D6050 Series Antenna Measurement System

Features and Specifications

Introduction

Overview

The D6050 Series is a highly versatile multi-axis antenna measurement system suited for devices up to 25 pounds (11.5 kg). The non-metallic, belt-driven head provides a low-reflection environment ideal for electrically small or omni-directional antennas.

What's Included?

The standard D6050 package features a 2-axis positioner, our powerful DAMS Antenna Measurement Studio, precision RF cables and rotary joints, all tools and documentation, plus DUT mounting hardware. Everything backed by 3-year warranty.

Measurement Capabilities

- 2D & 3D Spherical Measurements (AZ over EL, EL over AZ, XYZ planes and more)
- Far Field Parameters (gain, beamwidth, efficiency, directivity, polarization, isolation, and more)
- OTA Measurements (TRP/TIS)
- Phase Center Measurements
- Spherical Near Field (optional)

Highlights

- Dual rotary joints
- Multiple configuration options
- Indexable mast offset up to 23" from center
- Non-metallic DUT mounting axis
- Ultra-high precision (up to 0.02°)
- Ideal for most antennas up to 25 pounds

Configurable Models / Options

The D6050 platform is capable of operation from DC to 67 GHz with standard coaxial components and DC up to 110 GHz with waveguide components. Upgrades and options include automated Z-axis, auto-polarization switch, or high-precision worm-driven head. The D6050 system can be configured to include up to 5-axes. Complete turnkey packages can be configured to include anechoic chamber, network analyzer, reference horn, laptop, etc.

System Package Options

Standard Models

All standard model packages include the positioner, software, all RF components, tools and documentation and AUT mounting hardware.

D6050-00	No RF Components
D6050-06	6 GHz SMA RF Components
D6050-18	18 GHz SMA RF Components
D6050-40	40 GHz 2.92 mm RF Components
D6050-50	50 GHz 2.4 mm RF Components
D6050-67	67 GHz 1.85 mm RF Components
D6050-75	50 to 75 GHz mmW V-Band RF Components
D6050-90	60 to 90 GHz mmW E-Band RF Components
D6050-110	75 to 110 GHz mmW W-Band RF Components
D6050-MMW-CFX	No RF components; configured with mounts for Copper Mountain FX series mmW adapters (up to 110 GHz)

Full Turnkey Solutions

We offer **complete** turnkey measurement systems including anechoic chamber, VNA, positioner, reference antenna, and laptop with DAMS Antenna Measurement Studio. Packages can be tailored to meet your specific needs. From MHz to mmW, we can deliver a complete solution. Our chambers are custom designed and feature double-knife-edge doors with high quality absorber and honeycomb vents to ensure proper shielding. We also provide a comprehensive system training session following the installation process.
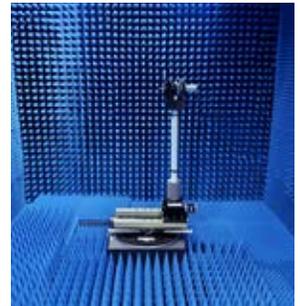
Additional Options

OPT-SR	No slip ring (for limited ± 180º rotations only, not for 360º)
OPT-WGDH	Worm-gear driven head
OPT-AZ	Automated linear Z-axis
OPT-AZXY	Automated linear Z- and X-axis with pseudo Y-axis
OPT-ENC	Encoder feedback capability
DPA-PDK	DAMS Platform Development Kit
OPT-SMA	Software maintenance agreement

Accessories

DEPC-D	Pre-configured PC (desktop)
DEPC-L	Pre-configured PC (laptop)
DE-SIM	DAMS Antenna & Network Simulator software add-on
DPA-SW-N2F	Spherical nearfield processing
DPA-AUTOPOL	18 GHz SPDT RF switch auto-polarizer with cables/adapters
DPA-AUTOPOL-40	40 GHz SPDT RF switch auto-polarizer with cables/adapters
DE-05xx	Broadband reference horn 500 MHz to 18, 26, 30 or 40 GHz
DE-07xx	Broadband reference horn 700 MHz to 18, 26, 30 or 40 GHz

DAMS Antenna Measurement Studio *(included!)*

Overview

The DAMS Antenna Measurement Studio is an advanced data collection platform for both passive and active measurements. Includes several built-in semi-automatic modules for post-processing DUT data. The DAMS Studio is also capable of generating various reports and visual data representations ranging from 3D spherical plots, gain over frequency plots, Smith charts and more. The unlimited viewing license permits installation on multiple computers for post-processing or data-analysis.

Measurement Features

- Support for vector network analyzers (VNA/PNA/ENA), spectrum analyzers, signal generators, power meters and even voltmeters.
- Extensive post-processing modules
- Export data with variable formatting options
- Measure up to 1600 frequency points @ every position
- Variable speed
- Move to max signal position
- Vertical / horizontal scan measurements
- CW/CCW antenna rotation
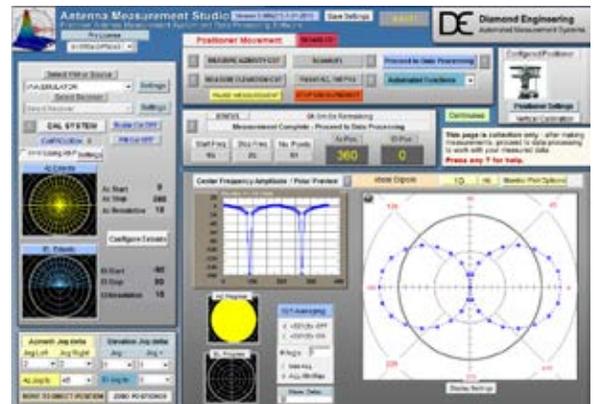
Data Processing and Visualization

- **Process 500,000 data points** under normal operation
- Quad-trace polar plots
- Dual-trace amplitude plots
- Compliance overlay
- 3D AZ/EL over freq
- 3D AZ over El
- Spherical plots
- Calibrated ref antenna import
- Path loss calculator
- Excel or .TXT export
- Complete data manipulation
- Multiple storage registers for convenience
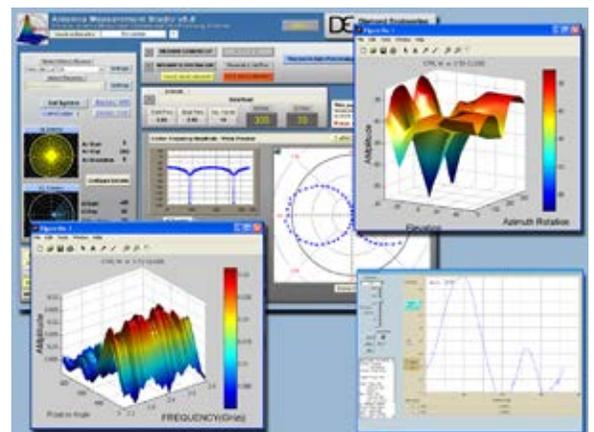
For more information about our software, including screen shots, full specifications of capabilities and the ability to download a demo version, please visit:

http://www.DiamondEng.net/PDF/software_specs.pdf

Specifications

General

Dimensions

Footprint:	24" x 24" (609 mm x 609 mm)
Total Height:	61.475" (1561.4 mm)
Clearance Radius:	35" (1320 mm) surrounding clearance required for full 360° rotation
Total Weight:	99 lbs (44.9 kg)

Positioner

Turntable

Frequency Ranges (GHz):	Coax: DC to 6, 18, 40, 50, or 67 GHz
	mmW: 50-75 (V-Band), 60-90 (E-Band) or 75-110 (W-Band) GHz
Resolution:	0.02°
Drivetrain:	Precision worm gear table with 1.8° stepper motor
Gear Ratio:	90:1
Movement Range:	0-360° or ± 180° (re-indexable hardware limits)
Slip Ring:	12-channel slip ring (standard, other options available)
Position Feedback:	Optional encoder (default open loop, position tracked by software)
Weight (positioner only):	76 lbs (34.5 kg) with slide rails
Positioner Max Speed:	4 RPM (24° per second)
AUT Mounting Options: [1]	24" (610 mm) diameter acrylic plate, 0.750" thick, 1/4"-20 hole array
	(M6 hole array available upon request)
Through-bore Diameter:	Standard: 1.4" (35.5 mm)
	mmW: 3.25" (82.5 mm)
Weight Capacity:	Centered: 150 lbs (45.5 kg); distributed: 250 lbs (113.6 kg)
RF Rotary Joint:	Precision (SMA, 2.92 mm, 2.4 mm, 1.85 mm or waveguide)

Roll / Phi Axis

Frequency Ranges:	Coax: DC to 6, 18, 40, 50, or 67 GHz
	mmW: 50-75 (V-Band), 60-90 (E-Band) or 75-110 (W-Band) GHz
Resolution:	0.05°
Drivetrain:	Belt driven with 1.8° stepper motor
Gear Ratio:	36:1 with precision planetary reducer
Movement Range:	360° continuous or ± 180°
Positioner Max Speed:	4 RPM (24° per second)
Position Feedback:	Optional encoder (default open loop, position tracked by software)
Weight (mast only):	22 lbs (10 kg)
AUT Mounting Options: [1]	4.5" (115 mm) diameter PVC mounting plate with 10-32 hole array
	(Larger plate and/or M5 hole array available upon request)
Through-bore Diameter:	1.75" (44.5 mm)
Weight Capacity:	25 lbs (11.4 kg)
Axial Moment Capacity:	20 ft-lbs (27 Nm, 2.75 m-kg)
Lateral Moment Capacity:	10 ft-lbs (13.5 Nm, 1.35 m-kg)
RF Rotary Joint:	Precision (SMA, 2.92 mm, 2.4 mm, 1.85 mm or waveguide)

[1] *= Custom mounting solutions available upon request*

Z-Axis	*(Standard feature on 50 GHz, 67 GHz and waveguide systems)*
Movement travel:	Up to 11" (279.5 mm)
Drive Type:	Precision ground C7 steel ball-screw
Motor:	NEMA 17 stepper motor (with manual control knob)
Max speed:	4 in/s (100 mm/s)
Movement resolution:	0.008" (0.2 mm)
Minimum travel:	0.008" (0.2 mm)
Position feedback:	None (default open loop, position tracked by software)

Electrical & Communications

Controller type:	Internal 3-axis microprocessor-based controller
Resolution:	Up to 1/32nd microstepping
Motor current:	3.125A per motor phase
Cooling:	24V fan
Communication interface:	9-pin D-Sub RS-232 (USB-to-Serial adapter included)
Included cable length:	10 feet (3 meters)
Input voltage:	24VDC 5A - 2.5 mm DC barrel connector
Power supply:	24VDC 5A, 110V / 220V input (included)

Software Features

Pattern Measurement Modes
- Time or Frequency Domain
- Gated Frequency domain (RCS, multipath elimination)
- Index and Measure
- Simultaneous axis movement support - (Conical Scan)
- Any supported S-Parameter (S21, S11, S12, S22, etc.)

Calculated Antenna Parameters
- Gain
- Peak gain and position
- Beamwidth
- Front to Back Ratio
- Efficiency / TRP
- Dual Linear to Circular Transform (RHCP/LHCP)
- Nearfield to Farfield Translation Module

Data Export
- TXT / .S1P
- DAT export
- Export data and report to Excel
- Trace Data only to Excel
- MatLab Compatible .TXT Format

Plots
- Multi-Trace polar and XY plots
- Efficiency and TRP
- Beamwidth vs. Frequency
- Spherical 3D Radiation Plots with Overlays
- 3D Amplitude Plot / 3D Color Map Plot
- Built In Matlab Plots (does not require MatLab)

Calibration and Correction
- Gain Substitution, Gain Transfer, and 3 Point gain modules
- Calibration Profiles for gains or losses.
- Table Based Correction
- Calibration Interpolation
- Phase Correction
- Data Normalization
- Data/Register Math - Add/ Subtract

**Automated / Batch Functions**
- File Trigger Mode
- Position from list
- Batch plot export

Product Drawings

Front View

Units: inches [mm]

⌀10.000 [⌀254.00]

46.794 [1188.58]

56.475 [1434.47]

1.855 [47.11]

9.681 [245.90]

24.000 [609.60]
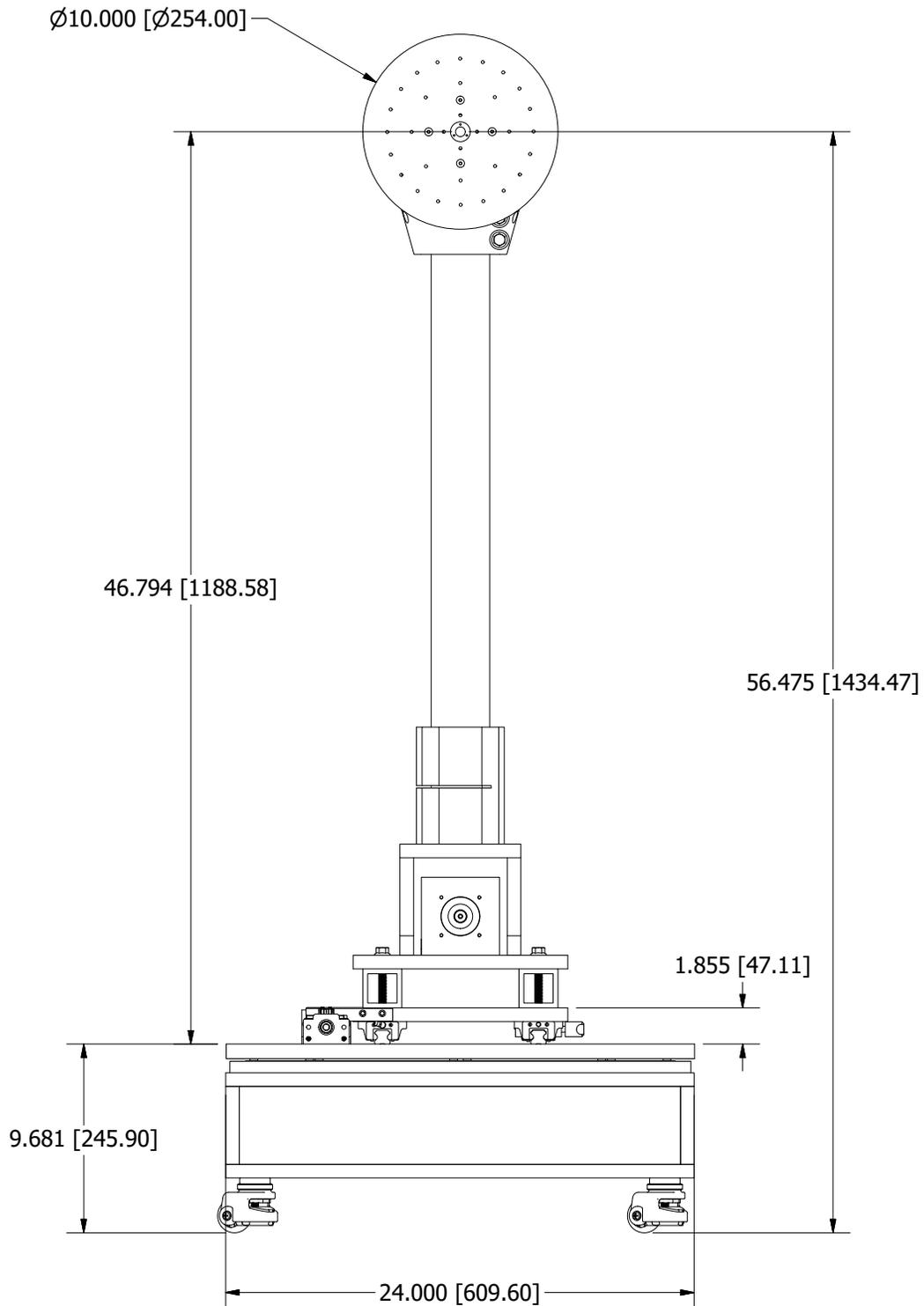
Side View

Units: inches [mm]

Standard configuration

10.677 [271.19]

58.663 [1490.04]

61.475 [1561.47]

Maximum extension

56.473 [1434.42]

23.115 [587.12]
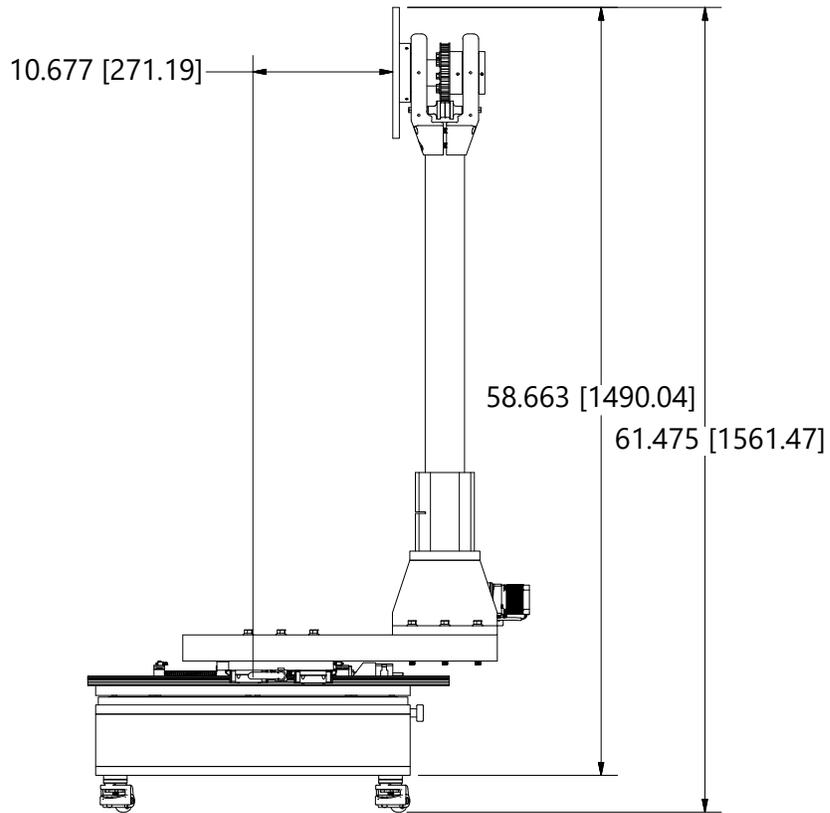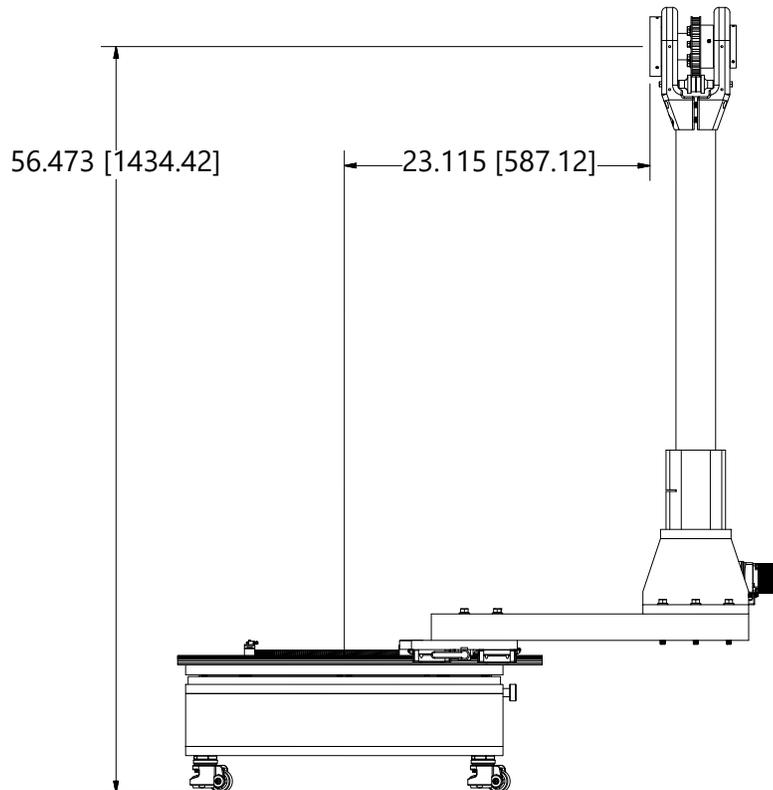
Turntable Top View

(Shown with maximum carriage plate extension, mast removed, and optional Z-axis)

Units: inches [mm]

11.153 [283.29]
(Maximum Z-axis travel)

Ø24.000 [Ø609.60]

24.000 [609.60]

9.340 [237.24]
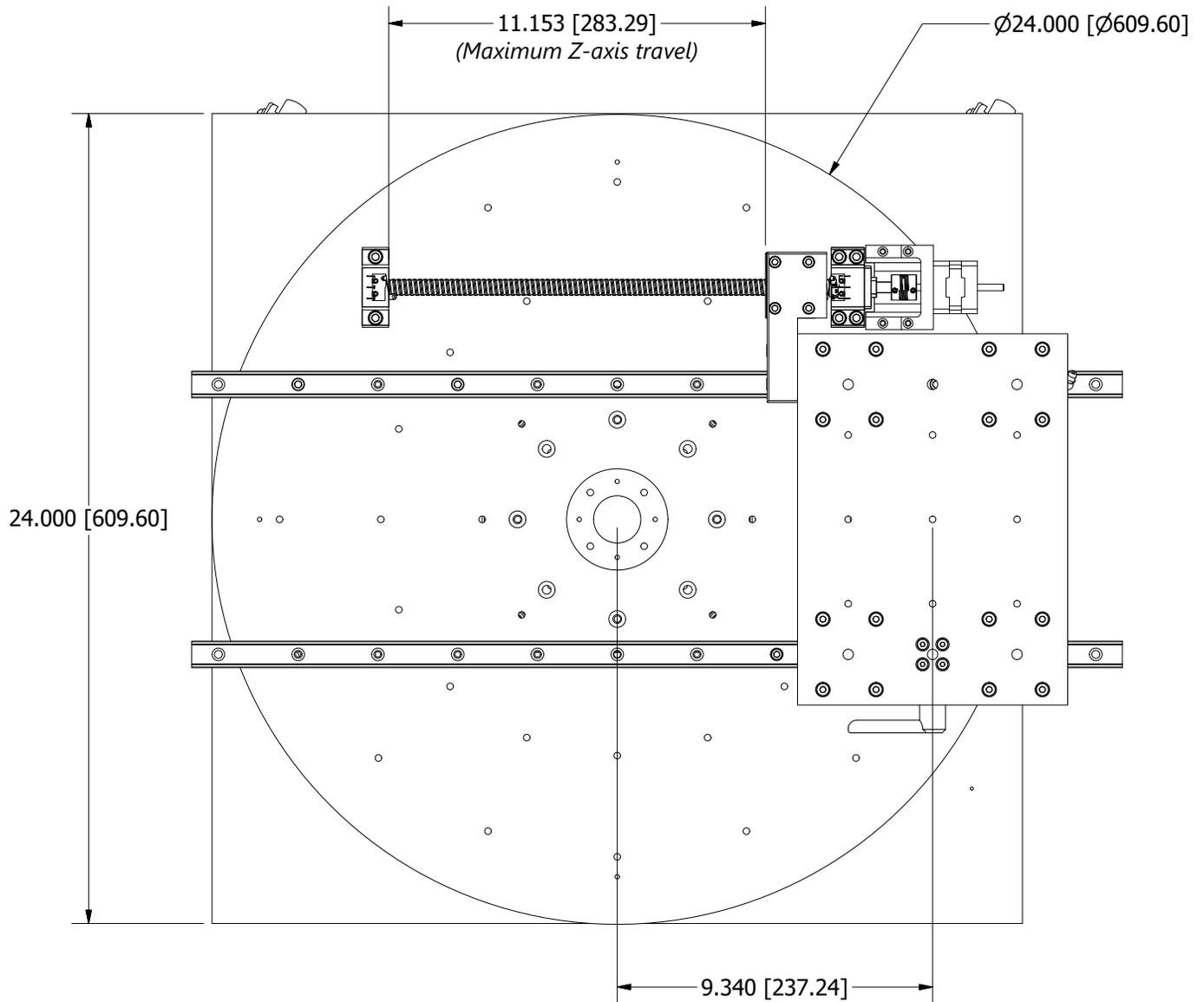
Operational Space Requirements

Top view with maximum extension. Illustrates the minimum amount of free space surrounding the positioner to allow it to spin unimpeded when extended to its maximum.

Units: inches [mm]
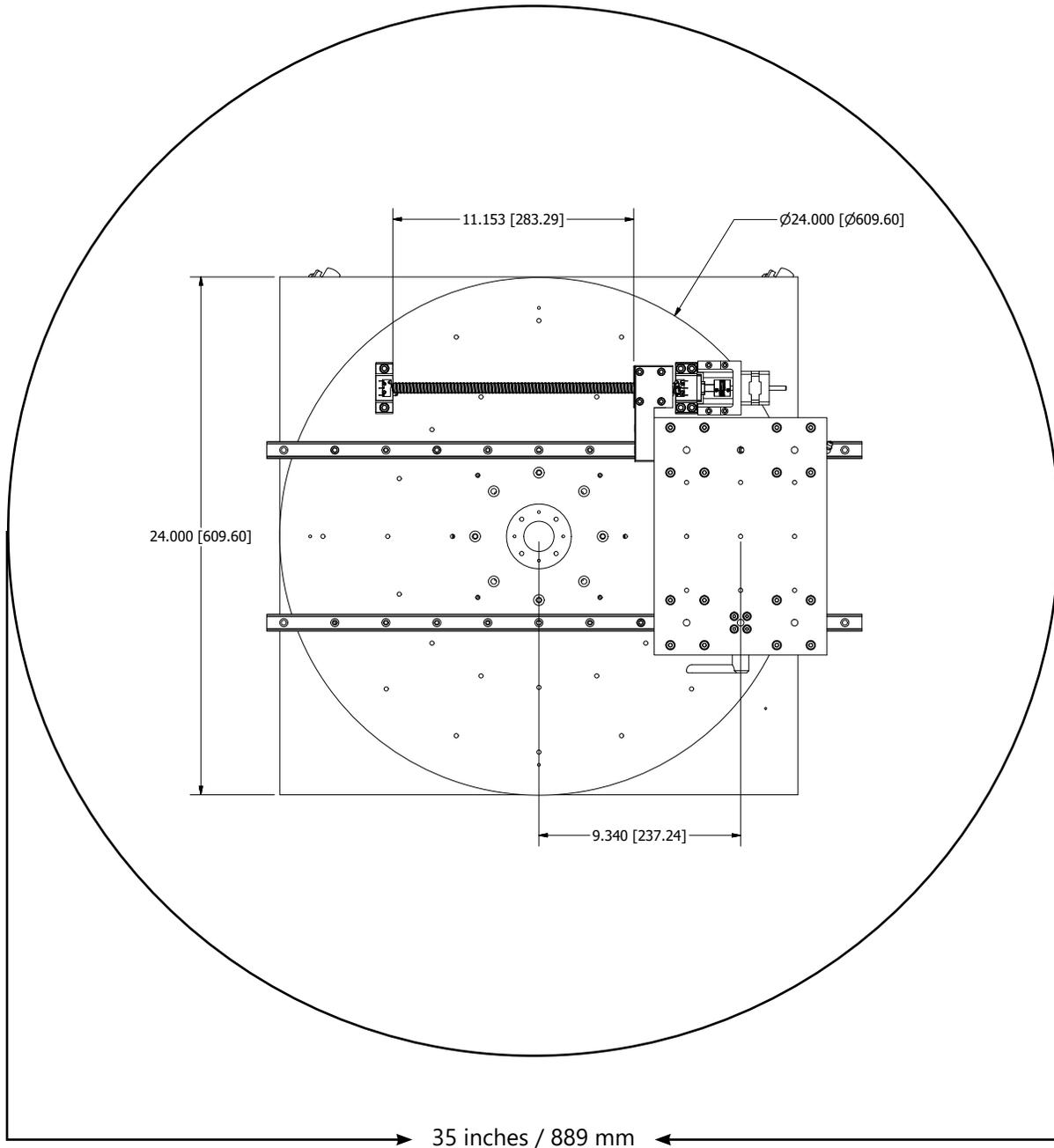
More Information

Software

For more information about our software, including screen shots, full specifications of capabilities and the ability to download a demo version, please visit:

http://www.DiamondEng.net/PDF/software_specs.pdf

Broadband Reference Horns

For more information about our broadband reference horns, please visit:

http://www.DiamondEng.net/PDF/de0726_datasheet.pdf

Power Amplifiers

For more information about our broadband power amplifiers, please visit:

http://www.DiamondEng.net/power-amplifiers

Diamond Engineering
Automated Measurement Systems

http://www.DiamondEng.net · Support@DiamondEng.net
P.O. Box 2037 · Diamond Springs, CA 95619 · 530-626-3857