



ZERO KNOWS

R U G G E D I Z E D E N C L O S U R E S



ZERO

UNPARALLELED PROTECTION

ZERO KNOWS...SOLUTIONS!

In practice, ZERO Manufacturing produces metal and plastic cases, containers and enclosures. But in truth, our products are protection solutions—ensuring the safe transport and viability of valuable equipment and electronics, without compromise.

Whether we meet your needs with one of our nearly 3,000 standard products, or with the infinite possibilities through a specialized custom design, ZERO has the engineering expertise and manufacturing experience to provide the perfect solution for your protection needs.

Please review the Ruggedized Enclosures product data for specifications and information about how ZERO provides protection solutions for your industry.



Quality Commitment

ZERO MANUFACTURING IS committed to providing products and services that meet and exceed our customers' expectations. To that end, we have been ISO 9001 certified since 1994, are an SPC Certified Supplier and boast nearly a dozen Military Certifications. We have also received numerous awards and certifications from hundreds of customers and industries, both domestically and internationally.

ZERO MANUFACTURING, INC.

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CASE/CONTAINER SELECTION GUIDE

OPTIONS AVAILABLE

CENTURION® MIL-SPEC CASES	VALAN® SERIES	VALAN®900 SERIES	PRE-ENGINEERED RUGGEDIZED CASES	MODULAR CONTAINERS	FLY® CONTAINERS	CENTURION® ELITE CASES*	CENTURION® VALUINE CASES*
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SPECIFICATIONS:

MIL-C-4150				X	X	X		
MIL-STD-108	X	X	X	X	X	X		
MIL-STD-810**			X	X	X	X		
MIL-T-28800			X	X	X	X		

CASE TYPE:

Instrument Case	X	X	X	X	X	X	X	X
Transit Case	X	X	X	X	X	X	X	X
Combination Case	X	X	X	X	X	X	X	X
Accepts 19" EIA Panel			X		X			

PERFORMANCE:

Watertight	X	X	X	X	X	X		
Splash Proof	X	X	X	X	X	X		
Drip Proof	X	X	X	X	X	X		
Salt Exposure	X	X	X	X	X	X		
Dust Proof	X	X	X	X	X	X		
EMI Shielded	X	X	X	X			X	

EXAMPLE ACCESSORIES:

Fork Lift Guides					X	X		
Hoisting Grapple			X	X	X	X		
Separable Hinges	X	X		X			X	X
Skid Rails				X	X	X		

An "X" indicates options available, but not necessarily standard. As definitions may vary from customer to customer, consult this catalog or Zero Manufacturing, Inc. for more specific details.

*Not included in this catalog. See separate catalog (No. CC2005) published by Zero Manufacturing, Inc. for information regarding these cases/containers.

**Tests as applicable to cases/containers.





Ruggedized Aluminum Cases & Containers

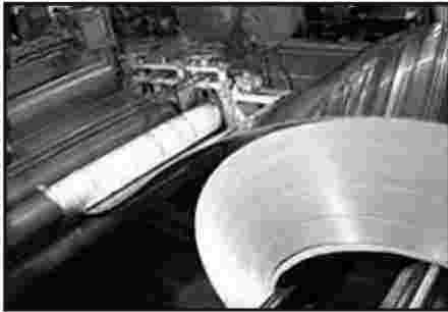
Zero Manufacturing, Inc. is the number one supplier of high performance, deep drawn aluminum cases. In addition, we produce many other types of aluminum cases using a variety of fabrication methods. Ruggedized cases made from aluminum achieve the demanding standards required of our products.

– EXCEPTIONAL FEATURES OF ALUMINUM CASES BY ZERO MANUFACTURING, INC. –

- **High Strength-to-Weight Ratio** – Lightweight aluminum alloys used in our cases are known for their excellent strength in protecting equipment from damage.
- **Extraordinary Resistance to Corrosion** – Aluminum is highly resistant to nearly all substances that cause corrosion and weathering.
- **Endurance Against Stress, Tearing and Cracking** – Aluminum offers much better fracture toughness than most other materials used in cases, including resistance to both mechanical breakage and propagation of fractures.
- **Sustaining Cold Temperatures** – Instead of becoming more fragile and brittle in cold weather, the tensile strength of our aluminum cases actually increases with cold, without loss of ductility.
- **RF/EMI Shielding and ESD/Grounding** – Aluminum has the highest electrical conductivity-to-weight ratio of any metal, making our cases excellent for RF/EMI shielding and for ESD/grounding systems. Aluminum is also an efficient reflector for externally generated interference, including the electromagnetic wavelengths of radio and radar.
- **Heat Dissipation/Shielding** – Aluminum is widely used in “heat sinks” and heat exchangers because of its high thermal conductivity. In an enclosure it can efficiently transport heat away from electronics and other equipment. It also has high reflectance to encroaching radiated heat, such as sunlight. (Aluminum has a light reflectivity of over 80%.) Further, the low coefficient of thermal expansion of aluminum allows it to sustain higher temperatures without distortion.
- **Special Environments** – Aluminum is non-toxic, odorless, tasteless, non-absorbing, non-sparking, non-magnetic and resistant to fire. Aluminum cases can therefore be used in a wide variety of special environments, including sanitary or clean rooms, food service areas and certain volatile environments, as well as for more traditional environments requiring such provisions as watertight, splash proof, drip proof and salt exposure protection.
- **Customizing Through Secondary Operations** – Our aluminum products can be customized and modified without the cost of special molds, through such secondary operations as drilling, laser cutting, riveting, welding, brazing, soldering, etc., provided at Zero Manufacturing, Inc.. In addition, aluminum products by Zero Manufacturing, Inc. accommodate virtually every kind of finish, whether mechanical (such as brushing or polishing), chemical (such as anodizing) or any of an almost unlimited variety of coatings (such as paint and powder coatings).

Equipment and Capabilities

ZERO Manufacturing, Inc. is the leader in the manufacture of *quality*, deep drawn and *fabricated* cases and enclosures. Offering over 32,000 pre-tooled sizes of deep drawn enclosures, and *virtually* unlimited sizes and configurations, ZERO Manufacturing, Inc. is the source for *secondary* operations and customization, whether commercial or military specification.



Deep Draw

Presses:

Thirty presses.

Capacity Range: Up to a 440 ton fully CNC controlled press with quick die change capability.

Maximum Bed Size: 60" x 98"

Maximum Drawn Depth: 18"

Sizes:

In addition to 32,000 pre-tooled sizes, ZERO can tool for any size, depth or material.

Shears:

Blanks are cut on automatic coil shears or conventional 12 foot shears for sheet stock.

Certified to meet MIL-H-6088 and customer specifications.



Processes:

Washer System:

Automatic titrating conveyor system 6' x 90'.

Etch:

For weld preparation and cleaning.

Chemical Film:

Certified to meet MIL-C-5541, Classes 1A and 3.

Aluminum & Metal Laser Cutting:

Five-Axis Laser: Computer controlled five-axis laser provides flexibility, speed and efficiency to design and manufacturing capabilities and the ability to custom cut and fabricate aluminum or other metals. Bypassing the entire tooling process eliminates costly setup and tooling fees. It's ideal for creating prototypes and for shorter runs.

Specifications:

Working Range (X, Y, Z, C, B):

X = 158, 118, 80, 50"

Y = 60"

C = 360° Endless

B ± 120°

Speed (X, Y, Z, C, B): X, Y = 2000 IPM

Z = 1200 IPM

C, B = 360°/sec

Smallest Programmable Increment: .000039"

Position Accuracy: .0039"

Repeatability: Ps .0012"

Working Height: 28"

Sheet Metal Fabrication

Press Brakes:

Five press brakes up to 130 tons, equipped with back gauging.

Metal Fabricator:

Two turret fabricators with 58 stations.

Punch Presses:

Fifty-four mechanical punch presses up to 350 ton capacity, including a CNC metal fabricator.

Extrusion Forming:

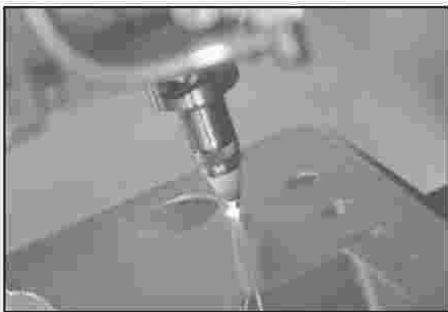
Three heavy-duty and two light-duty benders for forming extrusions.

Shears:

Three shears, 12 feet wide, with 10 gauge capacity and digital back gauging.

Environmental Testing

Three test tanks to test for watertight integrity per MIL-STD-108.





Welding

Welding performed IAW MIL-STD-2219 Class B & C (Class A by contract only) and certified to MIL-STD-1595.

Resistance: Twelve 3-phase spot welders with Class A solid state controls rated up to 250 KVA. This permits spot welding aluminum up to 5/16" thick. Certified to MIL-W-6858D.

Fusion: Eight 300 amp GTAW stations, 2 GMA welders, and longitudinal and peripheral seam welders.



Assembly

Equipment: A wide range of electrical and pneumatic hopper fed riveters and versatile presses for threaded insert and stud installation. Conventional pedestal and hand held riveters are used as well.

Painting

The ZERO Manufacturing, Inc. paint system was custom designed to accommodate all enclosure products and types of paint. The primary system is completely enclosed and supplied with a 100,000 cfm filtered, climate controlled air make-up system.



Layout: A 540 foot overhead conveyor runs through five alternatively opposed filter booths and a 60 foot long drying oven. (Oven is also equipped with a six foot wide lower conveyor to handle large and/or heavy objects).

Additional: Two off-line booths, and a third booth with two batch ovens for short runs.

Certification: Capable of painting to all specifications meeting safe environmental conditions. Enamel, water-base, and powder paints available and others as specified.



Tool Department

ZERO Manufacturing, Inc. has a 9,600 square foot tool and die, and production machine shop with over 40 pieces of primary equipment. A foundry for casting sleeves for multiple draw jobs is also in-house. Production machining is performed on two CNC milling machines. Quality control is monitored by a coordinate measuring machine and a profile projector.

Additional Facts

Plant Size: 286,000 square feet
Manufacturing: 250,000 square feet
Sample Plan: Based on MIL-STD-105, Level II

SPC certified supplier to major and key customers.

Water Filtration System: All process lines are integrated with a reverse osmosis filtrations system. Over 80 percent of the industrial waste stream is recovered for purification and recycling.

Engineering Capabilities: Thirteen CAD-based design systems. Can custom design to meet all customer and military specifications. Manufacturing engineering is performed on the latest computer network system.

CENTURION® MIL-SPEC

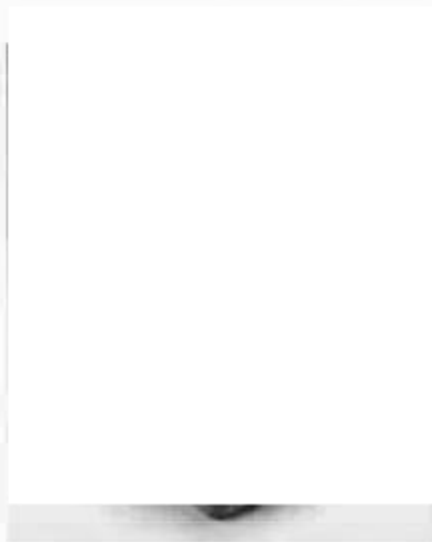
Watertight Carrying Cases

The watertight Centurion® MIL-Spec Series from ZERO Manufacturing, Inc. features deep-drawn heat-treated aluminum case shells with wrinkle-free surfaces, accented by distinctive styling beads. Sturdy and durable. Centurion® MIL-Spec cases are strong enough to stand on, yet are ultra-lightweight. Cases are available in a variety of finishes and with a choice of closures, and three different panel mounting flanges.

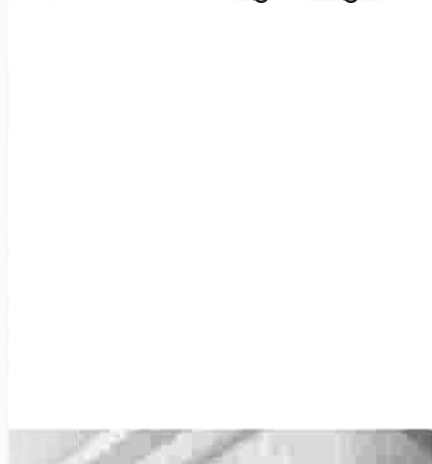
Hinged inner lids available as special order item.

Gasketed Closures

Closure features interlocking tongue and groove extrusion of 6063-T1 aluminum, permitting maximum sealing and alignment of two halves.



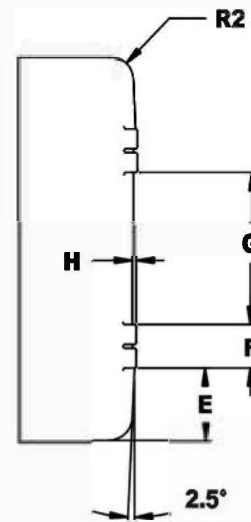
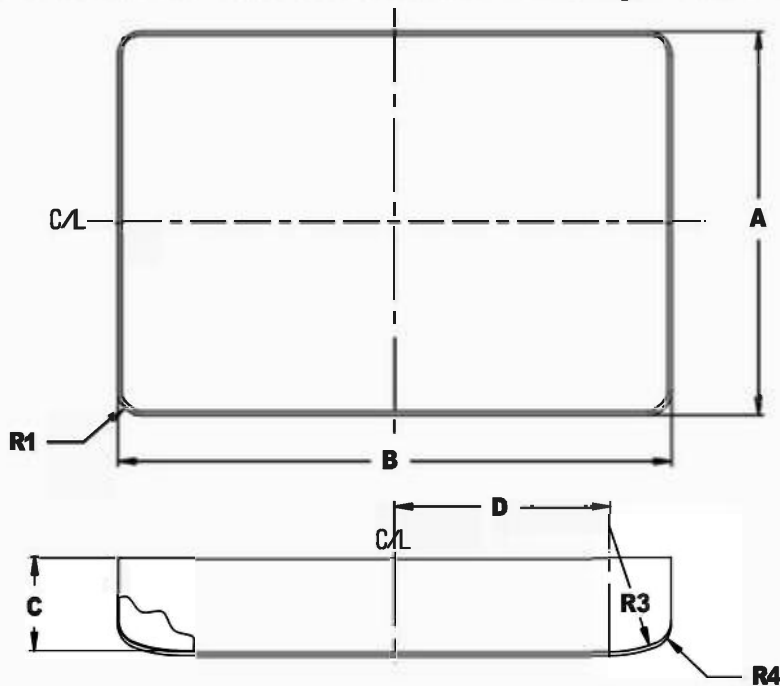
Panel Mounting Flanges



Case Description and Finish Options

CASE NUMBER	"A" OUTSIDE WIDTH	"B" OUTSIDE LENGTH	"C" INSIDE MIN.	"C" INSIDE MAX.	D	E	F	G	H	R1	R2	R3	R4	MAT'L THICK-NESS
100P	9.00	12.00	2.50	3.36	3.50	1.75	1.34	2.81	.09	1.00	1.00	6.00	1.00	.040
101P	9.00	16.00	2.50	5.56	5.50	1.75	1.34	2.81	.09	1.25	1.00	6.00	1.00	.051
103P	13.00	18.00	2.50	5.91	6.40	2.00	1.75	5.12	.12	1.25	1.00	6.25	1.00	.040
105P	13.00	21.00	2.50	4.06	7.90	2.00	2.00	5.00	.12	1.25	1.00	6.25	1.00	.040
106P	17.00	21.00	2.78	4.81	7.46	2.68	2.25	7.13	.12	1.25	1.25	6.50	1.25	.051
109P	18.00	26.00	2.38	7.31	9.81	3.16	1.63	8.43	.12	1.00	1.00	6.50	1.00	.063
112P	18.00	24.00	2.78	4.81	8.87	2.93	2.25	7.64	.12	1.25	1.25	6.50	1.25	.051
114P	17.00	18.00	2.31	4.36	6.40	2.68	2.25	7.14	.12	1.25	1.00	6.25	1.00	.040
129P	20.00	29.00	2.78	5.02	11.31	2.94	2.25	9.62	.12	1.25	1.25	6.50	1.25	.051
132P	19.75	8.50	2.50	2.91	—	—	—	—	—	1.25	.50	—	.50	.051

Basic Shell Dimensions and Case Specifications



Finish Options

(FINISH: EXCEPT LATCHES, HANDLE GRP, HINGES, AND VALVE)

A = Chemical Film per MIL-C-5541

B = Wash Prime per DOD-P-15328 and Epoxy Primer per MIL-PRF-23377, Type I, Class C.

C = Same as B Plus Light Gray Semi-gloss Baked Enamel per MIL-E-15090, Type I or II, Class 2.

D = Same as B Plus Light Gray Gloss Baked Enamel per MIL-E-15090, Type I or II, Class 1.

E = Same as B Plus Yellow Gloss Baked Enamel, Color No. 13538 of FED-STD-595.

F = Same as B Plus Strata Blue Gloss Baked Enamel, Color No. 15045 of FED-STD-595.

G = Same as B Plus Green Semi-gloss Baked Enamel, Color No. 24300 of FED-STD-595.

H = Same as B Plus Olive Drab Semi-gloss Enamel, Color No. 24084 of FED-STD-595.

J = Same as B Plus Olive Drab Lusterless Baked Enamel, Color No. 34088 of FED-STD-595.

S = Special Order- Please Specify.

W = Chemical Film per MIL-C-5541, Class 1A.

Epoxy Primer per MIL-P-53022, Type II or Waterbase.

Epoxy Primer per MIL-P-53030, Paint with Polyurethane coating per MIL-PRF-85285, Type II,

Color No. 17925 (White) of FED-STD-595 or Epoxy Coating per MIL-C-22750, Type I.

Other Colors and Finishes Available Upon Request

Commercial or military specifications can be met, and Zero Manufacturing, Inc. can supply any color per FED-STD-595.

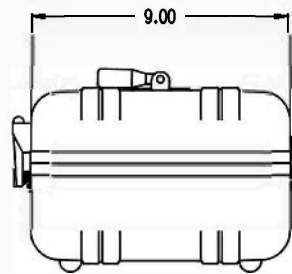
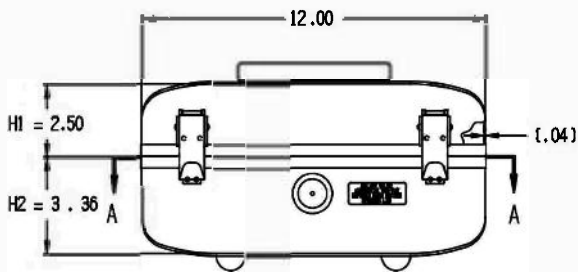
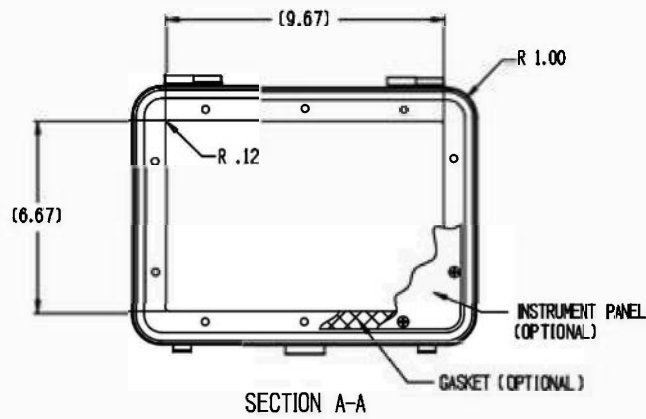
Panel Fabrication

- silk-screening
- engraving
- custom fabrication

Case Customization

- stenciling
- designation printing
- decals / labels
- silk-screening

100P



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100P				

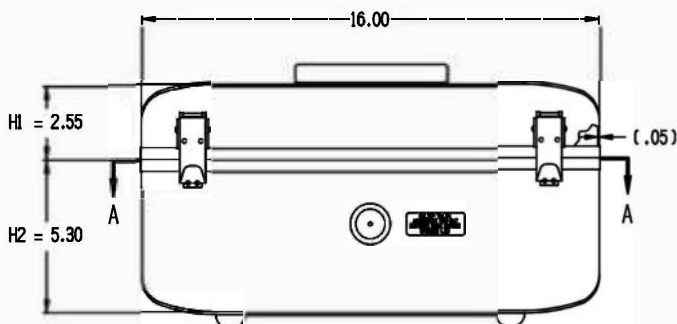
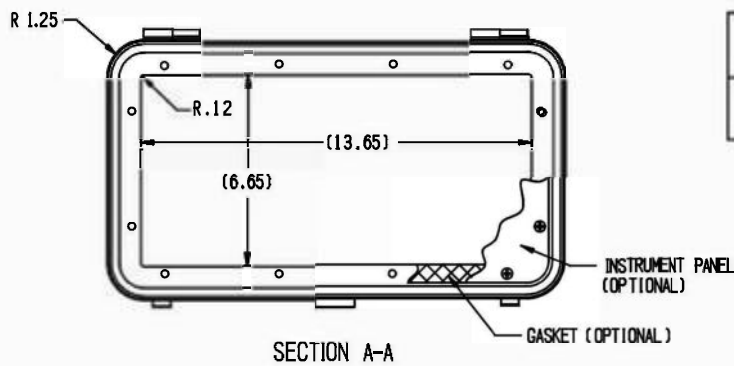
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SEE PAGE 7 FOR OPTIONS

A FOR AUTOMATIC
M FOR MANUAL

SEE PAGE 8 FOR OPTIONS

101P



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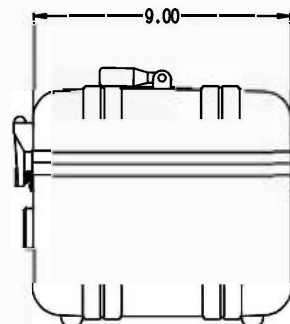
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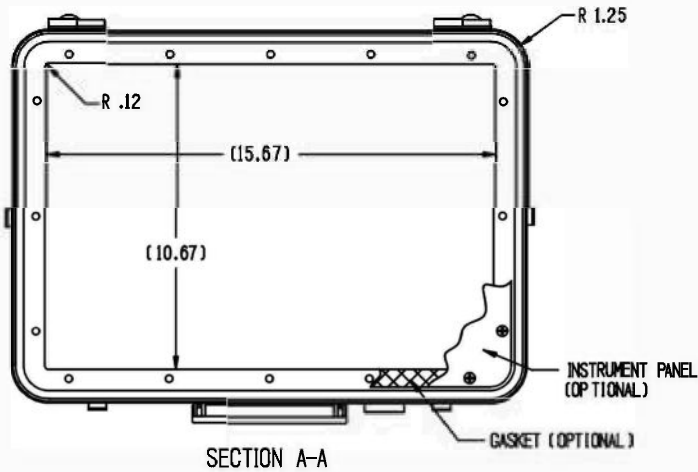
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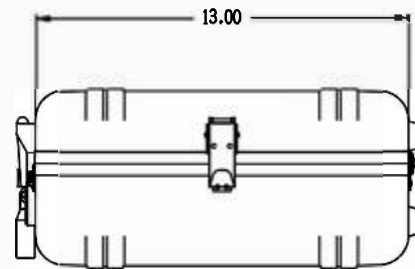
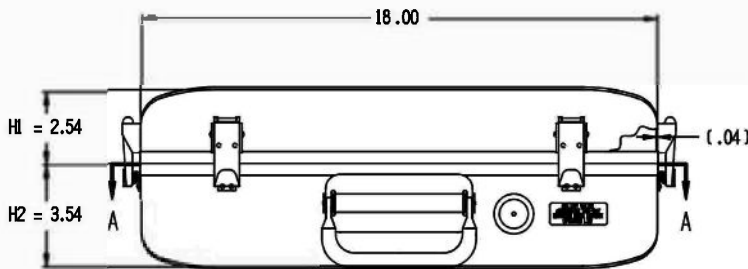
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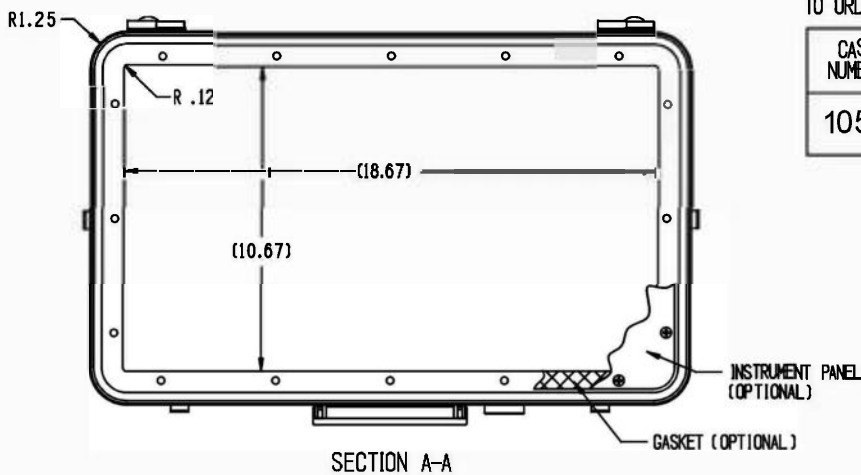
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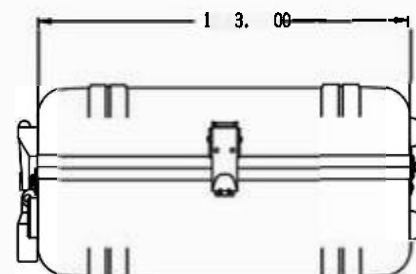
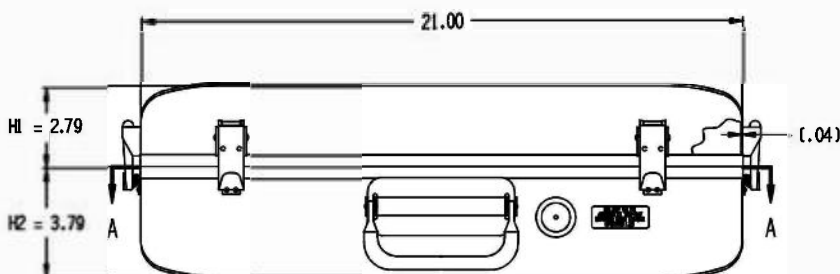
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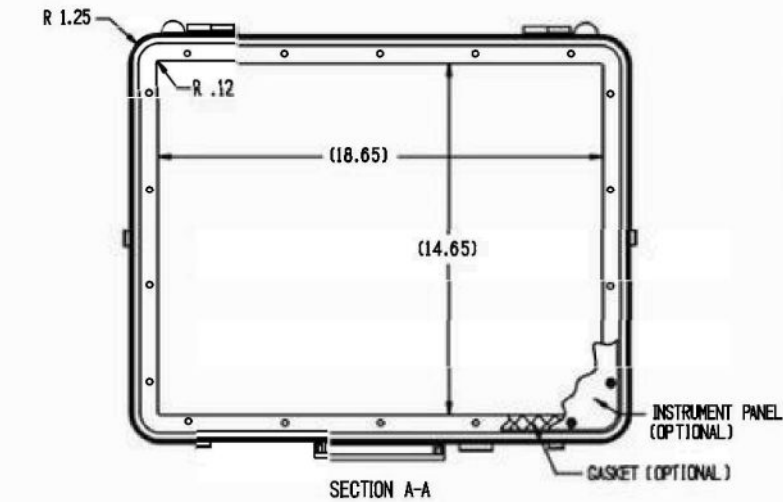
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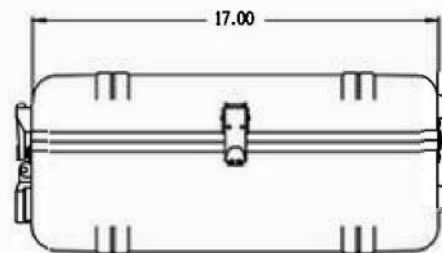
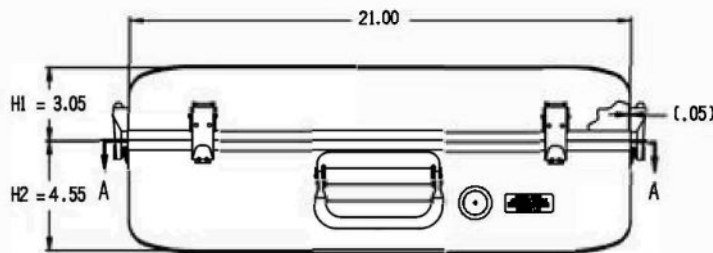
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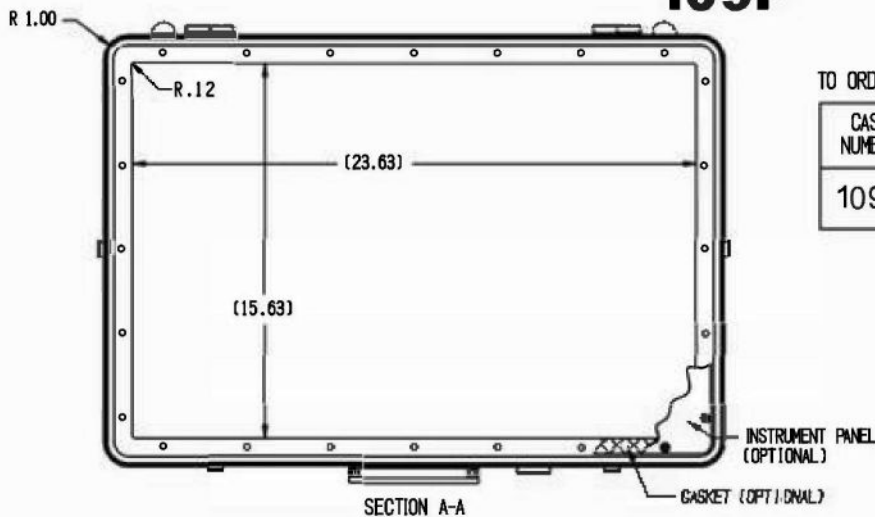
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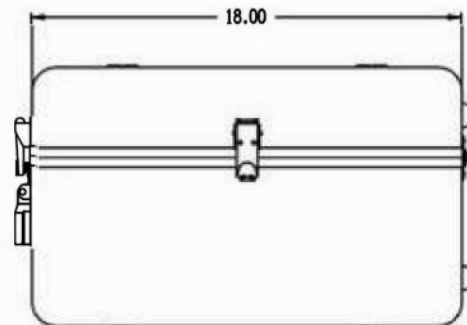
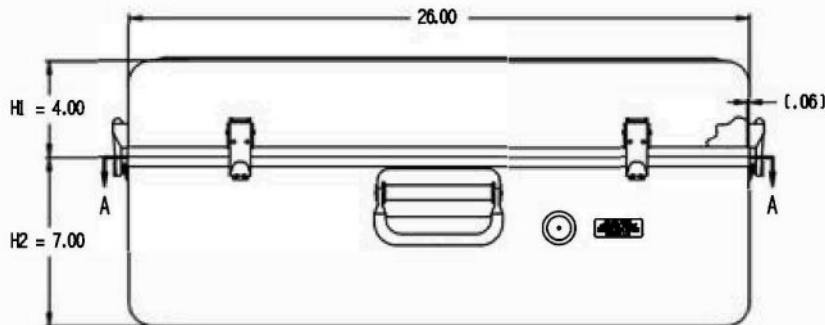
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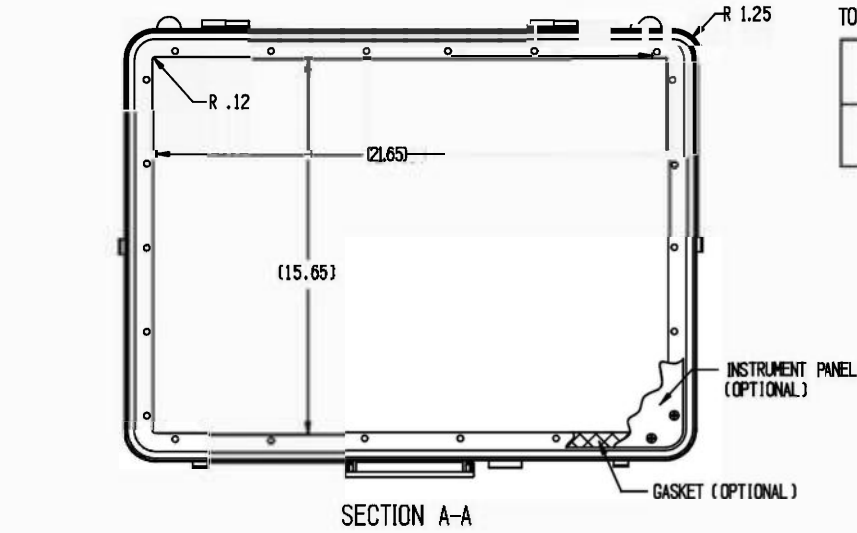
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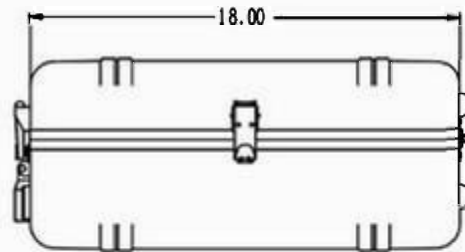
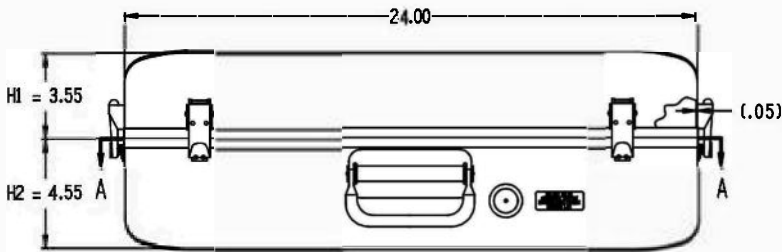
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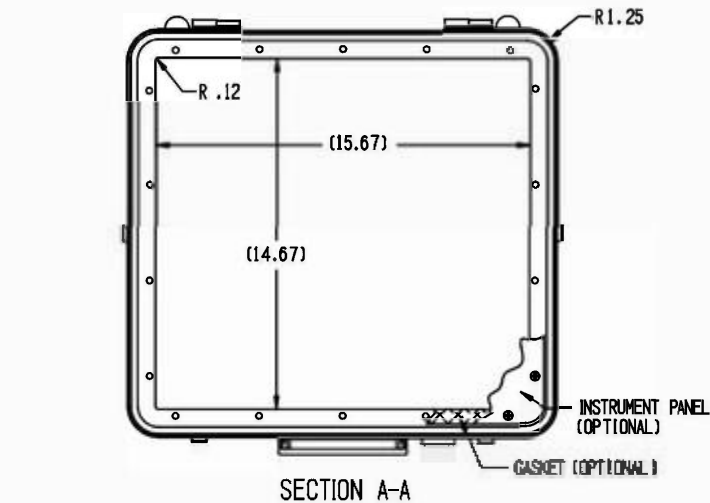
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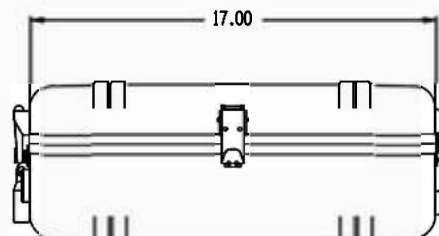
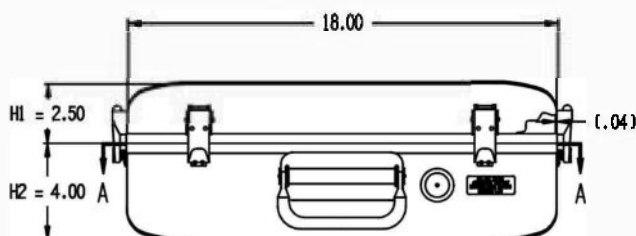
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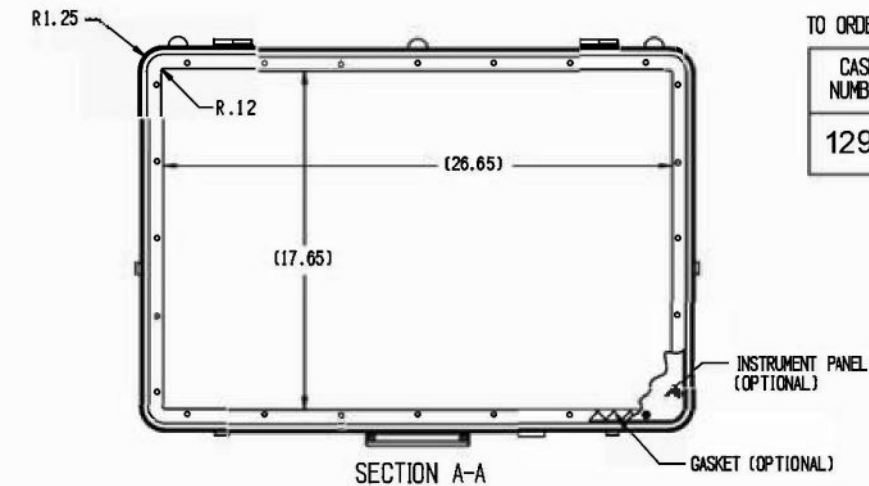
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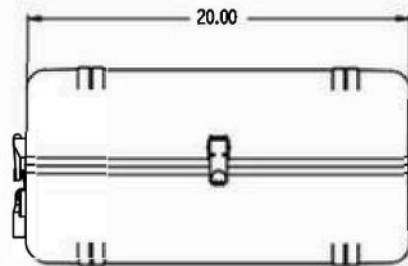
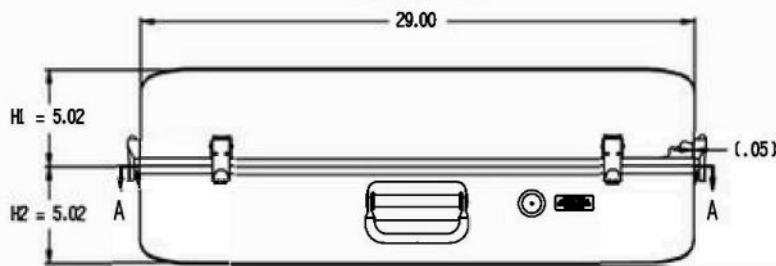
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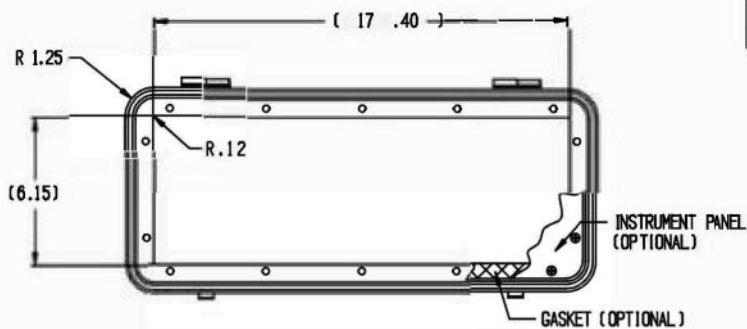
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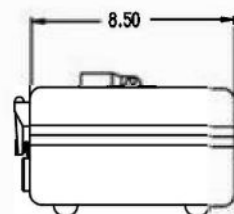
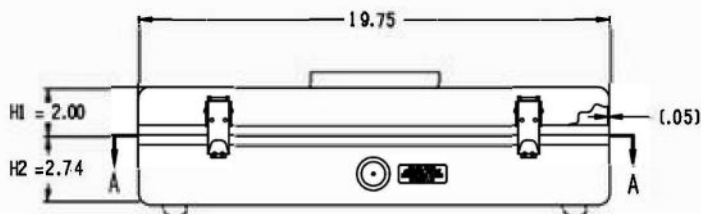
SEE PAGE 7 FOR OPTIONS

A FOR AUTOMATIC
M FOR MANUAL

SEE PAGE 8 FOR OPTIONS



SECTION A-A



NOTE: CASE SHELLS ARE NOT BEADED.