2.1 GAIN Standard Dimensions Drawings

This section provides the GAIN standard dimensions drawings for the specified GAIN sizes. **The dimensions and tolerances are shown in English with Metric in brackets. Should there be a conflict in the dimensions and tolerances, these values in English take precedent. If not otherwise ~~be~~ specified, all tolerances are according to ISO ~~MED~~2768-1. [Class M TBD]**

GAINs are categorized by the size of the cavity into which they are inserted. GAIN units are identified as:

Size 1 Beverage makers
Size 2 Ovens/Refrigerators
Size 3 ~~Carts/~~Trash Compactors
Size 4 ~~Containers~~/Bun Warmers **& Microwave Ovens**
Size 5 Miscellaneous

Figure 2-1 shows **an example of** the various GAIN sizes in a ~~typical~~ galley configuration. **Other configurations are acceptable.**

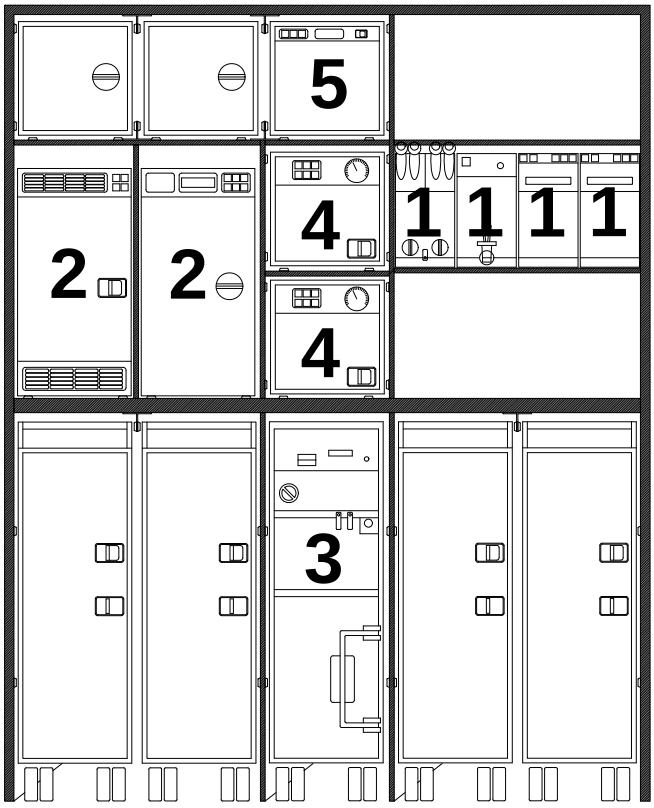
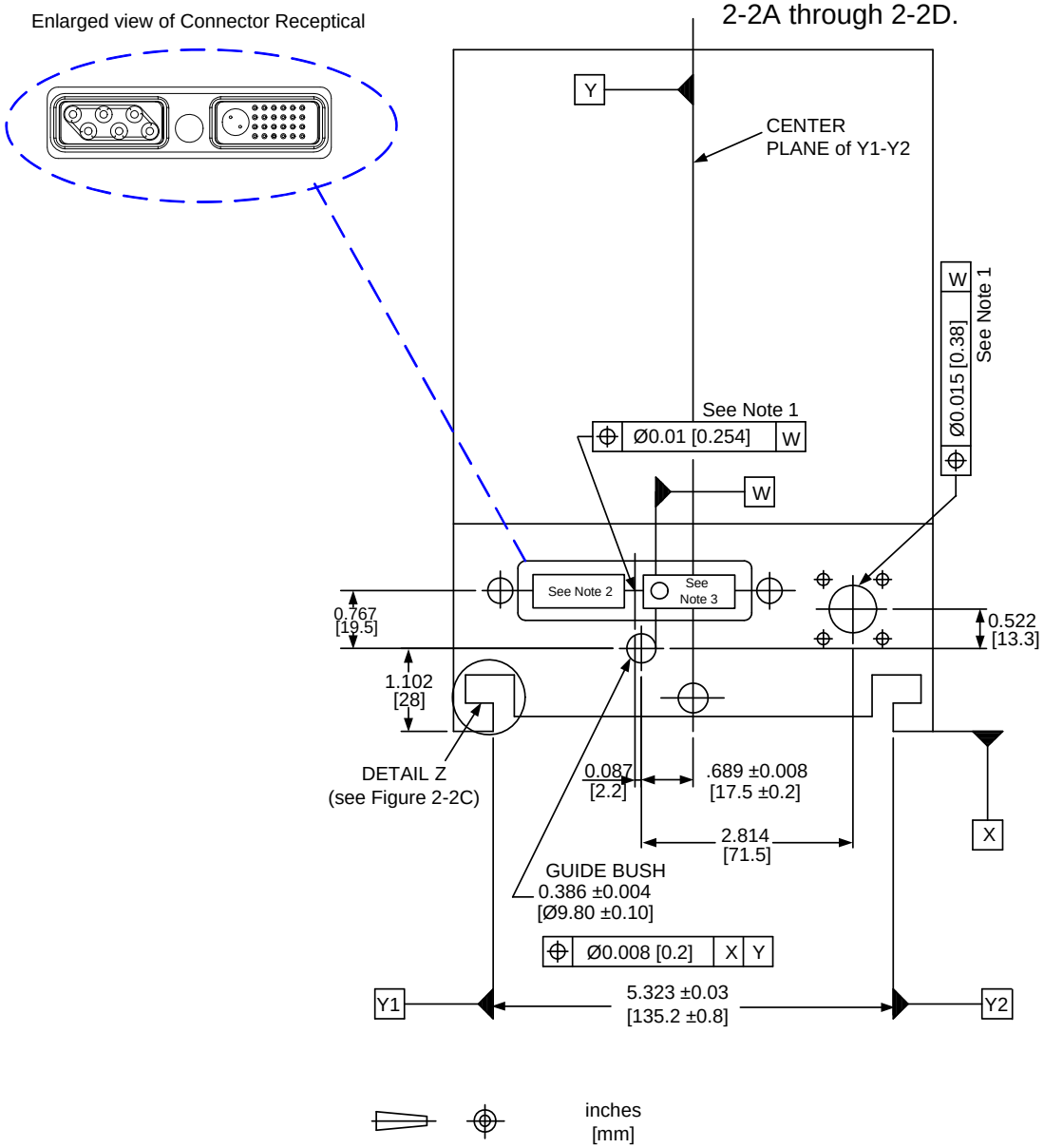


Figure 2-1 – Example of GAIN Cavity Sizes in a Typical Galley Configuration

2.1.1 GAIN Size 1

The GAIN Standard Dimensions Drawing for the Size 1 GAIN is shown in Figures 2-2A through 2-2D.



[Radiall and Tyco - Make drawing changes here and throughout: Rotate pins in enlarged view by 90º]

Notes:

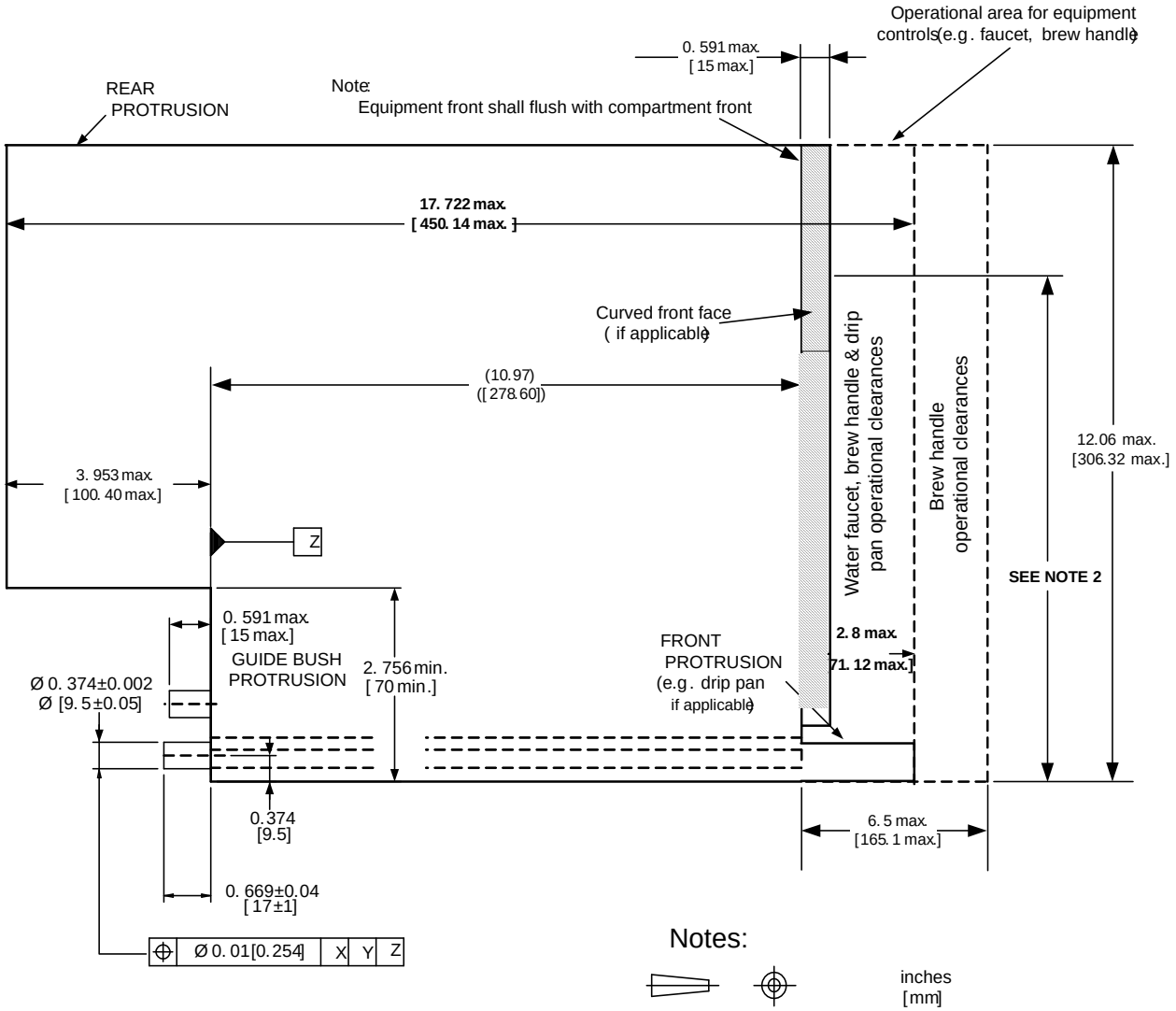
1. Panel cut-out dimensions will be defined in Connector and Water Coupling Specifications.

2. Location of Power Pins Insert.

3. Location of CAN bus and Pin Programming.

Figure 2-2A – Rear View of Beverage Maker

2.0 GAIN INTERFACE DEFINITION



1. Example of equipment front concision with compartment front (see Appendix C).

2. This dimensions defines the height of the water faucet outlet (applicable for water heaters only!):

   a. High water faucet = 8 in [203.2 mm]
   b. Low water faucet = 1 in [25.4 mm]

Figure 2-2B – Side View of Beverage Maker

[Action:
1) Ralph – Clarify the Z reference
2) Extend shade area all way downward
3) Suppliers – Propose extension of op clearance area
4) Suppliers – Describe what goes in op clearance area (description should be general)

2.0 GAIN INTERFACE DEFINITION

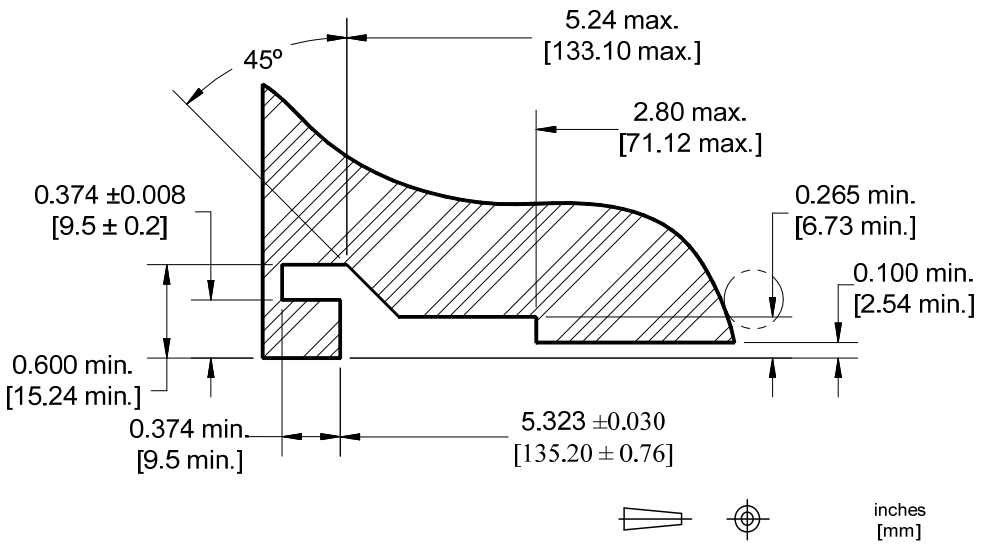


Figure 2-2C.1 – Enlargement of Rail Interface (Front Section)

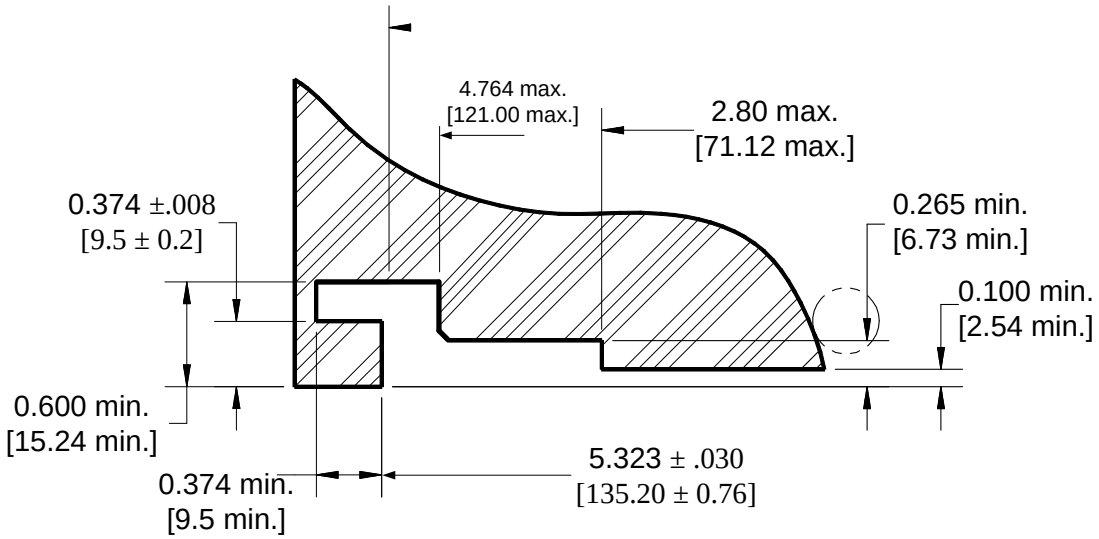
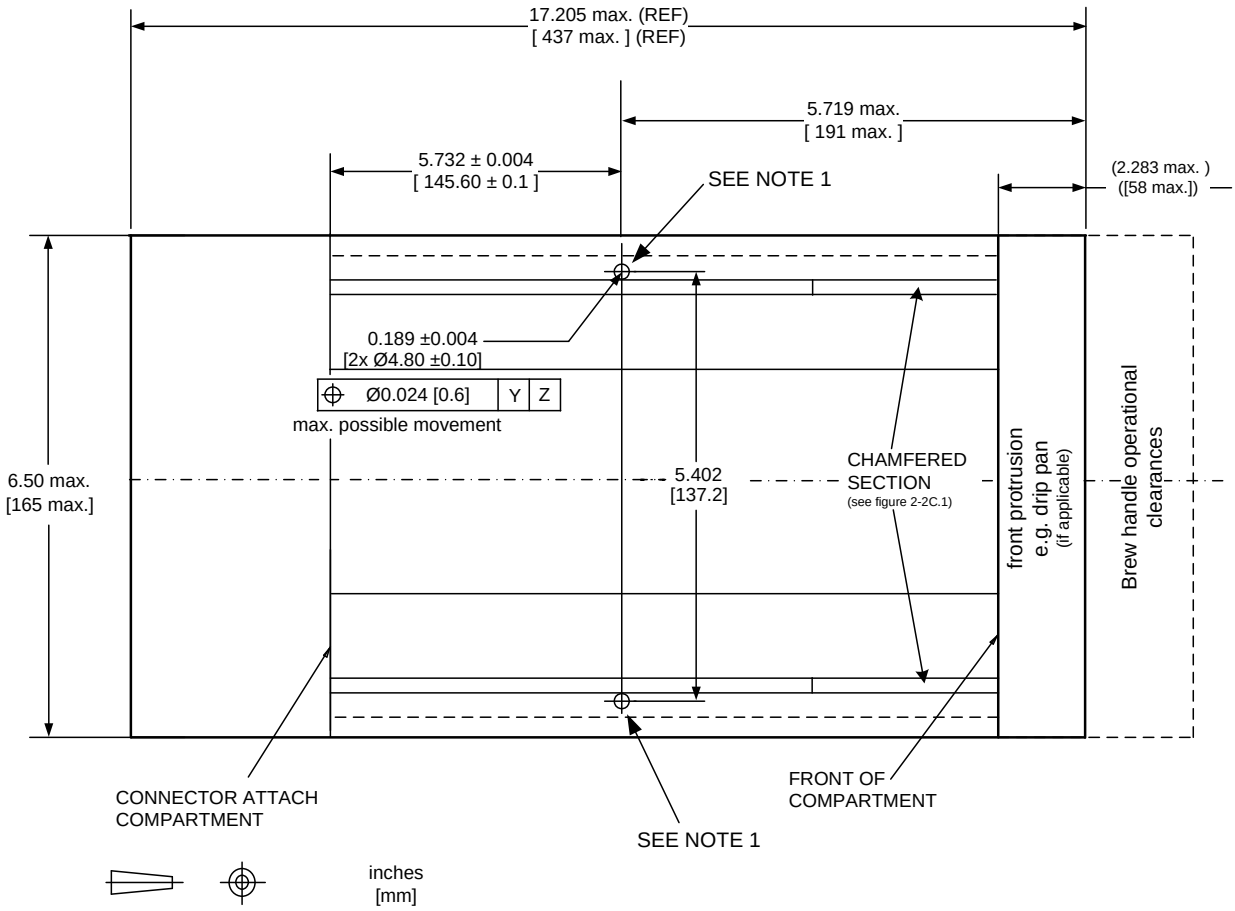


Figure 2-2C.2 – Enlargement of Rail Interface (Rear Section)

2.0 GAIN INTERFACE DEFINITION



[Airbus (Ralph) will redo ths drawing]

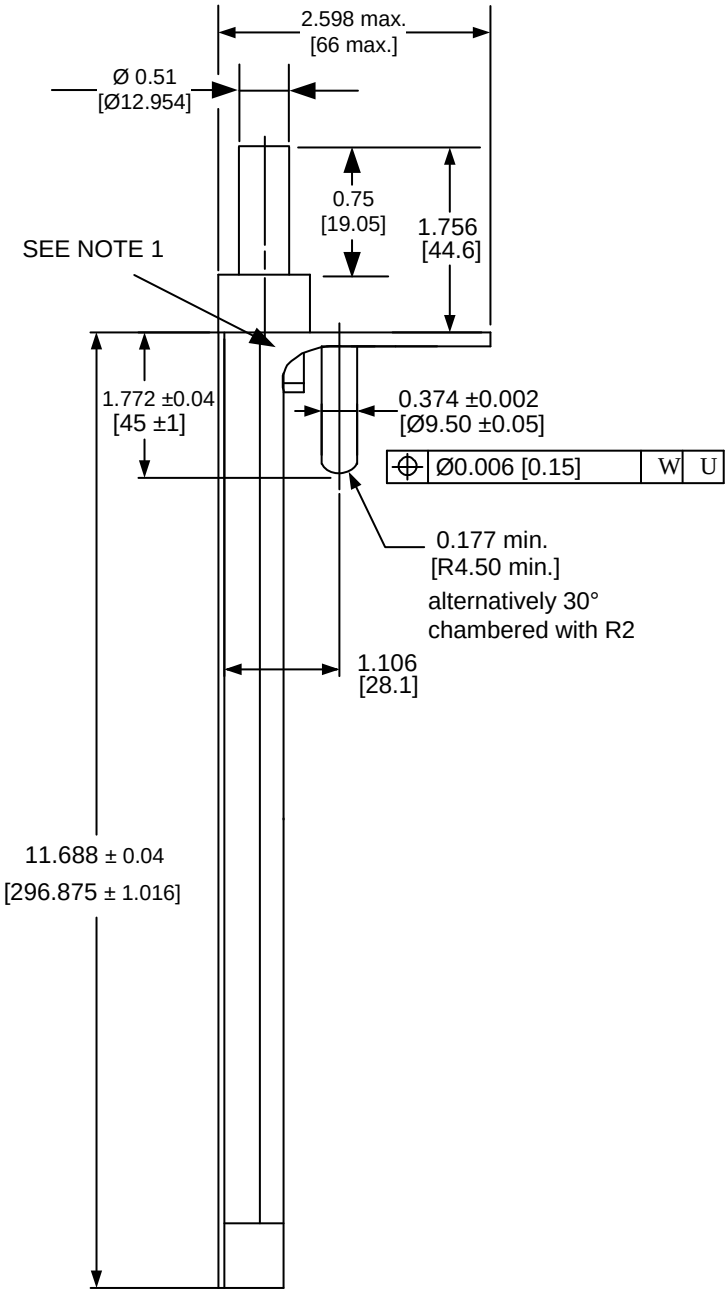
Note:

1. **Two latching devices/pins should be implemented at the electrical galley inserts equipment (GAIN).**

Figure 2-2D – Bottom View of Beverage Maker

2.1.1.1 Rail System of GAIN Size 1

The GAIN Standard Dimensions Drawing for the rail system of the Size 1 GAIN is shown in Figures 2-3A through 2-3D.2.

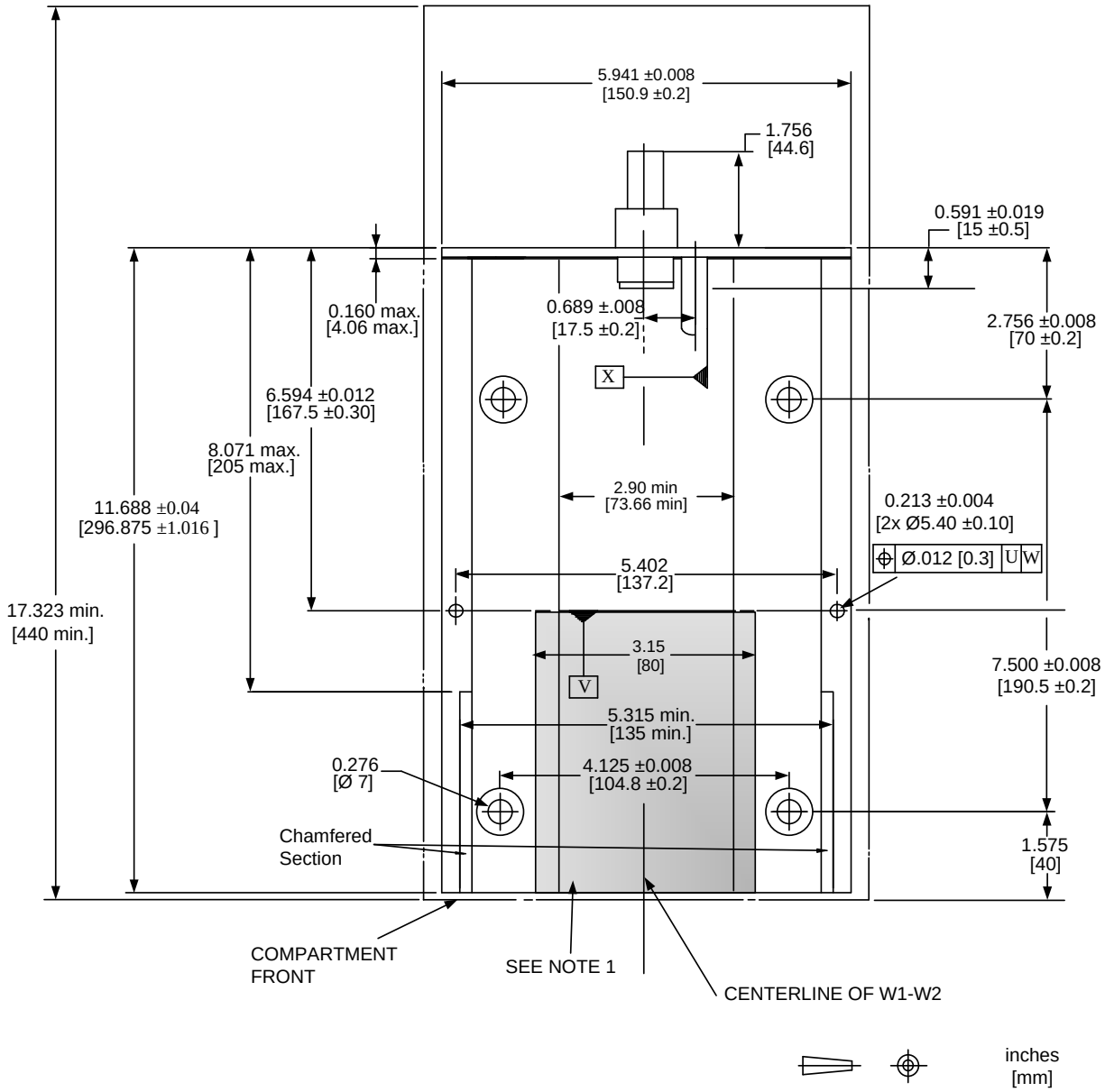


Note: inches [mm]

1. Reinforcement material between vertical and horizontal plate max. 15 mm (height & depth).

Figure 2-3A – Side View of Beverage Maker Rail

2.0 GAIN INTERFACE DEFINITION



Note:

~~1. Reinforcement material between vertical and horizontal plate is maximun 15 mm (height and depth).~~

~~1.~~1 The shaded area is for warming plates temperature shielding.

Figure 2-3B – Plan View of Beverage Maker Rail

Action:
1) Ralph – Clarify the X reference
2) Monogram – Perform study on datum and tolerances between rail and size 1 equipment. Earl will distribute

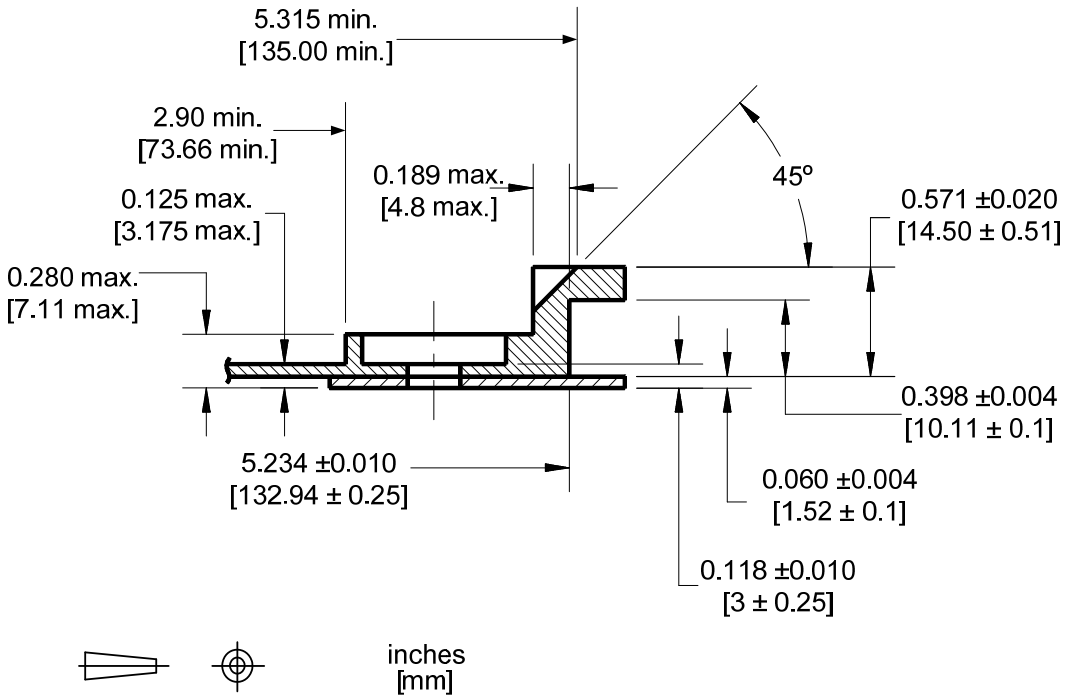
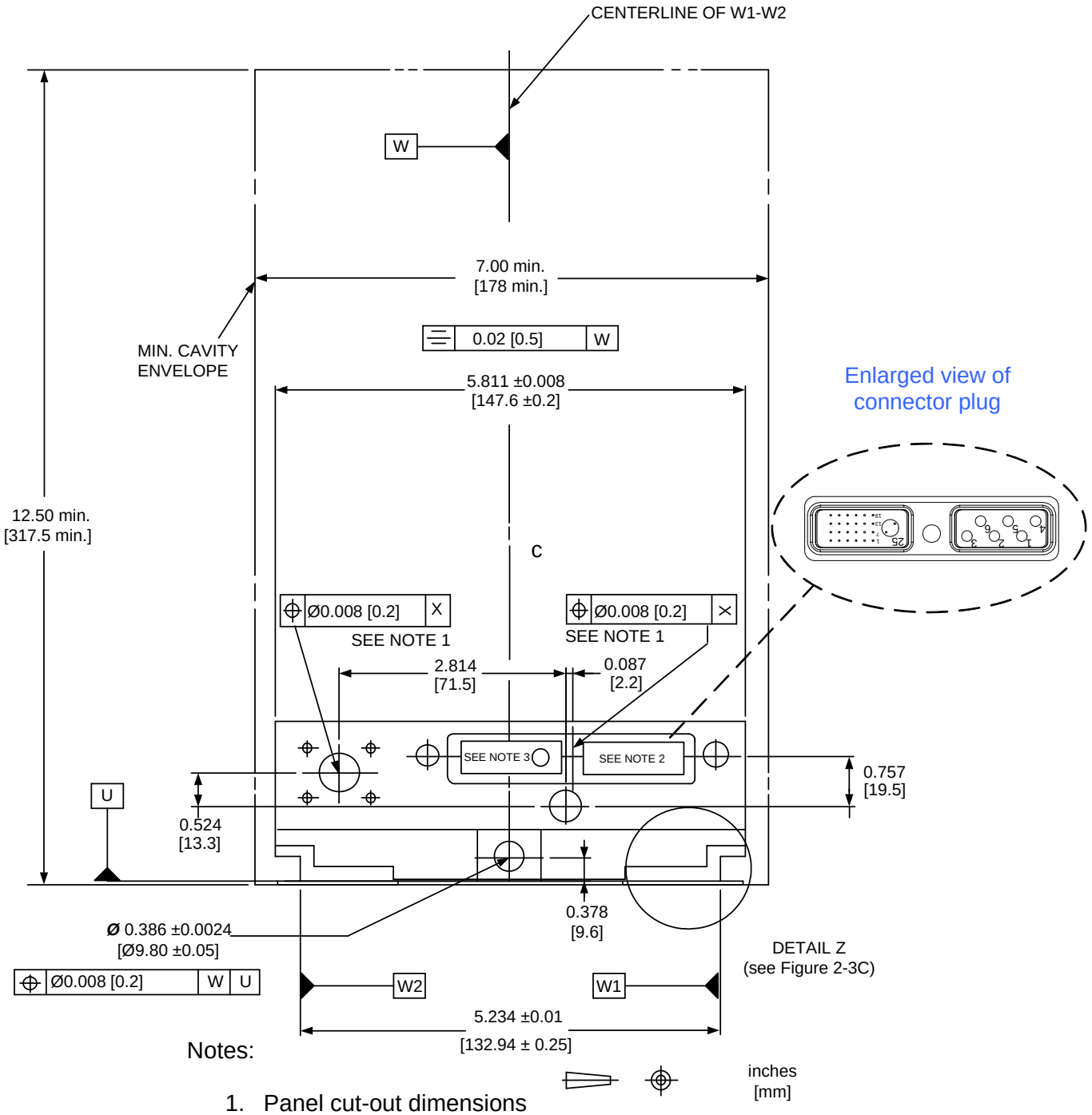


Figure 2-3C – Enlargement of Rail Interface

2.0 GAIN INTERFACE DEFINITION



Notes:

1. Panel cut-out dimensions will be defined in Connector and Water Coupling Specification.

2. Location of Power Pins Insert.

3. Location of CAN bus and Pin Programming.

Figure 2-3D.1 – Front View of Beverage Maker Rail/Compartment

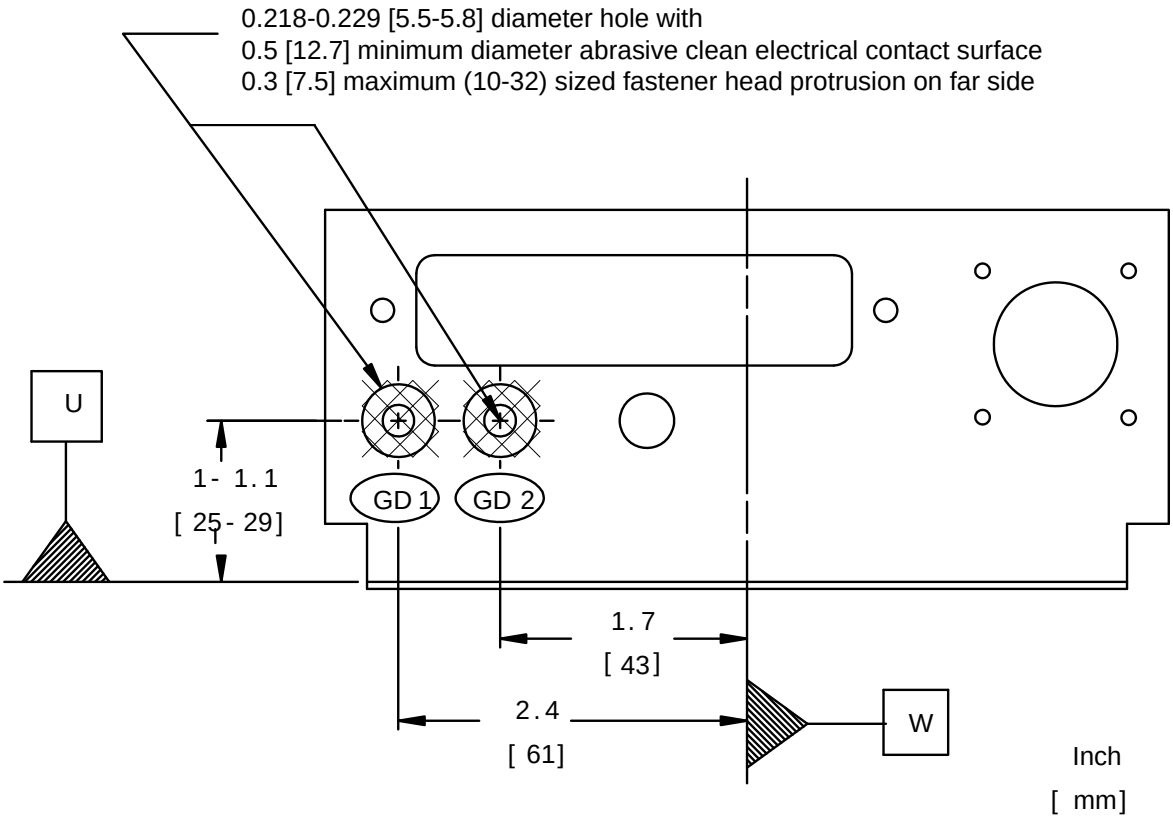


Figure 2-3D.2 – Rear View of ARINC Size 1 Rail

2.1.1.2 Consolidated Assembly and Double-Size Compartment

The GAIN Standard Dimensions Drawing for the GAIN size 1 consolidated assembly and one double-size compartment are shown in Figures 2-3E through 2-3F.

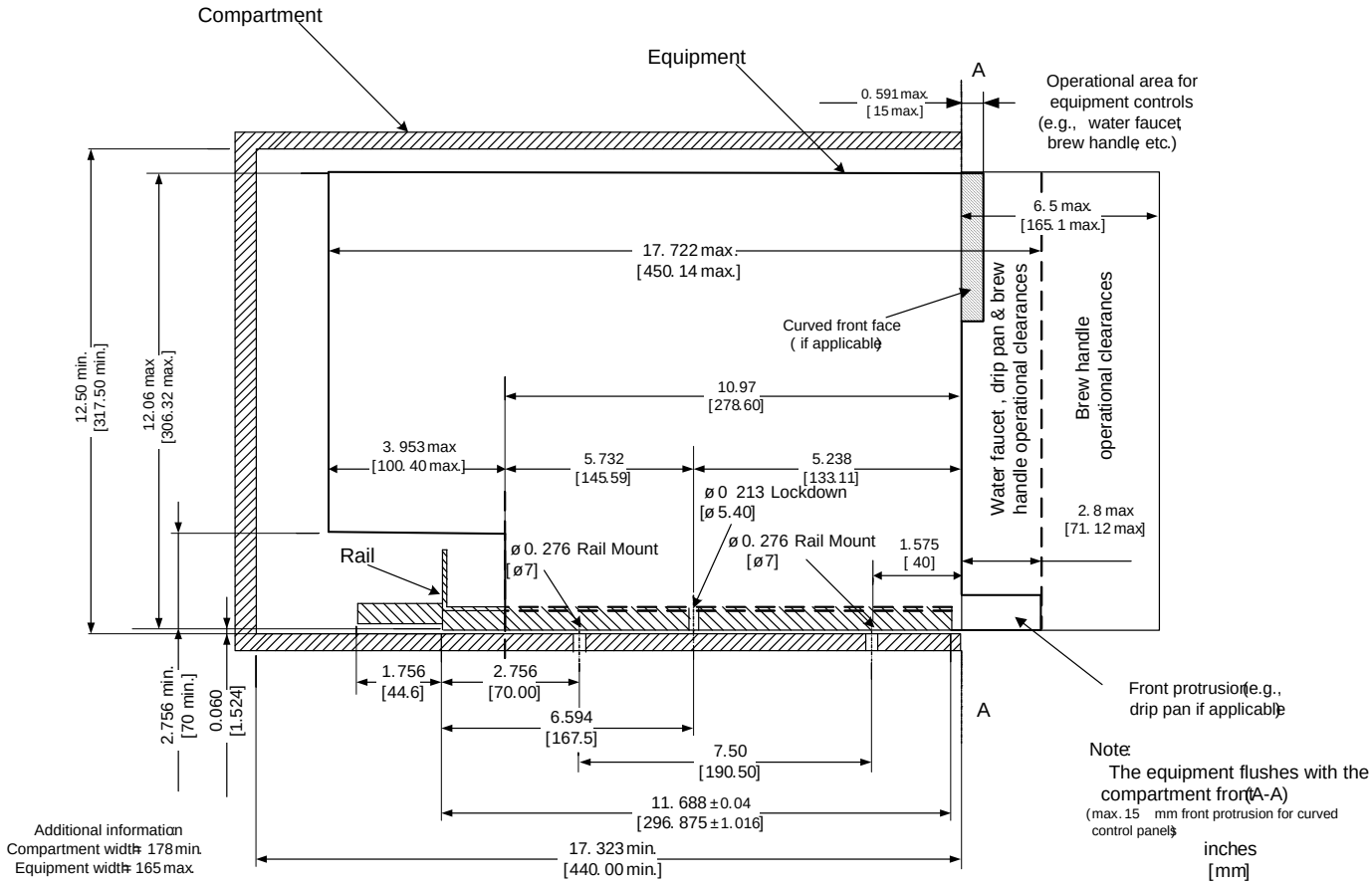


Figure 2-3E – GAIN Size 1 Consolidated Assembly View

1) Ralph will provide updated figure
2) Suppliers will propose definition of operational clearance area

2.0 GAIN INTERFACE DEFINITION

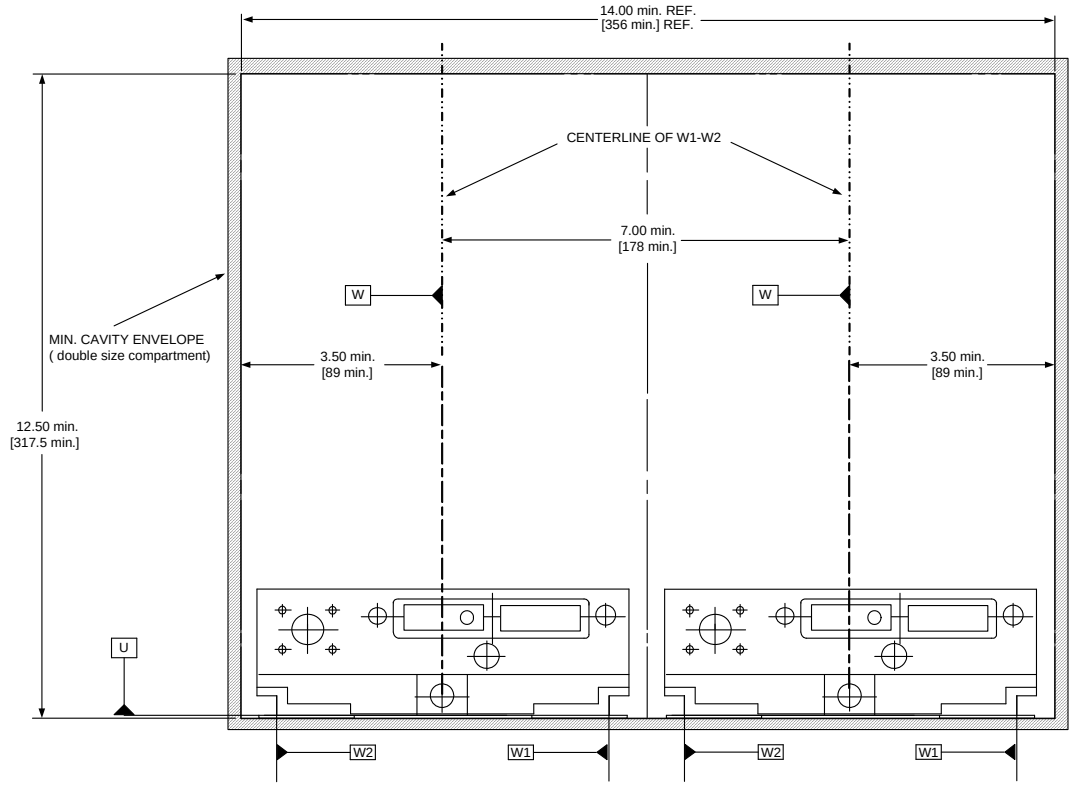
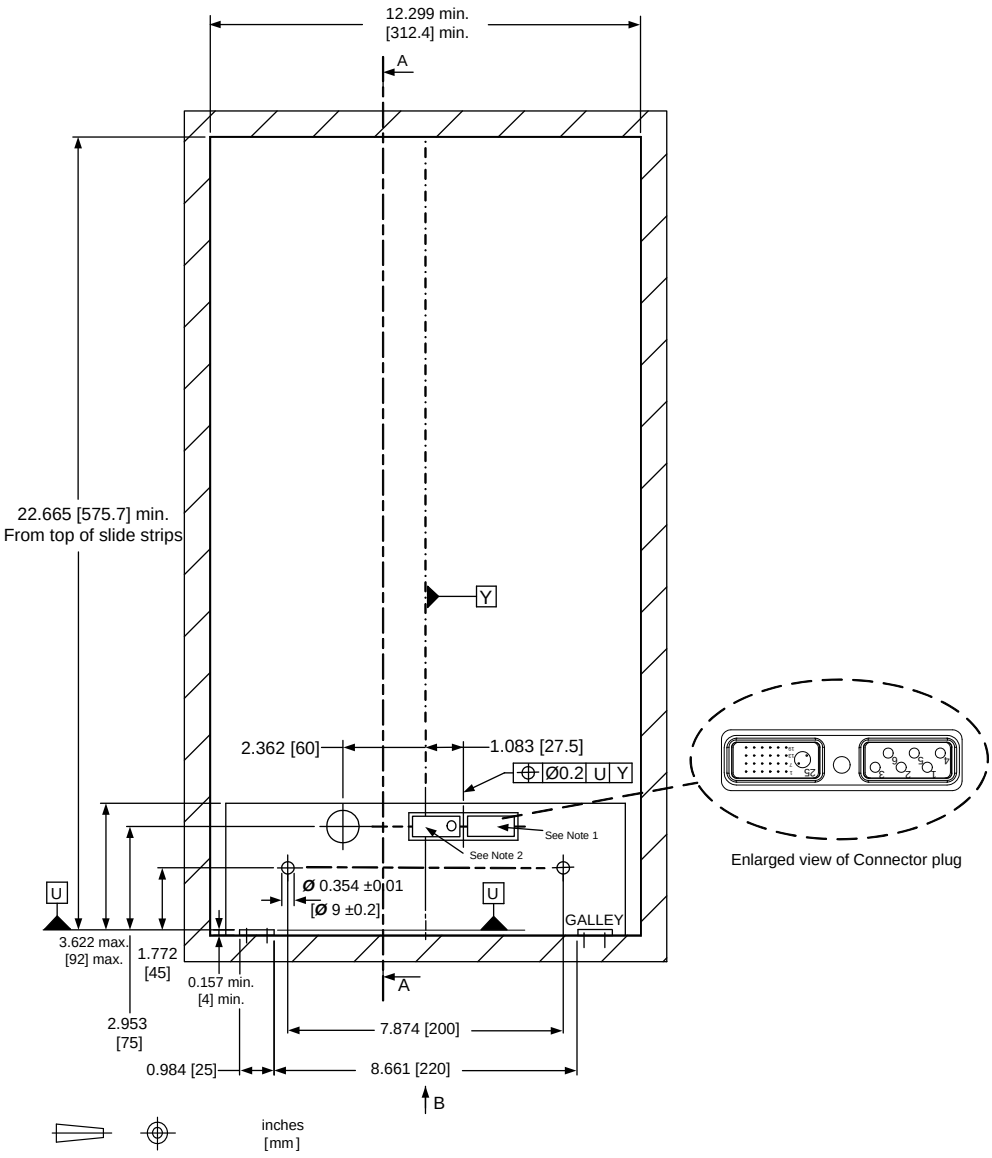


Figure 2-3F – GAIN Size 1 ~~Two~~ Double-Size Compartment

[Remove 2 from “2 double” in figure]

2.1.2 GAIN Size 2

The GAIN standard dimensions drawing for the Size 2 Compartment Structural and Systems Interface is shown in Figures 2-4A through 2-4C5H.



[It shows brackets on galley, but needs to show X1 and X2]

Notes:

1. Location of Power Pins Insert.
2. Location of CAN bus and Pin Programming.

Figure 2-4A – Size 2 Compartment Structural and Systems Interface Drawing – Front View

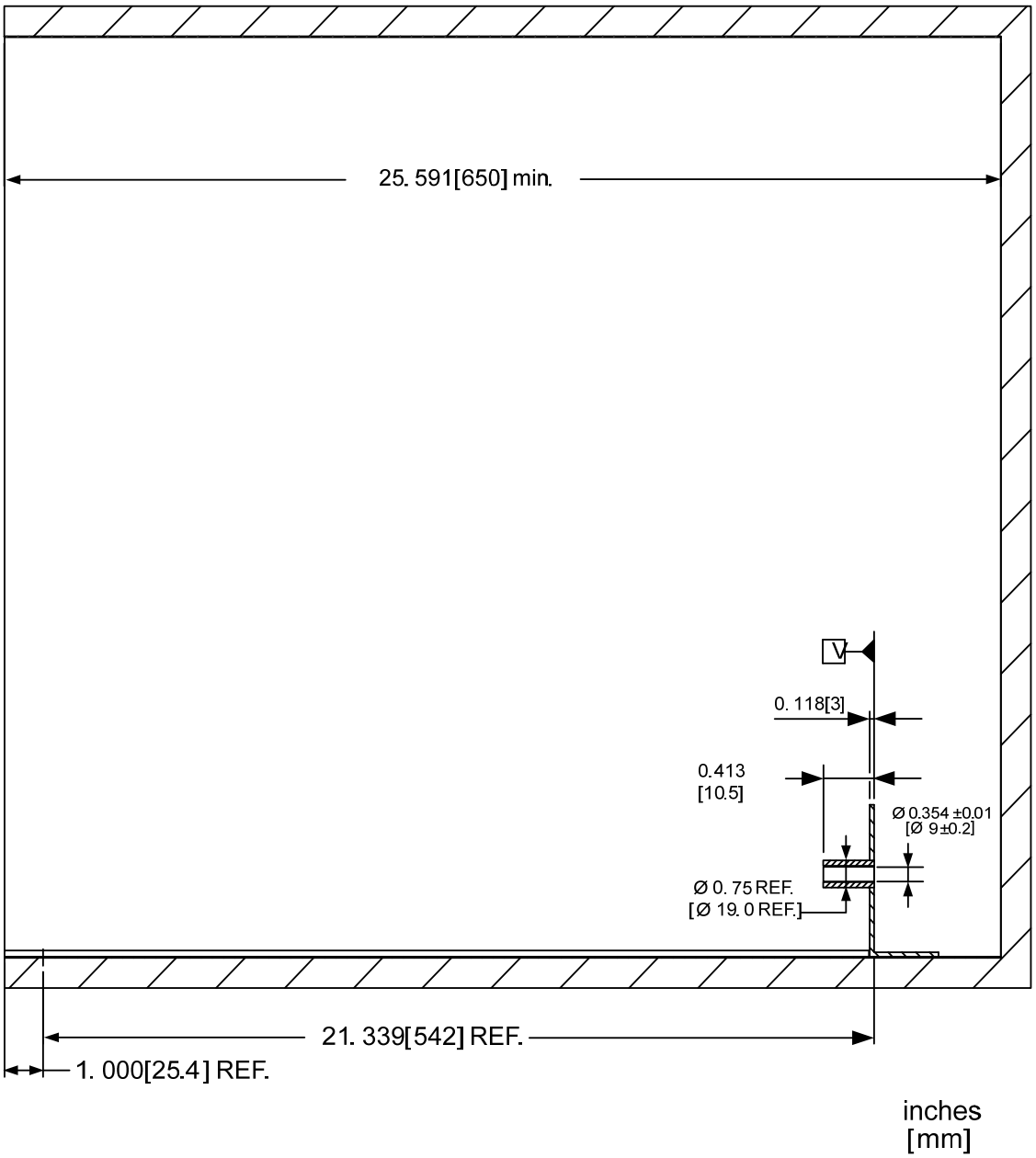


Figure 2-4B – Size 2 Compartment Structural and Systems Interface Drawing – Side View

Action:
1) Make minor modification to the lower right gap
2) Suppliers – As part of proposals, add chamfer design on guide pin lead-in to prevent mis-alignment

2.0 GAIN INTERFACE DEFINITION

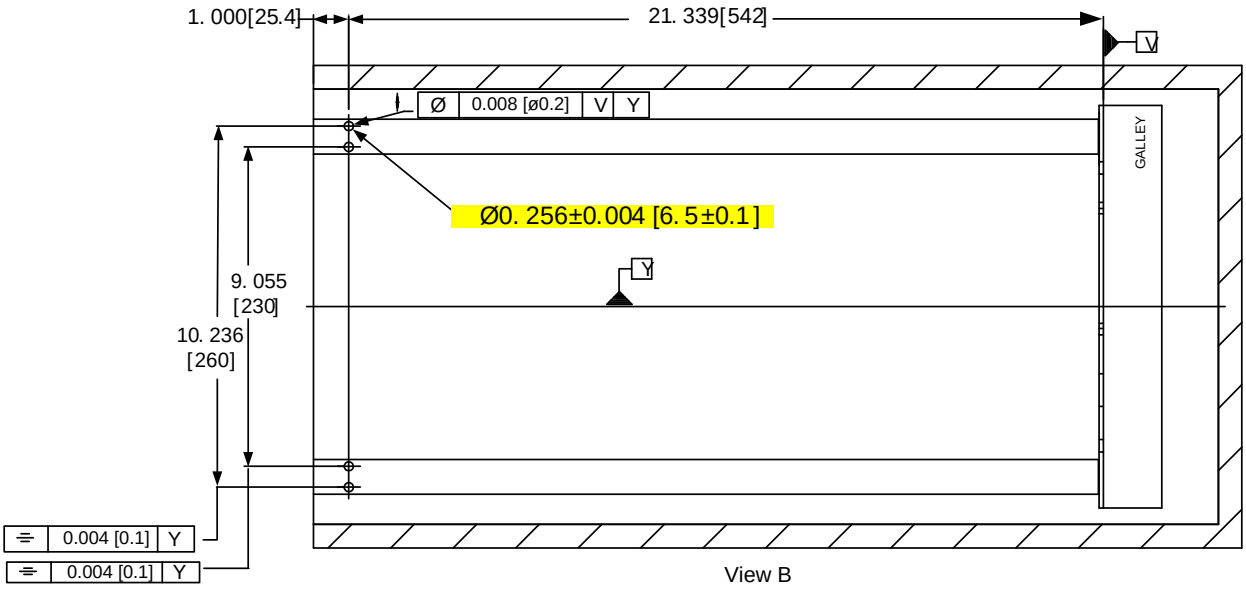
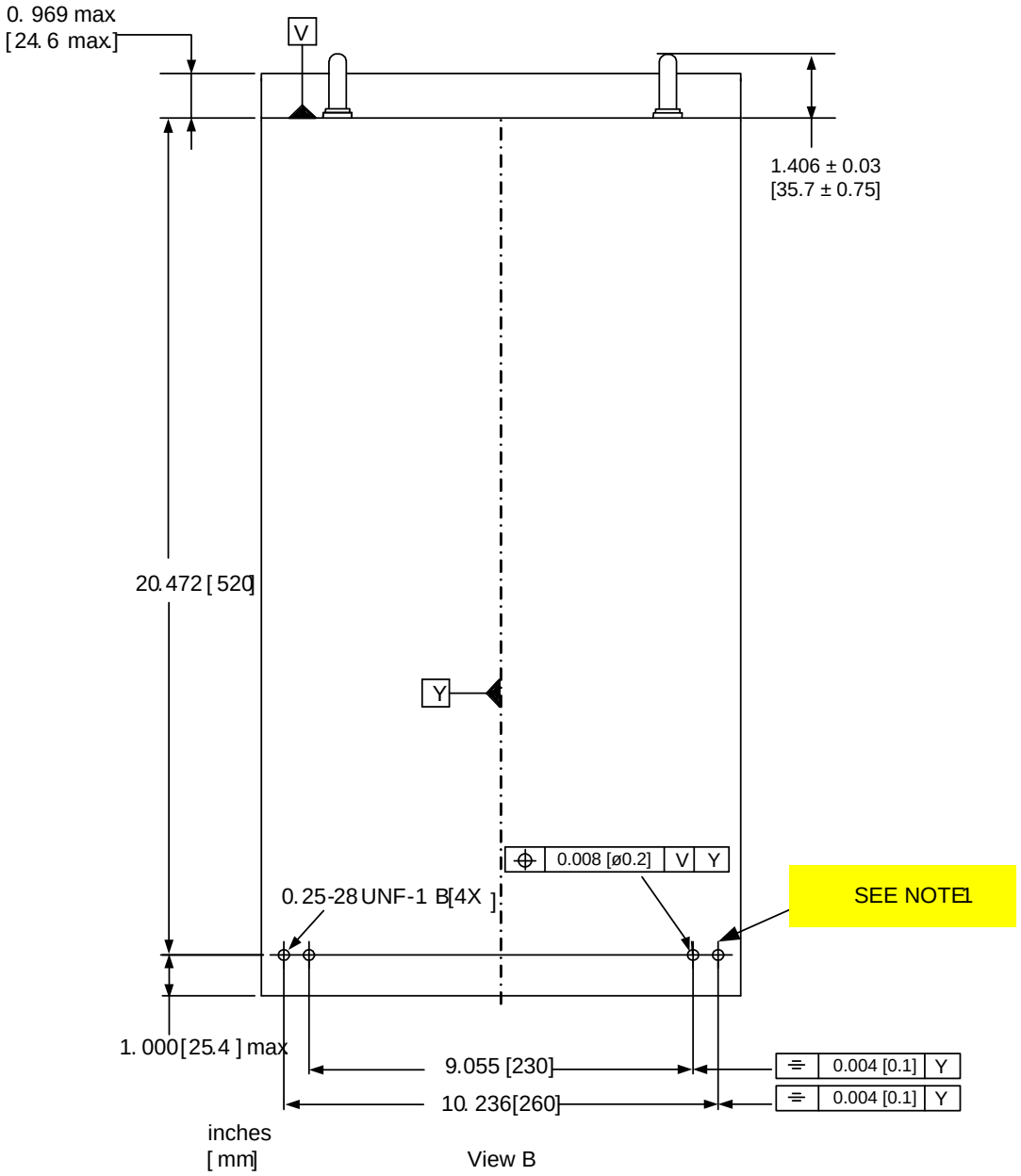


Figure 2-4C – Size 2 Compartment Structural and Systems Interface Drawing – Top View

~~2.1.3 GAIN Compartment Interfaces~~

~~The GAIN standard dimension drawings for the Size 2 GAIN equipment is shown in Figures 2-5A through 2-5D.~~

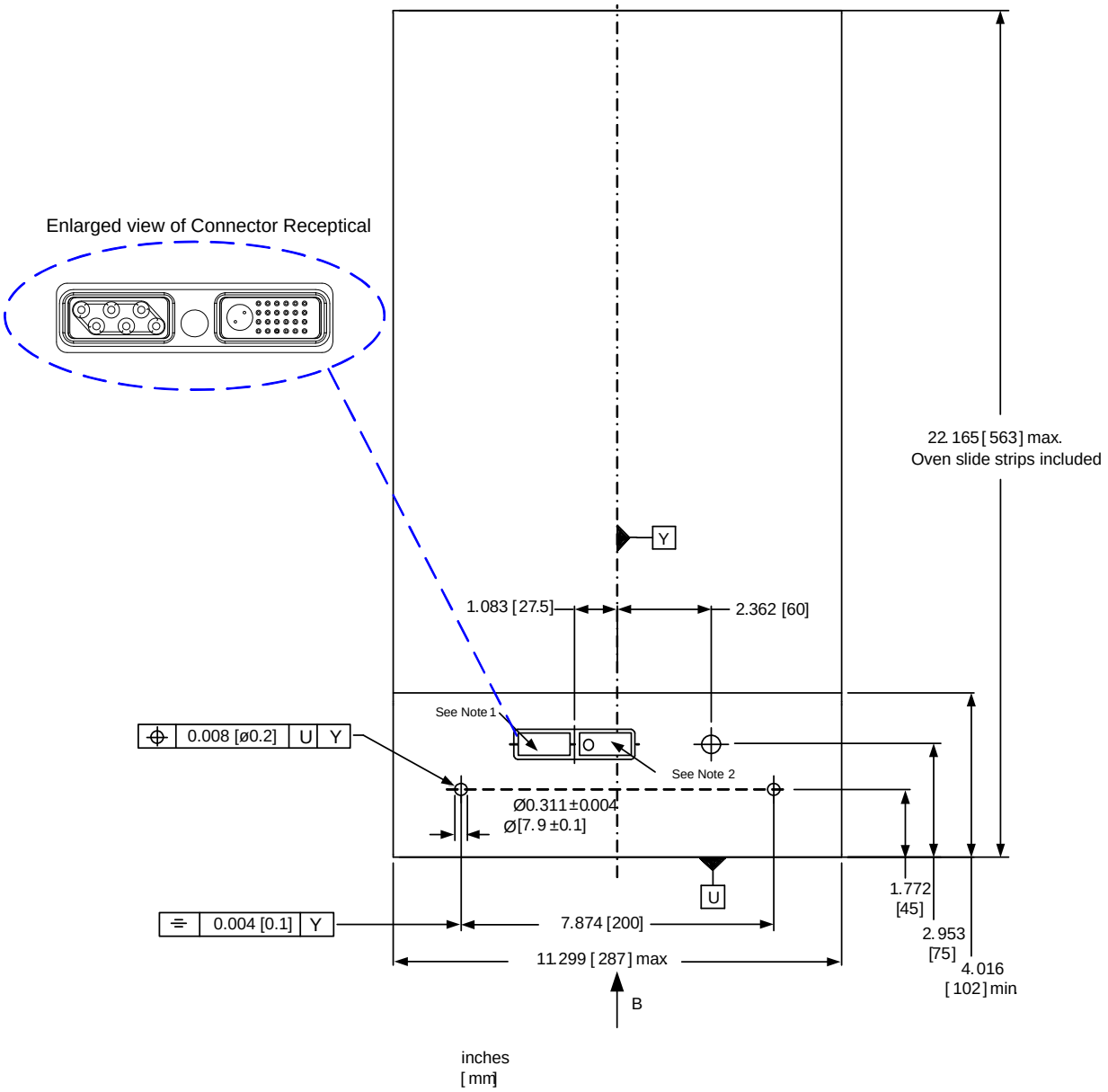


Note:

1. **Either both outer (2x) attachment ~~I/F~~interface or both inner (2x) attachment ~~I/F~~interface should be used.**

Figure 2-5A – Size 2 GAIN Equipment Standard Dimensions Drawing Bottom View

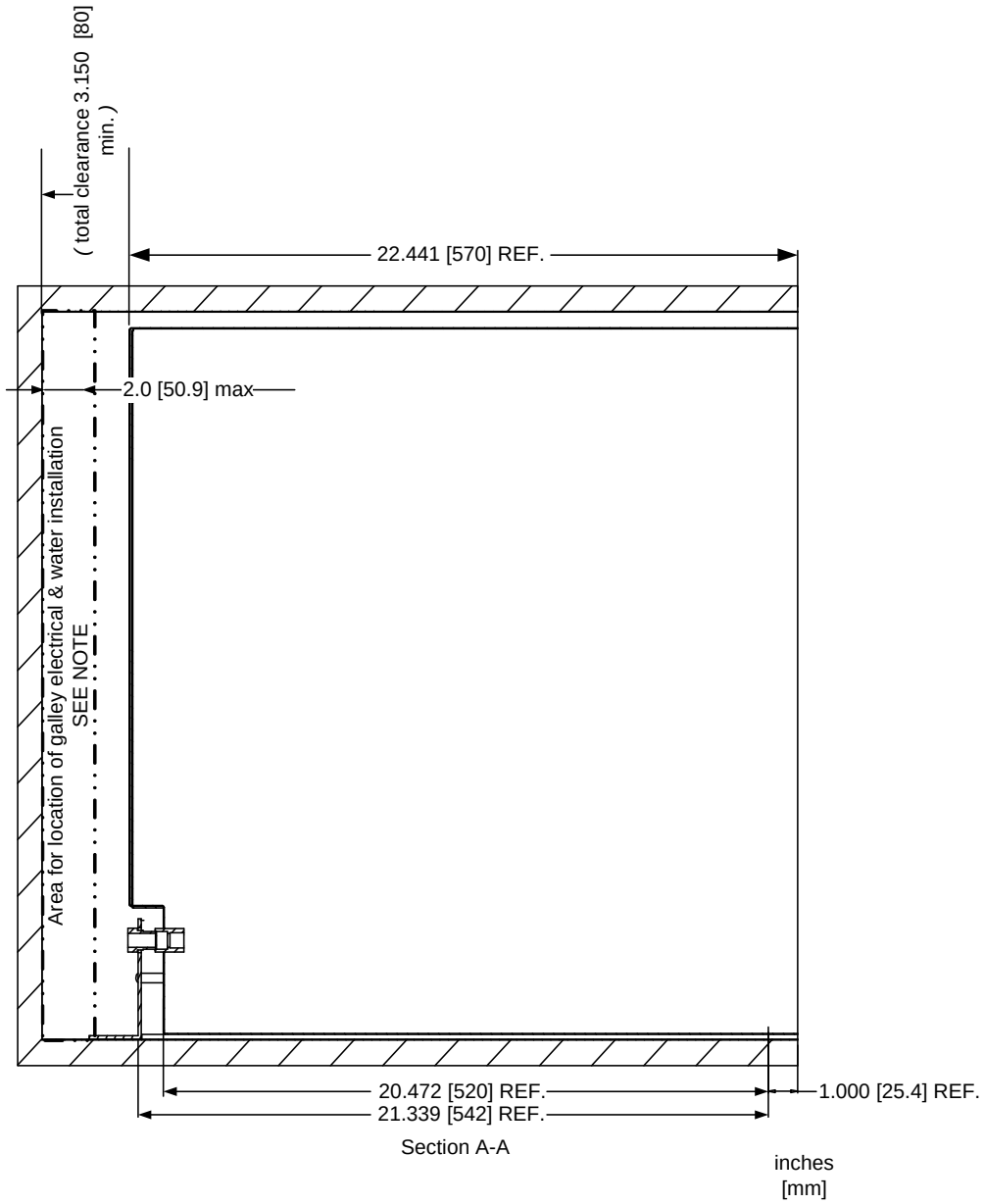
2.0 GAIN INTERFACE DEFINITION



Notes:

1. Location of Power Pins Insert.
2. Location of CAN bus and Pin Programming.
3. **Defines the height dimension.**

Figure 2-5B – Size 2 GAIN Equipment Standard Dimensions Drawing – Rear View



Note: Only to be used for electrical harness and plumbing hoses; no dividing wall should be allowed.

Figure 2-5C – Size 2 GAIN Equipment Standard Dimensions Drawing – Installed Side Views

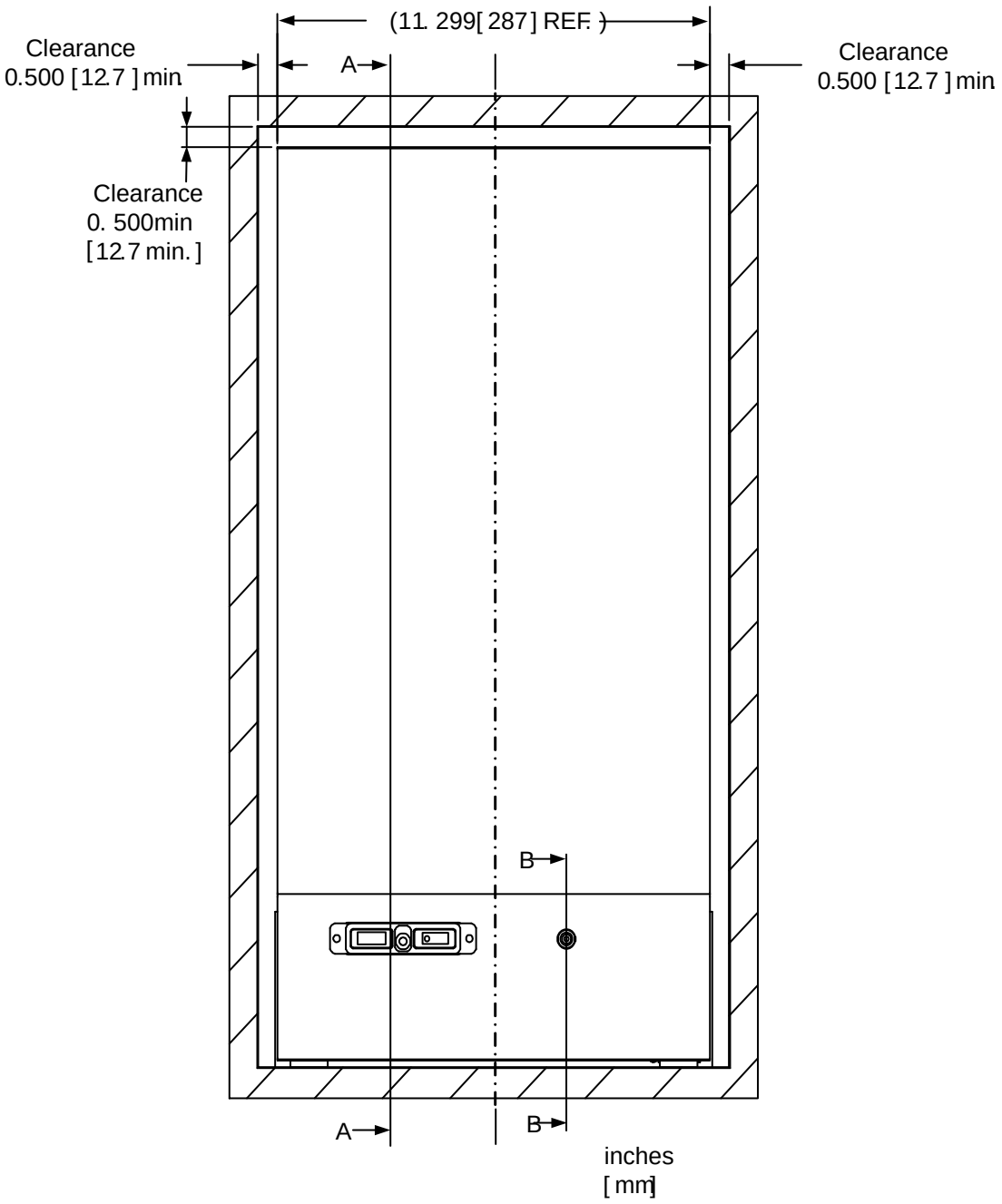
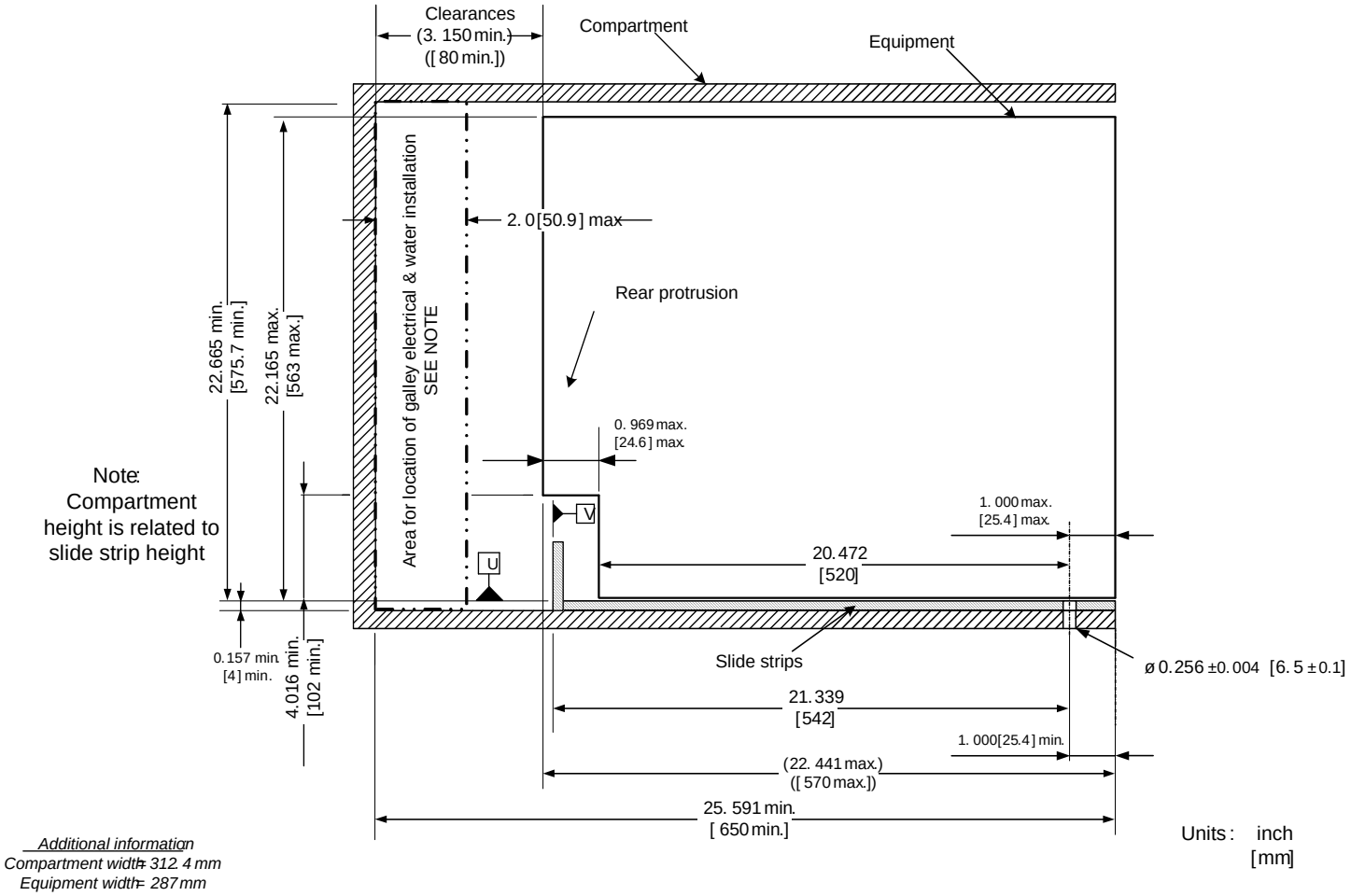


Figure 2-5D – Size 2 GAIN Equipment Standard Dimensions Drawing – Installed Rear Views

2.0 GAIN INTERFACE DEFINITION



Additional information
Compartment width = 312. 4 mm
Equipment width = 287 mm

Note: Only to be used for electrical harness and plumbing hoses; no dividing wall should be allowed.

Figure 2-5E – GAIN Size 2 Consolidated Assembly View

2.0 GAIN INTERFACE DEFINITION

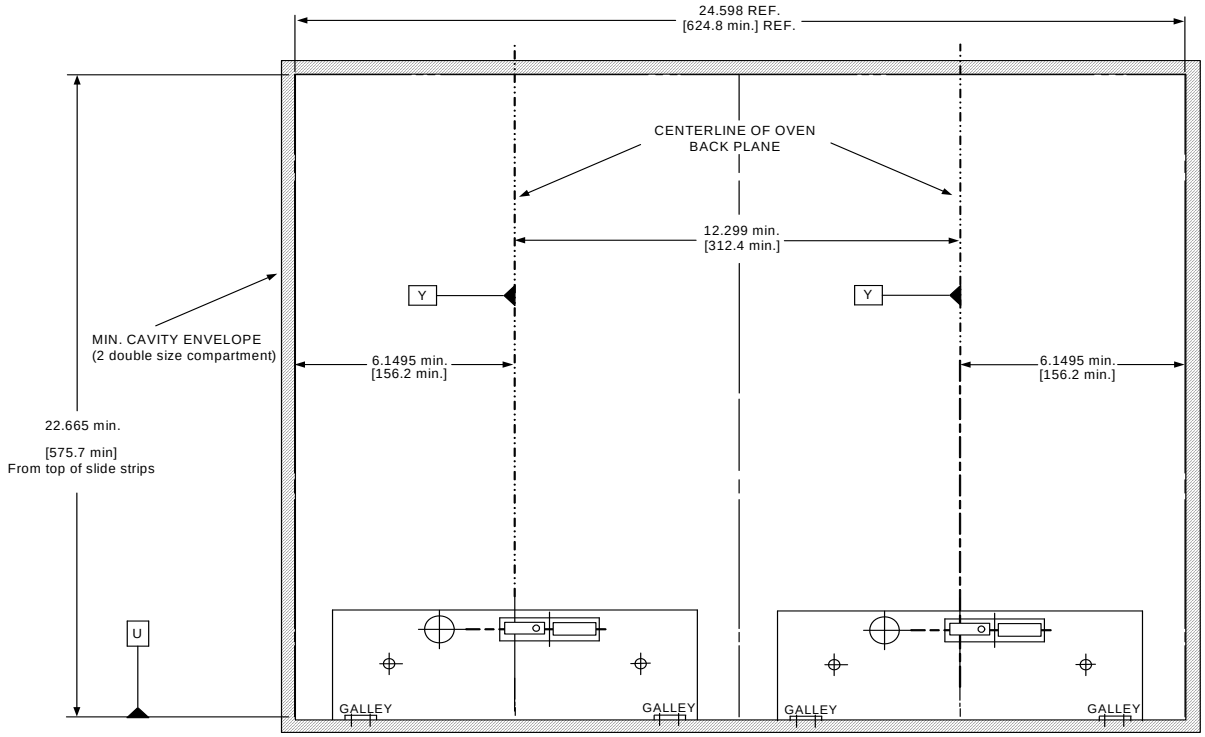
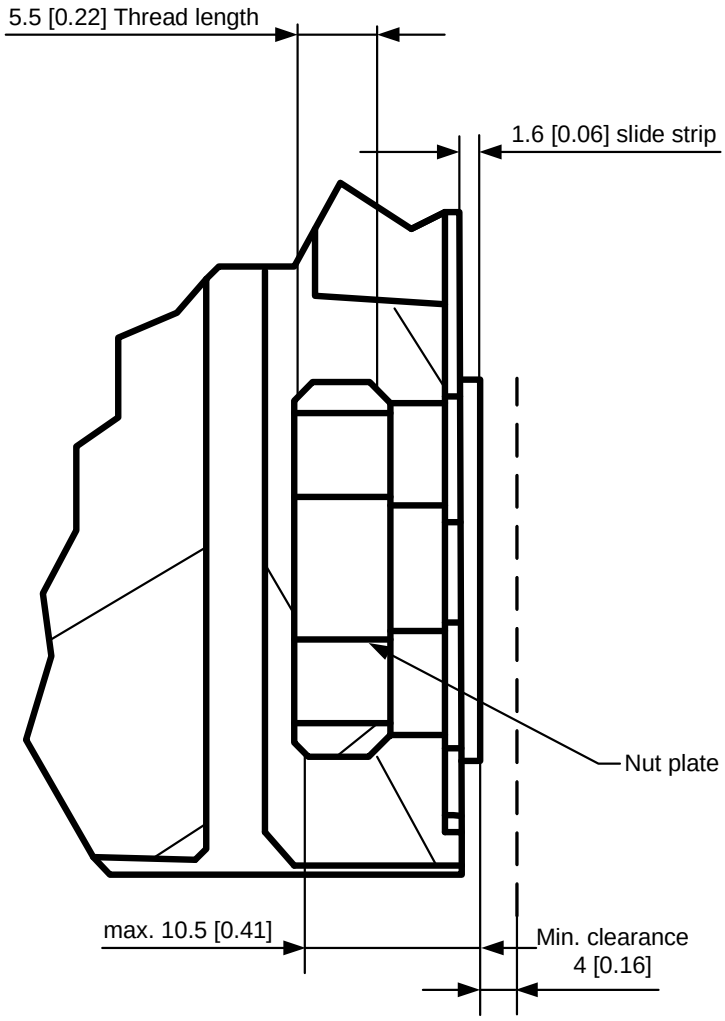


Figure 2-5F – GAIN Size 2 Two Double-Size Compartment



Section A-A (1:1)

Figure 2-5G –Galley Attachment Screw and Nut Plate

2.0 GAIN INTERFACE DEFINITION

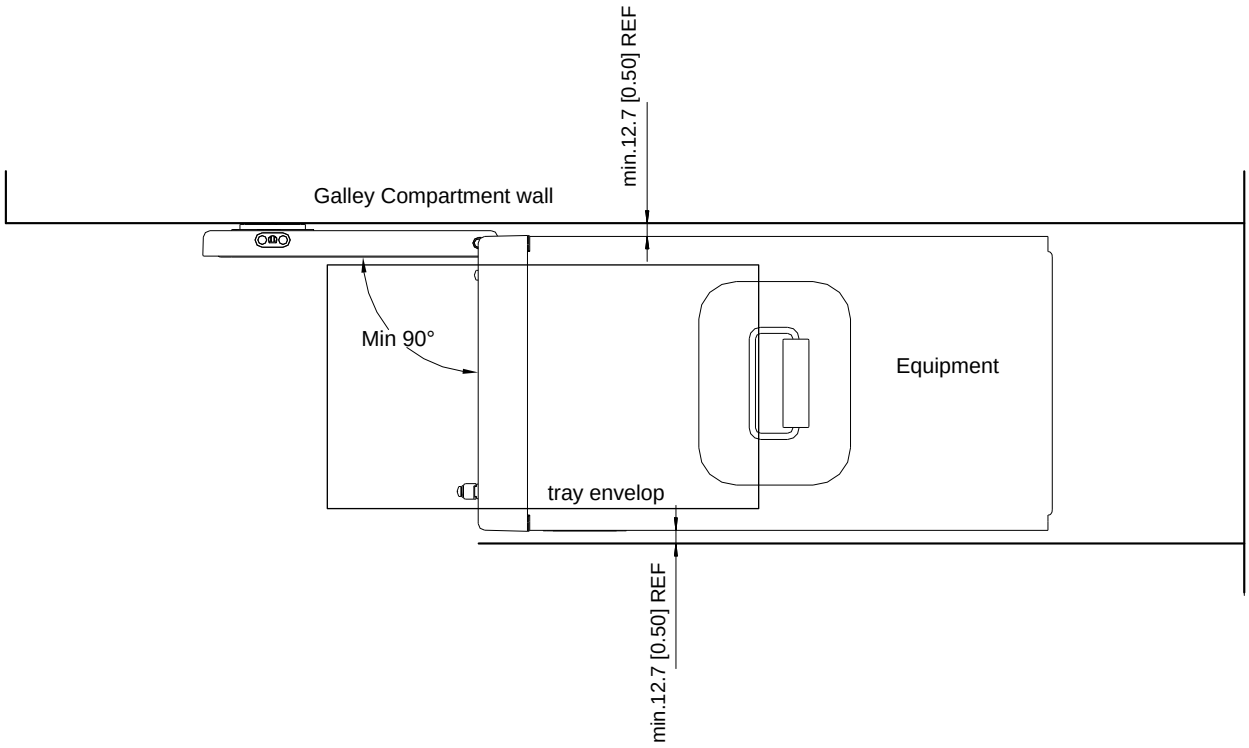


Figure 2-5H – Size 2 Top View including Door Opening Envelope

2.1.4 ~~3~~ GAIN Size 3

The GAIN standard dimension drawings for the Size 3 GAIN are shown in Figures 2-6A ~~C~~ **through 2-6C** and Table 2-1, **Figures** 2-7A ~~D~~**through 2-7D**, and 2-8A ~~C~~**through 2-8C**.

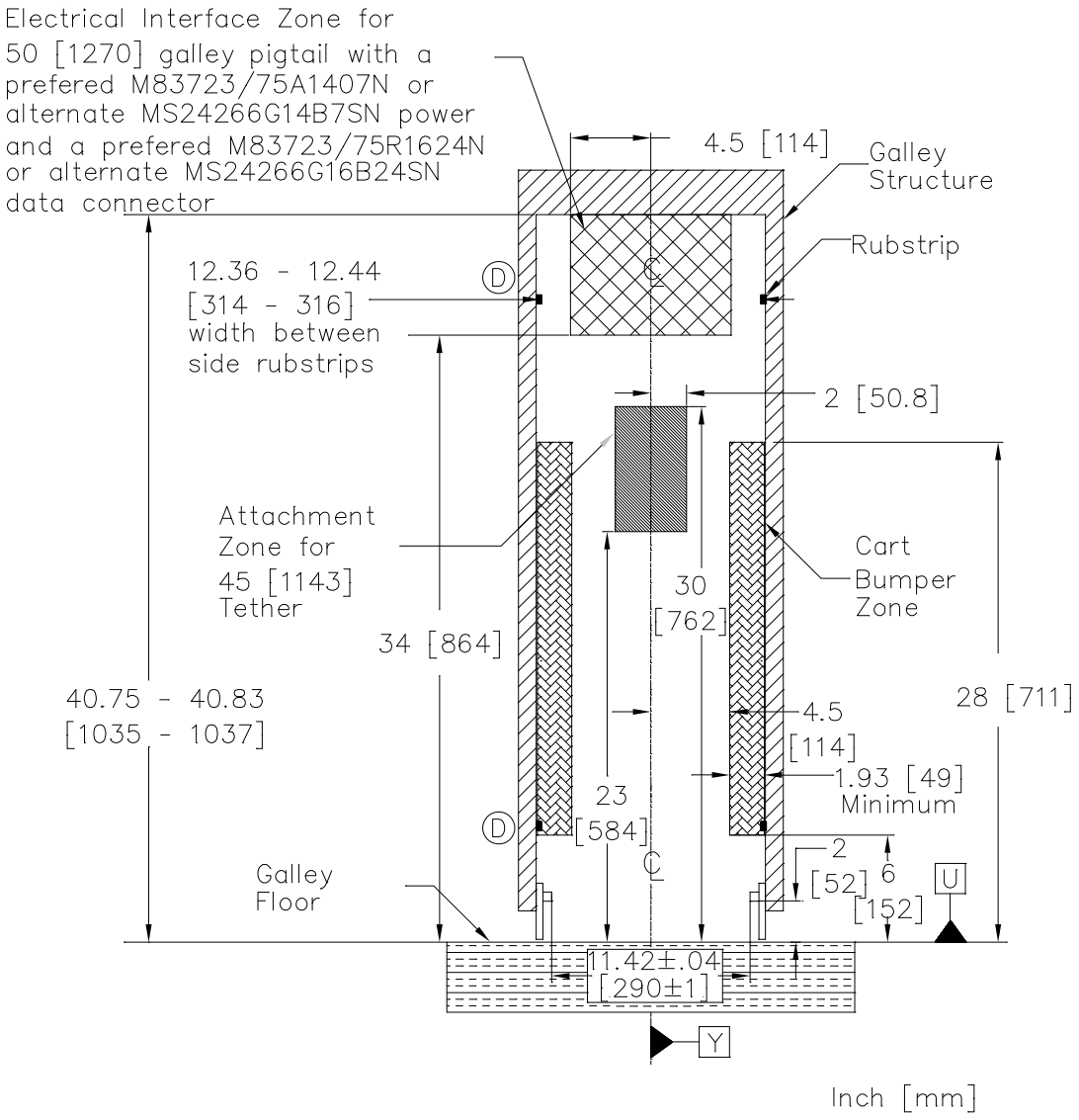


Figure 2-6A – GAIN Size 3 Compartment Structure and Electrical Interface Drawing - Front View

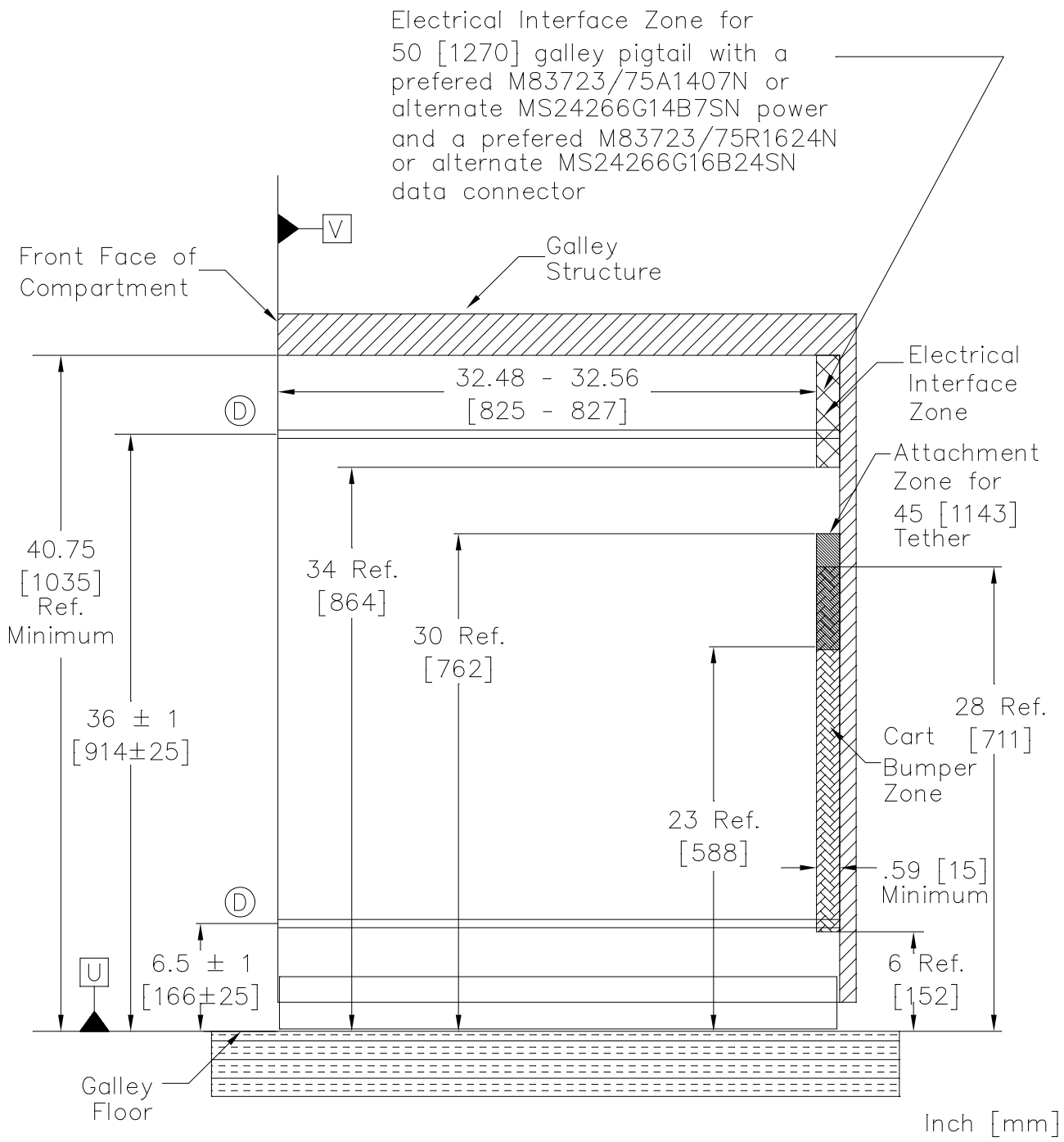


Figure 2-6B – GAIN Size 3 Compartment Structure and Electrical Drawing - Side View

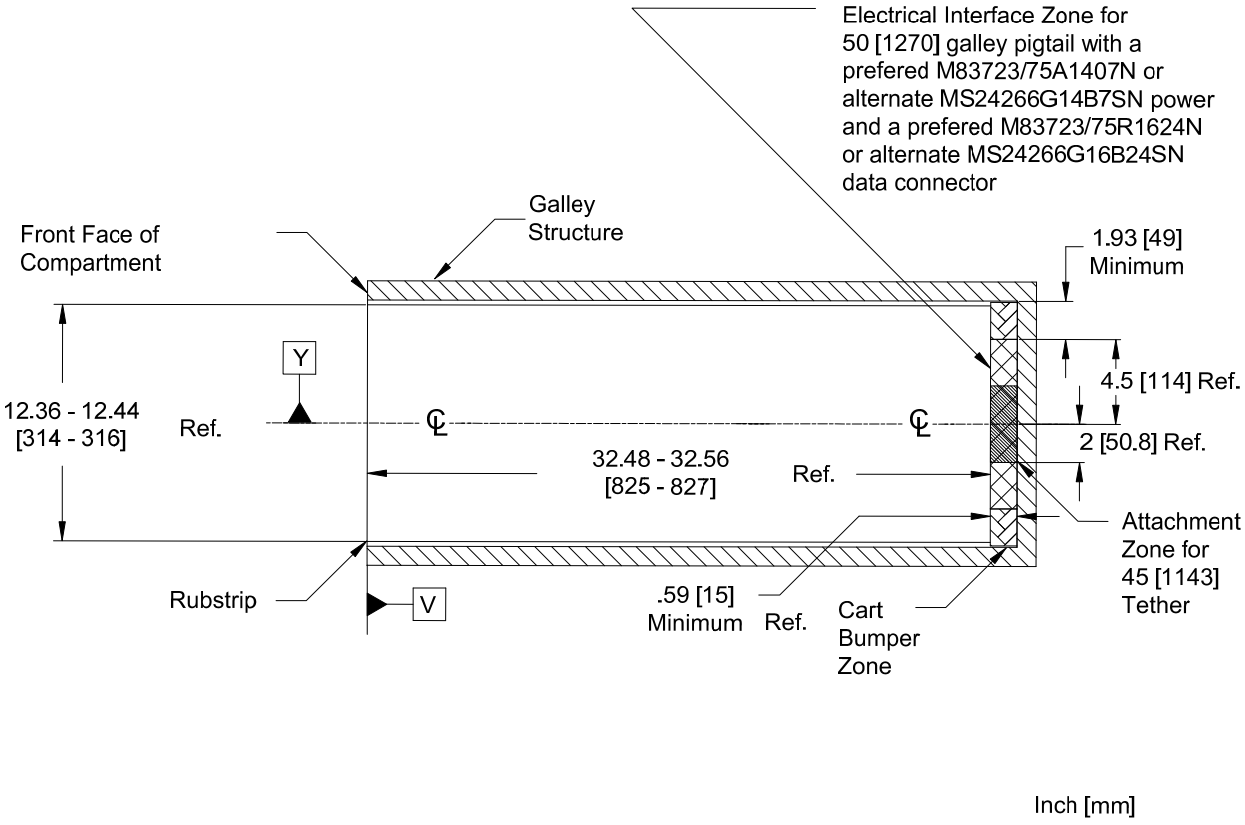


Figure 2-6C – GAIN Size 3 Compartment Structure and Electrical Interface Drawing - Plan View

Table 2-1 – GAIN Size 3 Compartment Structure and Electrical Interface Drawing – Connector Pin-Out

Ⓓ Galley pigtail with preferred	Ⓓ GAIN Size 3 with preferred	Ⓓ Galley pigtail with preferred	Ⓓ GAIN Size 3 with preferred
M83723/75A1407N or alternate MS24266G14B7SN power connector	M83723/72A1407N or alternate MS24264G14B7PN power connector	M83723/75R1624N or alternate MS24266G16B24SN data connector	M83723/72R1624N or alternate MS24264G16B24PN data connector
	Pin 1 – Phase A (115 Vac)		
	Pin 2 – Phase B (115 Vac)		
	Pin 3 – Phase C (115 Vac)		
	Pin 4 – Neutral		
	Pin 5 – Static Ground		
	Pin 6 – Static Ground		
	Pin 7 – Static Ground		

Ⓓ = ?

Notes:

1. Data pinout is defined in Table 3-7**a and 3-7b.** ~~(Data Insert Contact Designation)~~
2. **Galley side connector selection and design integration is the responsibility of the galley supplier. Matching MS or a GAIN 810 rectangular dual shell connector may be used. See Appendix ??? for additional guidance.**

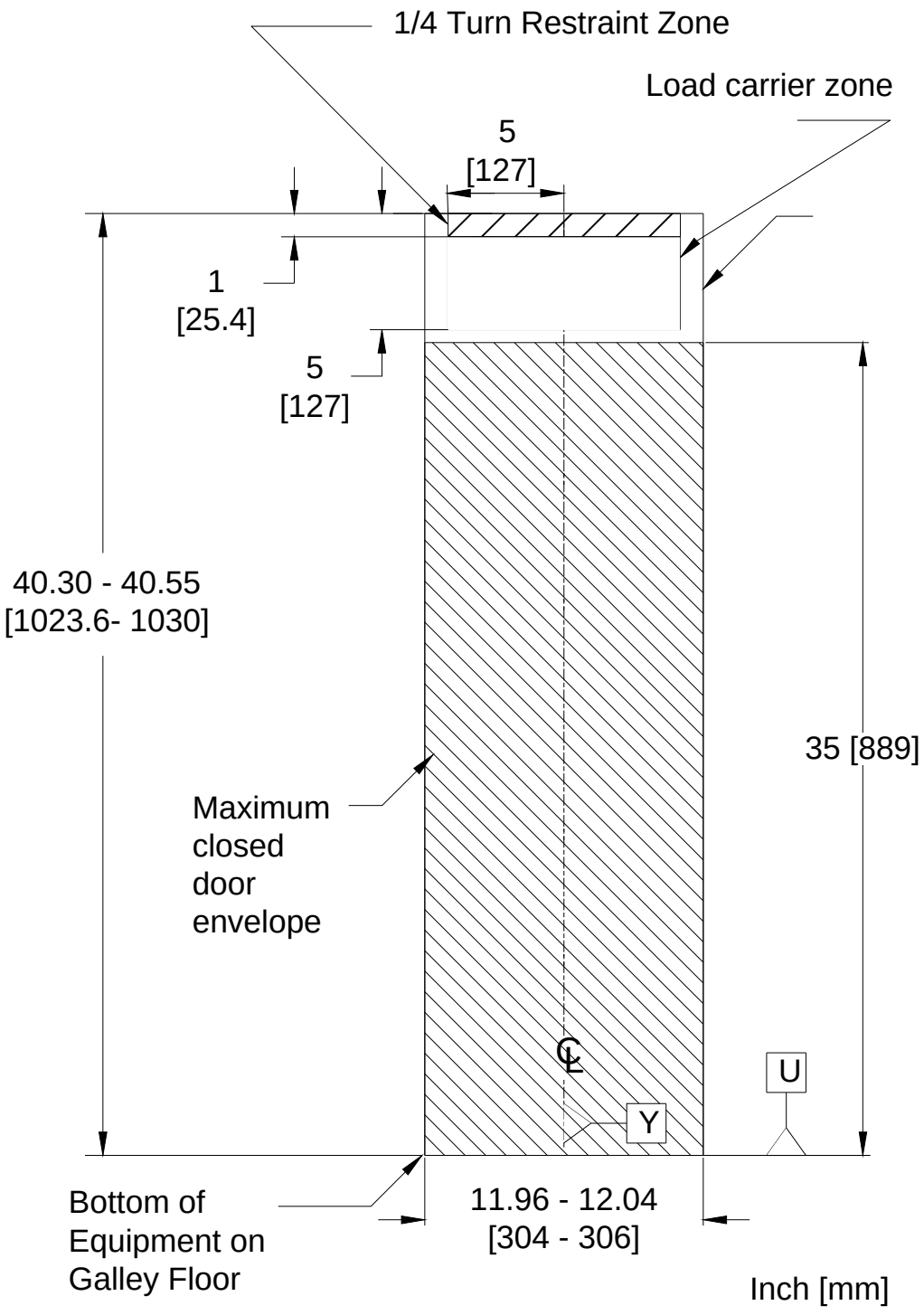


Figure 2-7A – GAIN Size 3 Equipment Standard Dimensions Drawing - Front View

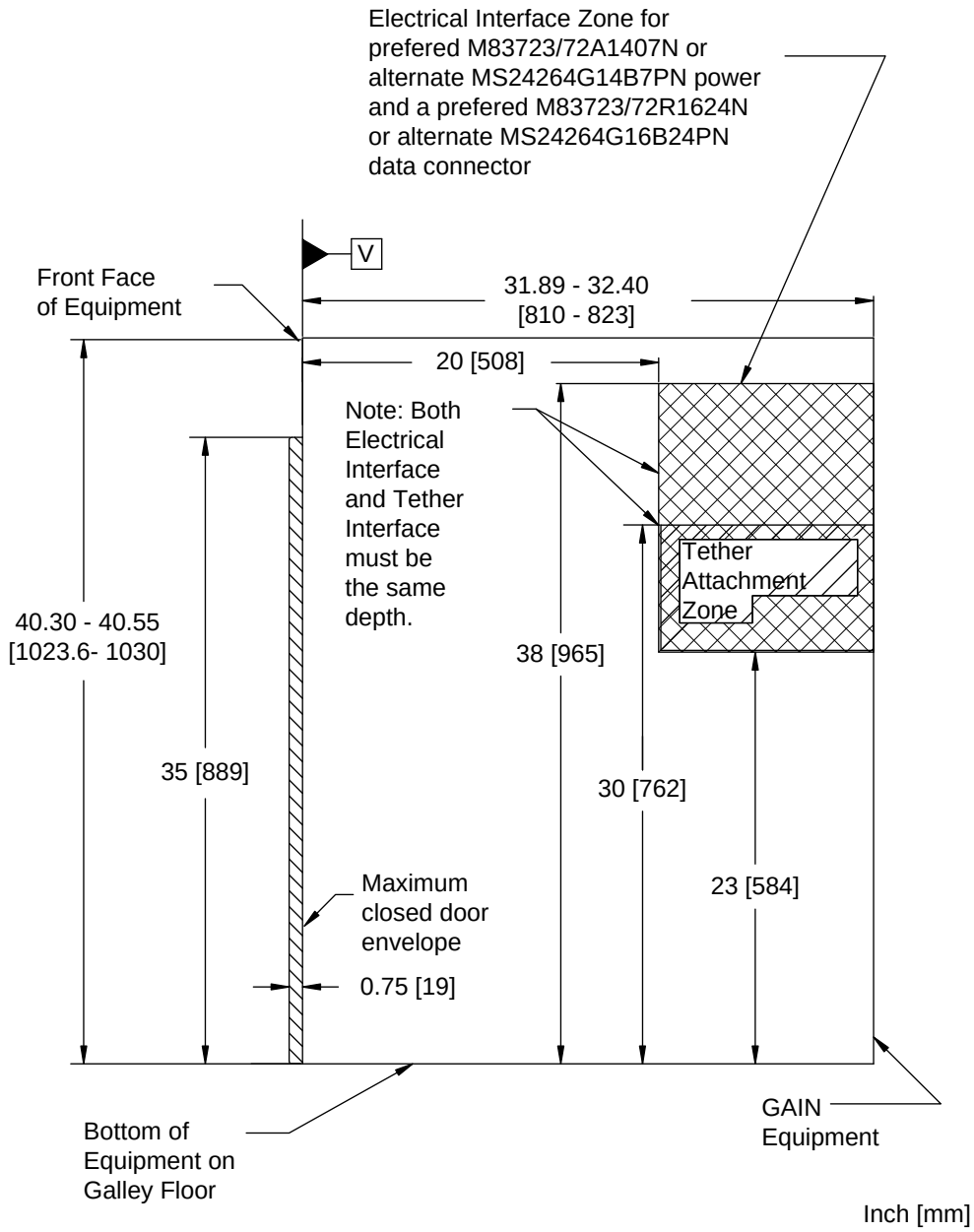


Figure 2-7B – GAIN Size 3 Equipment Standard Dimensions Drawing – Side View

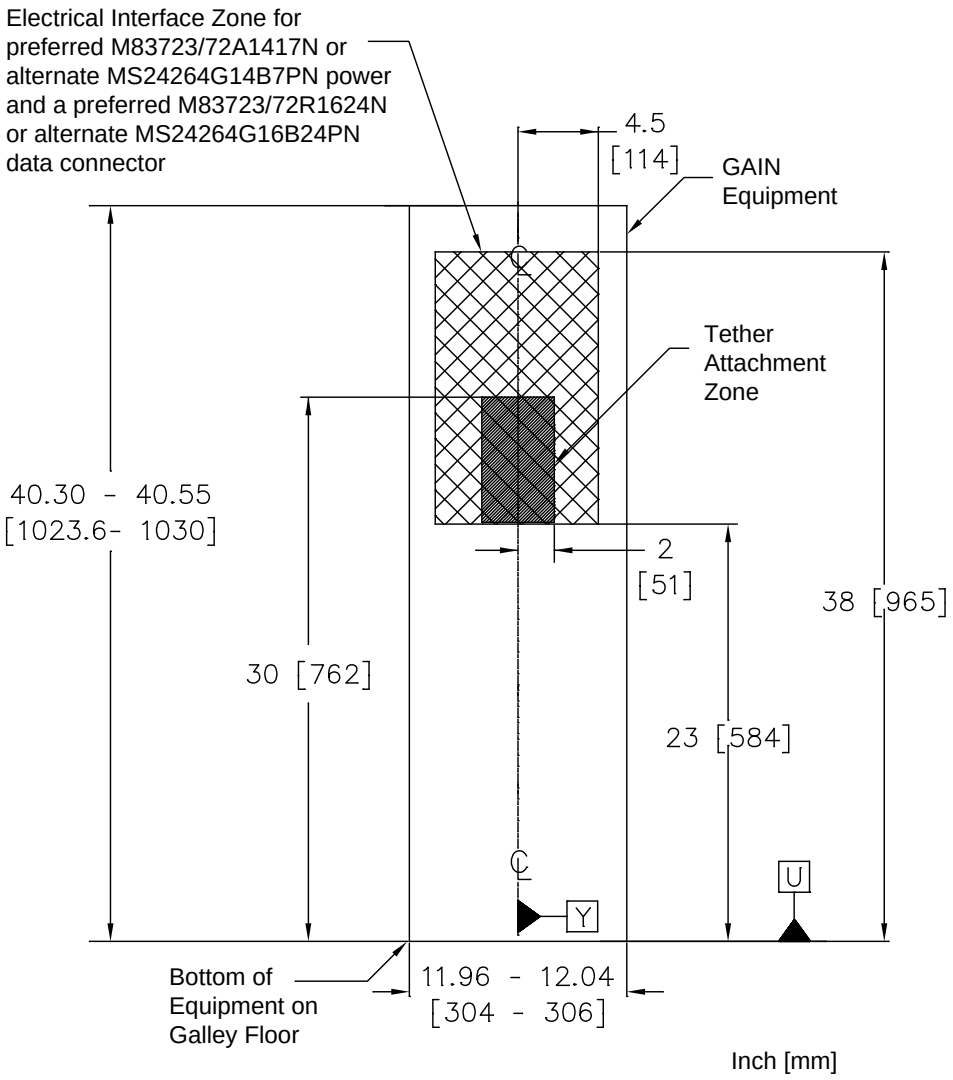


Figure 2-7C – GAIN Size 3 Equipment Standard Dimensions Drawing – Rear View

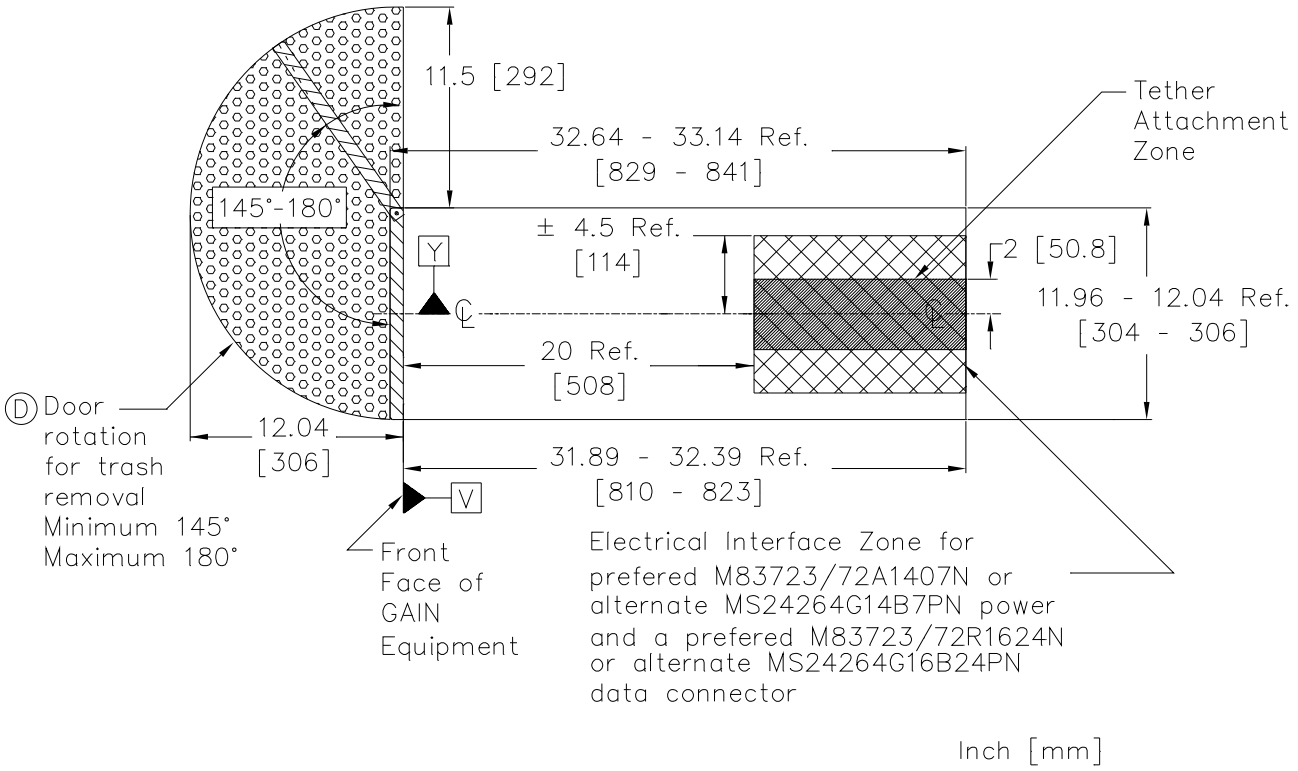


Figure 2-7D – GAIN Size 3 Equipment Standard Dimensions Drawing – Plan View

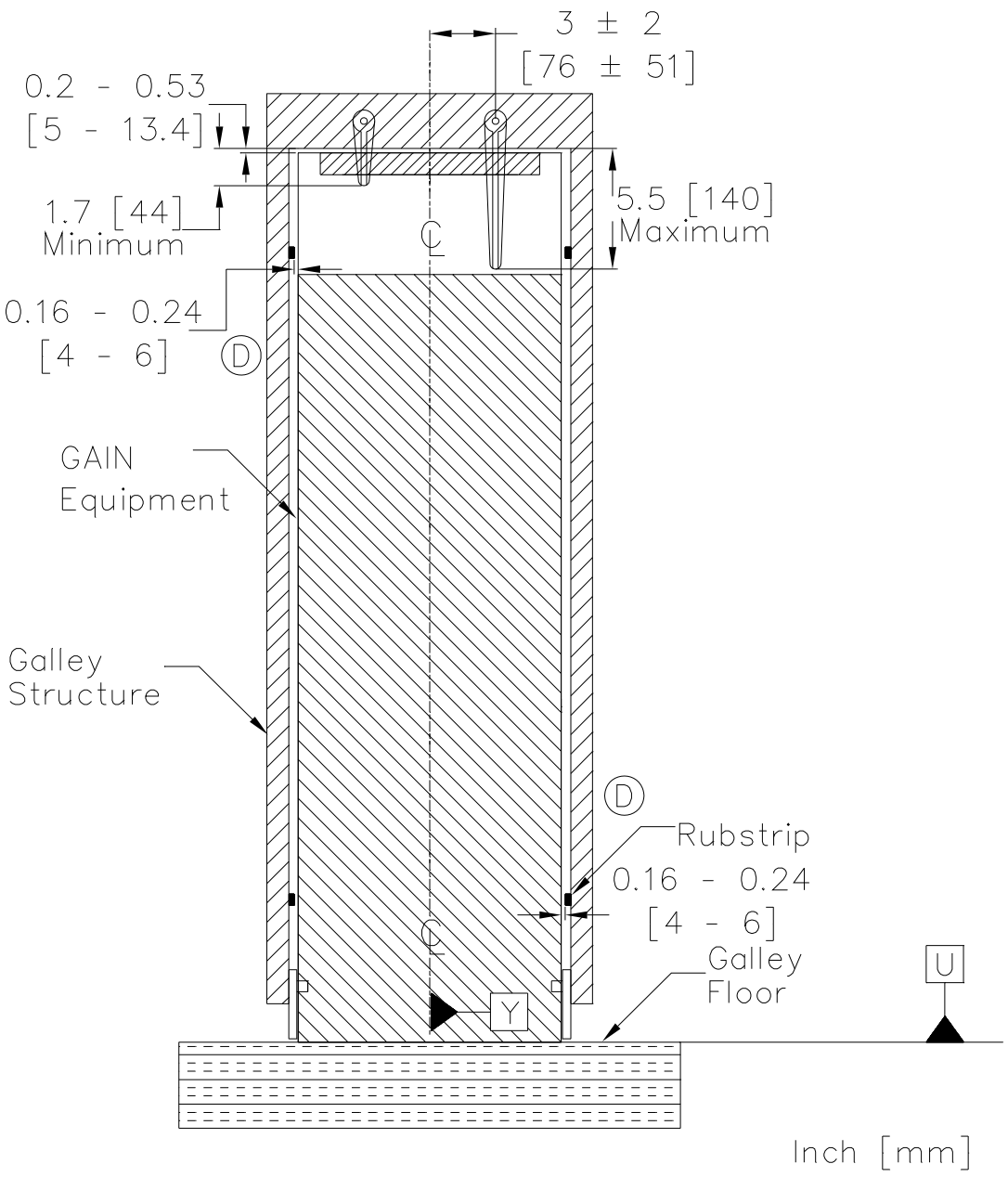


Figure 2-8A – GAIN Size 3 Compartment and Equipment Installation Details Front View

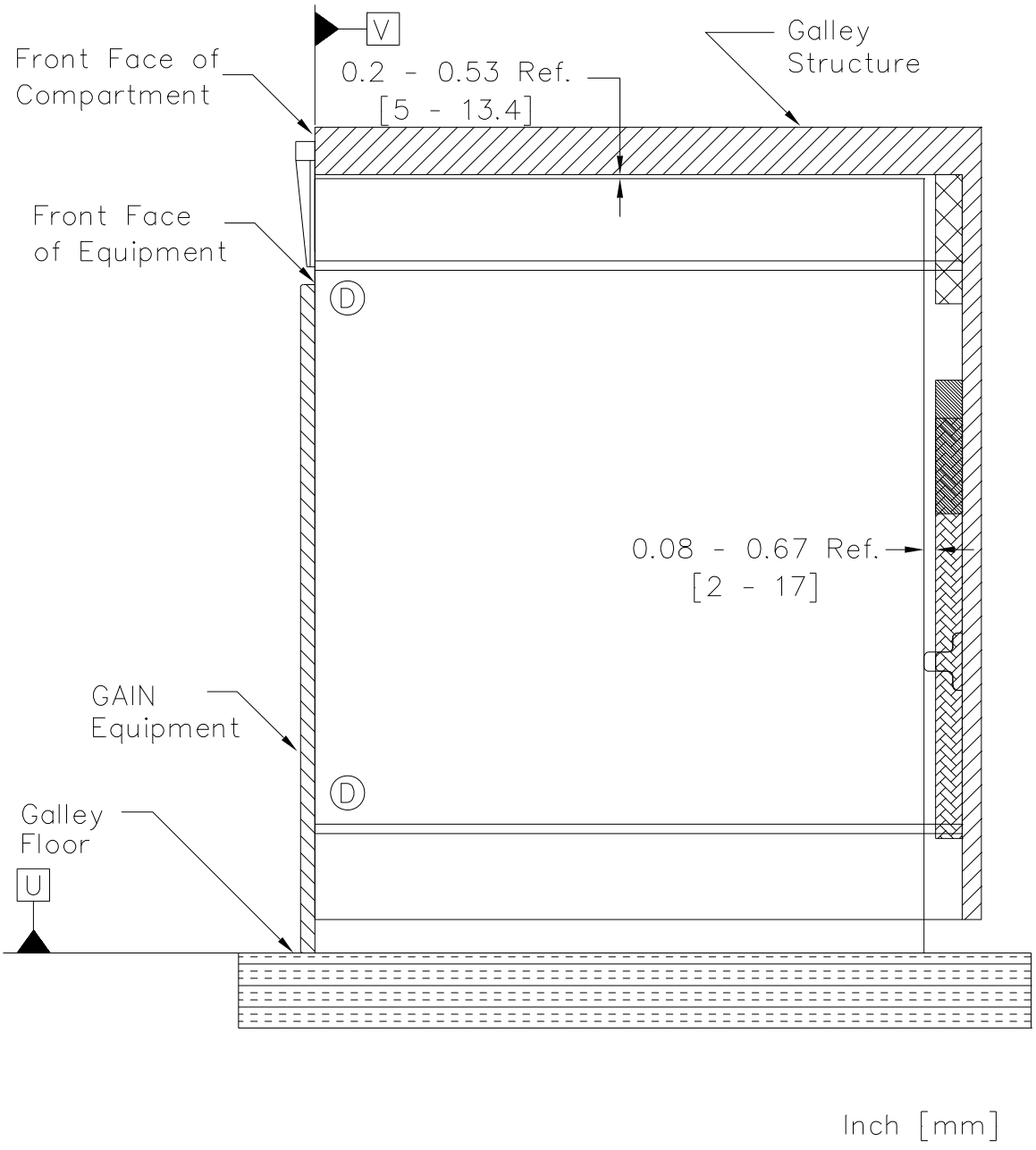


Figure 2-8B – GAIN Size 3 Compartment and Equipment Installation Details Side View

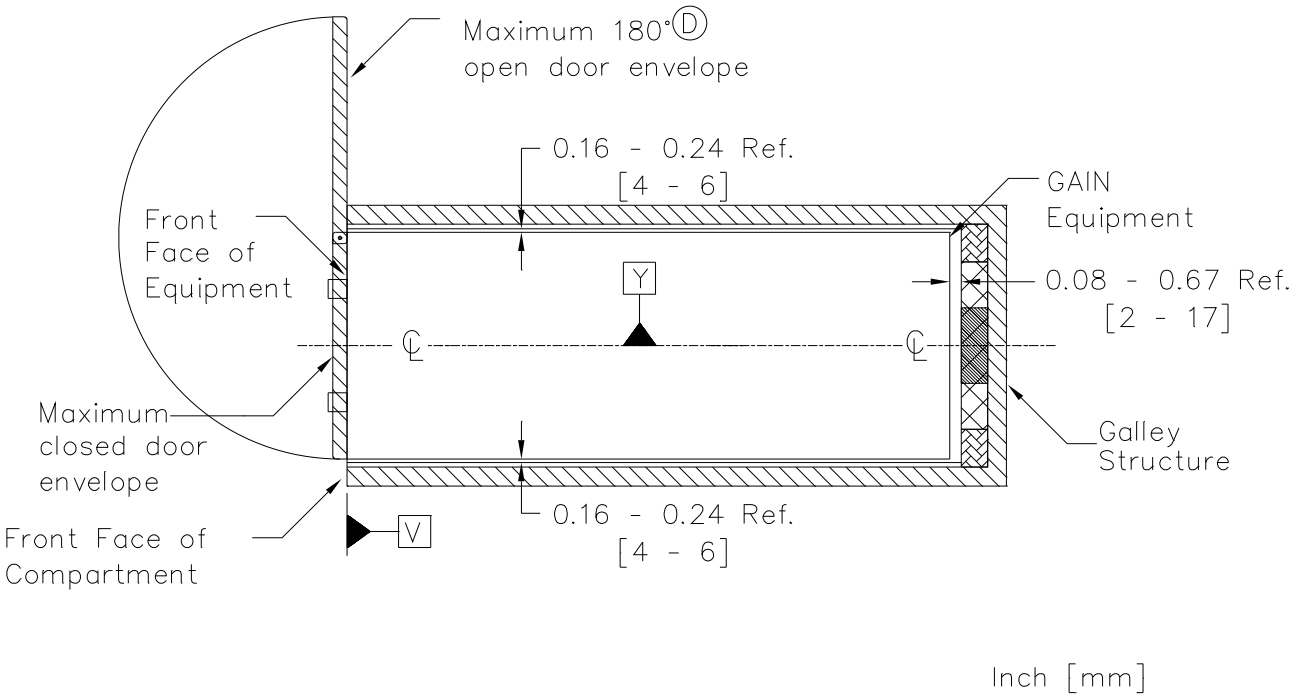


Figure 2-8C – GAIN Size 3 Compartment and Equipment Installation Details
Plan View

2.1.~~5 4~~ GAIN Size 4

The GAIN standard dimension drawings for the Size 4 GAIN are shown in Figures **2-9A through 2-9D, 2-10A through 2-10C, and 2-11A through 2-11D.**~~2-9A-C, 2-10A-C, and 2-11A-C~~.

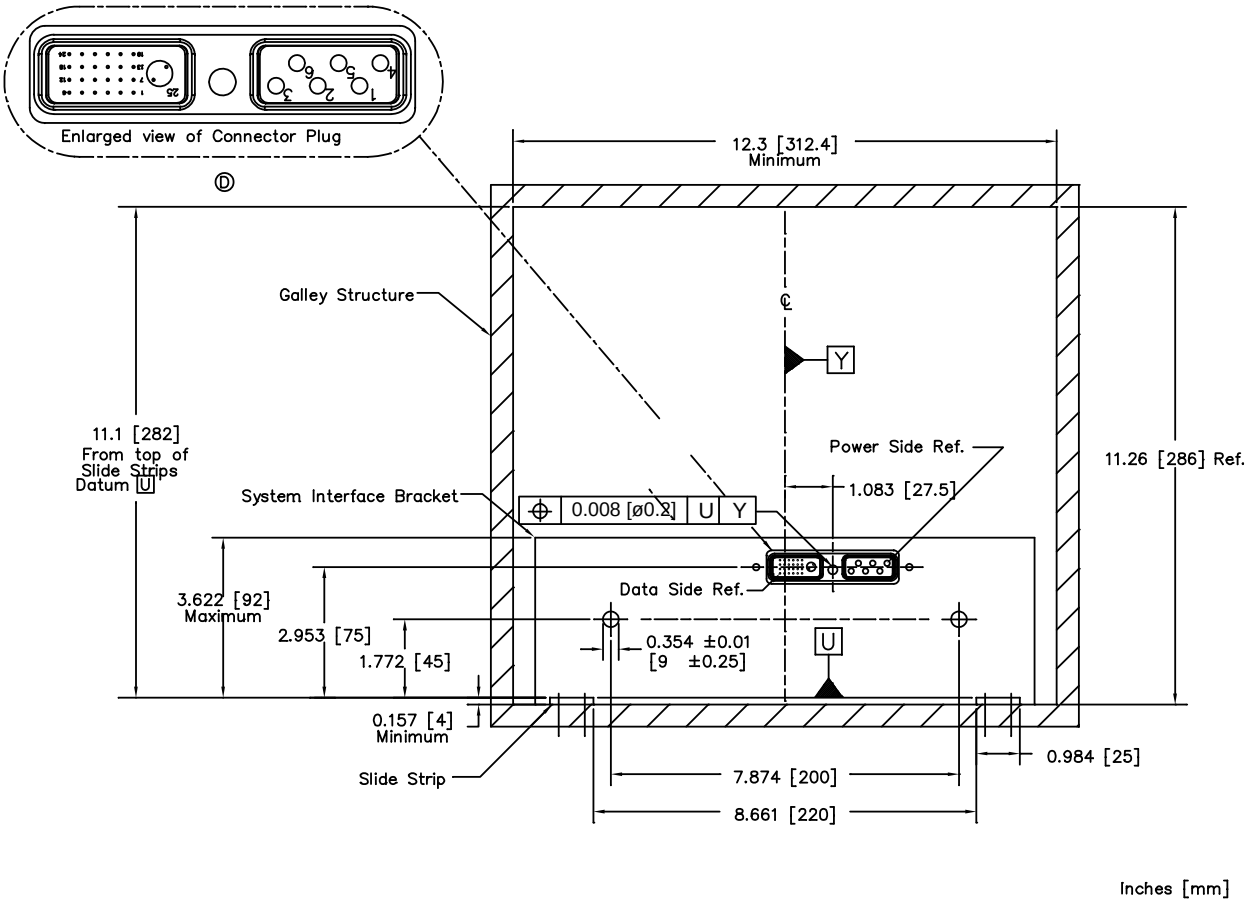


Figure 2-9A – GAIN Size 4 Compartment Structural and Systems Interface Drawing – Front View

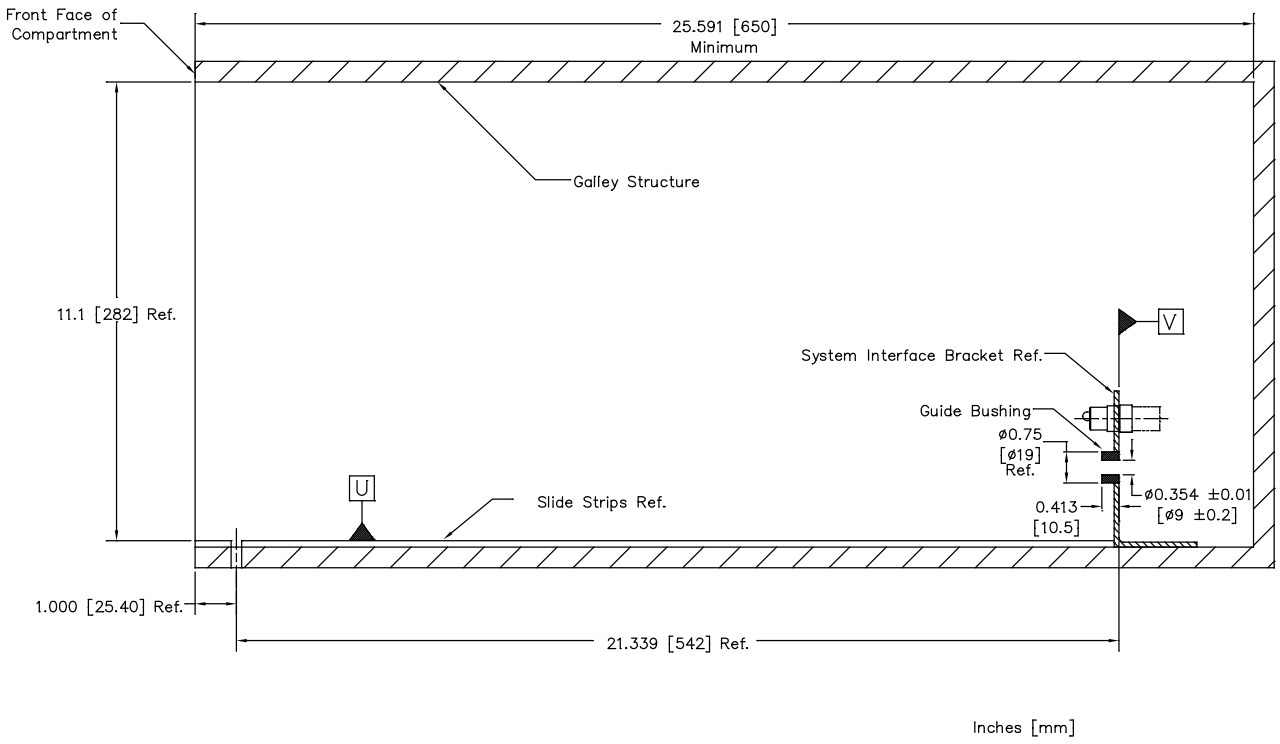


Figure 2-9B – GAIN Size 4 Compartment Structural and Systems Interface Drawing – Side View

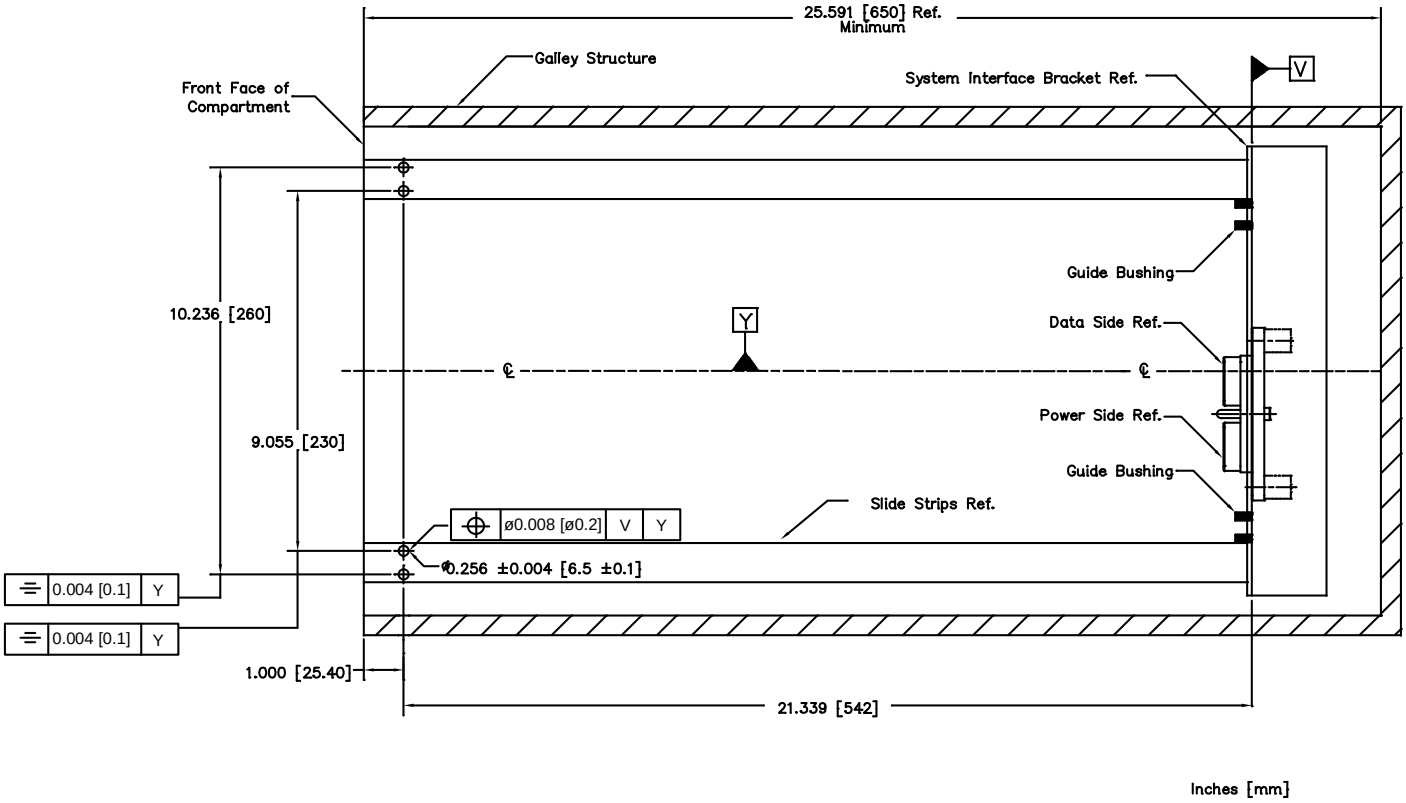


Figure 2-9C – GAIN Size 4 Compartment Structural and Systems Interface Drawing – Plan View

2.0 GAIN INTERFACE DEFINITION

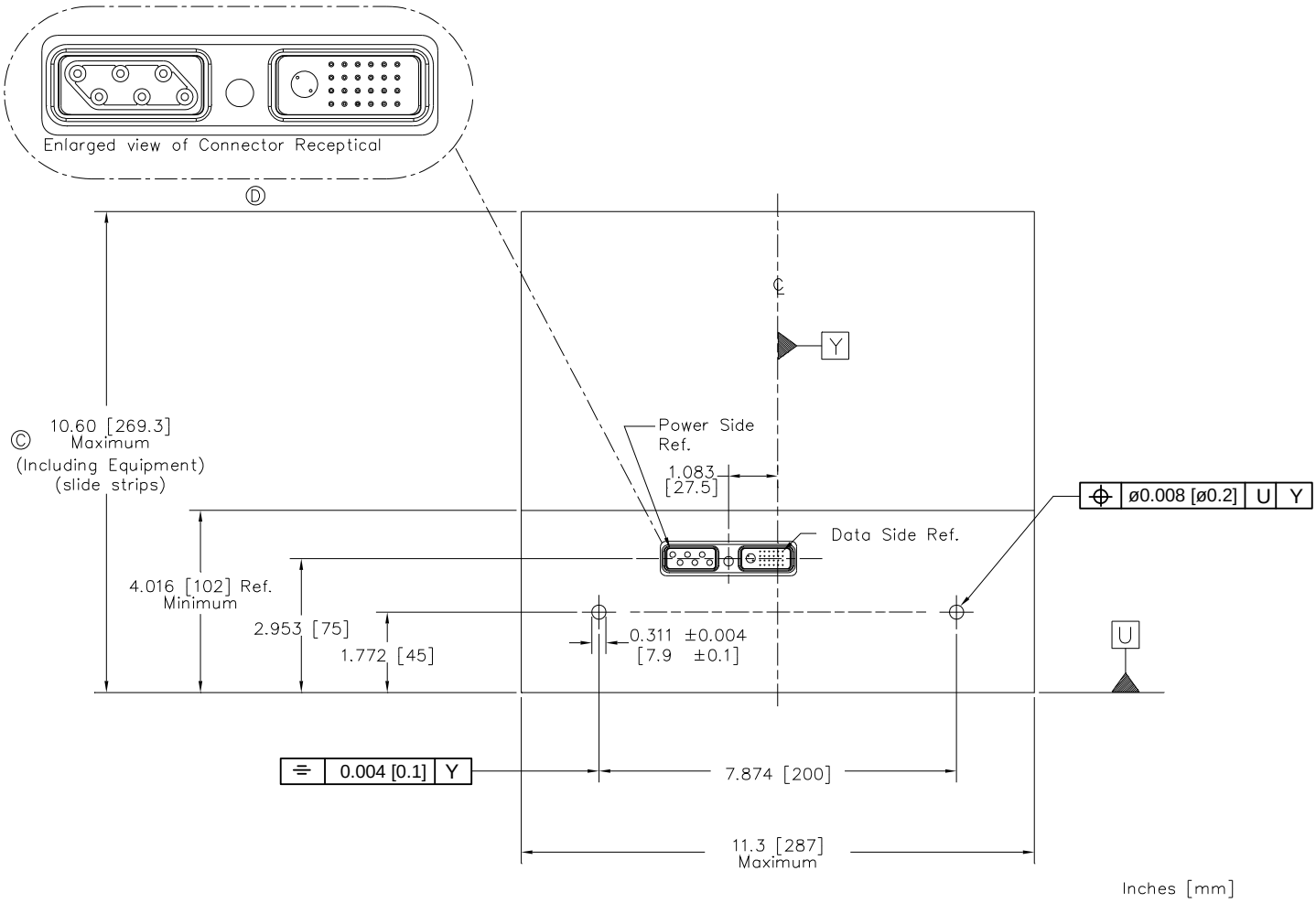


Figure 2-10A – GAIN Size 4 Equipment Standard Dimensions Drawing – Rear View

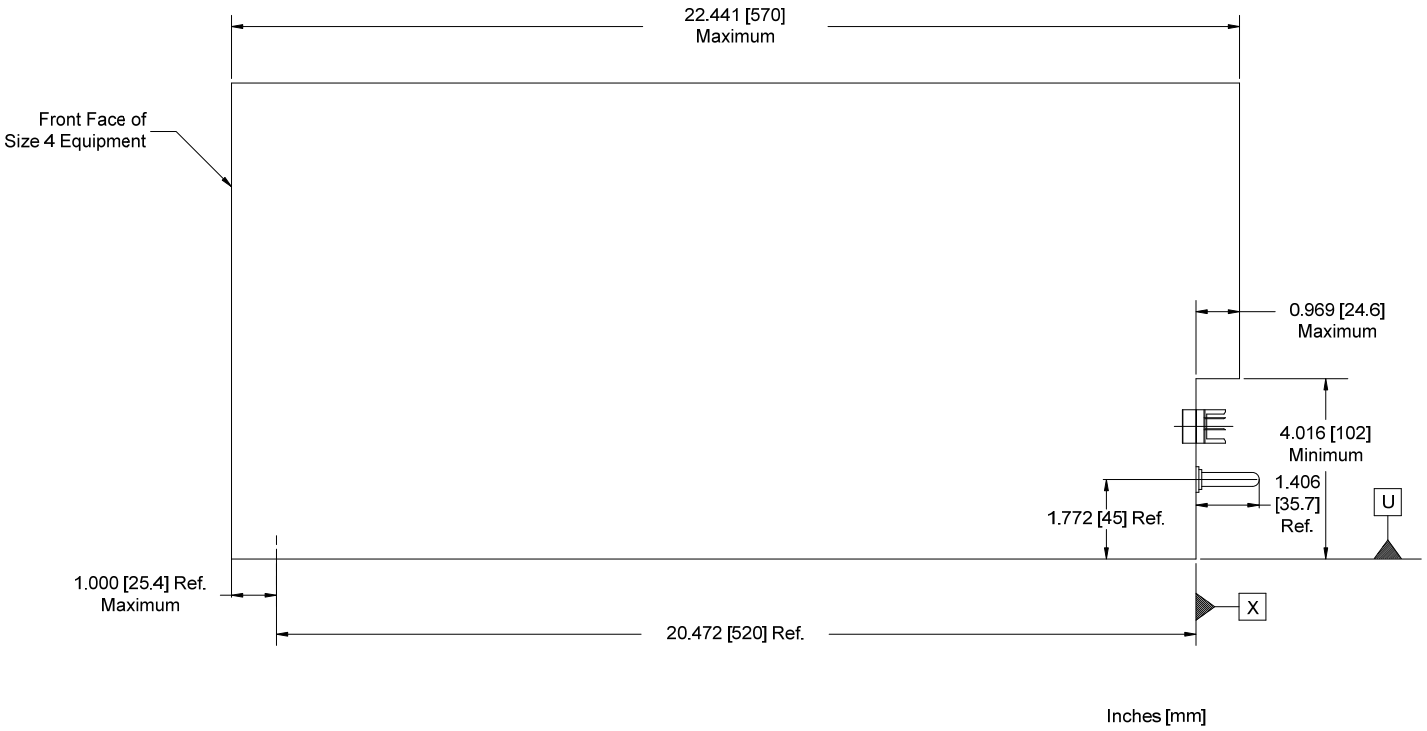
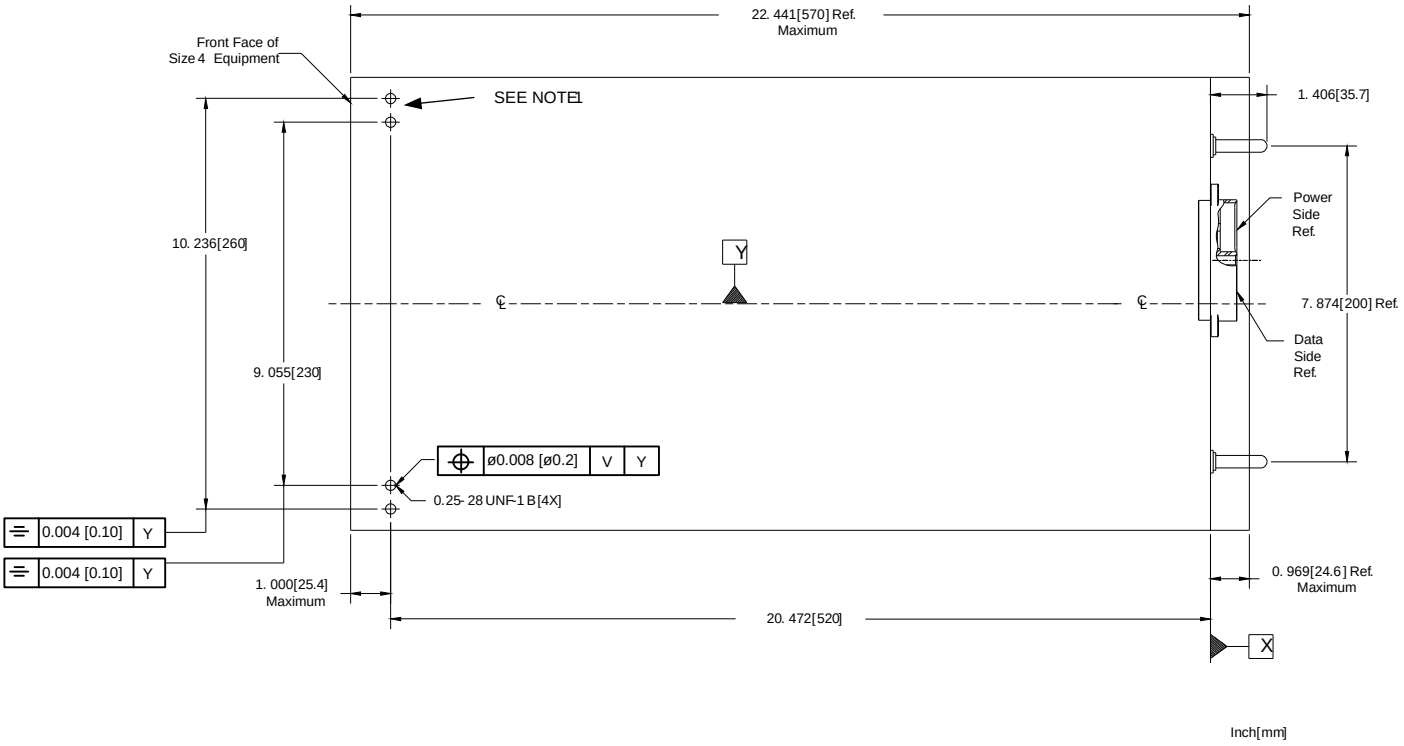


Figure 2-10B – GAIN Size 4 Equipment Standard Dimensions Drawing – Side View

2.0 GAIN INTERFACE DEFINITION



Note:

1. **Either both outer (2x) Attachment I/F or both inner (2x) Attachement I/F should be used.**

Figure 2-10C – GAIN Size 4 Equipment Standard Dimensions Drawing – Bottom View

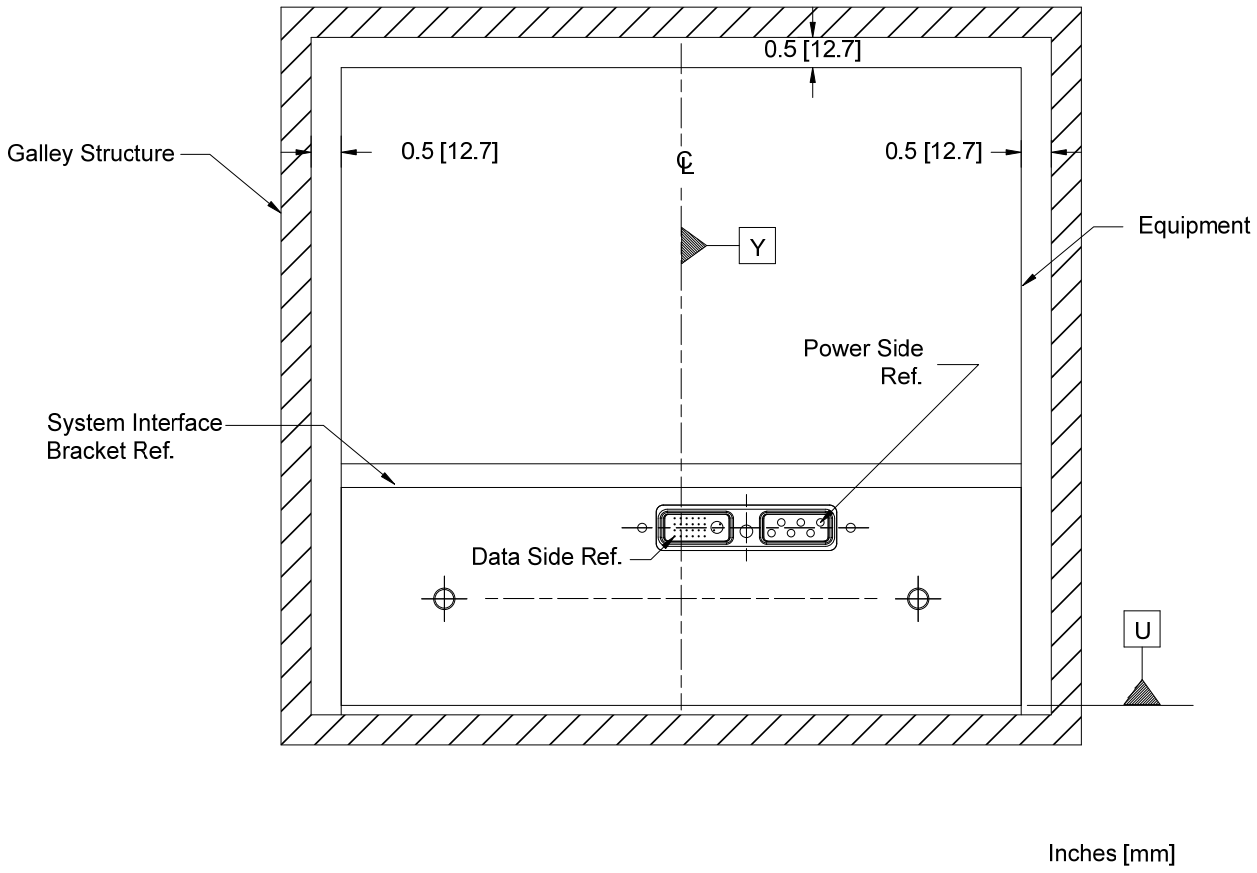


Figure 2-11A – GAIN Size 4 Compartment and Equipment Installation Details
Front View

2.0 GAIN INTERFACE DEFINITION

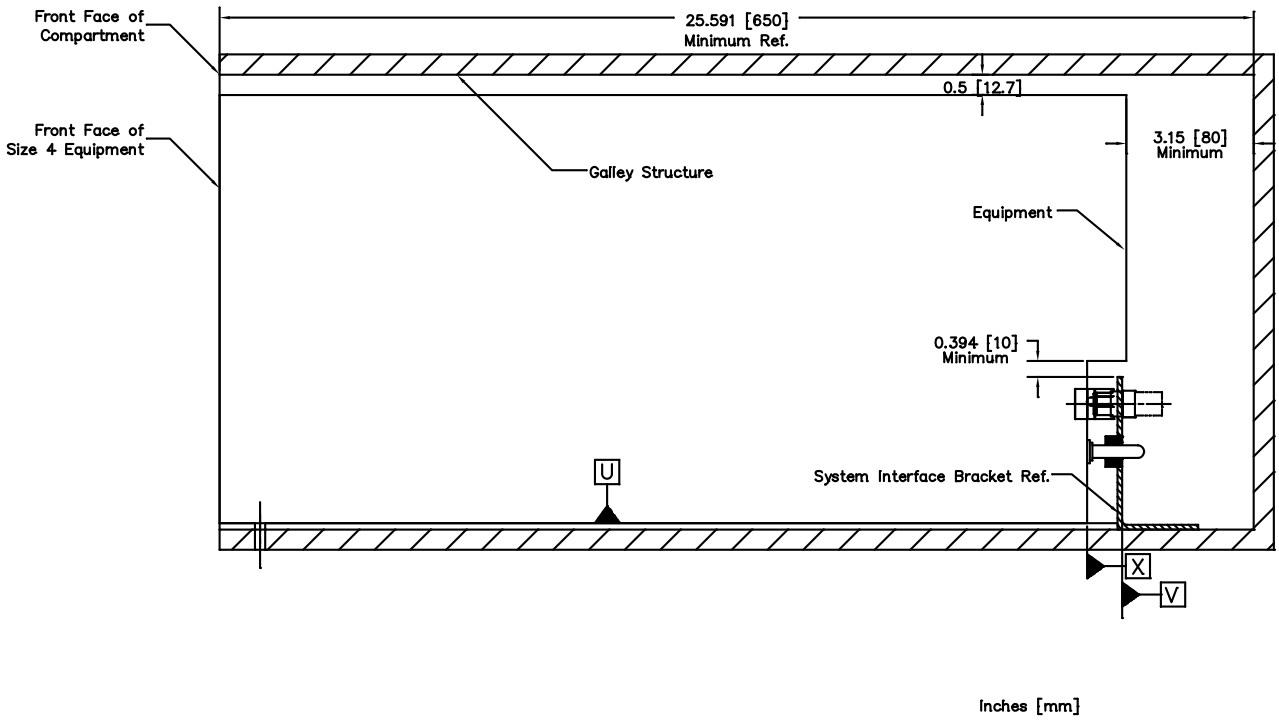


Figure 2-11B – GAIN Size 4 Compartment and Equipment Installation Details Side View

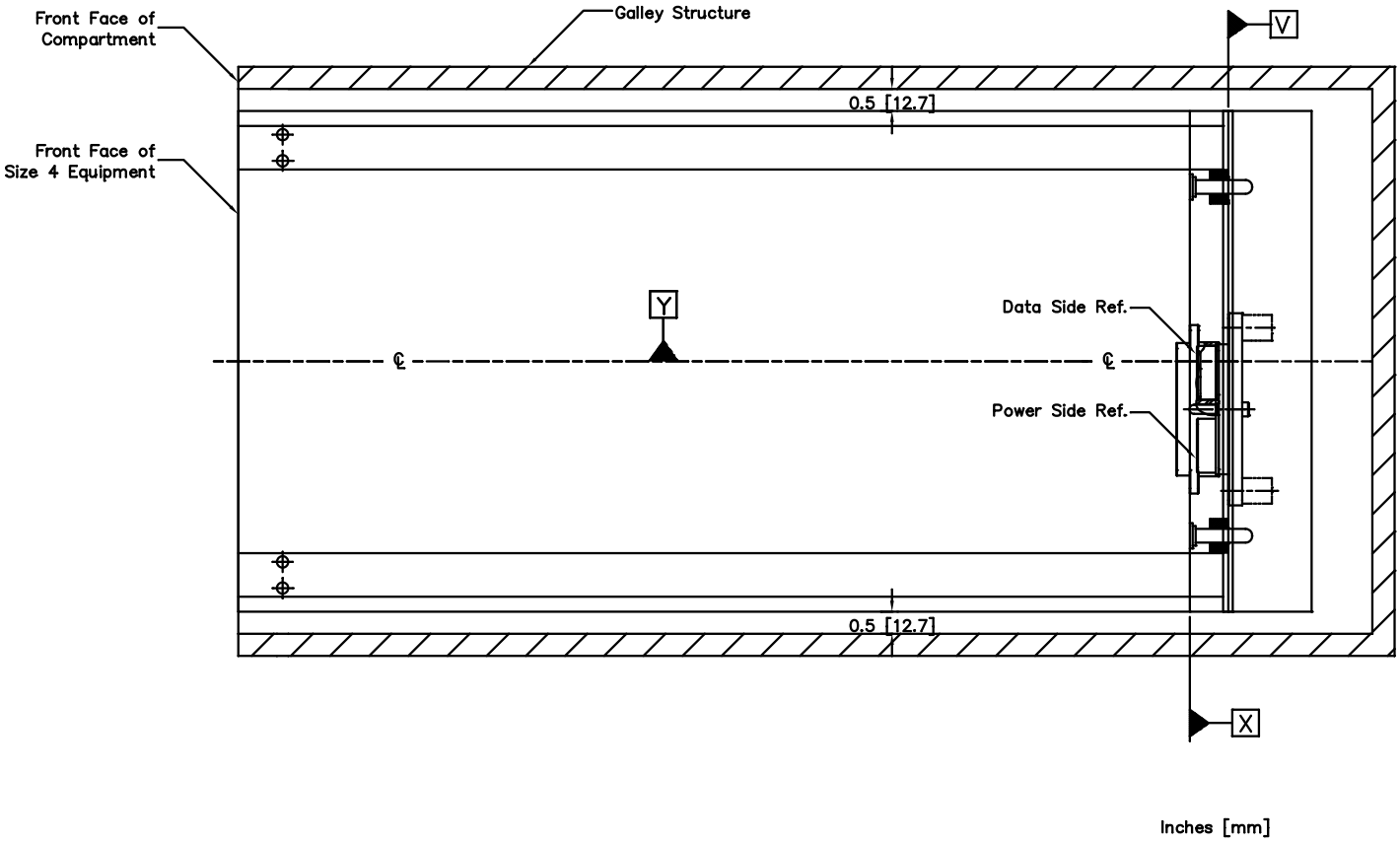


Figure 2-11C – GAIN size 4 Compartment and Equipment Installation Details Plan View

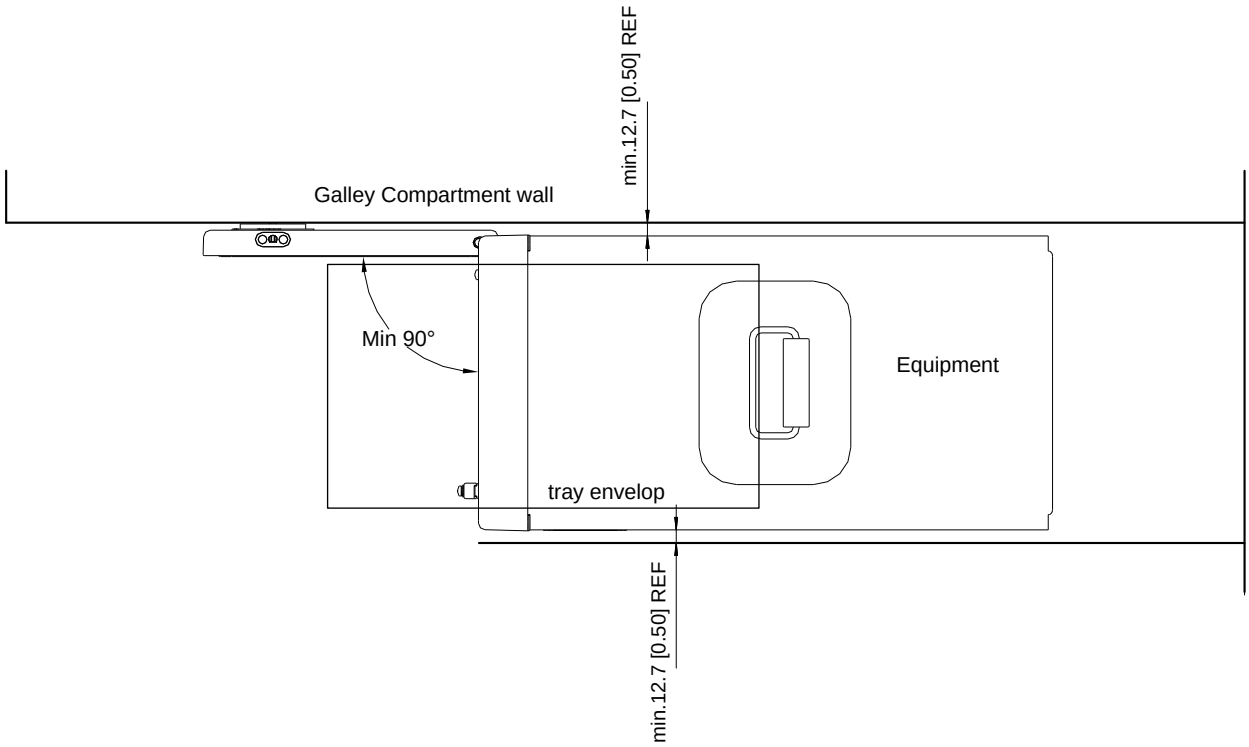


Figure 2-11D – Size 4 Top View including Door Opening Envelope

2.1.~~6~~ 5 GAIN Size 5

The GAIN standard dimension drawings for the Size 5 GAIN are shown in Figures **2-12A through 2-12C, 2-13A through 2-13C, and 2-14A through 2-14D**~~2-12A-C, 2-13A-C, and 2-14A-C~~.

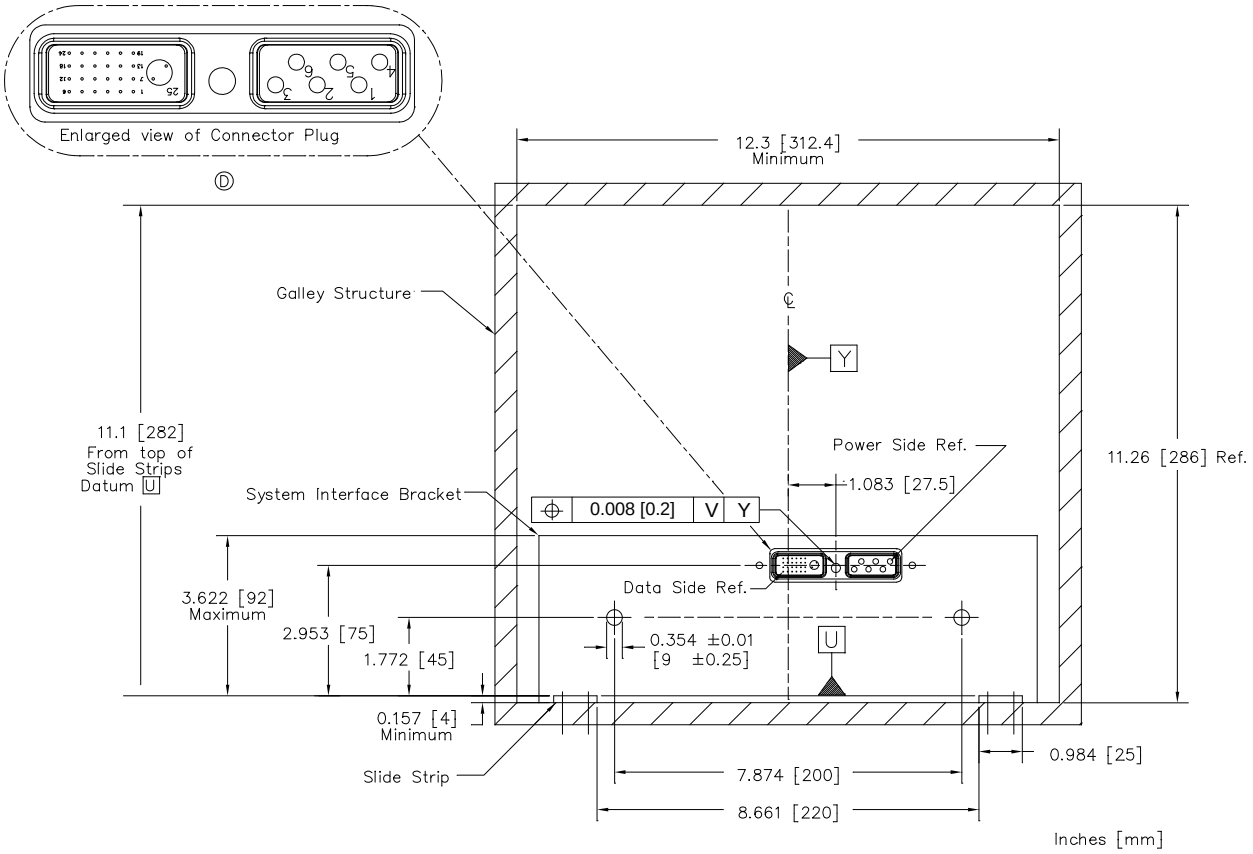


Figure 2-12A – GAIN Size 5 Compartment Structural and Systems Interface Drawing – Front View

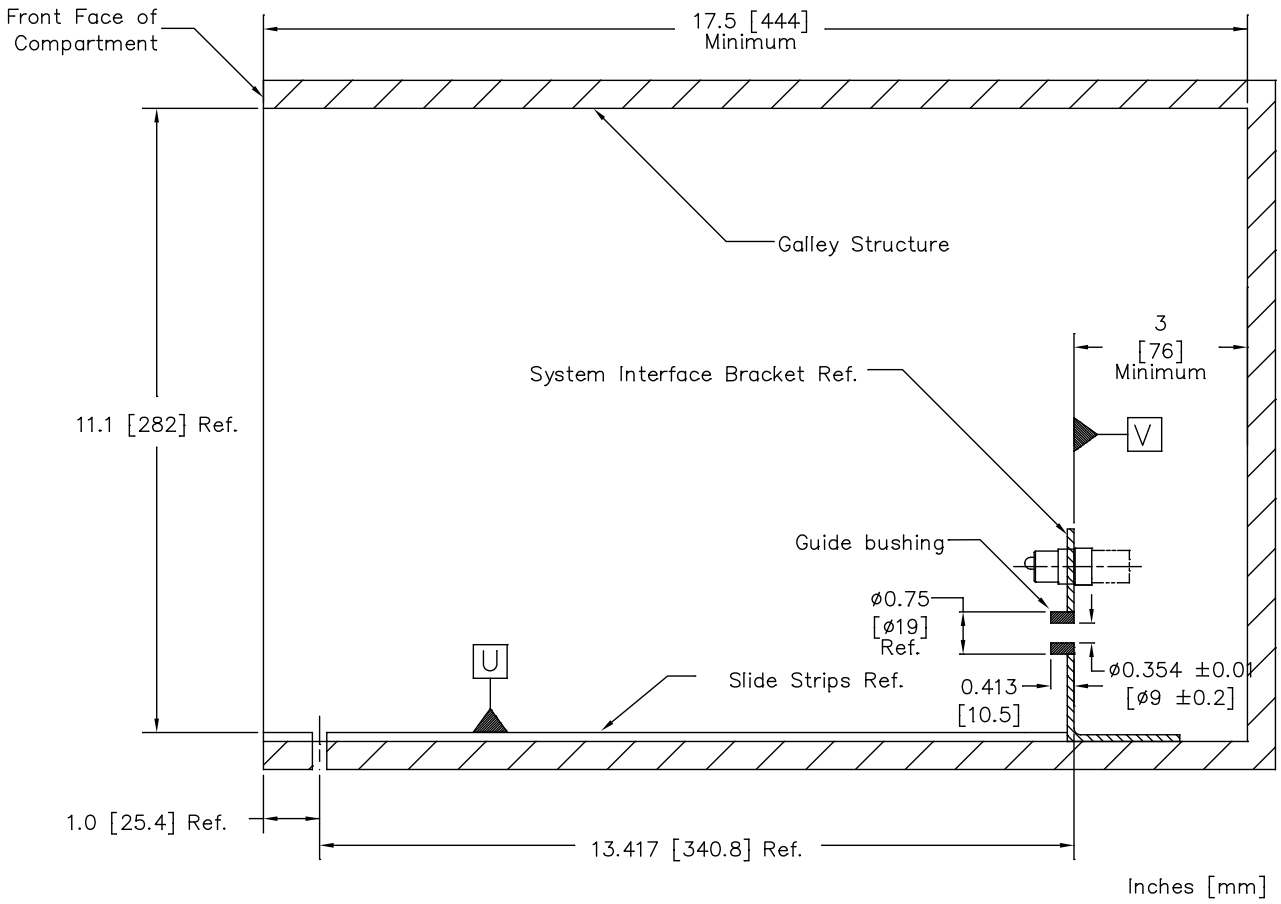


Figure 2-12B – GAIN Size 5 Compartment Structural and Systems Interface Drawing – Side View

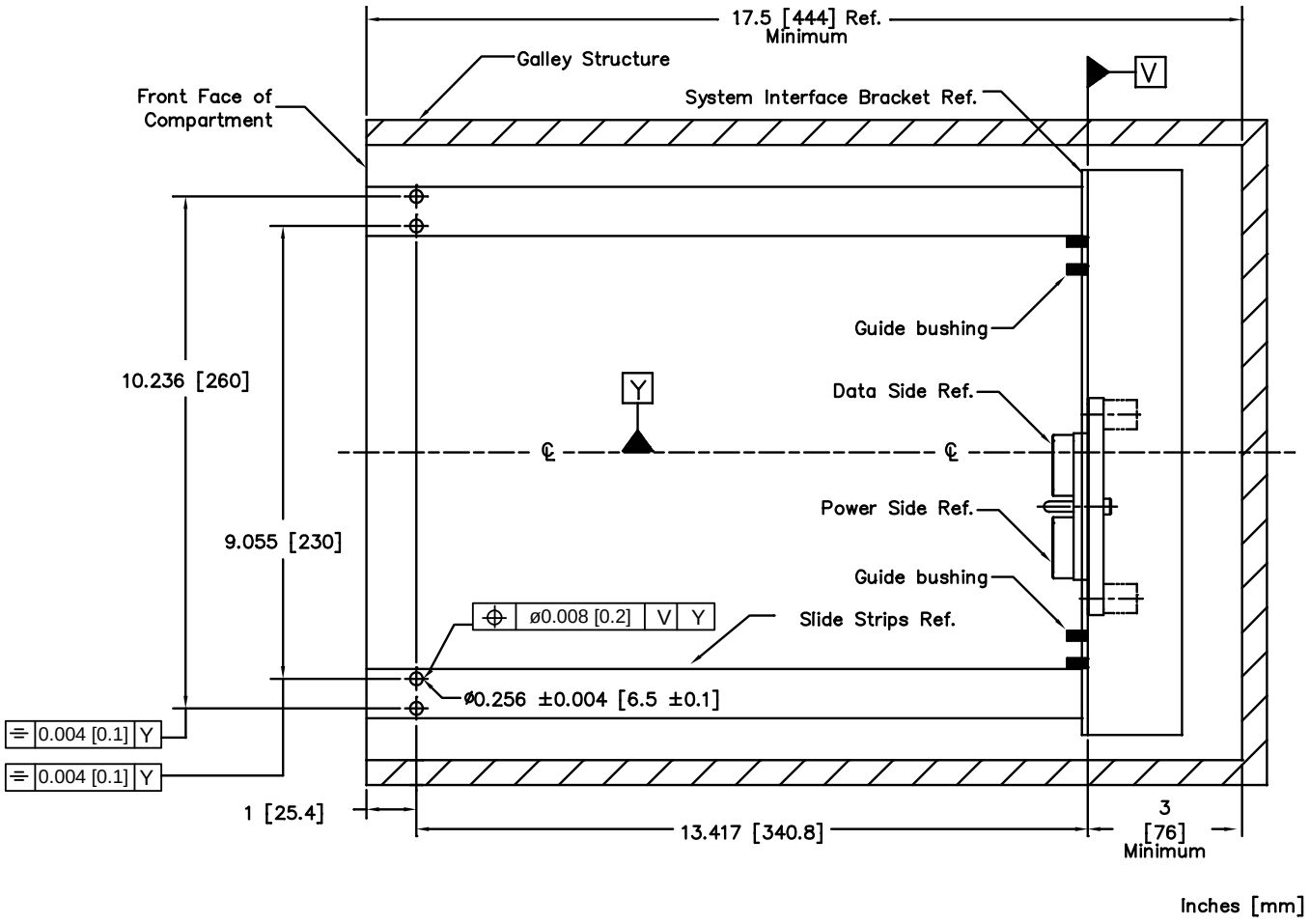


Figure 2-12C – GAIN Size 5 Compartment Structural and Systems Interface Drawing – Plan View

2.0 GAIN INTERFACE DEFINITION

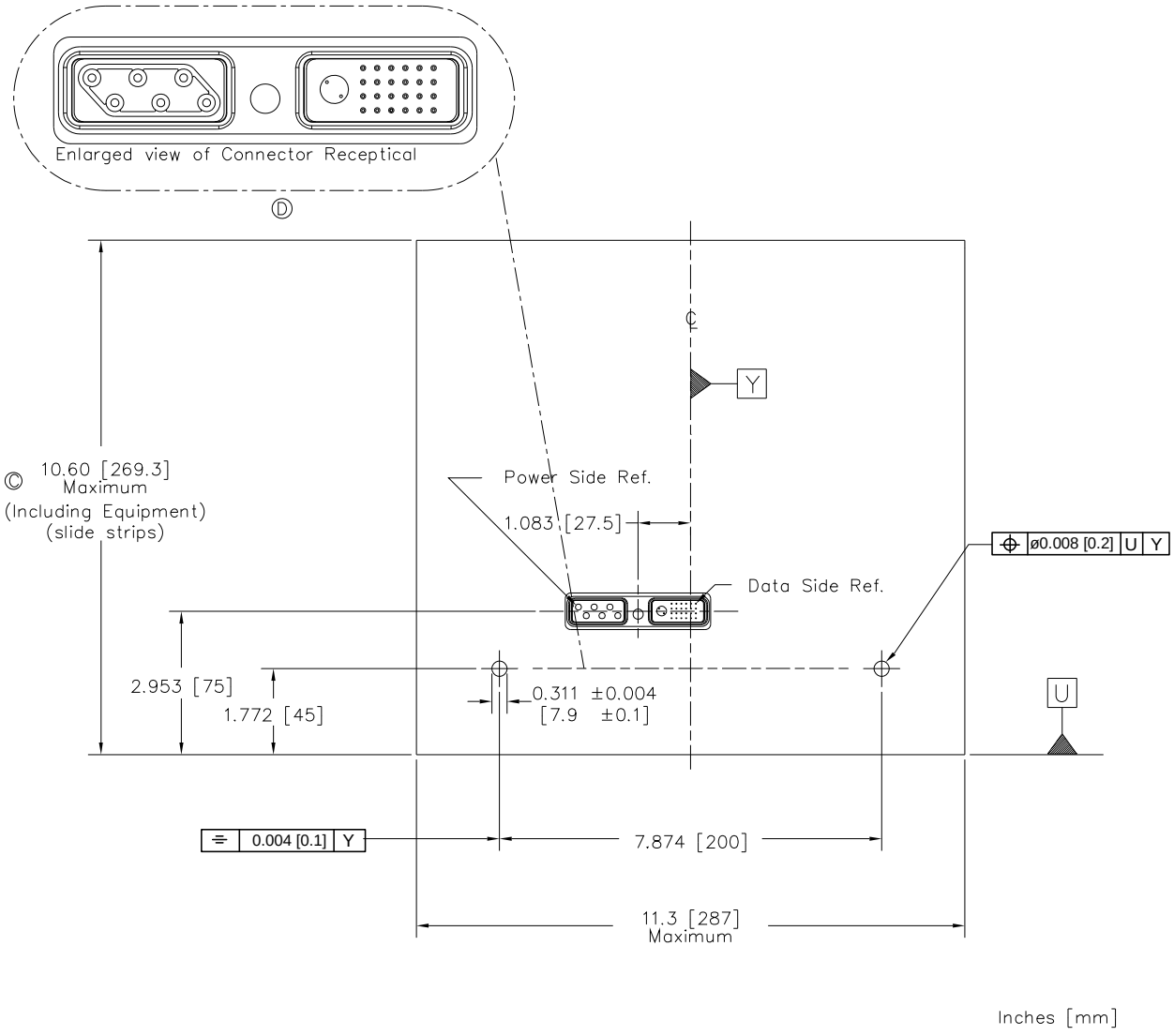


Figure 2-13A – GAIN Size 5 Equipment Standard Dimensions Drawing – Rear View

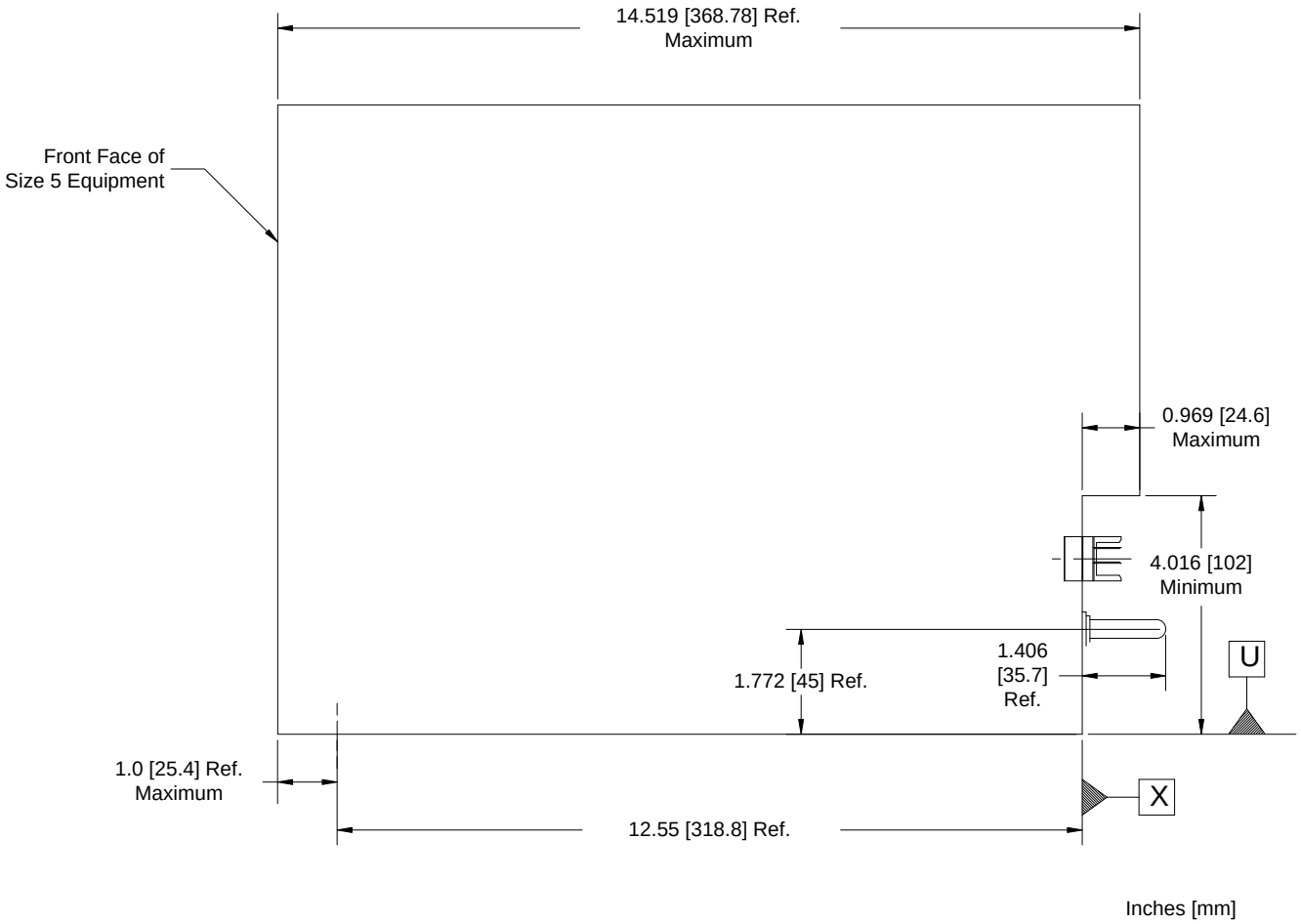
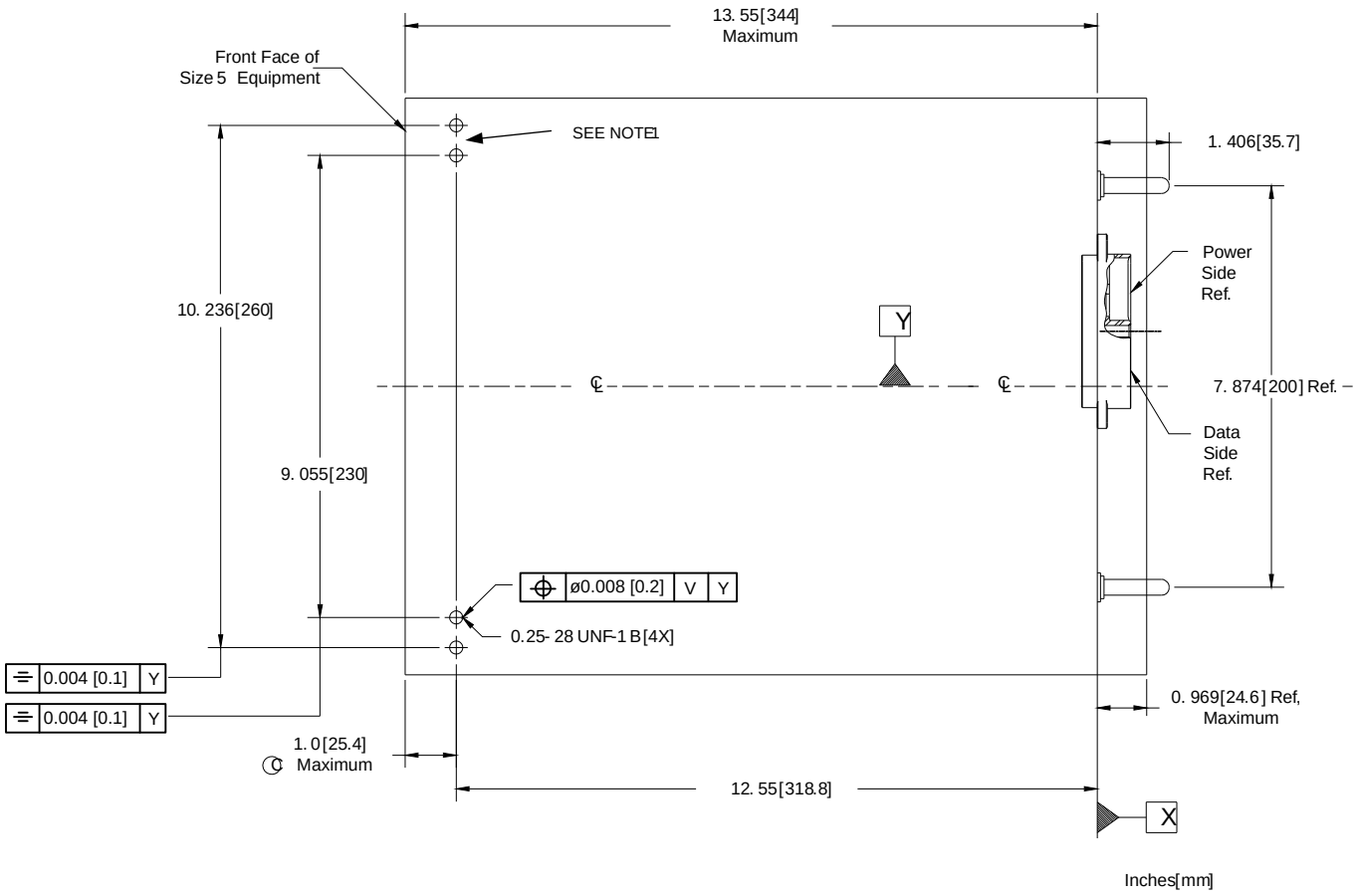


Figure 2-13B – GAIN Size 5 Equipment Standard Dimensions Drawing – Side View

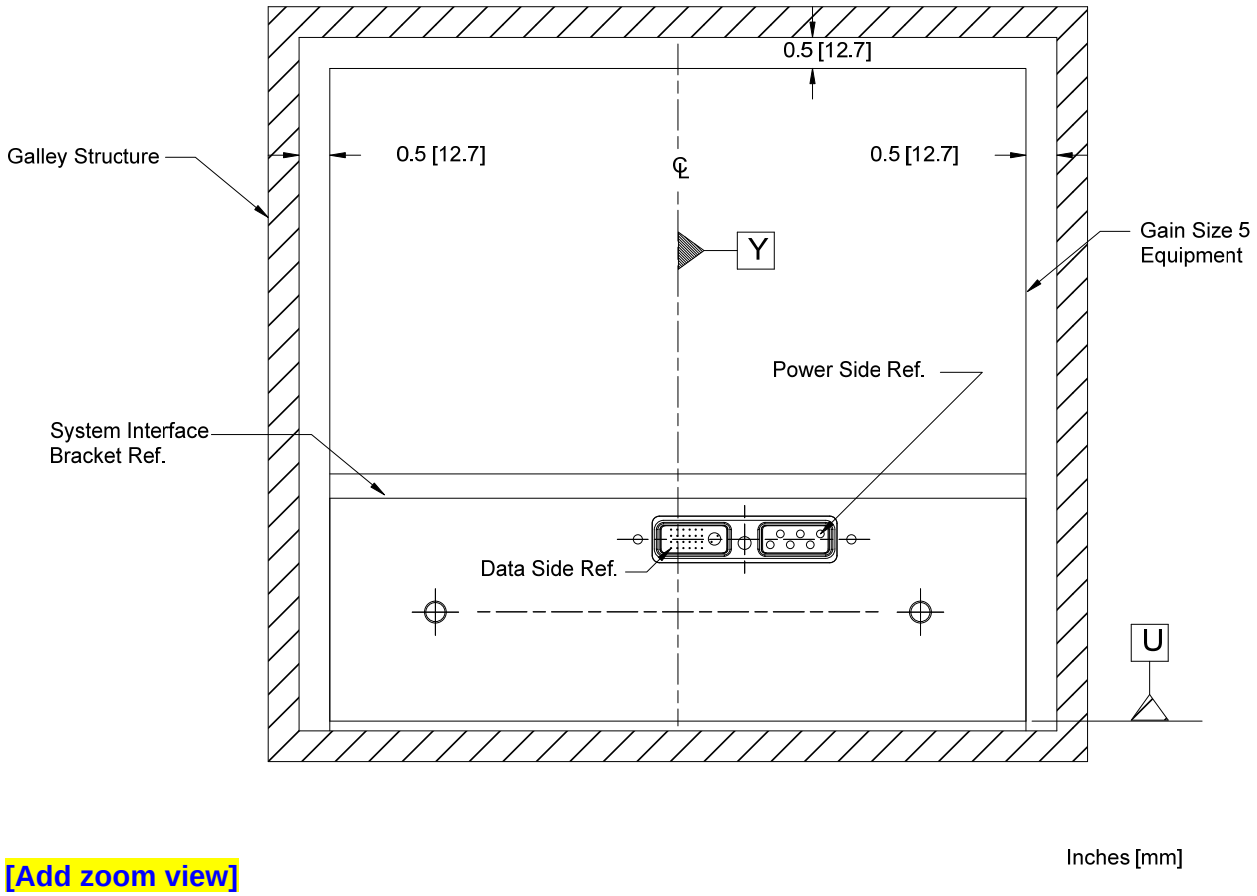
2.0 GAIN INTERFACE DEFINITION



Note:

1. **Either both outer (2x) Attachment I/F or inner (2x) Attachment I/F should be used.**

Figure 2-13C – GAIN Size 5 Equipment Standard Dimensions Drawing – Bottom View



[Add zoom view]

Figure 2-14A – GAIN Size 5 Compartment and Equipment Installation Details
Front View

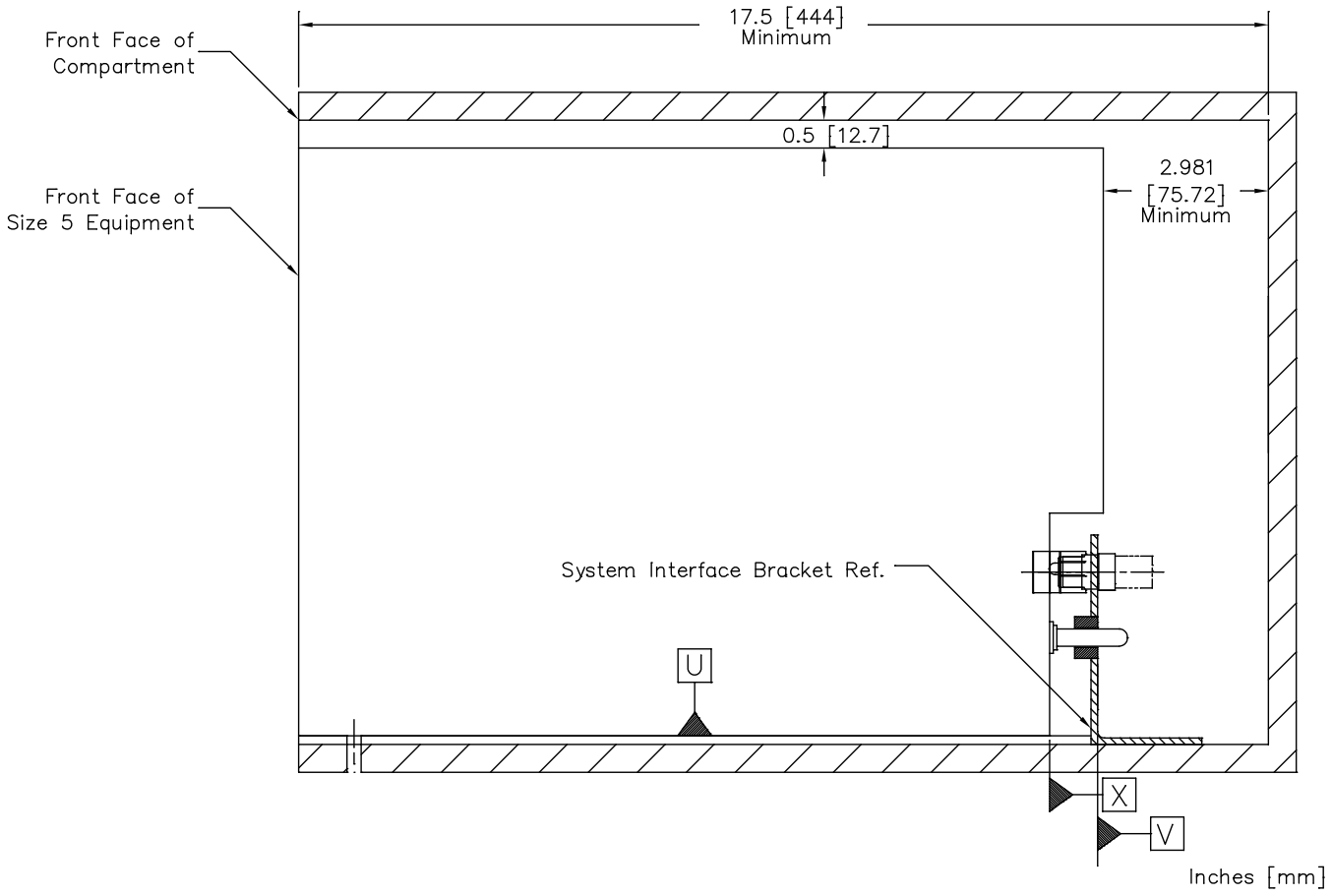


Figure 2-14B – GAIN Size 5 Compartment and Equipment Installation Details
Side View

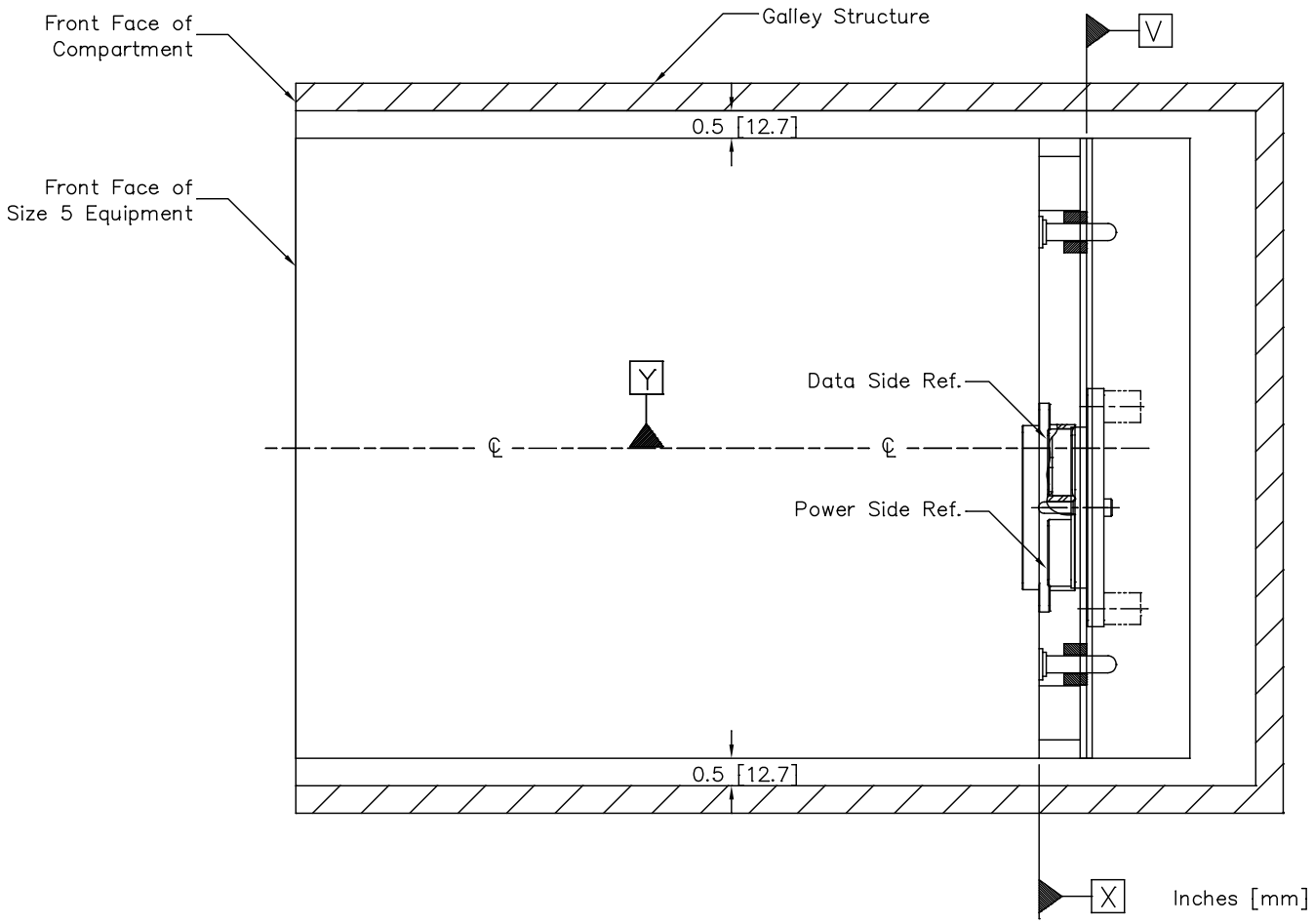


Figure 2-14C – GAIN Size 5 Compartment and Equipment Installation Details
Plan View

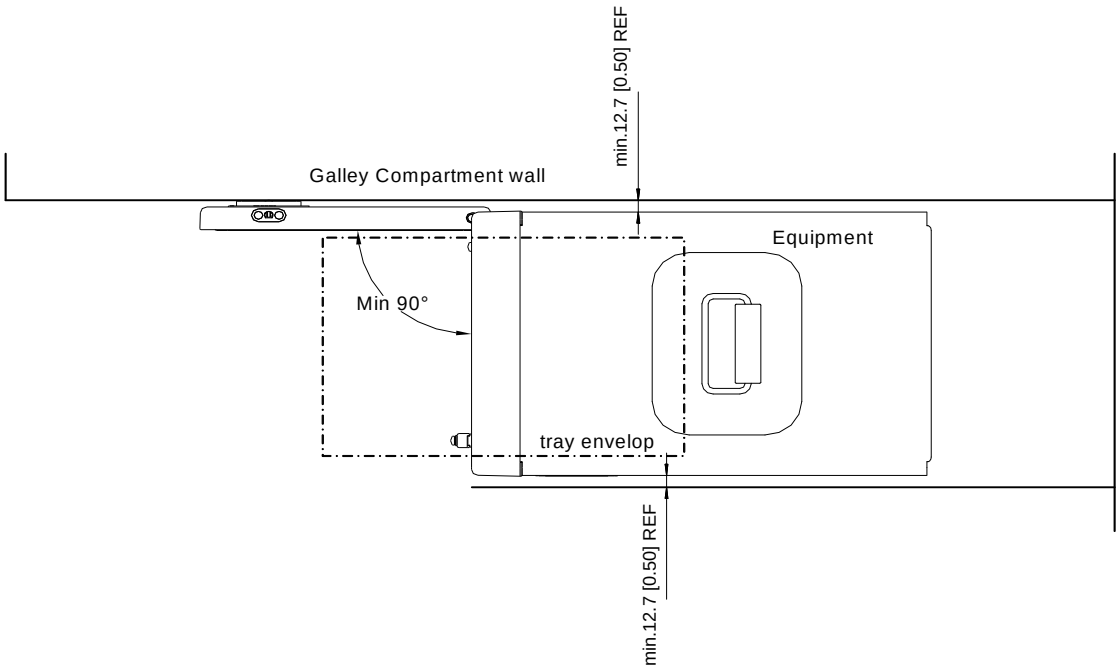


Figure 2-14D – Size 5 Top View including Door Opening Envelope

2.1.7 Emerging Catering Components

Note: Text for this section will be provided in a future supplement. Existing or future suppliers of any in-flight catering equipment that are within the compartment sizes outlined in Section 2.1 are strongly encouraged to contact ARINC and to support the development of this specific section. This may include equipment outlined in Section 1.3 or any other valuable piece of equipment, who's interface standardization would benefit the industry.

2.2 Installation

[Text for this section will be provided in a future supplement.]

2.2.1 Structural

[Text for this section will be provided in a future supplement.]

2.2.2 Heat

[Text for this section will be provided in a future supplement.]

2.2.3 Clearance

[Text for this section will be provided in a future supplement.]

3.1 Electrical Connector

This section defines the provisions for the design and fabrication of electrical rectangular modular rack and panel connector for galley insert equipment.

The rectangular, modular rack, and panel connector is intended for use in galley furnishings on aircraft using variable frequency and a Controller Area Network (CAN) data bus, known as a CAN bus, communication system. The connector provides the electrical interface between the GAIN equipment (e.g., ovens, beverage makers, trash compactors, and refrigeration equipment) and the galley furnishings.

3.1.1 Requirements

In case of conflicts with this specification and other documents, the provisions of this specification should take precedence.

The items furnished under this specification should be capable of passing the performance verification test specified in **ARINC Specification 813:** *Definition of Standard Interfaces for Galley Insert (GAIN) Equipment, Qualification, and System-test Guidance.*

COMMENTARY

ARINC Specification 813 is being produced by the GAIN Subcommittee. It is expected to be adopted by October 2006.

Dimensional information concerning the connector design is provided in this document to ensure that other designs will be intermateable and interchangeable with the selected design and each other. Inserts, contacts, and backshells should be interchangeable.

The design and material should be compatible with environmental conditions similar to those encountered in the galley area located in the pressurized area of a commercial subsonic jet airplane.

Unless otherwise protected against electrolytic corrosion, dissimilar metals should not be employed in intimate contact with each other in a connector or in any mated pairs of connectors conforming to the specification.

Non-magnetic materials and components should be used to the greatest extent possible. The permeability of the basic connector assembly should be less than 2.0 MU. The permeability should be checked using the instrument described in ASTM A 342, EN2591-513, or equivalent.

3.1.1.1 Shell

The connector shell should conform to dimensions shown in Figure 3-1 - Receptacle Outer Dimensions, Figure 3-2 - Receptacle Panel Cut-out, Figure 3-3 - Plug Outer Dimension, and Figure 3-4 - Plug Panel Cut-out.

3.0 GAIN RESOURCE CONNECTIONS

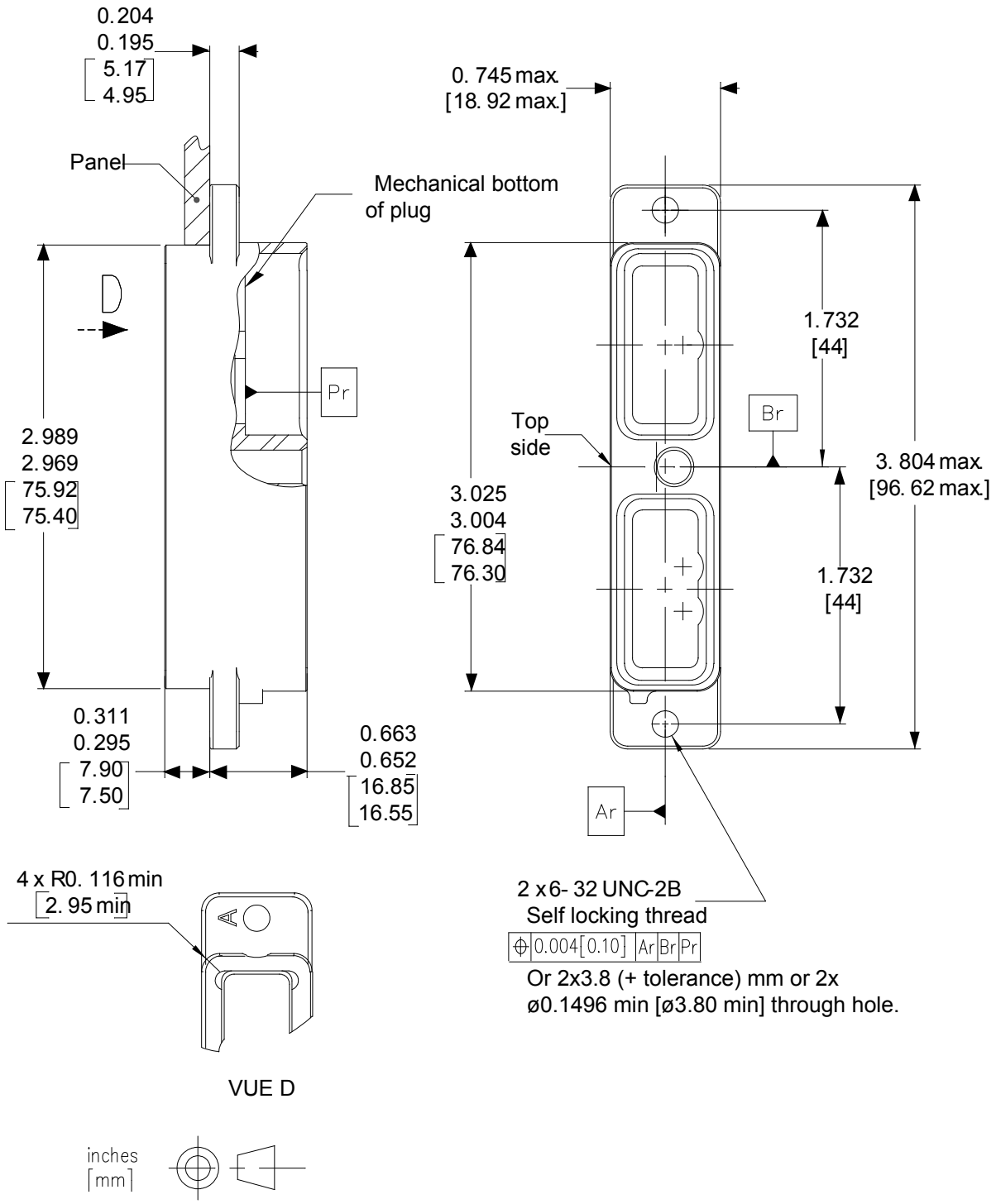


Figure 3-1 – Receptacle Outer Dimensions

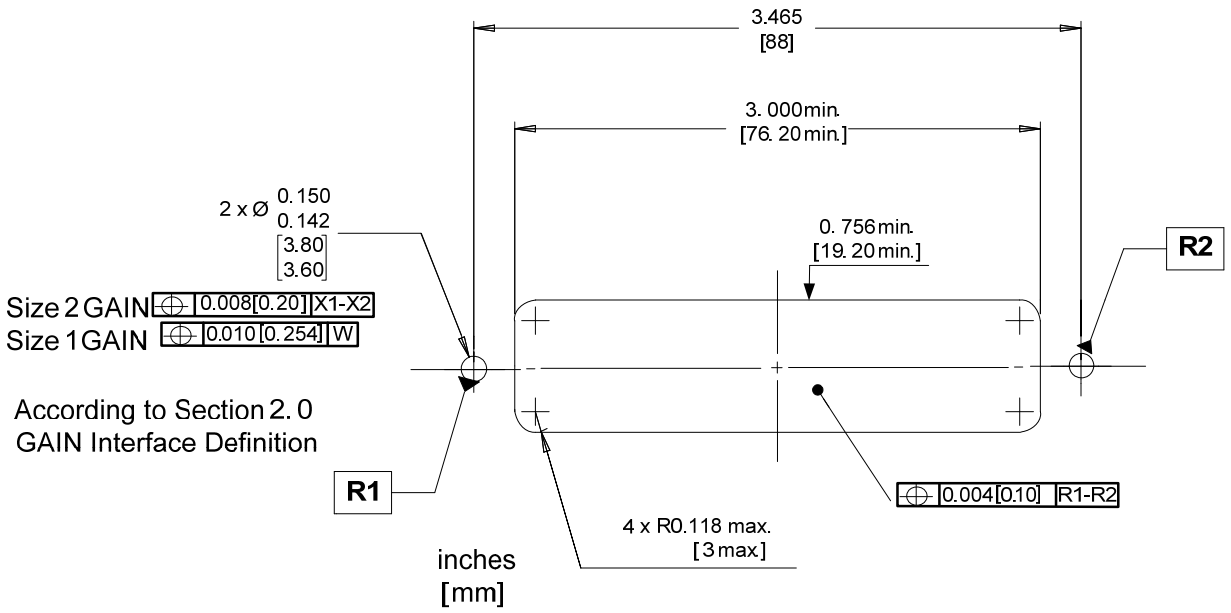


Figure 3-2 – Receptacle Panel Cut-out

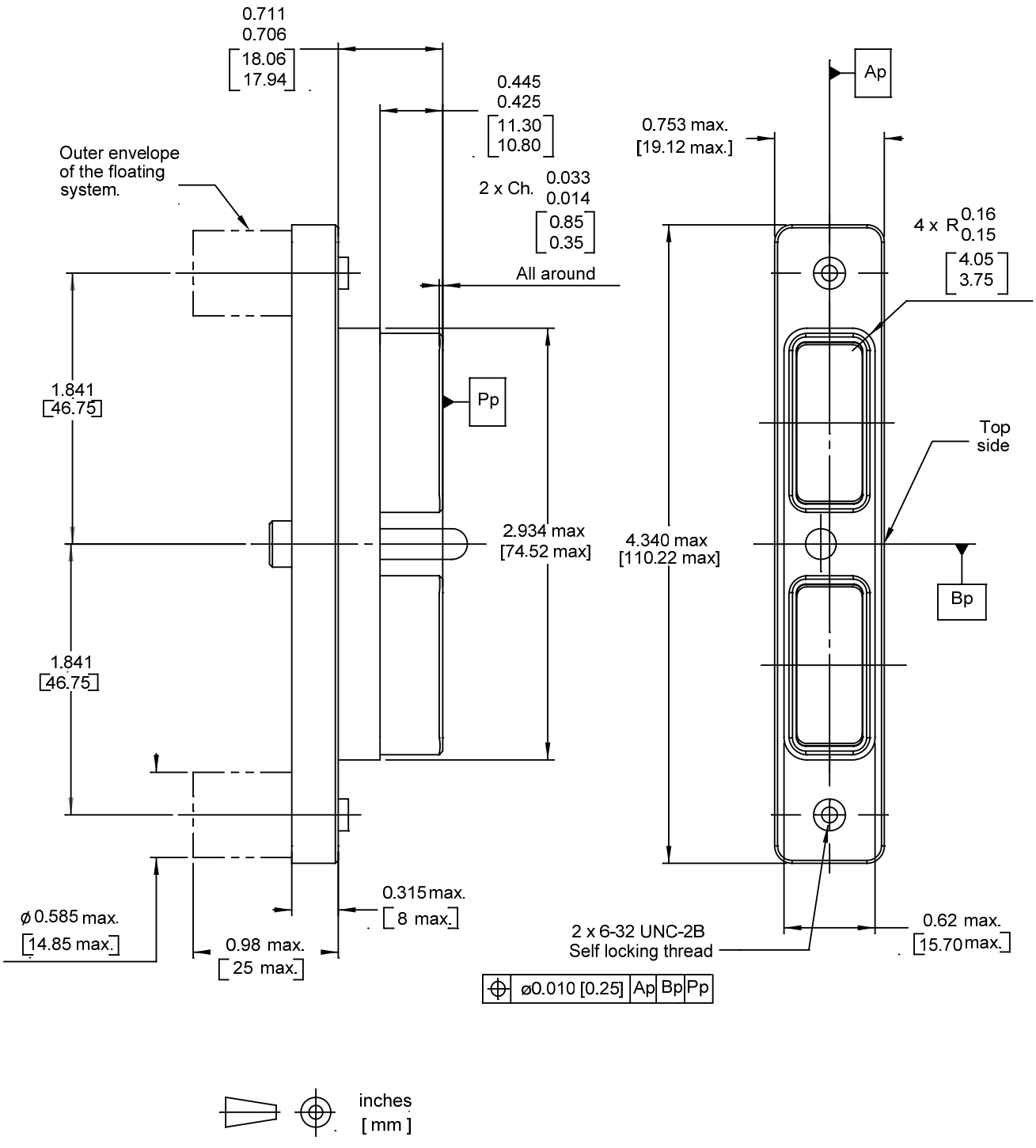


Figure 3-3 – Plug Outer Dimension for Size 1 and 2

[Ralph to find this reference check page 13]

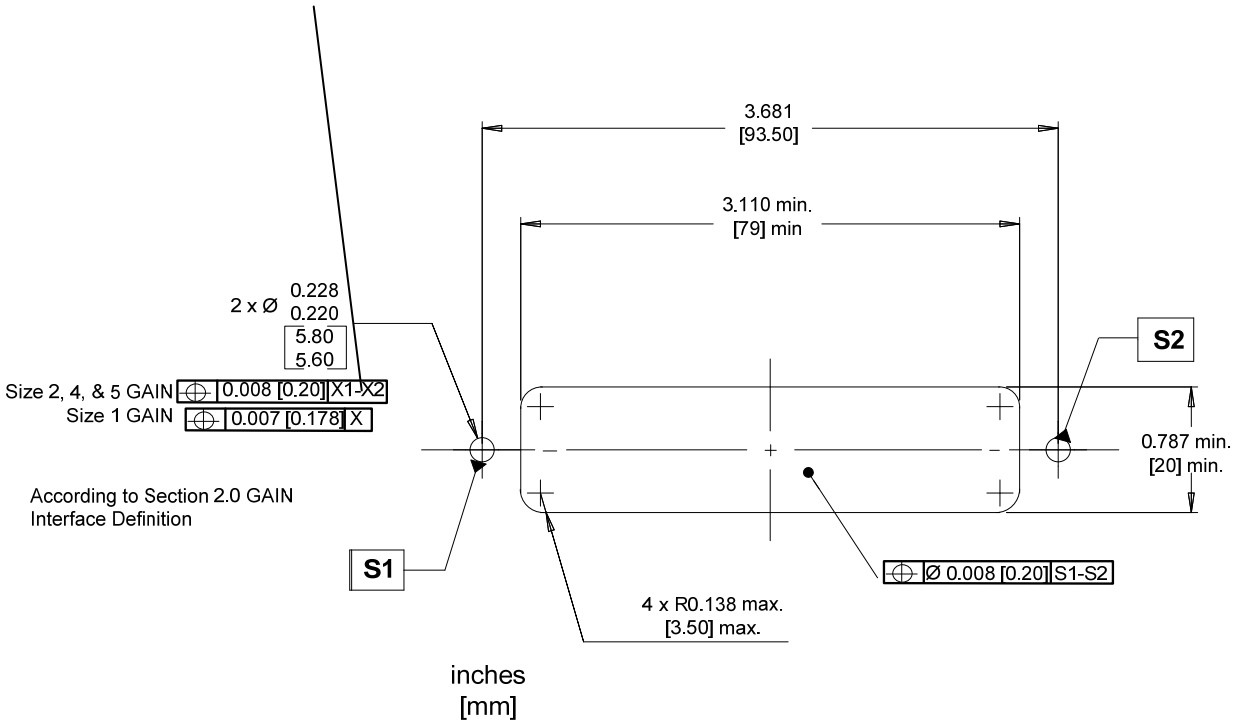


Figure 3-4 – Plug Panel Cut-out for Sizes 1 and 2 GAINs

The shell material should be made of high grade materials which provide dimensional stability compatible with connector mateability. The shell should be made of corrosion resistant materials or be protected to meet the performance of this specification.

The connector shell should be minimum weight consistent with performance requirements and within the limitations of sound design practices.

The shell should be designed and constructed to withstand handling and maintenance functions incident to installation and service. It should fit the panel cut-outs specified in Section 2.1.

The shell design should provide for physical barriers for circuit separation. The shell design should have two gangs to accommodate the inserts described in Section 3.1.1.2 and should accommodate a strain relief backshell as depicted in Figure 3-5, Plug Interface for Strain Relief Backshell, and Figure 3-6, Strain Relief Backshell Interface and Outer Dimensions.

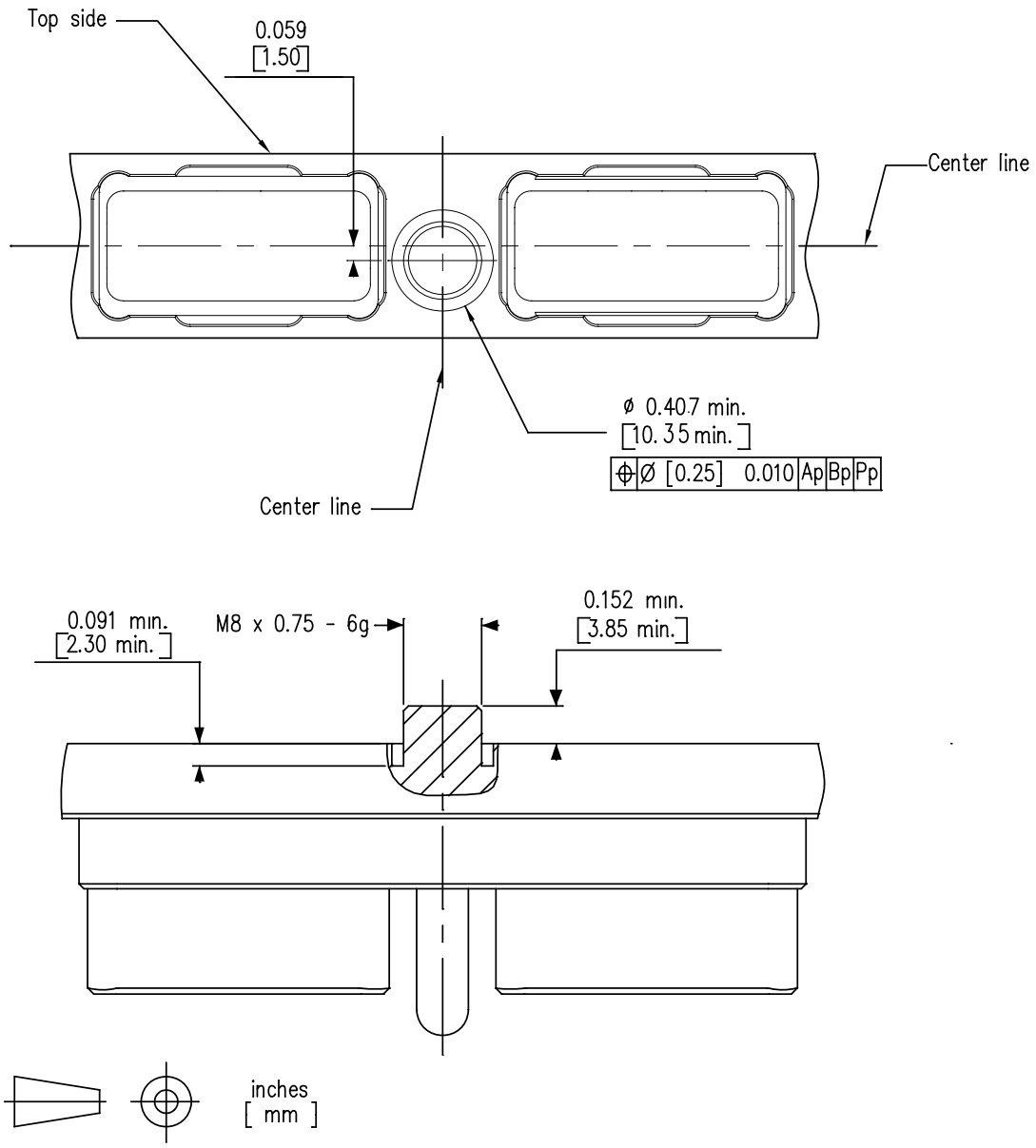


Figure 3-5 – Plug Interface for Strain Relief Backshell

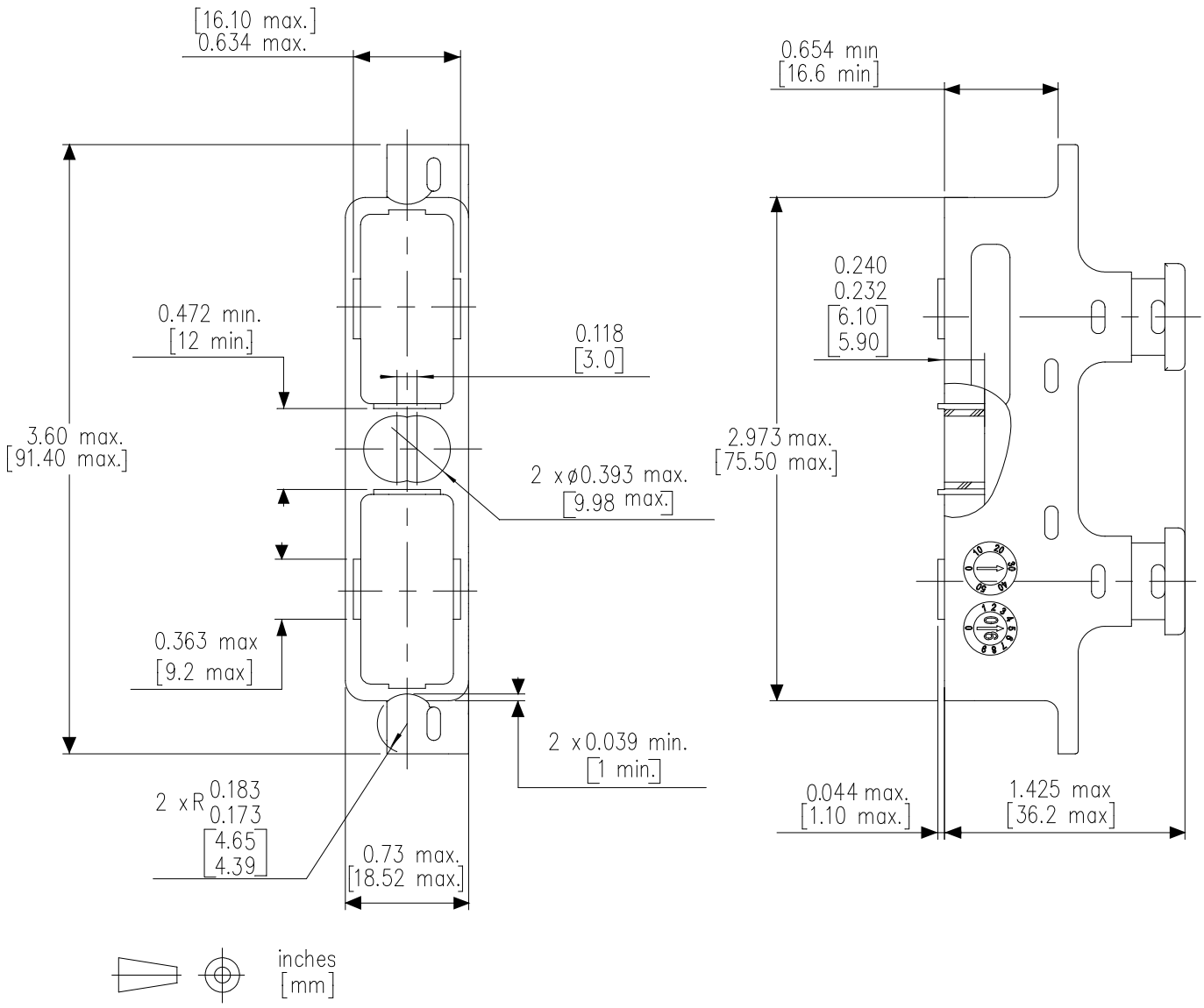


Figure 3-6 – Strain Relief Backshell Interface and Outer Dimensions

The receptacle connector should provide a surface for the bottoming of the plug shell to ensure full connector mating.

The plug shell should be fitted with spring loaded float-mounted eyelets and should be fitted with inserts for socket contacts. The corresponding CAN bus twinax contact (CAN bus) should be the socket differential twinax contact (see Figure 3-19). The plug shell should be installed on the galley side (e.g., coffee maker rail). The receptacle shell should be fixed-mounted on the galley insert side (e.g., coffee make unit).

~~The shell should be designed to allow a maximum axial displacement along the mating direction of Z = 2.25 mm ±1 mm, which is the distance between the rear face of the panel on the galley and the front face of the connector flange (including the floating eyelets)~~. The X and Y maximum misalignment are ±2 mm and the maximum angular misalignment is ±2°.

Shell polarization to prevent 180° mis-mating should be accomplished by means of an off-centered pin guide on the plug and the mating guide bushing on the receptacle. Polarization should occur prior to contact mating.

Figures 3-7 and 3-8 define the Receptacle and Plug mating dimensions respectively. Figure 3-9 defines the mating conditions.

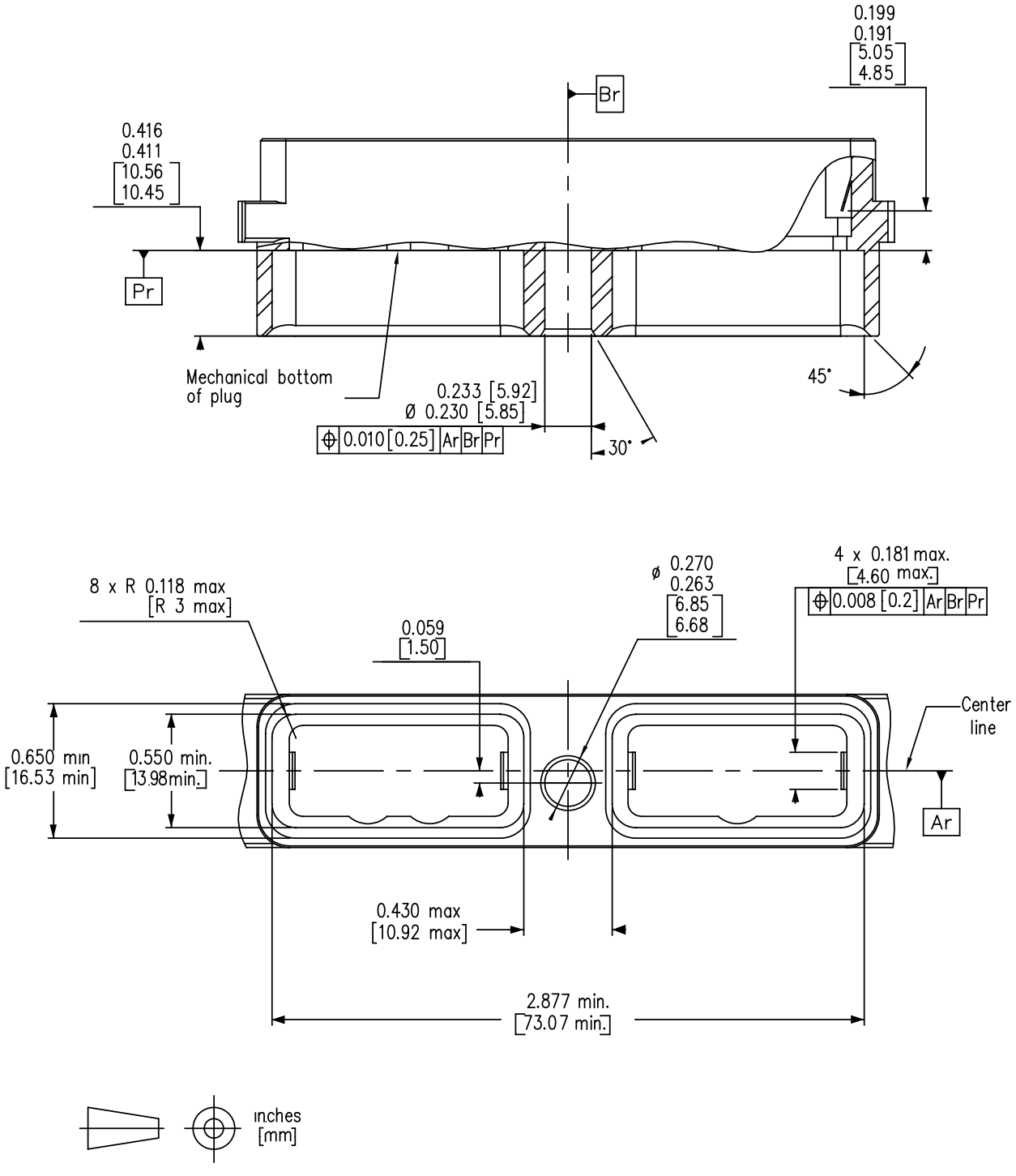


Figure 3-7 – Receptacle Mating Dimensions

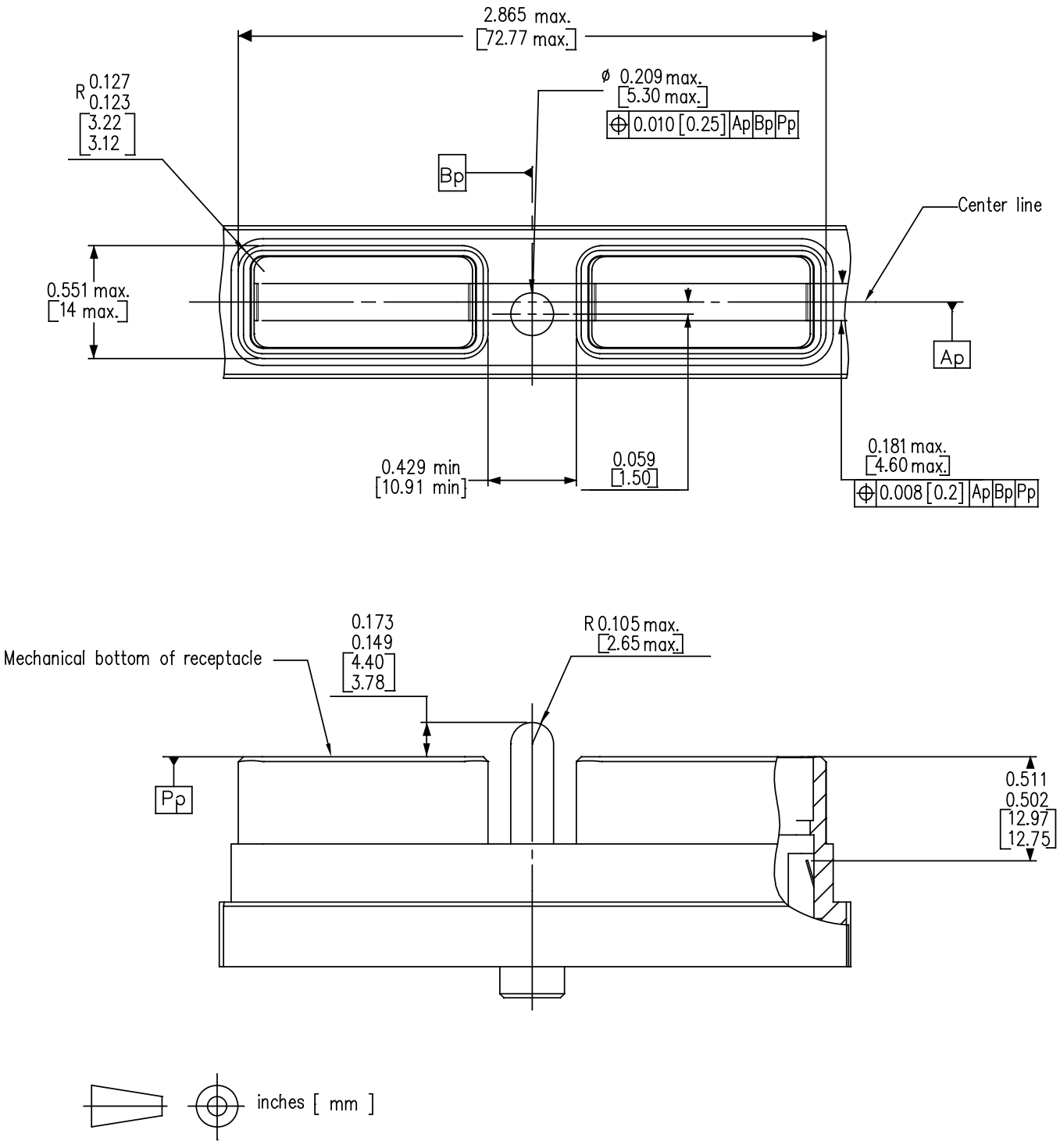


Figure 3-8 – Plug Mating Dimensions

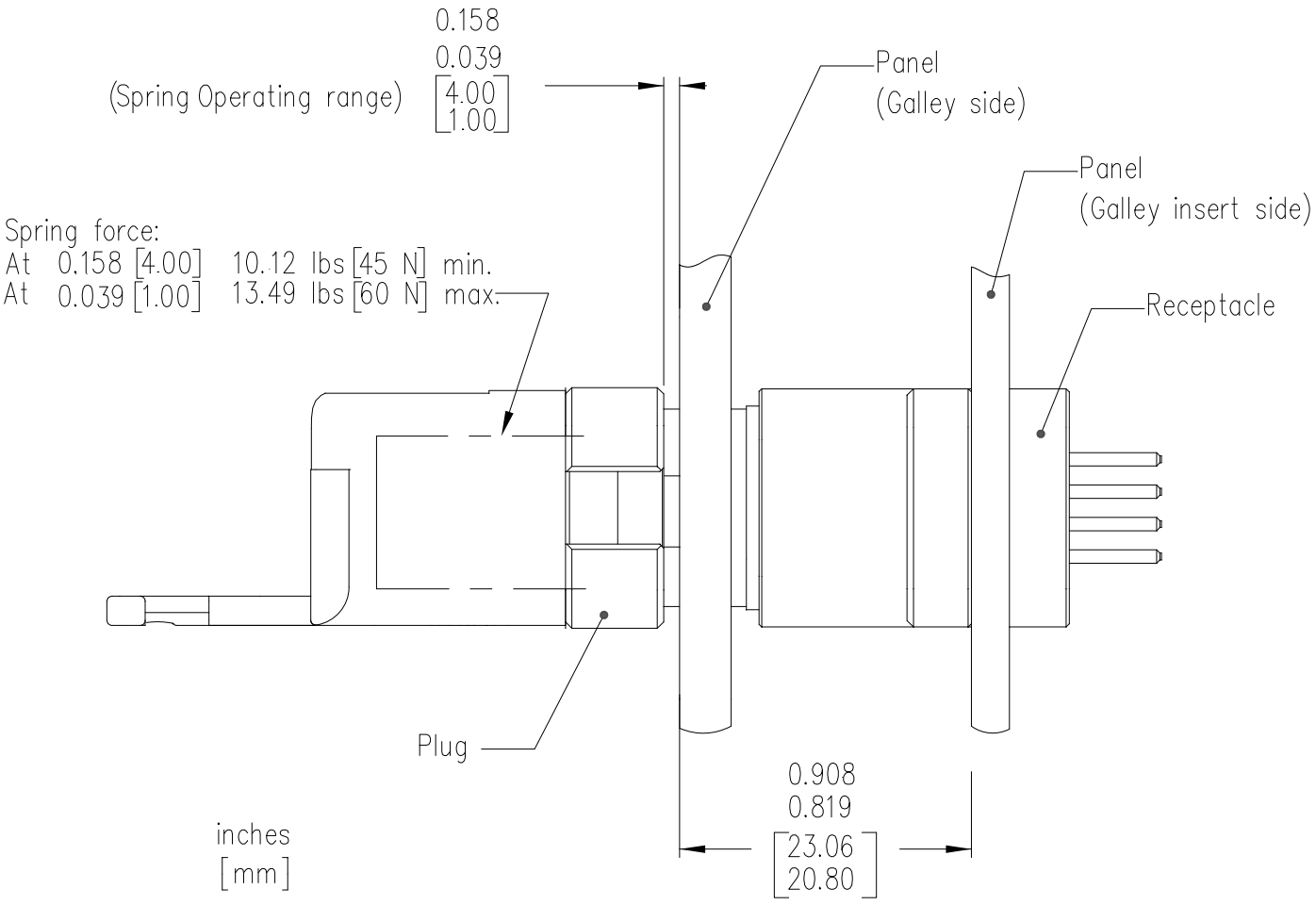


Figure 3-9 – Mating Conditions

3.1.1.2 Inserts

Rigid insert materials should have properties which conform to the electrical and mechanical requirements of this specification.

The inserts should be designed and constructed with proper sections and radii, such that they will not readily chip, crack, or break in assembly or normal service. Hollow-type inserts should not be used.

Inserts from different vendors should be intermateable and interchangeable.

The insert sealing members (rear grommet and interfacial seal) should be molded with resilient dielectric or elastomer materials of high dielectric quality and should provide sealing for the wires described in Table 3-1.

Table 3-1 – Insert Sealing Provisions

Contact size	Sealing range inches [mm]	
22	0.034 [0.86]	0.057 [1.45]
12	0.097 [2.46]	0.135 [3.43]
8	See note 1	See note 1

Note:

1. Sealing of the data bus cable is achieved through the use of a sealing boot delivered with the size 8 Twinax contact.

The inserts should be rear snapped into the shell and rear release using the extraction tool shown in Figure 3-10 - Insert Extraction Tool.

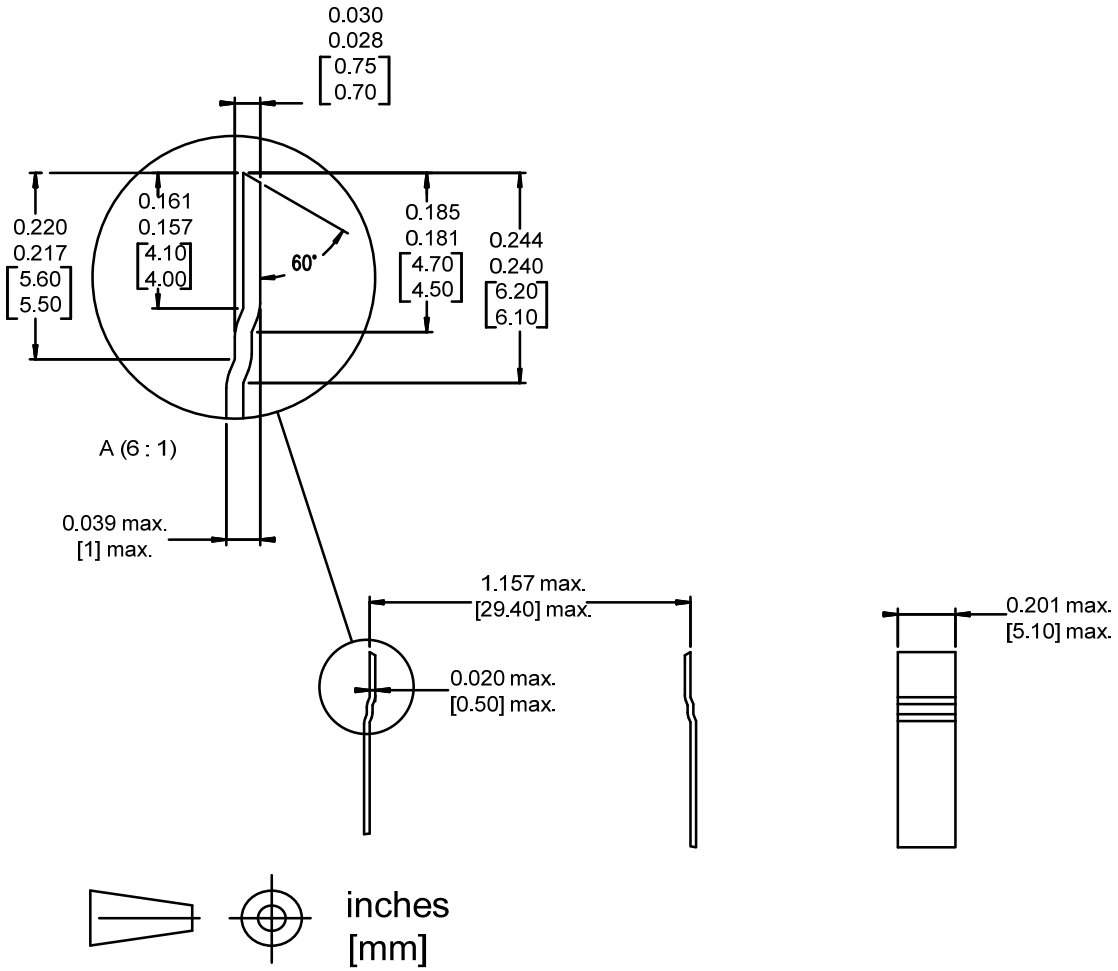


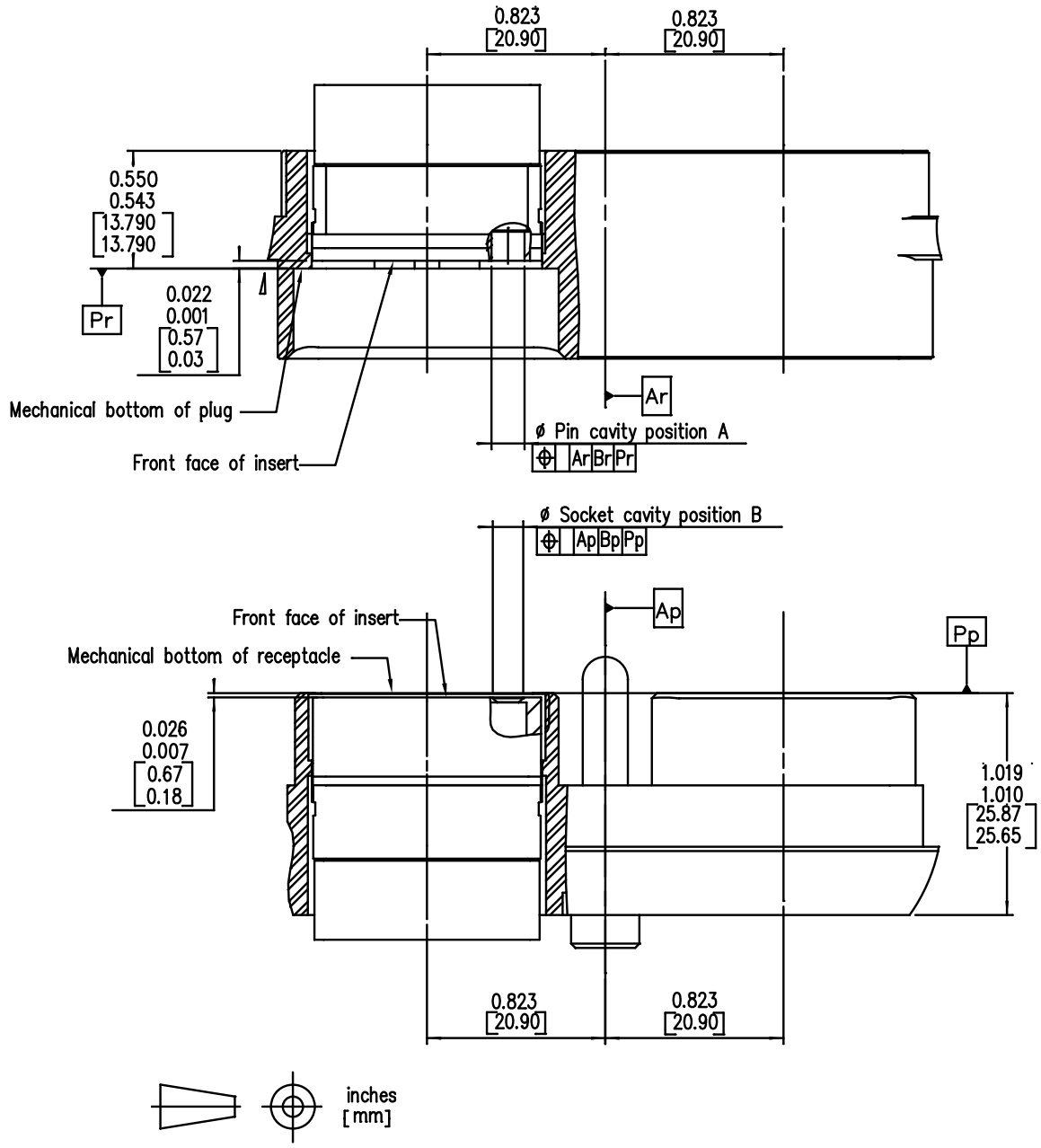
Figure 3-10 – Insert Extraction Tool

The inserts should be designed for positive locking of the contacts in the inserts. Inserts should be capable of allowing contacts insertion and extraction using MIL-I-81969 insertion/extraction tools described in Table 3-2.

Table 3-2 – Insertion and Extraction Tool Specification

Contact size	Insertion Tool	Extraction Tool
22	M81969/1-01	M81969/1-01 **or M81969/14-01 (plastic tool)**
12	M81969/28-02	M81969/28-02 **or M81969/14-04 (plastic tool)**
8	M81969/28-03	M81969/28-03

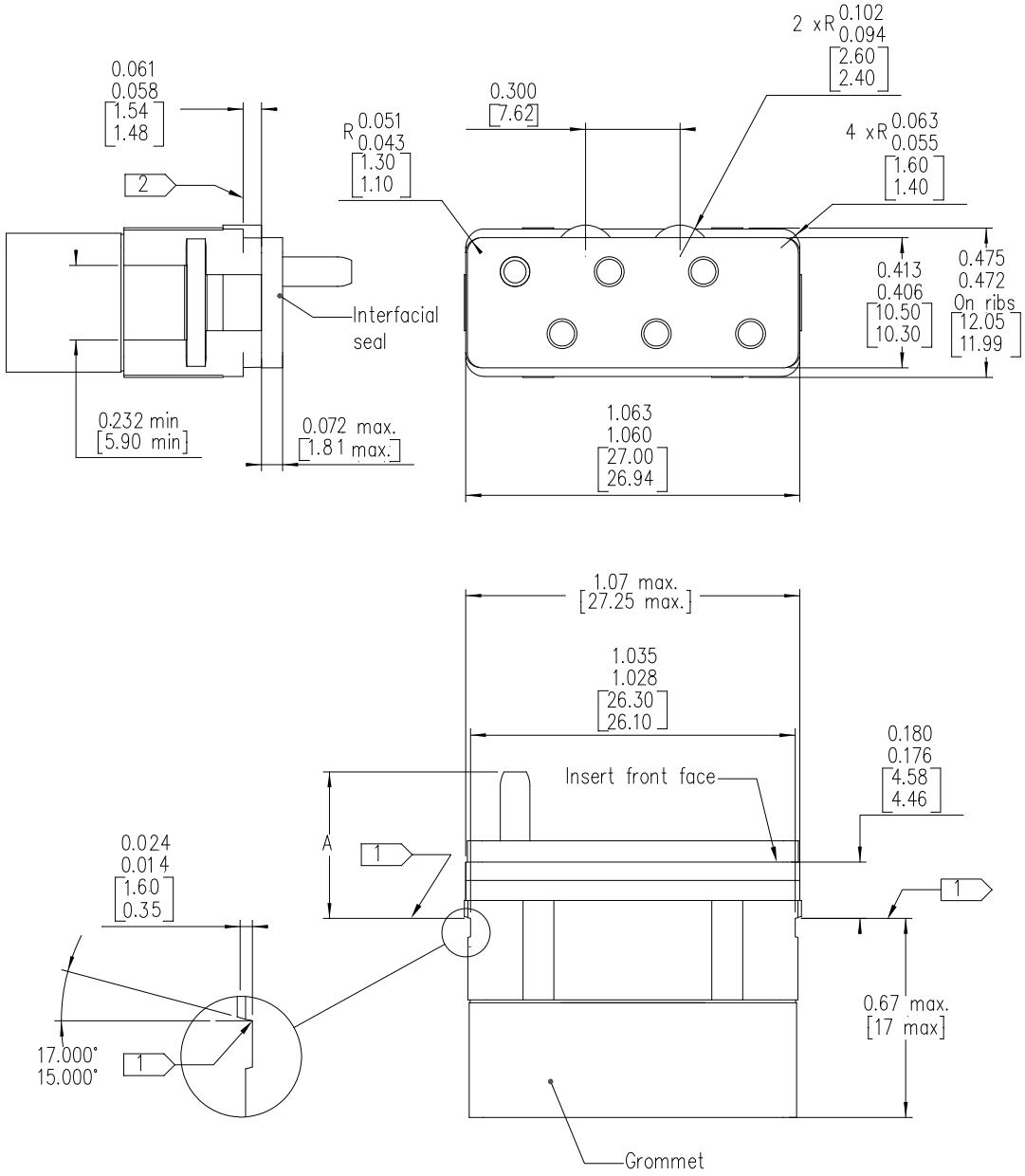
Inserts should conform to the dimensions shown in Figures 3-11, 3-12, 3-13, 3-14, and 3-15.



	Size 22 contacts	Size 12 contacts	Size 8 contacts
Pin cavity position A	0.012 [0.30]	0.012 [0.30]	0.012 [0.30]
Socket cavity position B	0.014 [0.36]	0.0145 [0.37]	0.015 [0.38]

Figure 3-11 – Electrical Insert/Connector Interface

3.0 GAIN RESOURCE CONNECTIONS

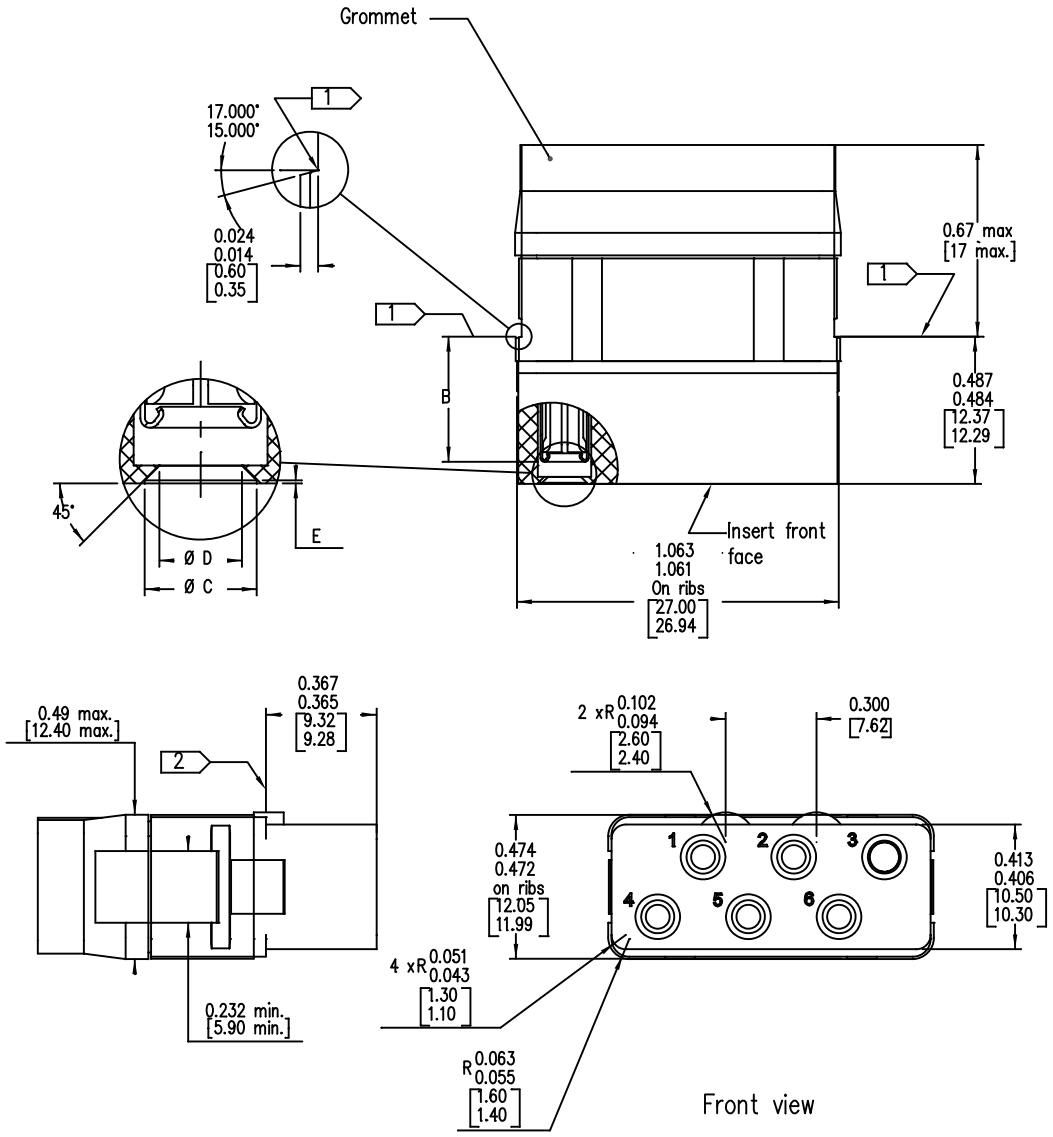


	Size 22 contacts	Size 12 contacts	Size 8 contacts
A	0.413/0.445 [10.50/11.30]	0.455/0.485 [11.55/12.30]	0.487/0.515 [12.22/13.07]

1 Insert rear limit stop (on the insert retention clip).
2 Insert front limit stop (on the shell).

inches
[mm]

Figure 3-12 – Pin Insert Definition and Contact Position



	Size 22 contacts	Size12 contacts	Size 8 contacts
B	0.42/0.448 [10.68/11.38]	0.421/0.449 [10.70/11.40]	0.407/0.435 [10.34/11.04]
Ø C	0.787/0.827 [2.00/2.10]	0.148/0.152 [3.75/3.85]	0.287/0.29 [7.29/7.39]
Ø D	0.040/0.042 [1.02/1.06]	0.109/0.111 [2.77/2.83]	0.227/0.228 [5.77/5.81]
E	0/0.004 [0.00/0.10]	0/0.004 [0.00/0.10]	0/0.004 [0.00/0.10]

1 Insert rear limit stop (on the insert retention clip).
2 Insert front limit stop (on the shell).

inches
[mm]

Figure 3-13 – Socket Insert Definition and Contact Position

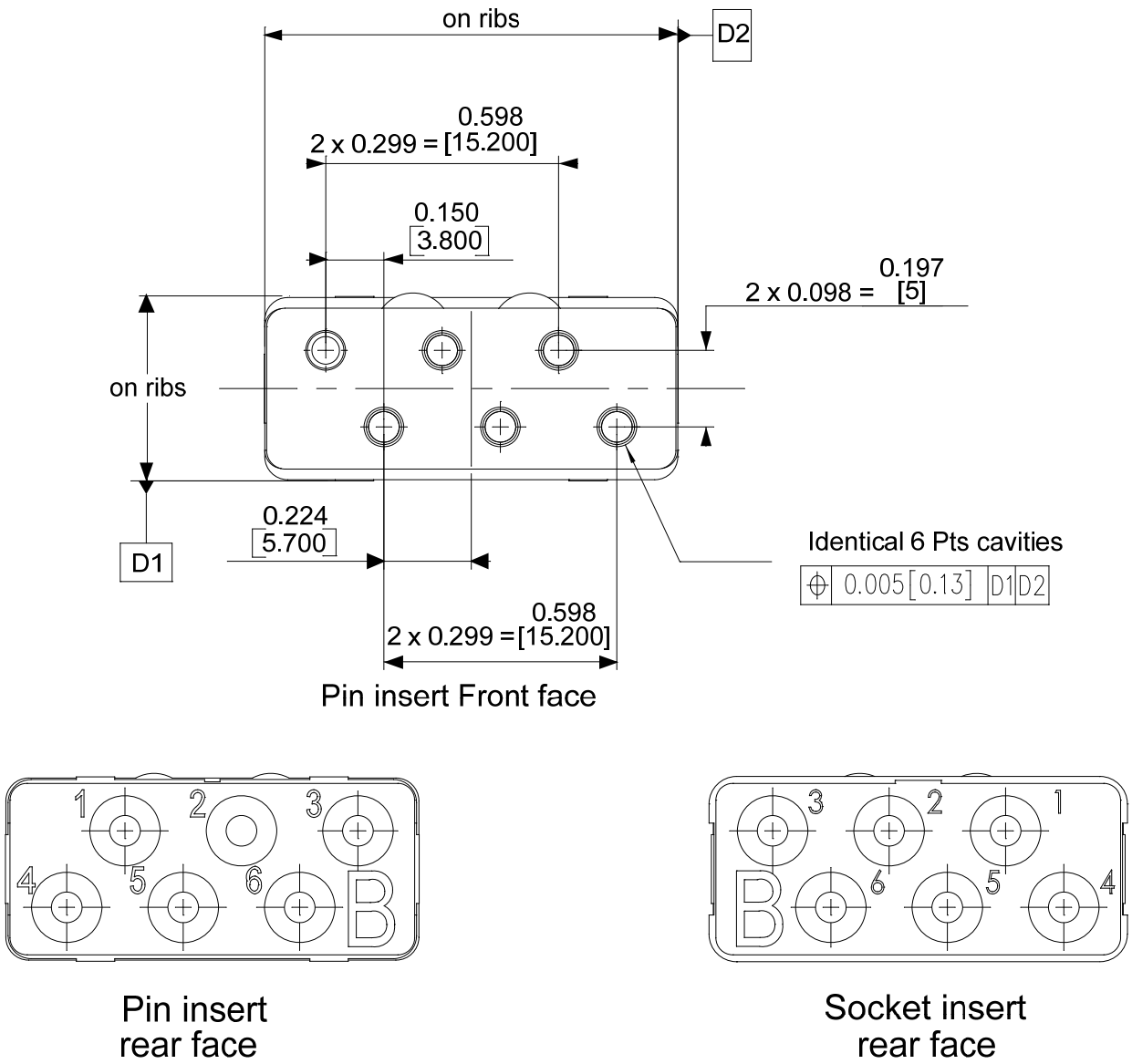
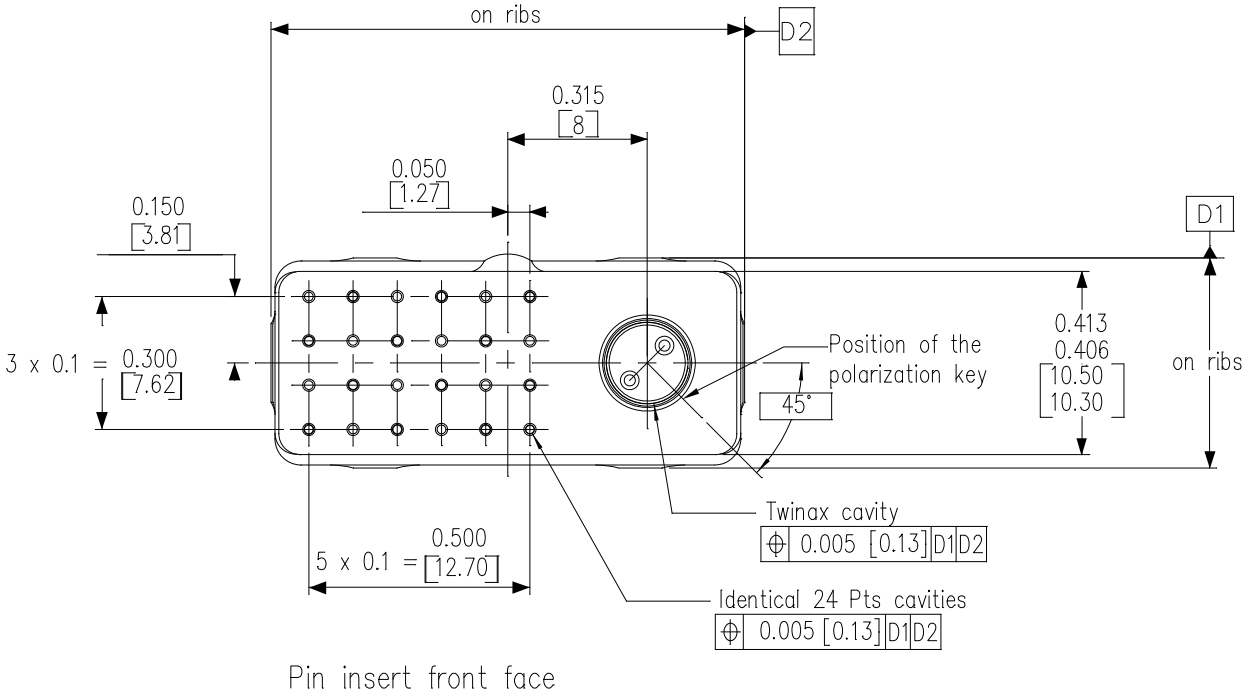


Figure 3-14 – 6 Points Cavity Insert Grid Layout



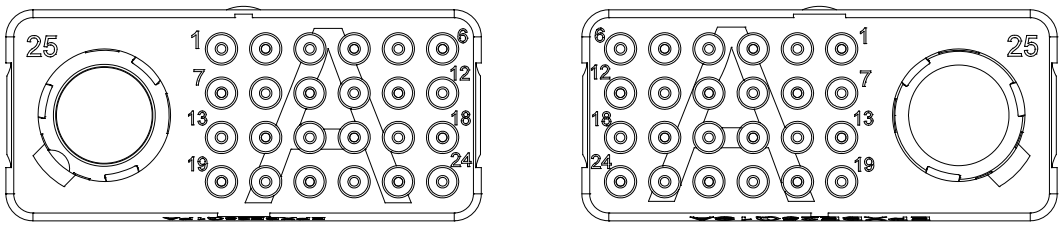


Figure 3-15 – 25Q1 Insert Cavity Location

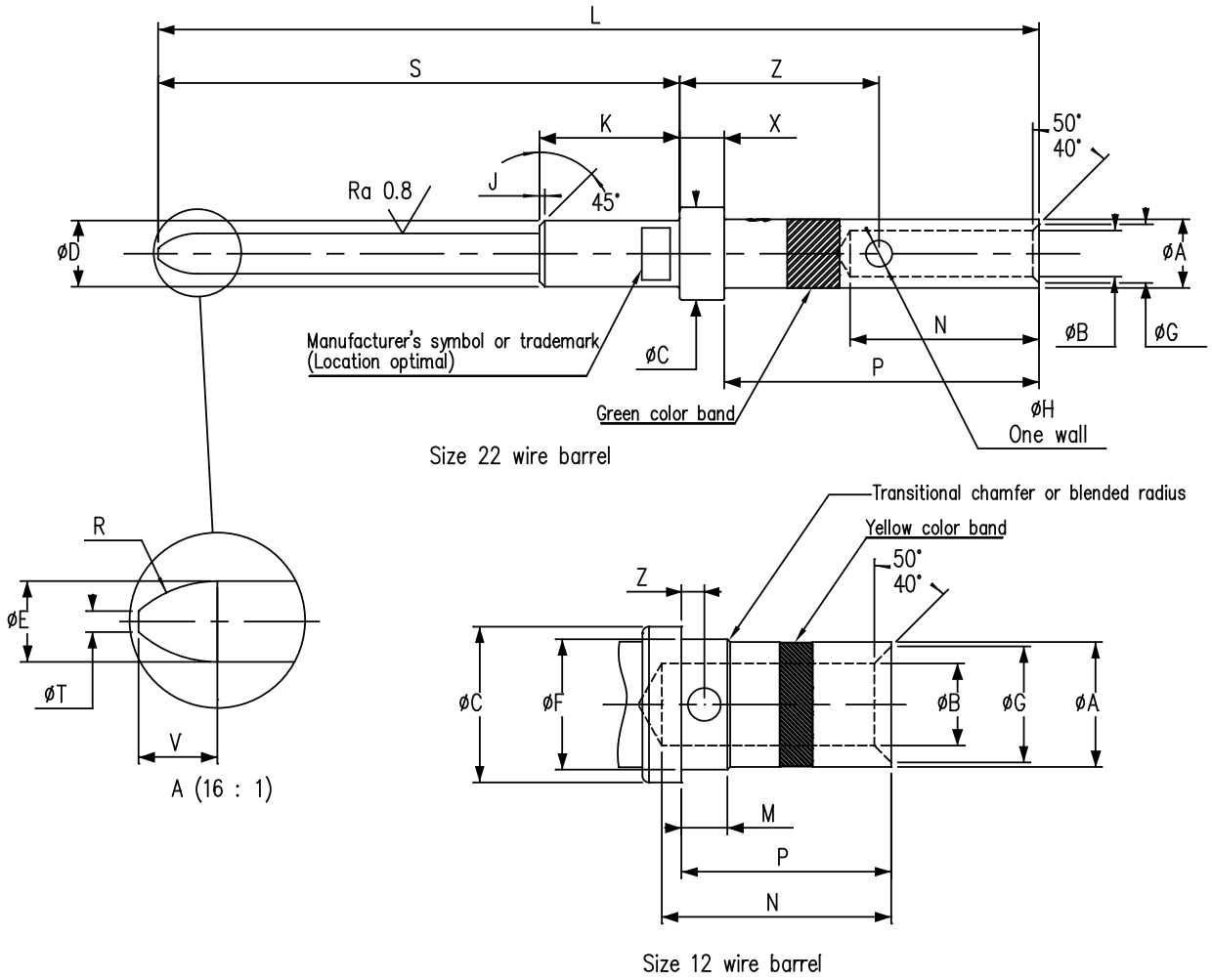
3.1.1.3 Contacts and Crimping

Contact mating action should be designed to provide a forward wiped and, where possible, back wiped surface contact.

3.1.1.3.1 Signal and Power Contacts

Figure 3-16 specifies the design of the Pin Contact. Figure 3-17 specifies the design of the Socket Contact.

3.0 GAIN RESOURCE CONNECTIONS



Size	A	B	C	D	E	F	G	H	J	K
22	0.052/0.050 [1,32/1,27]	0.0375/0.034 [0.95/0.86]	0.070/0.068 [1.78/1.73]	0050/0.047 [1.27/1.19]	0.031/0.029 [0.79/0.74]	N/A N/A	0.047/0.041 [1.19/1.04]	0.022/0.018 [0.56/0.46]	0.009/0.003 [0.24/0.08]	0.105/0.095 [2.67/2.41]
12	0.151/0.148 [3.84/3.76]	0.102/0.098 [2.59/2.49]	0.190/0.186 [4.83/4.72]	0.151/0.148 [3.84/3.76]	0.095/0.093 [2.41/2.36]	0.158/0.155 [4.01/3.94]	0.145/0.135 [3.68/3.42]	0.042/0.036 [1.07/0.91]	0.009/0.003 [0.24/0.08]	0.112/0.106 [2.85/2.70]

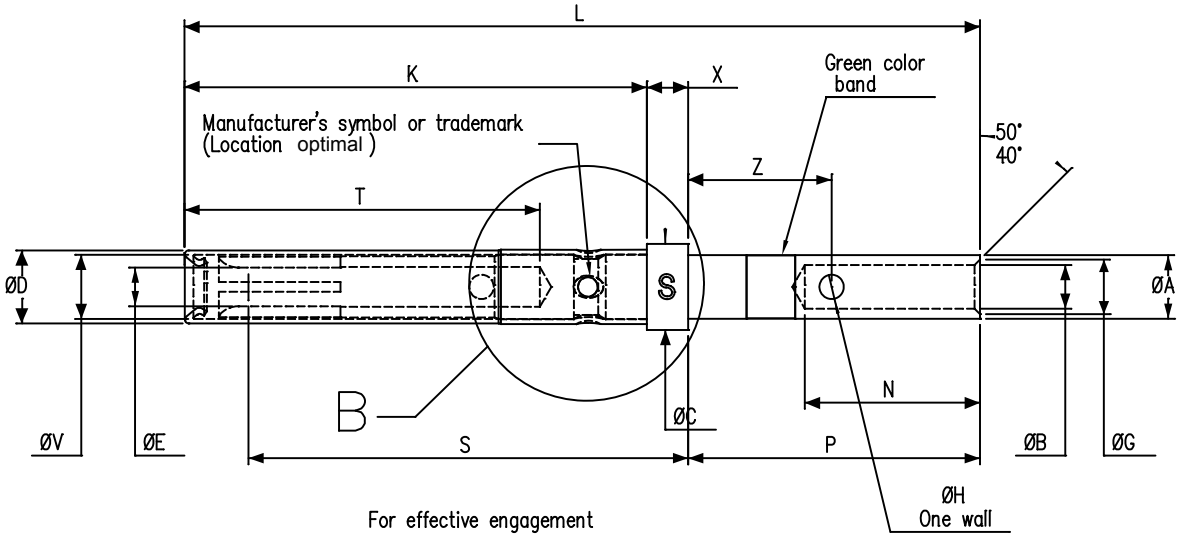
Size	L	M	N	P	R	S	T	V	X	Z
22	N/A N/A	N/A N/A	0.165/0.135 [4.19/3.43]	0.236/0.228 [6.0/5.8]	0.050/0.040 [1.27/1.02]	0.394/0.385 [10.01/9.78]	0.008max. [0.20] max.	0.035/0.025 [0.89/0.635]	0.034/0.029 [0.86/0.74]	0.161/0.132 [4.09/3.35]
12	N/A N/A	0.060/0.050 [1.52/1.28]	0.290/0.250 [7.37/6.35]	0.256/0.244 [6.50/6.20]	0.087/0.039 [2.2/1.00]	0.442/0.426 [11.23/10.83]	0.062/0.047 [1.57/1.19]	0.050/0.038 [1.27/0.97]	0.048/0.044 [1.22/1.12]	0.037/0.022 [0.94/0.56]

inches
[mm]

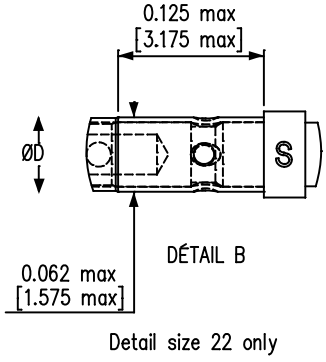
Size	Basic Crimping tool	Positioner	Installing tool	Removal tool
22	M 22520 / 2-01	M 22520 / 2-23	M 81969 / 1-01	M 81969 / 1-01
12	M 22520 / 1-01	M 22520 / 1-02	M 81969 / 28-02	M 81969 / 28-02

Figure 3-16 – Pin Contact Dimensions

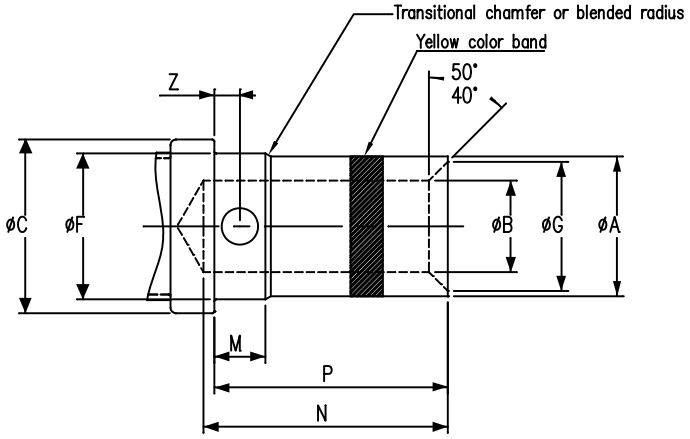
3.0 GAIN RESOURCE CONNECTIONS



Size 22 wire barrel



Detail size 22 only



Size 12 wire barrel

Size	A	B	C	D	E	F	G	H	K
22	0.052/0.050 [1.32/1.27]	0.0375/0.034 [0.95/0.86]	0.070/0.068 [1.78/1.73]	0.061/0.059 [1.55/1.50]	0.031 min. [0.79] min.	N/A N/A	0.047/0.041 [1.19/1.04]	0.022/0.018 [0.55/0.45]	0.380/0.368 [9.67/9.35]
12	0.151/0.148 [3.84/3.76]	0.102/0.098 [2.59/2.49]	0.190/0.186 [4.83/4.72]	0.161/0.158 [4.09/4.01]	0.0960 min. [2.44] min.	0.158/0.155 [4.01/394]	0.145/0.135 [3.68/3.42]	0.042/0.036 [1.07/0.91]	0.379/0.366 [9.63/9.29]

Size	L	M	N	P	S	T	V	X	Z
22	N/A N/A	N/A N/A	0.165/0.135 [4.19/3.43]	0.236/0.228 [6.0/5.8]	0.356 min. [9.04] min.	0.260 min. [6.60] min.	0.043 min. [1.09] min.	0.034/0.029 [0.86/0.74]	0.161/0.132 [4.09/3.35]
12	N/A N/A	0.060/0.050 [1.52/1.28]	0.290/0.250 [7.37/6.35]	0.256/0.244 [6.50/6.20]	0.358 min [9.10] min.	0.256 min. [6.50] min.	0.116 min. [2.95] min.	0.048/0.044 [1.22/1.12]	0.037/0.022 [0.94/0.56]

inches
[mm]

Size	Basic Crimping tool	Positioner	Installing tool	Removal tool
22	M22520/2-01	M22520/2-23	M81969/1-01	M81969/1-01
12	M22520/1-01	M22520/1-02	M81969/28-02	M81969/28-02

Figure 3-17 – Socket Contact Dimensions

Size 22 and 12 pin and socket contacts should be rear-release, rear-removable, and provide for crimp termination conforming to Figure 3-13, Electrical Insert/Connector Interface.

Table 3-3 specifies the cable accommodation for the signal and power contacts.

Table 3-3 – Cable Accommodations

Contact Size	Wire Size (AWG)	Crimping Tool	Positioner
22	26 24 22	M22520/2-01	M22520/2-23
12	16 14 12	M22520/1-01	M22520/1-02
8	**26** 24	Center contacts: M22520/2-01 Outer Body: M22520/5-01	Center contacts: Daniels K709 Outer Body: M22520/5-45

Size 8 Twinax contact should be rear-release and rear-removable for crimping on ~~the a~~ Size 24 **or Size 26** cable. The Size 8 Twinax should conform to Figure 3-18, 3-19, and 3-20.

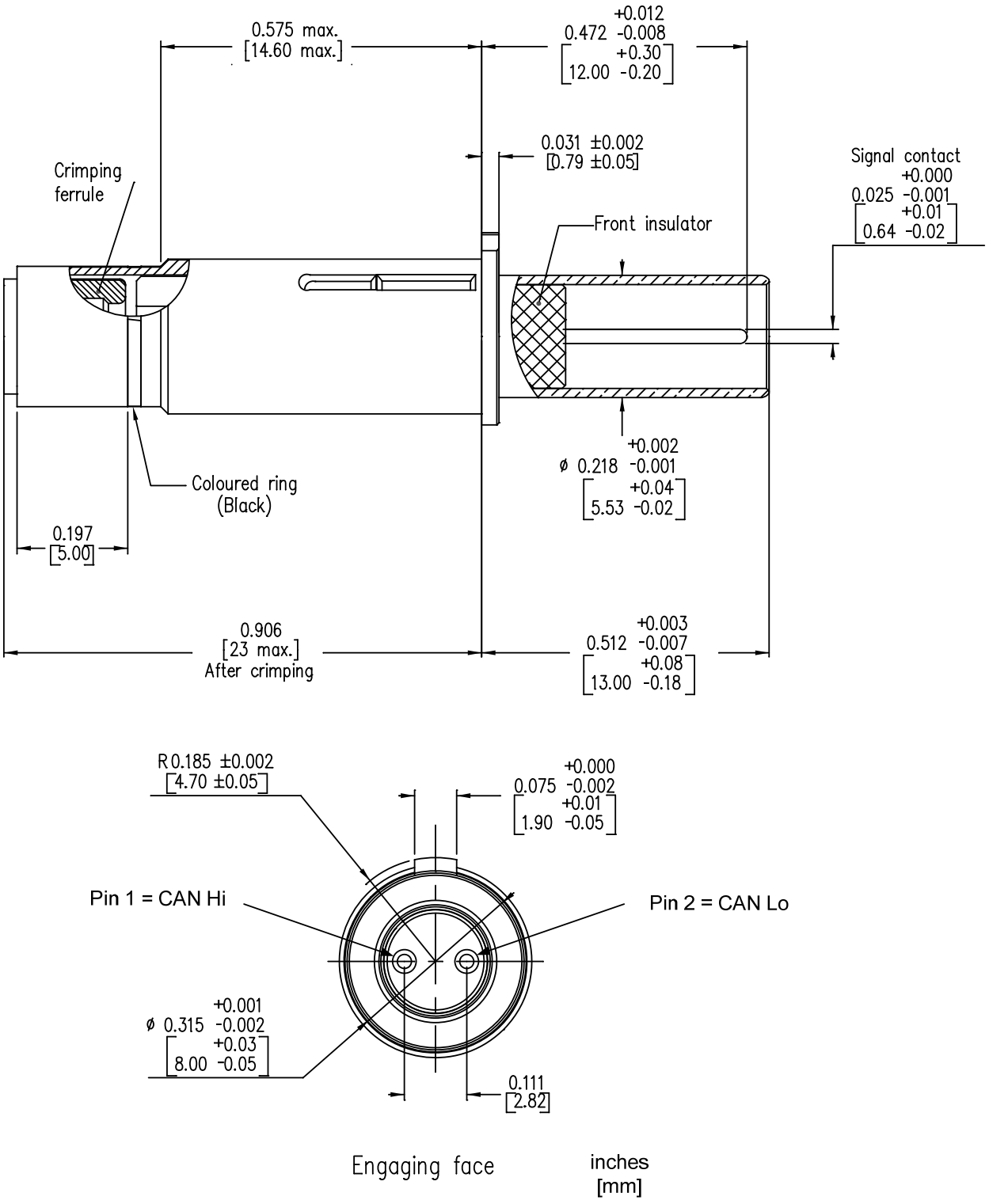


Figure 3-18 – Pin Size 8 Differential Twinax Contact

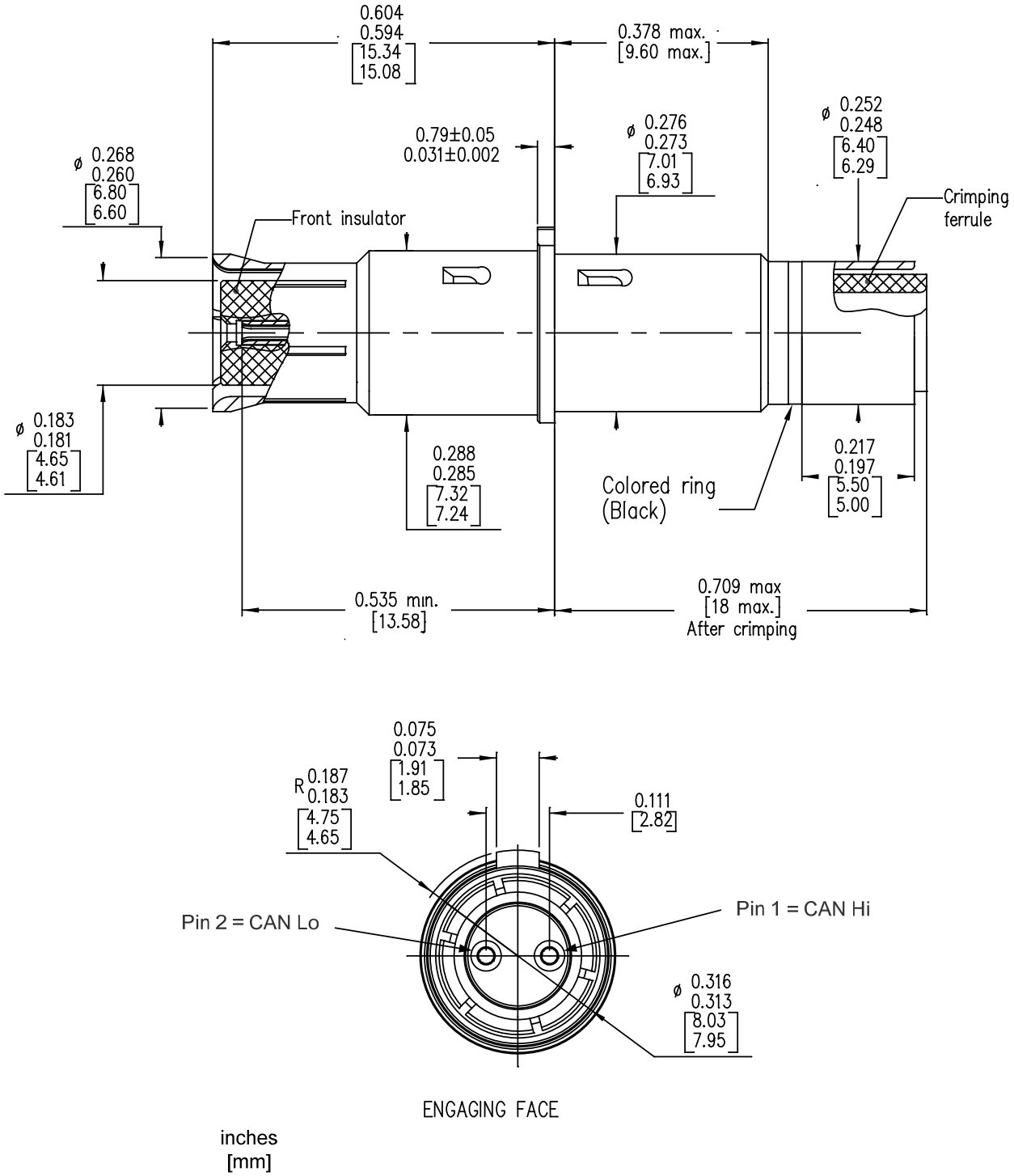


Figure 3-19 – Socket Differential Twinax Contact

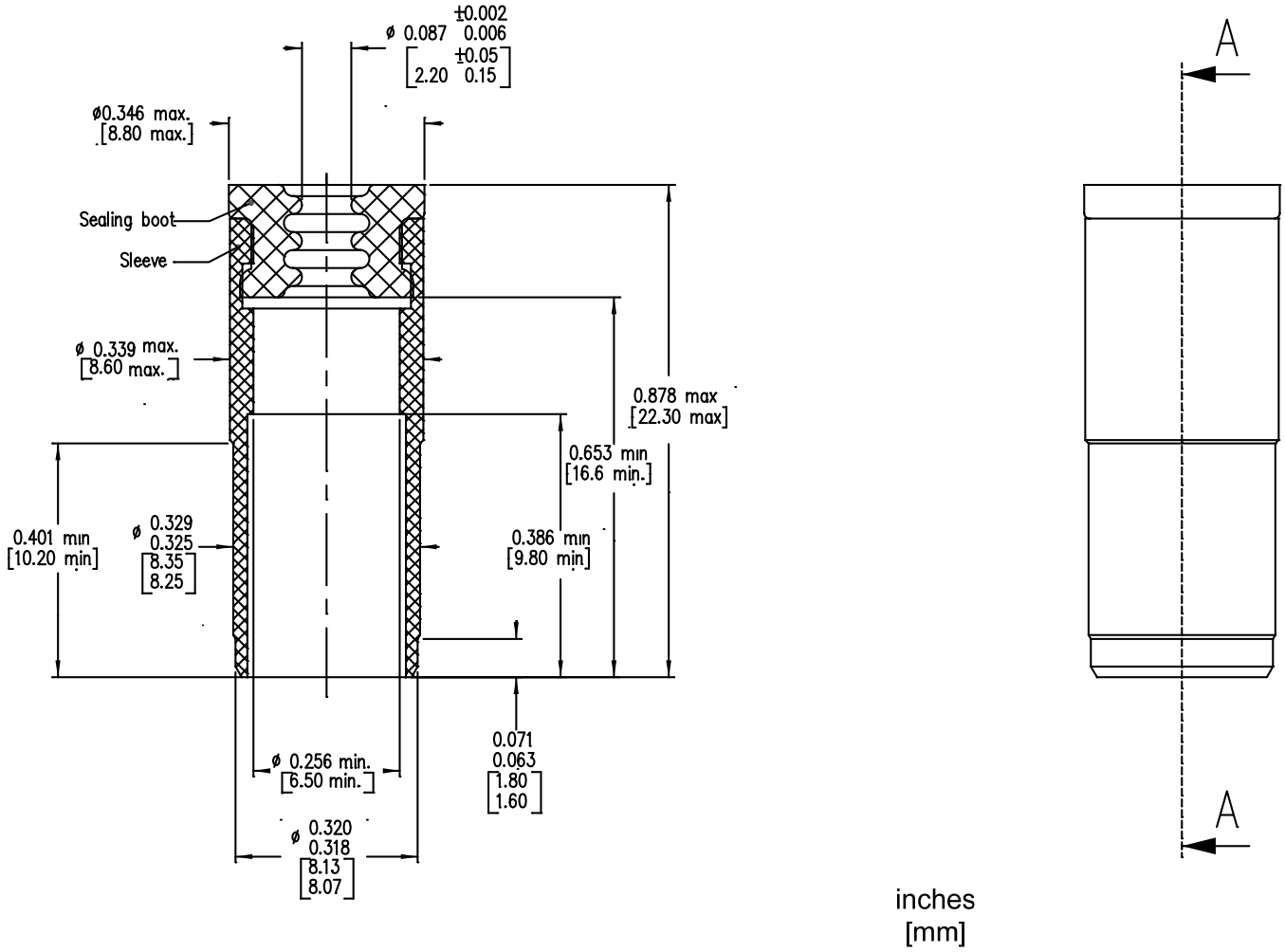


Figure 3-20 – Size 8 Twinax Contact Sealing Boot

Provision should be made to accommodate the following combinations of contacts:

- Size 22 signal contacts with 5 A, x V, y Hz continuous duty.
- Size 12 contacts with 23 A, x V, y Hz continuous duty.

Contacts should have the nominal electrical characteristics specified in Table 3-4.

Table 3-4 – Contact Electrical Characteristics

Contact size	Amperes (A)
22	5
12	23.0
8	Outer body: 12
	Center contact: 1

Contacts should be positioned in the connector such that the length of pin surface being wiped by the spring member of the socket contact should not be less than the value shown in Table 3-5.

Table 3-5 – Contact Minimum Engagement Provisions

Contact size	Minimal engagement inches [mm]
22	0.050 [1.27]
12	0.059 [1.50]
8	Outer body: 0.224 [5.70]
	Center contacts: 0.148 [3.75]

The contact designation for the power and data inserts are as listed in Tables 3-6 and 3-7.

Note: A 12-pin contact size is for power and a 22-contact size is for data.

Table 3-6 – Power Insert Contact Designation

Contact Number	Designation
1	Phase C
2	Neutral
3	Ground
4	Phase A
5	Phase B
6	Ground

Table 3-7a – Data Insert Contact Designation (except Size 3)

Pin Number	Name	Bit Priority	Designation	Remark
1	dc Ground		dc Ground reference	Necessary for pin programming and other GND/open signals dc ground shall be provided by GAIN
2	Pin Programming		GND = Secondary Open = Primary	In case of "No bus communication" only baseline equipment can be switched on
3	~~Spare~~ **Reserved**			
4	Pin Programming	MSB	Feeder No (0-31)	Maximum of 32 galley power feeder per aircraft
5	Pin Programming			
6	Pin Programming			
7	Pin Programming			
8	Pin Programming	LSB		
9	Pin Programming	MSB	Device No (~~0-31~~) **(0- 127)**	Maximum of ~~32~~ **128** devices ~~per galley power feeder~~
10	Pin Programming			
11	Pin Programming			
12	Pin Programming			
13	Pin Programming	~~LSB~~		
14	Pin Programming		Even parity	To eliminate single point failures in configuration Even parity = 0 Odd parity = 1 All Pin programming pins should be considered for calculation.
15	~~Reserved~~ **Pin Programming**		**Device No (0-127)**	**Maximum of 128 Devices**
16	~~Reserved~~ **Pin Programming**	**LSB**		
17	Reserved			
18	Reserved			
19	Reserved			
20	Pin Programming		Workshop mode	GND = Workshop mode Open = normal operation
21	Reserved for Supplier			
22	Reserved for Supplier			
23	Reserved for Supplier			
24	Reserved for Supplier			
25 - 1	Reserved for CAN Bus			Provisional for CAN bus Hi
25 - 2	Reserved for CAN Bus			Provisional for CAN bus Lo

Note: For pin programming, GND = 1; Open = 0

Table 3-7b – Data Insert Contact Designation (Size 3)

Pin Number	Name	Bit Priority	Designation	Remark
1	dc Ground		dc Ground reference	Necessary for pin programming and other GND/open signals dc ground shall be provided by GAIN
2	Pin Programming		GND = Secondary Open = Primary	In case of "No bus communication" only baseline equipment can be switched on
3	~~Spare~~ Reserved			
4	Pin Programming	MSB	Feeder No (0-31)	Maximum of 32 galley power feeder per aircraft
5	Pin Programming			
6	Pin Programming			
7	Pin Programming			
8	Pin Programming	LSB		
9	Pin Programming	MSB	Device No (~~0-31~~) **(0- 127)**	Maximum of ~~32~~ **128** devices ~~per galley power feeder~~
10	Pin Programming			
11	Pin Programming			
12	Pin Programming			
13	Pin Programming	~~LSB~~		
14	Pin Programming		Even parity	To eliminate single point failures in configuration Even parity = 0 Odd parity = 1 All Pin programming pins should be considered for calculation.
15	~~Reserved~~ **Pin Programming**		**Device No (0-127)**	**Maximum of 128 Devices**
16	~~Reserved~~ **Pin Programming**	**LSB**		
17	Reserved			
18	Reserved			
19	Reserved			
20	Pin Programming		Workshop mode	GND = Workshop mode Open = normal operation
21	Reserved for Supplier			
22	Reserved for CAN Bus			Provisional for CAN bus Shielding
23	Reserved for CAN Bus			Provisional for CAN bus Hi
24	Reserved for CAN Bus			Provisional for CAN bus Lo

Note: For pin programming, GND = 1; Open = 0

3.2 Electrical Cable

Data cables for Galley Inserts should provide the principle characteristics specified in Table 3-8.

Table 3-8 – Characteristics of GAIN Data Cables

Characteristic	Value
Impedance	120 ±12 Ohm @ 700 kHz to 1 MHz
Resistance at 20 °C	Nominal 144 Ohm/km
Capacitance	Maximum 46 pF/m @ 1 kHz
Attenuation	0.03 dB/m @ 1 MHz max 0.06 dB/m @ 5 MHz max
Mass	Maximum 22 g/m
Bend Radius	Minimum 1.096 [27.84]

Galley Inserts should use two-core cable, shown in Figure 3-21, with the parameters specified in Table 3-9.

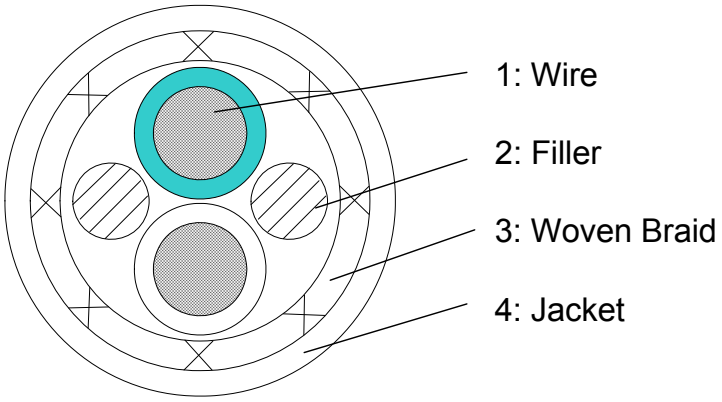


Figure 3-21 – Two-Core Cable

Table 3-9 – Parameter Specification for Two-Core Cable

Element Number	Element Name	Parameter
1	Conductor	Configuration AWG 267 x 0.0063 [0.48]
1	Insulation	Outer diameter 0.54 ±0.002 [1.37 ±0.05]
2	Filler	Not specified
3	Braid	Woven Braid AWG 40 , Coverage 90% minimum
4	Jacket	Outside diameter 0.137 ±0.008 [3.48 ±0.20]

Note: Dimensions in inches [mm]

The electrical cable characteristics are:

- Impedance 120 ±12Ω from 700 kHz – 1MHz.
- Resistance at 20 °C max. 144Ω/km.
- Maximum Capacitance 45 pF/m at 1 kHz Attenuation ≤ 0.03 dB/m at 1 MHz, 06 dB/m at 5 MHz.
- Test voltage 2 kVrms for 1 Min. (core to core, cores to braid).
- 1 kVrms for 1 Min. (braid to jacket).
- 2.5 kVrms Sparker.
- Conductor in accordance with EN 2038.
- Two Cores Twisted Pair Cable.

The operating temperature range of the cable should be from –55 °C to + 200 °C, both ambient and heating.

3.3 Potable Water Coupling

This section specifies the GAIN potable water couplings.

3.3.1 Requirements

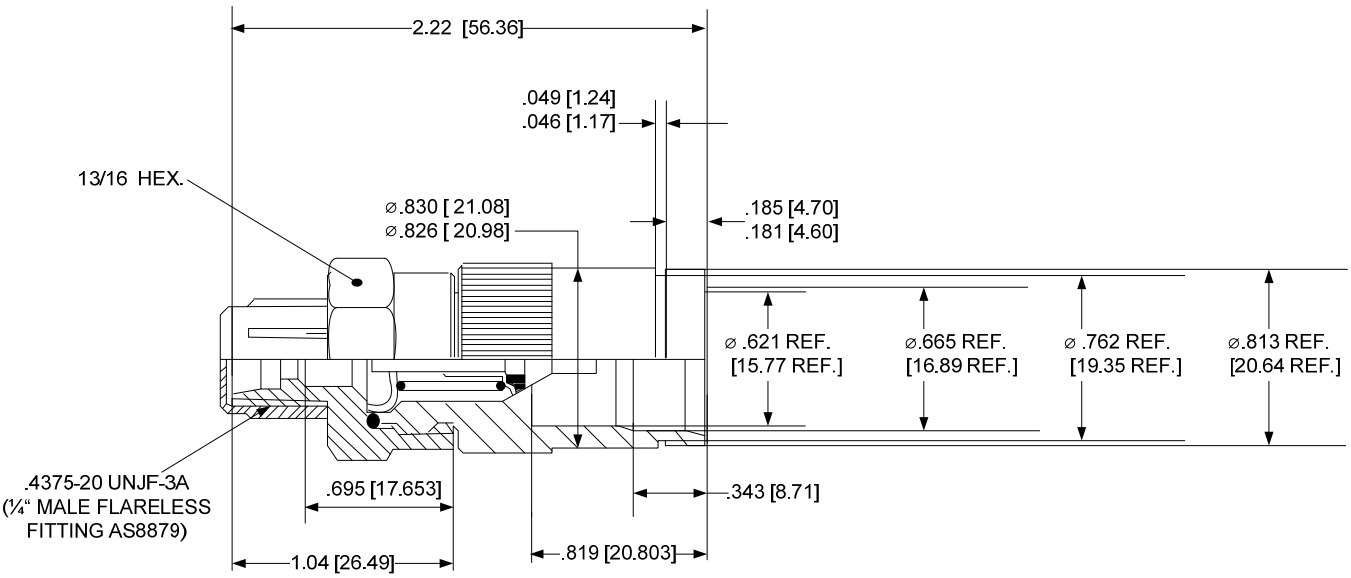
The GAIN potable water couplings should be made of corrosion resistance construction materials, e.g., stainless steel, to ensure no negative effect on the taste or purity of the water. Seal material should be food grade. The preferred seal material type is ethylene-propylene rubber known as EPDM.

3.3.2 Configuration

This section defines the configuration of the GAIN potable water coupling.

3.3.2.1 Receptacle

Figure 3-*22* is the GAIN standard dimensions drawing for the potable water receptacle coupling.



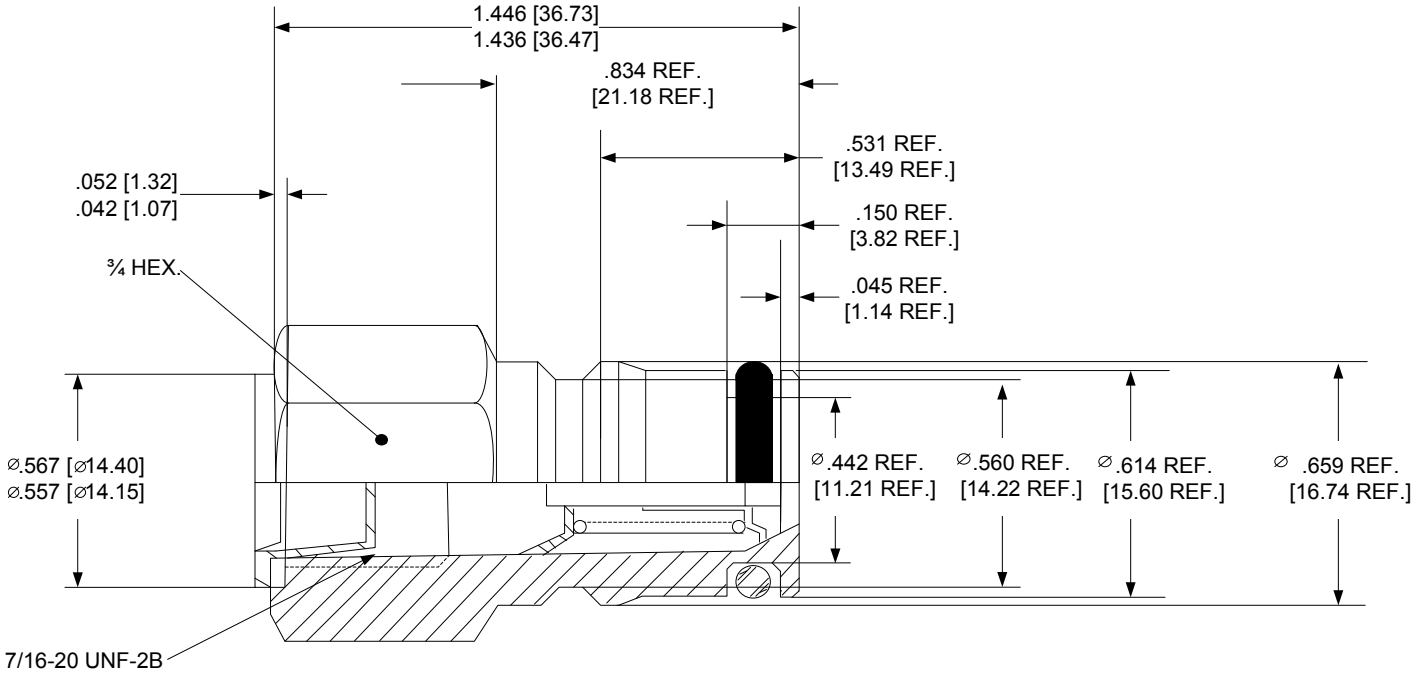
Notes:

1. Spring force 5.25 lbs [23.4 N]
2. Socket valve travel 0.12 in [3.05 mm] min.

Figure 3-22 – Potable Water Receptacle Coupling

3.3.2.2 Plug

Figure 3-23 is the GAIN standard dimensions drawing for the potable water plug coupling.



Notes:

1. Spring force 4.7 lbs [20.1N]
2. Plug valve travel 0.13 in [3.3 mm] min.

Figure 3-23 – Potable Water Plug Coupling

3.3.2.3 Receptacle Mounting

The mounting interface of the potable-water receptacle to the GAIN side of the panel is specified in Figure 3-24. This drawing shows one possible mounting method for information only. The actual mounting is the responsibility of the galley side equipment manufacturer. Mounting hardware should position the socket such that the front side of the retaining ring groove is 0.5 ±0.1 mm behind the rear of the galley side panel. The mounting should accommodate 2 mm maximum diametral misalignment.

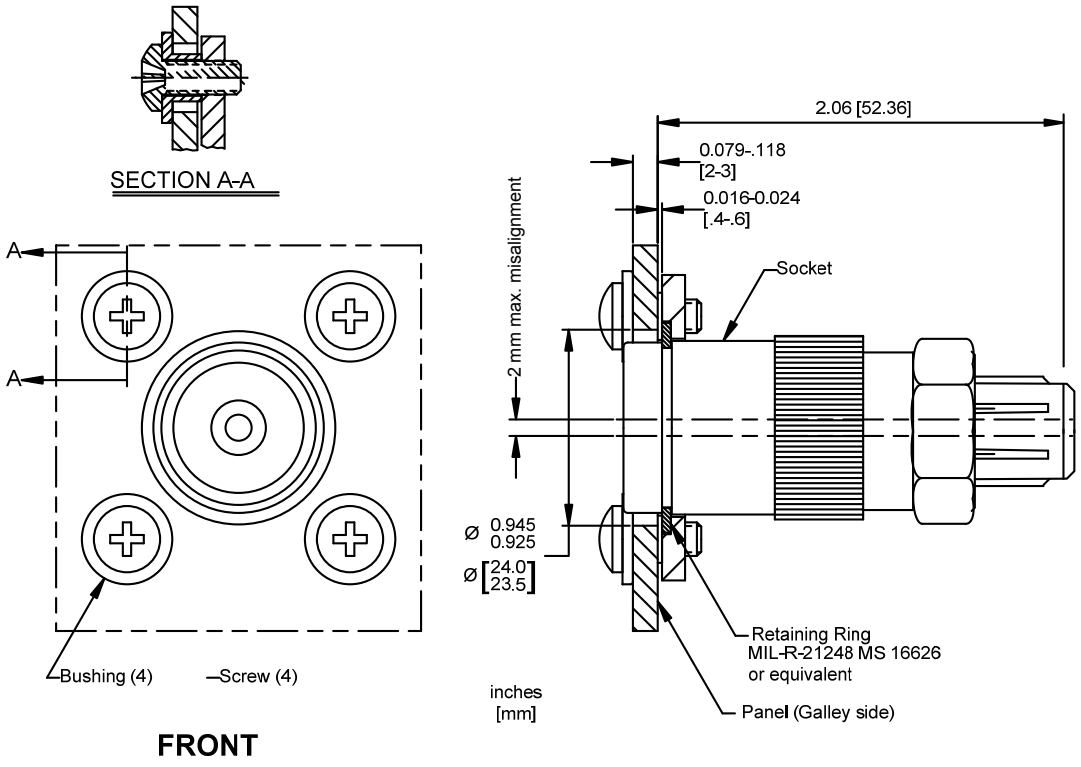


Figure 3-24 – Mounting of Potable Water Plug Coupling

3.3.2.4 Final Assembly

The configuration of the final assembly of the potable-water coupling and the GAIN is defined in Figure 3-25.

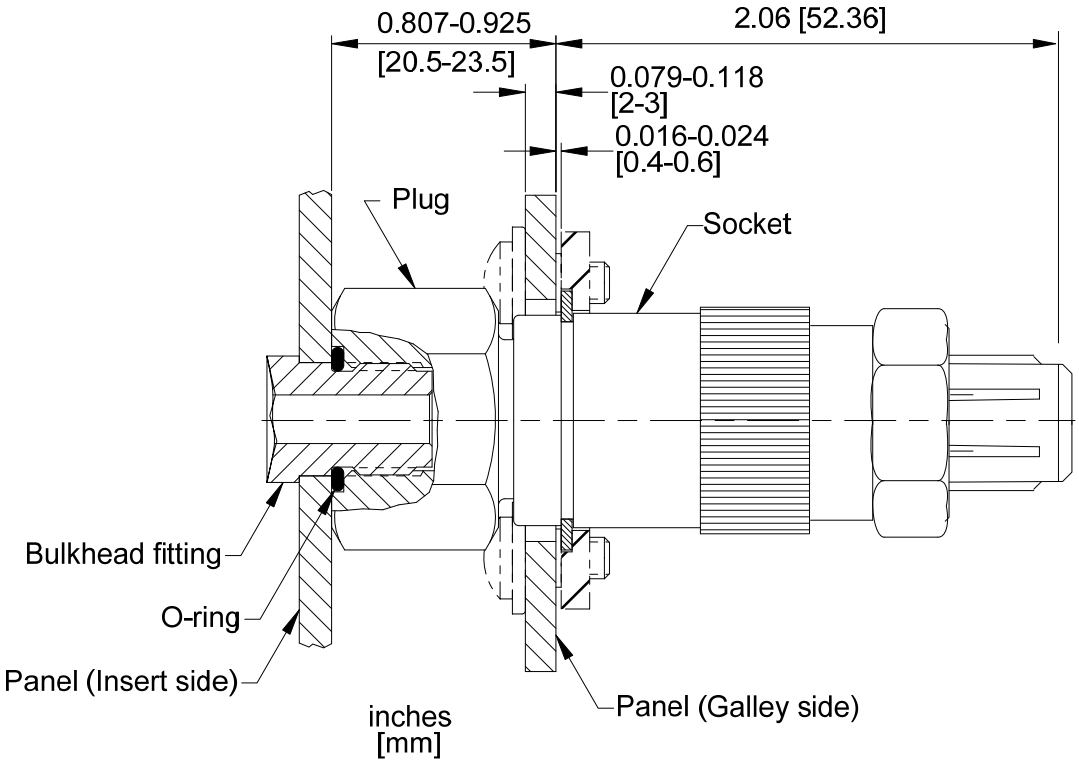
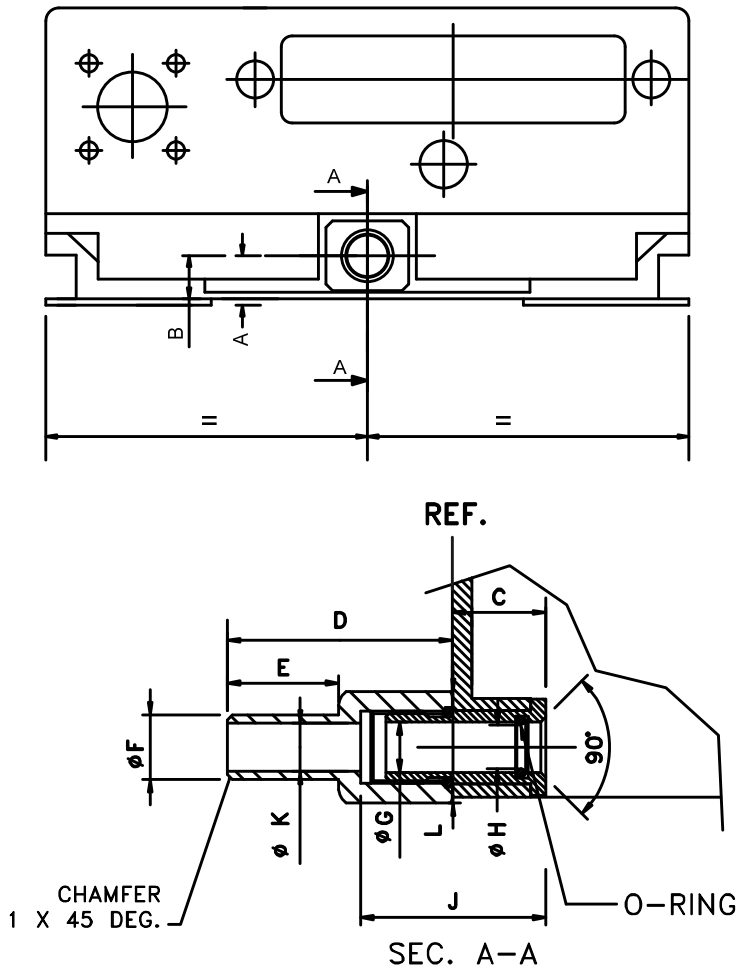


Figure 3-25 – Final Assembly of the GAIN Potable Water Coupling

3.4 Waste Water Interface

The location and detail of the GAIN waste water interface is specified in Figure 3-26.



ITEM	DIM. ±	ITEM	DIM. ±
A	REF.	G	9.90 mm
B	REF.	H	- - - -
C	15 ±0.5 mm	J	36.60 mm (max.)
D	44.50 mm	K	9.50 mm
E	22.00 mm	L	19.00 mm HEX FLAT-FLAT
F	12.70 mm	- -	- - - -

Figure 3-26 – Location and Detail of Waste Water Drain