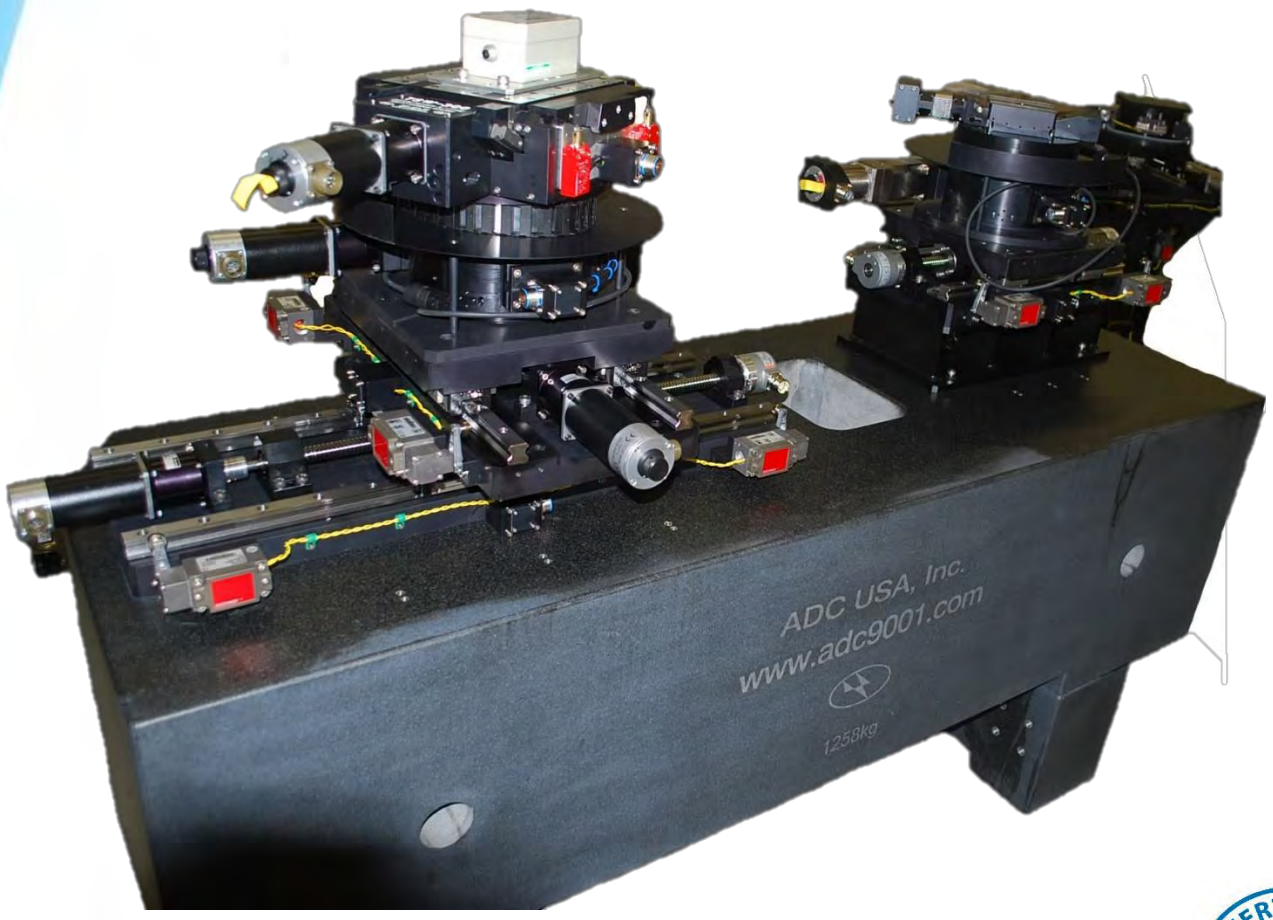
Neutron Instrumentation

Custom Neutron and High Energy Physics

Instrumentation/Manufacturing



2019

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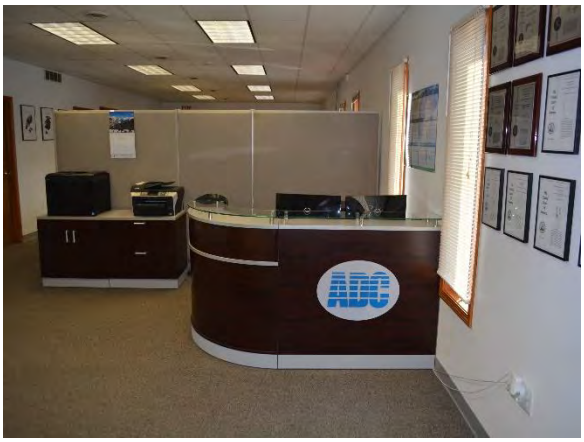
ADC USA, Inc.

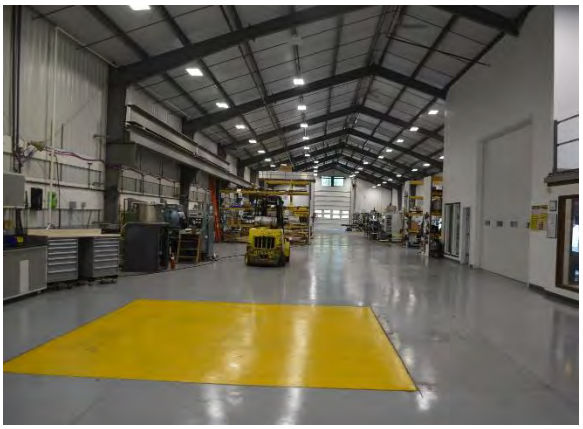
ADC USA, Inc. (ADC) is a leading developer and supplier of complex scientific components and instruments for large government laboratories and corporations around the world.



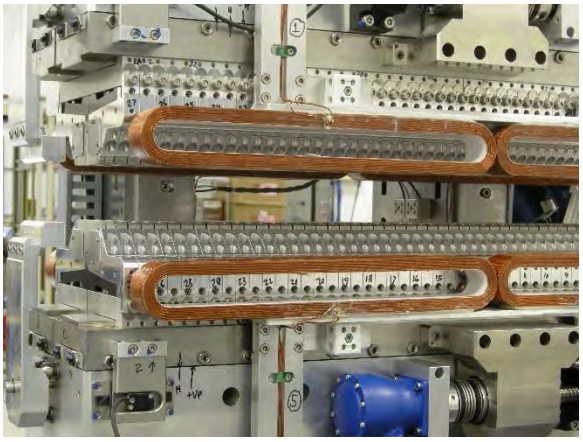
ADC, like many successful companies (and rock bands), got its start in a garage in 1995. Our garage was in Ithaca, NY, on the shores of Cayuga Lake and home of Cornell University. ADC has since grown into a worldwide leader in the field of design and manufacturing of complex research instrumentation.

ADC provides machining systems and products to our diverse customers from structural metal fabrication to turn key design products with complex control systems.

We specialize in engineered experimental tables and beamline components.



ADC occupies over 22,000 square feet of space. This includes our in-house machine shop. We use precision equipment to verify each order and are committed to delivering precision machined parts. We are very proud of our shop and the capabilities we can offer because of our state-of-the-art precision CNC milling and CNC turning machines.



Our engineering department works closely with our customers to realize designs that meet their technical requirements. Through an iterative process, we have developed standard designs that can be optimally customized for each new project. Our engineers provide incisive trouble shooting and technical recommendations to our customers resulting in high performing cutting-edge instruments.

Company History

ADC was incorporated in 1995, starting in a small office at Cornell Business and Technology Park. ADC established itself as a custom design manufacturing prime contractor. In 1995, ADC won its first contract for $10,700 working with Crouse-Hinds-Cooper Industries. By 1998, ADC had expanded enough to occupy its first building with 3,000 square feet of office and workshop space. The company grew steadily throughout the next decade, always reinvesting in the people and new engineering design, manufacturing and assembly equipment to provide the most cost-effective solutions to our customers.

We have come a long way from our modest beginnings by developing our expertise and capabilities while continuing to provide excellence in products and service. ADC now consists of different departments to make up the framework of our operations: Engineering Design and Analysis, Manufacturing and Planning, Temperature Control/Clean Room Assembly/Testing Facility, Ultra-High Vacuum (UHV) Facility, Metrology Laboratory, Magnetic Measurement Facility (Undulator Testing Facility), and Electronics and Instrumentation. Our comprehensive facilities give our engineers the capacity and freedom to innovate.

Today, ADC has a worldwide reach. ADC's vision is to be a global leader in the development and manufacturing of innovative products for scientific and research markets.

Neutron Instrumentation Projects

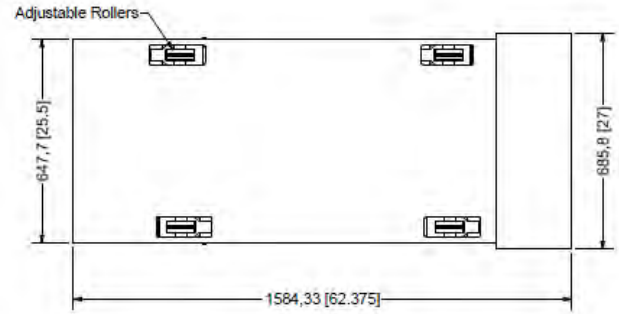
Deuterium Cryostat Plugs for Neutron Application

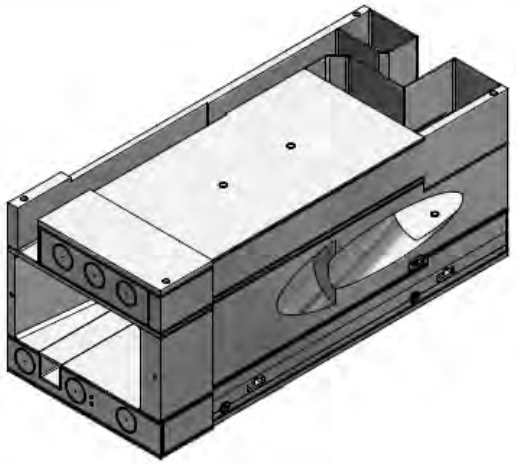
Customer:
NIST
100 Bureau Drive
Gaithersburg, MD 20899-001

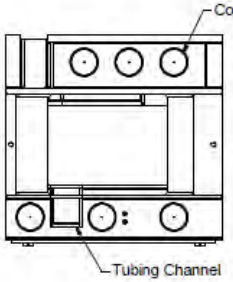
A structure was designed for NIST to hold a cryostat assembly. The structure, known as a cryostat plug, serves as a support for the cryostat as well as a radiation shield. The plug was built to house the new liquid deuterium cold neutron source that replaced the former liquid hydrogen source and its plug assembly. The cryostat plug holds the deuterium cryostat inside the cold port of the NBSR reactor.

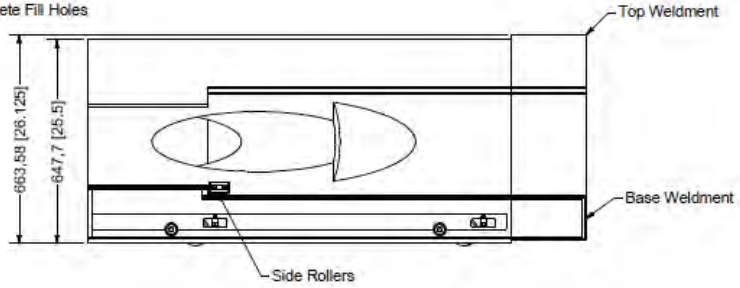
The cryostat plug is a large stainless-steel welded structure that is made up of two separate weldments, a top and bottom weldment, and two side pieces to connect them. All pieces are made from 304 Stainless Steel. The top and bottom weldments consist of individual stainless-steel pieces that are cut to size and welded together. After welding, the top and bottom weldments are connected to the two large machined side pieces. These side pieces have channels cut into them for beam tubes for the neutron beams. After welding, the outside of the structure is machined to reach the overall dimension tolerances. Finally, the spaces within the top and bottom weldments were filled with an MS1-a concrete mixture to aid in radiation shielding. The structure has four rollers on the bottom to roll it in and out of the cold port in the reactor. It also has a roller on each side to ensure that it is properly aligned within the port.

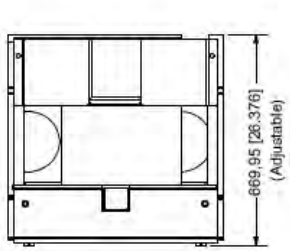
REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
n/a	0	Initial Release	2014-08-04	J Stranger

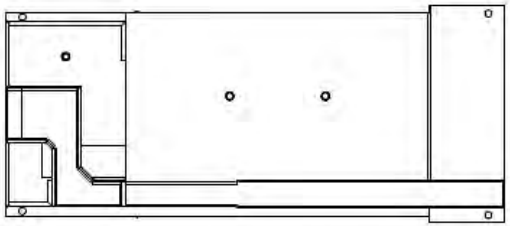












Notes:

1) Fill with empty spaces MS1-a concrete mixture for radiation shielding.

2) Weld in vented cover plates. Cover plates must be vented to allow gases to escape.

Purchased Part Modification	No		

First Angle Projection
All dimensions are mm [in]
inch dimensions are reference

Material: | Protective Finish: None

Drawing Standard: ANSI Y14.5M-1994

		Date
Drawn by	J Stranger	2014-08-04
Design by	J Stranger	2014-07-24

UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
N7 Machined surfaces 0,13 0,38
⌖ 0,25 A B C
⌓ 0,25 A B C

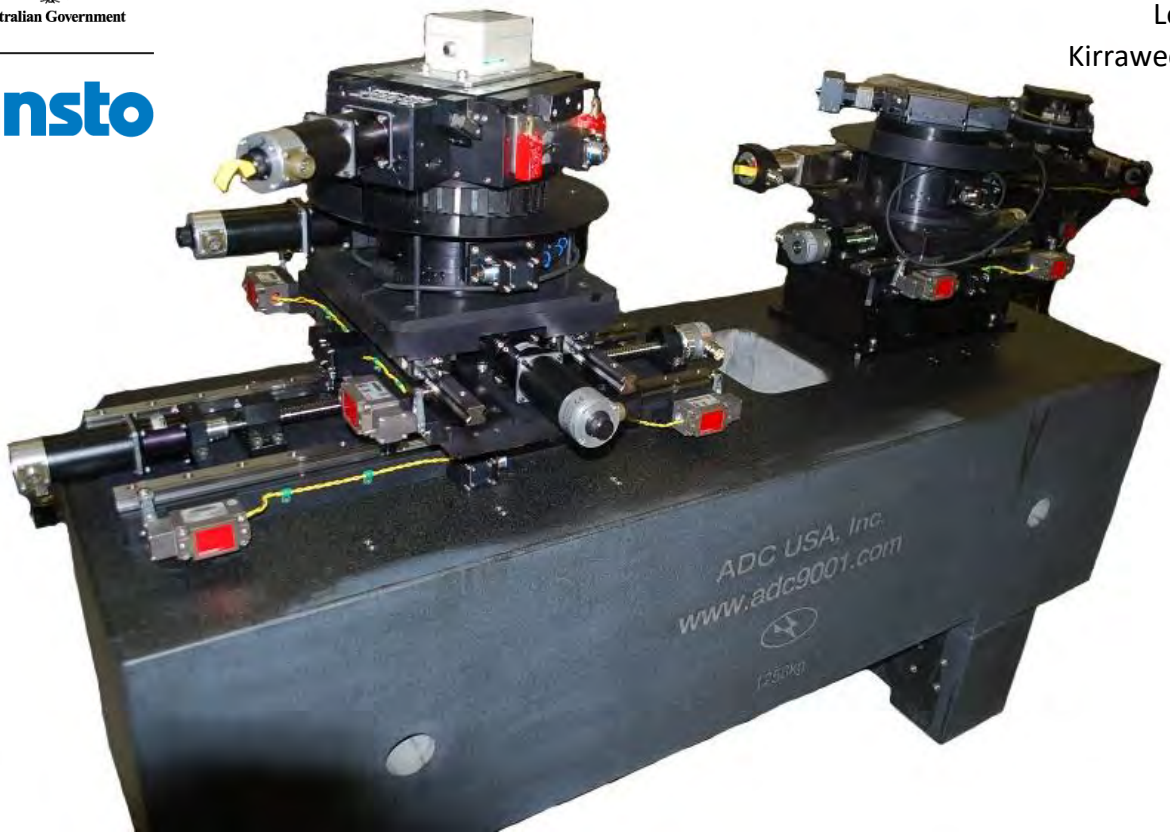
ADC Inc.
126 Ridge Road
Lewiston, NY 14092
Phone: 607.533.3531 / Fax: 607.533.3618
E-mail: adc@adc9001.com / Web: www.adc9001.com

Cryostat Plug Assembly

Part Number	Revision	Size	Sheet
00024124_2DOverview	0	A2	1 / 1

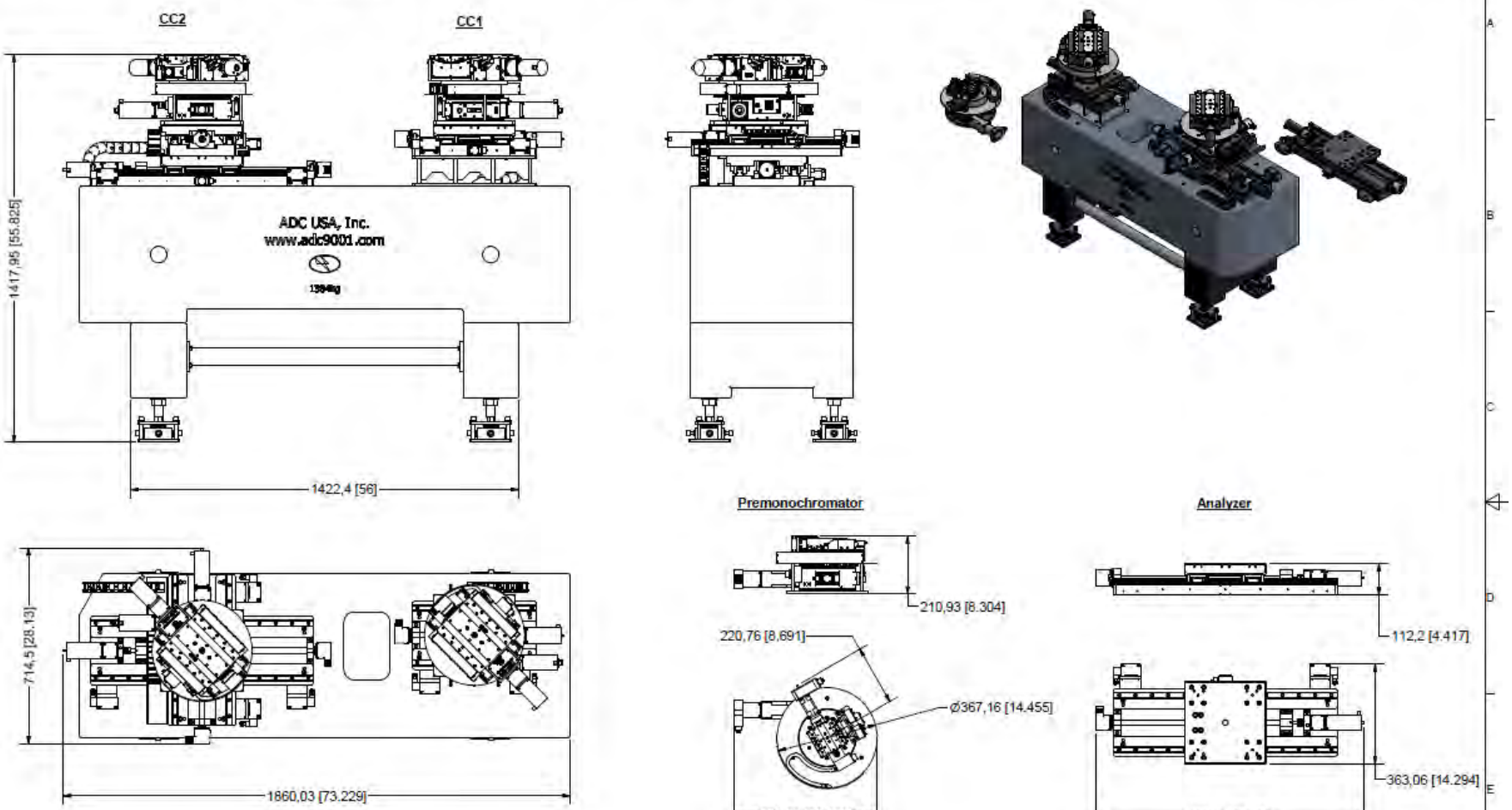
Ultra-Small-Angle Neutron Scattering (USANS) Monochromator

Customer:
ANSTO
Locked Bag 2001
Kirrawee DC NSW 2232
Australia



ADC designed and built a multi-axis positioning system for an ultra-small-angle neutron scattering (or USANS) method which is used for studying structure in the 100 nm to 10 µm range by diffraction. This system consists of a Premonochromator, Channel Cut Monochromator Crystal, and Channel Cut Analyzer Crystal. For this application a mix of ADC standard products and new customized stages were incorporated. These included the TS-160 and TSW-300 tilt stages, the RS-200 rotation stage, and three linear translation stages.

Monochromator



Premonochromator

Analyzer

Notes:

Premonochromator:
Weight: 36.7 kg [80.9 lb]
Travel:
Rotation = 360°
Tilt = 20°

Monochromator:
Weight: 1607.4 kg [3543.7 lb]
Travel:
-CC1
x = 150 mm [5.9 in]
Rotation = 360°
Tilt = 16°
-CC2
x = 500 mm [19.7 in]
y = 250 mm [9.8 in]
Rotation = 360°
Tilt = 16°

Analyzer:
Weight: 45.2 kg [99.6 lb]
Travel
x = 500 mm

Purchased Part Modification	No

First Angle Projection
All dimensions are mm [in]
inch dimensions are reference

Material: Protective Finish:

Drawing Standard: ANSI Y14.5M-1994

		Date
Drawn by	TROSCIO	5/23/2011
Eng approval	E Van Every	
Mfg approval		
Assy approval		

UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
N7 machined surfaces
0,13 / 0,38
⌖ 0,25 A B C
⏥ 0,25 A B C

Advanced Design Consulting USA, Inc.
136 Ridge Road / PO Box 187
Lansing, NY 14882
Phone: 607.533.3531 / Fax: 607.533.3518
E-mail: adc@adc9001.com / Web: www.adc9001.com

Part Number	Revision	Size	Sheet
00018001		A2	3 / 3

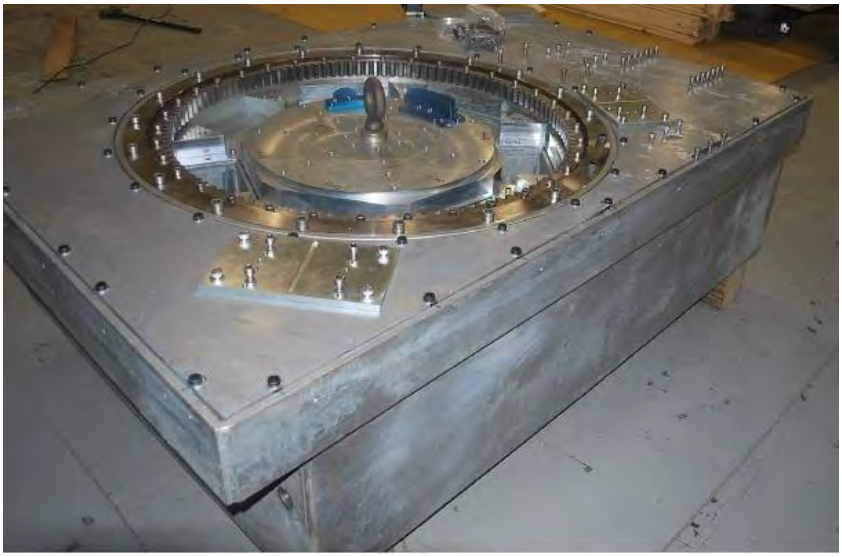
Neutron Scattering Collimation Instrument

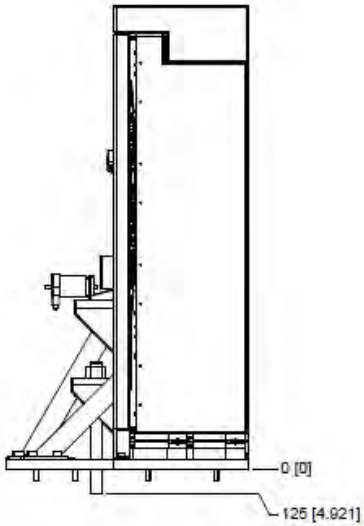
Australian Government

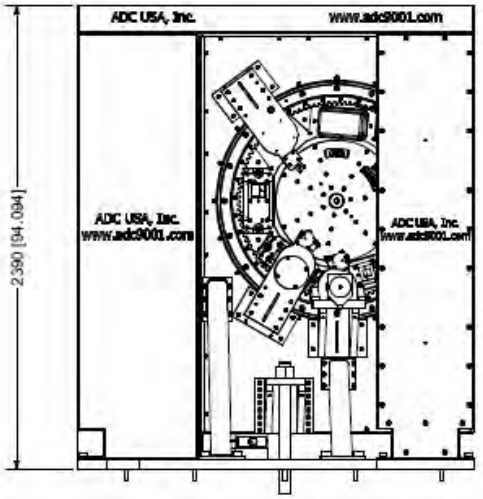
ansto

Customer:
ANSTO
Locked Bag 2001
Kirrawee DC NSW 2232
Australia

This system was designed for the Bragg Institute, a division of ANSTO, to provide a selector wheel shutter unit for their Radiography Instrument. The selector wheel shutter unit combines two distinct functions in one item. The first function is to work as an instrument shutter and the second one is to work as a selector wheel. The selector wheel assembly component, as suggested in its name, provides selective aperture options for high resolution or phase contrast imaging as it separates the two beams coming from the in-pile collimator. One beam is blocked and the other passes the selector wheel insert. A positioning accuracy of 0.01° step width is achieved. The selector wheel was designed with a stepped housing to mate with the inserts and prevent direct shine from the beam.

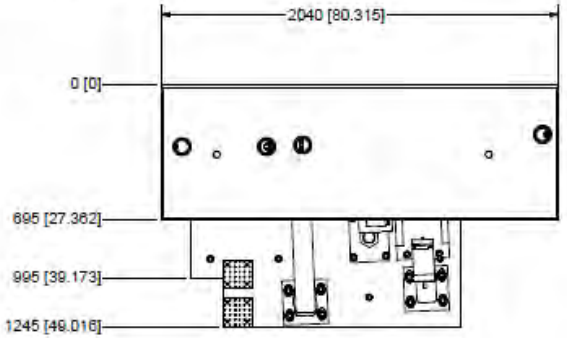






SPECS:

Total Weight: 144214.5 kg [31,800 lbs]
Rotational Speed:1.4 RPM
Minimum Shielding Thickness: 400 mm
6 Unique inserts with unique tapers allow the beam to be collimated



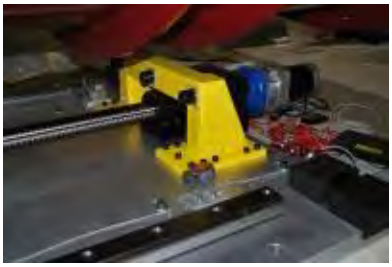
First Angle Projection All dimensions are mm [in] Inch dimensions are reference	Drawing Standard: ANSI Y14.5M-1994	Date	ADC USA, Inc. 126 Ridge Road Lansing, NY 14882 Phone: 607.533.3501 / Fax: 607.533.3510 E-mail: adc@adc9001.com / Web: www.adc9001.com
Material:	Drawn by: M Popov	4/21/2012	
Protective Finish: None	Eng approval: M Popov	4/21/2012	
	Mfg approval:		ANSTO Selector Wheel Top Level Assembly
	Assy approval:		
UNLESS OTHERWISE SPECIFIED: All Dimensions BASIC N7 machined surfaces 0.13 / 0.38 0.25 A B C 0.25 A B C			Part Number: 00020556 | Revision: 0 | Size: A2 | Sheet:

Purchased Part Modification: No

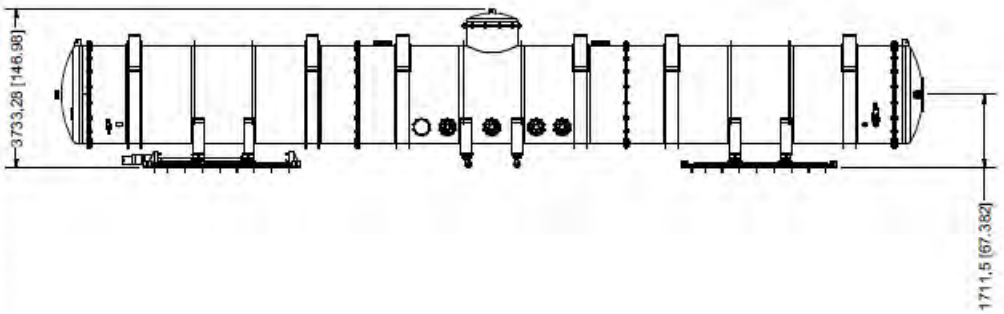
Small-Angle Neutron Scattering (SANS) Instrument

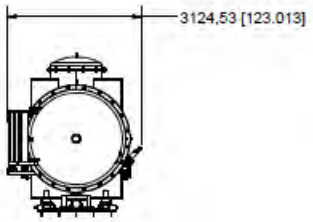
Customer:
ANSTO
New Illawarra Road
Lucas Heights, NSW Australia

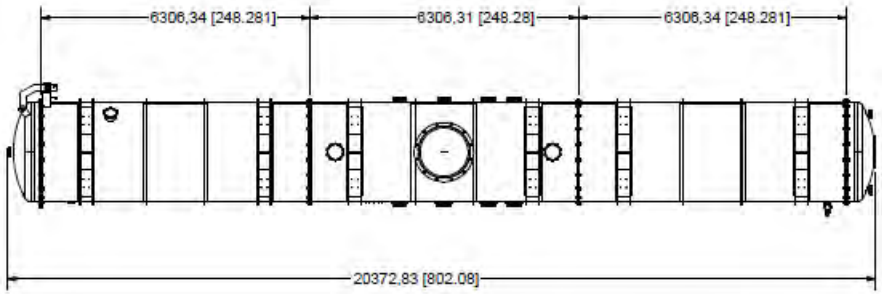
The Time-of-Flight Small Angle Neutron Scattering (ToF SANS) instrument is located at ANSTO, Australia. SANS is a complex machine. One key component is a large detector vessel. ADC took the overall concept for the vessel developed by ANSTO designers, and provided final engineering design, and built the detector vessel as imaged below. A low vacuum requirement was met. In addition, the entire vessel can be accurately moved 1.5 meters to a repeatability of 100 µm using external rails and a ball screw. The front end consists of a sample window and 630 mm gate valve. The rear of the vessel has a hatch with an articulated hinge. There is a central man-way hatch on the top and 17 ports for vacuum pumps, electrical, feed through, and sensors.



REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
n/a	0	Sales Drawing	8/1/2012	M Popov







Key Specs:

-External Travel of Chamber: 1500 millimeters
-Internal Travel of Carriage: 16060 millimeters
-Internal Motion Load Capacity: 2000 kg (4400 lbs)
-Weight of Bilby Detector Vessel: 24,632 kg (65,994 lbs)
-Internal Vacuum Level: 1x10-4mbar (7.5x10-5)

Purchased Part Modification	No

First Angle Projection
All dimensions are mm [in]
Inch dimensions are reference

Material: Protective Finish: None

Drawing Standard: ANSI Y14.5M-1994

		Date
Drawn by	M Popov	8/1/2012
Eng approval	M Popov	8/1/2012
Mfg approval		
Assy approval		

UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
N7 machined surfaces
0,13 / 0,38
0,25 A B C
0,25 A B C

ADC USA, Inc.
126 Ridge Road
Lansing, NY 14882
Phone: 607.533.3521 / Fax: 607.533.3518
E-mail: adc@adc9001.com / Web: www.adc9001.com

Bilby Detector Vessel System

Part Number	Revision	Size	Sheet
0002000	0	A2	

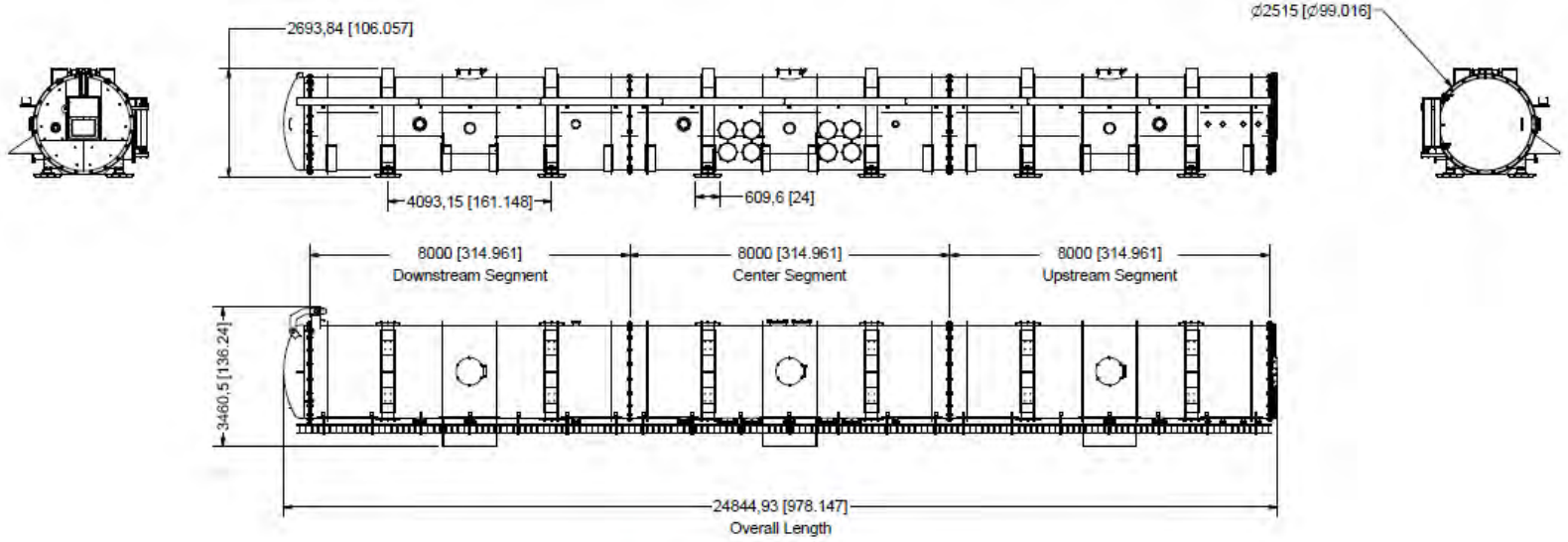
The Very Small-Angle Neutron Scattering (VSANS) Diffractometer

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Customer:
NIST
100 Bureau Drive
Gaithersburg, MD 20899-001

ADC designed and built components for a large instrument for National Institute of Standards and Technology (NIST). This instrument is like a more complex instrument we delivered to ANSTO in Australia called the Bilby SANS instrument. The NIST VSANS and the ANSTO Bilby SANS instruments have very similar dimensions for length and diameter and have similar requirements for internal detector motion, top access port, walkway supports, and ports; however, the NIST instrument did not have the low vacuum or motion requirements of the ANSTO instrument.

Shown: Inside the Chamber



Notes:

1. Very Small Angle Neutron Scattering (VSANS) evacuated flight tube and detector motion system
2. 3 rack-and-pinion driven carraiges carry 3 neautron detector arrays inside the vessel
3. System Weight: 33246 kg [73141 lb or 36.5 US tons], Foot Area: 48 ft^2, Floor Loading: 1523 psf
4. Vacuum Level: Rough Vacuum (10^-3 mbar)

VACUUM APPLICATION

DO NOT USE CHLORINE OR SULPHUR BEARING OILS OR ABRASIVES
APPROVED VACUUM COMPATIBLE LUBRICANTS AND COOLANTS ONLY

Approved by: T Shea Date: 2015-12-04
Purchased Part Modification: No

First Angle Projection
All dimensions are mm [in]
Inch dimensions are reference

Material: Protective Finish: None

Drawing Standard: ANSI Y14.5M-1994

		Date
Drawn By:	T Shea	2015-12-03
Design by:	J Stranger	2015-01-26

UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
N7 machined surfaces 0,13 0,38
0,25 A B C
0,25 A B C

ADC Inc.
126 Ridge Road
Lansing, NY 14882
Phone: 607.533.3631 / Fax: 607.533.3618
E-mail: adc@adc9001.com / Web: www.adc9001.com

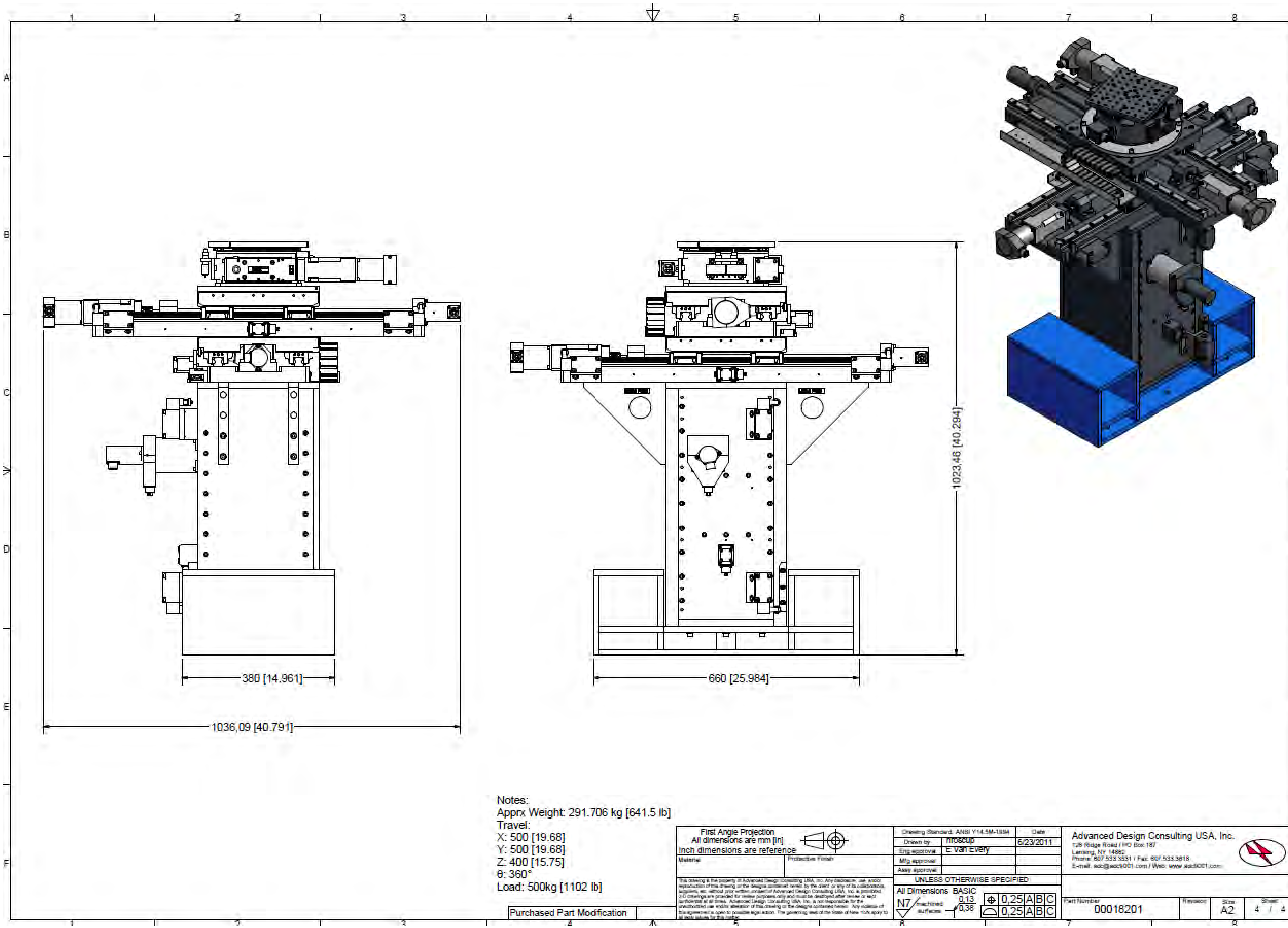
VSANS System Assembly

Part Number	Rev	Size	Sheet
00025178	D2/S2	0	A2

4-Axis Translation/Rotation Table

Customer:
ANSTO
New Illawarra Road
Lucas Heights, NSW Australia

This new state-of-the-art instrument was built and delivered to support Dingo - Radiography/Tomography/Imaging Station. The sample stage consists of an XYZ translation table and a rotation stage. The XYZ translation table was needed for sample positioning in front of the detector. For this procedure a range of >500 mm in the XY plane and 400 mm in the Z direction was essential. In addition, a high precision rotation stage with a resolution of 0.001° was needed for neutron tomography. The rotation stage has a loading capacity up to 200 kg.

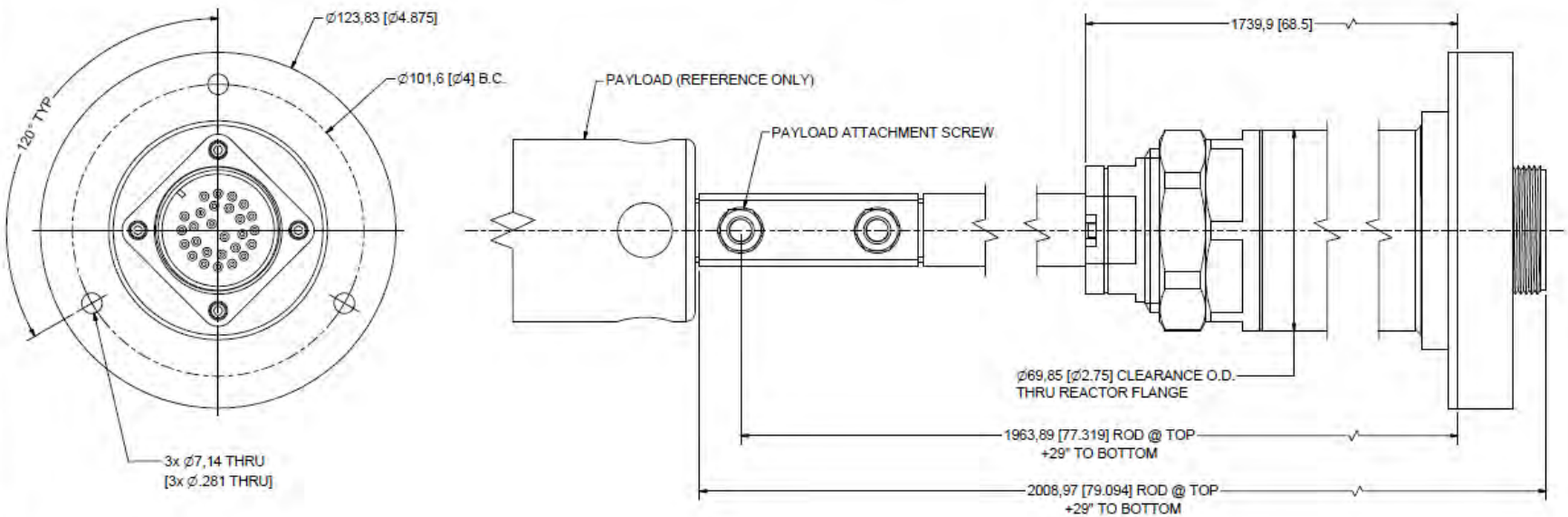

380 [14.961]
1036,09 [40.791]
660 [25.984]
1023,46 [40.294]
Notes:
Apprx Weight: 291.706 kg [641.5 lb]
Travel:
X: 500 [19.68]
Y: 500 [19.68]
Z: 400 [15.75]
θ: 360°
Load: 500kg [1102 lb]
Purchased Part Modification
First Angle Projection
All dimensions are mm [in]
Inch dimensions are reference
Drawn by
E Van Every
6/23/2011
UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
Advanced Design Consulting USA, Inc.
00018201
A2
4 / 4

Linear Actuator for Regulating Rod

Customer:
NIST
100 Bureau Drive
Gaithersburg, MD 20899-001

A linear actuator and attendant controller was designed for the National Center for Neutron Research (NCNR) at NIST in Gaithersburg, MD, to position their nuclear reactor's graphite regulating rod with 1/8" accuracy over a 29" range. The objective was to provide an upgraded replacement for the previous actuator, which had been in use for decades. To fit the reactor, the actuator was designed with a maximum body diameter of only 2.75". Compatibility was maintained with old systems by using an identical upper flange and electrical connector, along with an identical interface to the regulating rod. The actuator hangs inside the reactor vessel by its upper flange and attaches to the regulating rod at its lower end. Significant improvements over the old design included the use of a "hard anodized" (MIL Type III) coating on the output rod to resist wear, and the use of a backbone structure to which all drive components assemble in a repeatable fashion.

Description	Value	Units
Range of Motion	0.736 [29]	m [in]
Resolution (unit/step)	0.05 [0.002]	mm [in] / step
Minimum dynamic load capacity	1.8 [4]	kg [lb]
Weight	11.2 [24.8]	kg [lb]
Resolver Accuracy	10	arc. sec.



NOTES:

1. Approximate Weight: 24.8 lb
2. Nominal Travel: 29" (29-1/8" between hard stops)
3. Mechanical Resolution: 0.002" / motor step
4. Load Capacity: 4 lb

Material	Protective Finish: None	Drawing Standard: ASME Y14.5-2009	Date	ADC Inc. 126 Ridge Road Lansing, NY 14882 Phone: 607.533.3551 / Fax: 607.533.3618 E-mail: adc@adc9001.com / Web: www.adc9001.com
Purchased Part Modification: No	Approximate Mass: 11.2 kg [24.8 lbs]	Drawn By: T Shea	2017-12-14	
		Design by: T Shea	2017-12-05	
		UNLESS OTHERWISE SPECIFIED: All Dimensions BASIC		Regulating Rod Drive Unit Assembly
		N7 finished surfaces; 0,13 / 0,38; ⌖ 0,25 A B C; ⌓ 0,25 A B C		Part Number: 00030860
				Rev: D2/S0
				Revision:
				Size: A2
				Sheet:

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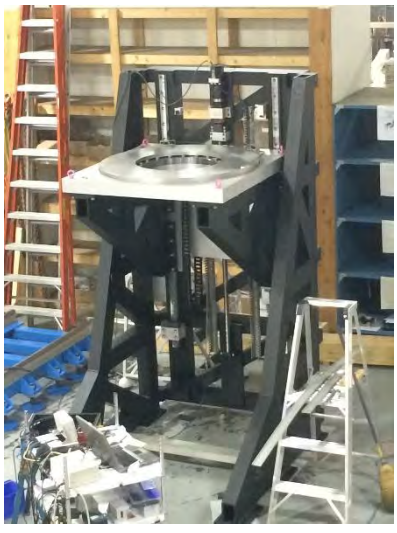
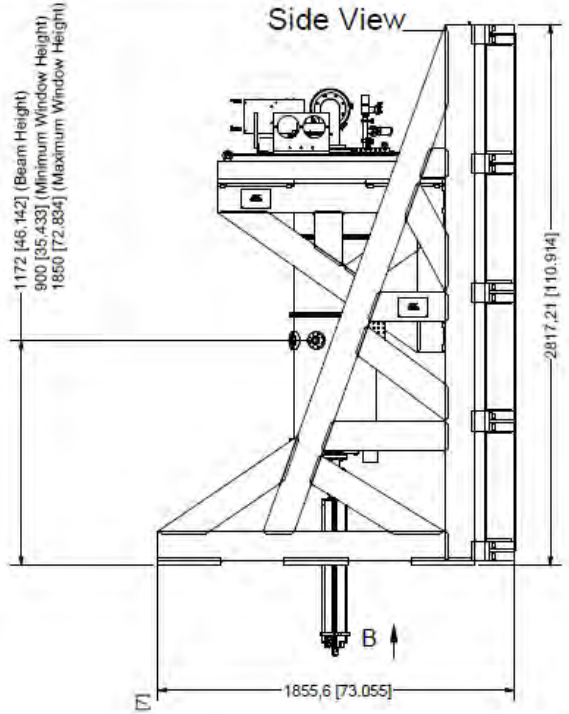
First Angle Projection
All dimensions are mm [in]
Inch dimensions are reference

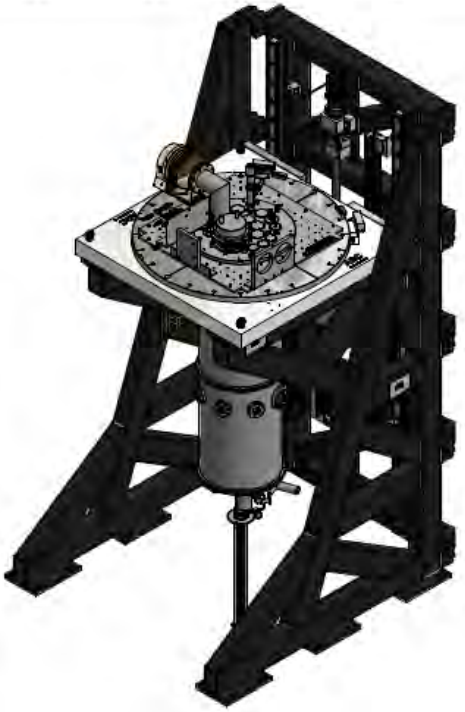
Cryostat Dilution Refrigerator

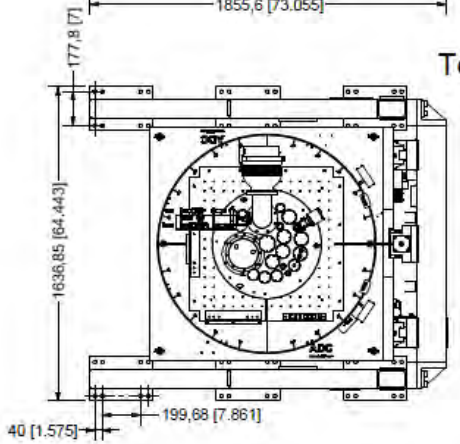
Customer:
University College London
London Centre for Nanotechnology
17-19 Gordon Street
London WC1H 0AH, UK

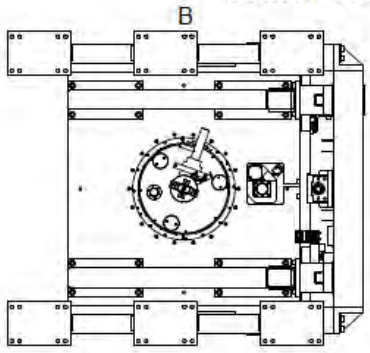
A system was custom designed for the Free Electron Laser for Infrared eXperiments (FELIX) in the Netherlands that provides both vertical (Z) axis positioning and rotation about the Z-axis of a Cryo-Free dilution refrigerator from Oxford Instruments (Kelvinox). The refrigerator has a vertical travel of 950 mm using linear bearings and a 40 mm ball screw driven by a triple stack NEMA 34 stepper motor and a planetary inline gearbox. With a 10:1 gear ratio on the 200 steps/rev motor the resolution is approximately 5 µm. 180 degrees of rotation is achieved through the use of a large bearing driven by a double stack NEMA 34 stepper motor and a planetary inline gearbox. With a 3:1 gear ratio on the 200 steps/rev motor the rotation has a resolution of approximately 0.07 degrees. The aluminum frame (non-magnetic) is bolted to the floor using M16 Screws to provide ultimate stability.











Notes:

1) Linear Travel: 950 mm [35.433 in]
2) Rotation: 180 degrees [3.14 radians]
3) Approximate Weight: 1560 kg [3439 lbs]

Purchased Part Modification	No

First Angle Projection
All dimensions are mm [in]
Inch dimensions are reference
Material: None
Protective Finish:

Drawing Standard: ANSI Y14.5M-1994

		Date
Drawn by:	C Adams	2014-04-01
Eng approval:	E Van Every	2014-04-01
Mfg approval:		
Assy approval:		

UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
N7 machined surfaces
0,13 / 0,38
0,25 A B C
0,25 A B C

ADC Inc.
125 Ridge Road
Lansing, NY 14882
Phone: 607.533.3531 | Fax: 607.533.3848
E-mail: adc@adc9001.com | Web: www.adc9001.com

Cryostat and Rack Assembly

Part Number:	Revision:	Size
	0	A2

Compact Precision Translator

Customer:
Los Alamos National Laboratory
Bikini Atoll Rd., SM 30
Los Alamos, NM 87545

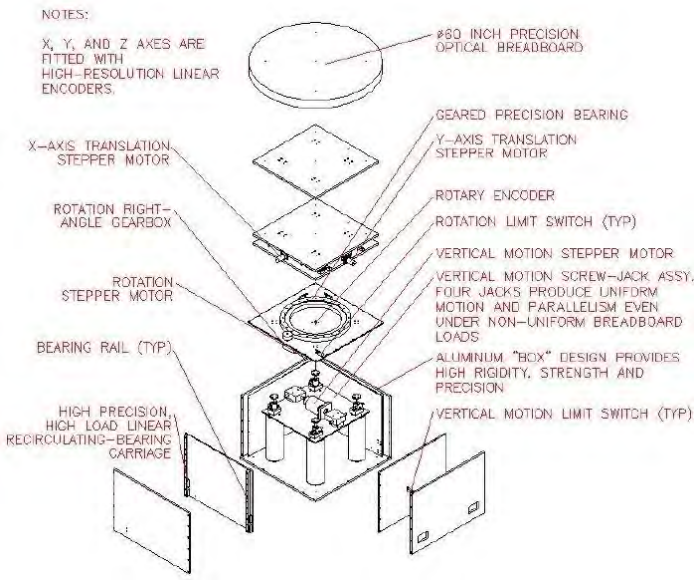
This system was designed and built for the Los Alamos National Laboratory. Although highly customized, it uses several of our standard slides, both motorized and non-motorized.

Motions: 50 mm max in Vertical (Z), 5 mm max in Rotation (R), 100 mm max for each direction in Horizontal (X, Y), 5 mm max tilt parallel to beam.

Capacity: The maximum mass to be placed on the table is 680 kg.

Customer:
Los Alamos National Laboratory
Bikini Atoll Rd., SM 30
Los Alamos, NM 87545

The SMARTS is a third-generation neutron diffractometer optimized for the study of engineering materials. It was funded by DOE, designed and installed by ADC at the Lujan Center, and went online in the summer of 2001. SMARTS provide a range of capabilities for studying polycrystalline materials focusing on two areas; the measurement of deformation under stress and extreme temperature and the measurement of spatially resolved strain fields. With an extensive array of in situ capabilities for sample environments, it enables measurements on small (1 mm^3) or large (1 m^3) samples. Components with dimensions up to 1 m and up to 1,500 kg can be positioned precisely in the beam. Permanently mounted alignment theodolites provide a simple and efficient way to position samples or equipment to within 0.01 mm.



7-Axis High Load Precision Motion System

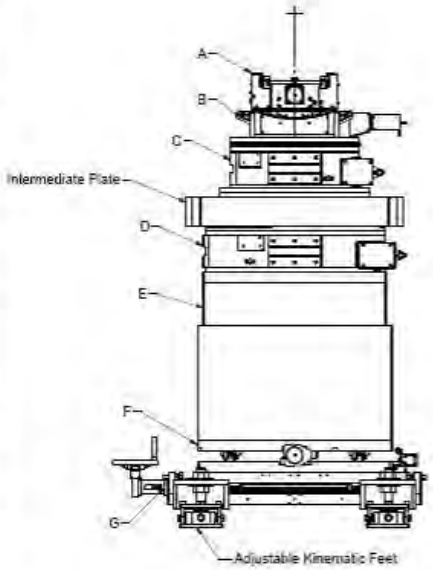
This is a high load and high precision system that can be used in wide areas of Neutron as well as Synchrotron experimental stations.

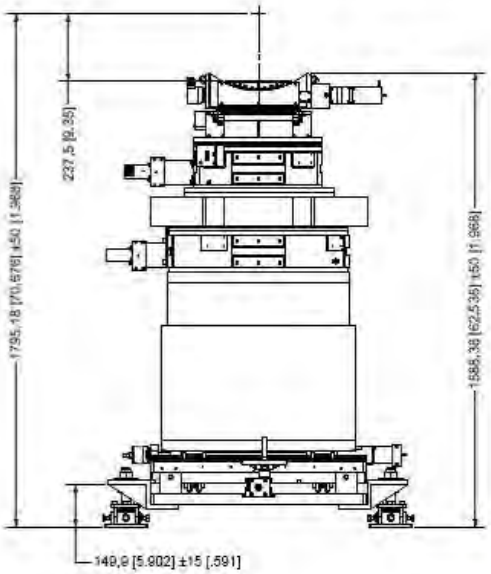
The following summarizes notes in regard to the above motion system:

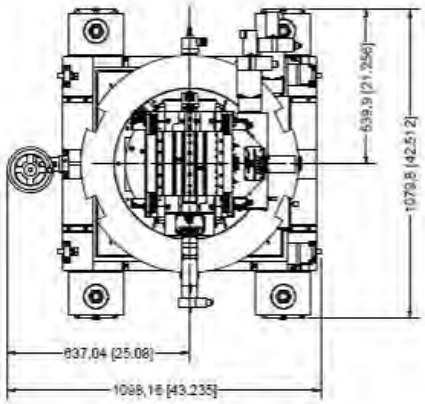
1. The common rotation point from the goniometers is located 270 mm above the surface of the top plate.
2. The maximum load is 600 kg.
3. One manual translation stage of 300 mm supports the whole assembly. The translation has adjustable move stoppers with dampers. It allows the whole assembly with 1000 kg to be maneuvered by only one person with an accuracy of 1 mm. The translation is mechanically fixed to the floor with 4 adjustable feet, each allowing a 30 mm vertical course.
4. All the elements are non-magnetic with the exception of certain components that might not be 100% non-magnetic. These components include ball screws, bearing, motors, etc.
5. All the geared elements are coded in absolute.
6. All the stages have rulers to manually read the position value.
7. Encoders are from Renishaw.

Motion Description	ADC Product	Range	Load	Accuracy	Speed
Rotation About Z-Axis	TSW-300-18-E Tilt Stage Assembly	+/-18°	1 kg	0.003°	20°/min
		≤ +/-2°	600 kg		
		≤ +/-5°	150 kg		
Rotation About X-Axis	TS400 Tilt Stage Assembly	+/-8°	1 kg	0.003°	20°/min
		≤ +/-2°	600 kg		
		≤ +/-5°	150 kg		
Rotation About Y-Axis	RS400 Rotation Stage Assembly	360°	600 kg	0.003°	60°/min
Rotation About Y-Axis	RS500 Rotation Stage Assembly	360°	600 kg	0.003°	20°/min
Vertical Elevator	Custom Jack	300 mm	700 kg	0.005 mm	50 mm/min
Translation X-Axis	X-Axis Linear Slide	100 mm	1000 kg	0.005 mm	100 mm/min
Translation Z-Axis	Z-Axis Linear Slide (Manual)	300 mm	1000 kg	1 mm	n/a

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
n/a	A	Release for Review	4/9/2013	E Acome







	Description	Range	Load	Speed
A	Z-Axis Tilt Stage	+/- 18 deg	1 kg	20 deg/min
		+/- 2 deg	600 kg	20 deg/min
		+/- 5 deg	150 kg	20 deg/min
B	X-Axis Tilt Stage	+/- 8 deg	1 kg	20 deg/min
		+/- 2 deg	600 kg	20 deg/min
		+/- 5 deg	150 kg	20 deg/min
C	Y-Axis Rotation	360 deg	600 kg	60 deg/min
D	Y-Axis Rotation	360 deg	700 kg	20 deg/min
E	Y-Axis Lift	+/- 150 mm	700 kg	50 mm/min
F	X-Axis Slide	+/- 50mm	1000 kg	100 mm/min
G	Y-Axis Slide	+/- 150 mm	1000 kg	n/a

Notes:

- Overall Dimensions Shown with All Axes at Mid-Travel
- All Components are Non-Magnetic and Radiation Hard
- Approximate Weight: 715 kg [1576 lb]

Purchased Part Modification	No

First Angle Projection
All dimensions are mm [in]
Inch dimensions are reference

Material: Protective Finish:

Drawing Standard: ASME Y14.5M-1994		Units
Drawn by	E Acome	4/9/2013
Eng approval	M Pollard	4/9/2013
Mfg approval		
Assy approval		

UNLESS OTHERWISE SPECIFIED
All Dimensions BASIC
N7 fractional surfaces ±.13 ±0.38 ⌖ 0.25 A B C ⏥ 0.25 A B C

ADC USA, Inc.
626 Ridge Road
Lansing, NY 14882
Phone: 607.533.3634 / Fax: 607.533.3641
E-mail: info@adc9001.com / Web: www.adc9001.com

CEA Motion System

Part Number	Revision	Size	Sheet
	A	A2	1 / 1

Ultra High Precision Slits for Neutron

ADC has been a leading supplier of slits to the synchrotron and neutron source scientific community for over 18 years. These slits use standard micro stepped stepper motors that can be controlled with a wide array of controllers/drivers available on the market. Our standard slits run the range from in-air monochrome beam to UHV high heat load white beam.

Key Features:

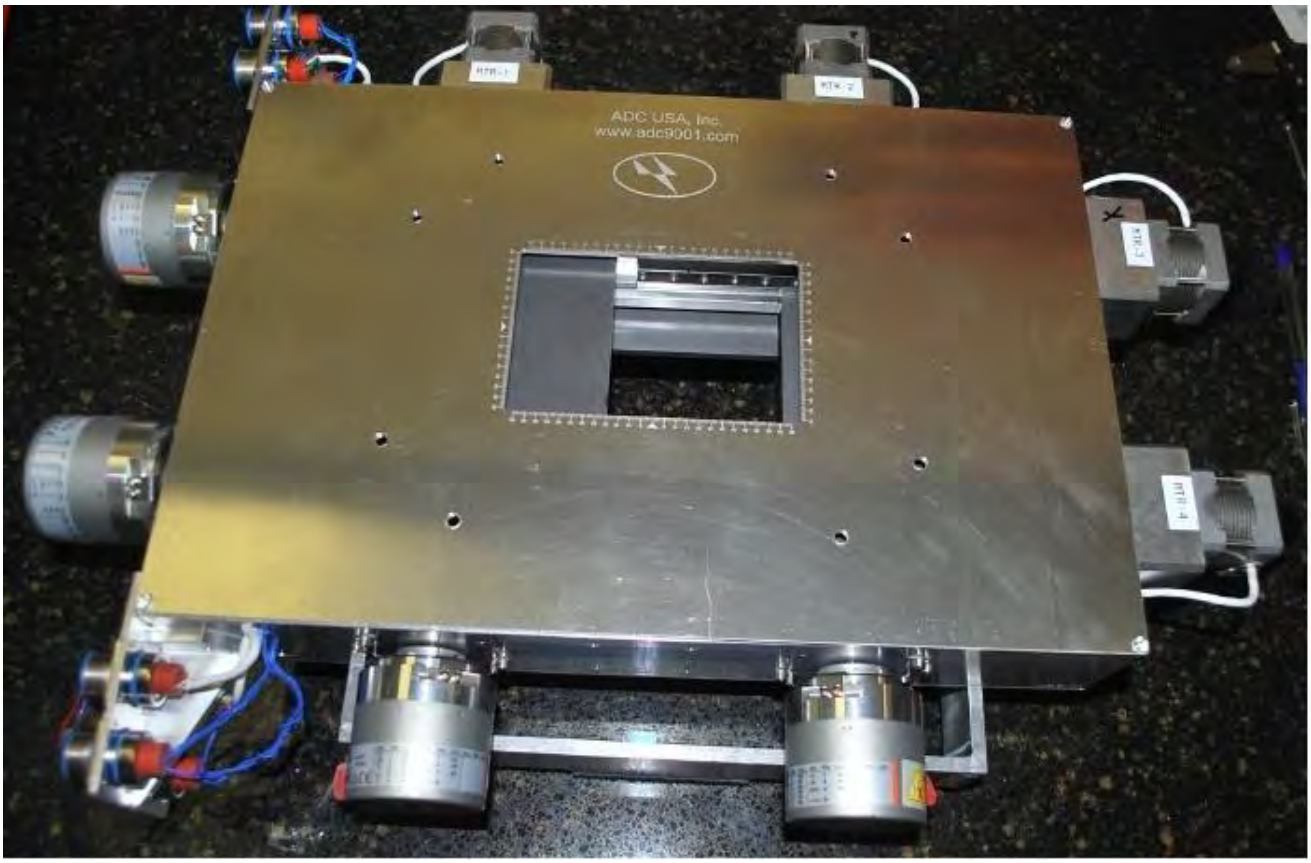
- Micron precision
- High radiation resistance components such as motors, brake, and encoders
- Blade material:
    - Cadmium, Boron Nitride, Boron Carbide and/or composite structure consisting of several materials.
- Blades can go "past closed" without clashing (Overlapping/Zero beam).
- Customized to Customer Specifications; size, blade material, etc.
- Air or Vacuum

Standard sizes:

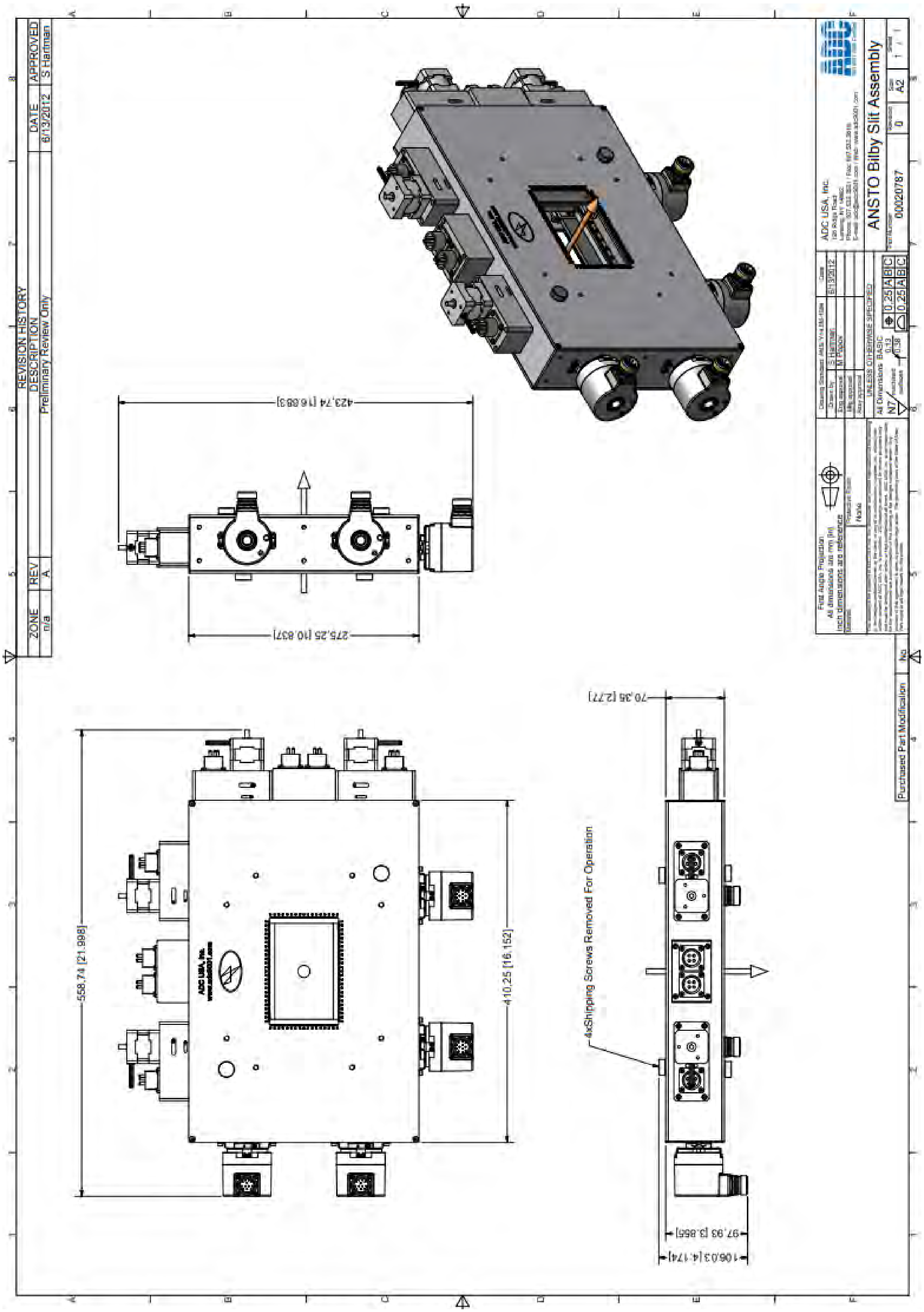
- (12 mm X 12 mm aperture)
- (25 mm X 25 mm aperture)
- (60 mm X 60 mm aperture)
- (100 mm X 100 mm aperture)
- (150 mm X 150 mm aperture)

ANSTO SANS Instrument Vacuum Slits

Customer:
ANSTO
New Illawarra Road
Lucas Heights, NSW Australia



ADC custom designed and built two slits for SANS Instrument located at ANSTO Neutron facility. The ANSTO Neutron Beam Slit is a standard XY Slit. This slit uses a single NEMA 17 motor coupled to a screw for each blade to open and close the aperture. The blades are made from 5 mm Thick Boron Carbide; are fully scannable, and the maximum aperture size is 70 mm x 115 mm. A Kubler Absolute Multiturn Rotary Encoder is used to track the position of the blades. The limits are lever style snap-action switches. Connectors are circular MIL Spec Metal Connectors as specified by the customer. This slit was designed for use in a rough vacuum environment.

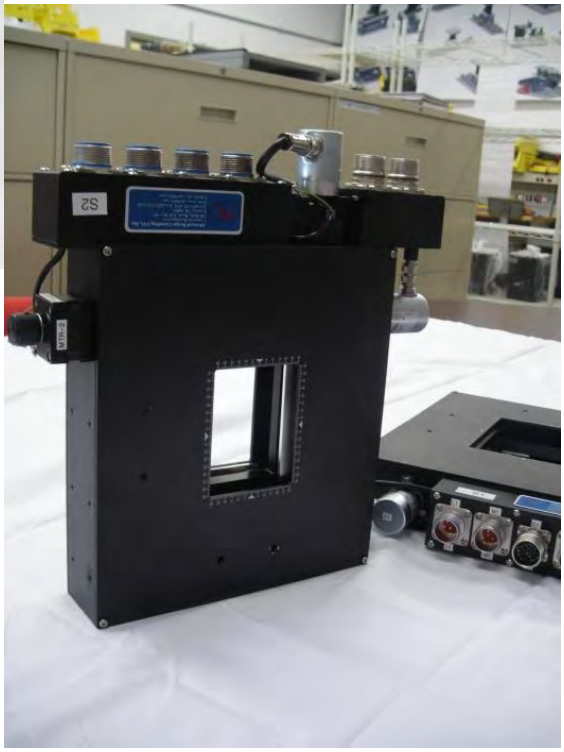

REVISION HISTORY
ZONE
REV
DESCRIPTION
DATE
APPROVED
n/a
A
Preliminary Review Only
6/13/2012
S Hartman
423,74 [16.683]
275,25 [10.837]
558,74 [21.998]
410,25 [16.152]
70,35 [2.77]
97,93 [3.855]
106,03 [4.174]
4xShipping Screws Removed For Operation
ADC USA, Inc.
ANSTO Bilby Slit Assembly
00020787
A2
Purchased Part Modification
First Angle Projection
UNLESS OTHERWISE SPECIFIED

ANSTO PELICAN Instrument Slits

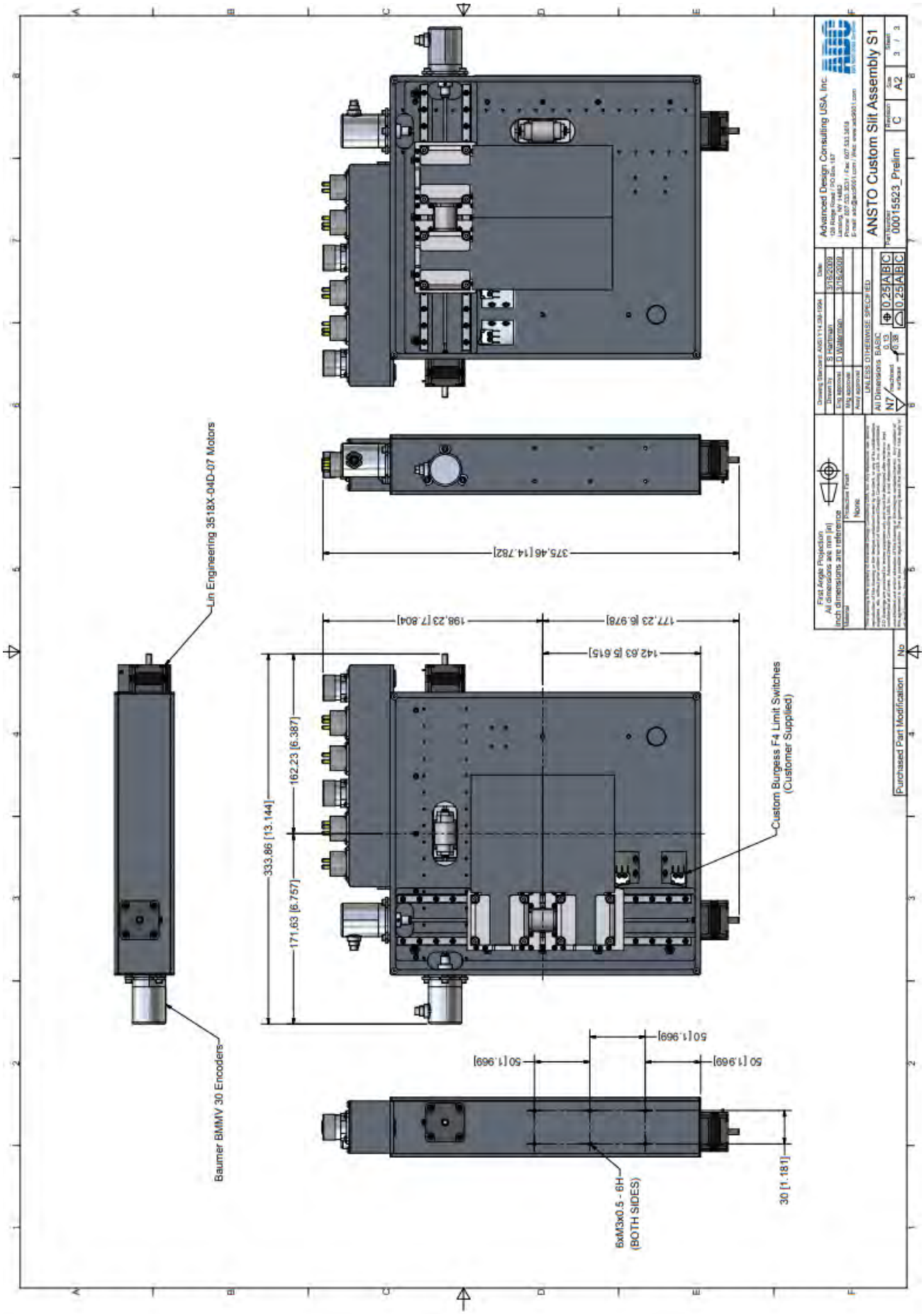
Australian Government

ansto

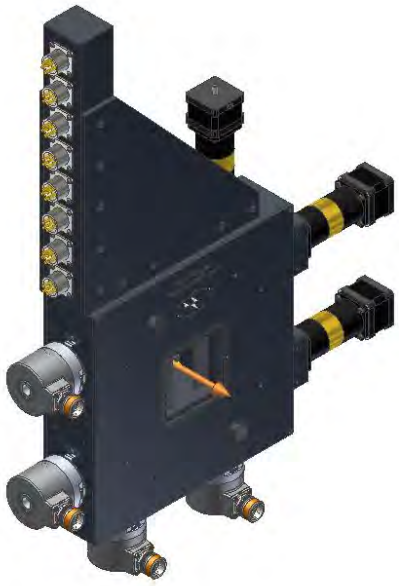
Customer:
ANSTO
New Illawarra Road
Lucas Heights, NSW Australia



ADC custom designed and built two slits for PELICAN instrument located at ANSTO Neutron facility. The blades are mounted on preloaded carriages that are guided by miniature ball guide rails. The blades are fully scannable. A Kubler Absolute Multiturn Rotary Encoder is used to track the position of the blades. The limits are lever style snap-action switches. Connectors are circular MIL Spec Metal Connectors as specified by the customer.


Lin Engineering 3518X-04D-07 Motors
Baumer BMMV 30 Encoders
375.46 [14.782]
198.23 [7.804]
177.23 [6.978]
142.63 [5.615]
333.86 [13.144]
162.23 [6.387]
171.63 [6.757]
Custom Burgess F4 Limit Switches
(Customer Supplied)
50 [1.969]
50 [1.969]
50 [1.969]
6xM3x0.5 - 6H
(BOTH SIDES)
30 [1.181]
Advanced Design Consulting USA, Inc.
ANSTO Custom Slit Assembly S1
Purchased Part Modification

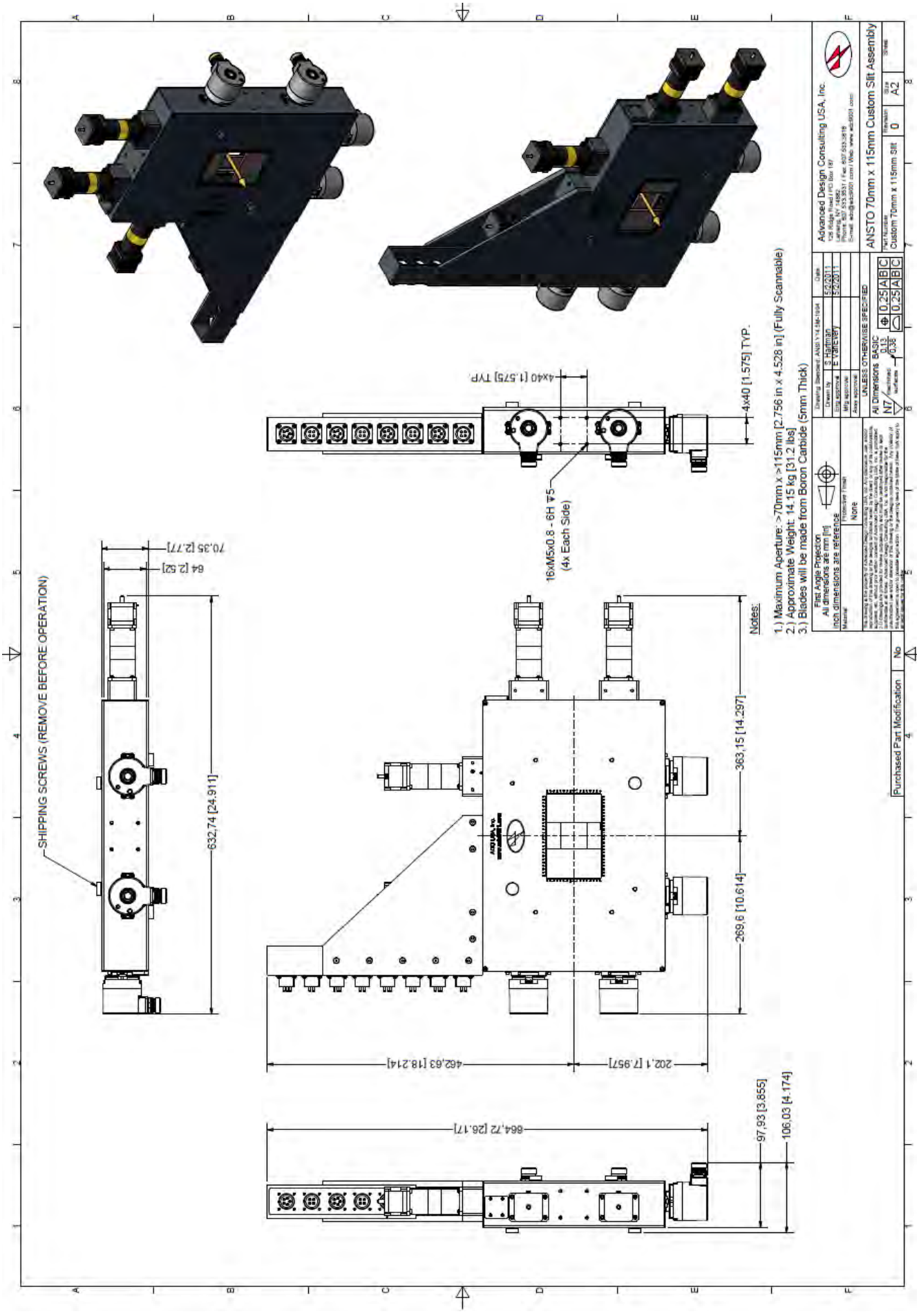
Customer:
ANSTO
New Illawarra Road
Lucas Heights, NSW Australia



The NIST Neutron Beam Slit is a “curtain style” XY Slit. This slit uses a single NEMA 17 motor on each axis coupled to a screw with both right- and left-hand threads to move two blades simultaneously to open and close the aperture. The blades are mounted on preloaded carriages that are guided by miniature ball guide rails. The blades are made from Cadmium, Boron-aluminum, and Lithium Polymer. The blades can go from a 2 mm overlap to a maximum aperture size of 60 mm x 140 mm. A Renishaw Tonic Linear Encoder is used to track the position of the blades. The limits are lever style snap-action switches. Connectors are black AMP CPC type as specified by the customer. This slit was designed for use in a rough vacuum environment.

Key Specifications:

- Weight: 7.6 kg [16.75 lb]
- “Curtain Style Blades” (2 blades one motor)
- Max Aperture: 140 mm x 60 mm
- Blade Material: 6Li-Poly (~3 mm), Aluminum-Boron (~1.5 mm), & Cadmium (~0.5 mm)
- Internal Linear Renishaw Encoder
- Rough Vacuum Compatible (10-3 Torr)
- Full step (without Gearbox) 0.005 mm
- Full step (with Gearbox) 0.001 mm
- Average of 3 µm unidirectional repeatability


Notes:
1.) Maximum Aperture: >70mm x >115mm [2.756 in x 4.528 in] (Fully Scannable)
2.) Approximate Weight: 14.15 kg [31.2 lbs]
3.) Blades will be made from Boron Carbide (5mm Thick)
16xM5x0.8 - 6H ↧5
(4x Each Side)
4x40 [1.575] TYP.
4x40 [1.575] TYP.
SHIPPING SCREWS (REMOVE BEFORE OPERATION)
70.35 [2.77]
64 [2.52]
632.74 [24.911]
363.15 [14.297]
269.6 [10.614]
462.63 [18.214]
202.1 [7.957]
664.72 [26.17]
97.93 [3.855]
106.03 [4.174]
Advanced Design Consulting USA, Inc.
ANSTO 70mm x 115mm Custom Slit Assembly
Custom 70mm x 115mm Slit
Purchased Part Modification

Engineered Systems

Elettra 2-Axis System with Controller

SOLARIS 3-Axis

NASA Positioning System

CHESS 3-Axis Stage Stack

APS Press Manipulation System

Colorado Gimbal System

XYZ & O Multistage
UHV Manipulators

Spectrometer

Cryostat Dilution Refrigerator

Engineered Experimental Tables (EETs)

Argonne NATIONAL LABORATORY

APS

BROOKHAVEN NATIONAL LABORATORY

BNL

CHESS CORNELL HIGH ENERGY SYNCHROTRON SOURCE

CHESS

Air Force

NSRRC

NSRRC

PAUL SCHERRER INSTITUT PSI

PSI

SLAC NATIONAL ACCELERATOR LABORATORY

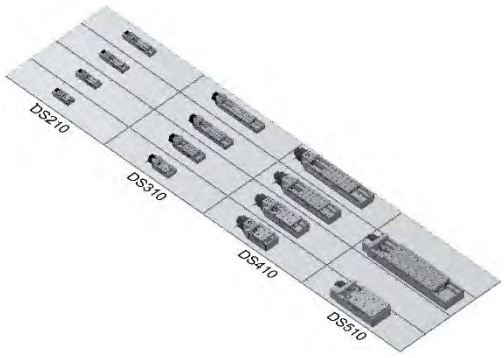
SLAC

Motion Stages

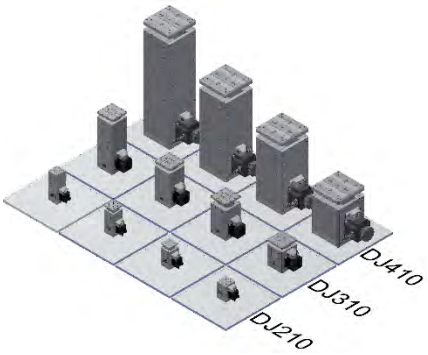
ADC manufactures high quality motion control products and systems that are suitable for Semi-conductor, Automation, and Aerospace industries. Our extensive product line includes linear stages (slides), lift stages (jacks), rotation stages, and tilt stages (goniometers).

Linear stages

ADC's linear slides are driven by a high class preloaded ballscrew coupled to a high torque 200 step per revolution stepper motor which can be run in full, half, or micro stepping mode to meet customer resolution requirements. Maximum rigidity is assured through the of preloaded crossed roller linear bearings. Each slide also features two fully adjustable, normally closed limit switches to define the extents of travel.



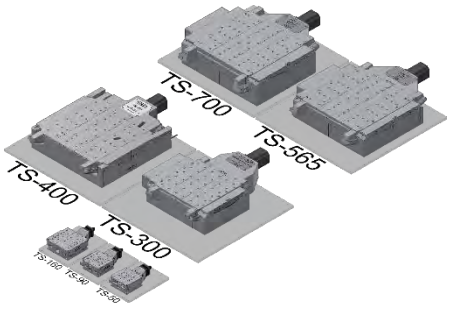
Lift Stages



ADC's lift stages are driven by a high class preloaded ballscrew coupled to a high torque 200 step per revolution stepper motor which can be run in full, half, or micro stepping mode to meet customer resolution requirements. Maximum rigidity is assured through the use of preloaded crossed roller linear bearings. Each jack also features two fully adjustable, normally closed limit switches to define the extents of travel.

Tilt Stages/Goniometers

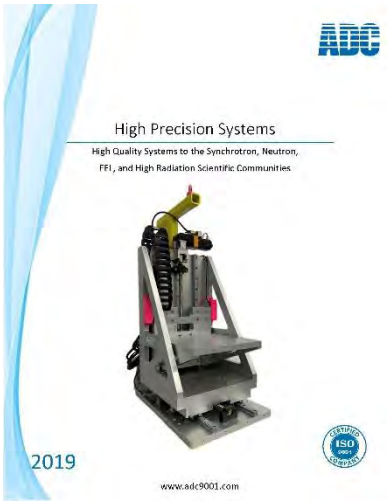
ADC's tilt stages are based on precision curved guide rails combined with a tangent bar (HD Series) or worm gear drive (LD Series) system providing fine angular resolution and accuracy. The stages can be paired to create an orthogonal (X-Y) tilt stage system. All tilt stages come standard with a stepper motor.



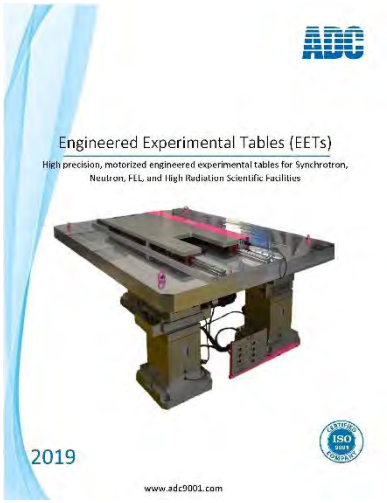
Rotation Stages

ADC's rotation stages are built upon an industry leading, preloaded, duplexed angular contact bearing set. These stages not only give an exceptionally high running accuracy but allow for large radial and thrust loads as well. Each stage is driven by a precision ground worm gear set and a high resolution, high torque stepper motor. Backlash is reduced by employing a flexure style shimming technique to preload the worm and worm wheel.

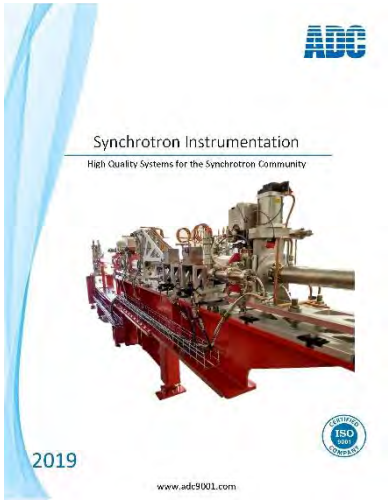
For more information on ADC's products, go to adc9001.com to download all of ADC's catalogs.



High Precision Systems

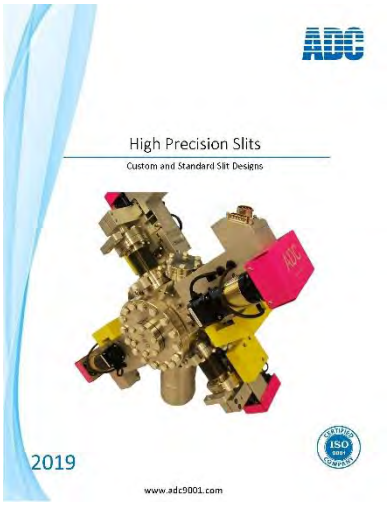


High Precision Engineered Experimental Tables



Synchrotron Instrumentation

Motion Stages



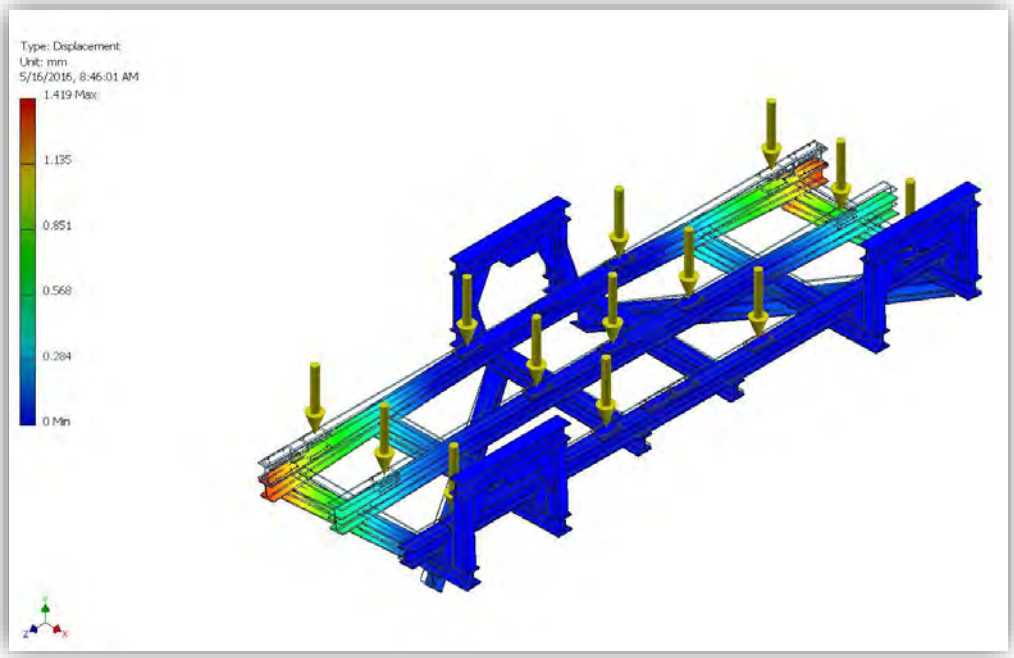
High Precision Slits

Company Capabilities

Engineering Design and Analysis

The Engineering Design and Analysis group is a multi-disciplinary team of engineers with unique training and creativity, and dedication to meeting the needs of our customers. ADC uses the latest computational and graphics software and hardware to approach the most challenging problems in the Aerospace, Automotive, Nuclear, Ultra-High Vacuum, Automated Machinery, Electro-Optical Products, synchrotron, high energy physics, and neutron diffraction communities.

- Finite Element Analysis
- Magnetic Design
- Optics Design
- Conceptual Design
- Materials Selection
- Tooling Design
- Fabrication Specifications
- Virtual Prototyping
- Design Analysis and Optimization
- Detailed Design
- Component Design



Electronics, Instrumentation and Software

ADC's electrical/software engineers and techs can provide custom circuit design and complete turn-key control systems. Some of our skills include integrated PLC design and programming, analog and digital circuit design, logic design (including PLA and FPGA programming), stepper and servo motor applications, microprocessor, RFID, serial and RF communications, and system controllers. The standard motor controls and driver that we offer are the Aerotech Ensemble™ series controllers. However, many of our customers have requirements for custom integration of these components into a functioning system, fully debugged, documented, and ready for operation. Software skills and development platforms include Microsoft Visual C++, LabView, EPICS, Visual Basic, CNC, and generic PLC (AB, NAIS, GE-Fanuc, Schneider, etc.) and Parker ACR and Accroloop. Our primary skill, however, is the integration of these components into a functioning system, fully debugged, documented, and ready for operation.

Vacuum Assembly & Testing

ADC is well equipped to handle any stand-alone fabrication and machining requirement. It is often the integration of these talents, combined with higher level assembly and testing, that brings the value added our customers demand. We have developed processes and employ qualified personnel and systems that allow ADC to assemble and test to challenging requirements. Examples of this include state-of-the-art, high-resolution, extreme-ultraviolet-light (EUV) microscope making measurements in Nano range for Lawrence Berkeley National Laboratory (LBNL); 26 tone, 20-meter-long, 2.3 meter in diameter complex Time-of-Flight Small Angle Neutron Scattering (ToF SANS) instrument for ANSTO, Australia; and Jefferson Lab 12 GeV Upgrade Cavity Parts Project.

ADC utilizes some of the most advanced measurement equipment available to control the requirements that our customers' complex projects require. This is accomplished using Coordinate Measuring Machines (CMMs) equipped with model-based inspection software, providing us with the ability to verify results using customer supplied CAD models, Elcomat 3000 Autocolimator, and Keyence Optical non-contact Micrometer.

Advanced Manufacturing

ADC provides machining systems and products to our diverse customers from structural metal fabrication to turn key design products with complex control systems. ADC is fully equipped with a CNC precision machine shop. Through application and experience, our ability to fabricate/provide parts for precision vacuum machining equipment has grown immensely. Our process begins with providing quotes based on specific drawing requirements given to us by the customer.

The following are views of ADC manufacturing and major assembly areas.

Equipment

We use precision equipment to verify each order and are committed to delivering precision machined parts. We are very proud of our shop and the capabilities we can offer because of our state-of-the-art precision CNC milling and CNC turning machines. Equipment used for inspections include a Brown & Sharpe CMM, a Jones & Lamson Optical Comparator, and an extensive selection of gauges. We ensure calibrations are performed and are traceable to meet our customers' standards. Our inspection room is temperature controlled to enable the utmost accuracy and consistency in measurements. We can provide a Certificate of Conformance for all processes as required. These are stored electronically and attached to each job for future reference.

CLAUSING CSG-1224 ASDII SURFACE GRINDER, s/n E1TAJ0079, w/PLC Control, Magnetic Chuck

ADC's precision grinder CSG-1224 is especially suitable for heavy duty grinding. The large spindle is supported by four ball bearings to allow for durability.

Welding Capabilities

At ADC, we offer full service custom metal fabrication which includes welding services for short and long production run jobs. Our extensive welding capabilities utilize both robotic welding and manual welding in MIG and TIG and mesh welding for wire products. We are experienced in welding aluminum, carbon steel, and stainless-steel materials. We also have complete resistance welding, also known as spot welding capabilities. Our unique welding shop supports our custom metal fabrication process.

The welding services at ADC support our full-service fabrication process with capabilities including:

- Resistance Welding / Spot Welding
- Gas Metal Arc Welding (GMAW) / Metal Inert Gas (MIG Welding) - This semi-automatic or automatic process uses a continuous wire feed.
- Gas Tungsten Arc Welding (GTAW) / Tungsten Inert Gas (TIG Welding) - A manual welding process that is extremely precise, especially useful for welding thin materials.
- Mesh Welding - Electric flash butt welding where the two wires are pressed together, and the electric current is activated.

Benefits of TIG Welding

- Superior quality welds
- Welds can be made with or without filler metal
- Precise control of welding variables (heat)
- Free of spatter
- Low distortion

Benefits of MIG Welding

- All position capability
- Higher deposition rates than SMAW
- Less exacting operator requirements
- Long welds can be made without starts and stops
- Minimal post weld cleaning is required

Benefits of Mesh Welding

- Wires resist movement
- It is much faster than traditional welding
- It is a high-quality low-cost spot-welding solution

ADC's Service and Support

ADC takes new approaches to shorten assembly and commissioning times. We create modular construction units which can be installed cost-effectively and extended easily when needed. Our customers can count on ADC's continued service support after the commissioning stage.

Through intensive technical training sessions and our policy of involving customer personnel at an early stage, we can assure seamless and rapid familiarization with our new technologies. This approach has meant that, in many major projects, our customers have been able to operate their equipment independently and to their satisfaction within a very short time.

ADC Customer Service team provides installation, installation supervision, after sales support and service, troubleshooting and remote diagnostics. We believe that success is in the details and this philosophy delivers high customer satisfaction and instills a strong sense of loyalty. Our friendly and courteous customer service staff is always available for questions and order placement for the key replacement parts to keep ADC's systems running at peak efficiency. Whether it is a small replacement part or a new component, we are committed to the fastest resolution to customer needs.

ADC is uniquely positioned and invested in providing exceptional after-sales support. Available support and services including:

- Installation and start-up
- Service and repair – factory / service center / or onboard
- Service contracts
- Troubleshooting assistance over the phone
- Engineering and technical sales assistance
- Upgrade and retrofit parts and programs
- Spare and replacement parts
- Tailored factory and on-board training
- On-board system and spares analysis

ISO 9001:2015

BUREAU VERITAS
Certification

ADVANCED DESIGN CONSULTING USA, INC.

126 RIDGE RD
LANSING, NY 14882 USA

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2015

Scope of certification

DESIGN, MANUFACTURE, AND DELIVERY OF DEVICES, INTEGRATED SYSTEMS, COMPONENTS AND INSTRUMENTS FOR COMMERCIAL, ACADEMIC, AND GOVERNMENT AGENCIES

Original cycle start date: **31 December 2014**

Certification / Recertification cycle start date: **31 December 2017**

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **30 December 2020**

Certificate No. ***US010798*** Version: **1**

Signed on behalf BVCH SAS – UK Branch

*Certification body address: **5th Floor, 66 Prescot Street, London E1 8HG, United Kingdom***
*Local office: **16800 Greenspoint Park Drive, Suite 300S, Houston, TX 77060***

*Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization. To check this certificate validity please call: **+(800) 937-9311***

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