SFF-TA-1026

Specification for

Storage System High Speed Cable Interconnect

Rev 1.1.4 May 23, 2025

SECRETARIAT: SFF TWG

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ABSTRACT: This specification defines the Storage System High Speed Interconnect: a shielded, board-to-board cable assembly and SMT board connector interface. The connector as shown has 72 or 144 contacts based on bandwidth needs. The cable-side connector is available in horizontal exit, angle exit, and vertical exit applications.

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FOREWORD

The development work on this specification was done by the SNIA SFF TWG, an industry group. Since its formation as the SFF Committee in August 1990, as well as since SFF's transition to SNIA in 2016, the membership has included a mix of companies which are leaders across the industry.

For those who wish to participate in the activities of the SFF TWG, the signup for membership can be found at https://www.snia.org/join.

REVISION HISTORY

Rev 1.0 *November 22, 2021*:
- First Publication

Rev 1.1 *July 18, 2024*:
- Added the following connector variants:
  - Dual-Bay Free-Side Horizontal (0°) Cable Exit with Pull-Tab
  - Dual-Bay Free-Side 60° Angle Cable Exit with Pull-Tab
- Revised drawings and made editorial fixes.

Rev 1.1.1 March 18, 2025:
Added low profile Fixed-Side connector variants with pin protection features
Added Free-Side connector variants for the low profile Fixed-Side connectors
Updated the Configurations Overview/Descriptions in Section 4.1
Updated the Abstract section
Made other editorial fixes

Rev 1.1.2 May 16, 2025:
Created a new section to focus on the low-profile connector variants
Combined the previous sections 5, 6, and 7 into section 5 for the standard height connector variants

Rev 1.1.3 May 20, 2025:
Added new definitions for Type 1 and Type 2
Replaced "Standard Height" description with Type 1
Replaced "Low Profile" description with Type 2
Updated the specification template to GOV-TA-0004 R1.2.2

Rev 1.1.4 May 23, 2025:
Replaced "1st Generation" description with Type 1
Replaced "2nd Generation" description with Type 2

Contents

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1. Scope

This specification defines the Storage System High Speed Interconnect. This 72-contact interconnect system is a shielded, board-to-board solution that consists of 18 differential pairs and 16 single-ended signals. The dimensional requirements for both sides of this connector system as well as performance requirements are detailed in this specification. Additional information is available in the appendices.

2. References and Conventions

2.1 Industry Documents

The following documents are relevant to this specification:

- ASME Y14.5 Dimensioning and Tolerancing
- EIA-364-1000 Environmental Test Methodology for Assessing the Performance of Electrical Connectors and Sockets Used in Controlled Environment Applications

2.2 Sources

The complete list of SFF documents which have been published, are currently being worked on, or that have been expired by the SFF Committee can be found at https://www.snia.org/sff/specifications. Suggestions for improvement of this specification are welcome and should be submitted to https://www.snia.org/feedback.

Standard	Organization	Website
ASME	American Society of Mechanical Engineers (ASME)	https://www.asme.org
Electronic Industries Alliance (EIA)	Electronic Components Industry Association (ECIA)	https://www.ecianow.org

2.3 Conventions

The following conventions are used throughout this document:

DEFINITIONS: Certain words and terms used in this standard have a specific meaning beyond the normal English meaning. These words and terms are defined either in the definitions or in the text where they first appear.

ORDER OF PRECEDENCE: If a conflict arises between text, tables, or figures, the order of precedence to resolve the conflicts is text; then tables; and finally figures. Not all tables or figures are fully described in the text. Tables show data format and values.

LISTS: Lists sequenced by lowercase or uppercase letters show no ordering relationship between the listed items.

EXAMPLE 1 - The following list shows no relationship between the named items:

a. red (i.e., one of the following colors):
    A. crimson; or
    B. pink;
b. blue; or
c. green.

Lists sequenced by numbers show an ordering relationship between the listed items.

EXAMPLE 2 -The following list shows an ordered relationship between the named items:

1. top;
2. middle; and
3. bottom.

Lists are associated with an introductory paragraph or phrase and are numbered relative to that paragraph or phrase (i.e., all lists begin with an a. or 1. entry).

DIMENSIONING CONVENTIONS: The dimensioning conventions are described in ASME-Y14.5, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters, which are the controlling dimensional units (if inches are supplied, they are for guidance only).

NUMBERING CONVENTIONS: The ISO convention of numbering is used (i.e., the thousands and higher multiples are separated by a space and a period is used as the decimal point). This is equivalent to the English/American convention of a comma and a period.

American	French	ISO
0.6	0,6	0.6
1,000	1 000	1 000
1,323,462.9	1 323 462,9	1 323 462.9

3. Keywords, Acronyms, and Definitions

For the purposes of this document, the following keywords, acronyms, and definitions apply.

3.1 Keywords

May: Indicates flexibility of choice with no implied preference.

May or may not: Indicates flexibility of choice with no implied preference.

Obsolete: Indicates that an item was defined in prior specifications but has been removed from this specification.

Optional: Describes features which are not required by the SFF specification. However, if any feature defined by the SFF specification is implemented, it shall be implemented as defined by the specification. Describing a feature as optional in the text is an informational callout to assist the reader.

Prohibited: Describes a feature, function, or coded value that is defined in a referenced specification to which this SFF specification makes a reference, where the use of said feature, function, or coded value is not allowed for implementations of this specification.

Reserved: Where the term is used for a signal on a connector contact, the function is set aside for future standardization. It is not available for vendor specific use. Where this term is used for bits, bytes, fields, and code values; the bits, bytes, fields, and code values are set aside for future standardization. The default value shall be zero. The originator is required to define a Reserved field or bit as zero, but the receiver should not check Reserved fields or bits for zero.

Restricted: Refers to features, bits, bytes, words, and fields that are set aside for other standardization purposes. If the context of the specification applies to the restricted designation, then the restricted bit, byte, word, or field shall be treated as a value whose definition is not in scope of this document, and is not interpreted by this specification.

Shall: Indicates a mandatory requirement. Designers are required to implement all such mandatory requirements to ensure interoperability with other products that conform to this specification.

Should: Indicates flexibility of choice with a strongly preferred alternative.

Vendor specific: Indicates something (e.g., a bit, field, code value) that is not defined by this specification. Specification of the referenced item is determined by the manufacturer and may be used differently in various implementations.

3.2 Acronyms and Abbreviations

PCB: Printed Circuit Board
PF: Press Fit
PTH: Plated Through Hole
SMT: Surface Mount Technology

3.3 Definitions

Connector: Each half of an interface that, when joined together, establish electrical contact and mechanical retention between two components. In this specification, the term connector does not apply to any specific gender; it is used to describe the fixed-side, the free-side, or the union of fixed-side to free-side. Other common terms include: connector interface, mating interface, and separable interface.

Contacts: A term used to describe connector terminals that make electrical connections across a separable interface.

Fixed-side connector: A term used to describe a connector that is terminated to a PCB. An example is shown in Figure 3-1.

Free-side connector: A term used to describe connector terminals that make electrical connections across a separable interface (i.e. the cable end). An example is shown in Figure 3-1.

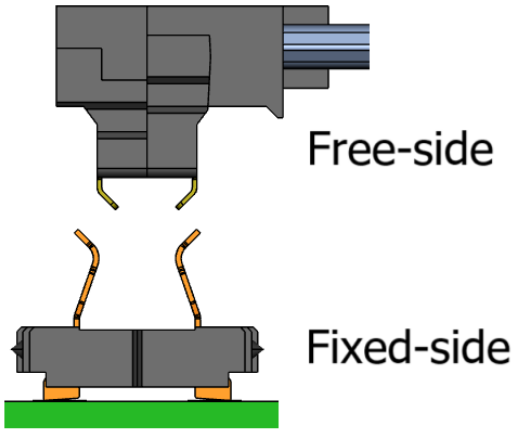


Figure 3-1 Fixed-side and Free-side Connector Definition

Plated through hole termination: A term used to describe a termination style in which rigid pins extend into or through the PCB. Pins are soldered to keep the connector or cage in place. Other common terms are through hole or PTH.

Press fit: A term used to describe a termination style in which collapsible pins penetrate the surface of a PCB. Upon insertion, the pins collapse to fit inside the PCB's plated through holes. The connector or cage is held in place by the interference fit between the collapsed pins and the PCB.

Surface mount: A term used to describe a termination style in which solder tails sit on pads on the surface of a PCB and are then soldered to keep the connector or cage in place. Other common terms are surface mount technology or SMT.

Termination: A term used to describe a connector's non-separable attachment point such as a connector contact to a bulk cable, a cage to a PCB, or a solder tail to PCB. Common PCB terminations include: surface mount (SMT), plated through hole termination (PTH), and press fit (PF). Common cable terminations include insulation

displacement contact (IDC), insulation displacement termination (IDT), wire slots, solder, welds, crimps, and brazes.

Vertical: A term used to describe a connector design where the mating direction is perpendicular to the printed circuit board upon which the connector is mounted.

Type 1: A term used to describe the connector variants in SFF-TA-1026 Rev 1.1 and earlier revisions.

Type 2: A term used to describe the lower profile connector variants with pin protection features.

Wipe: The distance a contact travels on the surface of its mating contact during the mating cycle as shown in Figure 3-2.

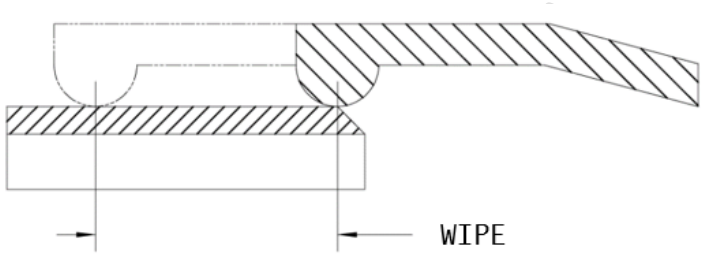


Figure 3-2: Wipe for a Continuous Contact

4. General Description

4.1 Configuration Overview/Descriptions

The connector system described in this document is made up of fixed-side connectors and free-side connectors. The free-side connectors may have one of three different cable exit directions (horizontal (0°), 60°, or vertical (90°)) and may or may not have a pull tab.

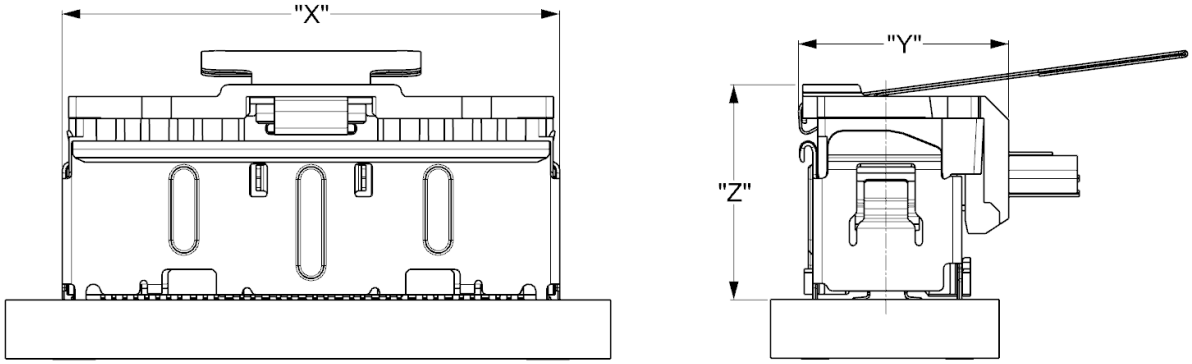


Figure 4-1 Overall Dimensions for Connector/Cable Configurations

Table 4-1 Overall Dimension Values for Connector/ Cable Configurations

Config	Description	Dim "X"	Dim "Y" for Type 1	Dim "Z" for Type 1	Dim "Y" for Type 2	Dim "Z" for Type 2
1	Free-Side Horizontal (0°) Cable Exit with Pull-Tab	27.20	11.43	11.80	11.43	9.8
2	Free-Side 60° Angle Cable Exit with Pull-Tab		13.00	11.80	13.08	9.8
3	Free-Side Vertical (90°) Cable Exit with Pull-Tab		9.55	14.40	9.55	14.40
4	Free-Side Horizontal (0°) Cable Exit with NON Pull-Tab		12.75	11.20	N/A	
5	Free-Side 60° Angle Cable Exit with NON Pull-Tab		13.00	11.20		
6	Dual-Bay Free-Side Horizontal (0°) Cable Exit with Pull-Tab	53.05	11.60	11.80		
7	Dual-Bay Free-Side 60° Angle Cable Exit with Pull-Tab		13.20	11.80		

Table 4-2 Compatibility Matrix for Type 1 and Type 2 connector Configurations

	Type 1 – Free-Side	Type 2 – Free-Side
Type 1 – Fixed-Side	Fully Supported	Not Supported (see Note 2)
Type 2 – Fixed-Side	Supported – limited to Type 1 capability	Fully Supported

NOTES:
1. It is recommended that all future designs use the Type 2 fixed-side connector.
2. Insertion force required to latch Type 2 free-side connector into Type 1 fixed-side connector exceeds the limits specified in Table 7-1.

4.1.1 Configuration 1: With Free-Side Horizontal (0°) Cable Exit with Pull-Tab

This configuration has the cables exiting the connector perpendicular to the direction of mating and parallel to the PCB. It includes a pull tab for unmating of the connector.

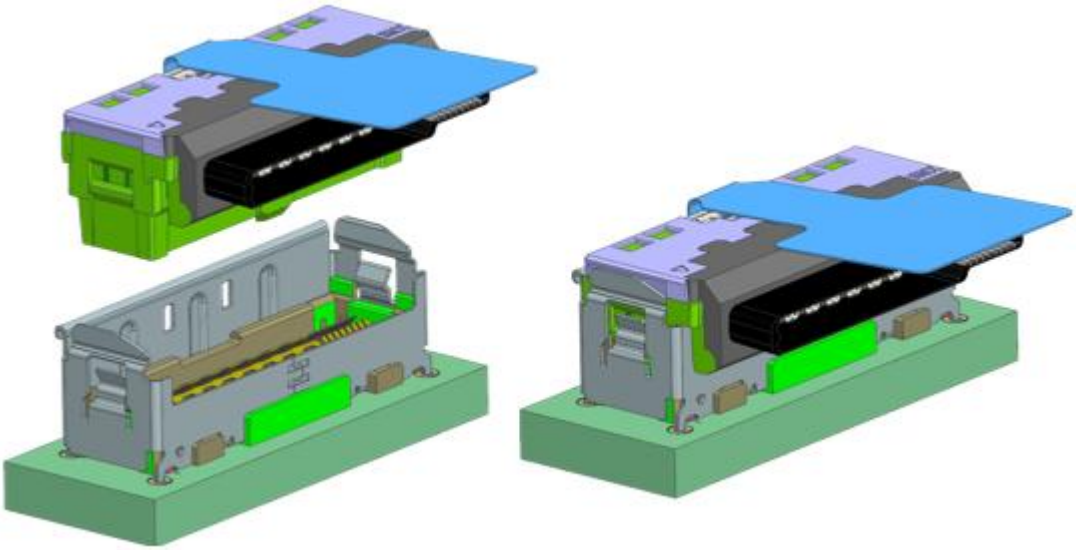


Figure 4-2: Configuration 1- Unmated and Mated

4.1.2 Configuration 2: With Free-Side 60° Angle Cable Exit with Pull-Tab

This configuration has the cables exiting the connector at a 60° angle in relation to the PCB. It also includes a pull tab for unmating of the connector.

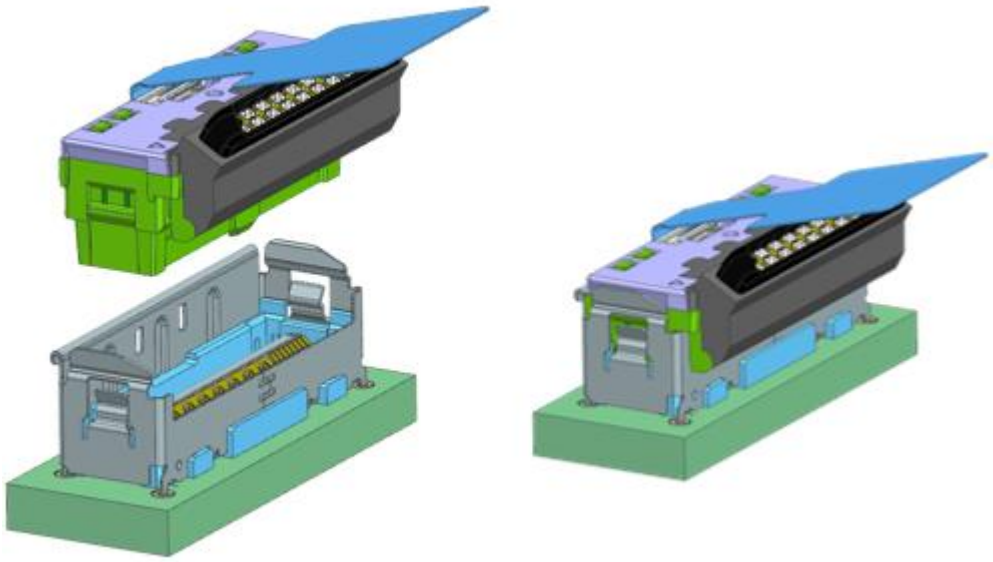


Figure 4-3: Configuration 2- Unmated and Mated

4.1.3 Configuration 3: With Free-Side Vertical (90°) Cable Exit

This configuration has the cables exiting the connector parallel to the direction of mating and perpendicular to the PCB. It also includes a pull tab for unmating of the connector. The vertical cable exit is not available without a pull tab.

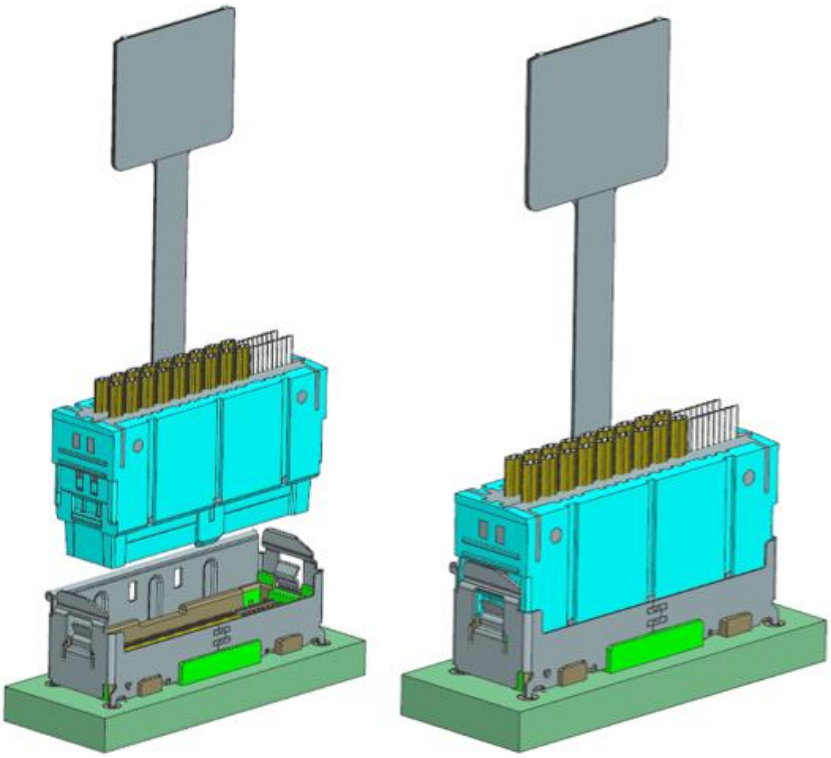


Figure 4-4 Configuration 3- Unmated and Mated

4.1.4 Configuration 4: With Free-Side Horizontal (0°) Cable Exit NON Pull-Tab

This configuration has the cables exiting the connector perpendicular to the direction of mating and parallel to the PCB (same as Configuration 1) except this has a latch that is intended to be pressed by the index finger while grabbing the sides with the thumb and other finger(s).

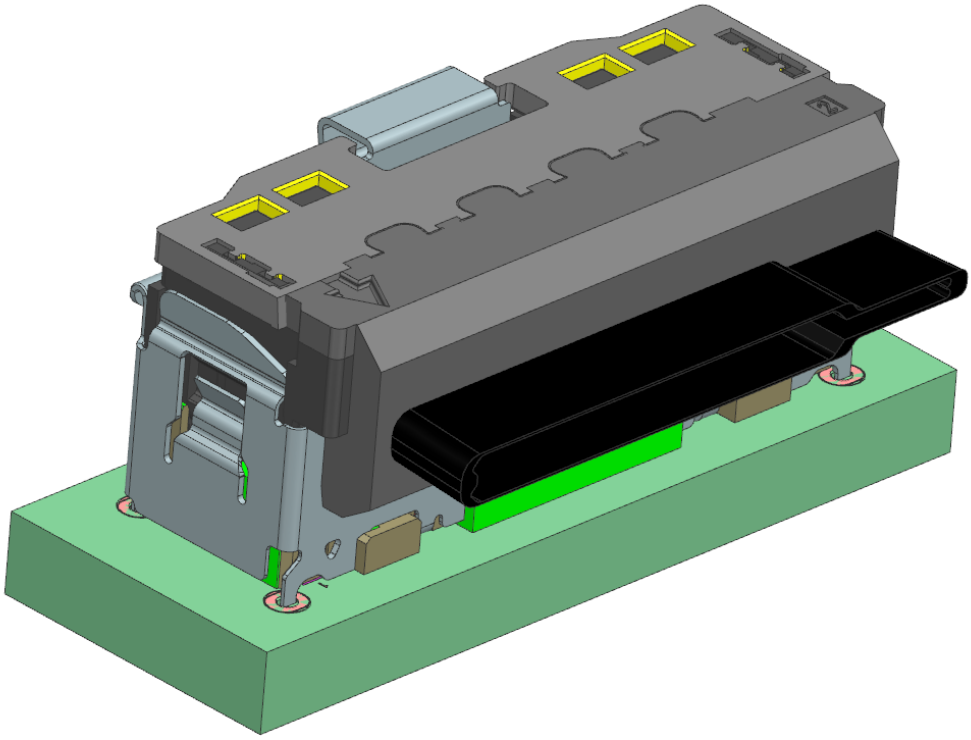


Figure 4-5: Configuration 4- Mated

4.1.5 Configuration 5: With Free-Side 60° Angle Cable Exit NON Pull-Tab

This configuration has the cables exiting the connector at a 60° angle in relation to the PCB (same as Configuration 2) except this also has a latch that is intended to be pressed by the index finger while grabbing the sides with the thumb and other finger(s).

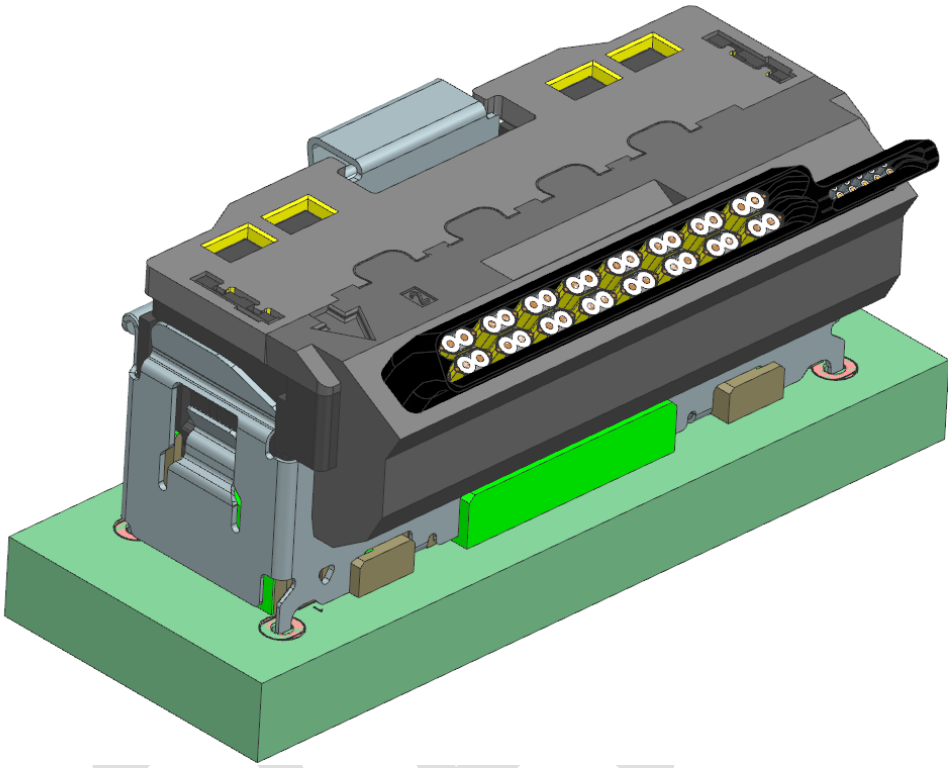


Figure 4-6: Configuration 5- Mated

4.1.6 Configuration 6: Dual-Bay Free-Side Horizontal (0°) Cable Exit with Pull-Tab

This configuration has the cables exiting the connector perpendicular to the direction of mating and parallel to the PCB. It also includes a pull tab for unmating of the connector.

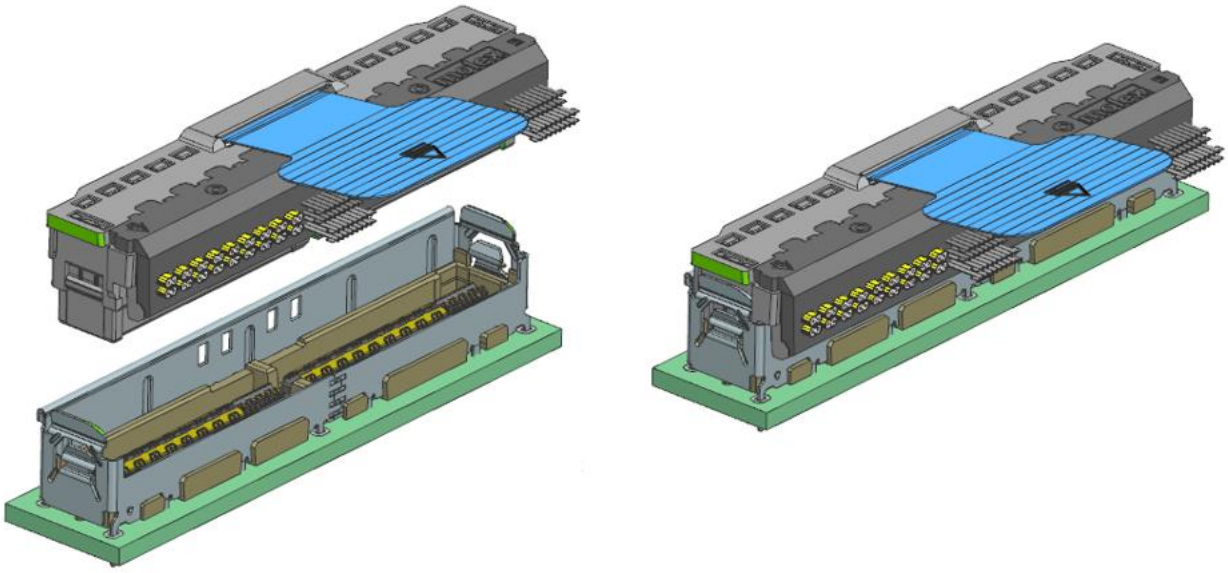


Figure 4-7: Configuration 6 - Unmated and Mated

4.1.7 Configuration 7: Dual-Bay Free-Side 60° Angle Cable Exit with Pull-Tab

This configuration has the cables exiting the connector at a 60° angle in relation to the PCB. It also includes a pull tab for unmating of the connector.

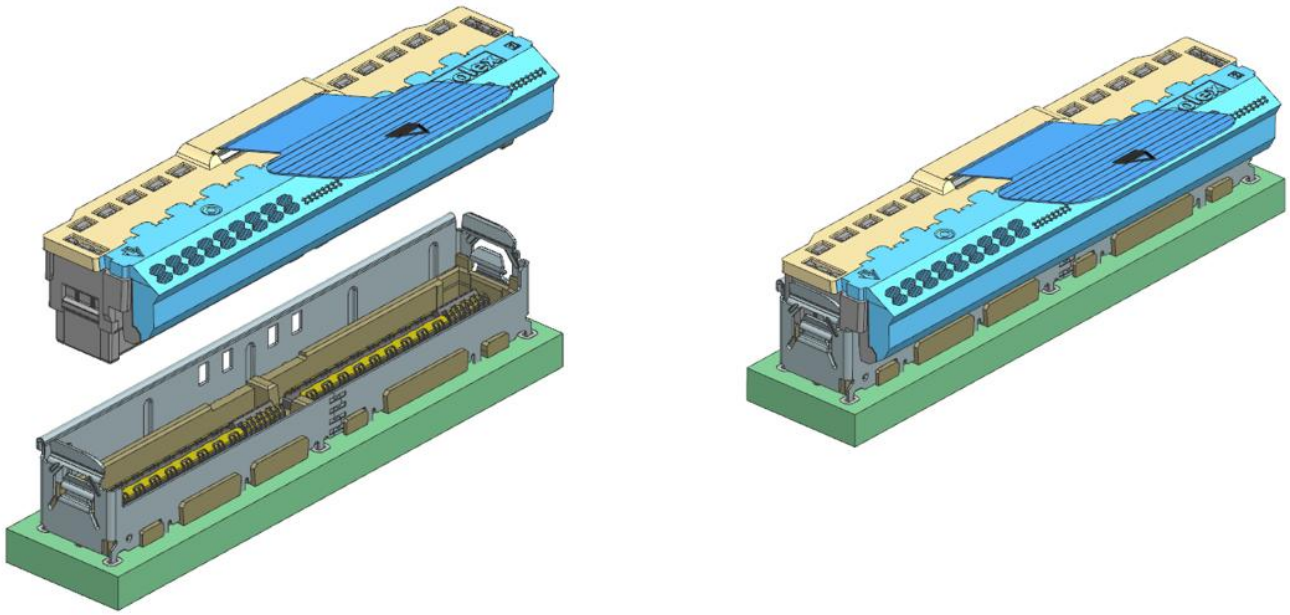


Figure 4-8: Configuration 7 - Unmated and Mated

4.2 Contact Numbering

The electrical contacts in this connector are numbered as shown in Figure 4-9. Electrical assignments are captured in Table 4-3. Contacts labeled "S" denote signals that carry half of a high-speed differential pair. Contacts labeled "SB" carry sideband signals. Ground contacts are labeled "GND".

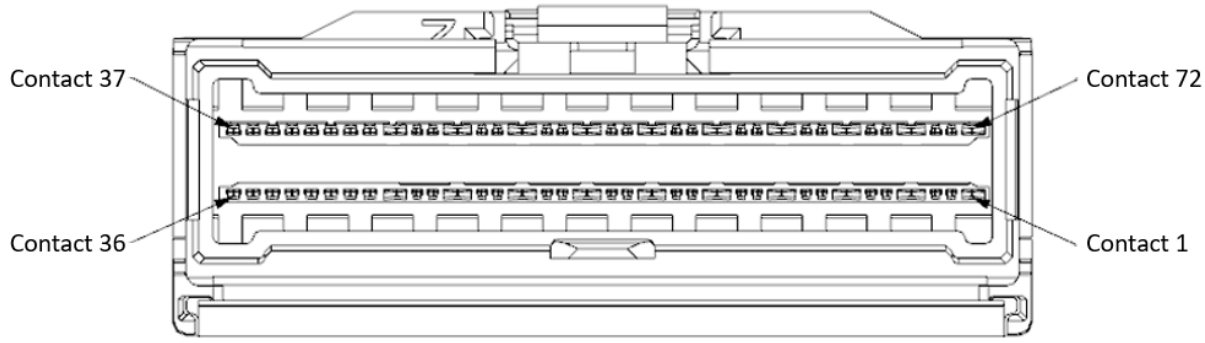


Figure 4-9: Free-side Connector Contact Numbering

Table 4-3: Free-Side Connector Pin Out

Contact	Assignment	Assignment	Contact
1	GND	GND	72
2	S	S	71
3	S	S	70
4	GND	GND	69
5	S	S	68
6	S	S	67
7	GND	GND	66
8	S	S	65
9	S	S	64
10	GND	GND	63
11	S	S	62
12	S	S	61
13	GND	GND	60
14	S	S	59
15	S	S	58
16	GND	GND	57
17	S	S	56
18	S	S	55
19	GND	GND	54
20	S	S	53
21	S	S	52
22	GND	GND	51
23	S	S	50
24	S	S	49
25	GND	GND	48
26	S	S	47
27	S	S	46
28	GND	GND	45
29	SB	SB	44
30	SB	SB	43
31	SB	SB	42
32	SB	SB	41
33	SB	SB	40
34	SB	SB	39
35	SB	SB	38
36	SB	SB	37

Figure 4-10 and Figure 4-11 illustrate cable assembly connector and contact numbering. Table 4-4 captures the cable signal wiring.

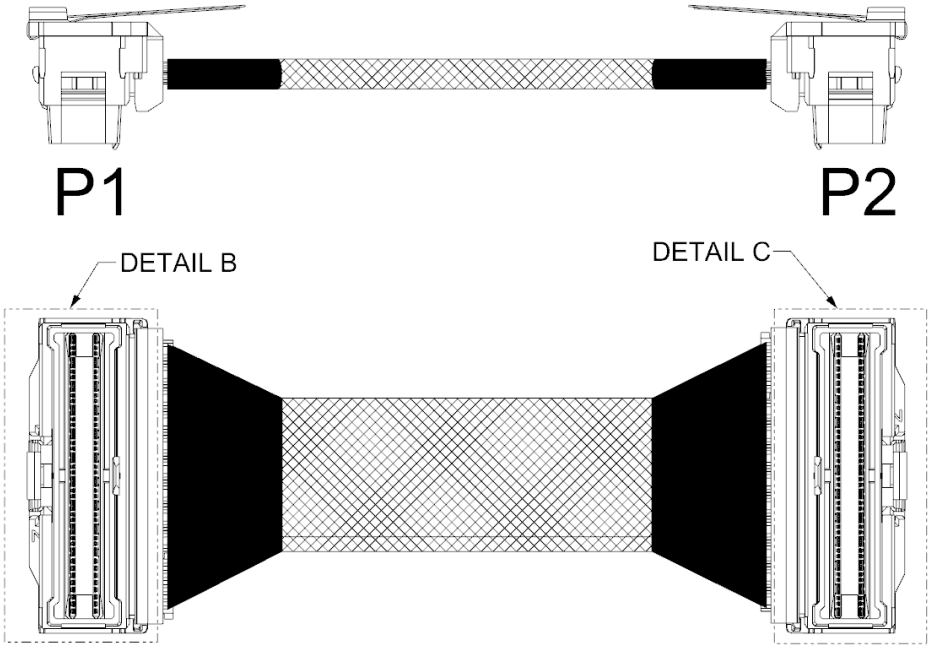


Figure 4-10: Cable Assembly Free-side Connector Numbering

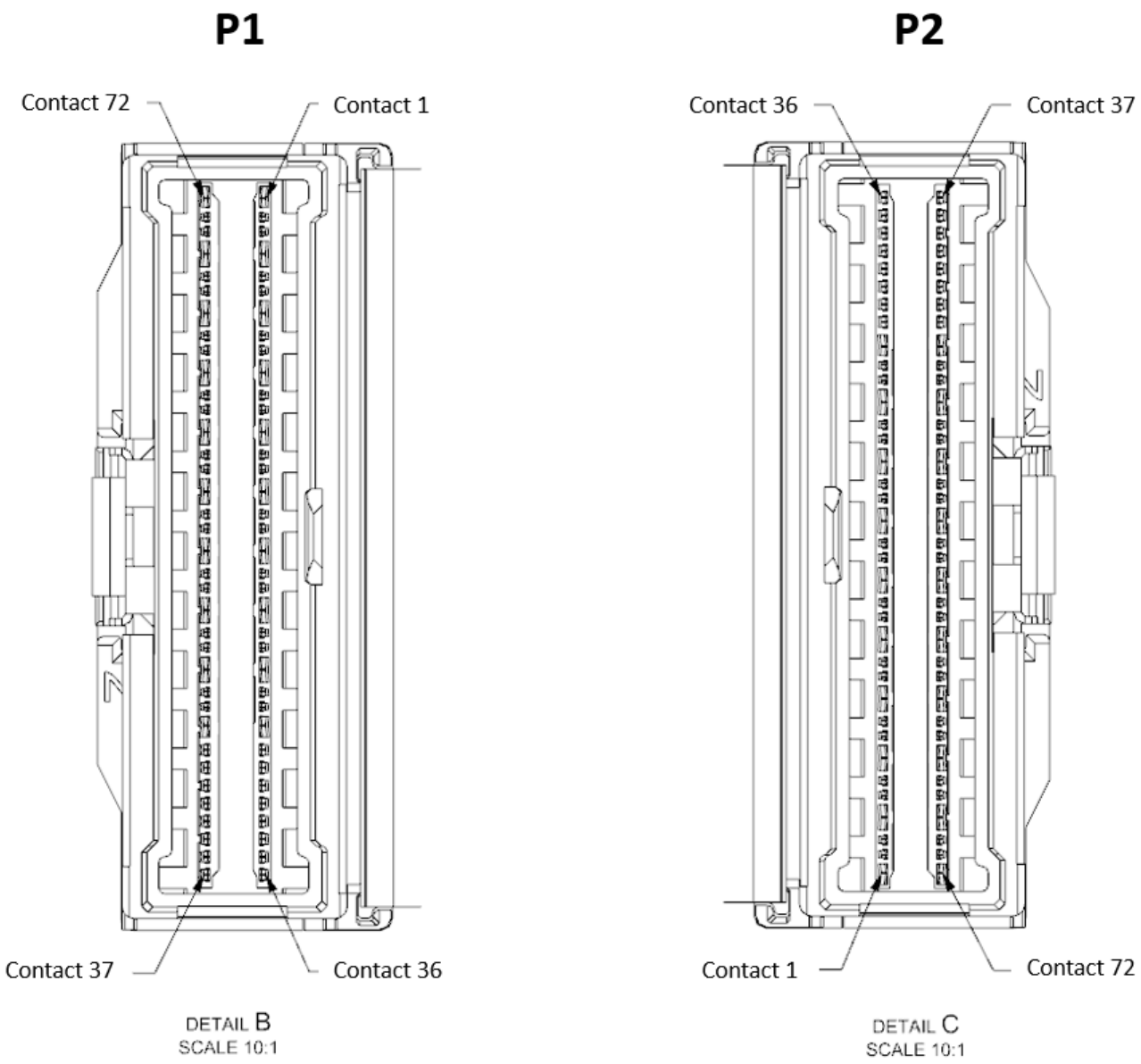


Figure 4-11: Cable Assembly Free-Side Connector Contact Numbering

Table 4-4: Cable Assembly Wiring Diagram

P1			P2	
Contact	Assignment		Assignment	Contact
1	GND	↔	GND	45
2	S	↔	S	46
3	S	↔	S	47
4	GND	↔	GND	48
5	S	↔	S	49
6	S	↔	S	50
7	GND	↔	GND	51
8	S	↔	S	52
9	S	↔	S	53
10	GND	↔	GND	54
11	S	↔	S	55
12	S	↔	S	56
13	GND	↔	GND	57
14	S	↔	S	58
15	S	↔	S	59
16	GND	↔	GND	60
17	S	↔	S	61
18	S	↔	S	62
19	GND	↔	GND	63
20	S	↔	S	64
21	S	↔	S	65
22	GND	↔	GND	66
23	S	↔	S	67
24	S	↔	S	68
25	GND	↔	GND	69
26	S	↔	S	70
27	S	↔	S	71
28	GND	↔	GND	72
29	SB	↔	SB	37
30	SB	↔	SB	38
31	SB	↔	SB	39
32	SB	↔	SB	40
33	SB	↔	SB	41
34	SB	↔	SB	42
35	SB	↔	SB	43
36	SB	↔	SB	44

P1			P2	
Contact	Assignment		Assignment	Contact
37	SB	↔	SB	29
38	SB	↔	SB	30
39	SB	↔	SB	31
40	SB	↔	SB	32
41	SB	↔	SB	33
42	SB	↔	SB	34
43	SB	↔	SB	35
44	SB	↔	SB	36
45	GND	↔	GND	1
46	S	↔	S	2
47	S	↔	S	3
48	GND	↔	GND	4
49	S	↔	S	5
50	S	↔	S	6
51	GND	↔	GND	7
52	S	↔	S	8
53	S	↔	S	9
54	GND	↔	GND	10
55	S	↔	S	11
56	S	↔	S	12
57	GND	↔	GND	13
58	S	↔	S	14
59	S	↔	S	15
60	GND	↔	GND	16
61	S	↔	S	17
62	S	↔	S	18
63	GND	↔	GND	19
64	S	↔	S	20
65	S	↔	S	21
66	GND	↔	GND	22
67	S	↔	S	23
68	S	↔	S	24
69	GND	↔	GND	25
70	S	↔	S	26
71	S	↔	S	27
72	GND	↔	GND	28

4.3 Datums

The datums defined in Figure 4-12, Figure 4-13, Figure 4-14, Figure 4-15, and Figure 4-16 are used throughout the rest of the document to describe the dimensional requirements of the connector. Additional descriptions are provided in Table 4-5, Table 4-6, Table 4-7, and Table 4-8.

4.3.1 Fixed-Side Connector Datum Descriptions

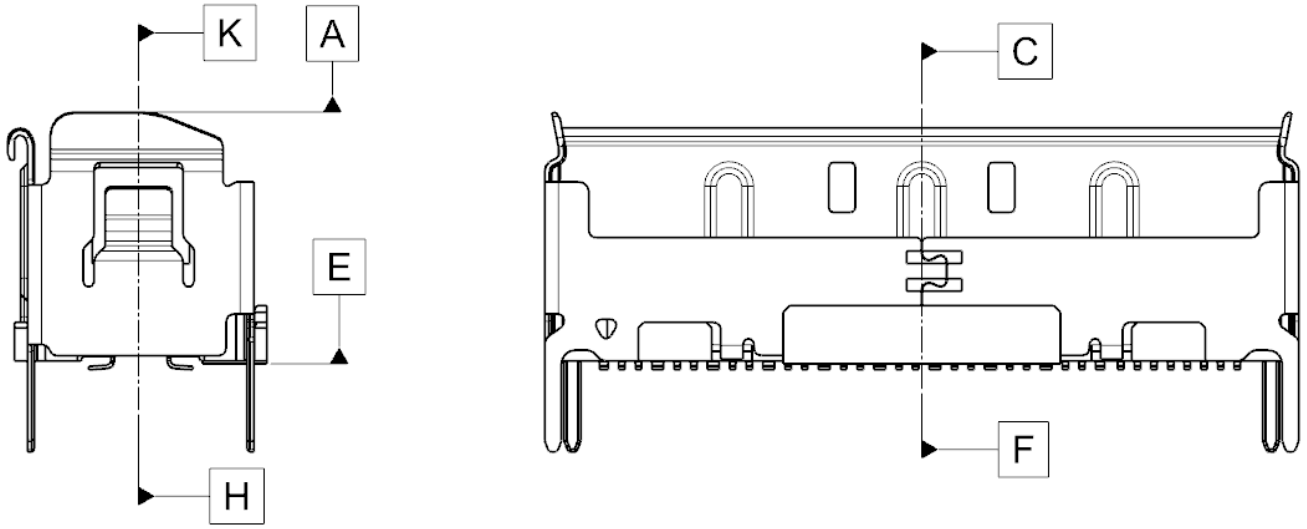


Figure 4-12: Fixed-Side Connector Datums

Table 4-5: Fixed-Side Connector Datum Descriptions

A	Fixed-side Can (top edge for staging)
K	Fixed-side centerline Y-direction mate side
H	Fixed-side centerline Y-direction PCB side
C	Fixed-side centerline X-direction mate side
F	Fixed-side centerline X-direction PCB side
E	Fixed-side housing (bottom)

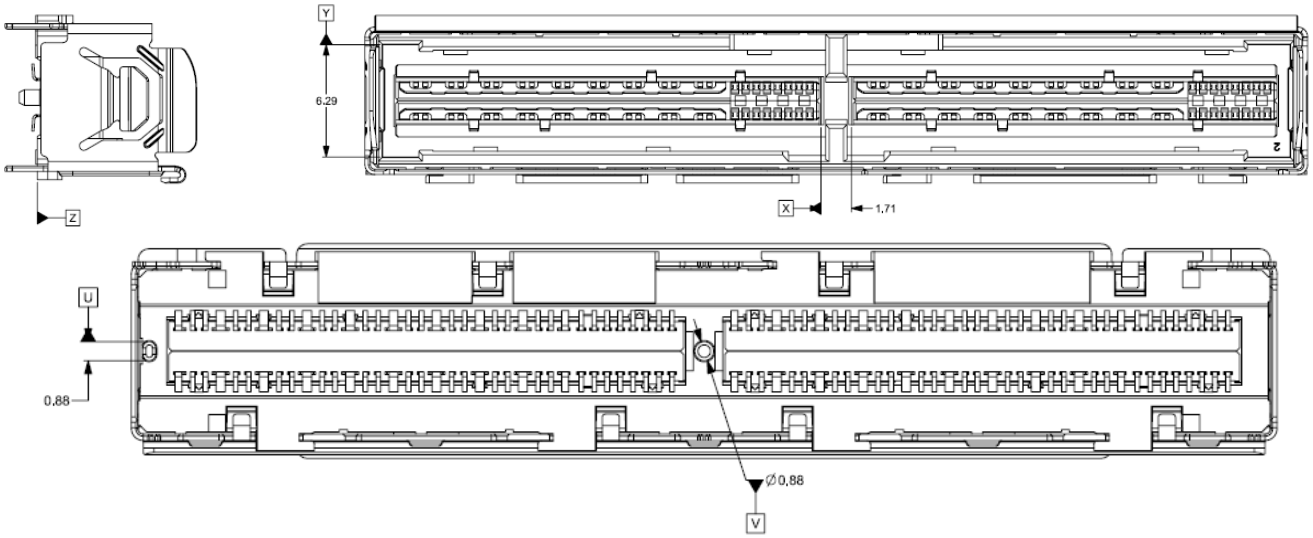


Figure 4-13: Dual-Bay Fixed-Side Connector Datums

Table 4-6: Dual-Bay Fixed-Side Connector Datum Descriptions

Y	Fixed-side centerline Y-direction mate side
V-U	Fixed-side centerline Y-direction PCB side
X	Fixed-side centerline X-direction mate side
V	Fixed-side centerline X-direction PCB side
Z	Fixed-side housing (bottom)

4.3.2 Free-Side Connector Datum Descriptions

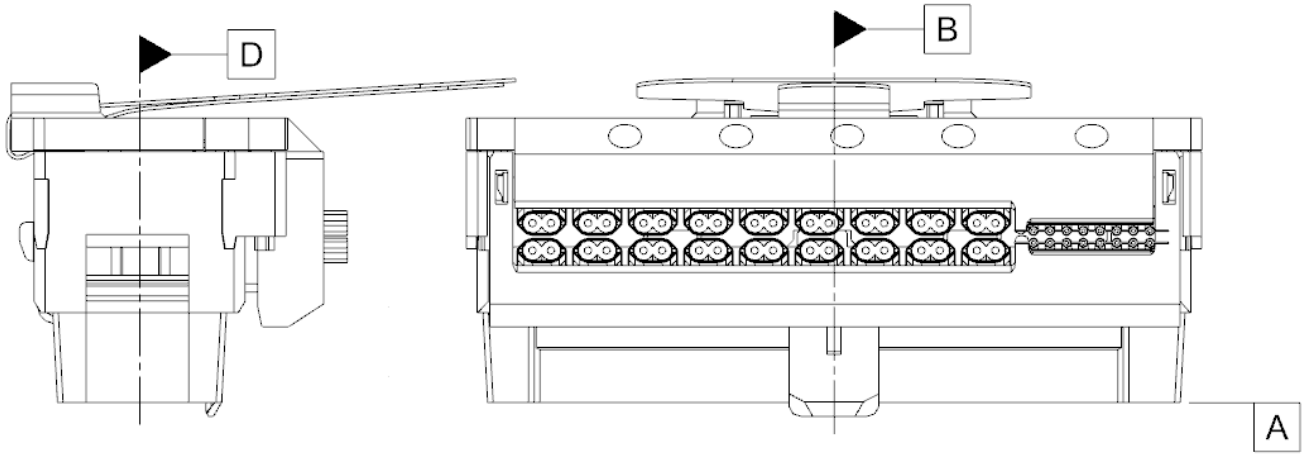


Figure 4-14: Horizontal (0°) Free-Side Connector Datums

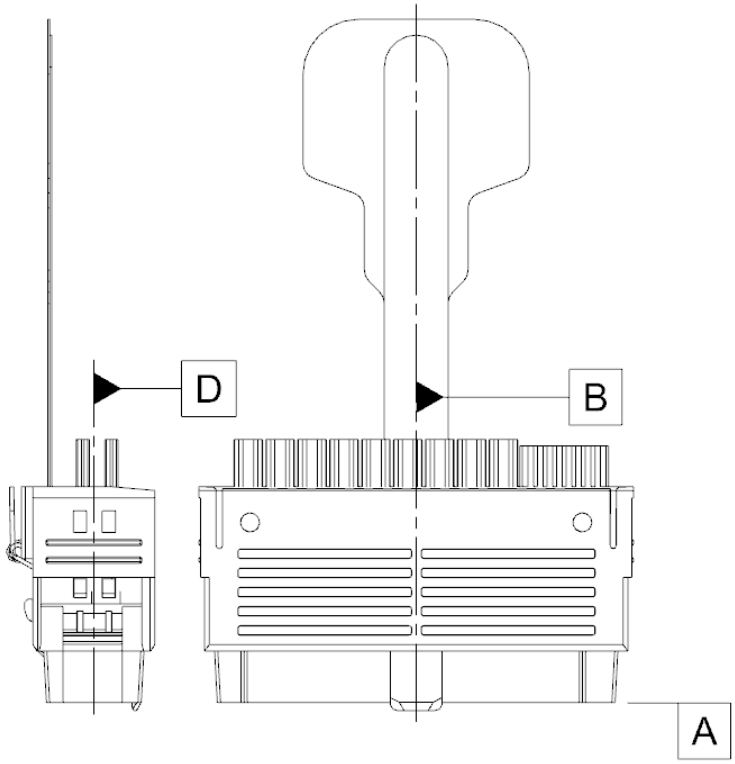


Figure 4-15: Vertical Cable Exit Free-Side Connector Datums

Table 4-7: Free-Side Connector Datum Descriptions

D	Free-side centerline Y-direction mate side
B	Free-side centerline X-direction mate side
A	Free-side connector (bottom for staging)

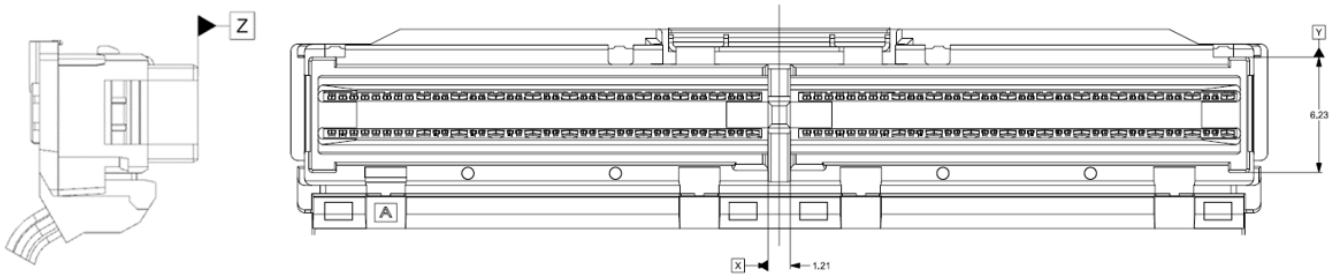


Figure 4-16: Dual-Bay Free-Side Connector Datum Descriptions

Table 4-8: Dual-Bay Horizontal (0°) Free-Side Connector Datum Descriptions

Y	Fixed-side centerline Y-direction mate side
X	Fixed-side centerline X-direction mate side
Z	Fixed-side housing (bottom for staging)

5. Type 1 Connector Mechanical Specification

5.1 Fixed-Side Mechanical Specification

5.1.1 Overview

The fixed-side connector is comprised of insert molded terminals with plastic that are encased by a stainless steel cage with additional press fit tails. The fixed-side connector is designed to mate to all free-side connector variants. The fixed-side connector cages are 0.25mm strip thickness which includes latch windows for the free-side cable connector and two passive latches on the sides. A vacuum cap is also included for pick-and-place equipment for placing the connector on the PCB and protecting the contacts during shipment and handling.

Note: It is recommended that all future designs use the Type 2 fixed-side connector.

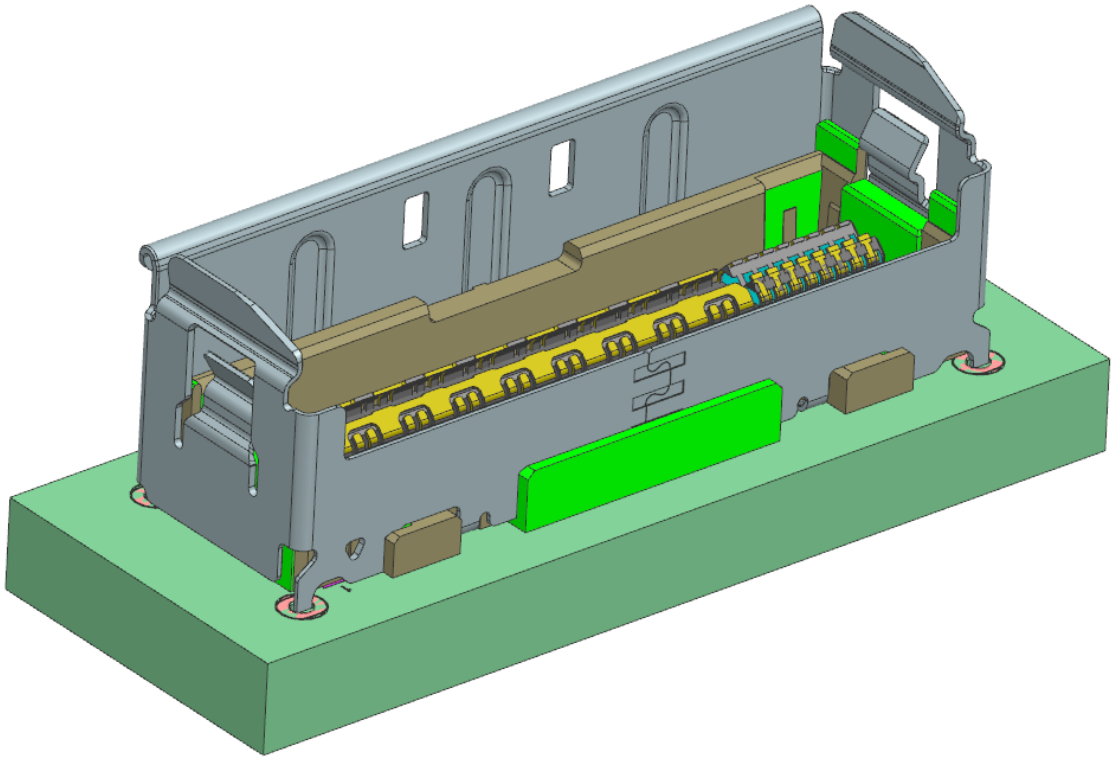


Figure 5-1: Fixed-Side Connector without Vacuum Cap

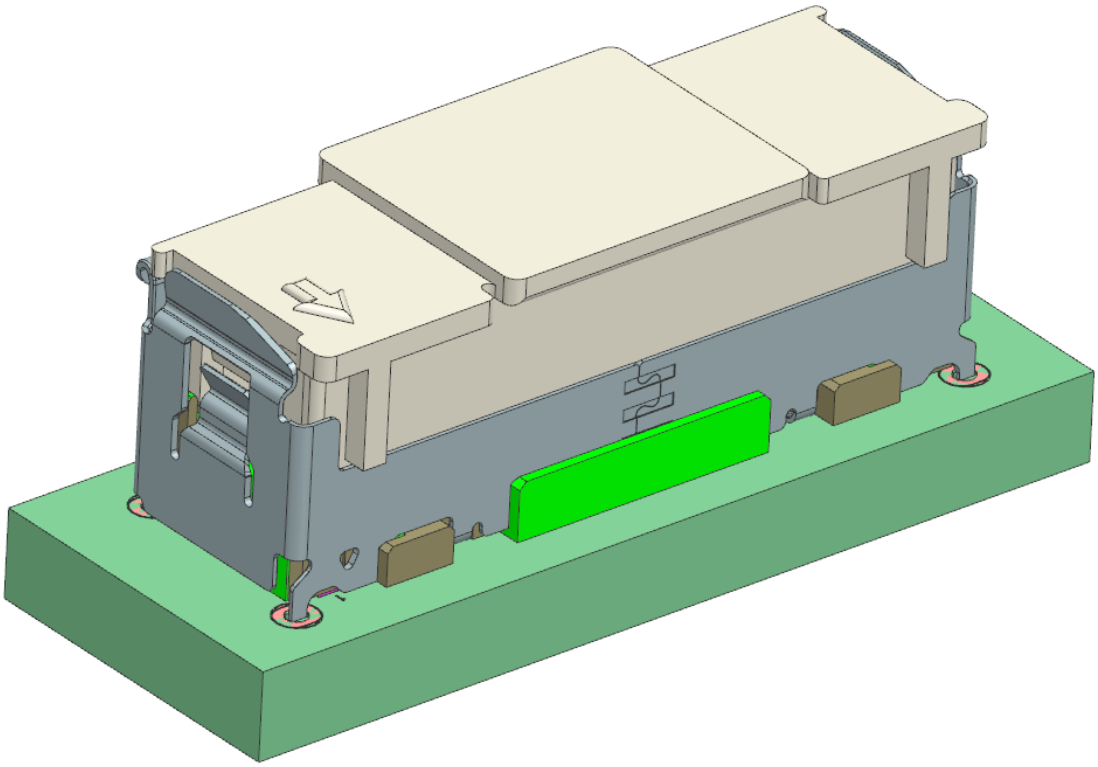


Figure 5-2: Fixed-Side Connector with Vacuum Cap

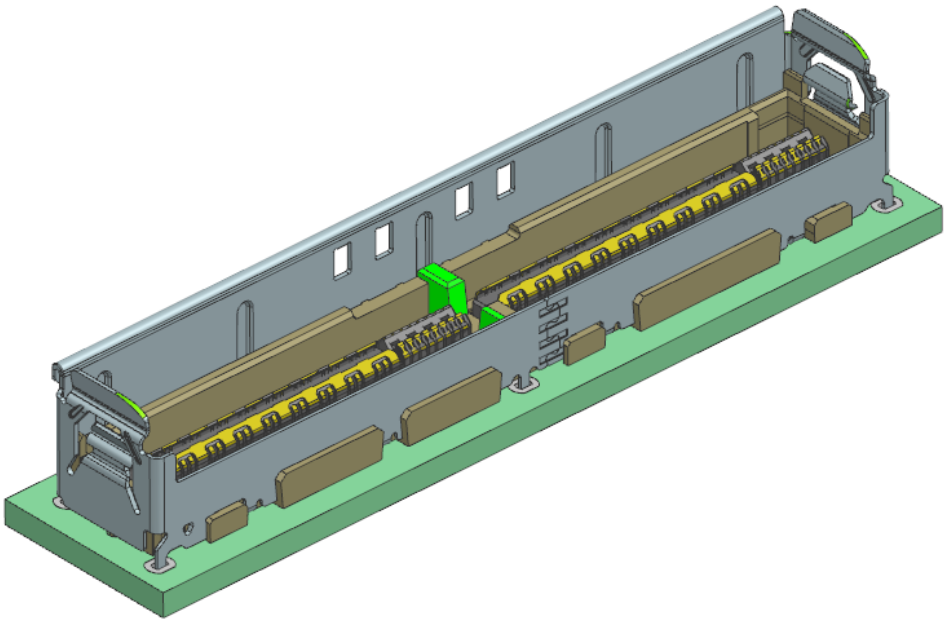


Figure 5-3: Dual-Bay Fixed-Side Connector without Vacuum Cap

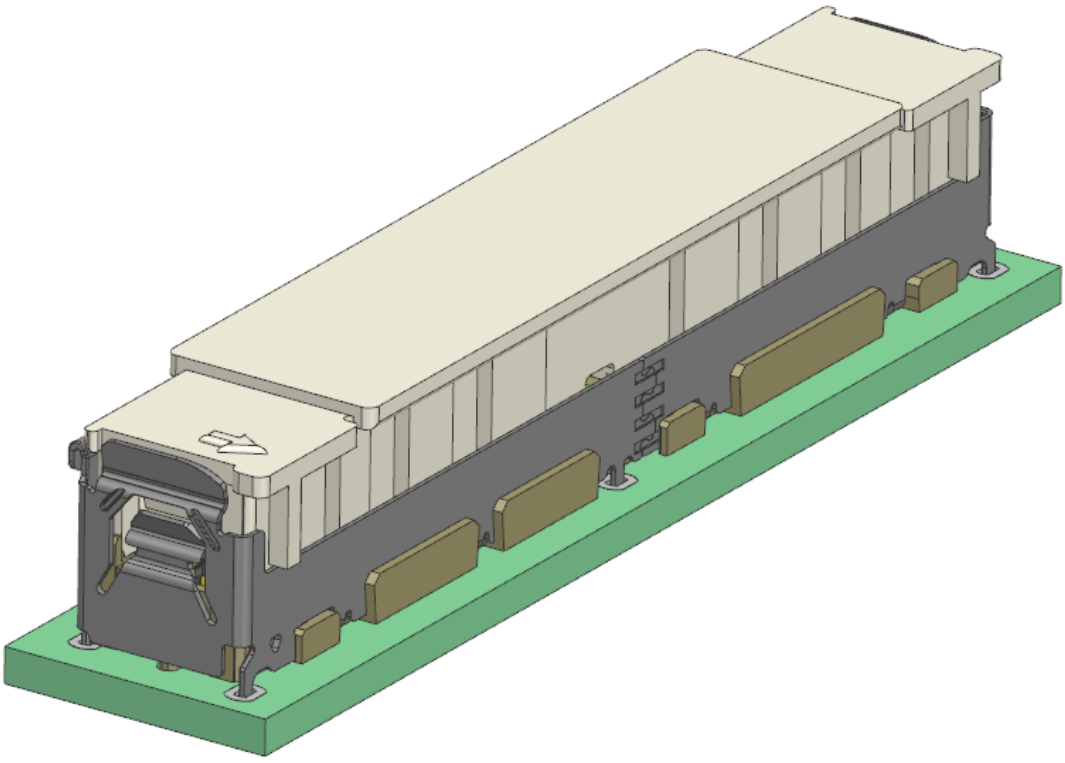


Figure 5-4: Dual-Bay Fixed-Side Connector with Vacuum Cap

The vacuum cap for the fixed-side connector is designed to fit only one way. It has an arrow on the top surface identifying the location of contact 1 (refer to Section 4.2 for contact numbering).

5.1.2 Mechanical Description: Fixed-Side Connector

Unless otherwise shown, the following tolerances shall apply to the figures:

a. Two & Three Place dimensions = +/- 0.05mm

b. Angular dimension = +/- 0.5°

The fixed-side connector cage has four press-fit tails. These tails may be one of two lengths. The selected length is application specific and is dependent on the thickness of the PCB to which the connector is fixed. Press-fit tail lengths are listed in Table 5-1.

5.1.3 Mechanical Description: Fixed-Side Connector

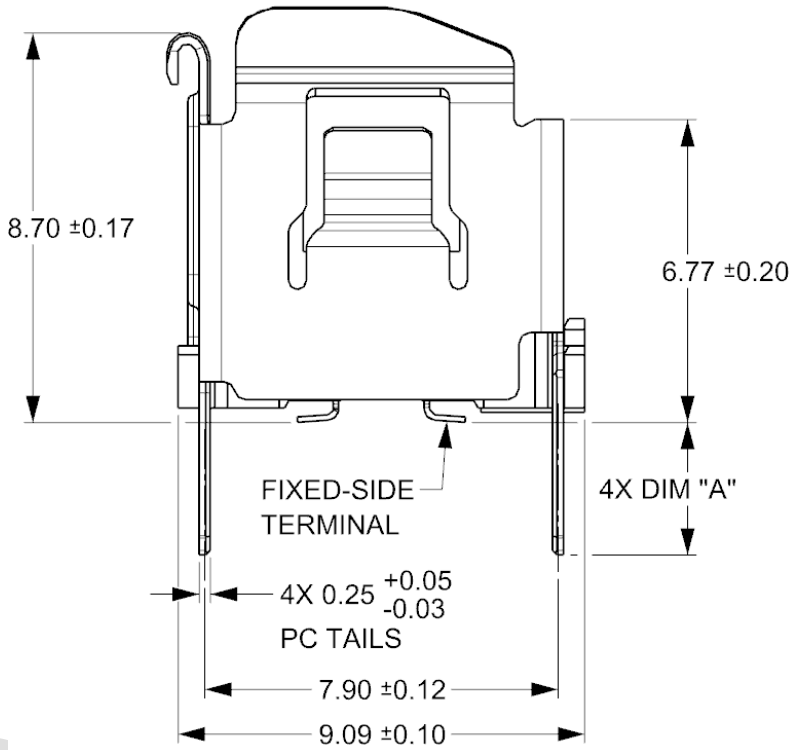


Figure 5-5: Profile View of Fixed- Side Connector Cage

Table 5-1: Press Fit Tail Lengths for Fixed-Side Connector Cage

DIM "A"
2.96
1.50

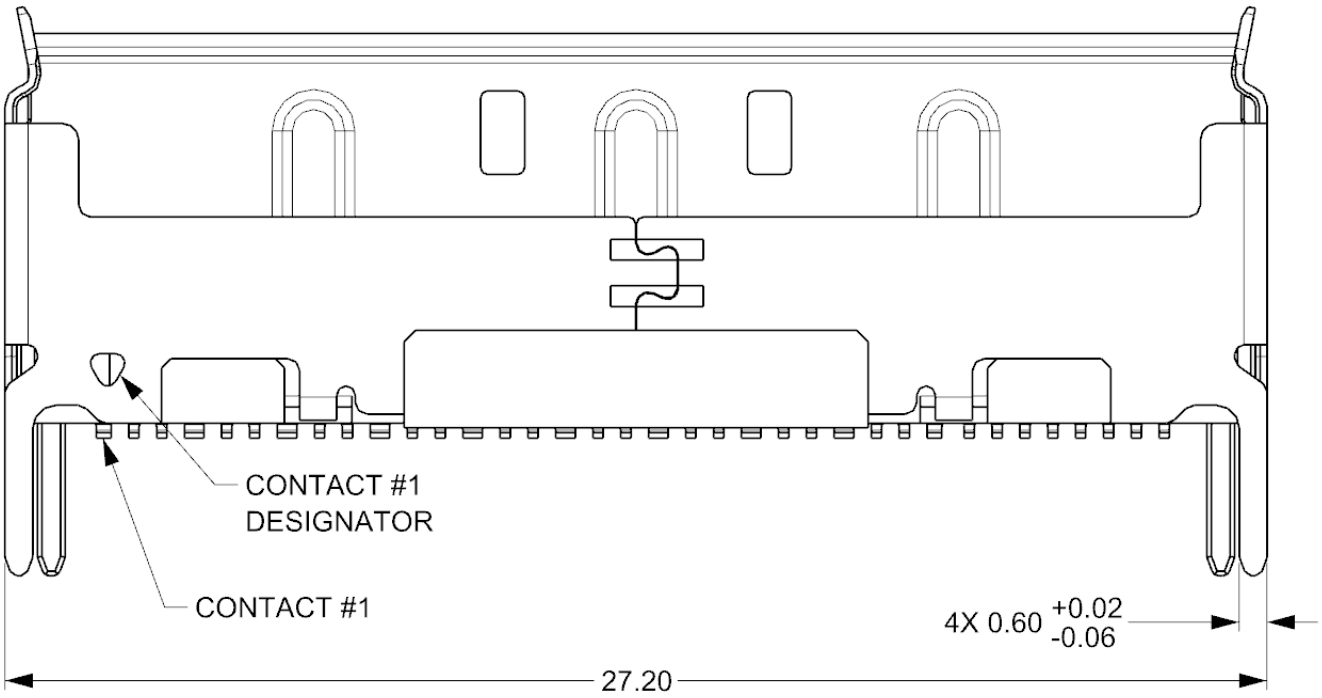
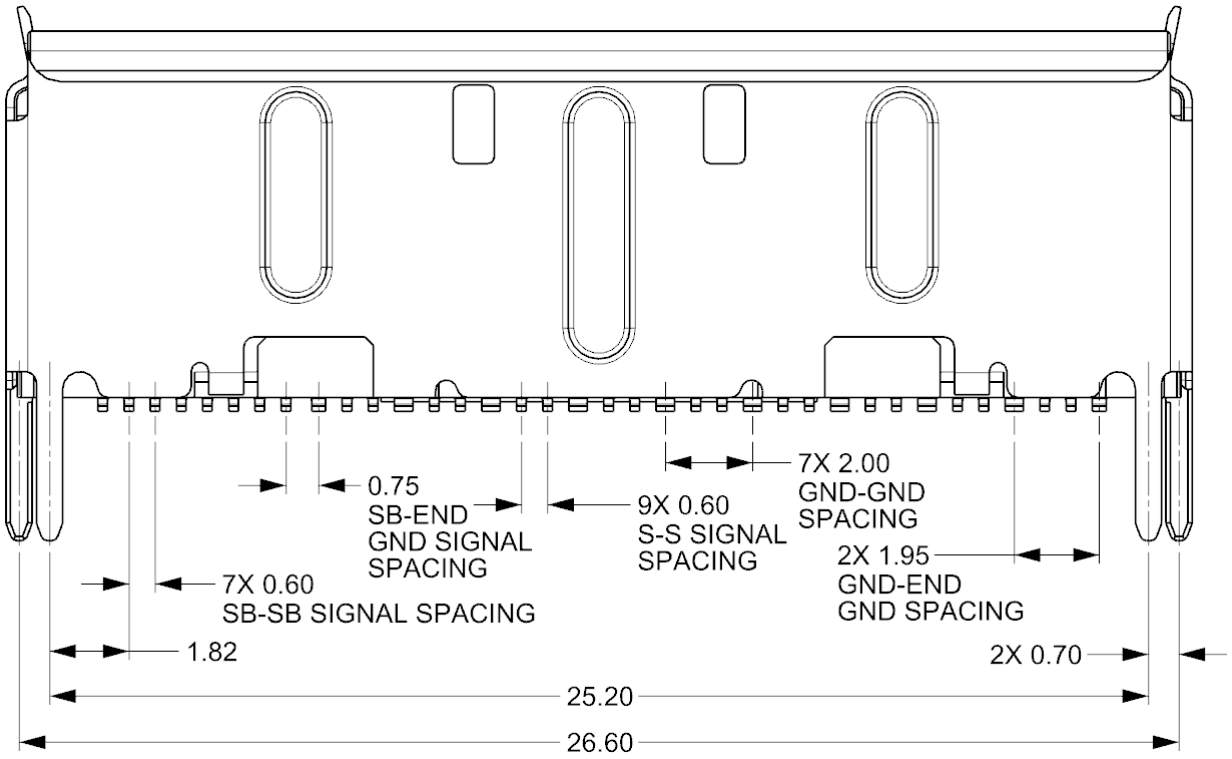
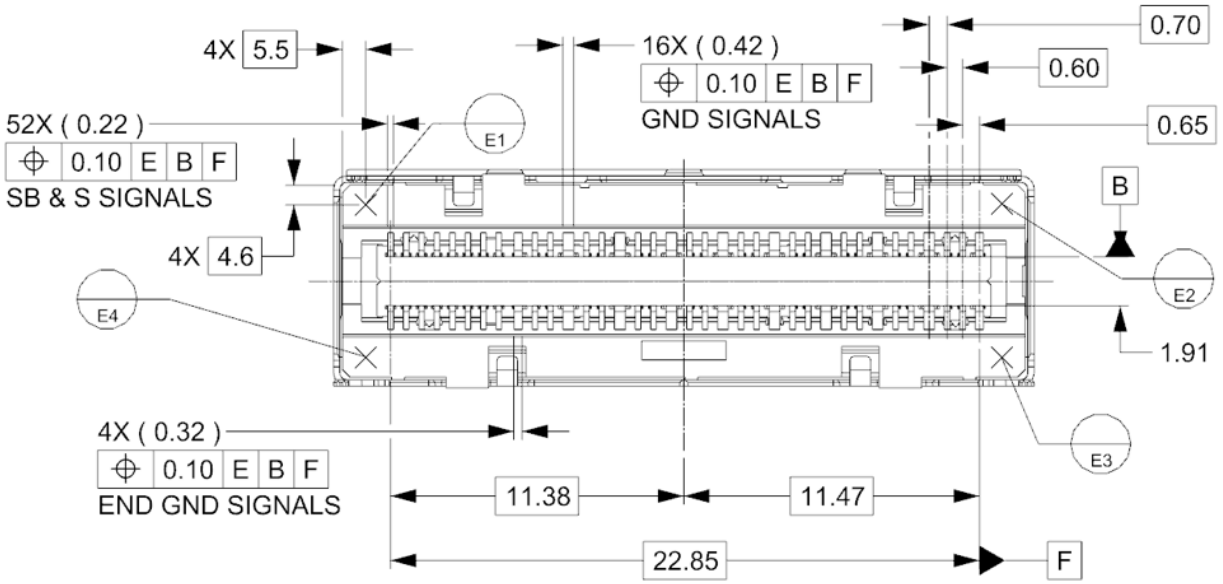


Figure 5-6: Front View of Fixed-Side Connector Cage



NOTE: Signal assignments are identified in Section 4.2. "END GND" refers to contacts 1, 28, 45, and 72.

Figure 5-7: Back View of Fixed-Side Connector Cage



NOTE: Signal assignments are identified in Section 4.2. "END GND" refers to contacts 1, 28, 45, and 72.

Figure 5-8: Bottom View of Fixed-Side Connector (1 of 2)

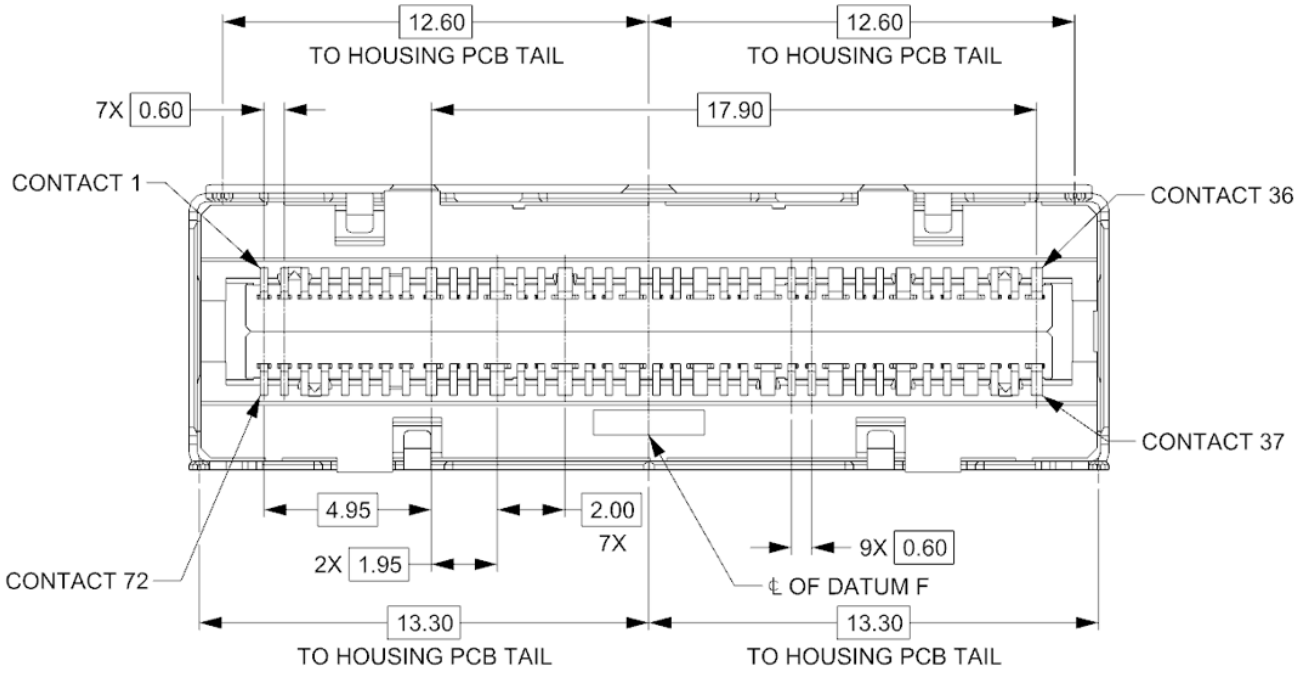


Figure 5-9: Bottom View of Fixed-Side Connector (2 of 2)

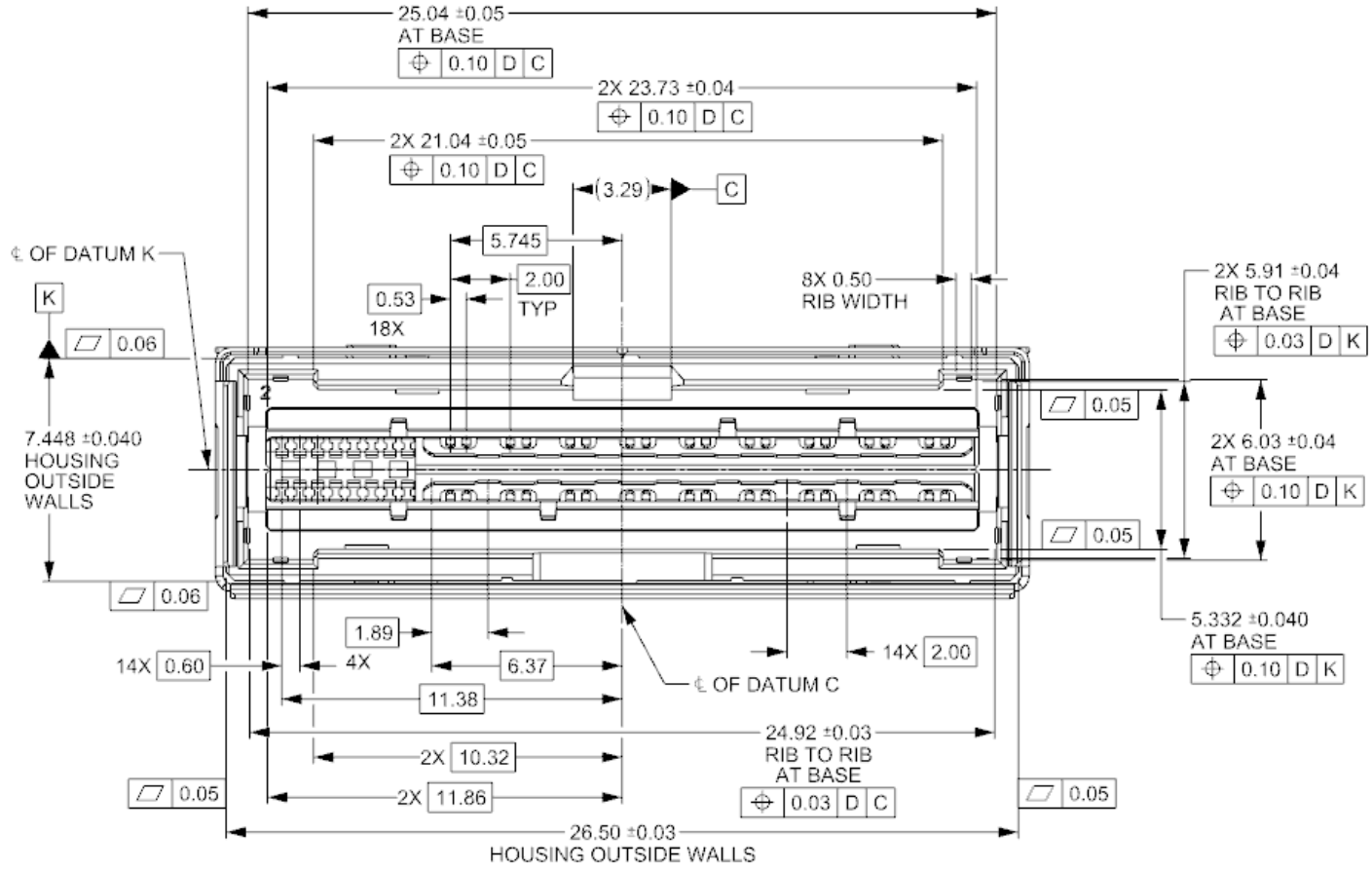


Figure 5-10: Top View of Fixed-Side Connector

5.1.4 Mechanical Description: Dual-Bay Fixed-Side Connector

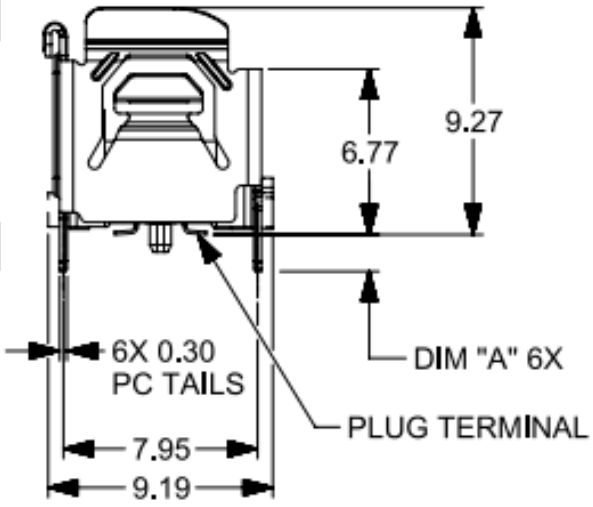


Figure 5-11: Dual-Bay Profile View of Fixed-Side Connector Cage

Table 5-2: Dual-Bay Tail Lengths of Fixed-Side Connector Cage

DIM "A"
1.50
2.96

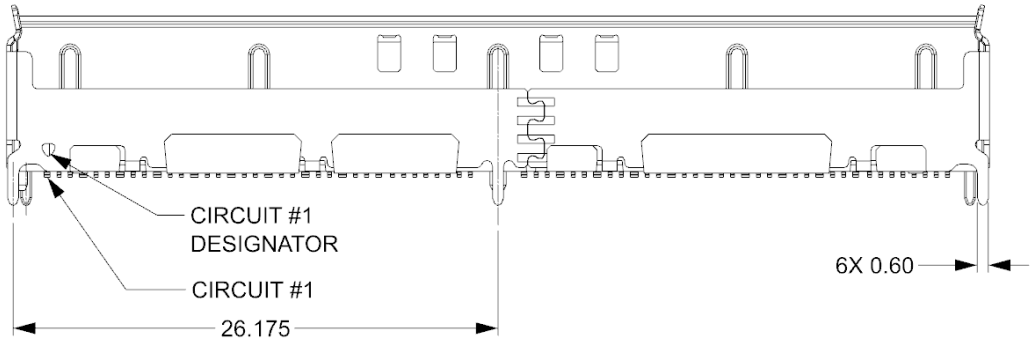


Figure 5-12: Dual-Bay Front View of Fixed-Side Connector Cage

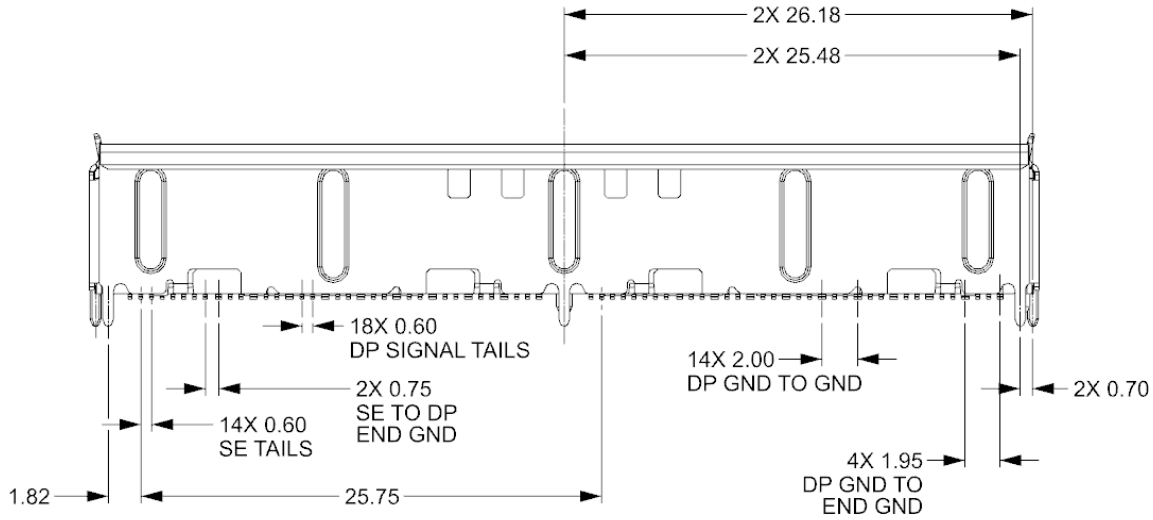


Figure 5-13: Dual-Bay Back View of Fixed-Side Connector Cage

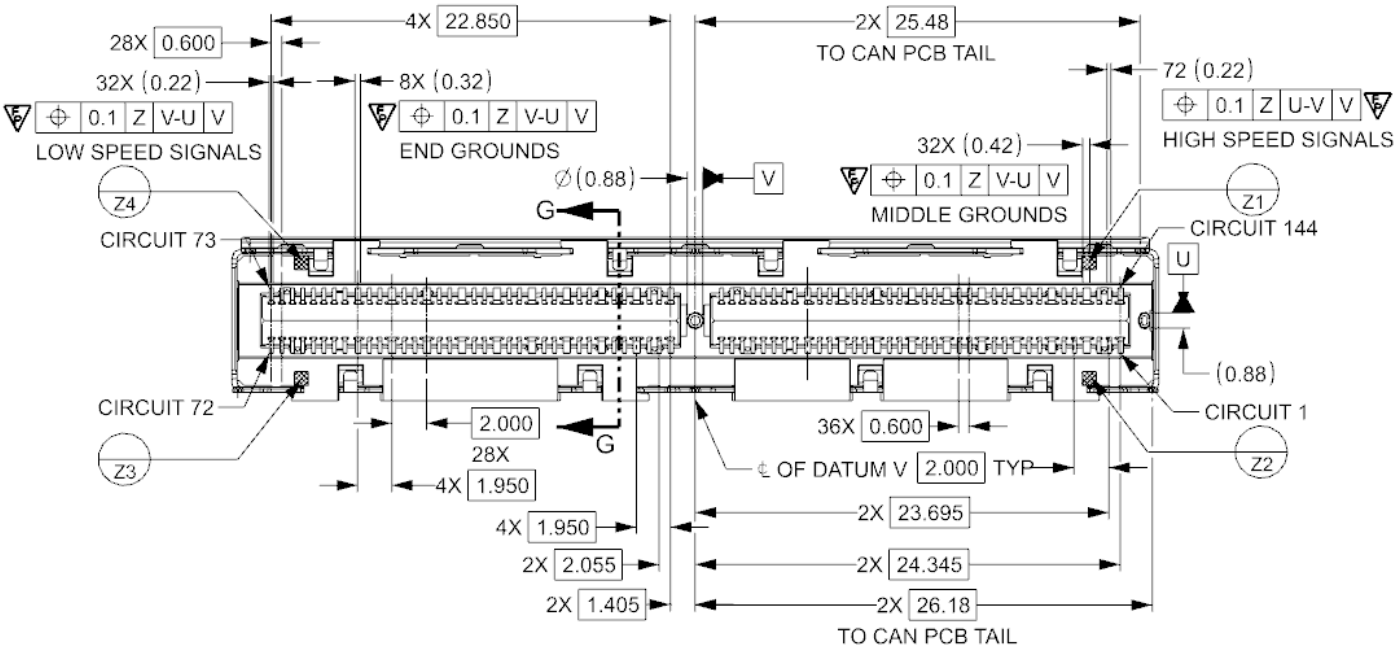


Figure 5-14: Dual-Bay Bottom View of Fixed-Side Connector

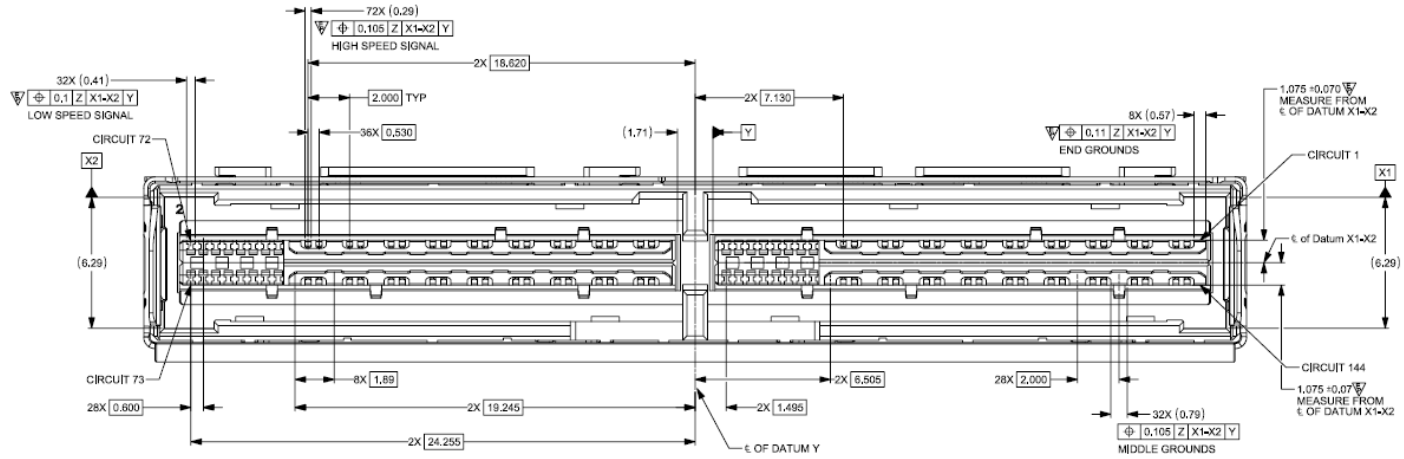


Figure 5-15: Dual-Bay Top View of Fixed-Side Connector

5.2 Free-Side Mechanical Specification

5.2.1 Overview

The free-side connector housing and cover are plastic. Twinaxial cable and single-ended ribbon cable is connected to the mating terminals inside the free-side connector. The free-side connector also includes a stainless steel positive latch with two designs, one for use with a pull tab and one for manual activation by hand. The vertical cable exit design is only available with a pull tab.

5.2.2 Mechanical Description: Free-Side Connectors

Unless otherwise shown, the following tolerances shall apply to the figures:

a. Two & Three Place dimensions = +/- 0.05mm
b. Angular dimension = +/- 0.5°

5.2.3 Free-Side Variant 1: Horizontal (0°) Cable Exit with Pull Tab

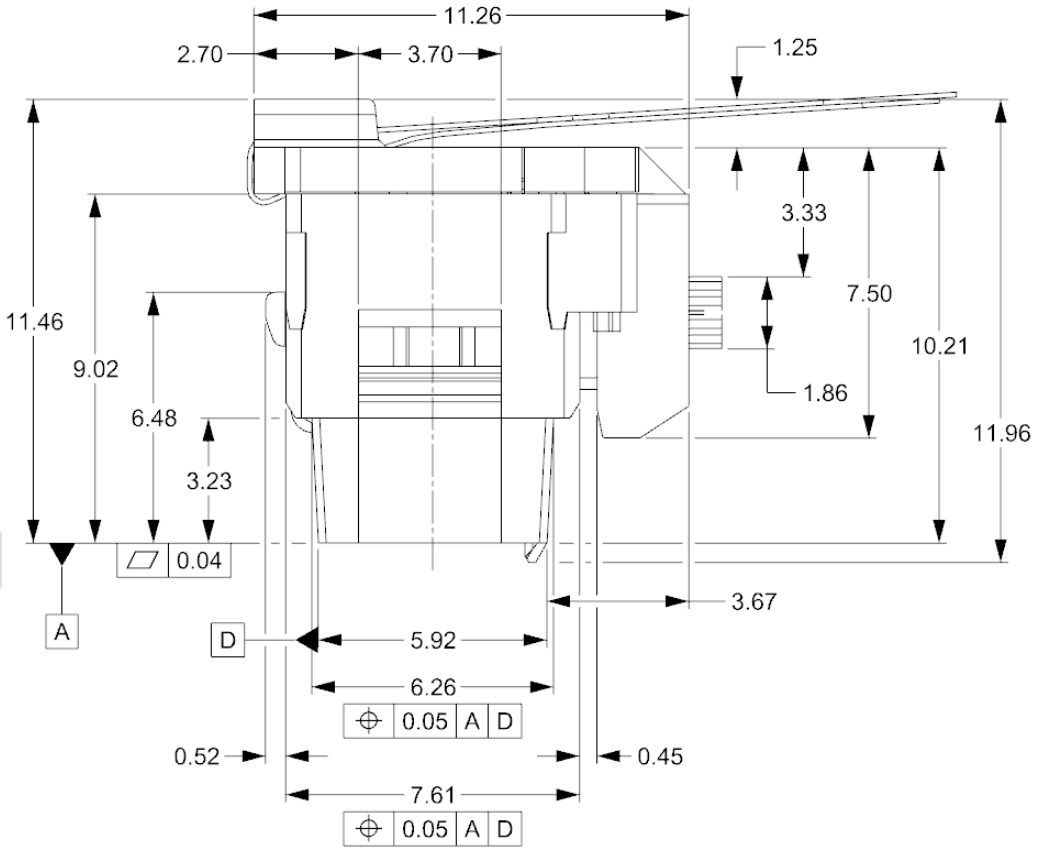


Figure 5-16: Profile View of Free-Side Connector with Horizontal (0°) Cable Exit & Pull Tab

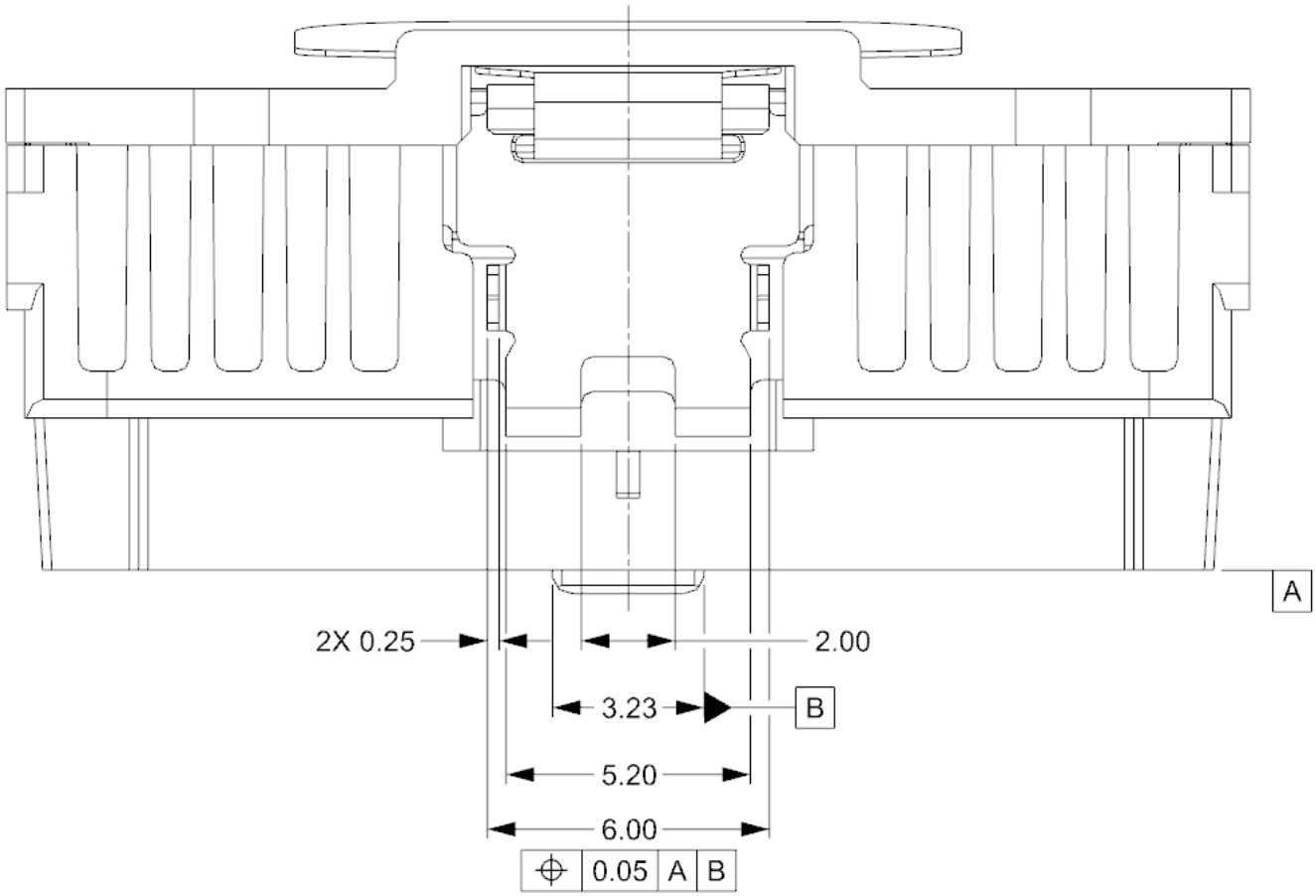


Figure 5-17: Latch for Free-Side Connector

The latch position dimensions shown in Figure 5-17 apply to all configurations of the free-side connector.

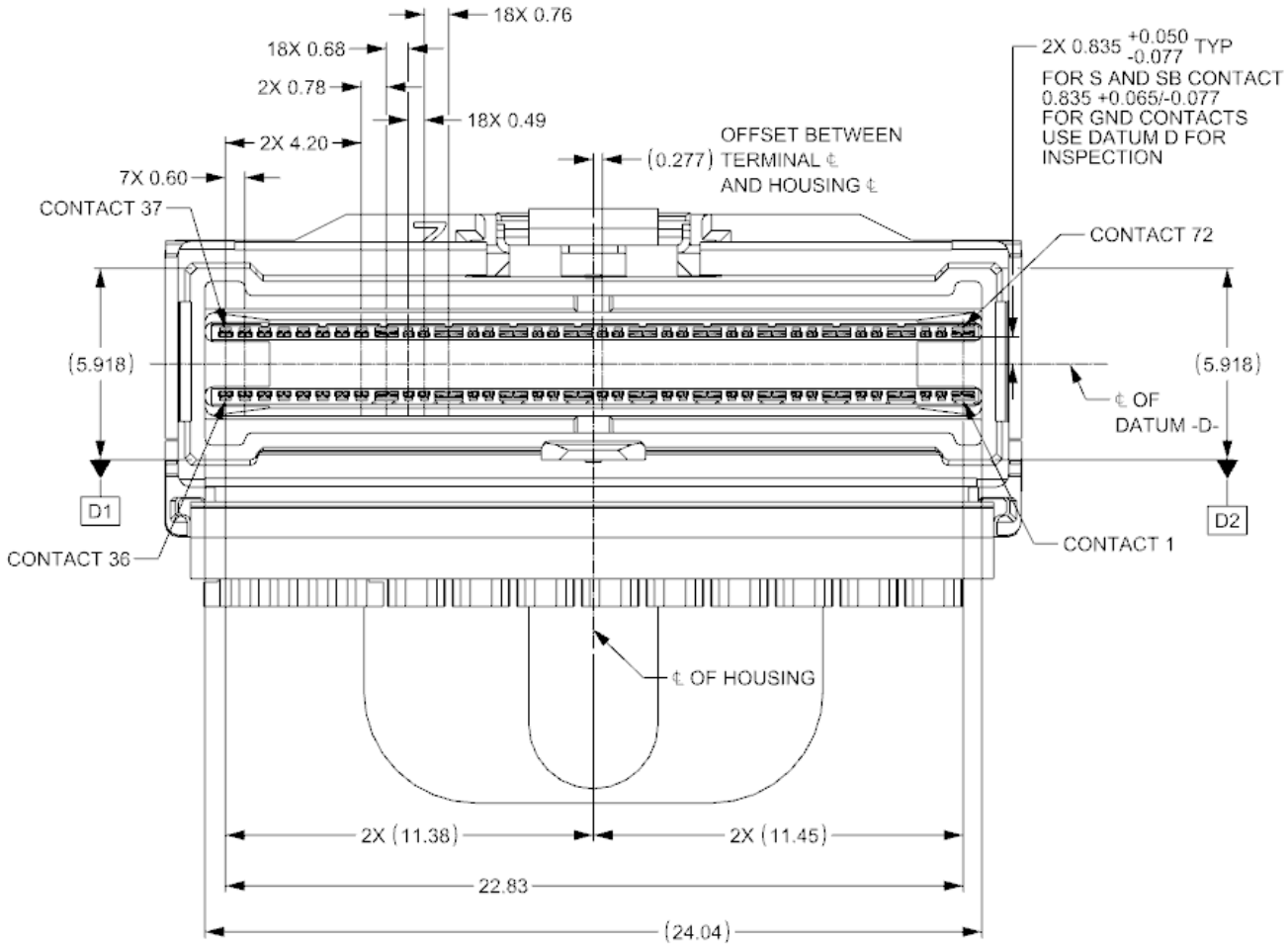


Figure 5-18: Top View of Free-Side Connector in Relation to Housing

The dimensions in Figure 5-18 are for intermateability and apply to all configurations of the free-side connector.

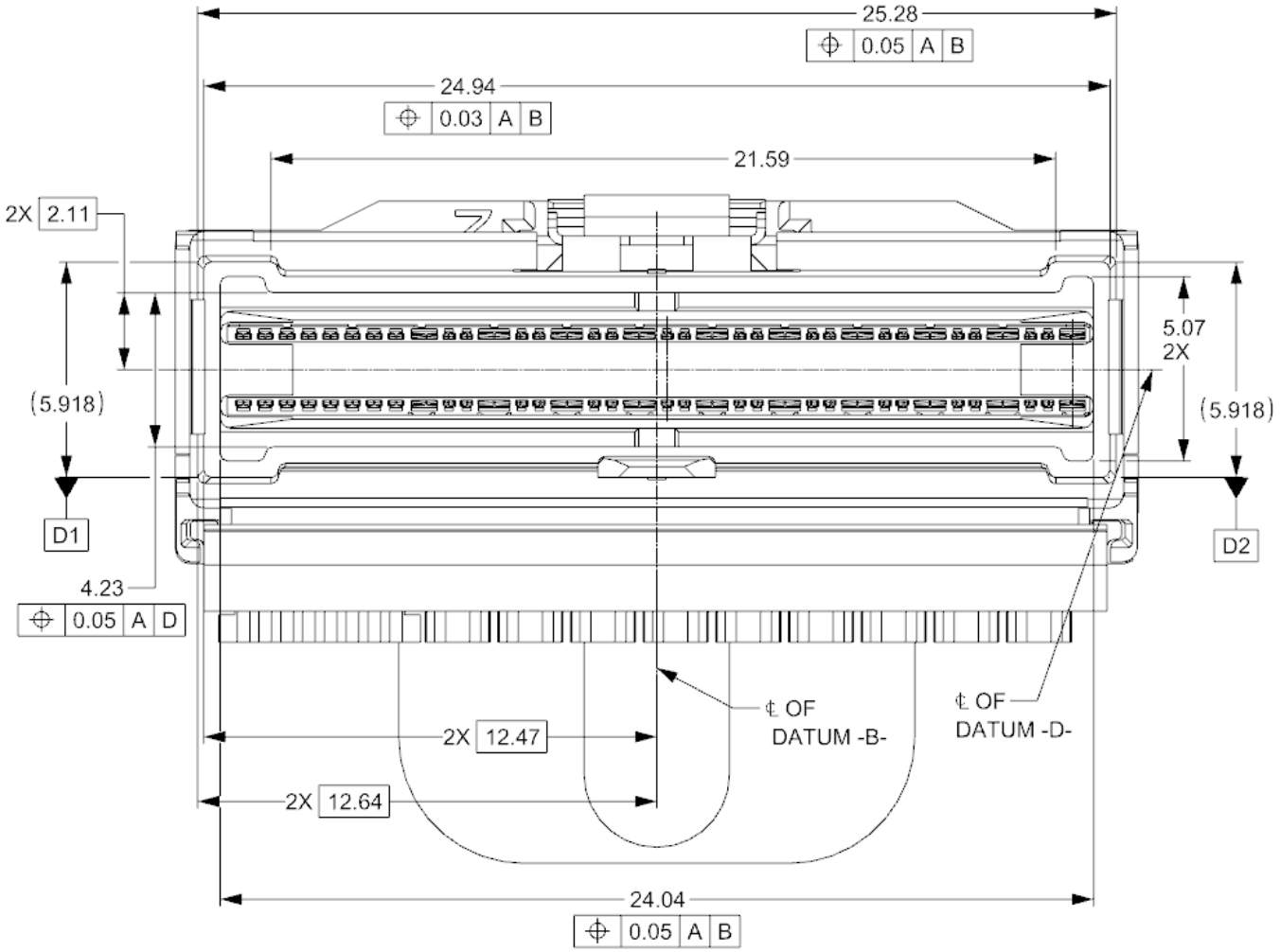


Figure 5-19: Front View of Free-Side Connector

The dimensions in Figure 5-19 apply to all configurations of the free-side connector.

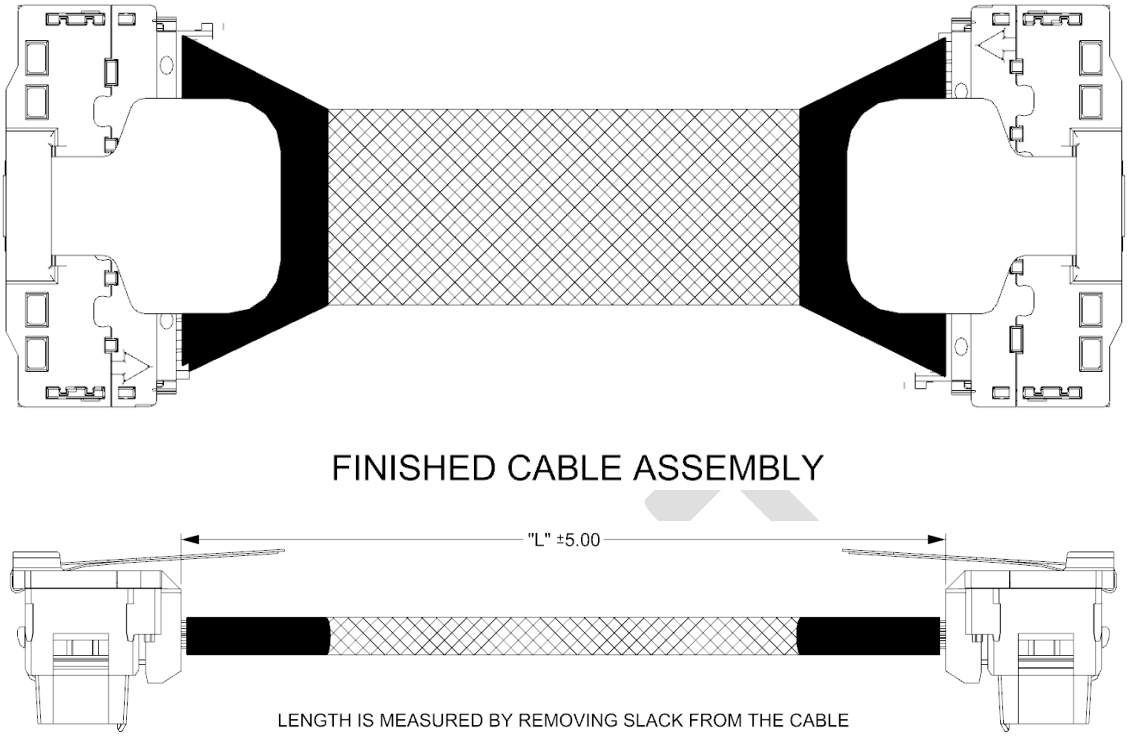


Figure 5-20: Finished Cable Assembly with Length Dimension

Table 5-3: Typical Cable-Connector Required Lengths

"L"
250
300
400
500
600
700
800
900
1 000

5.2.4 Free-Side Variant 2: 60° Angle Cable Exit with Pull Tab

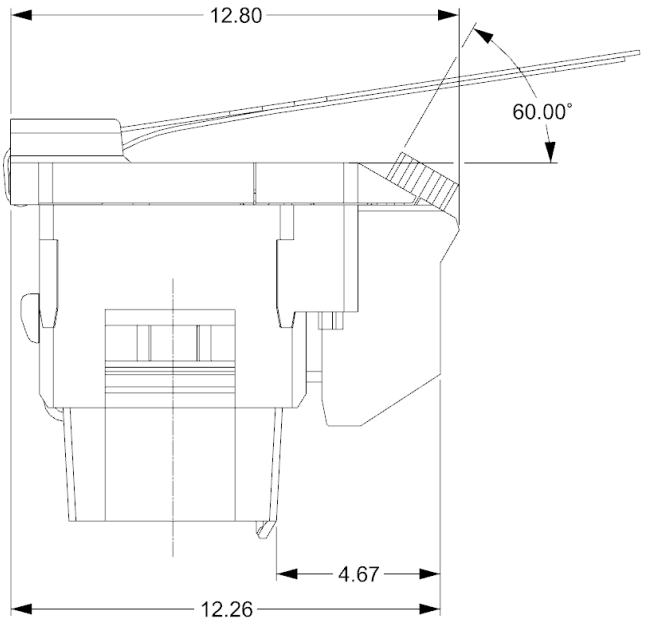


Figure 5-21: Profile View of Free-Side Connector with 60° Angle Cable Exit & Pull Tab

Dimensions in Figure 5-21 are specific to the free-side connector with 60° angle cable exit. All dimensions in Figure 5-16 apply except dimensions that are associated with the cable.

5.2.5 Free-side Variant 3: Vertical (90°) Cable Exit with Pull Tab

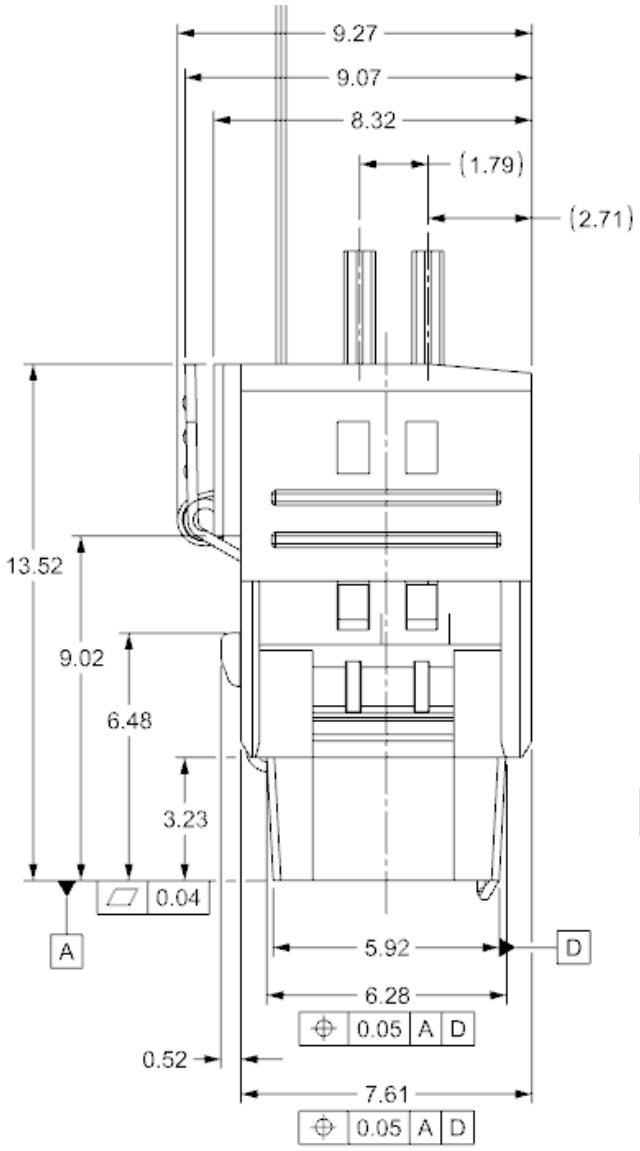


Figure 5-22: Profile View of Free-Side Connector with Vertical (90°) Cable Exit & Pull Tab

5.2.6 Free-side Variant 4: Horizontal (0°) Cable Exit NON Pull-Tab

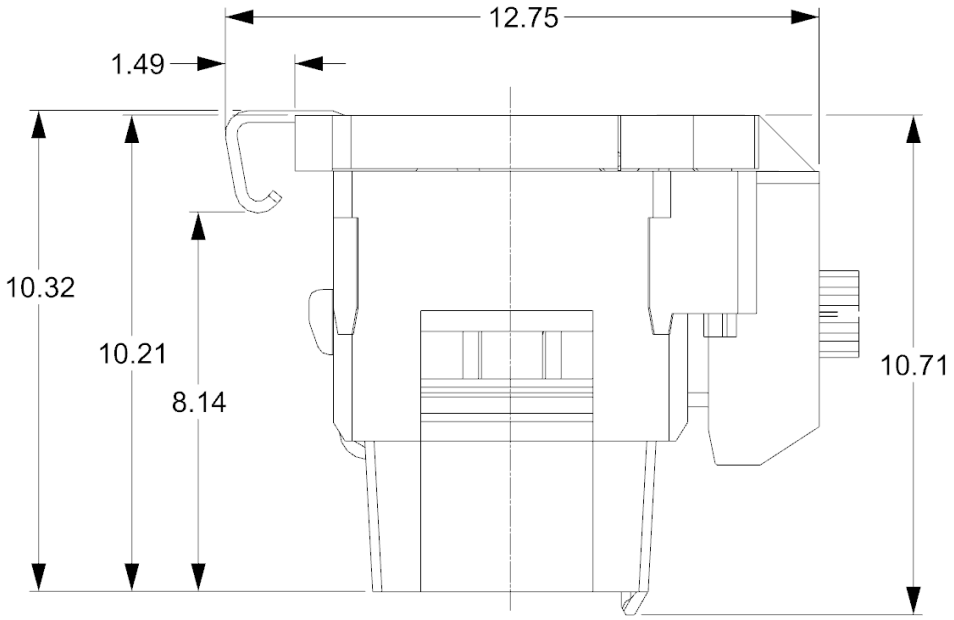


Figure 5-23: Profile View of Free-Side Connector with Horizontal (0°) Cable Exit & NON Pull-Tab

5.2.7 Free-side Variant 5: 60° Angle Cable Exit NON Pull-Tab

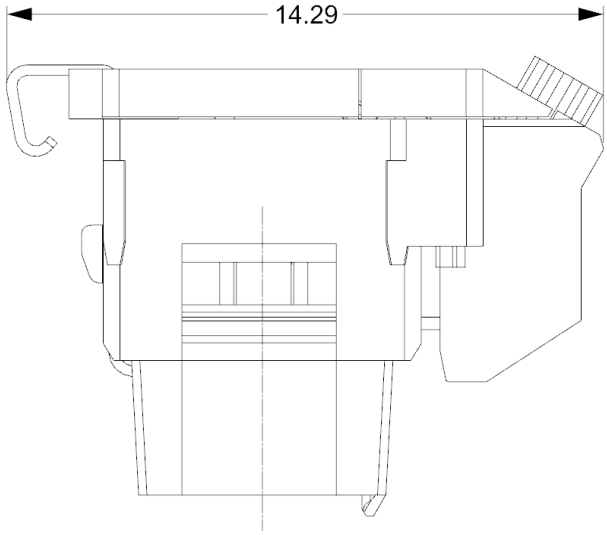


Figure 5-24: Profile View of Free-Side Connector with 60° Angle Cable Exit & NON Pull Tab

All dimensions shown in Figure 5-23 also apply to the free-side connector with 60° angle cable exit and NON pull tab shown in Figure 5-24.

5.2.8 Free-side Variant 6: Dual-Bay Horizontal (0°) Cable Exit with Pull-Tab

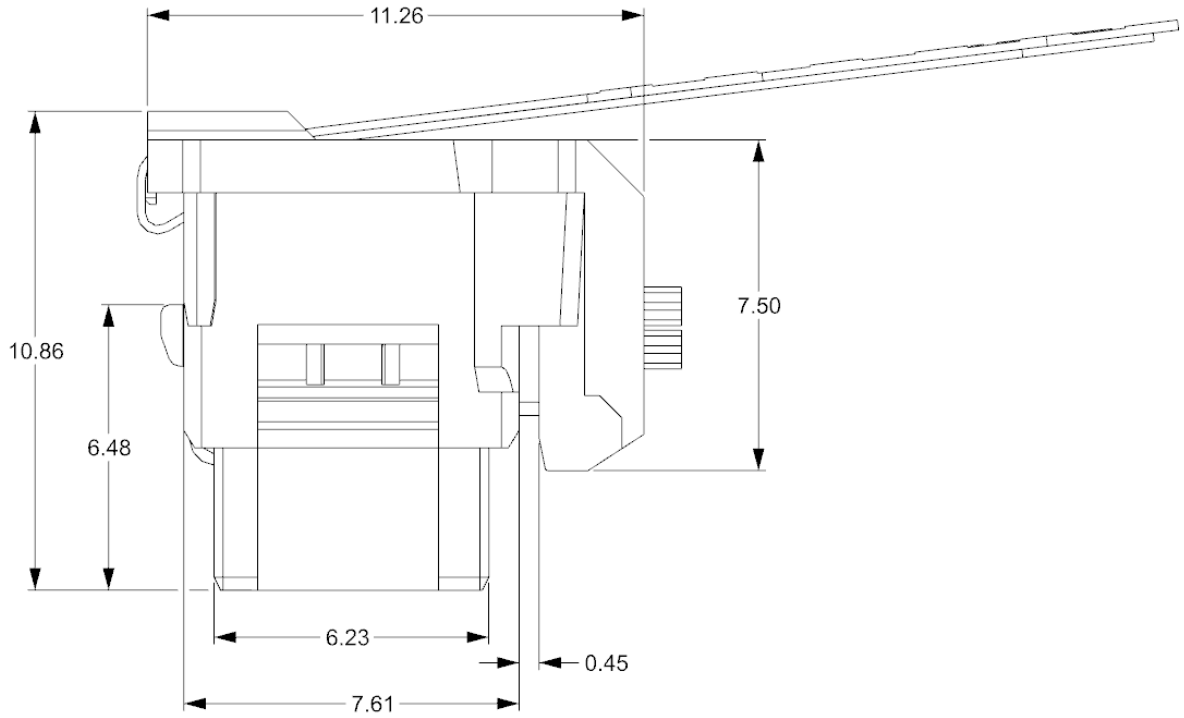


Figure 5-25: Dual-Bay Profile View of Free-Side Connector with Horizontal (0°) Cable Exit & Pull Tab

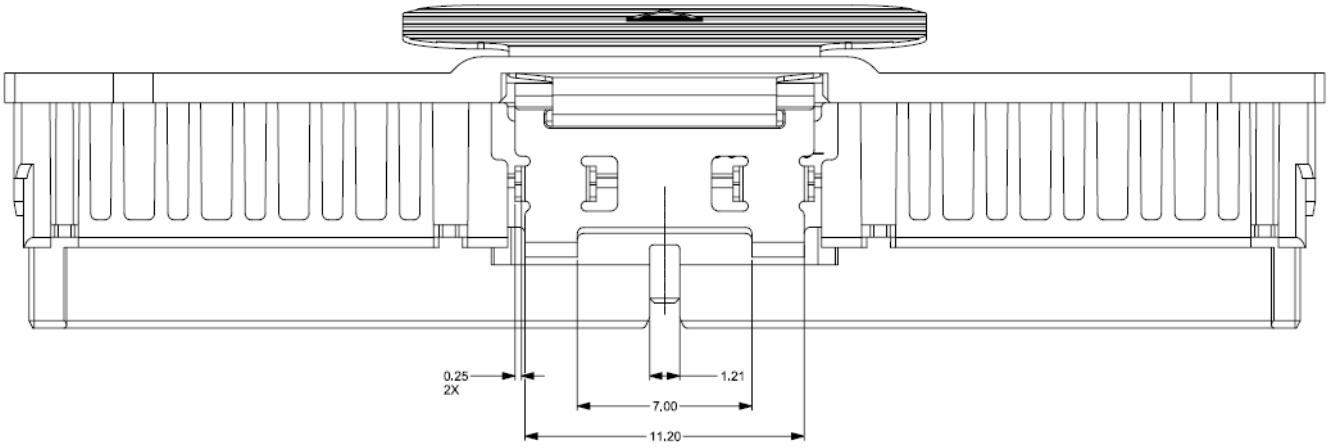


Figure 5-26: Dual-Bay Latch of Free-Side Connector

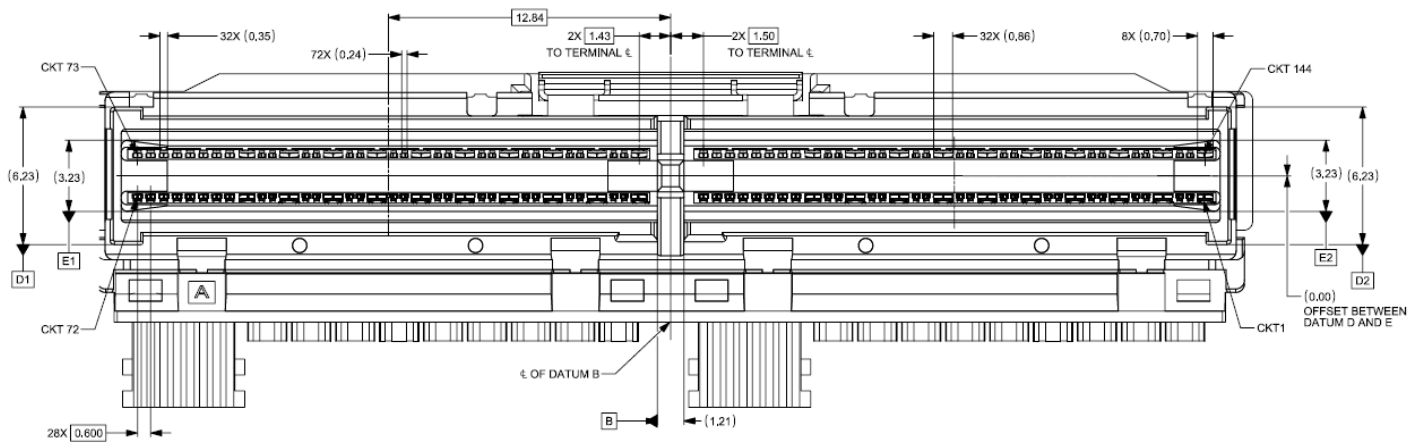


Figure 5-27: Top View of Free-Side Connector in Relation to Housing

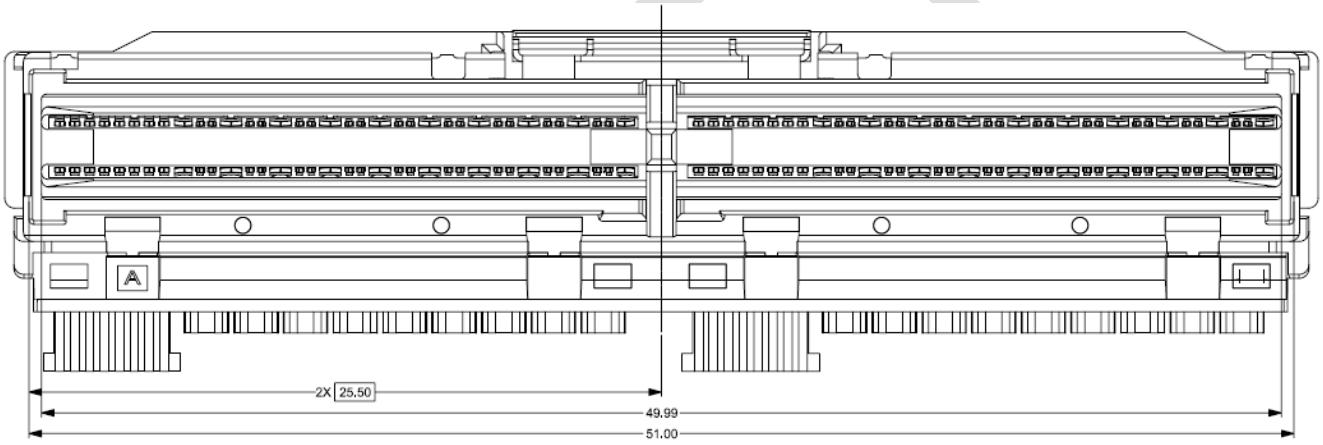
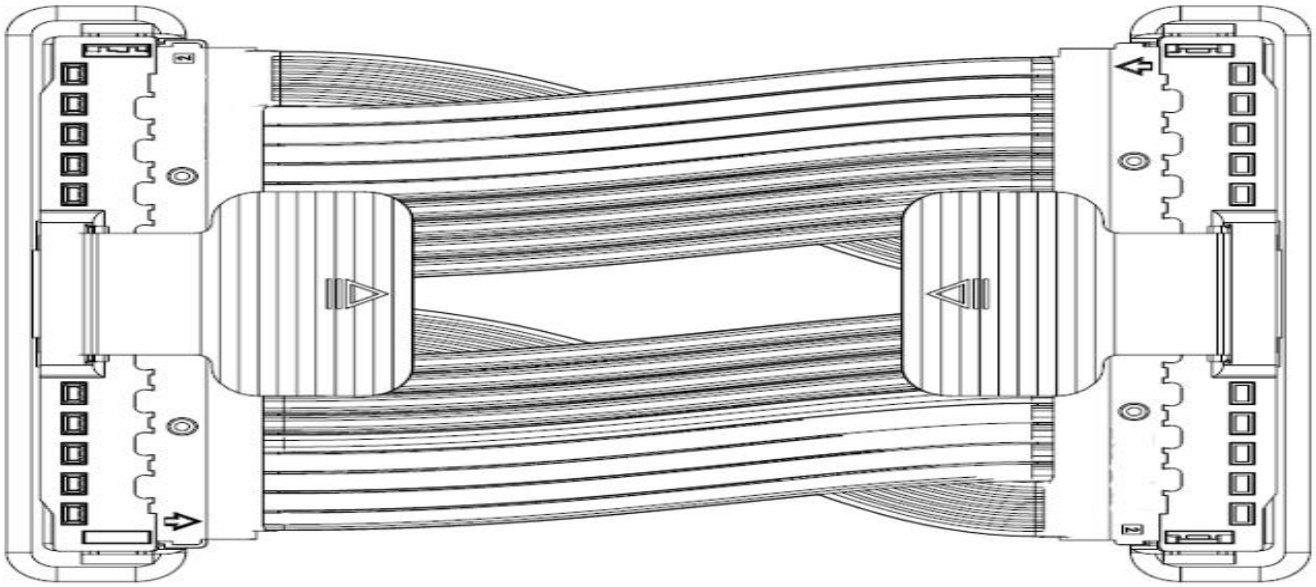


Figure 5-28: Front View of Free-Side Connector



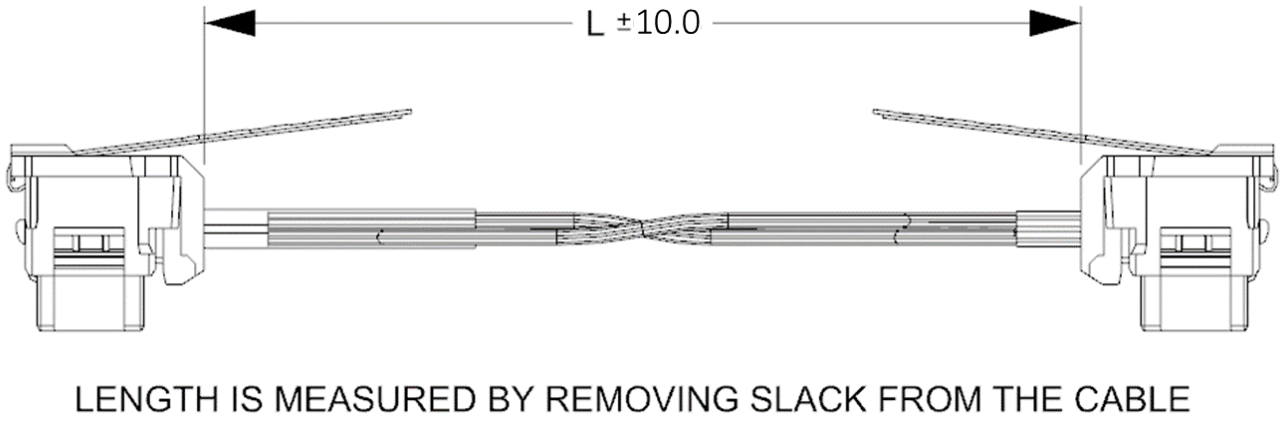


Figure 5-29: Finished Cable Assembly with Length Dimension

Table 5-4: Typical Cable-Connector Required Lengths

Dimension "L"
400
900
1000
1200
1500
1900

5.2.9 Free-side Variant 7: Dual-Bay 60° Angle Cable Exit with Pull-Tab

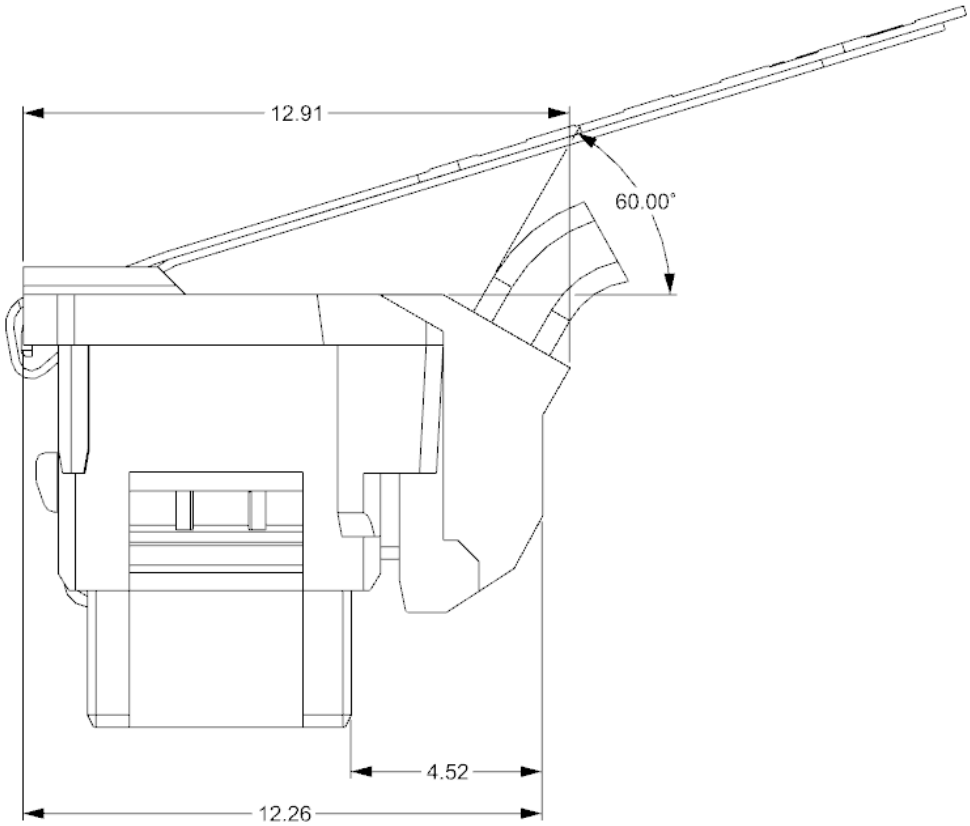


Figure 5-30: Profile View of Free-Side Connector with 60° Angle Cable Exit & Pull Tab

5.3 Dust Covers

5.3.1 Free-Side Connector Dust Cover

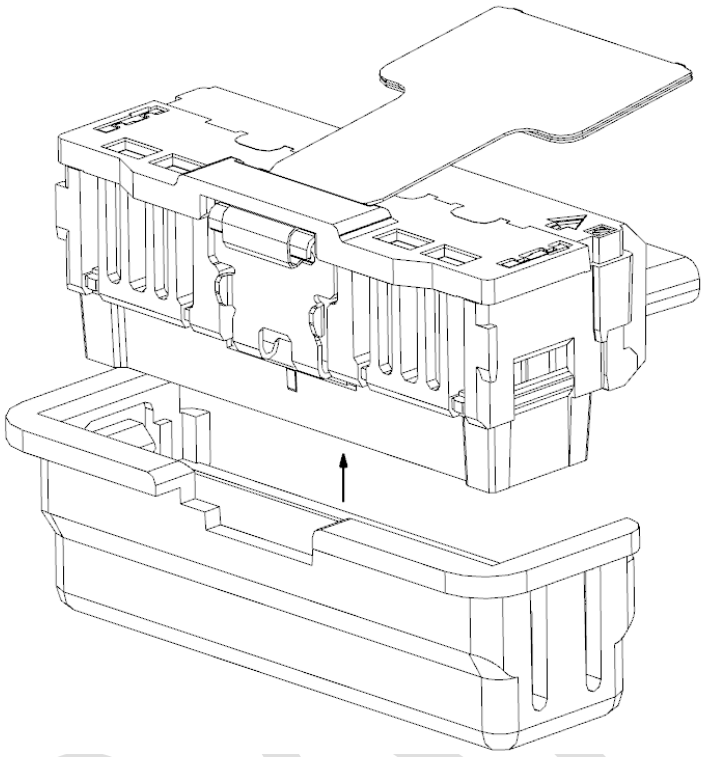


Figure 5-31: Free-Side Connector & Dust Cover Assembly Direction

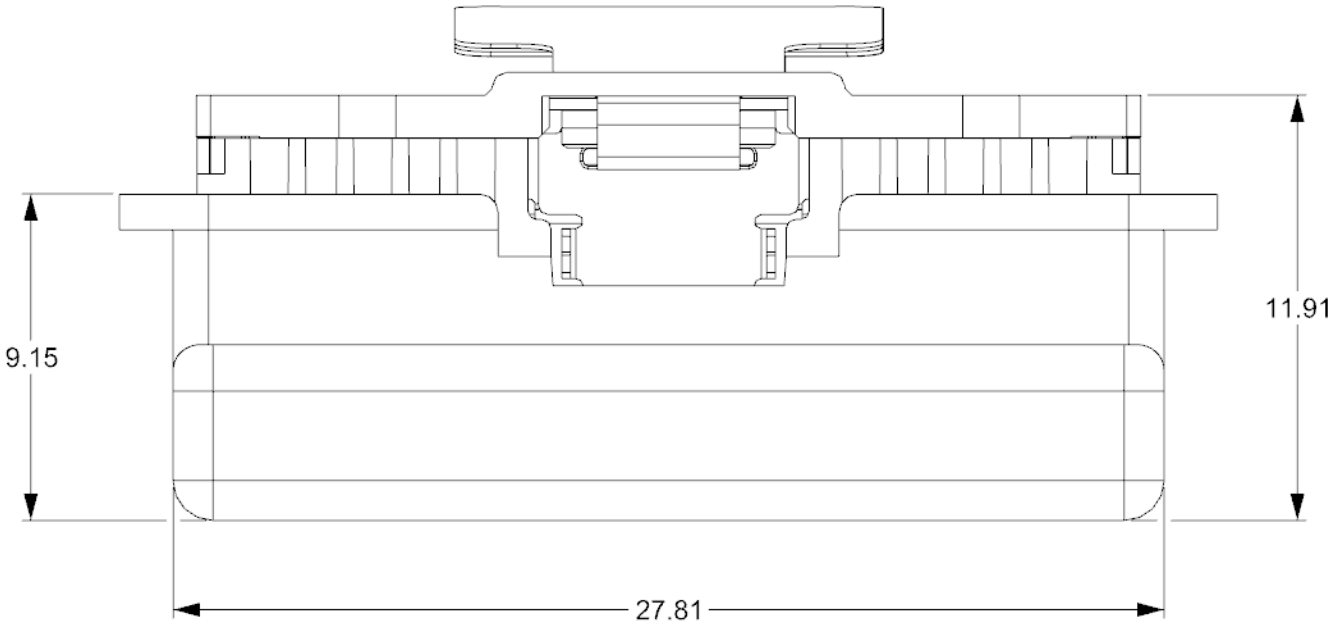


Figure 5-32: Top View of Free-Side Connector with Dust Cover Attached

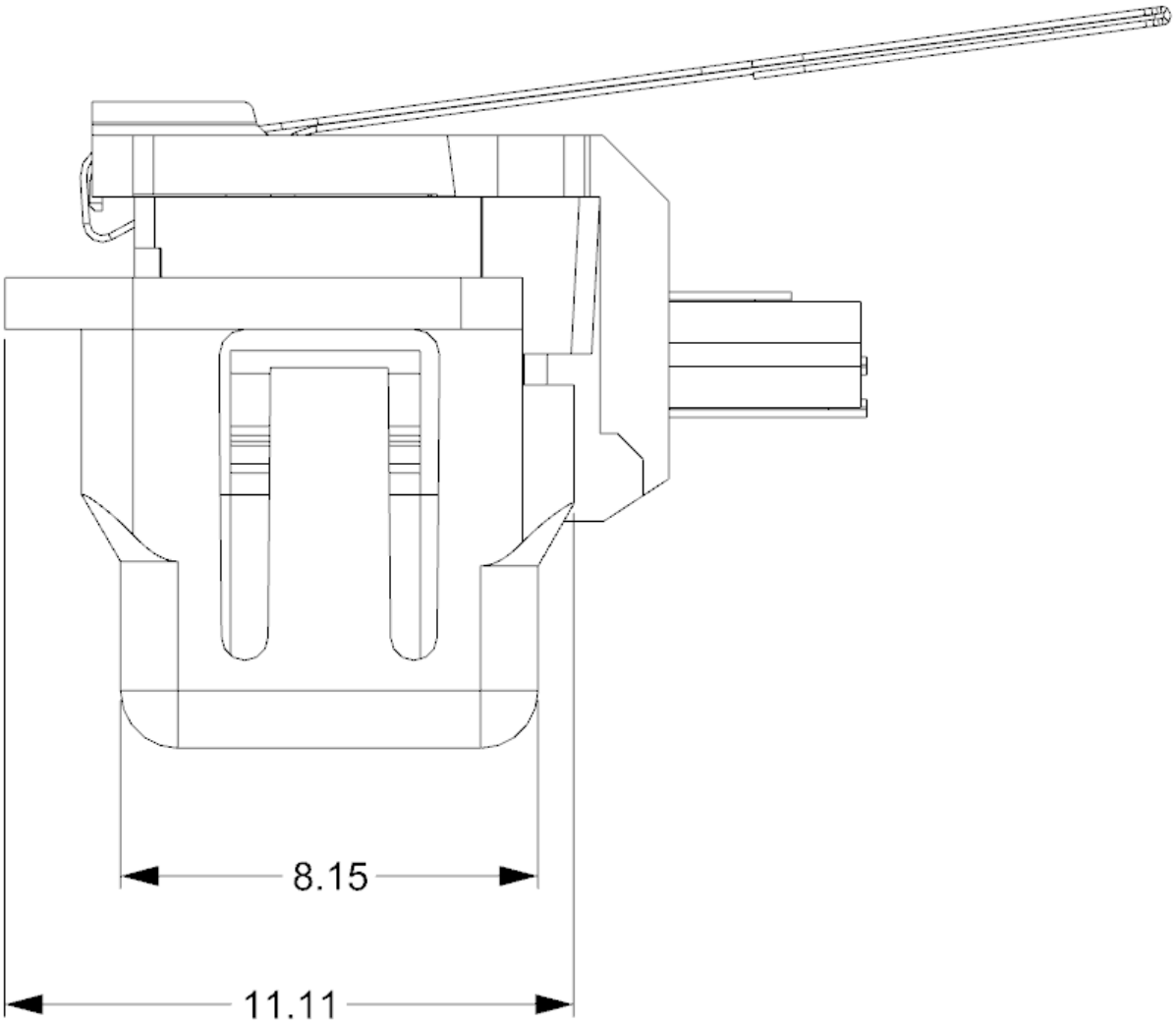


Figure 5-33: Profile View of Free-Side Connector with Dust Cover Attached

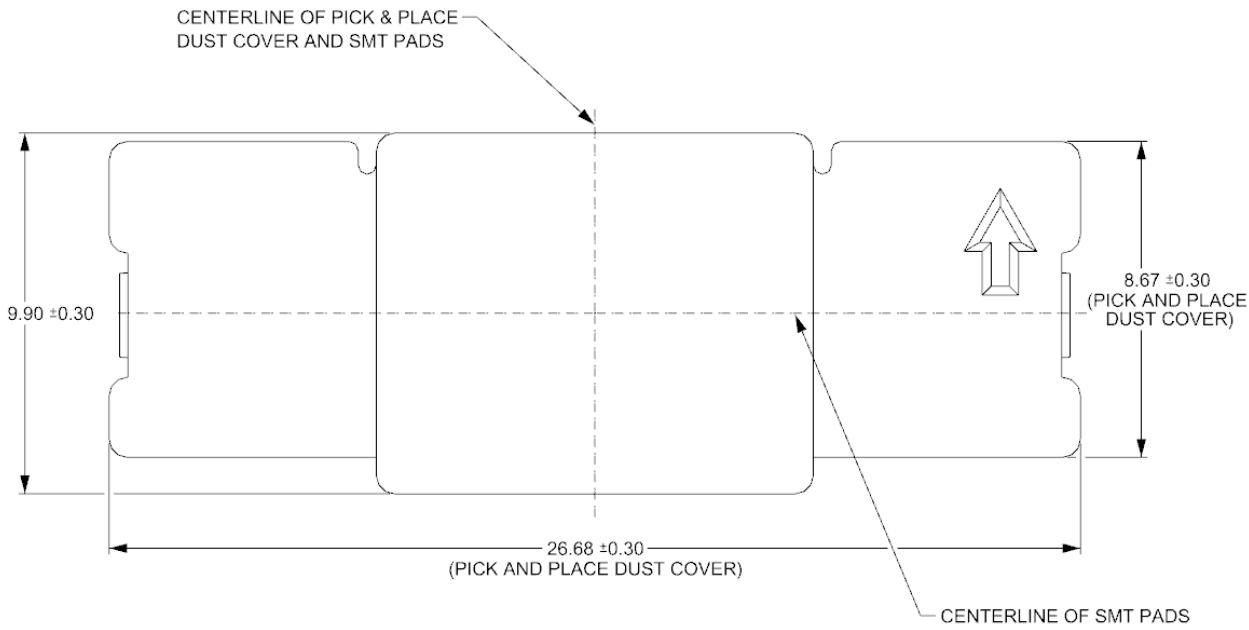


Figure 5-34: Top View of Vacuum Cap for Cage

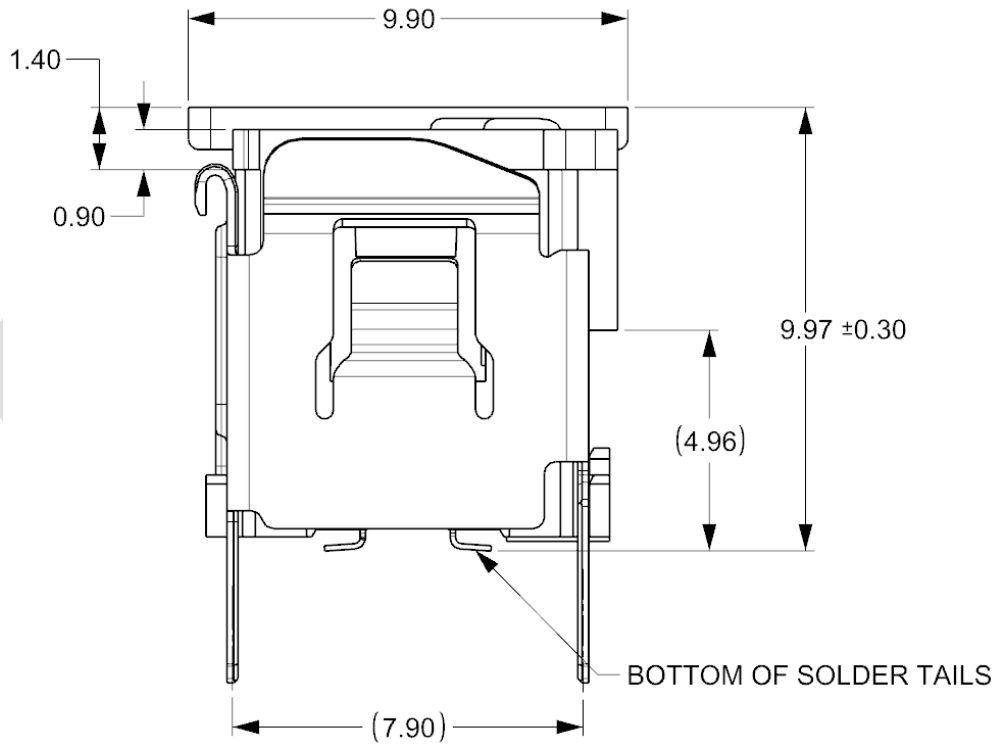


Figure 5-35: Profile View of Vacuum Cap for Cage

5.3.2 Dual-Bay Dust Cover

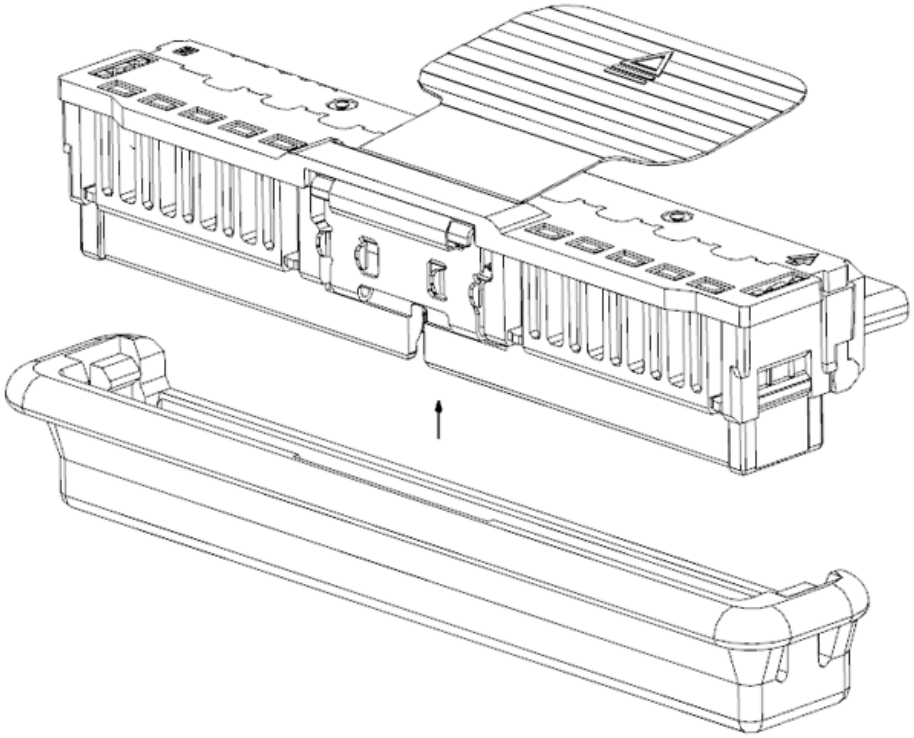


Figure 5-36: Free-Side Connector & Dust Cover Assembly Direction

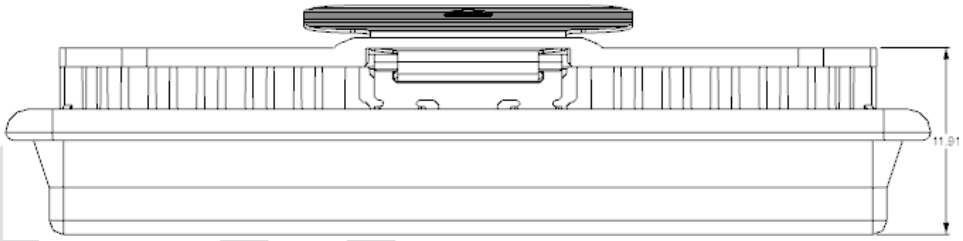


Figure 5-37: Top View of Free-Side Connector with Dust Cover Attached

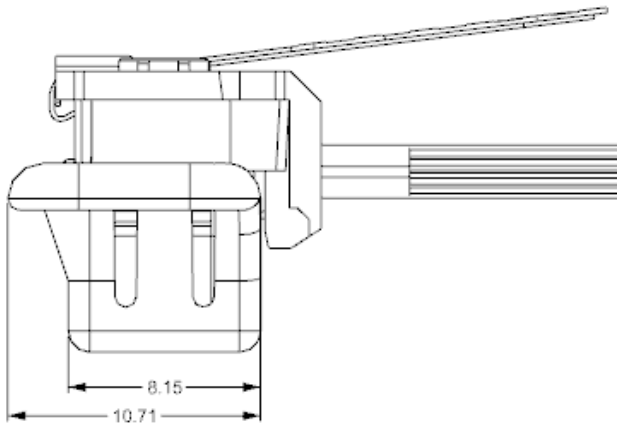


Figure 5-38: Profile View of Free-Side Connector with Dust Cover Attached

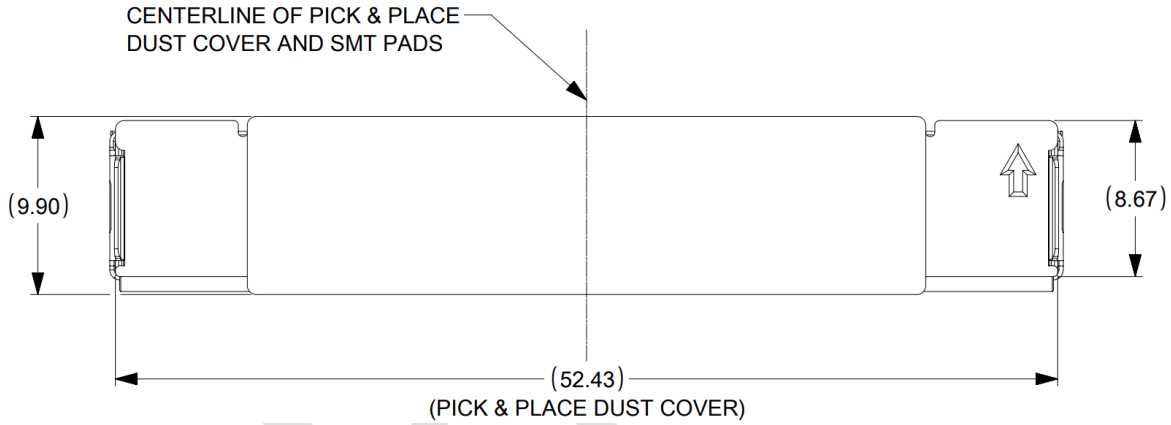


Figure 5-39: Top View of Vacuum Cap for Cage

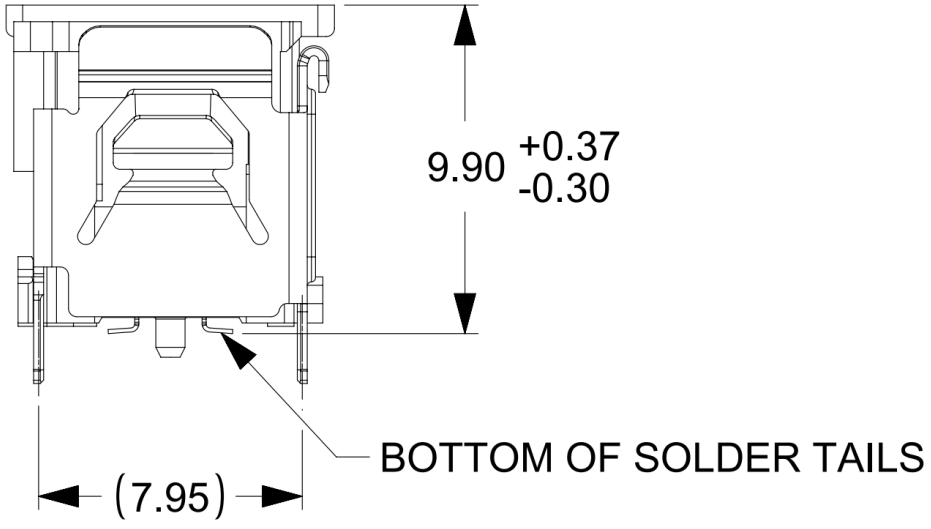


Figure 5-40: Profile View of Vacuum Cap for Cage

6. Type 2 Connector Mechanical Specification

6.1 Fixed-Side Mechanical Specification

6.1.1 Overview

The fixed-side connector is comprised of insert molded terminals with plastic that are encased by a stainless steel cage with additional press fit tails. The fixed-side connector is designed to mate to all free-side connector variants. The fixed-side connector cages are 0.25mm strip thickness which includes latch windows for the free-side cable connector and two passive latches on the sides. A vacuum cap is also included for pick-and-place equipment for placing the connector on the PCB and protecting the contacts during shipment and handling.

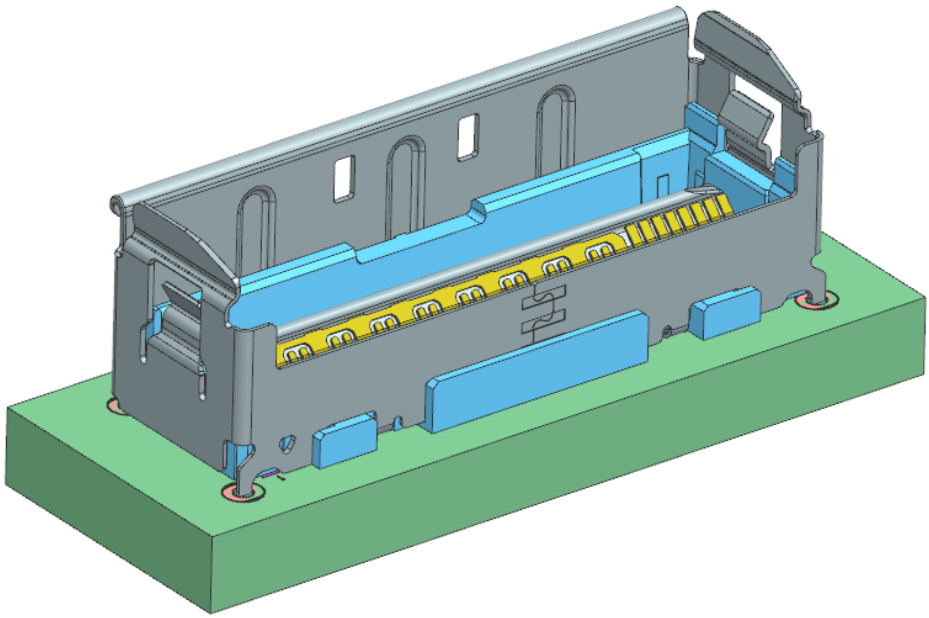


Figure 6-1: Fixed-Side Connector without Vacuum Cap

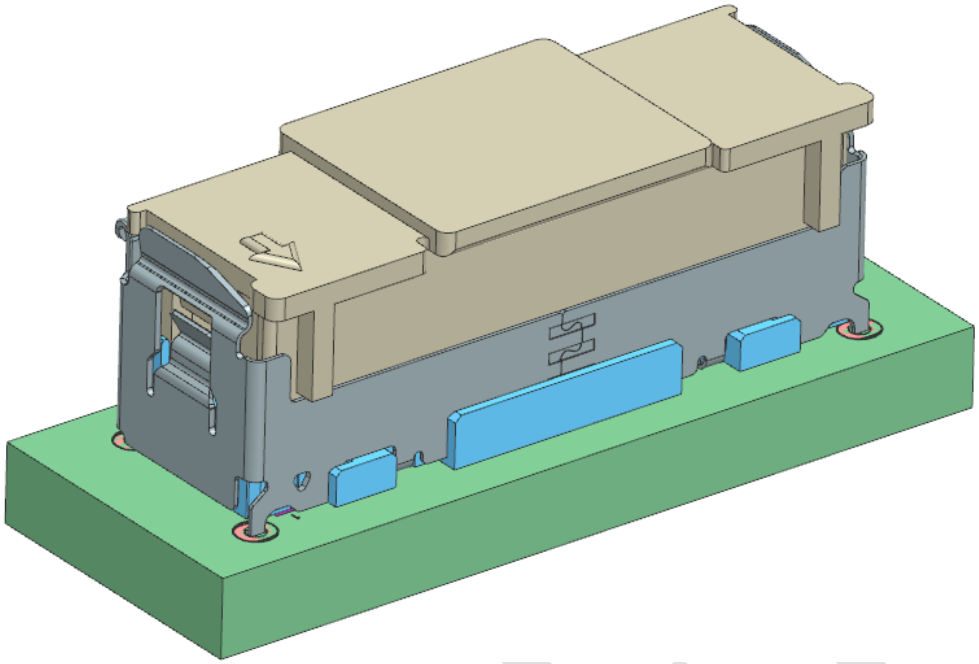


Figure 6-2: Fixed-Side Connector with Vacuum Cap

6.1.2 Mechanical Description: Fixed-Side Connector

Unless otherwise shown, the following tolerances shall apply to the figures:

c. Two & Three Place dimensions = +/- 0.05mm
d. Angular dimension = +/- 0.5°

The fixed-side connector cage has four press-fit tails. These tails may be one of two lengths. The selected length is application specific and is dependent on the thickness of the PCB to which the connector is fixed. Press-fit tail lengths are listed in Table 6-1.

6.1.3 Mechanical Description: Fixed-Side Connector

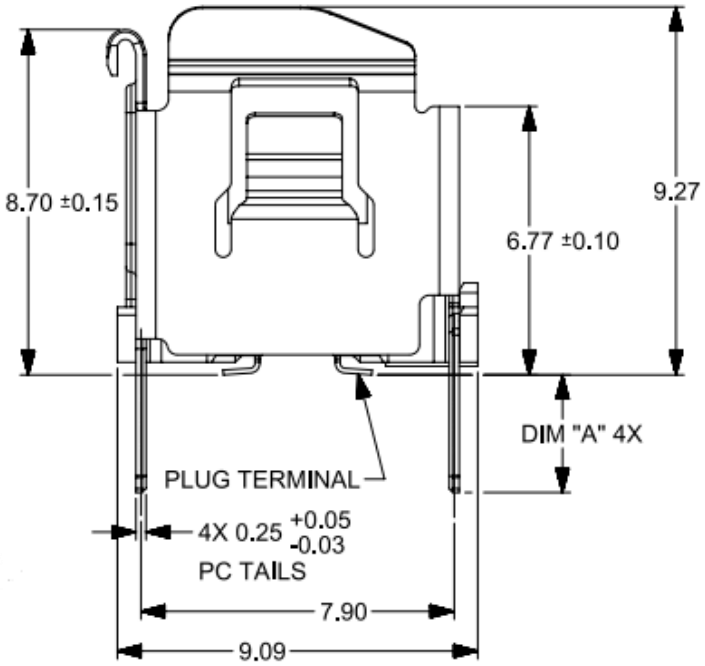


Figure 6-3: Profile View of Fixed- Side Connector Cage

Table 6-1: Press Fit Tail Lengths for Fixed-Side Connector Cage

DIM "A"
2.96
1.50

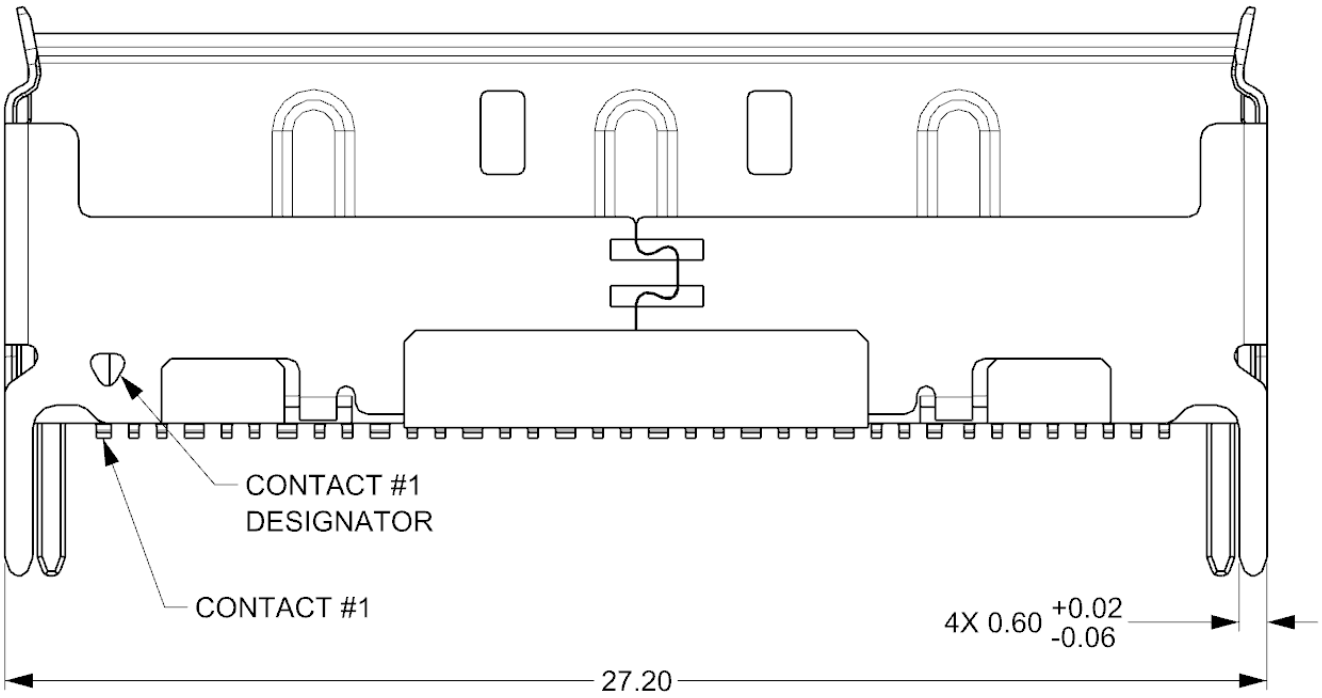
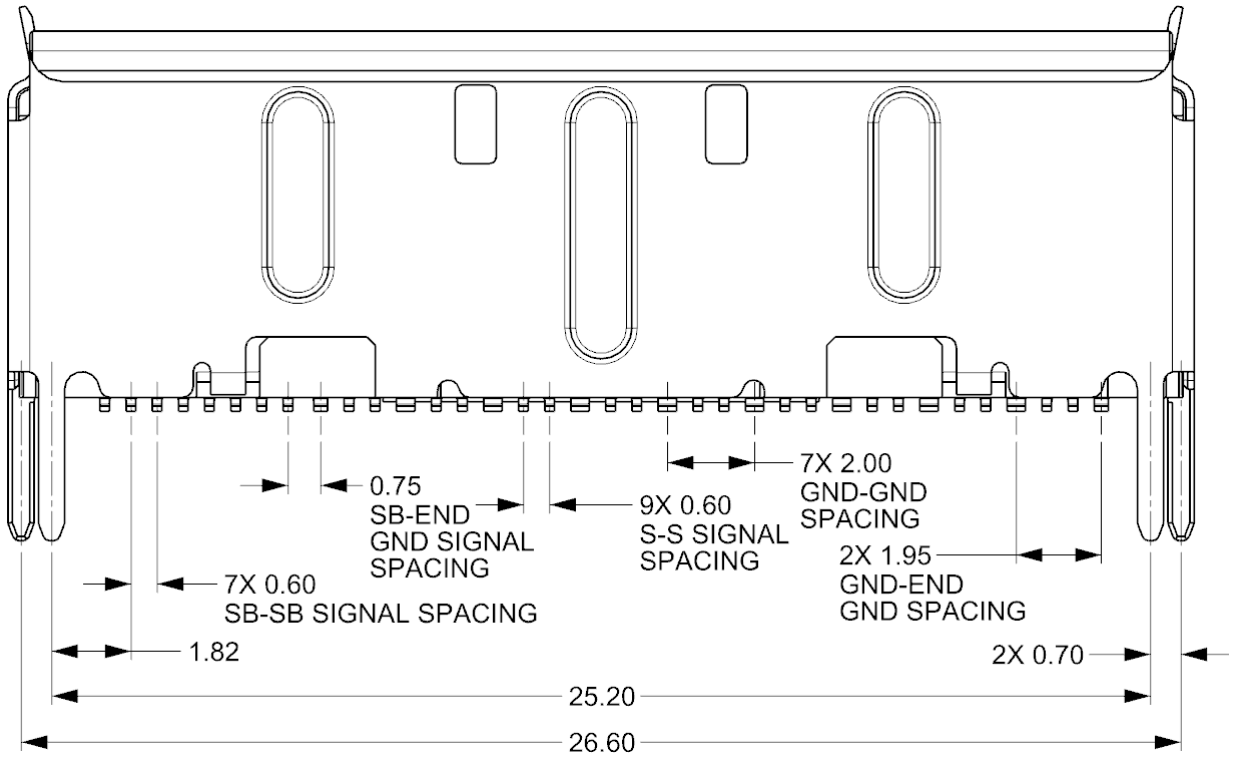
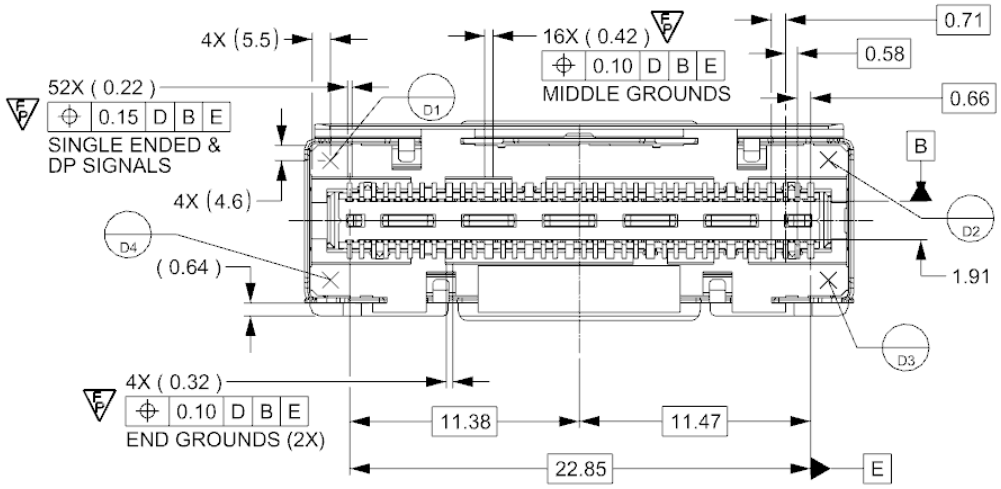


Figure 6-4: Front View of Fixed-Side Connector Cage



NOTE: Signal assignments are identified in Section 4.2. "END GND" refers to contacts 1, 28, 45, and 72.

Figure 6-5: Back View of Fixed-Side Connector Cage



NOTE: Signal assignments are identified in Section 4.2. "END GND" refers to contacts 1, 28, 45, and 72.

Figure 6-6: Bottom View of Fixed-Side Connector (1 of 2)

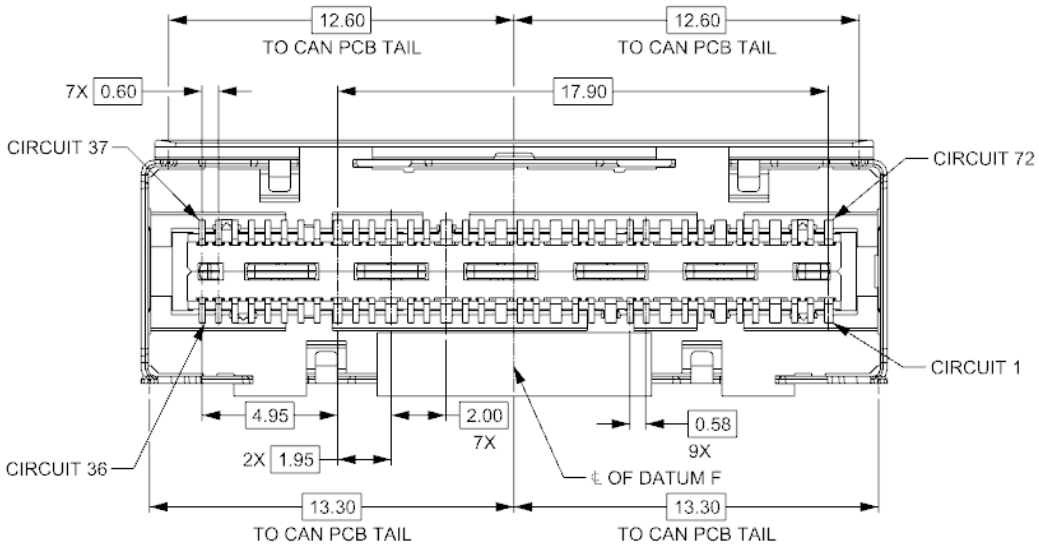


Figure 6-7: Bottom View of Fixed-Side Connector (2 of 2)

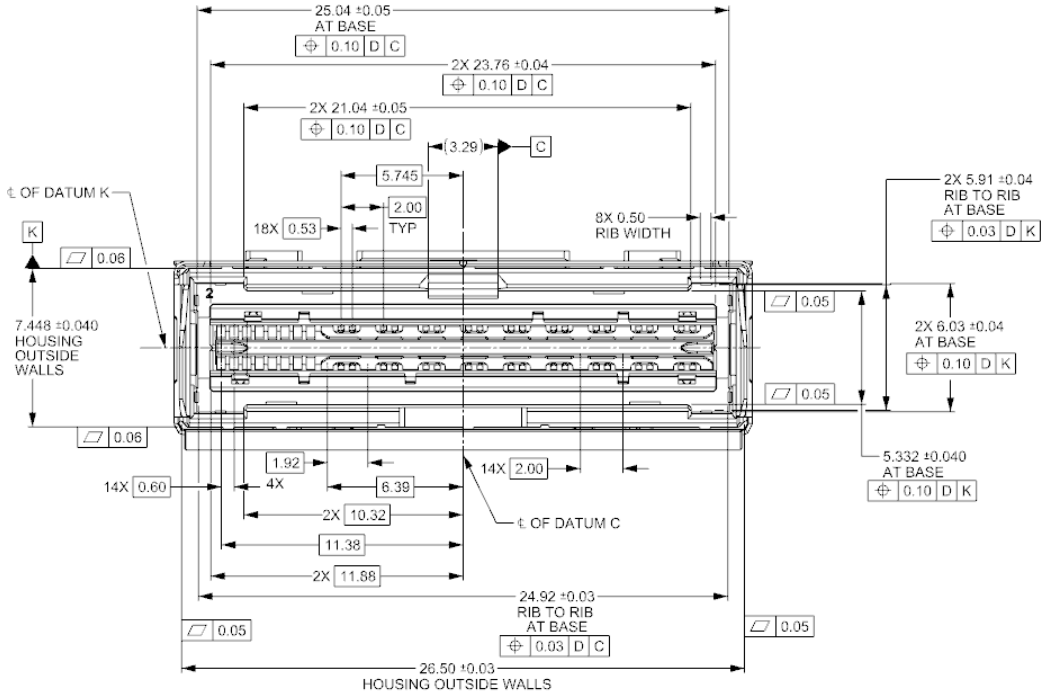


Figure 6-8: Top View of Fixed-Side Connector

6.2 Free-Side Mechanical Specification

6.2.1 Overview

The free-side connector housing and cover are plastic. Twinaxial cable and single-ended ribbon cable is connected to the mating terminals inside the free-side connector. The free-side connector also includes a stainless steel positive latch with two designs, one for use with a pull tab and one for manual activation by hand. The vertical cable exit design is only available with a pull tab.

6.2.2 Mechanical Description: Free-Side Connectors

Unless otherwise shown, the following tolerances shall apply to the figures:

c. Two & Three Place dimensions = +/- 0.05mm
d. Angular dimension = +/- 0.5°

6.2.3 Free-Side Variant 1: Horizontal (0°) Cable Exit with Pull Tab

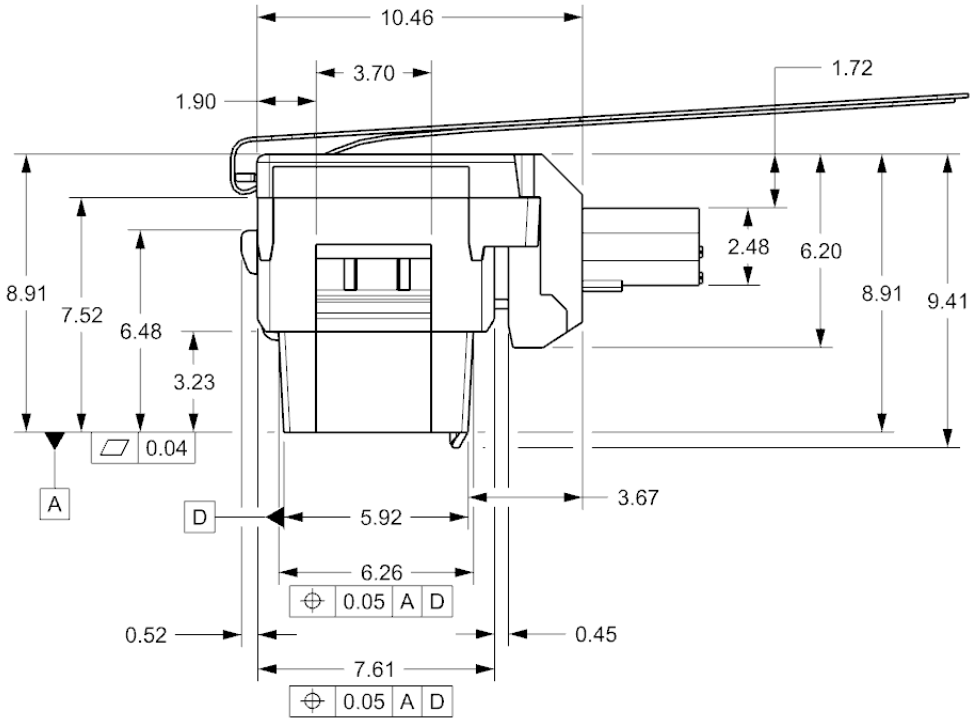


Figure 6-9: Profile View of Free-Side Connector with Horizontal (0°) Cable Exit & Pull Tab

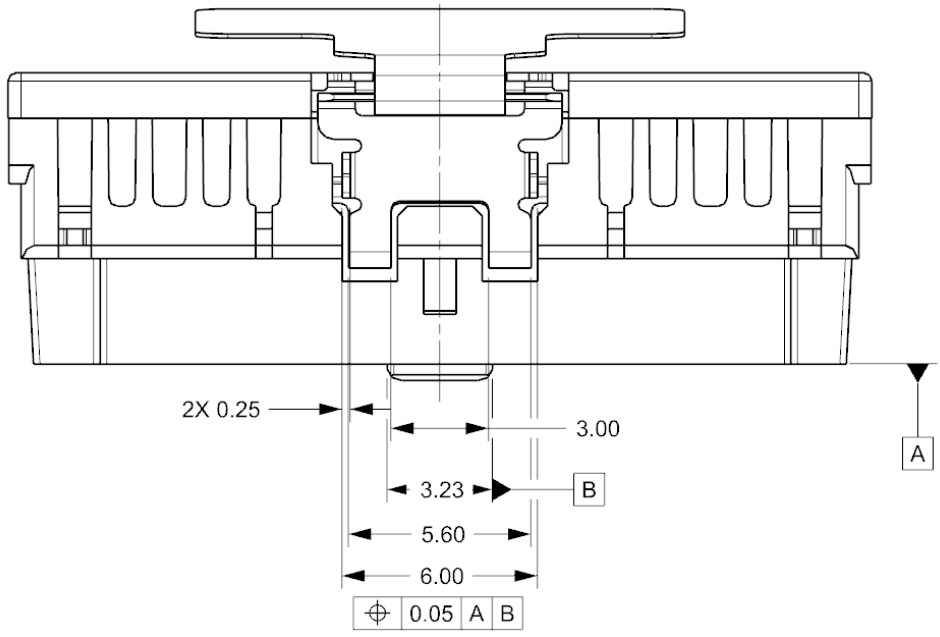


Figure 6-10: Latch for Free-Side Connector

The latch position dimensions shown in Figure 6-10 apply to all configurations of the free-side connector.

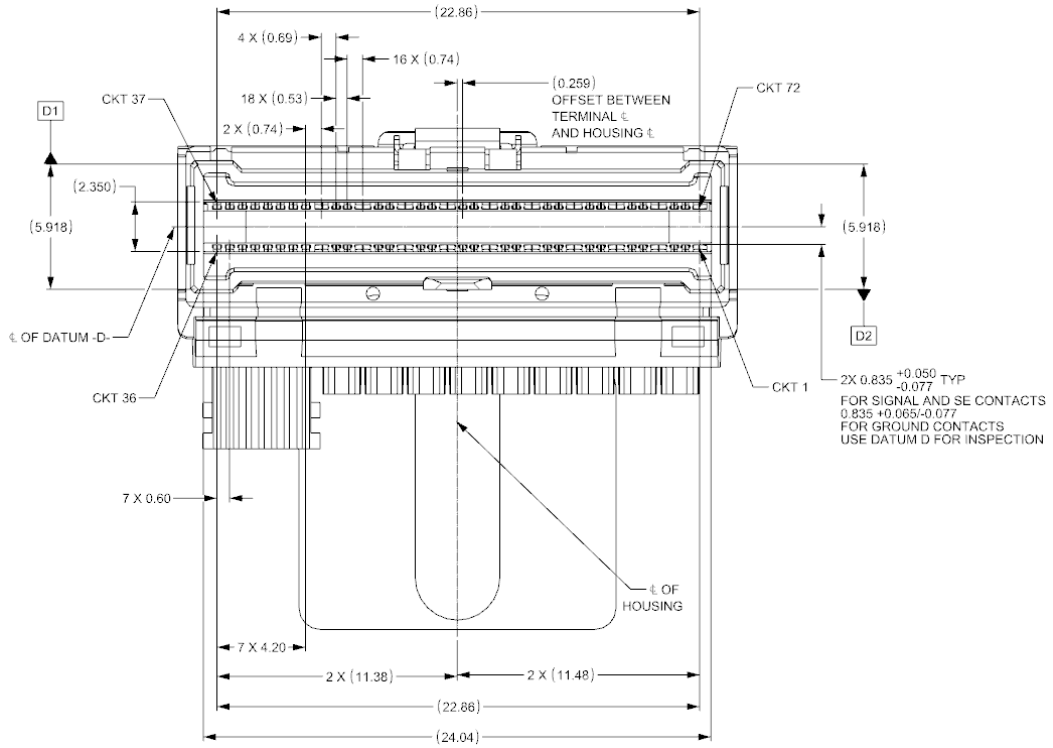


Figure 6-11: Top View of Free-Side Connector in Relation to Housing

The dimensions in Figure 6-11 are for intermateability and apply to all configurations of the free-side connector.

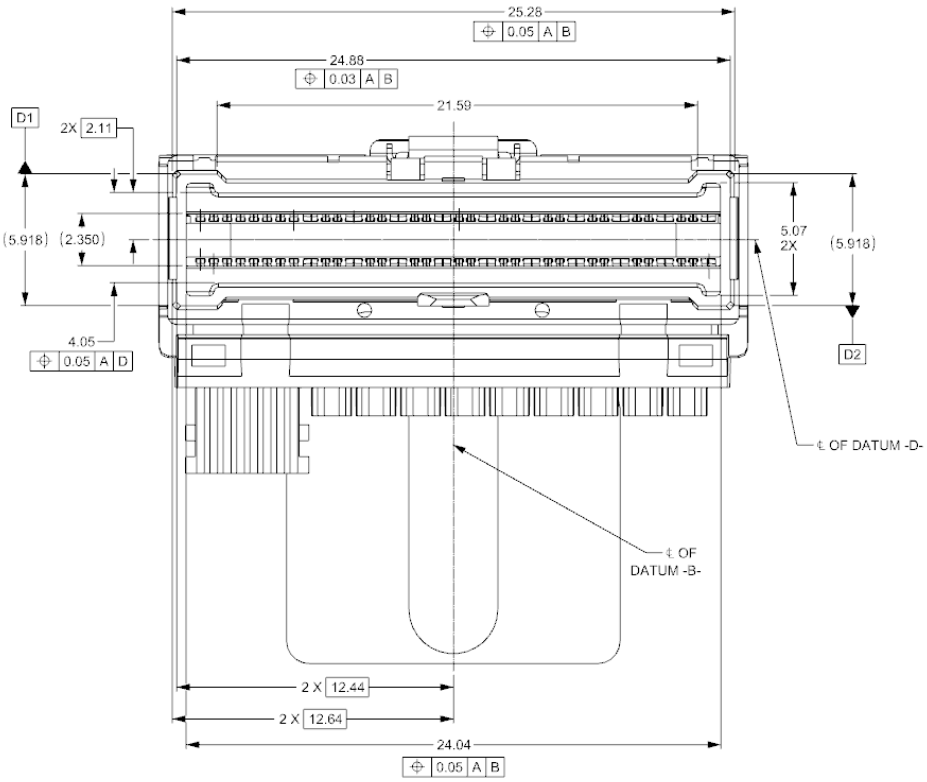


Figure 6-12: Front View of Free-Side Connector

The dimensions in Figure 6-12 apply to all configurations of the free-side connector.

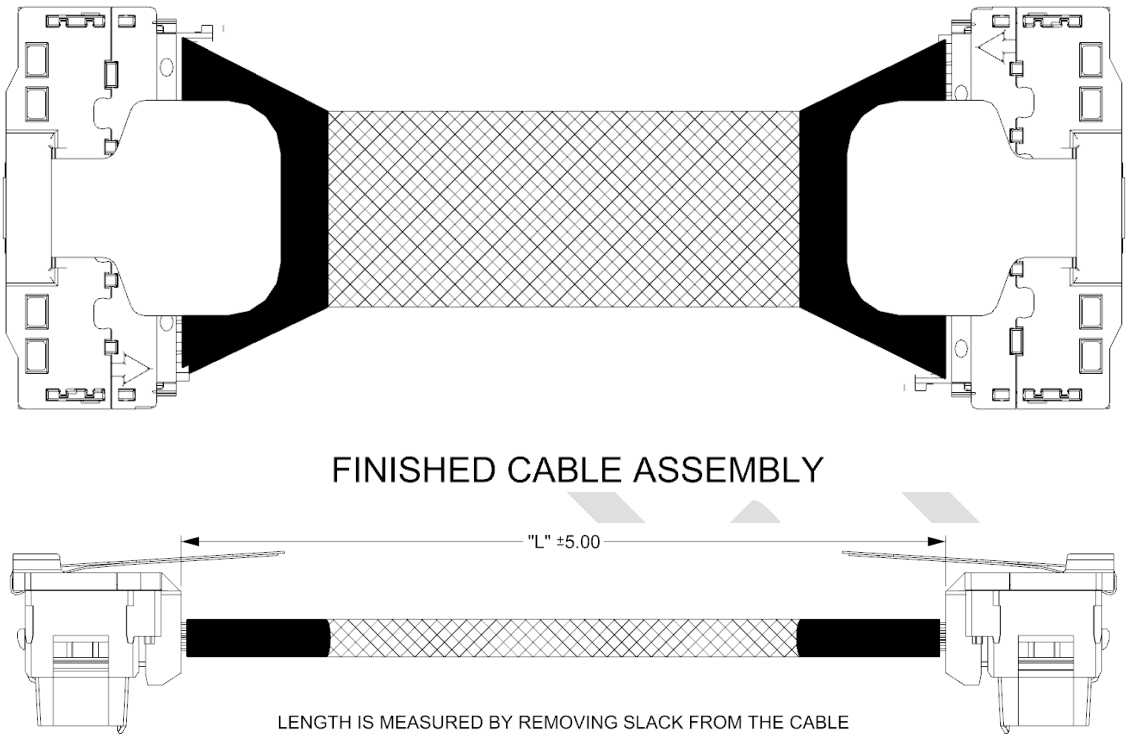


Figure 6-13: Finished Cable Assembly with Length Dimension

Table 6-2: Typical Cable-Connector Required Lengths

"L"
250
300
400
500
600
700
800
900
1 000

6.2.4 Free-Side Variant 2: 60° Angle Cable Exit with Pull Tab

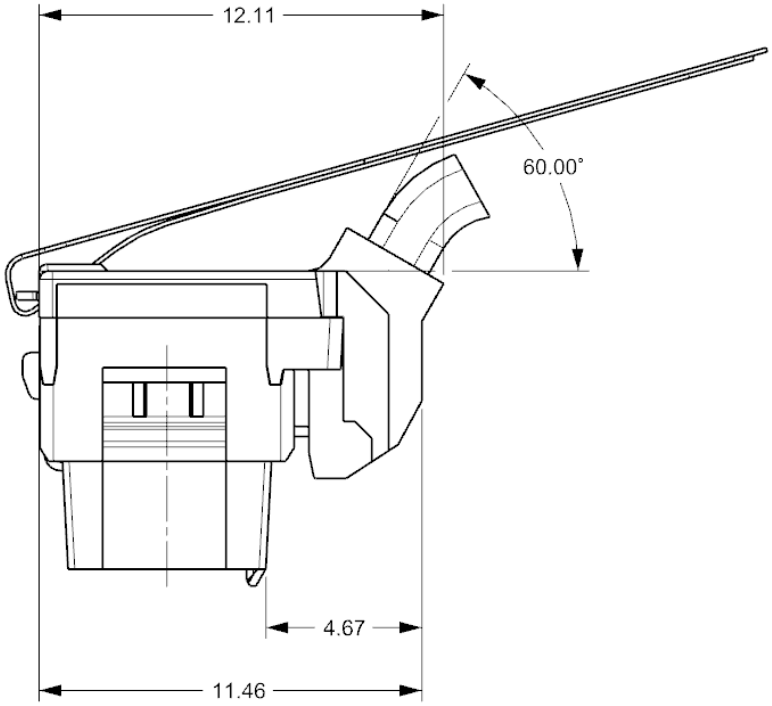


Figure 6-14: Profile View of Free-Side Connector with 60° Angle Cable Exit & Pull Tab

Dimensions in Figure 6-14 are specific to the free-side connector with 60° angle cable exit. All dimensions in Figure 6-9 apply except dimensions that are associated with the cable.

6.2.5 Free-side Variant 3: Vertical (90°) Cable Exit with Pull Tab

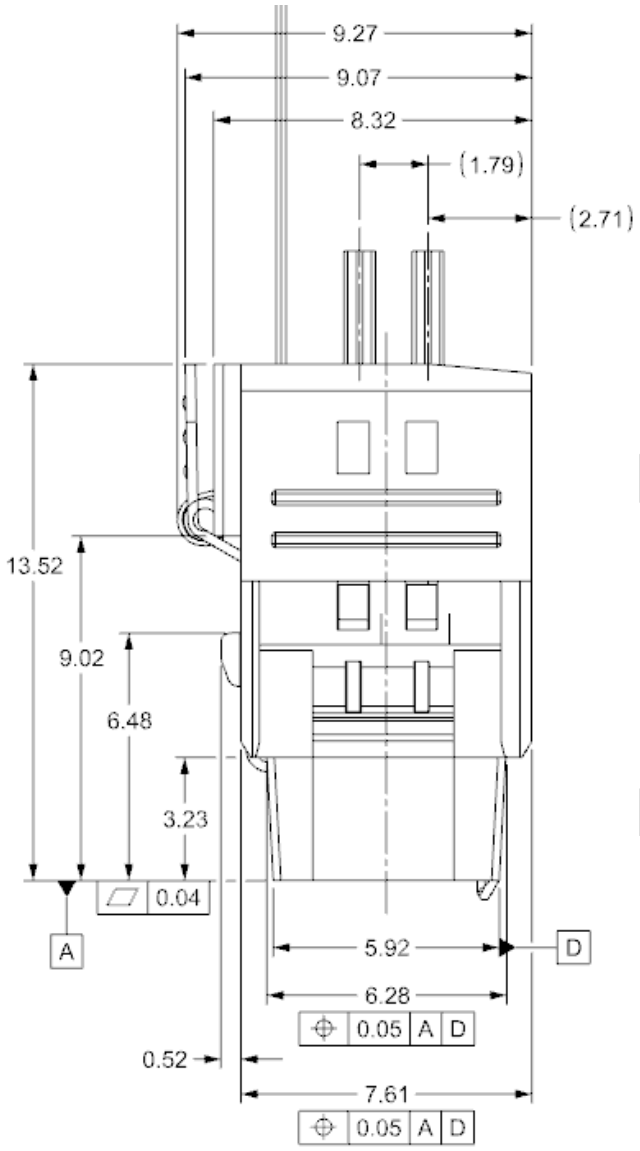


Figure 6-15: Profile View of Free-Side Connector with Vertical (90°) Cable Exit & Pull Tab

6.3 Dust Covers

6.3.1 Free-Side Connector Dust Cover

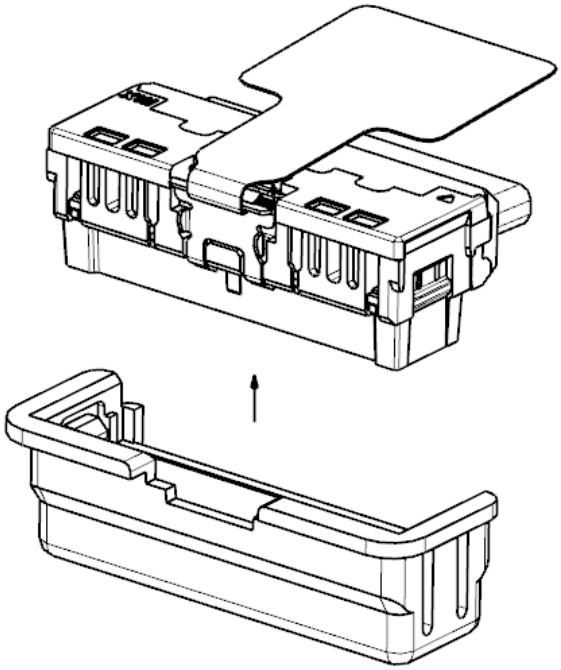


Figure 6-16: Free-Side Connector & Dust Cover Assembly Direction

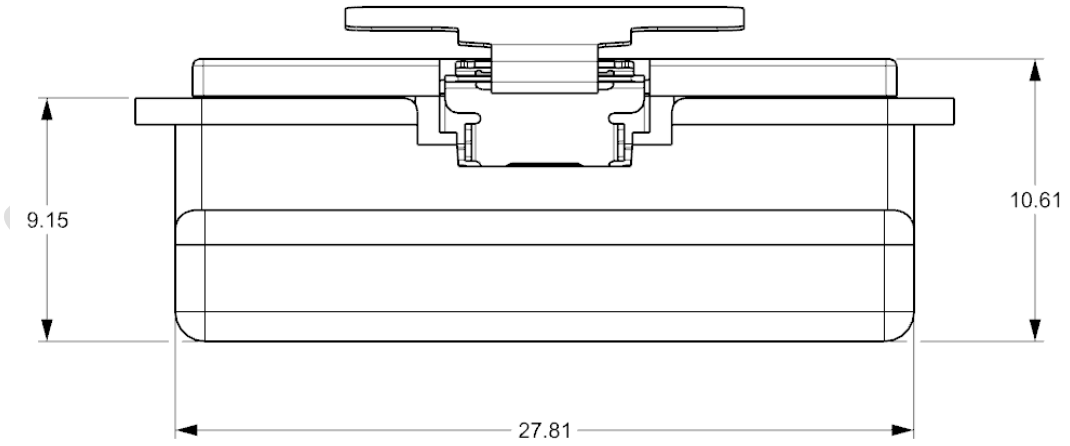


Figure 6-17: Top View of Free-Side Connector with Dust Cover Attached

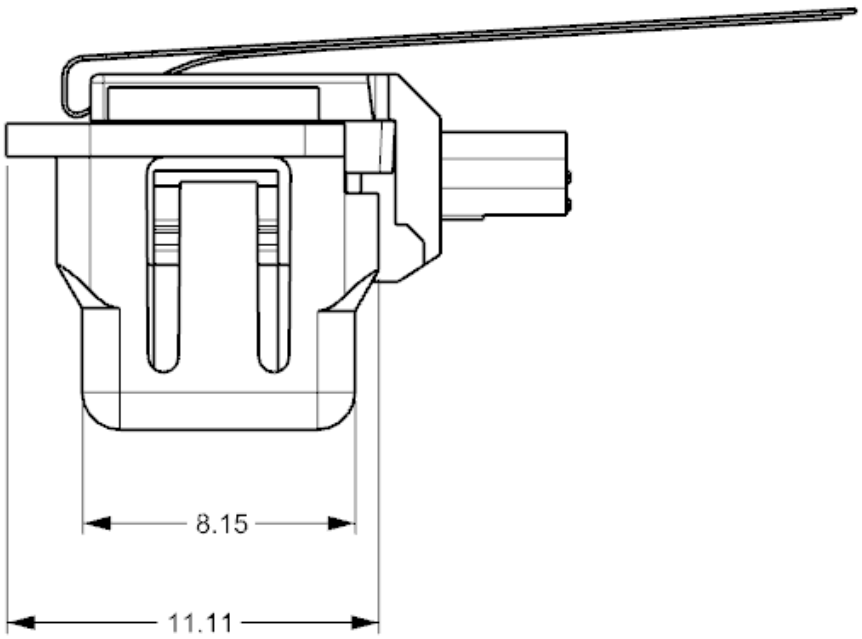


Figure 6-18: Profile View of Free-Side Connector with Dust Cover Attached

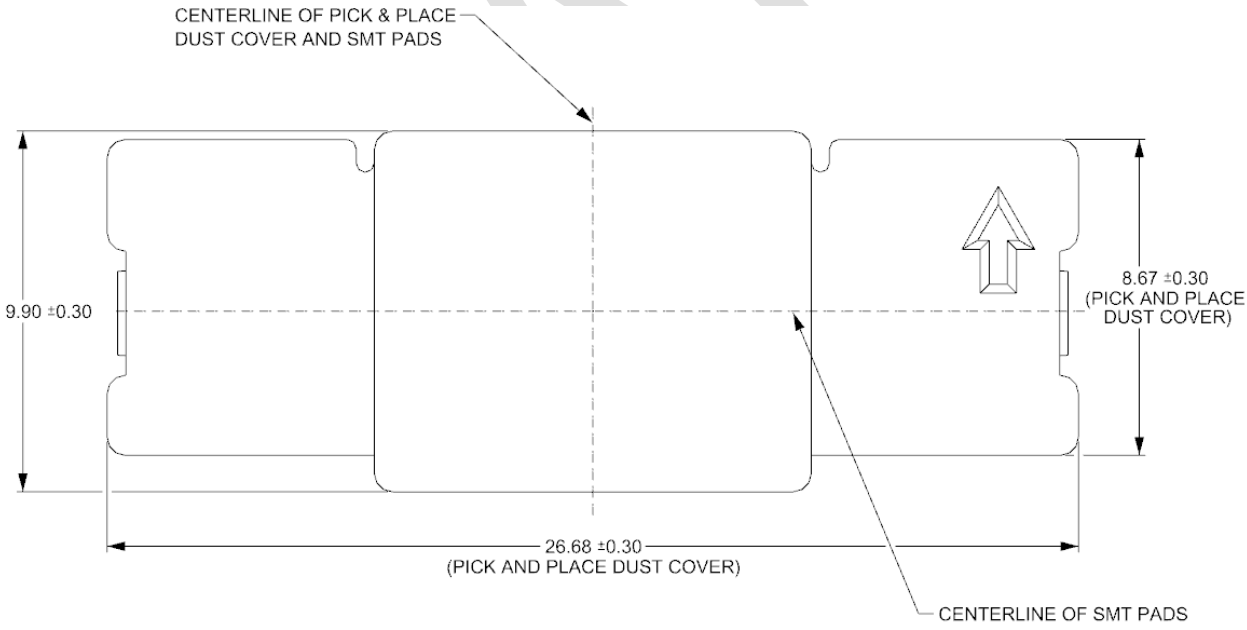


Figure 6-19: Top View of Vacuum Cap for Cage

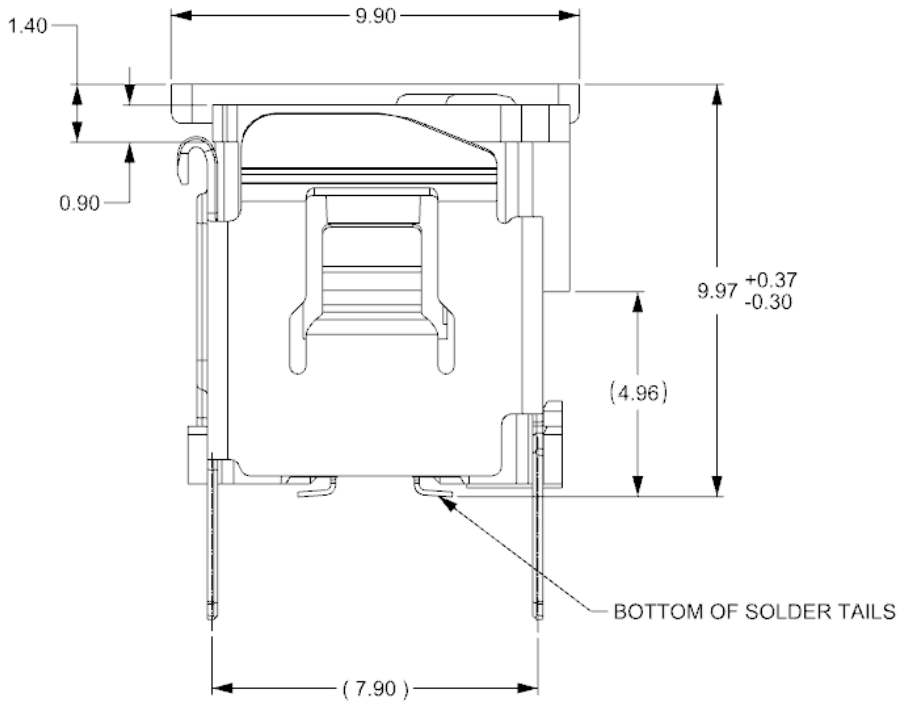


Figure 6-20: Profile View of Vacuum Cap for Cage

7. Test Requirements and Methodologies (TS-1000, etc.)

7.1 Performance Tables

EIA-364-1000 (TS-1000) shall be used to define the test sequences and procedures for evaluating the connector system described in this document. Where multiple test options are available, the manufacturer shall select the appropriate option where not previously specified. The selected procedure should be noted when reporting data. If there are conflicting requirements or test procedures between EIA-364 procedures and those contained within this document, this document shall be considered the prevailing authority.

Unless otherwise specified, procedures for sample size, data, and collection to be followed as specified in EIA-364-1000. See EIA-364-1000 Annex B for objectives of tests and test groups.

Table 7-1 summarizes the performance criteria that are to be satisfied by the connector described in this document. Most performance criteria are validated by EIA-364-1000 testing, but this test suite leaves some test details to be determined. To ensure that testing is repeatable, these details are identified in Table 7-2. Finally, testing procedures used to validate any performance criteria not included in EIA-364-1000 are provided in Table 7-3.

Table 7-1: Form Factor Performance Requirements

Performance Parameters	Description/ Details	Requirement
Mechanical/ Physical Requirements		
Plating Type	Plating type on connector contacts	Precious
Surface Treatment	Surface treatment on connector contacts	Non-lubricated
Wipe length	Designed distance a contact traverses over a mating contact surface during mating and resting at a final position	Greater than 0.127mm
Rated Durability Cycles	The expected number of durability cycles a component is expected to encounter over the course of its life	Connector/ cage: 200 cycles
Latched Mating Force*	Amount of force needed to mate a module with a connector when latches are deactivated	27 N MAX
Latch Retention*	Amount of force the latching mechanism can withstand	109 N MIN 121 N MAX
Environmental Requirements		
Field Life	The expected service life for a component	7 years
Field Temperature	The expected service temperature for a component	0°C to 85°C
Electrcial Requirements		
Current*	Maximum current to which a contact is exposed in use Refer to Table 4-3 for contact descriptions	0.65 A per "S" contact MAX 0.30 A per "SB" contact MAX
Operating Rating Voltage	Maximum voltage to which a contact is exposed in use	29.9 V DC per contact MAX
NOTE: Performance criteria denoted with stars (*) are not validated by EIA-364-1000 testing. Refer to **Table 7-3** for test procedures and pass/fail criteria.		

Table 7-2 describes the details necessary to perform the tests described in the EIA-364-1000 test sequences. Testing shall be done in accordance with EIA-364-1000 and the test procedures it identifies in such a way that the parameters/ requirements defined in Table 7-1 are met. Any information in this table supersedes EIA-364-1000.

Table 7-2: EIA-364-1000 Test Details

Test	Test Descriptions and Details	Pass/ Fail Criteria
Mechanical/ Physical Tests		
Durability (preconditioning)	EIA-364-09 To be tested with connector, cage, and module (Latches should not be locked)	No evidence of physical damage
Durability (see Note 1)	EIA-364-09 To be tested with connector, cage, and module (Latches should not be locked out per EIA-364-1000)	No visual damage to mating interface or latching mechanism
Environmental Tests		
Mixed Flowing Gas (see Note 2)	EIA-364-65 Class II See Table 4.1 in EIA-364-1000 for exposure times Test option Per EIA-364-1000: 2	10 mΩ MAX change from baseline
Electrical Tests		
Low Level Contact Resistance (see Note 3)	EIA-364-23 20 mV DC MAX, 100 mA MAX To include wire termination or connector-to-board termination	10 mΩ MAX change from baseline
Dielectric Withstanding Voltage	EIA-364-20 Method B 1000 VDC minimum for 1 minute Applied voltage may be product / application specific	No defect or breakdown between adjacent contacts -AND- 5 mA Max Leakage Current

NOTES:
1. If the durability requirement on the connector is greater than that of the module, modules may be replaced after their specified durability rating.
2. Test option, temperature, duration must be reported.
3. The first low level contact resistance reading in each test sequence is used to determine a baseline measurement. Subsequent measurements in each sequence are measured against this baseline.

Table 7-3 describes the testing procedures necessary to validate performance criteria not validated by EIA-364-1000 testing. The tests are to be performed in such a way that the parameters/ requirements defined in Table 7-1 are met.

Table 7-3: Additional Test Procedures

Test	Test Descriptions and Details	Pass/ Fail Criteria
Mechanical/ Physical Tests		
Latched Mating Force	EIA-364-13 To be tested with cage, connector, and module without heat sinks Latching mechanism deactivated (locked out)	Refer to Table 7-1 -AND- No physical damage to any components
Latched Unmating Force	EIA-364-13 To be tested with cage, connector, and module without heat sinks Latching mechanism deactivated (locked out)	
Latch Retention	EIA-364-13 To be tested with cage, connector, and module without heat sinks Latching mechanism engaged (not locked out)	
Environmental Tests		
Storage Temperature	EIA-364-32 Method A, Test Condition 1, Duration 4 Use min and max field temperatures listed in Table 7-1 for temperature range	Refer to Table 7-1
Storage Humidity	EIA-364-31	Refer to Table 7-1
Electrical Tests		
Current	EIA-364-70 Method 3, 30-degree temperature rise Contacts energized: Individually	Refer to Table 7-1 for current magnitude

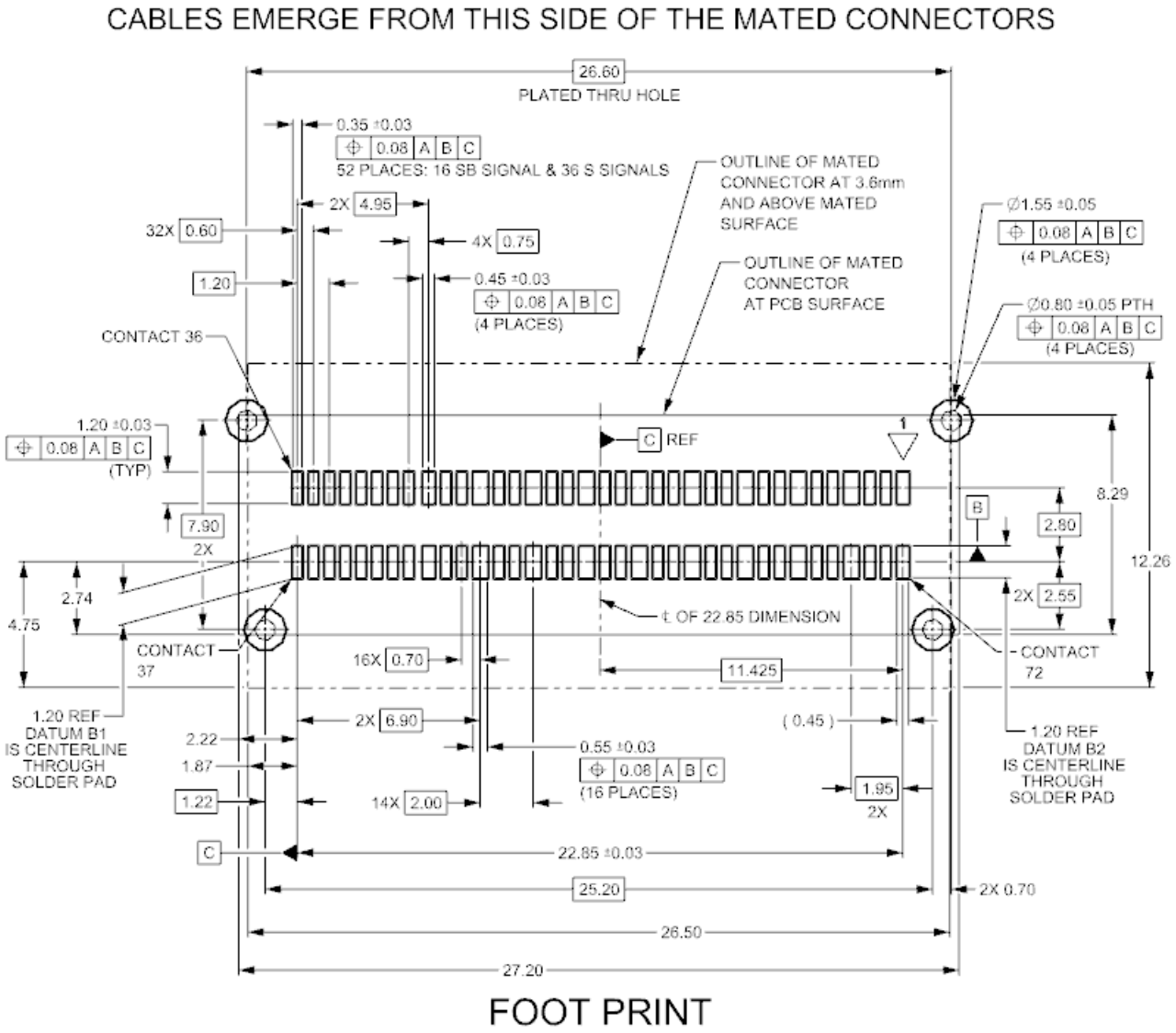
Appendix A. System Mechanical Specification (Normative)

A.1. Overview

All material within this appendix, whether defined as normative or informative, is subject to IP disclosure and reasonable and non-discriminatory (RAND) terms by SNIA SFF TA TWG member companies.

A.2. PCB Layout

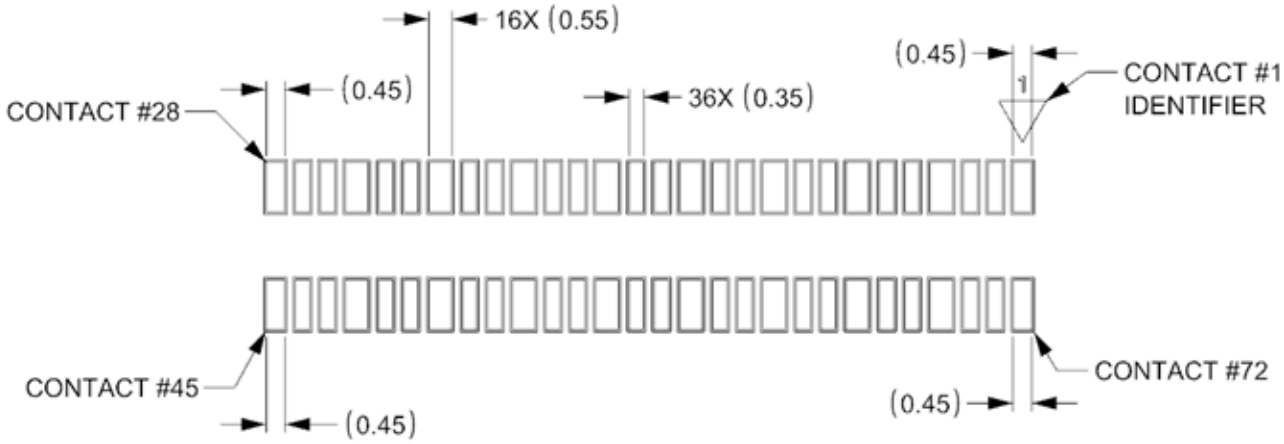
A.2.1. PCB Layout for 72P Connector Footprints



NOTES:

1. Datum -A- is the top of the PCB
2. Pin-in-paste soldering method is recommended, including thru-hole housing tails
3. Signal assignments are identified in Section 4.2

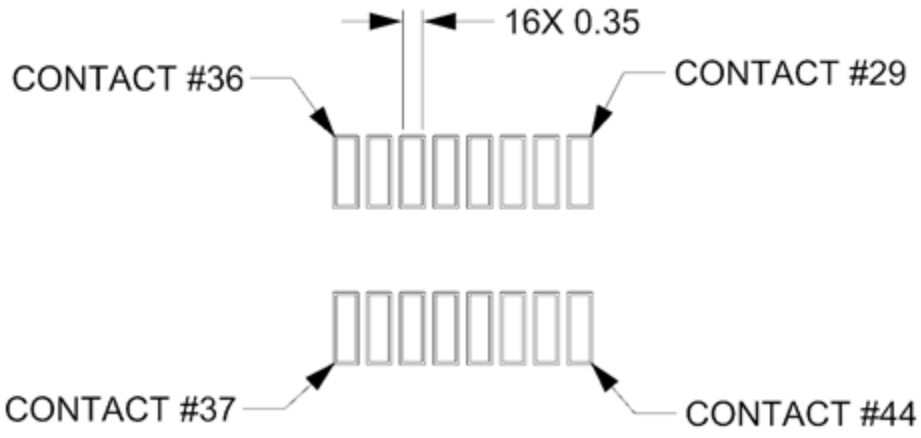
Figure A-1: PCB Layout



NOTES:

1. End grounds (END GND): Contacts 1, 28, 45, and 72; 0.45 wide
2. Grounds (GND): Contacts 4, 7, 10, 13, 16, 19, 22, 25, 48, 51, 54, 57, 60, 63, 66, & 69; 0.55 wide
3. Signals (S): All remaining contacts; 0.35 wide

Figure A-2: Pad Width Detail 1



NOTE: All contacts shown are sideband (SB) contacts

Figure A-3: Pad Width Detail 2

A.2.2. PCB Layout for 144P Connector Footprints

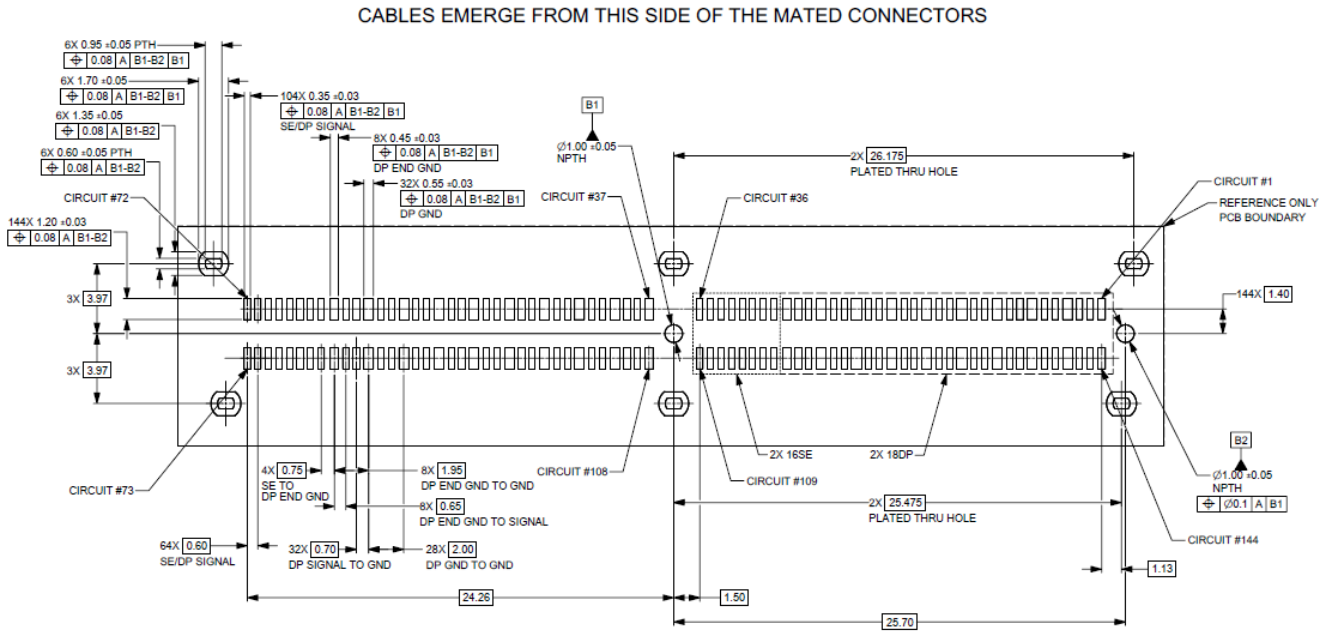


Figure A-4: Footprint for 2 Pegs Option

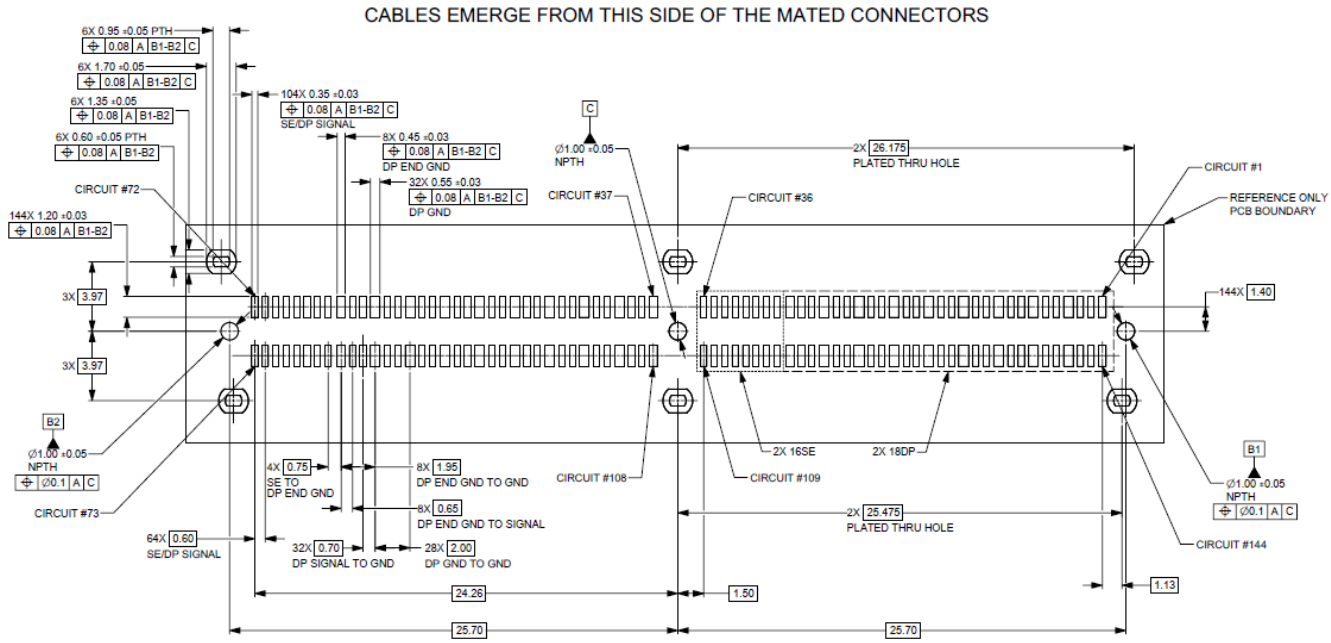


Figure A-5: Footprint for 3 pegs Option

Appendix B. Minimum Connector Spacing Requirements (Informative)

DESCRIPTION	DIM "X"	DIM "Y"
HORIZONTAL EXIT WITH PULL TAB	28.60	30.00
HORIZONTAL EXIT NON-PULL TAB	34.50	30.00
ANGLE EXIT WITH PULL TAB	28.60	15.00
ANGLE EXIT NON-PULL TAB	34.50	15.00
VERTICAL EXIT WITH PULL TAB	28.60	12.00

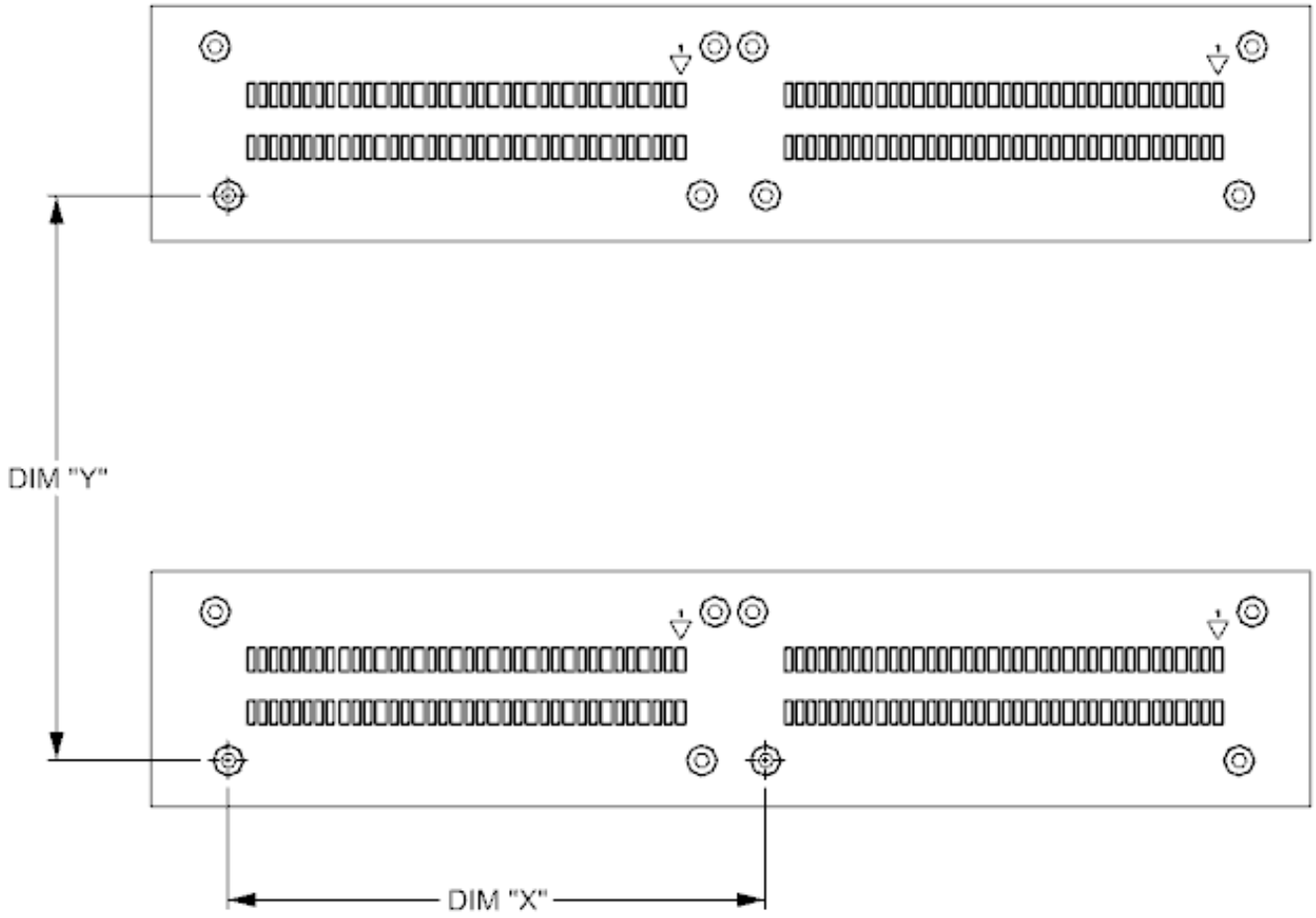


Figure B-1: Minimum Connector Spacing Requirements for 72P Connector

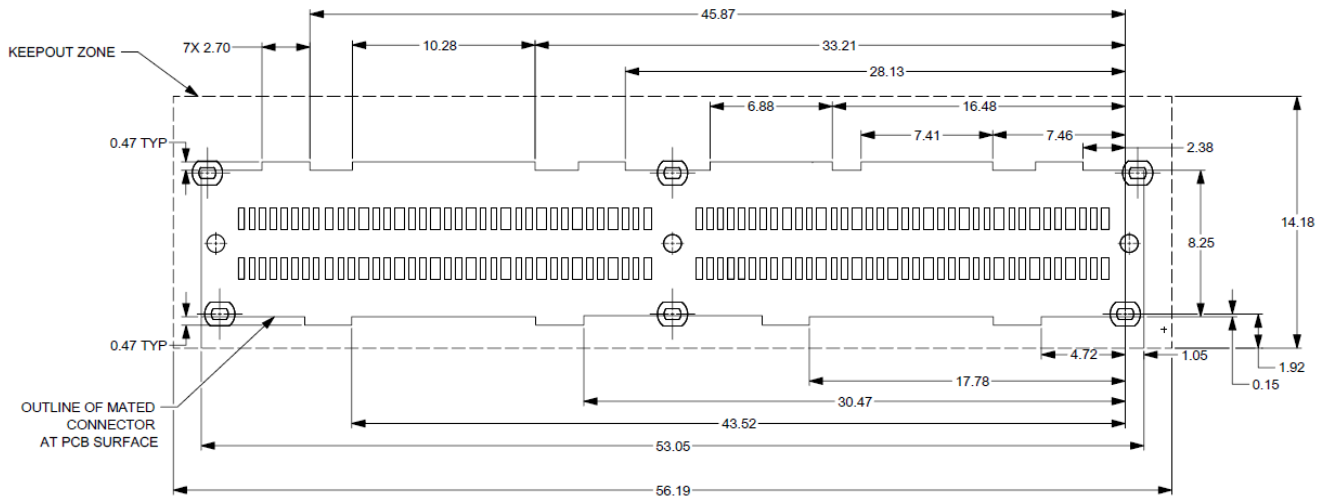


Figure B-2: Outline of Mated Connector (144P) on PCB

Table B-1: Spacing Recommendation for Mating Receptable Cable Assemblies

DESCRIPTION	DIM "X"	DIM "Y"
HORIZONTAL EXIT WITH PULL TAB	56.10	30
ANGLE EXIT WITH PULL TAB	56.10	15

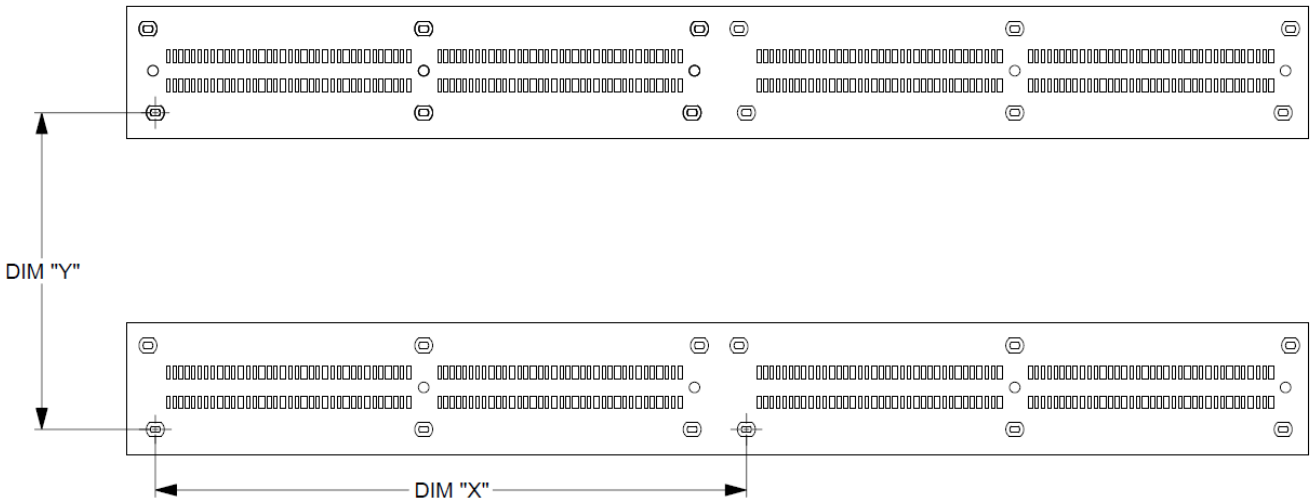


Figure B-3: Minimum Connector Spacing Requirements for 144P Connector

Appendix C. Gatherability (Informative)

The connector system is designed with lead-in chamfers on the fixed-side and free-side to allow the parts to mate without stubbing when not perfectly aligned. This gatherability works when the mating receptacle is allowed to "float" and find its way to the center of the free-side slot when fully mated. **These features are designed for easier mating but the connector system is not intended for blind mate applications.** If the fixed-side connector is rigidly held in place then it must be on center.

C.1 Type 1 Connector

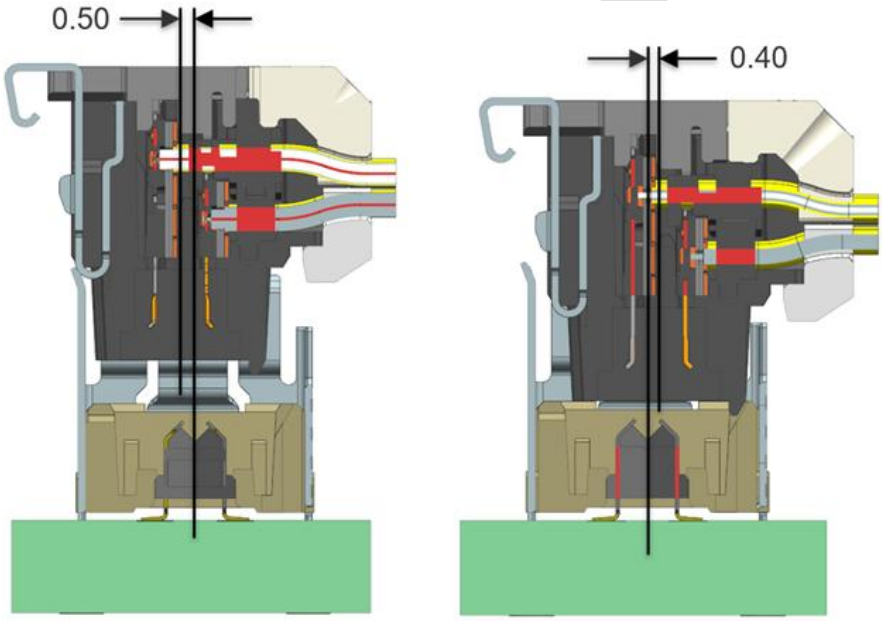


Figure C-1: Lateral Gatherability

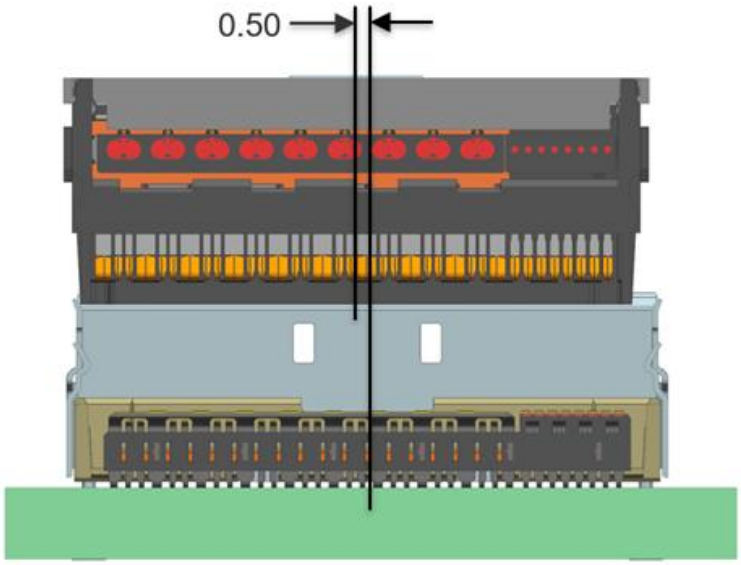


Figure C-2: Longitudinal Gatherability

To prevent damage to the connectors from over rotation proper care should be taken when mating and unmating connectors. **The connector system is not intended for blind mate applications**. Minimizing angular mating is critical to avoid any damage caused during mating, which can occur at angles larger than 5°.

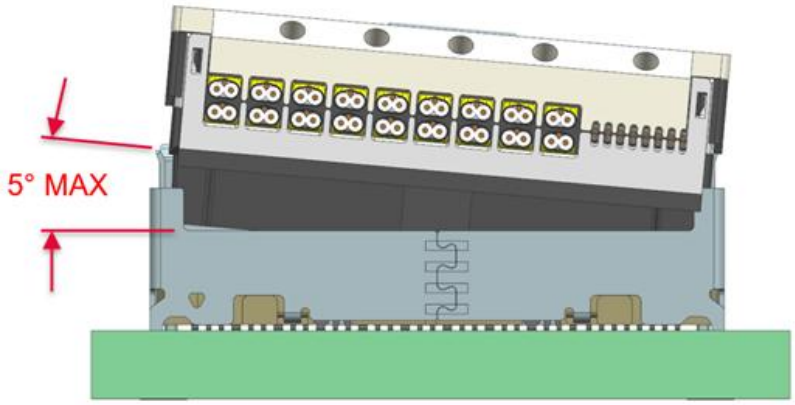


Figure C-3: Angular Gatherability

C.2 Type 2 Connector

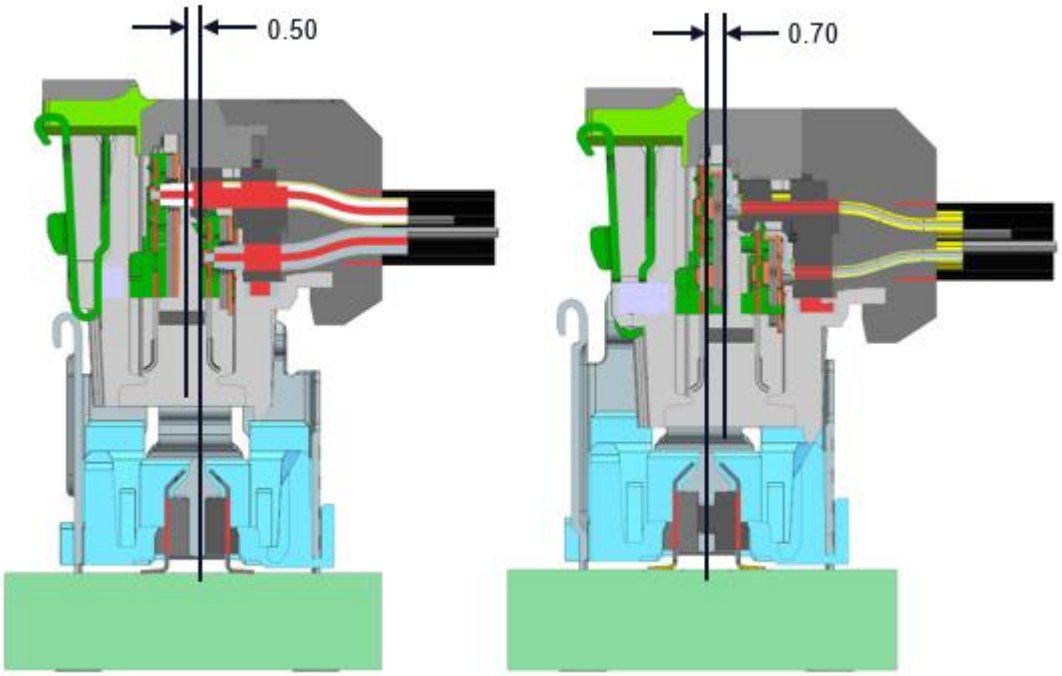


Figure C-4: Lateral Gatherability

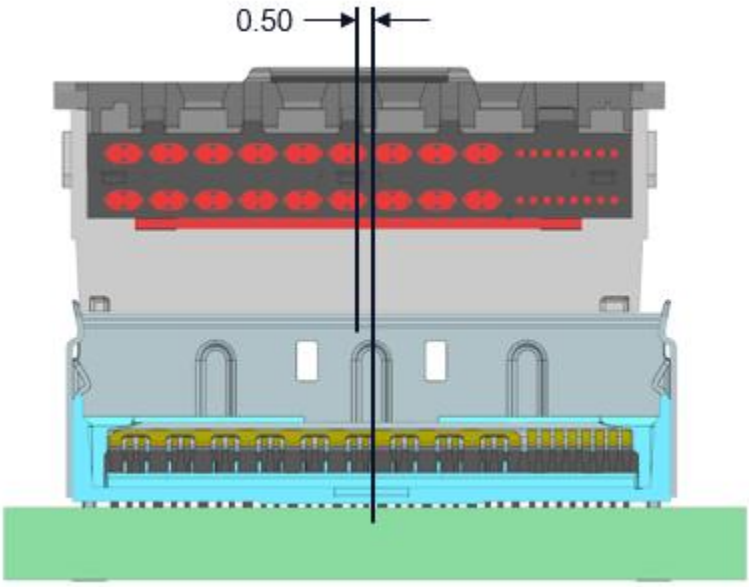


Figure C-5: Longitudinal Gatherability

To prevent damage to the connectors from over rotation proper care should be taken when mating and unmating connectors. **The connector system is not intended for blind mate applications**. Minimizing angular mating

is critical to avoid any damage caused during mating, which can occur at angles larger than 5°.

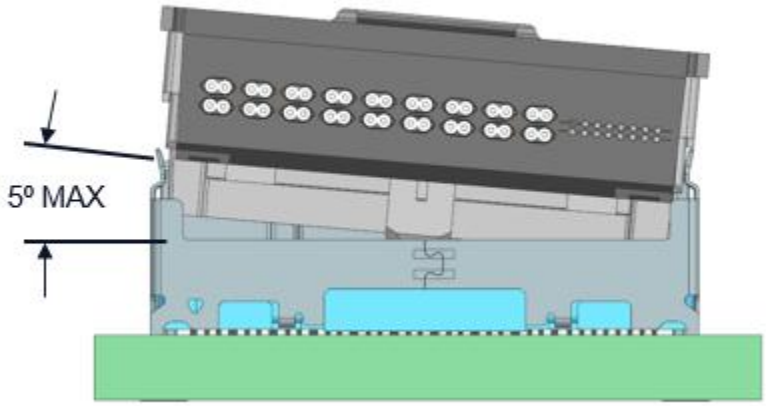


Figure C-6: Angular Gatherability