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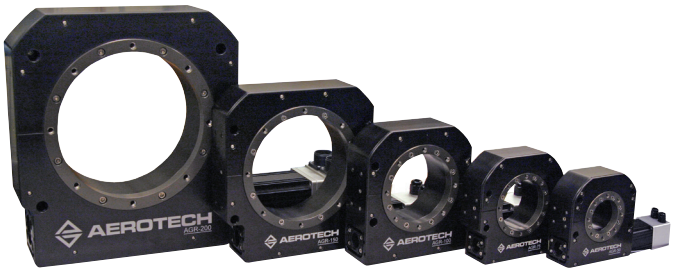
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AGR Series

Gear-Driven Rotary Stages

- Enhanced speed and load capacity
- Large aperture addresses a wide range of applications
- Continuous 360 degrees rotary positioning
- Direct encoder options available



AGR gear-driven rotary stages have a large, clear aperture and are available with a variety of motor selections to meet your needs.

AGR series motorized rotary stages provide significant improvements in speed, load capacity, and long-term positioning performance over previous generations of worm-gear-drive stages. AGR series stages address a wide range of applications for general purpose positioning in laboratory and industrial uses.

Construction Features

The presence of a large, clear aperture in the stage allows the AGR series to address applications requiring a through-hole or accommodations to mount an optic, including articulation of beam polarizing lenses, through-holes for cabling and/or air lines, or vision/camera/inspection applications.

The AGR stage base is fabricated from an aluminum alloy that offers significant weight savings in multi-axis arrangements and other weight critical applications, while providing high structural stiffness and long-term stability.

Each stage is designed with two high-precision angular contact bearings with optimal spacing to provide excellent error motions coupled with high load capacities in a small, compact package.

Flexible Options

Options include flexible motor selections as well as a direct encoder mounted to the stage shaft for outstanding repeatability and to virtually eliminate hysteresis and backlash. Vacuum-compatible versions (for use in pressures as low as 10^{-6} torr) are also available.

Motor and Drives

Standard AGR stage configurations feature Aerotech's brushless servomotors. However, all AGR stages can be outfitted with stepper or DC brush motors. A full range of matching drives and controls are available for a complete single-source solution.

AGR Series SPECIFICATIONS

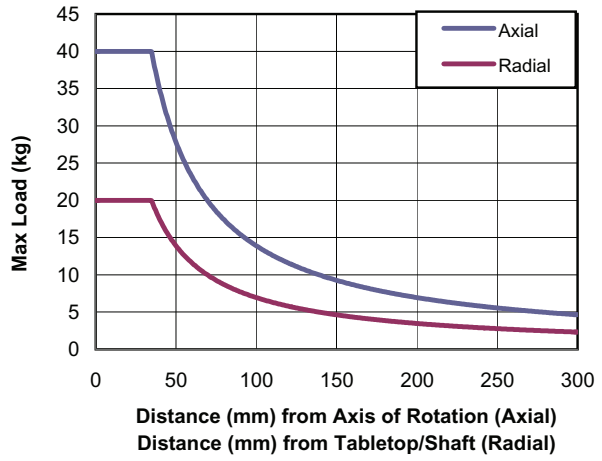
Mechanical Specifications		AGR50	AGR75	AGR100	AGR150	AGR200
Travel		360° (Limited Travel Versions Available)				
Accuracy	Uncalibrated	0.87 mrad (180 arc sec)	0.58 mrad (120 arc sec)			
	Calibrated	0.29 mrad (60 arc sec)	0.24 mrad (50 arc sec)			
	Uncalibrated with Direct Encoder Option	97 µrad (20 arc sec)				
	Calibrated with Direct Encoder Option	58 µrad (12 arc sec)	49 µrad (10 arc sec)			
Repeatability (Uni-Directional)	Standard	49 µrad (10 arc sec)				
	Direct Encoder(1)	24 µrad (5 arc sec)				
Repeatability (Bi-Directional)	Standard	0.22 mrad (45 arc sec)				
	Direct Encoder(1)	39 µrad (8 arc sec)		29 µrad (6 arc sec)		
Tilt Error Motion		49 µrad (10 arc sec)				
Axial Error Motion		5 µm				
Radial Error Motion		10 µm				
Gear Ratio		51:1	67:1	85:1	117:1	126:1
Maximum Speed(2)	with Brushless Servomotor (BM and BMS Models)	180°/s				120°/s
	with Stepper Motor	60°/s		40°/s		
Maximum Acceleration(3)		720°/s^2				480°/s^2
Aperture	mm	50 mm	75 mm	100 mm	150 mm	200 mm
Load Capacity	Axial	40 kg	100 kg	200 kg	300 kg	425 kg
	Radial	20 kg	50 kg	100 kg	125 kg	200 kg
	Moment	See Moment Load Curves				
Maximum Torque Load to Stage Shaft		2.5 N·m	3.5 N·m	12 N·m	20 N·m	80 N·m
Rotor Inertia (Unloaded)		0.00052 kg·m^2	0.0013 kg·m^2	0.0035 kg·m^2	0.011 kg·m^2	0.076 kg·m^2
Stage Mass (No Motor)	Standard	1.9 kg	2.4 kg	4.5 kg	6.1 kg	18.6 kg
	Direct Encoder	2.5 kg	3.1 kg	5.6 kg	7.6 kg	21.7 kg
Material		Aluminum				

Notes:
1. Direct encoder repeatability specifications are for systems using the -E1 or -E3 direct encoder options only.
2. Maximum speed is load dependent. Contact an Aerotech Application Engineer if imbalanced loads are present.
3. Unloaded acceleration.
4. On-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.

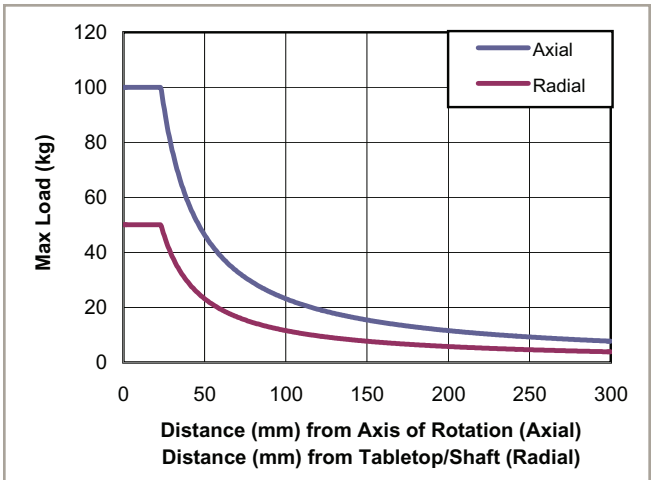
Electrical Specifications		AGR50	AGR75	AGR100	AGR150	AGR200
Drive System		Precision Worm-Gear with Brushless Servomotor or Stepper Motor				
Feedback	Standard	Noncontact Rotary Encoder Contained Within Motor; See Motor Description Under "Ordering Options" Section for Details				
	Direct Encoder	Noncontact Rotary Encoder Directly Mounted to AGR Stage Shaft				
		15744 Lines/Rev	18000 Lines/Rev	23600 Lines/Rev	31488 Lines/Rev	40000 Lines/Rev
Maximum Bus Voltage	with Brushless Servomotor (BM Models)	80 VDC		320 VDC		
	with Brushless Servomotor (BMS Models)	320 VDC				
	with Stepper Motor	40 VDC				80 VDC
Limit Switches		5 V, Normally Closed or Normally Open				
Home Switch		Near Limit (for Limited Travel Stage Version)				

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

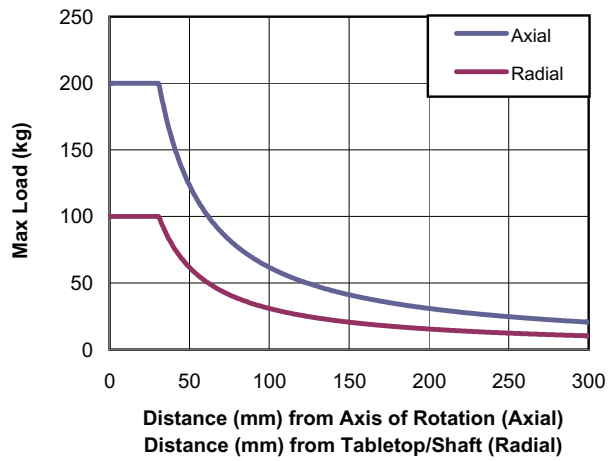
Recommended Controller		AGR50	AGR75	AGR100	AGR150	AGR200
Multi-Axis	A3200	Ndrive MP10/Ndrive CP10/Npaq				
	Ensemble	Ensemble MP10/Ensemble CP10/Epaq				
Single Axis	Soloist	Soloist MP10/Soloist CP10				



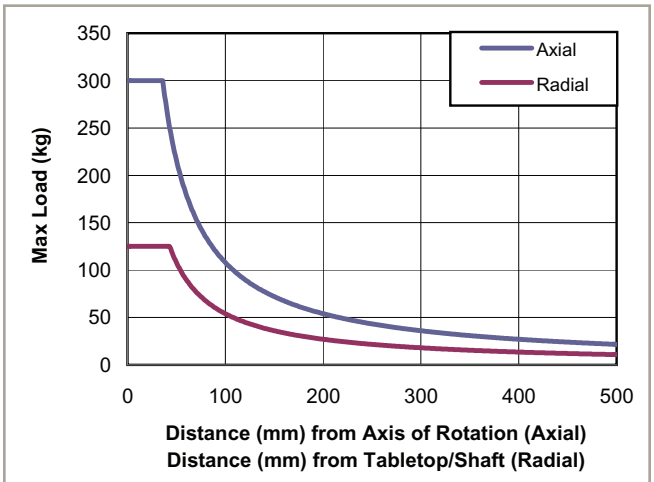
Axial and Radial Cantilevered Load Capability (AGR50)



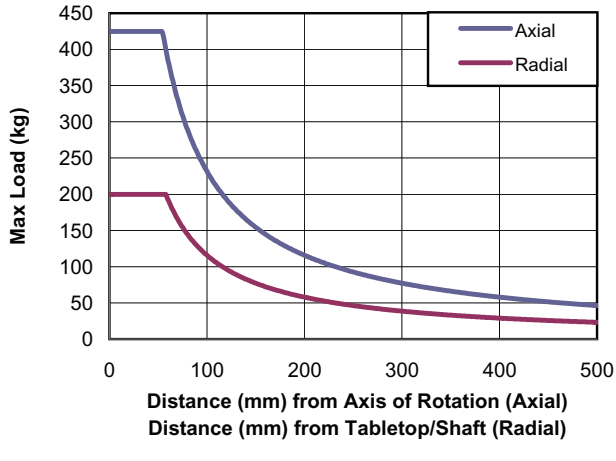
Axial and Radial Cantilevered Load Capability (AGR75)



Axial and Radial Cantilevered Load Capability (AGR100)



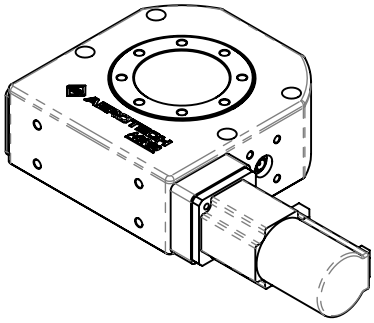
Axial and Radial Cantilevered Load Capability (AGR150)



Axial and Radial Cantilevered Load Capability (AGR200)

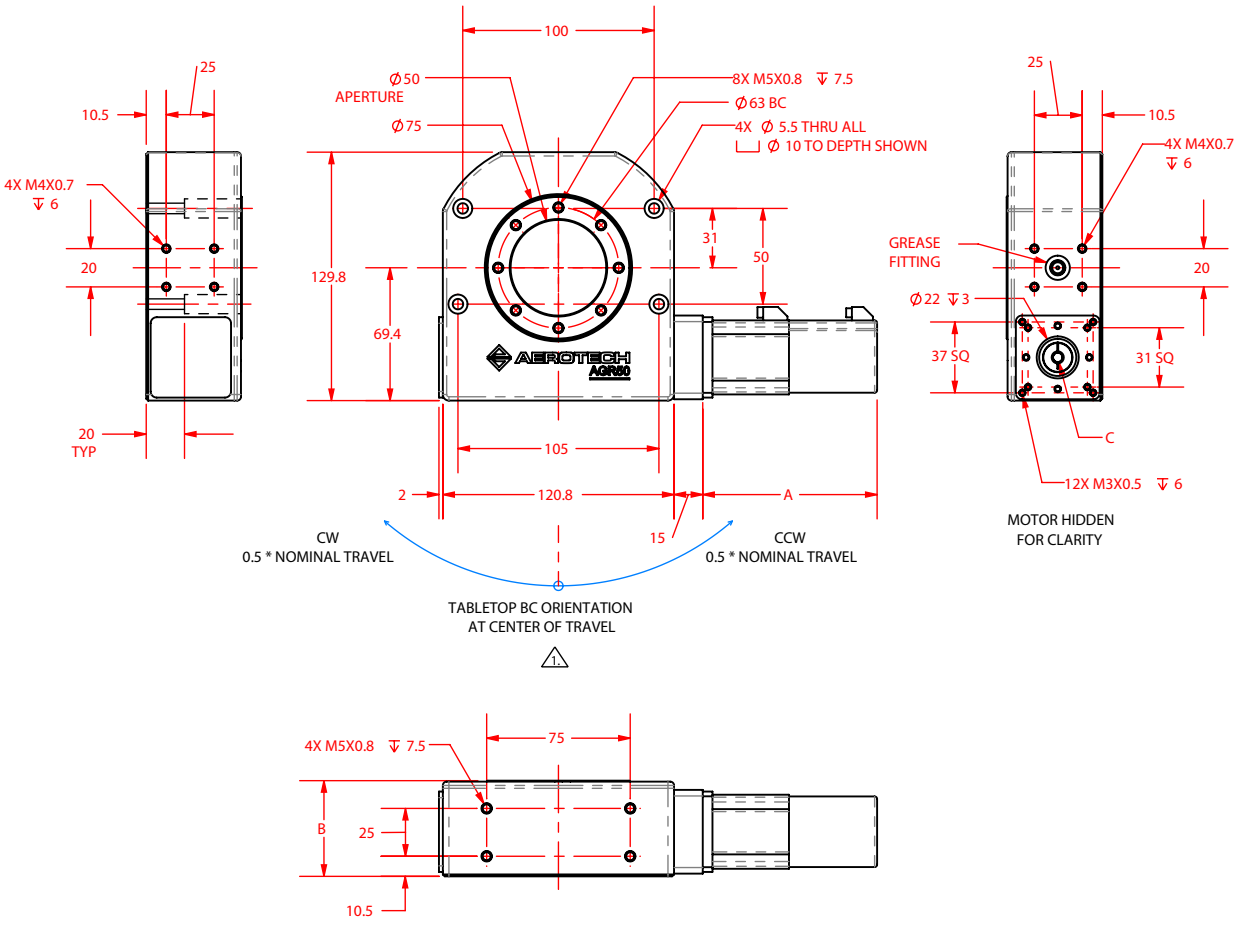
AGR Series DIMENSIONS

AGR50



MOTOR	LENGTH "A"	SHAFT INPUT DIAMETER "C"
NO MOTOR	-	Ø6.35 [0.25]
-M1, -M3	125	Ø6.35 [0.25]
-M2, -M4	153	Ø6.35 [0.25]
-M5	91.1	Ø6.35 [0.25]
-M6	128	Ø6.35 [0.25]
-M7	127	Ø5.0
-M8	132	Ø5.0

OPTION	HEIGHT "B"
DEFAULT	50
-SL1	60
-E1, -E2, -E3	66.4
-SL1 + -E1, -E2, -E3	76.4



NOTES:

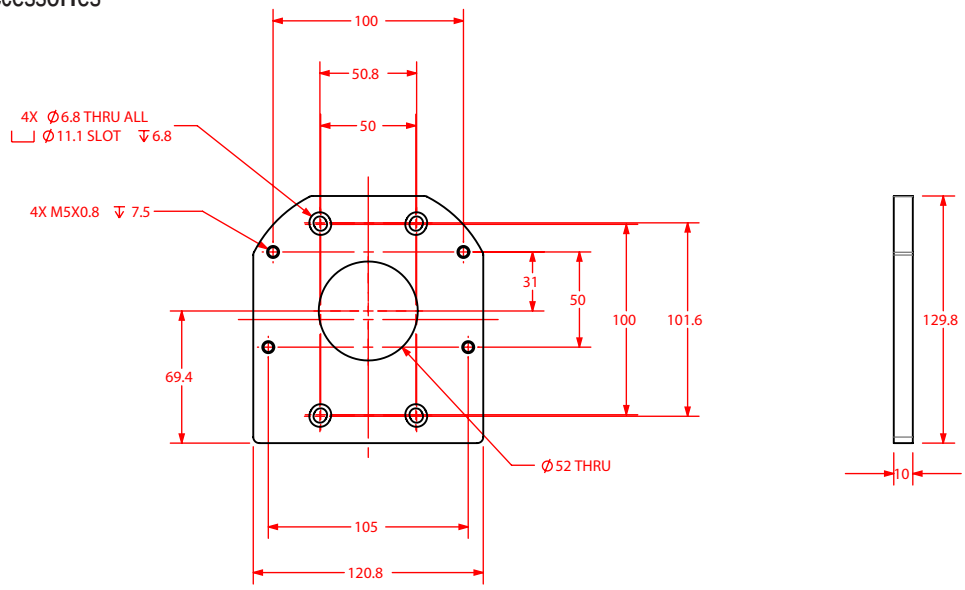
1. CW AND CCW TRAVEL LIMITATIONS APPLY TO -TRXXX LIMITED TRAVEL OPTION ONLY. ORIENTATION OF TABLETOP BC AT CENTER OF TRAVEL IS CONSISTENT FOR ALL CONFIGURATIONS.

DIMENSIONS: MILLIMETERS [INCHES]

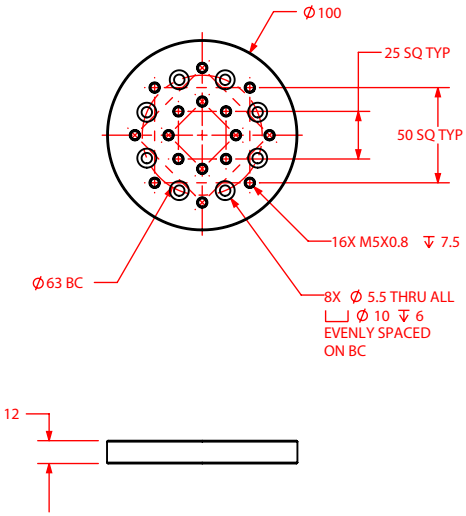
AGR Series DIMENSIONS

AGR50 Accessories

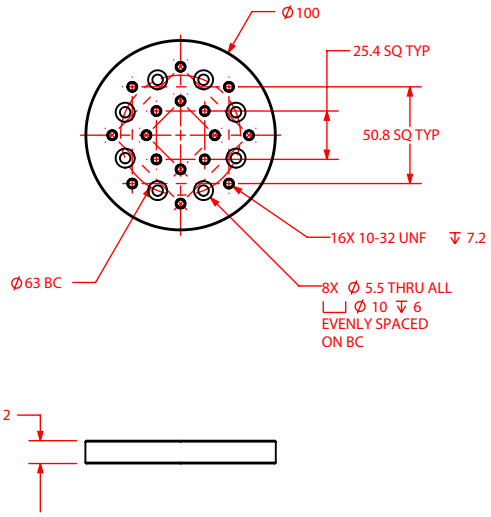
-MP1 MOUNTING PLATE



-TT1 TABLETOP



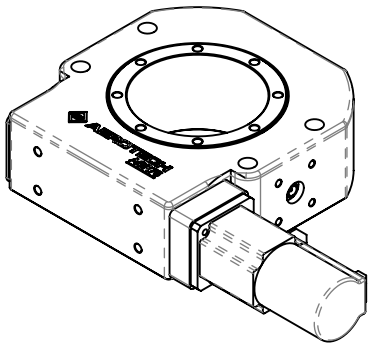
-TT2 TABLETOP



DIMENSIONS: MILLIMETERS

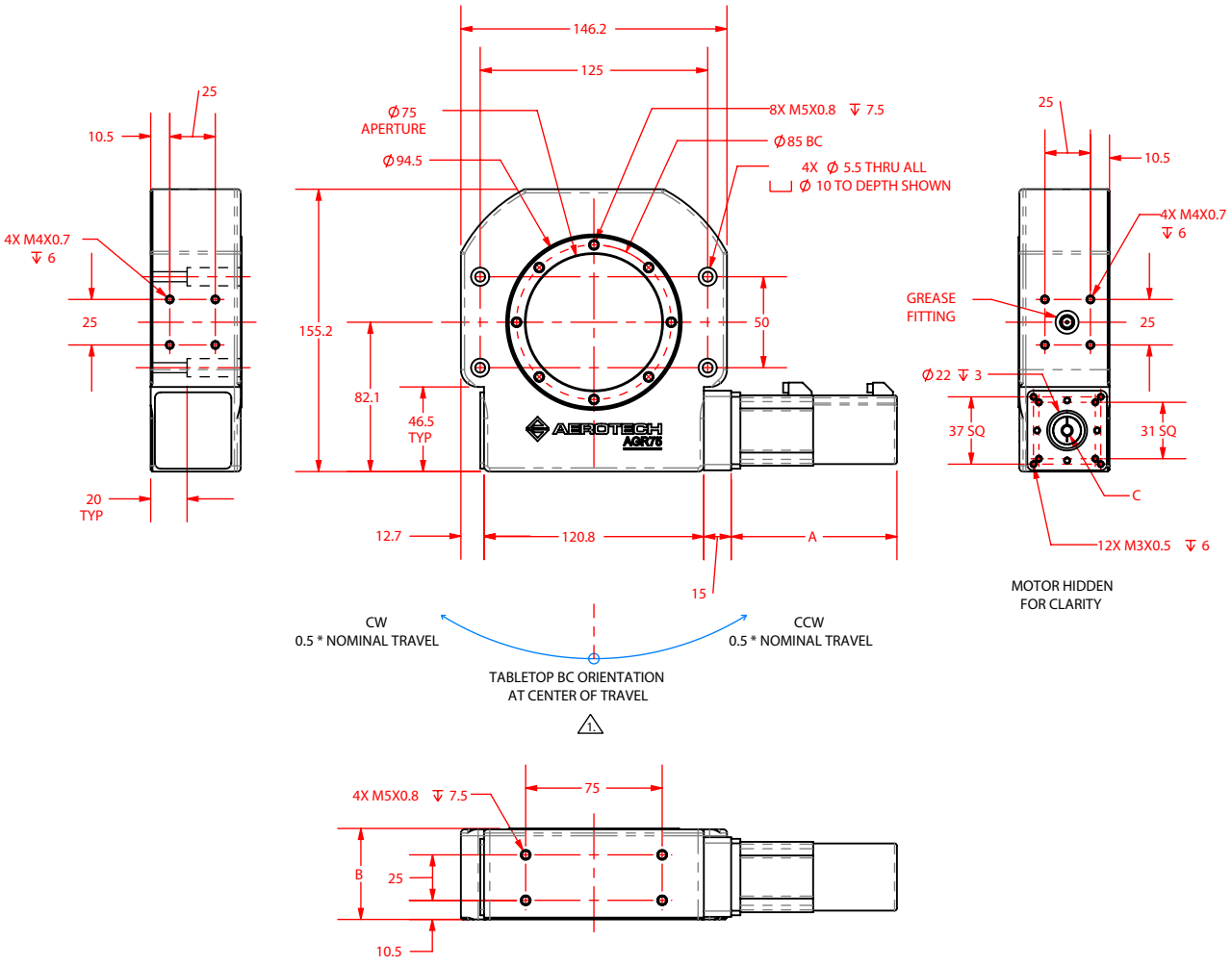
AGR Series DIMENSIONS

AGR75



MOTOR	LENGTH "A"	SHAFT INPUT DIAMETER "C"
NO MOTOR	-	Ø6.35 [0.25]
-M1, -M3	125	Ø6.35 [0.25]
-M2, -M4	153	Ø6.35 [0.25]
-M5	91.1	Ø6.35 [0.25]
-M6	128	Ø6.35 [0.25]
-M7	127	Ø5.0
-M8	132	Ø5.0

OPTION	HEIGHT "B"
DEFAULT	50
-SL1	60
-E1, -E2, -E3	66.4
-SL1 + -E1, -E2, -E3	76.4



NOTES:

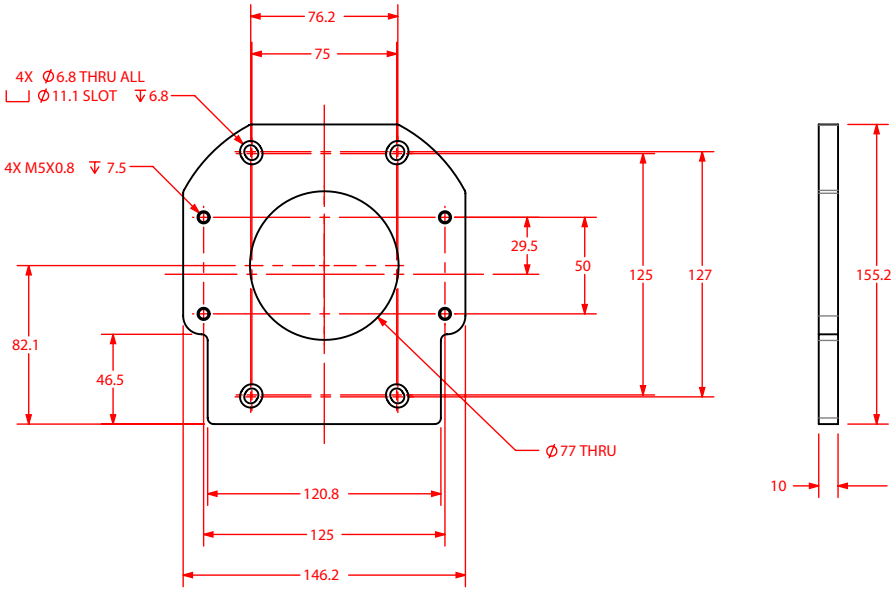
1. CW AND CCW TRAVEL LIMITATIONS APPLY TO -TRXXX LIMITED TRAVEL OPTION ONLY. ORIENTATION OF TABLETOP BC AT CENTER OF TRAVEL IS CONSISTENT FOR ALL CONFIGURATIONS.

DIMENSIONS: MILLIMETERS [INCHES]

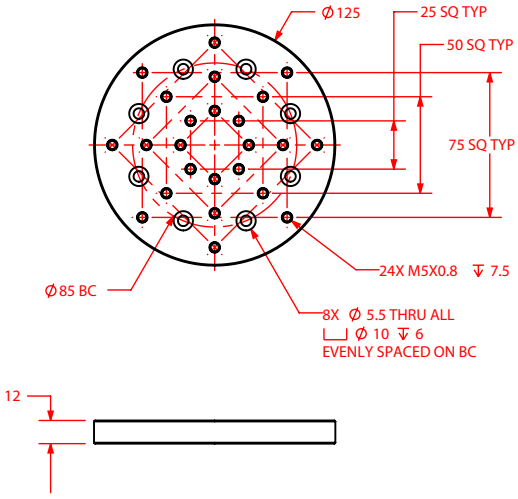
AGR Series DIMENSIONS

AGR75 Accessories

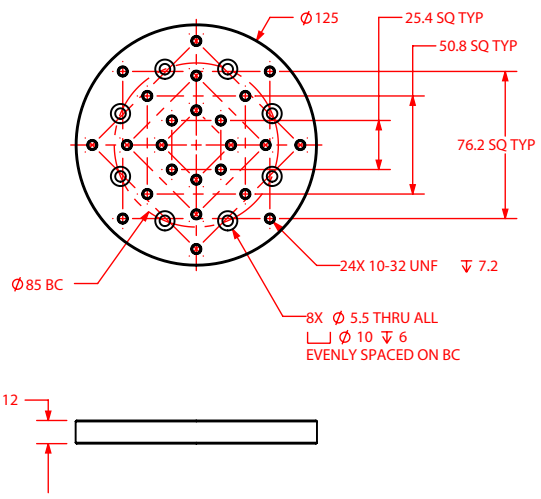
-MP1 MOUNTING PLATE



-TT1 TABLETOP



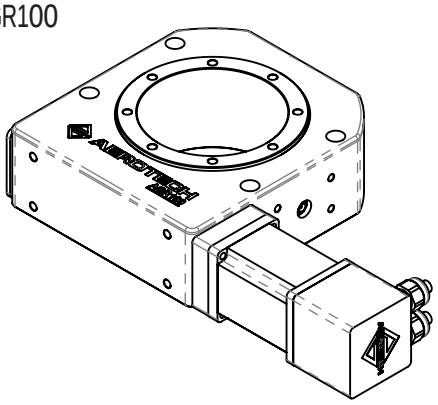
-TT2 TABLETOP



DIMENSIONS: MILLIMETERS

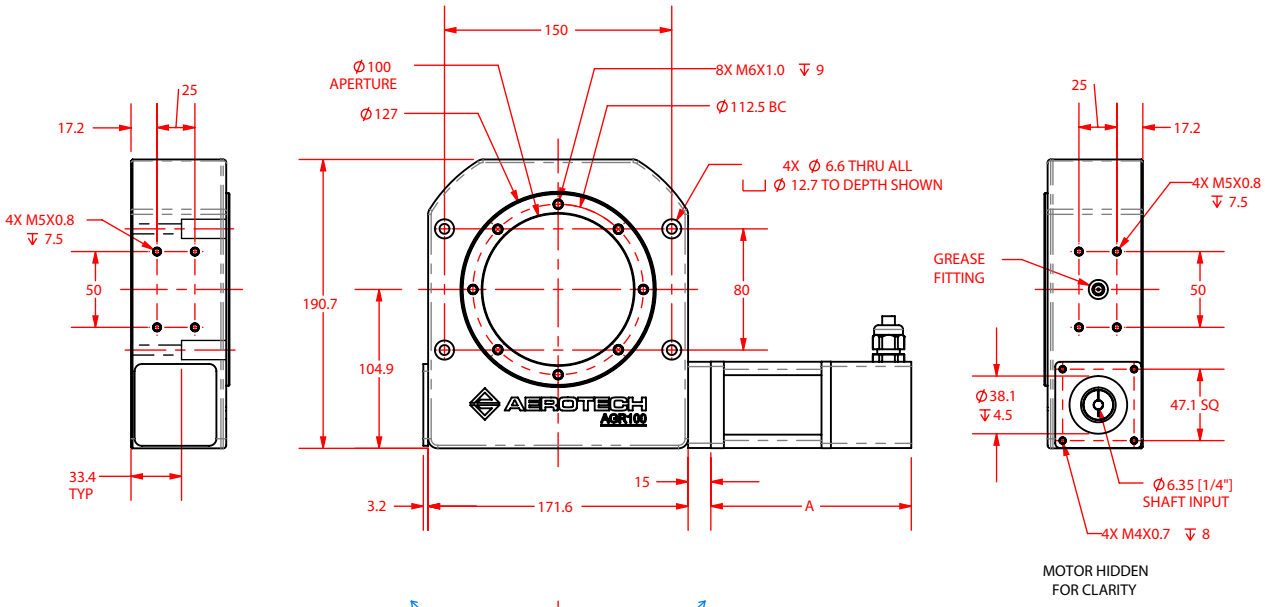
AGR Series DIMENSIONS

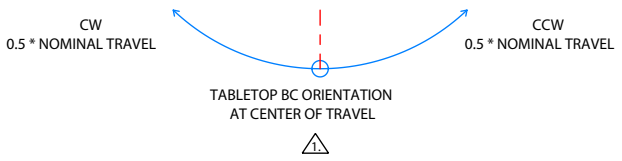
AGR100



MOTOR	LENGTH "A"
-M1, -M3, -M5, -M7	132.3
-M2, -M4, -M6, -M8	209.5
-M9	110.9
-M10	111.9

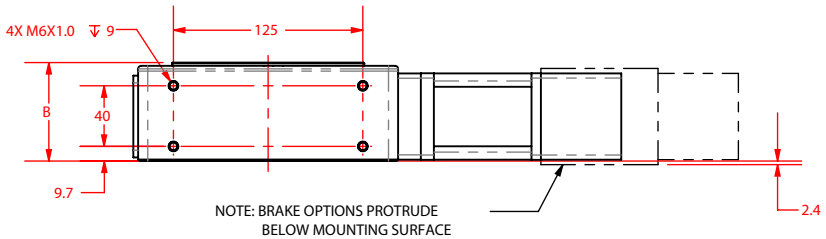
OPTION	HEIGHT "B"
DEFAULT	65
-SL1	78
-E1, -E2, -E3	81
-SL1 + -E1, -E2, -E3	94





TABLETOP BC ORIENTATION
AT CENTER OF TRAVEL

⚠1.



NOTE: BRAKE OPTIONS PROTRUDE
BELOW MOUNTING SURFACE

NOTES:

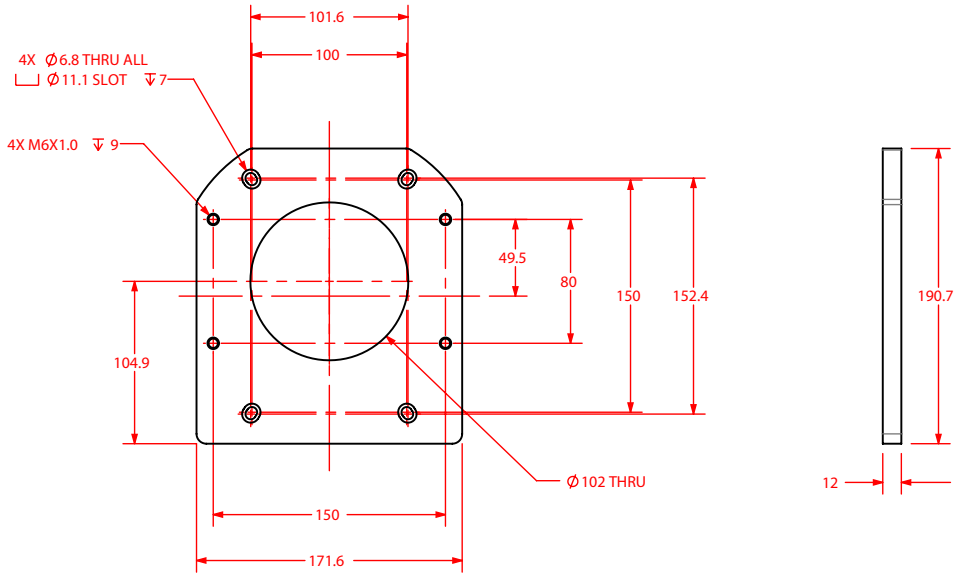
⚠1. CW AND CCW TRAVEL LIMITATIONS APPLY TO -TRXXX LIMITED TRAVEL OPTION ONLY. ORIENTATION OF TABLETOP BC AT CENTER OF TRAVEL IS CONSISTENT FOR ALL CONFIGURATIONS.

DIMENSIONS: MILLIMETERS

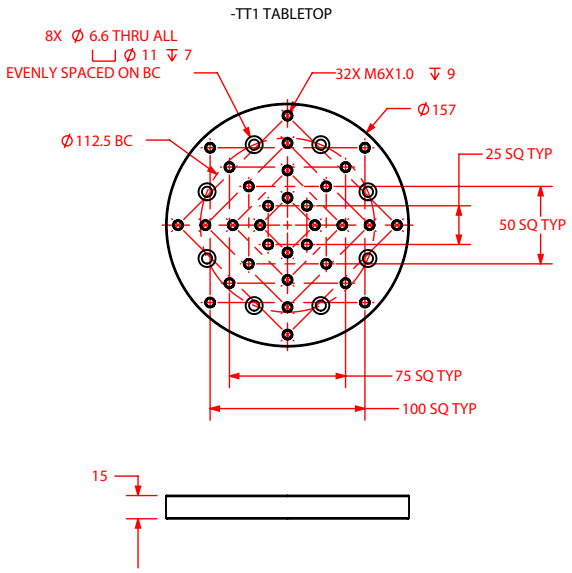
AGR Series DIMENSIONS

AGR100 Accessories

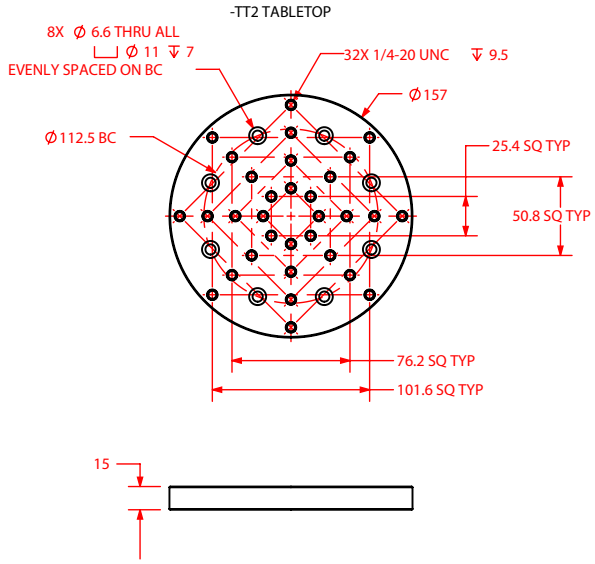
-MP1 MOUNTING PLATE



-TT1 TABLETOP



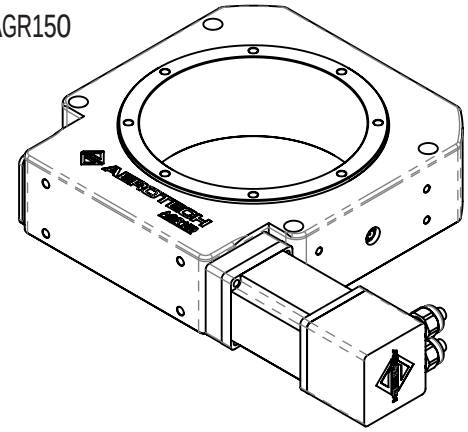
-TT2 TABLETOP



DIMENSIONS: MILLIMETERS

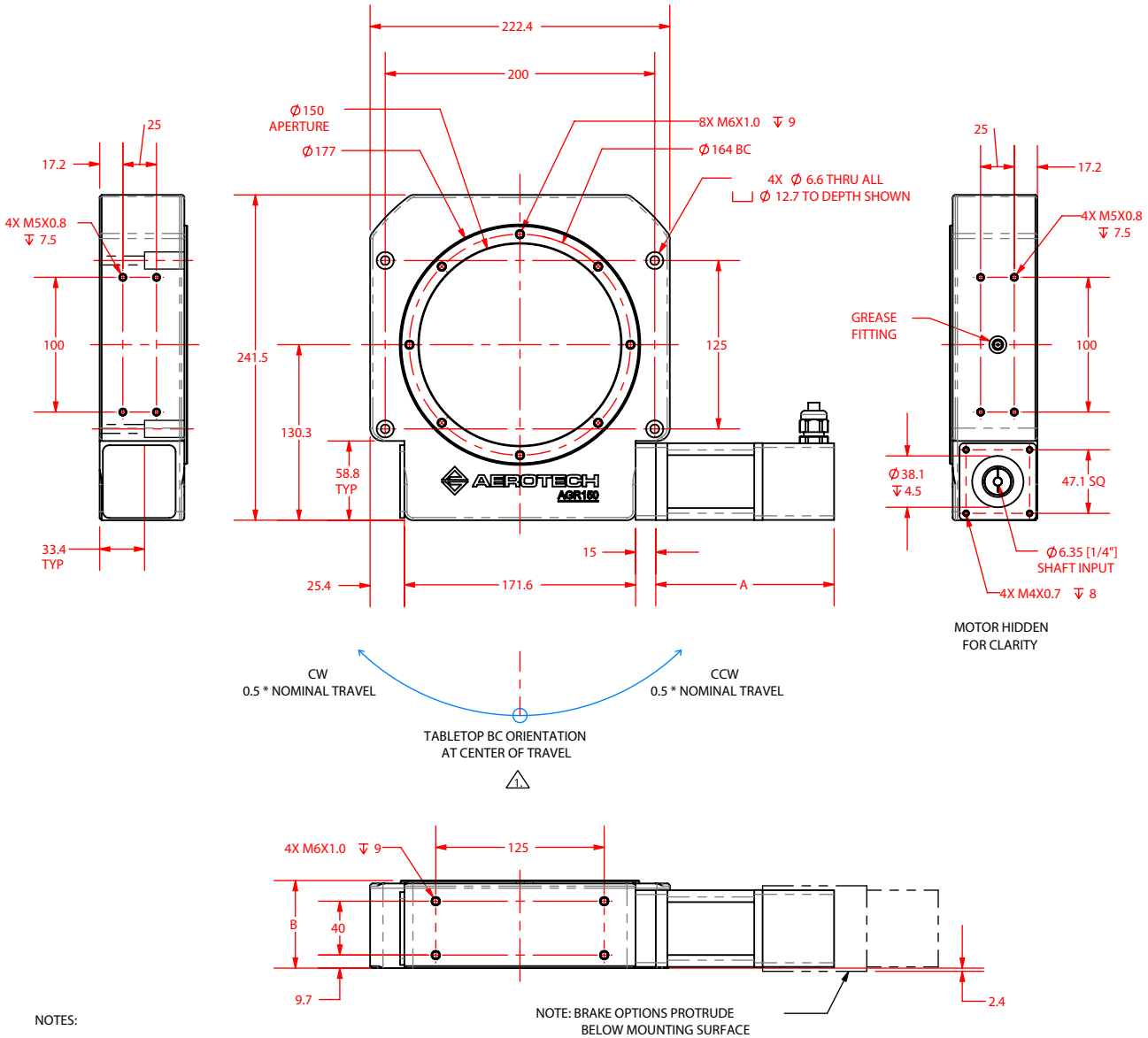
AGR Series DIMENSIONS

AGR150



MOTOR	LENGTH "A"
-M1, -M3, -M5, -M7	132.3
-M2, -M4, -M6, -M8	209.5
-M9	110.9
-M10	111.9

OPTION	HEIGHT "B"
DEFAULT	65
-SL1	78
-E1, -E2, -E3	81
-SL1 + -E1, -E2, -E3	94



NOTES:

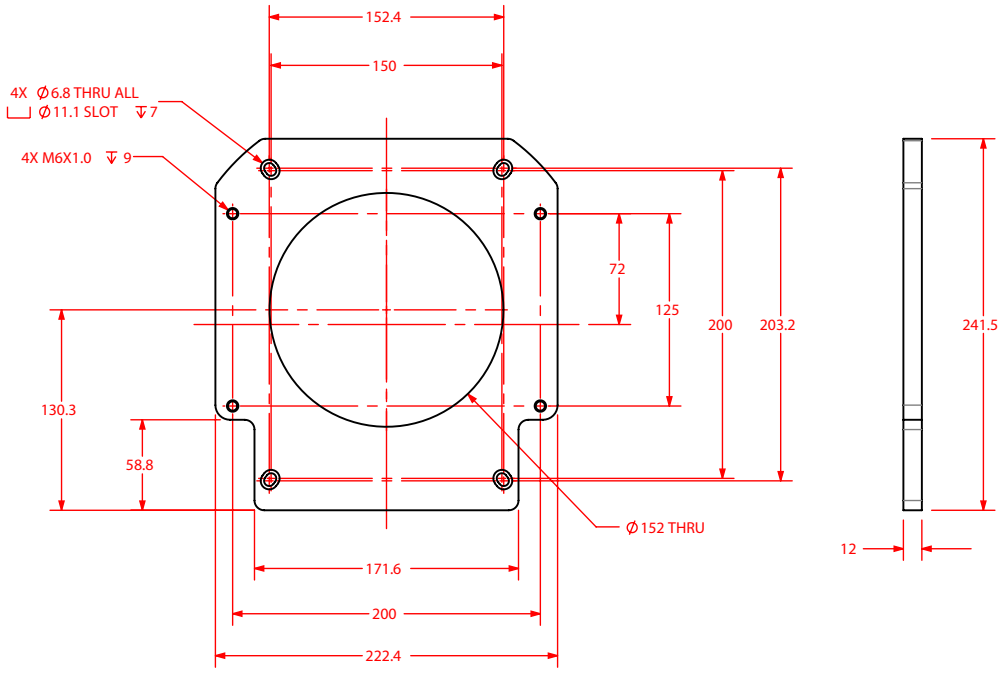
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DIMENSIONS: MILLIMETERS

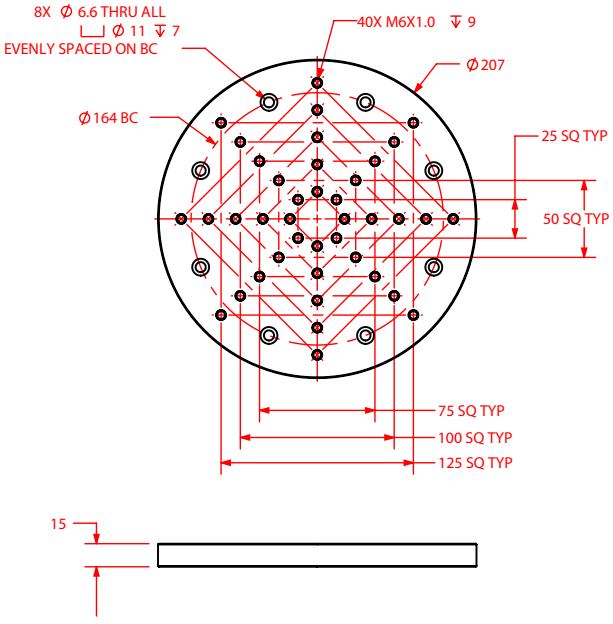
AGR Series DIMENSIONS

AGR150 Accessories

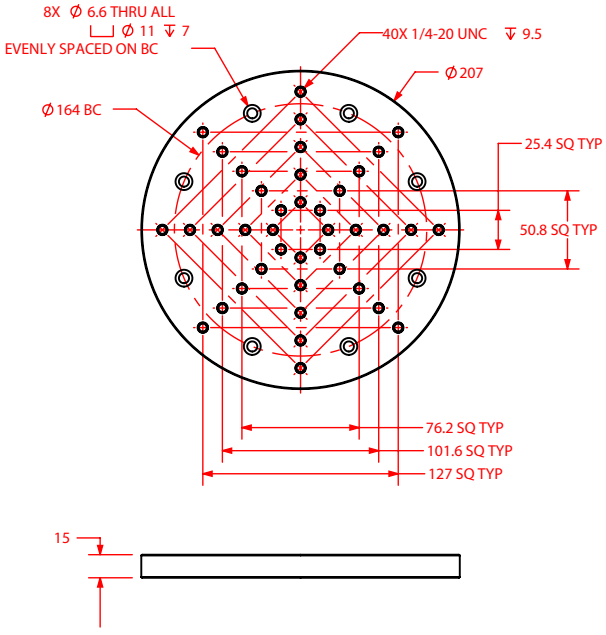
-MP1 MOUNTING PLATE



-TT1 TABLETOP



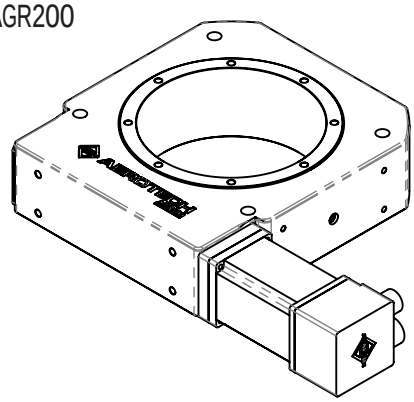
-TT2 TABLETOP



DIMENSIONS: MILLIMETERS

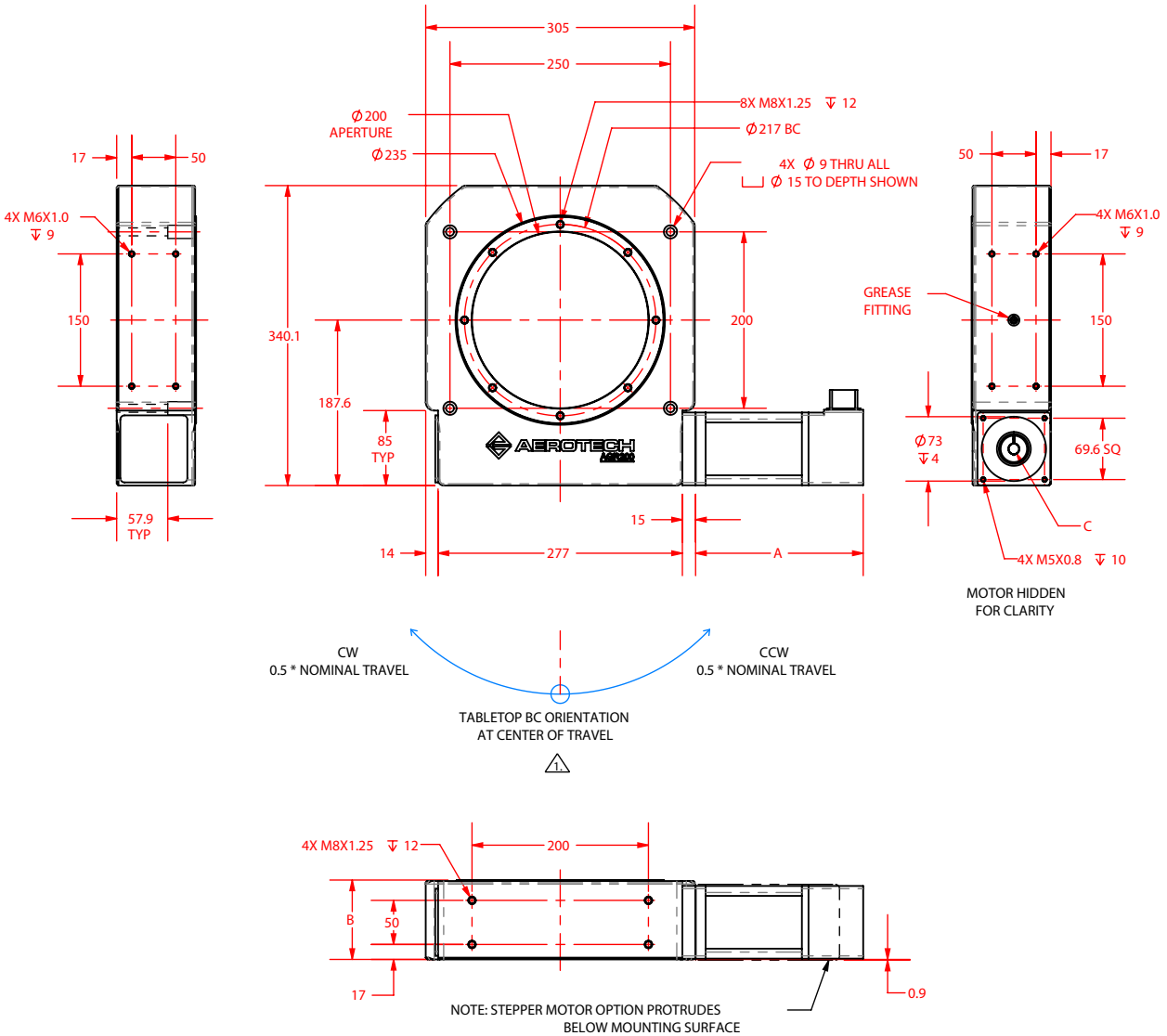
AGR Series – DIMENSIONS

AGR200



MOTOR	LENGTH "A"	SHAFT INPUT DIAMETER "C"
-M1, -M3, -M5, -M7	190	Ø12.7 [0.5]
-M2, -M4, -M6, -M8	245.6	Ø12.7 [0.5]
-M9	177.1	Ø9.5 [0.375]
-M10	187.1	Ø9.5 [0.375]

OPTION	HEIGHT "B"
DEFAULT	90
-SL1	107
-E1, -E2, -E3	108.5
-SL1 + -E1, -E2, -E3	125.5



NOTES:

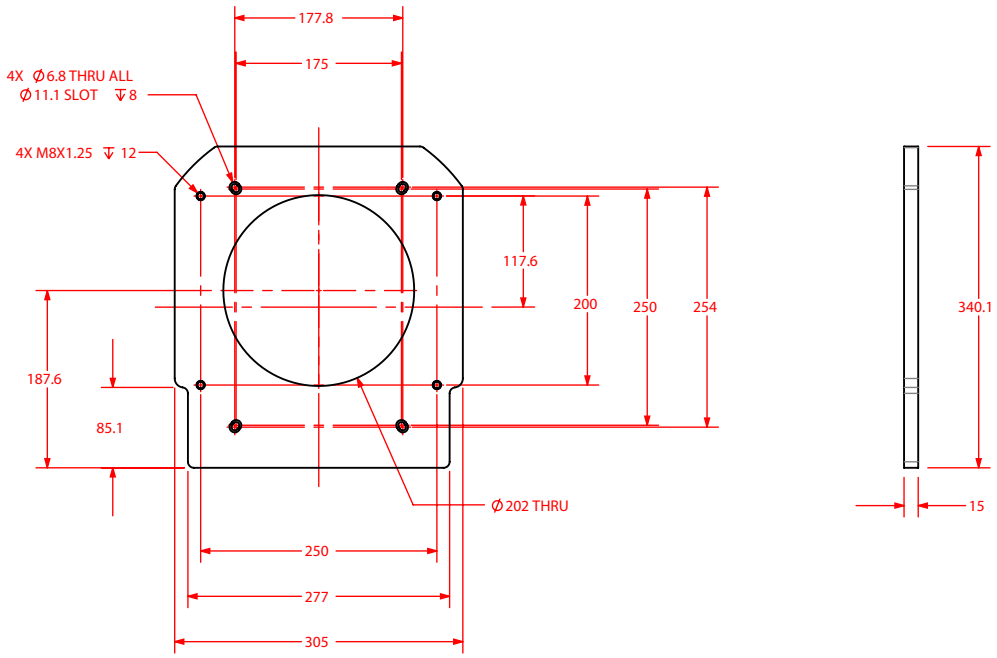
1. CW AND CCW TRAVEL LIMITATIONS APPLY TO -TRXXX LIMITED TRAVEL OPTION ONLY. ORIENTATION OF TABLETOP BC AT CENTER OF TRAVEL IS CONSISTENT FOR ALL CONFIGURATIONS.

DIMENSIONS: MILLIMETERS [INCHES]

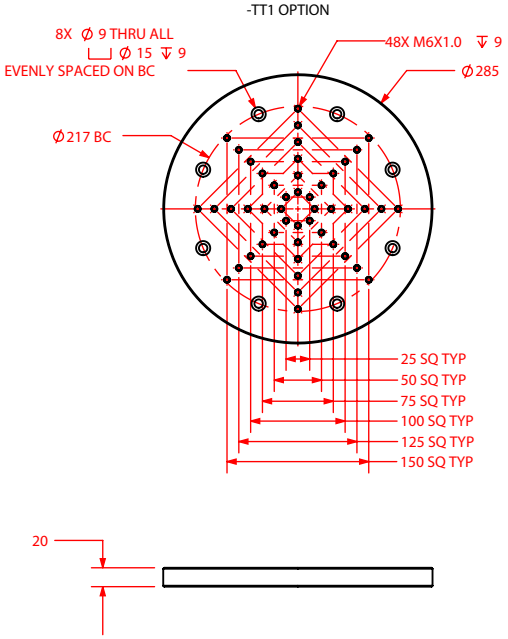
AGR Series DIMENSIONS

AGR200 Accessories

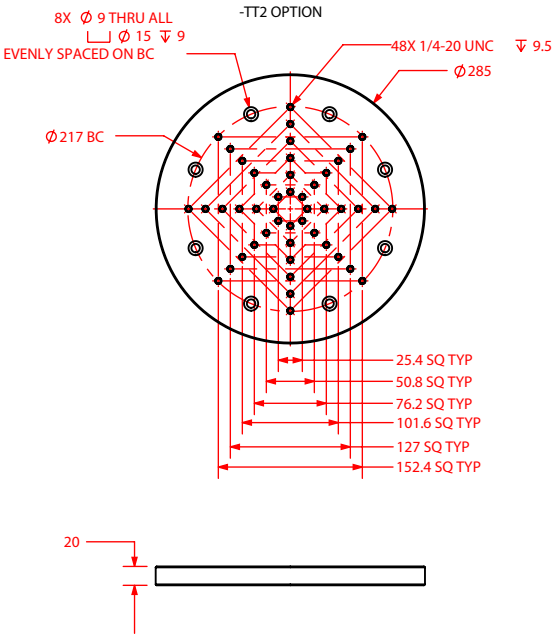
-MP1 MOUNTING PLATE



-TT1 OPTION



-TT2 OPTION



DIMENSIONS: MILLIMETERS

AGR Series ORDERING INFORMATION

AGR Series Gear-Driven Rotary Stages

Model (Required)

AGR50	Gear-driven rotary stage, 50 mm diameter clear aperture
AGR75	Gear-driven rotary stage, 75 mm diameter clear aperture
AGR100	Gear-driven rotary stage, 100 mm diameter clear aperture
AGR150	Gear-driven rotary stage, 150 mm diameter clear aperture
AGR200	Gear-driven rotary stage, 200 mm diameter clear aperture

Motor (Optional)

-M1	BMS35 brushless servomotor and 2000-line TTL encoder (AGR50, AGR75)
	BMS60 brushless servomotor and 2500-line TTL encoder (AGR100, AGR150)
	BMS280 brushless servomotor and 2500-line TTL encoder (AGR200)
-M2	BMS35 brushless servomotor and 2000-line TTL encoder with brake (AGR50, AGR75)
	BMS60 brushless servomotor and 2500-line TTL encoder with brake (AGR100, AGR150)
	BMS280 brushless servomotor and 2500-line TTL encoder with brake (AGR200)
-M3	BMS35 brushless servomotor and 1000-line 1 Vpp encoder (AGR50, AGR75)
	BMS60 brushless servomotor and 1000-line 1 Vpp encoder (AGR100, AGR150)
	BMS280 brushless servomotor and 1000-line 1 Vpp encoder (AGR200)
-M4	BMS35 brushless servomotor and 1000-line 1 Vpp encoder with brake (AGR50, AGR75)
	BMS60 brushless servomotor and 1000-line 1 Vpp encoder with brake (AGR100, AGR150)
	BMS280 brushless servomotor and 1000-line 1 Vpp encoder with brake (AGR200)
-M5	BM22 brushless servomotor and 2000-line TTL encoder (AGR50, AGR75)
	BM75 brushless servomotor and 2500-line TTL encoder (AGR100, AGR150)
	BM250 brushless servomotor and 2500-line TTL encoder (AGR200)
-M6	BM22 brushless servomotor and 2000-line TTL encoder with brake (AGR50, AGR75)
	BM75 brushless servomotor and 2500-line TTL encoder with brake (AGR100, AGR150)
	BM250 brushless servomotor and 2500-line TTL encoder with brake (AGR200)
-M7	SM35 stepper motor (AGR50, AGR75)
	BM75 brushless servomotor and 1000-line 1 Vpp encoder (AGR100, AGR150)
	BM250 brushless servomotor and 1000-line 1 Vpp encoder (AGR200)
-M8	SM35 stepper motor with brake (AGR50, AGR75)
	BM75 brushless servomotor and 1000-line 1 Vpp encoder with brake (AGR100, AGR150)
	BM250 brushless servomotor and 1000-line 1 Vpp encoder with brake (AGR200)
-M9	SM60 high voltage stepper motor (AGR100, AGR150)
	SM280 high voltage stepper motor (AGR200)
-M10	SM60 high voltage stepper motor with brake (AGR100, AGR150)
S	M280 high voltage stepper motor with brake (AGR200)

Motor Location (Required)

-ML1	Motor located on right side of stage housing, standard (see diagram)
-ML2	Motor located on left side of stage housing (see diagram)

Motor Orientation (Optional)

-2	Motor orientation 2 (see diagram)
-3	Motor orientation 3, standard (see diagram)
-4	Motor orientation 4 (see diagram)
-5	Motor orientation 5 (see diagram)

Travel (Required)

	Continuous travel (standard)
-TR015	Limited travel, ±7.5 degrees
-TR030	Limited travel, ±15 degrees
-TR045	Limited travel, ±22.5 degrees
-TR060	Limited travel, ±30 degrees
-TR075	Limited travel, ±37.5 degrees
-TR090	Limited travel, ±45 degrees

AGR Series ORDERING INFORMATION

-TR105	Limited travel, ±52.5 degrees
-TR120	Limited travel, ±60 degrees
-TR135	Limited travel, ±67.5 degrees
-TR150	Limited travel, ±75 degrees
-TR165	Limited travel, ±82.5 degrees
-TR180	Limited travel, ±90 degrees
-TR195	Limited travel, ±97.5 degrees
-TR210	Limited travel, ±105 degrees
-TR225	Limited travel, ±112.5 degrees
-TR240	Limited travel, ±120 degrees
-TR255	Limited travel, ±127.5 degrees
-TR270	Limited travel, ±135 degrees

Note: -TRxxx limited travel options contain an extra 2 degrees of overtravel between the nominal travel and the electrical limit on each side (Ex: -TR270 contains ±135 degrees of nominal travel, with ±137 degrees of travel between electrical limits).

Limits (Required)

LI1	Normally-closed, end-of-travel limit switches with 9-pin connector
LI2	Normally-open, end-of-travel limit switches with 9-pin connector

Note: Limits option is only available with limited-travel configurations.

Direct Rotary Feedback (Optional)

-E1	Direct, amplified-sine output encoder
-E2	Direct, square-wave TTL output encoder, X5 multiplication
-E3	Direct, square-wave TTL output encoder, X50 multiplication

Tabletop (Optional)

-TT1	Metric tabletop
-TT2	English tabletop

Mounting Plate (Optional)

-MP1	Universal English/metric mounting plate

Seals (Optional)

-SL1	Labyrinth seal

Metrology (Required)

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

Integration (Required)

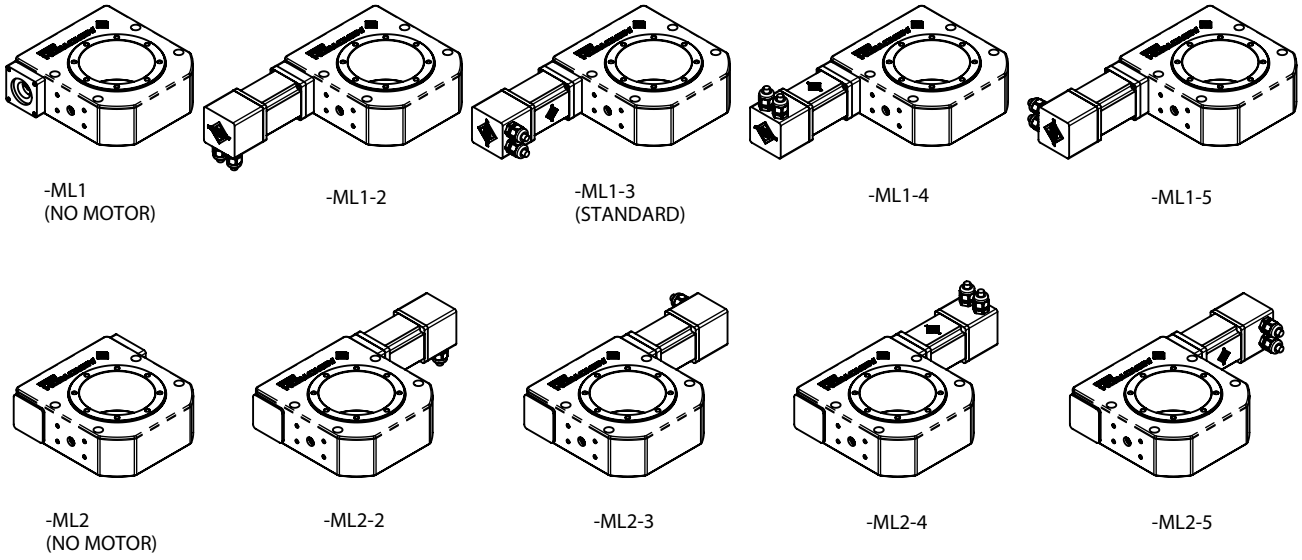
Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire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

AGR Series ORDERING INFORMATION

AGR Series – MOTOR ORIENTATION

AGR SERIES MOTOR LOCATION AND ORIENTATION OPTIONS



-ML1
(NO MOTOR)

-ML1-2

-ML1-3
(STANDARD)

-ML1-4

-ML1-5

-ML2
(NO MOTOR)

-ML2-2

-ML2-3

-ML2-4

-ML2-5

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