150GR) BMS60 brushless servomotor with 2500-line TTL encoder and brake (AMG200GR, AMG300GR)
-M3	BMS35 brushless servomotor with 1000-line 1 Vpp encoder (AMG100GR, AMG150GR) BMS60 brushless servomotor with 1000-line 1 Vpp encoder (AMG200GR, AMG300GR)
-M4	BMS35 brushless servomotor with 1000-line 1 Vpp encoder and brake (AMG100GR, AMG150GR) BMS60 brushless servomotor with 1000-line 1 Vpp encoder and brake (AMG200GR, AMG300GR)
-M5	BM22 brushless servomotor with 2000-line TTL encoder (AMG100GR, AMG150GR) BM75 brushless servomotor with 2500-line TTL encoder (AMG200GR, AMG300GR)
-M6	BM22 brushless servomotor with 2000-line TTL encoder and brake (AMG100GR, AMG150GR) BM75 brushless servomotor with 2500-line TTL encoder and brake (AMG200GR, AMG300GR)
-M7	SM35 stepper motor (AMG100GR, AMG150GR) BM75 brushless servomotor with 1000-line 1 Vpp encoder (AMG200GR, AMG300GR)
-M8	BM75 brushless servomotor with 1000-line 1 Vpp encoder and brake (AMG200GR, AMG300GR)
-M9	SM60 stepper motor (AMG200GR, AMG300GR)

Elevation Travel (Required)

-TR090	Limited travel, ± 45 degrees
-TR315	Limited travel, ± 157.5 degrees
-TRCNT	Continuous travel

Elevation Motor (Required)

-M0	No motor
-M1	BMS35 brushless servomotor with 2000-line TTL encoder (AMG100GR, AMG150GR, AMG200GR) BMS60 brushless servomotor with 2500-line TTL encoder (AMG300GR)
-M2	BMS35 brushless servomotor with 2000-line TTL encoder and brake (AMG100GR, AMG150GR, AMG200GR) BMS60 brushless servomotor with 2500-line TTL encoder and brake (AMG300GR)
-M3	BMS35 brushless servomotor with 1000-line 1 Vpp encoder (AMG100GR, AMG150GR, AMG200GR) BMS60 brushless servomotor with 1000-line 1 Vpp encoder (AMG300GR)
-M4	BMS35 brushless servomotor with 1000-line 1 Vpp encoder and brake (AMG100GR, AMG150GR, AMG200GR) BMS60 brushless servomotor with 1000-line 1 Vpp encoder and brake (AMG300GR)

AMG300GR Series ORDERING INFORMATION

-M5	BM22 brushless servomotor with 2000-line TTL encoder (AMG100GR, AMG150GR, AMG200GR)
-M6	BM75 brushless servomotor with 2500-line TTL encoder (AMG300GR) BM22 brushless servomotor with 2000-line TTL encoder and brake (AMG100GR, AMG150GR, AMG200GR)
-M7	BM75 brushless servomotor with 2500-line TTL encoder and brake (AMG300GR) SM35 stepper motor (AMG100GR, AMG150GR, AMG200GR)
-M8	BM75 brushless servomotor with 1000-line 1 Vpp encoder (AMG300GR)
-M9	BM75 brushless servomotor with 1000-line 1 Vpp encoder and brake (AMG300GR) SM60 stepper motor (AMG300GR)

Mounting Plate (Optional)

-MP	Optical table mounting plate
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Note: -MP option required when continuous azimuth travel option is selected.

Metrology (Required)

-PL0	No metrology performance plots
-PL1	Metrology, uncalibrated with performance plots
-PL2	Metrology, calibrated (HALAR) with performance plots

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.