

AEROTECH

Gear-Driven
Rotary Stages

AGR



Rugged Construction, Reliable Performance

Our versatile AGR gear-driven rotary stages bring you significant advantages in load capacity, long-term positioning performance and reliability over other gear-driven rotary positioners. Available in five models with apertures ranging from 50 mm to 200 mm diameters, AGR stages are well equipped to address a wide range of single- and multi-axis applications for general-purpose positioning in industrial and laboratory settings.

Key Applications

AGR stages are ideal for a variety of precision industrial and laboratory applications, including:

- ◆ Laser processing
- ◆ Measurement & inspection
- ◆ Sample positioning
- ◆ Nondestructive testing
- ◆ Pointing, scanning & tracking
- ◆ Integration into gimbal systems

KEY FEATURES:

- ◆ Features **LARGE, CLEAR APERTURE UP TO $\varnothing 200$ mm** for mounting optics, cameras, process equipment, cabling & more
- ◆ Configurable with **DIRECT ENCODER OPTION** for enhanced positioning precision
- ◆ Accommodates **PAYLOADS UP TO 425 kg**
- ◆ Offers **CONTINUOUS 360° ROTATION** with **CONFIGURABLE TRAVEL LIMITS** available
- ◆ Integrates easily in **MULTI-AXIS CONFIGURATIONS**

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 | 0.097 mrad (20 arc sec) | | | | |
| | Calibrated with Direct Encoder Option | 0.058 mrad (12 arc sec) | 0.049 mrad (10 arc sec) | | | |
| Repeatability (Uni-Directional) | Standard | 0.049 mrad (10 arc sec) | | | | |
| | Direct Encoder ⁽¹⁾ | 0.024 mrad (5 arc sec) | | | | |
| Repeatability (Bi-Directional) | Standard ⁽²⁾ | 0.22 mrad (45 arc sec) | | | | |
| | Direct Encoder ⁽¹⁾ | 0.039 mrad (8 arc sec) | 0.029 mrad (6 arc sec) | | | |
| Tilt Error Motion | | 0.049 mrad (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 with Brushless Servomotor ⁽³⁾ | | 180°/s | | | | 120°/s |
| Maximum Acceleration ⁽⁴⁾ | | 720°/s ² | | | | 480°/s ² |
| Aperture | | 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 -E3 direct encoder option.
2. Requires the use of an Aerotech controller. Consult factory if using a third-party controller.
3. Maximum speed is load dependent. Contact an Aerotech Application Engineer if imbalanced loads are present.
4. Unloaded acceleration.
5. On-axis loading is listed.
6. 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 | | | | |
| 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 | | |
| Limit Switches | | 5 V, Normally Closed | | | | |
| Home Switch | | Near Limit (for Limited Travel Stage Version) | | | | |

AGR SERIES ORDERING OPTIONS

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)

| | |
|-------------|---|
| -M5 | BM75 brushless servomotor and 2500-line TTL encoder (AGR100, AGR150) BM250 brushless servomotor and 2500-line TTL encoder (AGR200) |
| -M6 | BM75 brushless servomotor and 2500-line TTL encoder with brake (AGR100, AGR150) BM250 brushless servomotor and 2500-line TTL encoder with brake (AGR200) |
| -M7 | BM75 brushless servomotor and 1000-line 1 Vpp encoder (AGR100, AGR150) BM250 brushless servomotor and 1000-line 1 Vpp encoder (AGR200) |
| -M8 | 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) |
| -M11 | BM24 brushless servomotor and 2500-line TTL encoder (AGR50, AGR75) |
| -M12 | BM24 brushless servomotor and 2500-line TTL encoder with brake (AGR50, AGR75) |
| -M13 | BM24 brushless servomotor and 1000-line 1 Vpp encoder (AGR50, AGR75) |
| -M14 | BM24 brushless servomotor and 1000-line 1 Vpp encoder with brake (AGR50, AGR75) |

Other motor options are available upon request. Contact Aerotech for more information.

Motor Location (Required)

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

Other motor location and orientation options are available upon request. Contact Aerotech for more information.

Motor Orientation (Optional)

| | |
|-----------|-------------------------------|
| -2 | Motor orientation 2 |
| -3 | Motor orientation 3, standard |
| -4 | Motor orientation 4 |
| -5 | Motor orientation 5 |

Note: See diagram for details.

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 |

Travel options continued on next page

AGR SERIES ORDERING OPTIONS

| | |
|---------------|-------------------------------------|
| -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

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

Other limit options are available upon request. Contact Aerotech for more information.

Direct Rotary Feedback (Optional)

-E3 Direct, square-wave TTL output encoder, X50 multiplication

Other direct rotary feedback options are available upon request. Contact Aerotech for more information.

Tabletop (Optional)

-TT1 Metric tabletop

Other tabletop options are available upon request. Contact Aerotech for more information.

Mounting Plate (Optional)

-MP1 Universal English/metric mounting plate

-MP2 Metric Spacer Plate, Side Mounting Option

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.

Integration continued on next page

AGR SERIES ORDERING OPTIONS

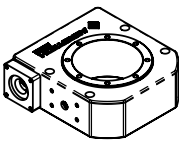
-TAS Integration - Test as system

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.

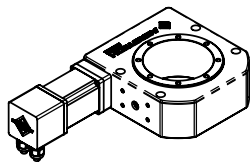
-TAC Integration - Test as components

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.

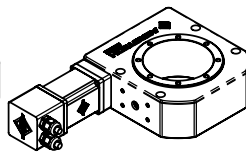
AGR SERIES MOTOR LOCATION AND ORIENTATION OPTIONS



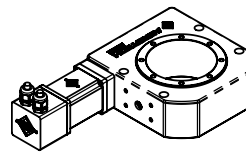
-ML1
(NO MOTOR)



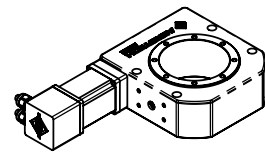
-ML1-2



-ML1-3
(STANDARD)

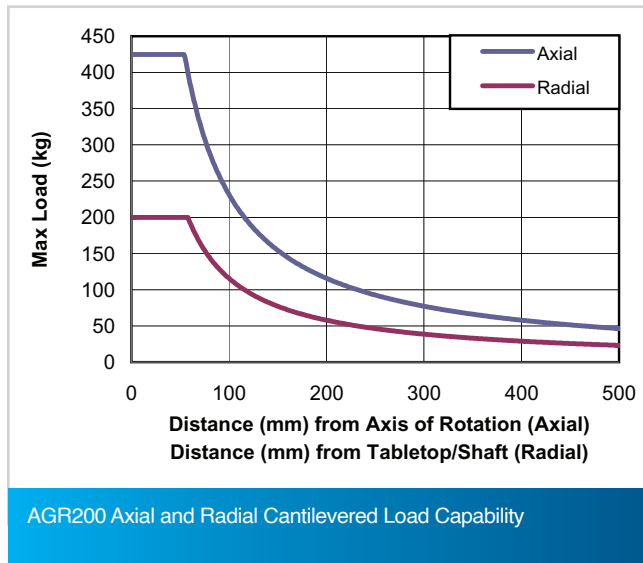
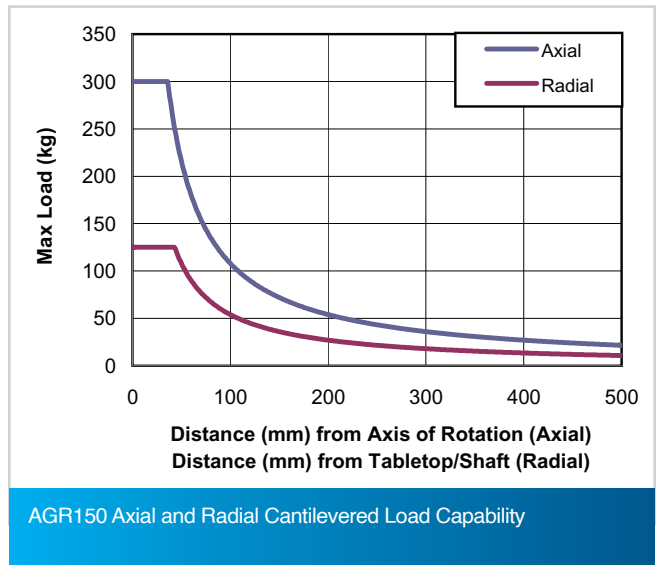
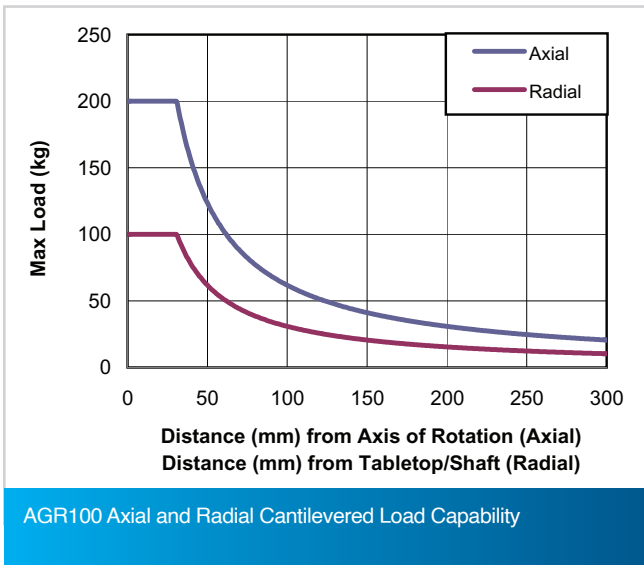
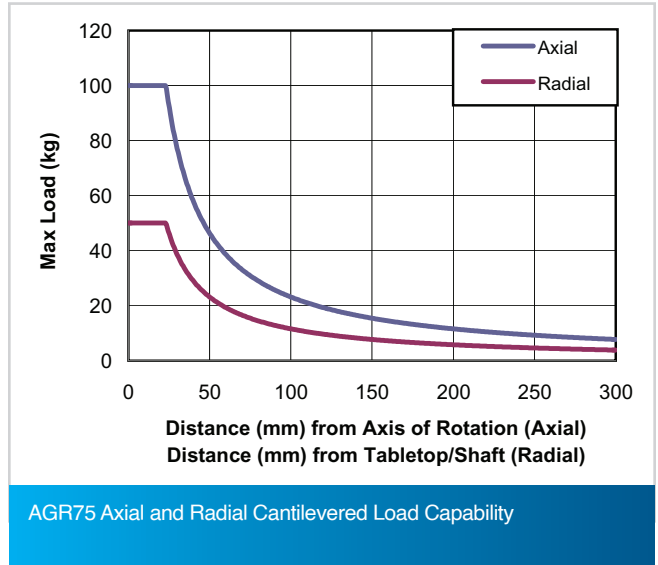
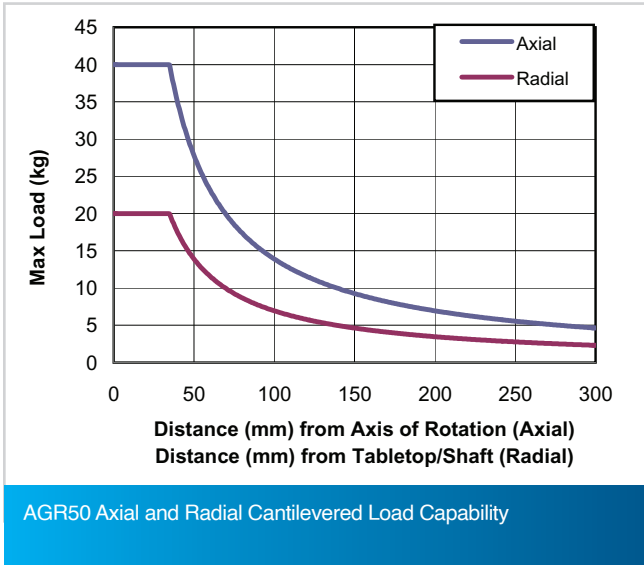


-ML1-4



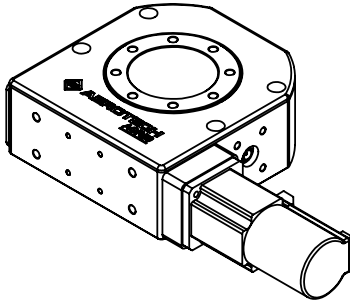
-ML1-5

AGR SERIES PERFORMANCE



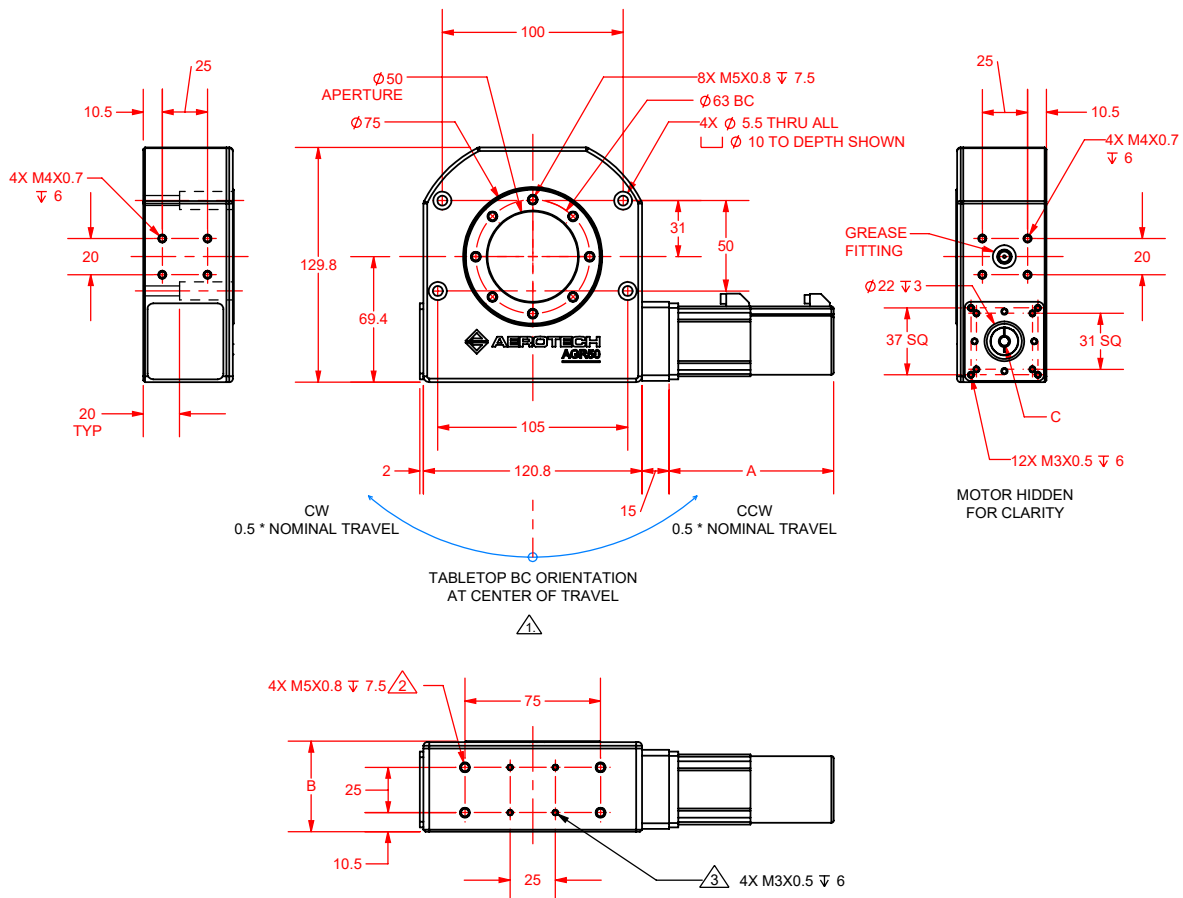
AGR DIMENSIONS

AGR50



| MOTOR | LENGTH "A" | SHAFT INPUT DIAMETER "C" |
|------------|------------|--------------------------|
| NO MOTOR | - | Ø6.35 |
| -M11, -M13 | 126.3 | Ø6.35 |
| -M12, -M14 | 154.3 | Ø6.35 |

| OPTION | HEIGHT "B" |
|---------|------------|
| DEFAULT | 50 |
| -E3 | 66.4 |



NOTES:

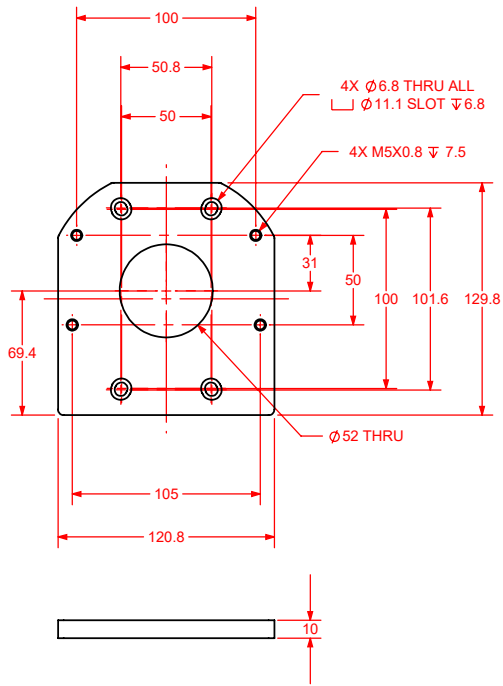
- ⚠️ CW AND CCW TRAVEL LIMITATIONS APPLY TO -TRXXX LIMITED TRAVEL OPTION ONLY. ORIENTATION OF TABLETOP BC AT CENTER OF TRAVEL IS CONSISTENT FOR ALL CONFIGURATIONS.
- ⚠️ MOTOR MAY PROTRUDE BELOW THIS SURFACE. -MP2 REQUIRED WHEN USING SIDE MOUNTING HOLES.
- ⚠️ MOUNTING PLATE HOLES. NOT FOR STAGE MOUNTING

DIMENSIONS: MILLIMETERS [INCHES]

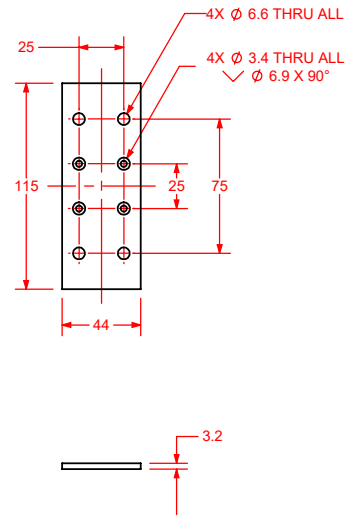
AGR DIMENSIONS

AGR50 ACCESSORIES

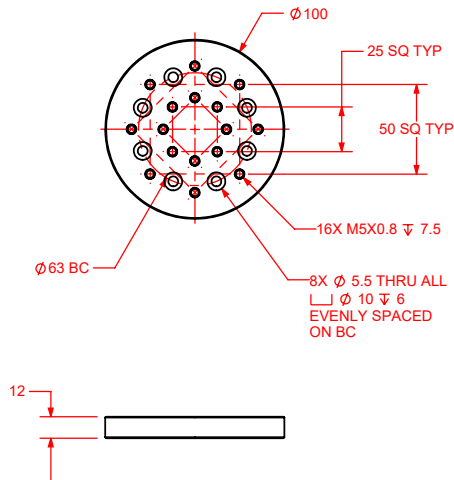
-MP1 MOUNTING PLATE



-MP2 METRIC SPACER PLATE, SIDE MOUNTING OPTION



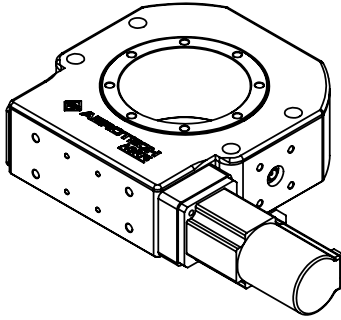
-TT1 TABLETOP



DIMENSIONS: MILLIMETERS

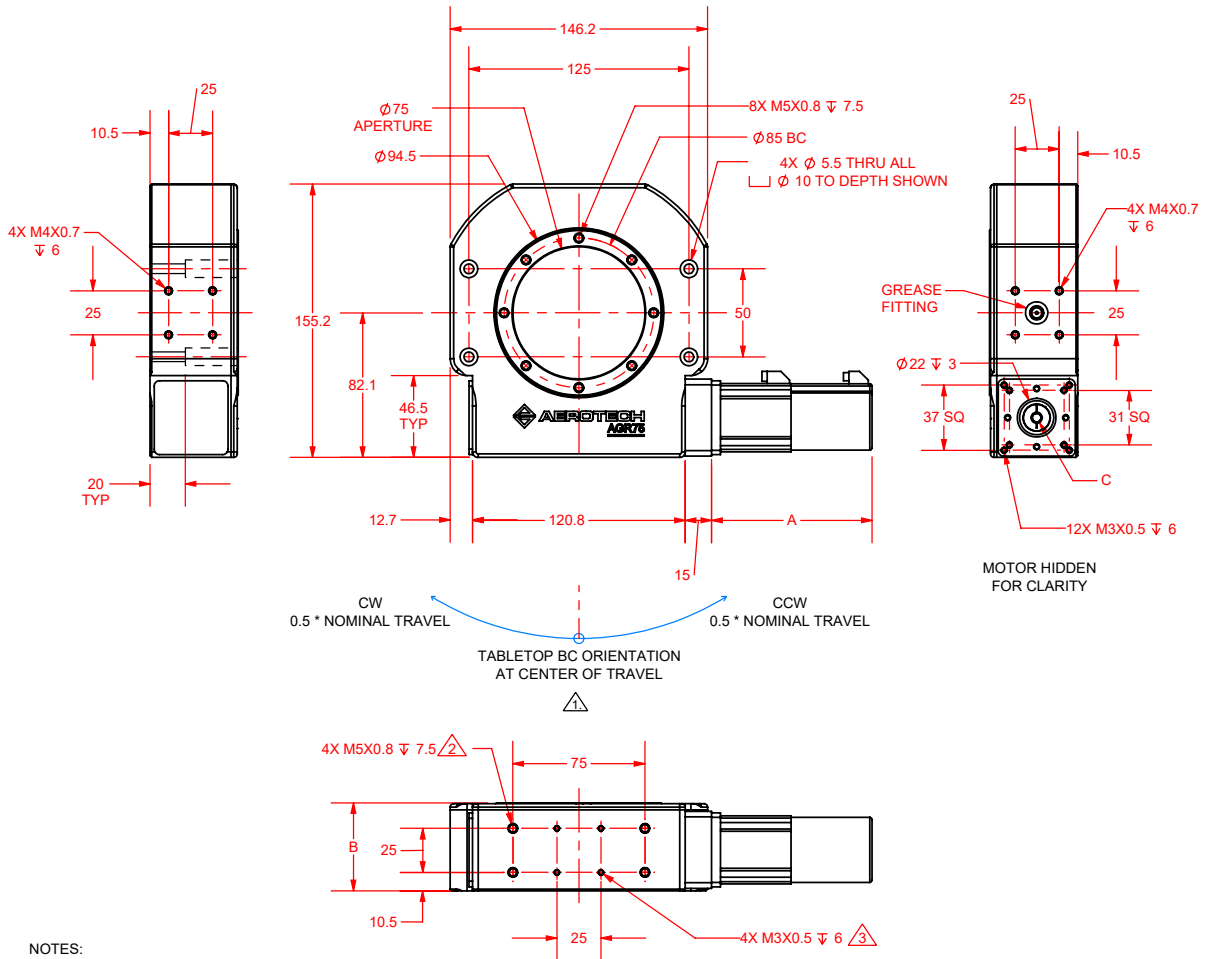
AGR DIMENSIONS

AGR75



| MOTOR | LENGTH "A" | SHAFT INPUT DIAMETER "C" |
|------------|------------|--------------------------|
| NO MOTOR | - | Ø 6.35 |
| -M11, -M13 | 126.3 | Ø 6.35 |
| -M12, -M14 | 154.3 | Ø 6.35 |

| OPTION | HEIGHT "B" |
|---------|------------|
| DEFAULT | 50 |
| -E3 | 66.4 |



NOTES:

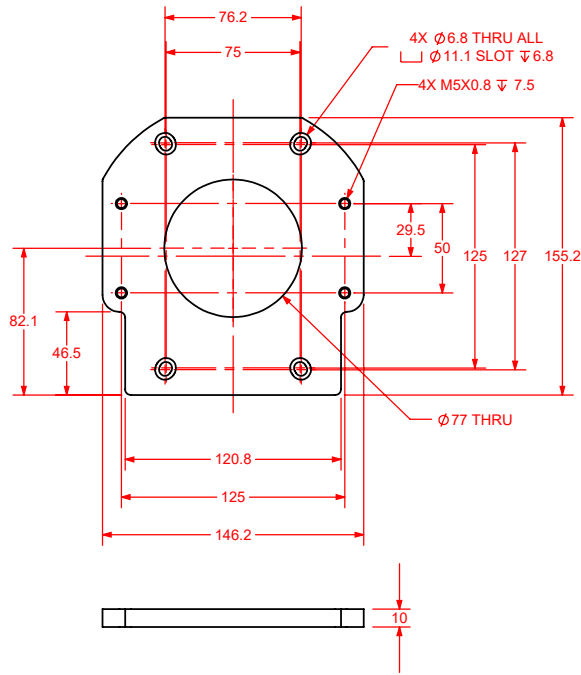
- ⚠️ CW AND CCW TRAVEL LIMITATIONS APPLY TO -TRXXX LIMITED TRAVEL OPTION ONLY. ORIENTATION OF TABLETOP BC AT CENTER OF TRAVEL IS CONSISTENT FOR ALL CONFIGURATIONS.
- ⚠️ MOTOR MAY PROTRUDE BELOW THIS SURFACE. -MP2 REQUIRED WHEN USING SIDE MOUNTING HOLES.
- ⚠️ MOUNTING PLATE HOLES. NOT FOR STAGE MOUNTING

DIMENSIONS: MILLIMETERS [INCHES]

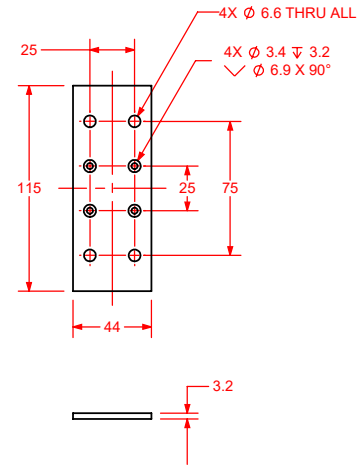
AGR DIMENSIONS

AGR75 ACCESSORIES

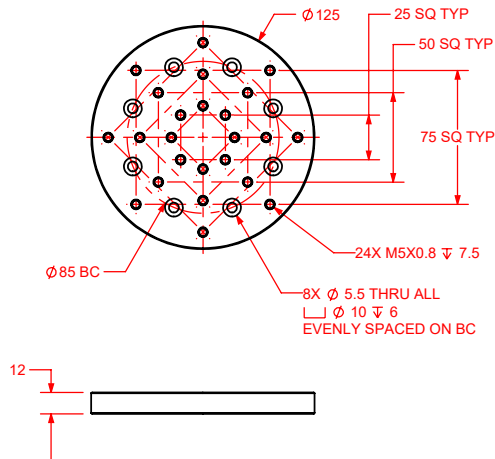
-MP1 MOUNTING PLATE



-MP2 METRIC SPACER PLATE, SIDE MOUNTING OPTION



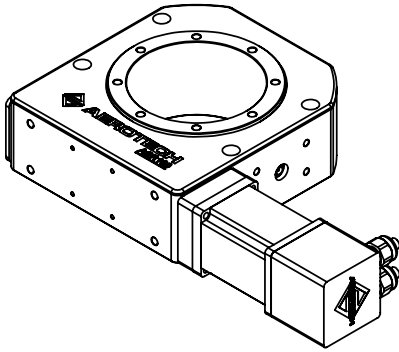
-TT1 TABLETOP



DIMENSIONS: MILLIMETERS

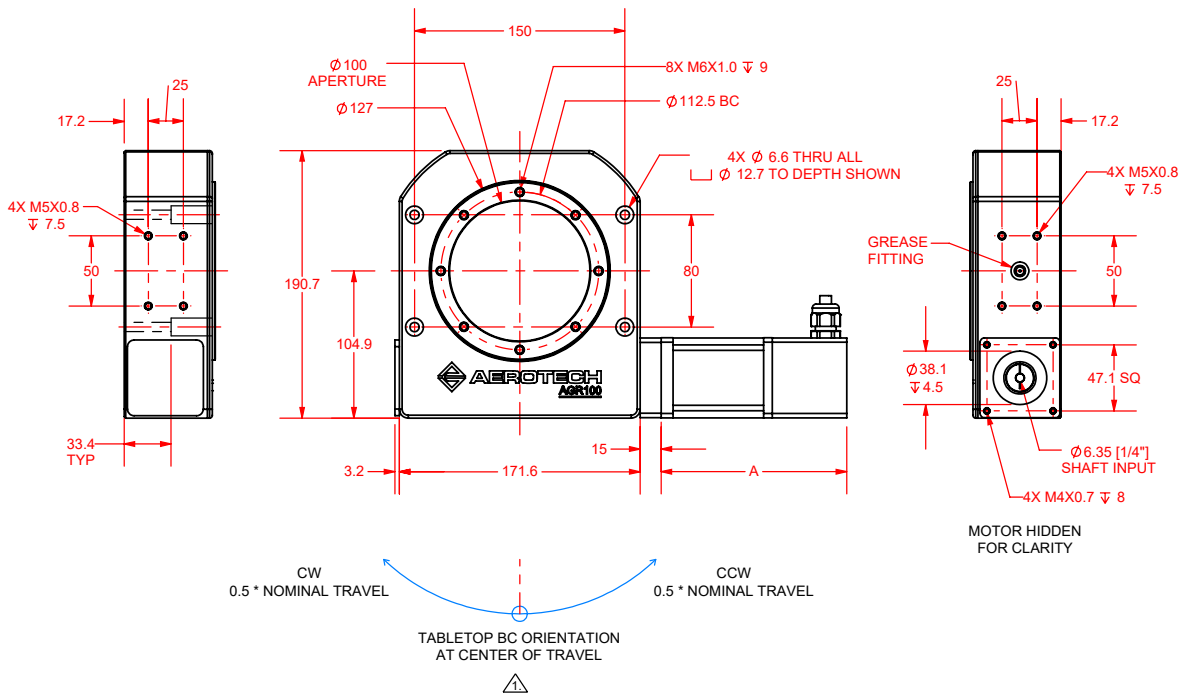
AGR DIMENSIONS

AGR100



| MOTOR | LENGTH "A" |
|--------------------|------------|
| -M1, -M3, -M5, -M7 | 132.3 |
| -M2, -M4, -M6, -M8 | 209.5 |

| OPTION | HEIGHT "B" |
|---------|------------|
| DEFAULT | 65 |
| -E3 | 81 |



NOTES:

- ⚠ 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.
- ② MOTOR MAY PROTRUDE BELOW THIS SURFACE. -MP2 REQUIRED WHEN USING SIDE MOUNTING HOLES.
- ③ MOUNTING PLATE HOLES. NOT FOR STAGE MOUNTING

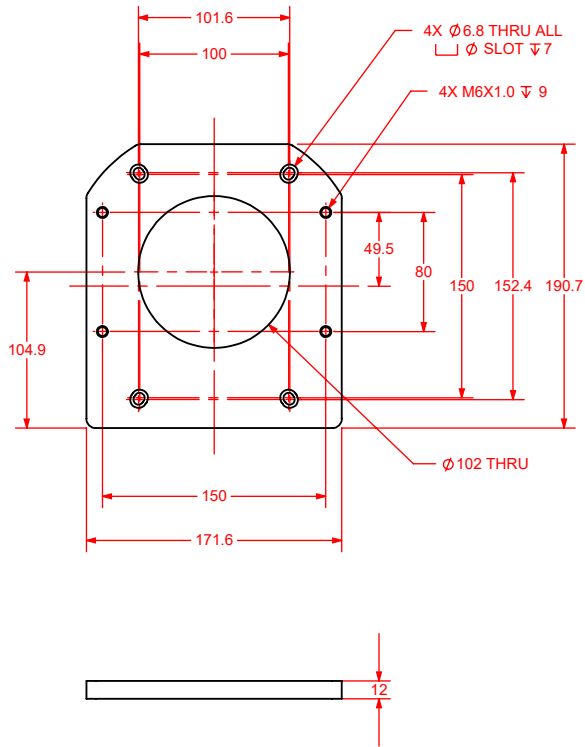
NOTE: BRAKE OPTIONS PROTRUDE BELOW MOUNTING SURFACE

DIMENSIONS: MILLIMETERS

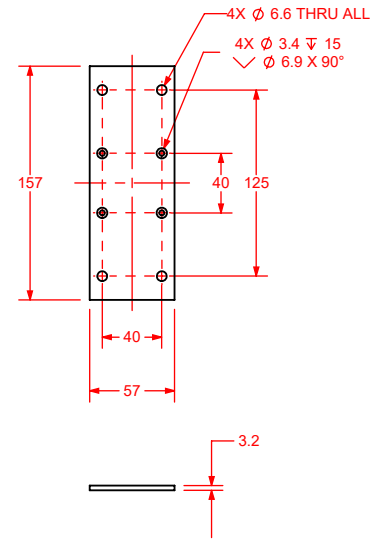
AGR DIMENSIONS

AGR100 ACCESSORIES

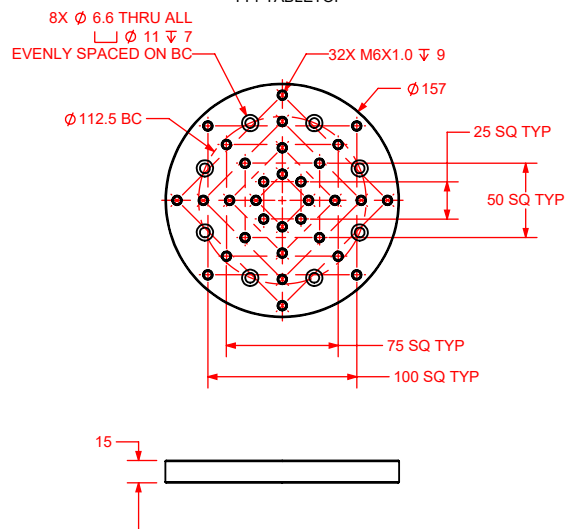
-MP1 MOUNTING PLATE



-MP2 METRIC SPACER PLATE, SIDE MOUNTING OPTION



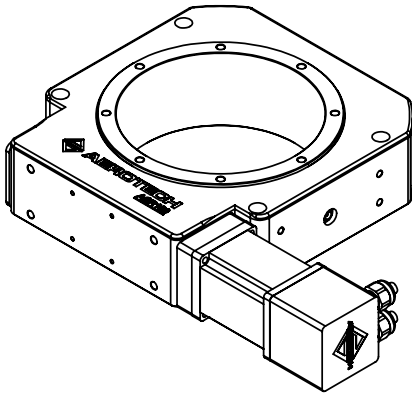
-TT1 TABLETOP



DIMENSIONS: MILLIMETERS

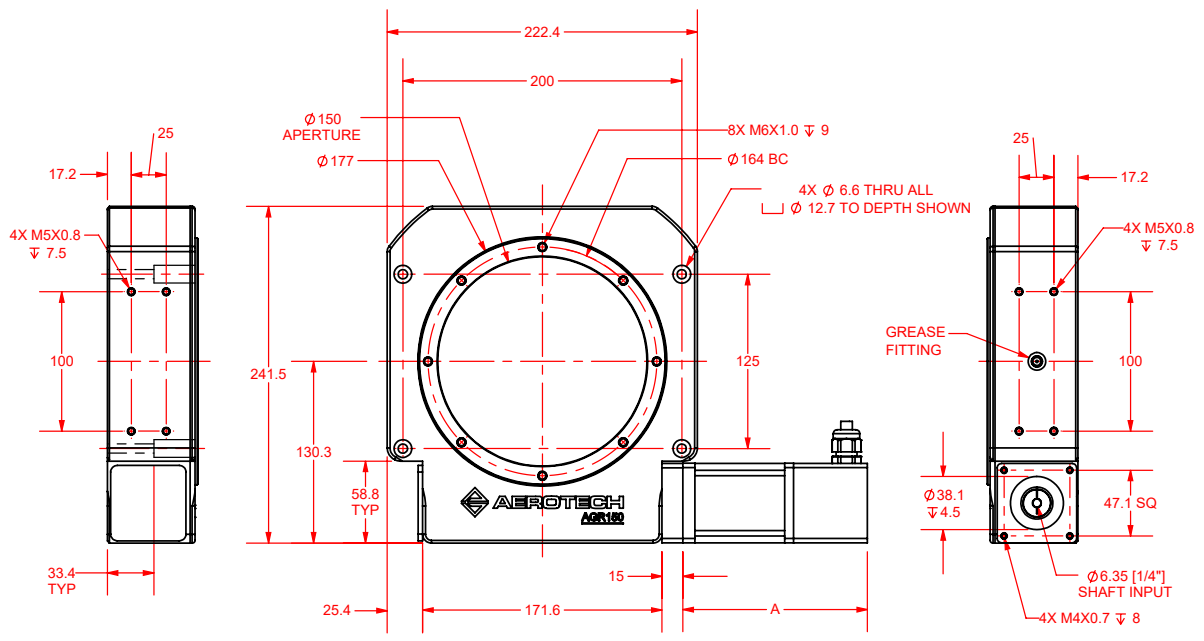
AGR DIMENSIONS

AGR150



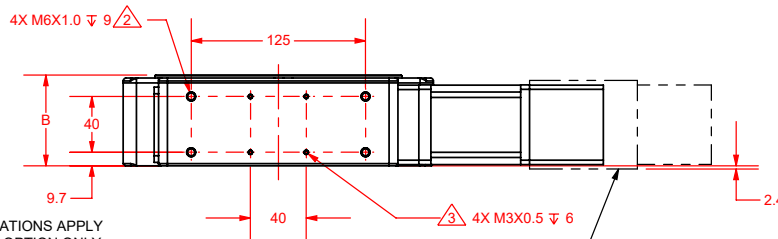
| MOTOR | LENGTH "A" |
|--------------------|------------|
| -M1, -M3, -M5, -M7 | 132.3 |
| -M2, -M4, -M6, -M8 | 209.5 |

| OPTION | HEIGHT "B" |
|---------|------------|
| DEFAULT | 65 |
| -E3 | 81 |



CW 0.5 * NOMINAL TRAVEL CCW 0.5 * NOMINAL TRAVEL

TABLETOP BC ORIENTATION AT CENTER OF TRAVEL



NOTES:

- $\triangle 1$ 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.
- $\triangle 2$ MOTOR MAY PROTRUDE BELOW THIS SURFACE. -MP2 REQUIRED WHEN USING SIDE MOUNTING HOLES.
- $\triangle 3$ MOUNTING PLATE HOLES. NOT FOR STAGE MOUNTING

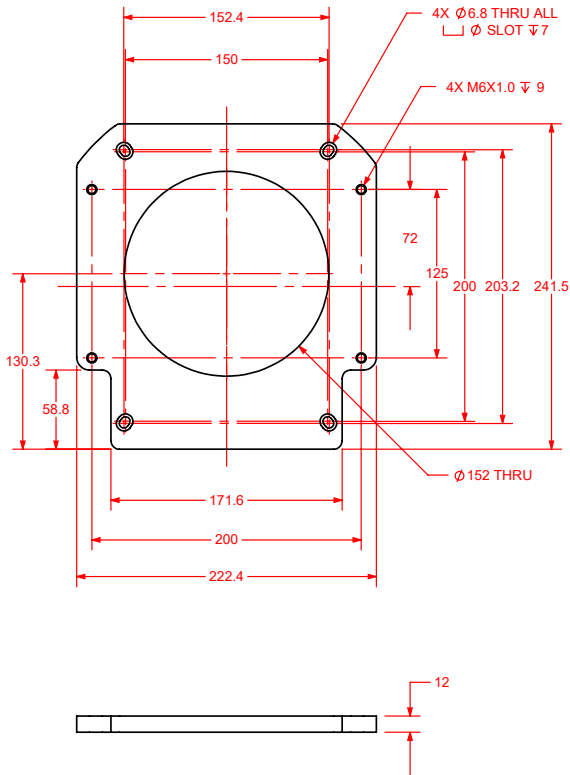
NOTE: BRAKE OPTIONS PROTRUDE BELOW MOUNTING SURFACE

DIMENSIONS: MILLIMETERS

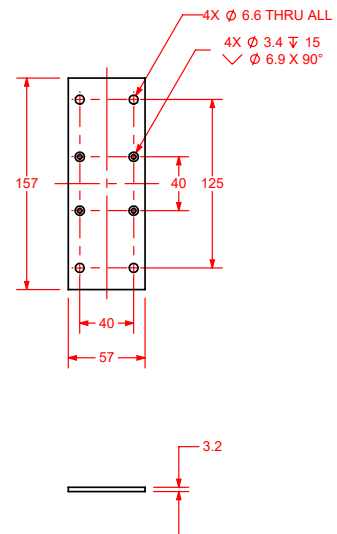
AGR DIMENSIONS

AGR150 ACCESSORIES

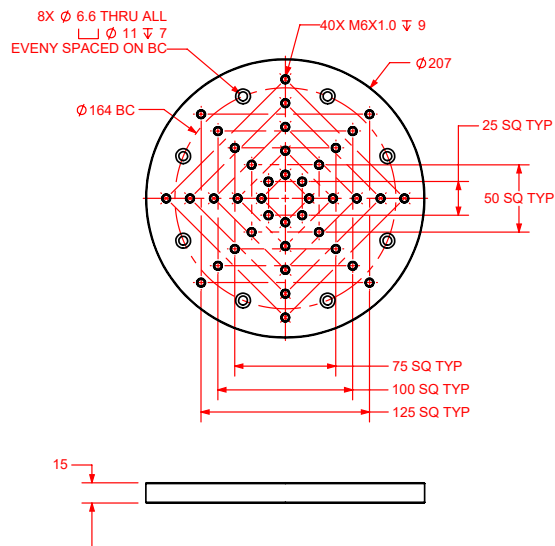
-MP1 MOUNTING PLATE



-MP2 METRIC SPACER PLATE, SIDE MOUNTING OPTION



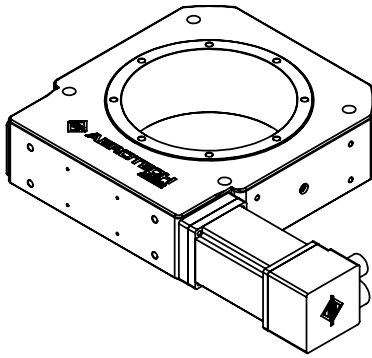
-TT1 TABLETOP



DIMENSIONS: MILLIMETERS

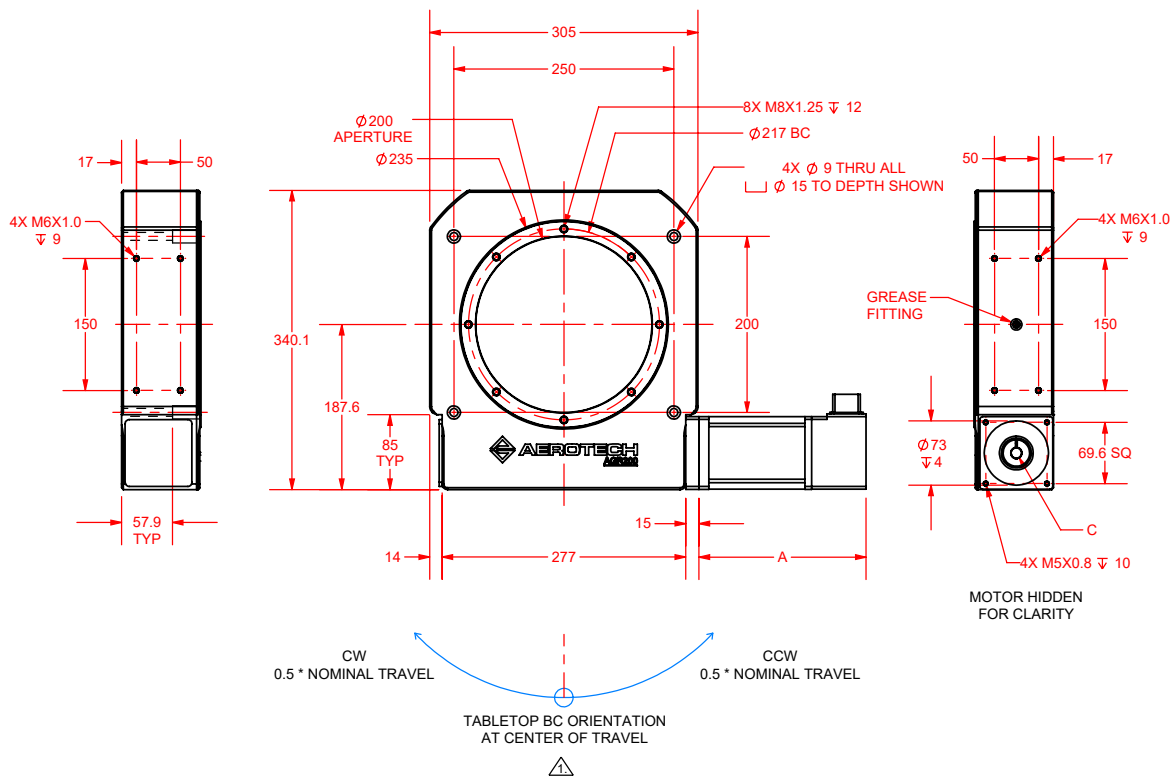
AGR DIMENSIONS

AGR200



| MOTOR | LENGTH "A" | SHAFT INPUT DIAMETER "C" |
|--------------------|------------|--------------------------|
| -M1, -M3, -M5, -M7 | 190 | Ø12.7 |
| -M2, -M4, -M6, -M8 | 245.6 | Ø12.7 |

| OPTION | HEIGHT "B" |
|---------|------------|
| DEFAULT | 90 |
| -E3 | 108.5 |



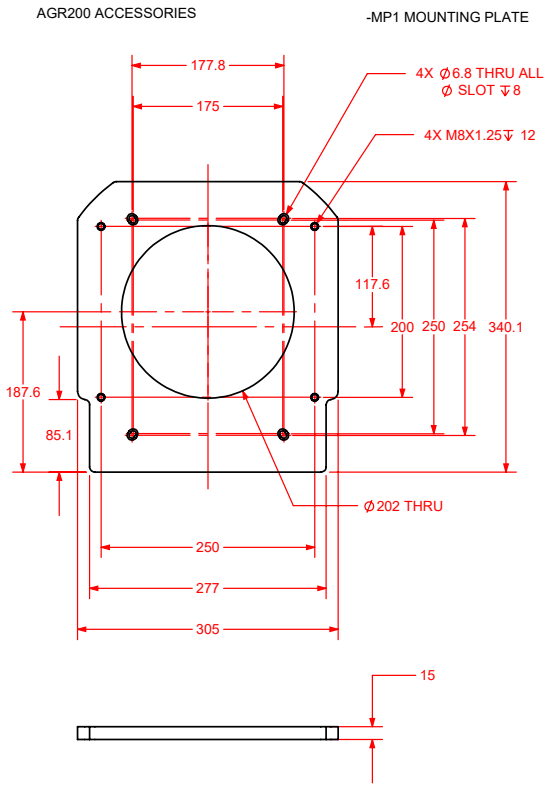
NOTES:

- ⚠️ 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.
- ⚠️ MOTOR MAY PROTRUDE BELOW THIS SURFACE. -MP2 REQUIRED WHEN USING SIDE MOUNTING HOLES.
- ⚠️ MOUNTING PLATE HOLES. NOT FOR STAGE MOUNTING

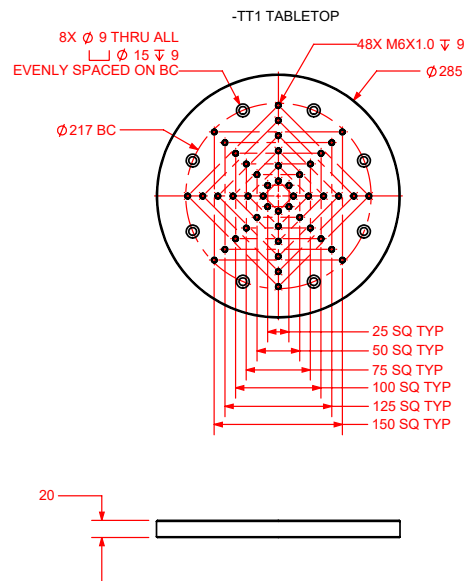
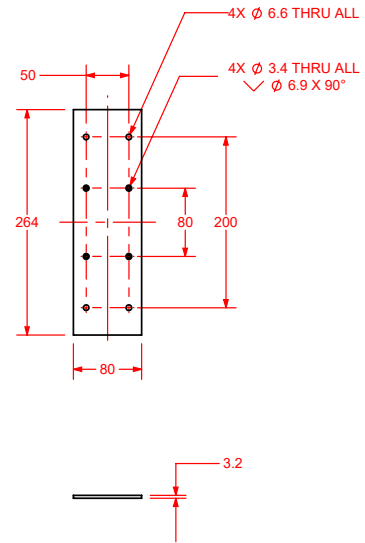
DIMENSIONS: MILLIMETERS [INCHES]

AGR DIMENSIONS

AGR200 ACCESSORIES



-MP2 METRIC SPACER PLATE, SIDE MOUNTING OPTION



DIMENSIONS: MILLIMETERS