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SFF Committee

SFF-8470 Specification for

Shielded High Speed Serial Multilane Copper Connector

Rev 3.3 April 3, 2006

Secretariat: SFF Committee

Abstract:

This specification defines the physical interface and performance requirements for a high-speed four-lane and twelve-lane connector and retention system to be used on 8 and 24 signal pair shielded connections. This connector is suitable for high speed interfaces such as InfiniBand, Fibre Channel, et al.

This document provides a common specification for systems manufacturers, system integrators, and suppliers. This is an internal working document of the SFF Committee, an industry ad hoc group.

This specification is made available for public review, and written comments are solicited from readers. Comments received by the members will be considered for inclusion in future revisions of this document.

The description of a connector in this document does not assure that the specific component is actually available from connector suppliers. If such a connector is supported it must comply with this specification to achieve interoperability between suppliers.

Support: This document is supported by the identified member companies of the SFF Committee.

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EXPRESSION OF SUPPORT BY MANUFACTURERS

The following member companies of the SFF Committee voted in favor of this industry specification.

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Fujitsu CPA
Hewlett Packard
Hitachi Cable
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The following member companies of the SFF Committee voted to abstain on this industry specification.

Agilent
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Maxtor
Micrel
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The user's attention is called to the possibility that implementation to this Specification may require use of an invention covered by patent rights. By distribution of this Specification, no position is taken with respect to the validity of this claim or of any patent rights in connection therewith. The patent holder has filed a statement of willingness to grant a license under these rights on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain such a license.

Foreword

The development work on this specification was done by the SFF Committee, an industry group. The membership of the committee since its formation in August 1990 has included a mix of companies which are leaders across the industry.

When 2 1/2" diameter disk drives were introduced, there was no commonality on external dimensions e.g. physical size, mounting locations, connector type, connector location, between vendors.

The first use of these disk drives was in specific applications such as laptop portable computers and system integrators worked individually with vendors to develop the packaging. The result was wide diversity, and incompatibility.

The problems faced by integrators, device suppliers, and component suppliers led to the formation of the SFF Committee as an industry ad hoc group to address the marketing and engineering considerations of the emerging new technology.

During the development of the form factor definitions, other activities were suggested because participants in the SFF Committee faced more problems than the physical form factors of disk drives. In November 1992, the charter was expanded to address any issues of general interest and concern to the storage industry. The SFF Committee became a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

Those companies which have agreed to support a specification are identified in the first pages of each SFF Specification. Industry consensus is not an essential requirement to publish an SFF Specification because it is recognized that in an emerging product area, there is room for more than one approach. By making the documentation on competing proposals available, an integrator can examine the alternatives available and select the product that is felt to be most suitable.

SFF Committee meetings are held during T10 weeks (see www.t10.org), and Specific Subject Working Groups are held at the convenience of the participants. Material presented at SFF Committee meetings becomes public domain, and there are no restrictions on the open mailing of material presented at committee meetings.

Most of the specifications developed by the SFF Committee have either been incorporated into standards or adopted as standards by EIA (Electronic Industries Association), ANSI (American National Standards Institute) and IEC (International Electrotechnical Commission).

If you are interested in participating or wish to follow the activities of the SFF Committee, the signup for membership and/or documentation can be found at:
www.sffcommittee.com/ie/join.html

The complete list of SFF Specifications which have been completed or are currently being worked on by the SFF Committee can be found at:
ftp://ftp.seagate.com/sff/SFF-8000.TXT

If you wish to know more about the SFF Committee, the principles which guide the activities can be found at:
ftp://ftp.seagate.com/sff/SFF-8032.TXT

Suggestions for improvement of this specification will be welcome. They should be sent to the SFF Committee, 14426 Black Walnut Ct, Saratoga, CA 95070.

SFF Committee --
Shielded High Speed Serial Multilane Copper Connector

1. Scope

This specification defines the terminology and physical requirements for shielded four lane and twelve lane copper connections and complete connectors.

Such connectors are suitable for use in multi signal pair, high speed I/O applications in systems where physical space is limited and signal integrity is required.

1.1 Description of Clauses

Clause 1 contains the Scope and Purpose.
Clause 2 contains Referenced and Related Standards and SFF Specifications.
Clause 3 contains the General Description
Clause 4 contains the Definitions and Conventions
Clause 5 contains Electrical cable plant and connector specifications

2. References

The SFF Committee activities support the requirements of the storage industry, and it is involved with several standards.

2.1 Industry Documents

The following documents are relevant to this Specification.

- SFF-8410 High Speed Serial Testing for Copper Links

2.2 SFF Specifications

There are several projects active within the SFF Committee. The complete list of specifications which have been completed or are still being worked on are listed in the specification at ftp://ftp.seagate.com/sff/SFF-8000.TXT

2.3 Sources

Those who join the SFF Committee as an Observer or Member receive electronic copies of the minutes and SFF specifications (http://www.sffcommittee.com/ie/join.html).

Copies of ANSI standards may be purchased from the InterNational Committee for Information Technology Standards (http://tinyurl.com/c4psg).

Copies of SFF, T10 (SCSI), T11 (Fibre Channel) and T13 (ATA) standards and standards still in development are available on the HPE version of CD_Access (http://tinyurl.com/85fts).

3. General Description

This specification defines the terminology and physical requirements for duplex shielded four lane and twelve lane copper connections and complete connectors. The performance requirements on cable assemblies that use the SFF-8470 connector system vary by application and are not specified in this document.

The description of a connector in this document does not assure that the specific component is actually available from connector suppliers. If such a connector

is supplied it must comply with this specification to achieve interoperability between suppliers.

These connectors are used in multi-signal pair, high speed I/O applications for systems where physical space is limited and signal integrity is required. The high speed differential signal connector provides a cost effective alternative to the short length optical cables used in switches, hubs, servers and disk storage array applications.

- The Four Lane interface with latch allows up to 3 I/O ports on a PCI card
- The Four Lane interface with jack screw allows up to 2 I/O ports on a PCI card
- The Twelve Lane interface allows for 2 I/O ports on a PCI card

Connector retention is via latch or jack screws. The mating sides are the same for all connector versions of the same gender. The termination side of the connector is based on SMT designs for the board mount and cable mount.

The High Speed serial multilane copper connector is designed for operating speeds up to 5.0~10.0 Gbaud per line in a 100 Ohm differential environment. Higher speeds are also possible. The SFF-8470 connector system has a differential impedance of 100 +/-5 ohms. This requirement is similar to the impedance specifications for high quality 100 ohm balanced bulk cable. This matching allows the connector to appear as a extension of the bulk cable and to be used multiple times in the same link.

The shield connector mating interface provides an EMI-tight (Electro-Magnetic Interference) seal. The design minimizes crosstalk (less than 4%), minimum transmission line impedance discontinuity across the connector, and management of EMI (caused by the connector or its mating interface).

The transmission line impedance of the connector itself (not including the termination interface to the wire or board) matches the electrical media within the tolerances allowed for the media. This connection scheme may be used in multiple places within a cabling scheme, and is optimized for a 100 ohm environment.

The design is physically robust e.g. no pins to bend and the small size suits applications across a wide variety of applications, from notebooks to high end servers.

This document specifies the requirements on the mating and termination side of the connector to enable functional multiple sourcing of the complete connectors. The construction of the connectors between mating and termination sides are not specified by this document. The connectors specified are fully shielded at the mating interface with provisions for the backshell to connector interfaces. 10G Fiber Channel, 10G Ethernet, and InfiniBand presently incorporate requirements on the characteristic impedance and ability to transmit up to 5.0~10.0 Gbaud per copper line.

The high-speed electrical performance requirements for the connector and its electrical neighbourhood are specified in SFF-8410, which is hereby incorporated by reference into this document.

4. Definitions and Conventions

4.1 Definitions

For the purpose of SFF Specifications, the following definitions apply:

Board Termination Technologies: Surface mount single row, surface mount dual row, through hole, hybrid, straddle mount, pressfit.

Cable Termination: The attachment of wires to the termination side of a connector. Schemes commonly used in the industry are IDC (Insulation Displacement Contact), IDT (Insulation Displacement Termination), wire slots, solder, weld, crimp, braise, etc.

Contact mating sequence: Order of electrical contact during mating/unmating process. Other terms sometimes used to describe this feature are: contact sequencing, contact positioning, make first/break last, EMLB (early make late break) staggered contacts, and long pin / short pin.

Fixed: Used to describe the gender of the mating side of the connector that accepts its mate upon mating. This gender is frequently, but not always, associated with the common terminology “receptacle”. Other terms commonly used are “female” and “socket connector”. The term “fixed” is adopted from EIA standard terminology as the gender that most commonly exists on the fixed end of a connection, for example, on the board or bulkhead side. In this specification “fixed” is specifically used to describe the mating side gender illustrated in Figure 2.

Free: Used to describe the gender of the mating side of the connector that penetrates its mate upon mating. This gender is frequently, but not always, associated with the common terminology “plug”. Other terms commonly used are “male” and “pin connector”. The term “free” is adopted from EIA standard terminology as the gender that most commonly exists on the free end of a connection, for example, on the cable side. In this specification “free” is specifically used to describe the mating side gender illustrated in Figure 2.

Frontshell: That metallic part of a connector body that directly contacts the backshell or other shielding material that provides mechanical and shielding continuity between the connector and the cable media. Other terms sometimes there is a conflict between text and tables on a feature described as optional, the table shall be accepted as being correct.

Reserved: Where this term is used for defining the signal on a connector pin its actual 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.

Right Angle: A connector design for use with printed circuit board assembly technology where the mating direction is parallel to the plane of the printed circuit board

Straight: A connector design for use with printed circuit board assembly technology where the mating direction is perpendicular to the plane of the printed

circuit board

Surface mount: A connector design and a printed circuit board design style where the connector termination points do not penetrate the printed circuit board and are subsequently soldered to the printed circuit board

Termination side: The side of the connector opposite the mating side that is used for permanently attaching conductors to the connector. Due to pin numbering differences between mating side genders the termination side shall always be specified in conjunction with a mating side of a specific gender. Other terms commonly used in the industry are: back end, non-mating side, footprint, pc board side, and post side

Through hole: A connector design and a printed circuit board design style where the connector termination points penetrates the printed circuit board and are subsequently soldered to the printed circuit board.
For the purpose of SFF Specifications, the following definitions apply:

4.2 Conventions

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

American:	ISO:
0.6	0,6
1,000	1 000

5 Electrical cable assembly plant and connector specifications

5.1 Shielding

Cable assemblies shall have a transfer impedance through the shield(s) of less than 100 mohm/m from DC through 3.1875 Gbaud/2 equivalent frequency and shall meet the common mode power transfer, requirements specified in SFF-8410 over the same frequency range.
Cable shield(s) on inter-enclosure cables shall be grounded through the bulkhead connector shell(s) on both ends.

5.2 Bulk Cable interoperability

All styles of balanced bulk cables are interoperable; i.e., electrically compatible with minor impact on TxRx Connection-length capability when intermixed. The unbalanced (coaxial) cables are also interoperable. Interoperability implies that the transmitter and receiver level and timing specifications are preserved, with the trade-off being distance capability in an intermixed system. Any electrically compatible, interoperable unbalanced or balanced cables may be used to achieve goals of longer distance, higher data rate, or lower cost as desired in the system implementation, if they are connector, impedance, and propagation mode compatible.
When bulk cable types are mixed, it is the responsibility

of the implementer to validate that the lengths of cable used do not distort the signal.
At transmission rates of 3125,0 Mbaud or greater, particular attention must be given to the transition between cable segments. No more than four connection points should be present from the transmitter to the receiver

5.3 Connector descriptions

5.3.1 Ratings
The ratings of this connector are shown in the Table 1.

Table 1 – Connector ratings

Items	Specifications
1) Current rating	0.5A /contact
2) Voltage rating	30V AC/contact
3) Temperature	-20~+85 degree C
4) Humidity	80% RH max.

5.3.2 Mounting Method
Recommended PCB for fixed genders (Receptacles) are shown as Table 2.

Table 2 – Suitable PCB

	Board thickness	Recommended Characteristic impedance
Receptacle mounting board	1.6mm, 2.4mm, 4.0mm	Differential impedance;100 ohms

5.3.3 Initial Performance
5.3.3.1 Electrical characteristics
This connector system, not including cable, shall meet the performance requirements shown in Table 3, these requirements show electrical characteristics.

Table 3 – Electrical characteristics

Items	Test Conditions	Specifications
1) Low level Contact resistance with conductor resistance - Initial	EIA -364-23 20 mV DC, 10 mA	80m ohms maximum
2) Insulation resistance	100V DC	10^3 M ohms minimum Between adjacent contacts
3) Dielectric withstanding voltage	300V/min. DC for 1 minute	No defect between adjacent contacts
4) Differential impedance (Connector area)	EIA 364-108 Rise time:70ps (20-80%)Includes-connector cable to connector interface and board termination pads and vias)	90~110 ohms (distribution) 100+/-5 ohms (distribution of average value)
5) Within pair skew	EIA 364-103	5ps maximum (By design)
6) Near end crosstalk	SFF 8410 Rise time:70ps (20~80%) Rise Time measurement point: at the connector. Use test fixture for calibration of rise time as shown in Figure 1.	4% maximum measured differentially with all adjacent neighbor pairs driven at 70ps (20~80%)rise time.
7) Insertion Loss	EIA-364-101 Measure the return loss of the test fixture with open end for calibration as shown in Figure 2. Measure the return loss of the connector system with test fixtures with open end as shown in Figure 3. Divide the connector with test fixtures return loss by the fixture return loss=1/2 of the divided return loss from above. Recommendation:4-port Network A nalyzer	1.0 dB maximum (Frequencies up to 1.6 GHz)

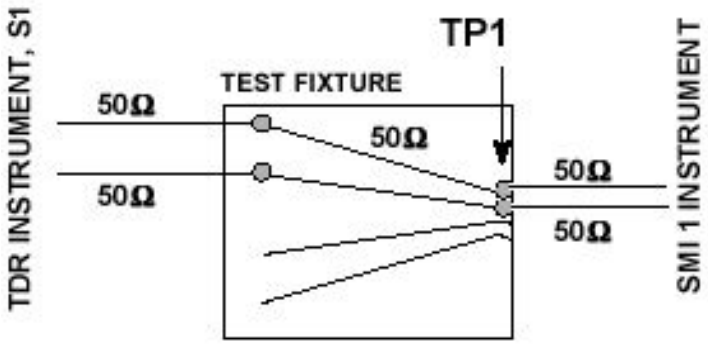


Figure 1 – Near end crosstalk Test Fixture

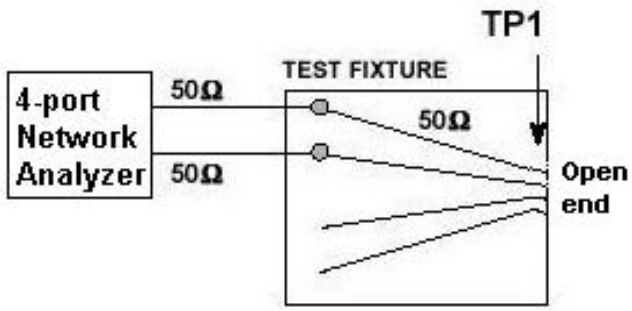


Figure 2 – Return Loss Test Fixture with open end for calibration

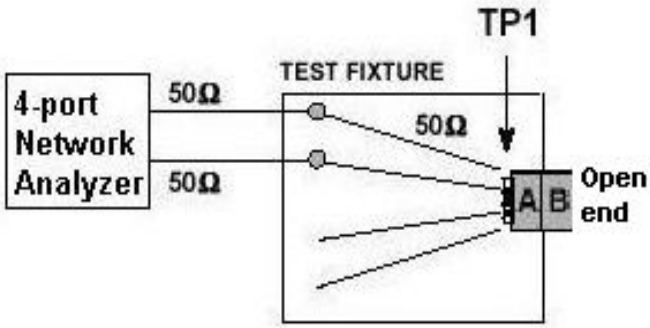


Figure 3 – Return Loss Test Fixture with connector

5.3.3.2 Mechanical performance

This connector system, not including cable, shall meet the performance requirements shown in Table 4 and Table 5, these requirements show mechanical characteristics.

Table 4 – Mechanical performance

Items	Test Conditions	Specifications
1) Durability	EIA-364-23	250 cycles
2) Insertion force	Measurement speed;10mm per minute maximum	See Table 5
3) Withdrawal Force	Measurement speed;10mm per minute maximum	See Table 5

5.3.4 Environmental performance

Table 5 – Insertion and withdrawal force

Items	4X	12X
Insertion Force (N maximum)	55.5	73.0
Withdrawal Force (N maximum)	49.0	59.0

Table 6 lists the minimum test criteria for this connector system. It is recommended that the appropriate test groups specified in EIA-364-1000.01 be used for qualification testing.

Table 6 – Environmental check item content

Test Items	Test Conditions	Specifications
1) Durability	EIA-364-23	250 cycles
2) Vibration	EIA-364-28D, condition VII, test condition letter D	
3) Thermal shock	EIA-364-32C, condition I	-55~+85 degree C
4) Temperature life	EIA-364-17B, method A	
5) Thermal disturbance		Cycle the connector system between 15+/-3 degree C and 85+/-3 degree, as measured on the part. Ramps should be a minimum of 2 degree C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Perform 10 such cycles.
6) Cyclic temperature & humidity	EIA-364-31B	
7) Mixed flowing gas	EIA 364-65, Class IIA option 2	Exposure time:7days

NOTE – The qualification test, in accordance with EIA-364-1000.01, should be using following conditions.

NOTE – 50 mating cycles preconditioning.

NOTE – Unmated exposure, option 2 mixed flowing gas exposure.

NOTE – Five year product life.

NOTE – Field operating temperature range up to 60 degree C.

NOTE – In Table 6, detailed test conditions within process of each test groups of EIA-364-1000.01 are shown.

5.3.5 Environmental performance (After test)

This connector system, not including cable, should satisfy the minimum performance indicated in the Table 7

Table 7 – Environmental Performance (After Test)

NOTE – On the Table 7, items with “Y” should be measured / observed. Items with “N” should not be required measurement or observation.

5.4 Contact assignment and keying

5.4.1 Free gender (Plug)

A free gender (plug) with latches is shown in Figure 4. The upper one has keys/slots. The lower one has no key slot. A without-key-slot free gender (plug) has no intermatability with any fixed gender (receptacle) that have keys. A free

Items	Insertion withdrawal force	Contact resistance	Insulation resistance	Dielectric withstanding voltage	Appearance check
Condition	Satisfy Table 5.	Resistance change should be 20 m ohms maximum.	100 M ohms minimum.	Same as initial. There should be no defect.	There should be no defect.
1) Durability	Y	Y	N	N	Y
2) Vibration	N	Y	N	N	Y
3) Thermal shock	Y	Y	Y	Y	Y
4) Temperature life	Y	Y	N	N	Y
5) Thermal disturbance	Y	Y	N	N	Y
6) Cyclic temperature & humidity	N	Y	Y	Y	Y
7) Mixed flowing gas	N	Y	N	N	Y

gender (plug) with jack screws is shown in Figure 5. The upper one has keys/slots. The lower one has no key slot. A without-key-slot free gender (plug) has no intermatability with any fixed genders (receptacles) that have keys. Standard cable assemblies shall have free genders (plugs) at both ends of the cable. The cable connector shall be the free gender (plug) while the bulkhead connector shall be the fixed gender (receptacle).
The free gender (plug) shall be mounted on the cable. The free gender (plug) contact numbering is shown in Figure 9.
Mechanical details of free gender (plug) are referred in Table 10.
Alternative methods of latching may be used other than a lanyard.

5.4.2 Fixed gender (Receptacle)
A fixed gender (receptacle) with latches is shown in Figure 4. A fixed gender (receptacle) with jack screws is shown in Figure 5. The fixed gender (receptacle) contact numbering is shown in Figure 9. Mechanical details of the fixed gender (receptacle) are referred in Table 10.

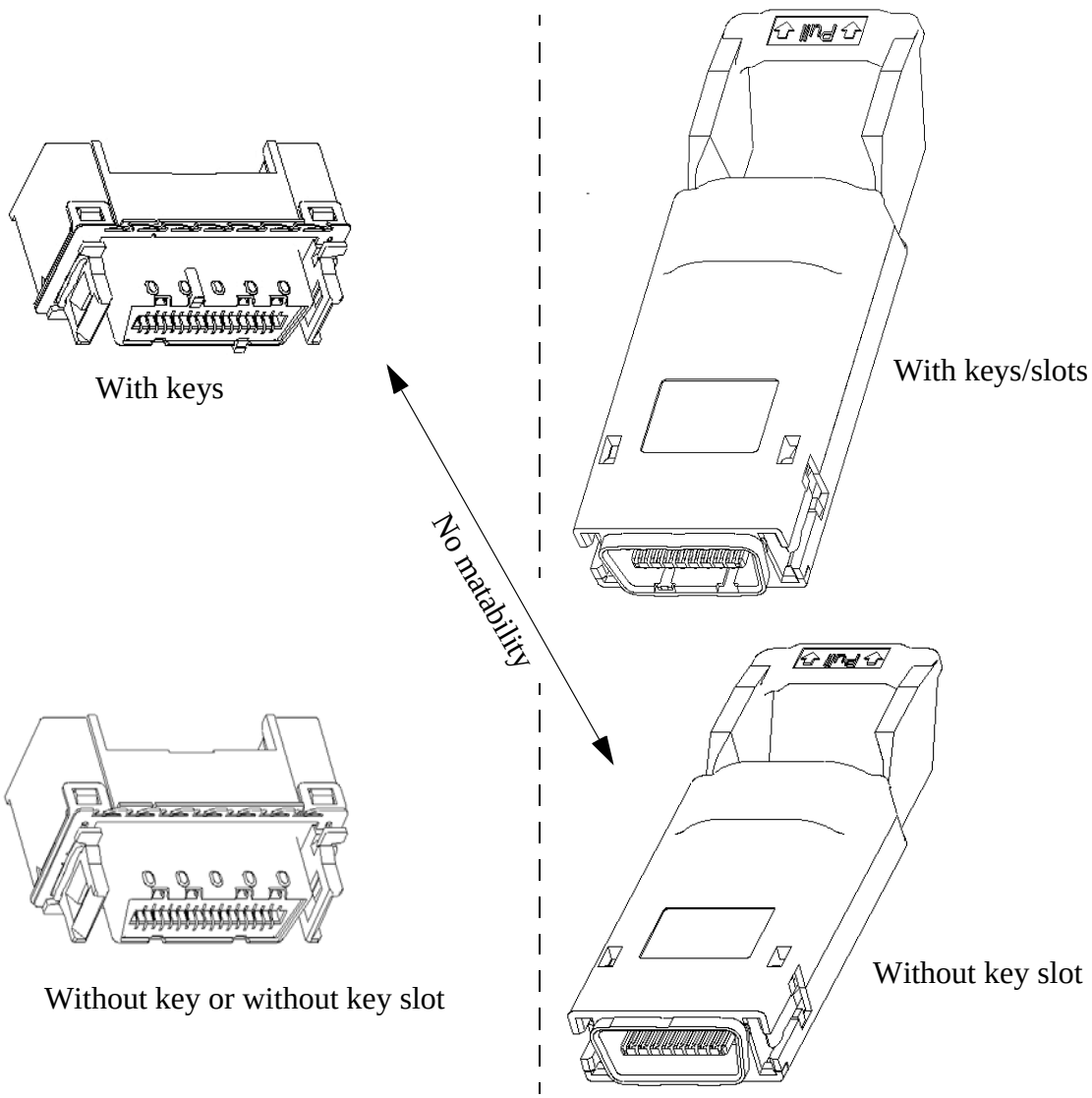


Figure 4 – General View of Latch Fixed Gender (Plug)

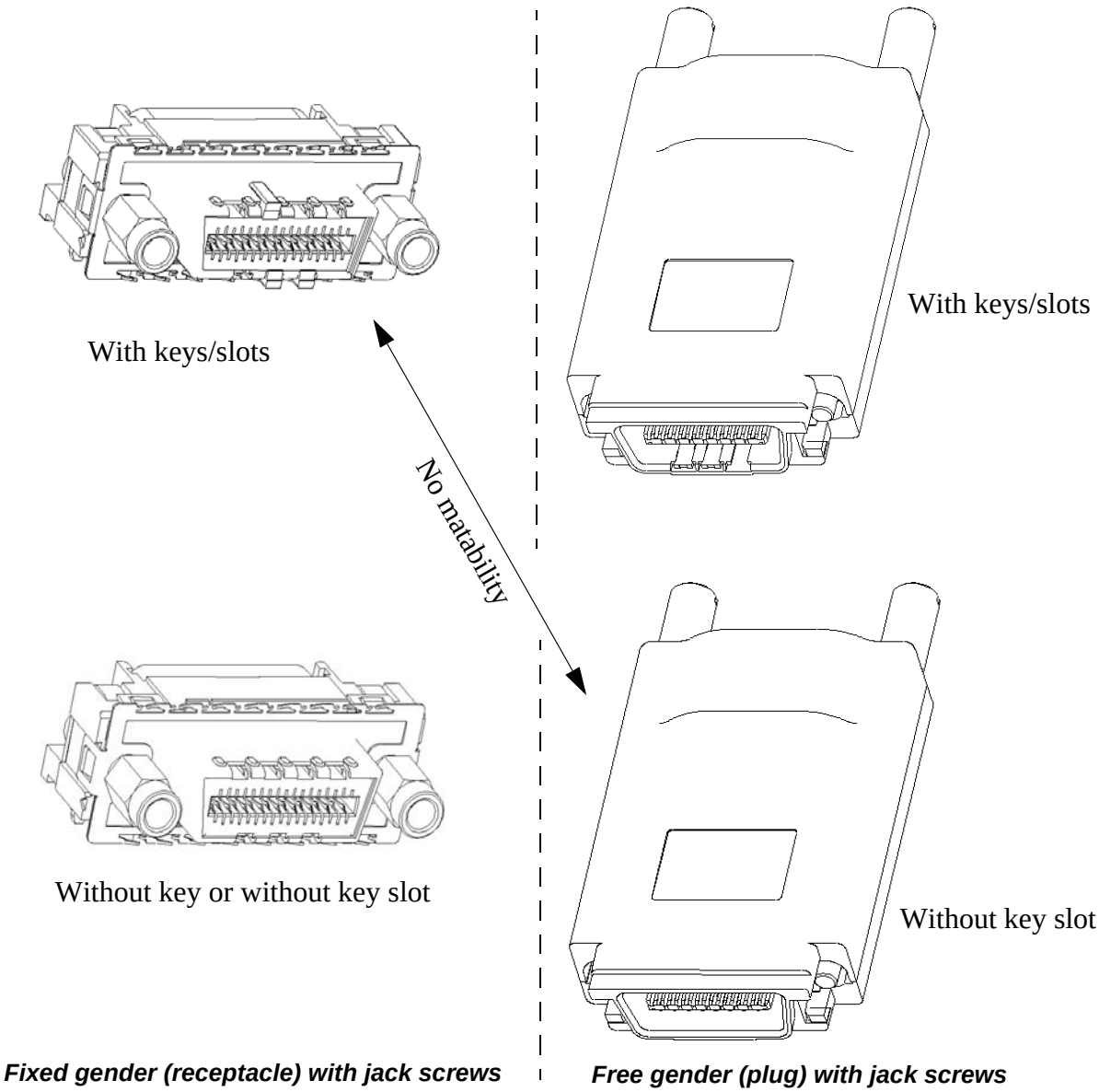


Figure 5 – General View of Jack Screw Fixed Gender (Receptacle)

5.4.3 Keying(Between Latch and Jack screw)

Keying is given by back shell design to prevent intermatability between latch and jack screw as shown in Figure 6.

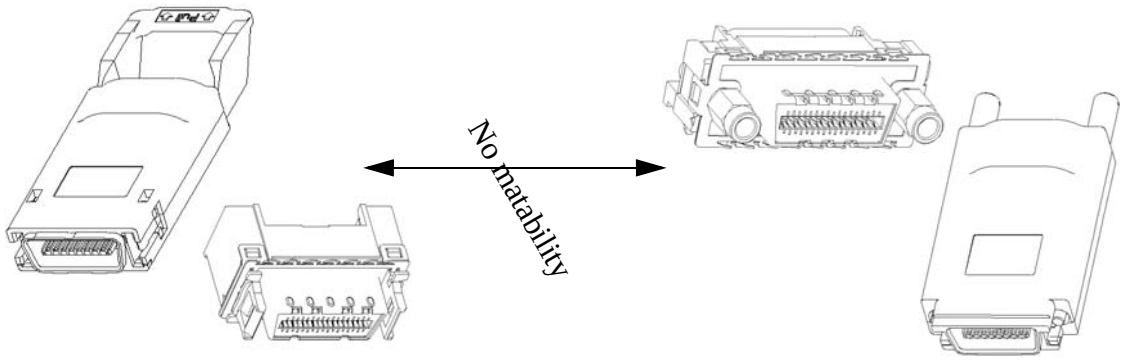


Figure 6 – No Matability between Latch and Jackscrew

5.4.4 Keying (Latch type)

Examples of Latch type key assignments are shown in Figure 7 and Table 8.

Fixed gender (Receptacle) Free gender (Plug)

Figure 7 – Key assignment (Latch type)

Table 8 – Key assignment (Latch type)

No.	Inserted keys (Receptacle)	Inserted Keys (Plug)	Note
1	None	None	No polarization
2	4,5	1,2,3,6	
3	None	All (No slot)	

5.4.5 Keying (Jack Screw type)

Examples of Jack Screw type key assignments are shown in Figure 8 and Table 9.

Fixed gender (Receptacle) Free gender (Plug)

Figure 8 – Key assignment (Jack Screw type)

Table 9 – Key assignment (Jack Screw type)

No.	Inserted keys (Socket)	Inserted Keys (Plug)	Note
1	None	None	No polarization
2	1,3,7	2,4,5,6	
3	1,4,6	2,3,5,7	
4	2,4,5	1,3,6,7	
5	2,6,7	1,3,4,5	
6	3,5,6	1,2,4,7	
7	None	All (No Slot)	

5.5 Dimensional requirements

5.5.1 Complete options

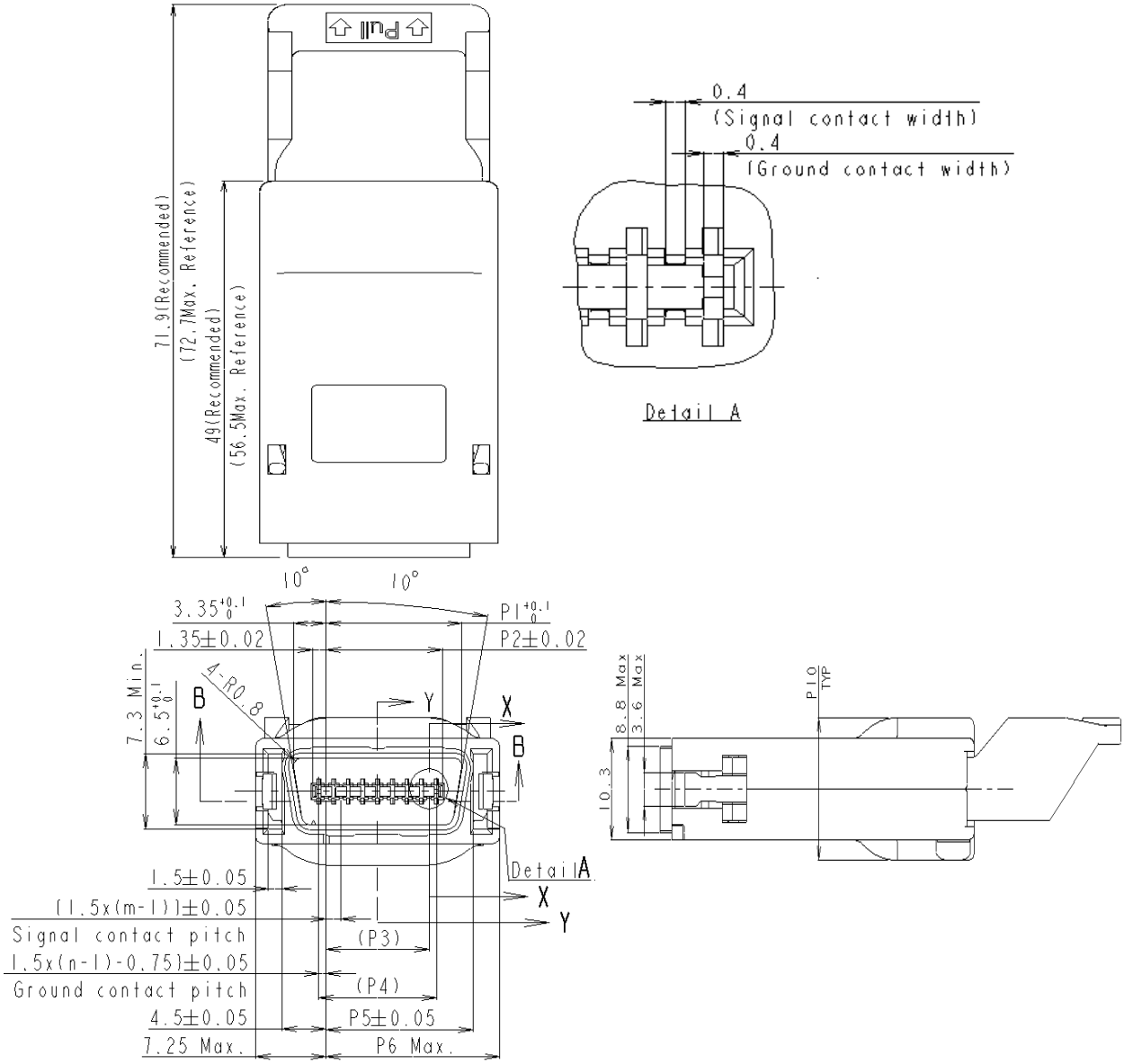
The complete options listed in this section are supported in this document. The free gender (plug) and the fixed gender (receptacle) options are listed in the Table 10.

Table 10 – Connector Options

	Connector type	Chapter	Overview	Contact Number	Outline	Termination side	Panel cutout/ Assembly
Free	Latch Plug (Without Key Slot)	5.6.1	Figure 4	Figure 9	Figure 9	NA	NA
	Latch Plug (With key Slots/WIthout Key)	5.6.2	Figure 4	Figure 9	Figure 10	NA	NA
	Latch Plug (With Keys/slots)	5.6.3	Figure 4	Figure 9	Figure 11	NA	NA
	Jack Screw Plug (Without key slot)	5.7.1	Figure 5	Figure 9	Figure 12	NA	NA
	Jack Screw Plug (With key Slots/WIthout Keys)	5.7.2	Figure 5	Figure 9	Figure 13	NA	NA
	Jack Screw Plug (With keys/slots)	5.7.3	Figure 5	Figure 9	Figure 14	NA	NA
Fixed	Latch Receptacle (Without Key)	5.8.1	Figure 4	Figure 9	Figure 15	Figure 17	Figure 20
	Latch Receptacle (With Keys)	5.8.2	Figure 4	Figure 9	Figure 16	Figure 17	Figure 20
	Latch Receptacle (With free positioning posts)	5.8.4	Figure 4	Figure 9	Figure 18	Figure 19	Figure 20
	Latch Receptacle (With force fitting positioning posts)	5.8.4	Figure 4	Figure 9	Figure 18	Figure 19	Figure 20
	Jack Screw Receptacle (Without Key)	5.9.1	Figure 5	Figure 9	Figure 21	Figure 23	Figure 26
	Jack Screw Receptacle (With Keys)	5.9.2	Figure 5	Figure 9	Figure 22	Figure 23	Figure 26
	Jack Screw Receptacle (With free positioning posts)	5.9.4	Figure 5	Figure 9	Figure 24	Figure 25	Figure 26
	Jack Screw Receptacle (With force fitting positioning posts)	5.9.4	Figure 5	Figure 9	Figure 24	Figure 25	Figure 26

5.6 Latch Plug Dimensional requirements

5.6.1 Latch Plug (Without Key Slot)



NOTE – Alternative methods of latching may be used other than a lanyard.

NOTE – Each dimension is indicated in Table 11

Figure 9 – Latch Plug dimensions (Without key slot)

Table 11 – Dimension Table of Latch Plug (Without Key Slot)

TYPE	m	n	P1	P2	P3	P4	P5	P6	P10
4X	1~8	1~9	13.85	11.85	10.5	12.0	15.0	17.75	14.4*
12X	1~24	1~25	37.85	35.85	34.5	36.0	39.0	41.75	21.0**

NOTE – * Recommendation:14.4mm(TYP), Reference: 16.0mm maximum.

NOTE – **Recommendation:21.0mm(TYP), Reference: 22.0mm maximum.

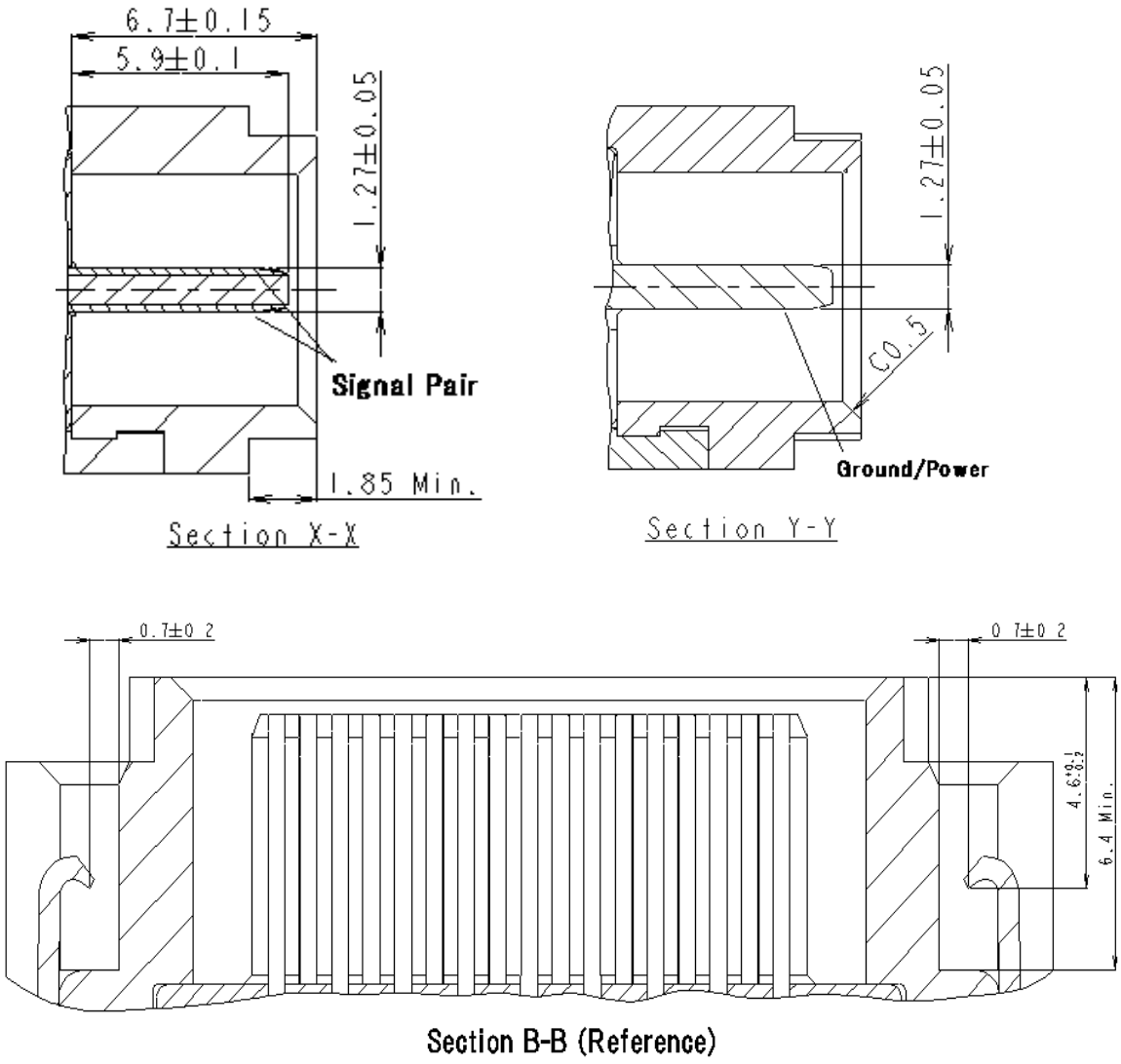
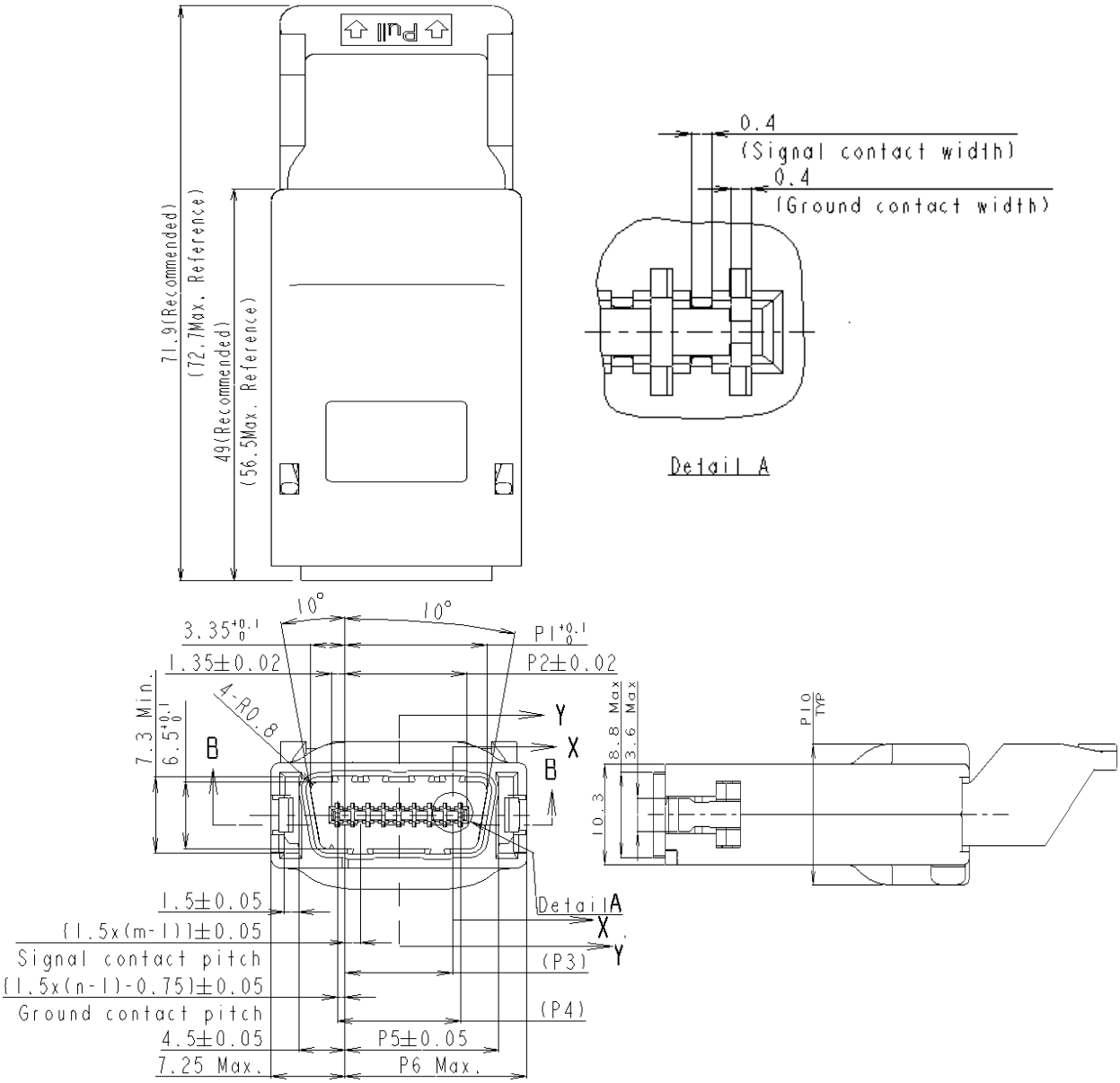


Figure 9-Latch Plug Dimensions (Without Key Slot)

5.6.2 Latch Plug (With Key Slots/Without Key)



NOTE – Alternative methods of latching may be used other than a lanyard.

NOTE – Each dimension is indicated in Table 12.

Figure 10 – Latch Plug Dimensions (With Key Slots/Without Key)

Table 12 – Dimension Table of Latch Plug (With Key Slots/WIthout Key)

TYPE	m	n	P1	P2	P3	P4	P5	P6	P10
4X	1~8	1~9	13.85	11.85	10.5	12.0	15.0	17.75	14.4*
12X	1~24	1~25	37.85	35.85	34.5	36.0	39.0	41.75	21.0**

NOTE – * Recommendation:14.4mm(TYP), Reference: 16.0mm maximum.

NOTE – ** Recommendation: 21.0mm(TYP), Reference: 22.0mm maximum.

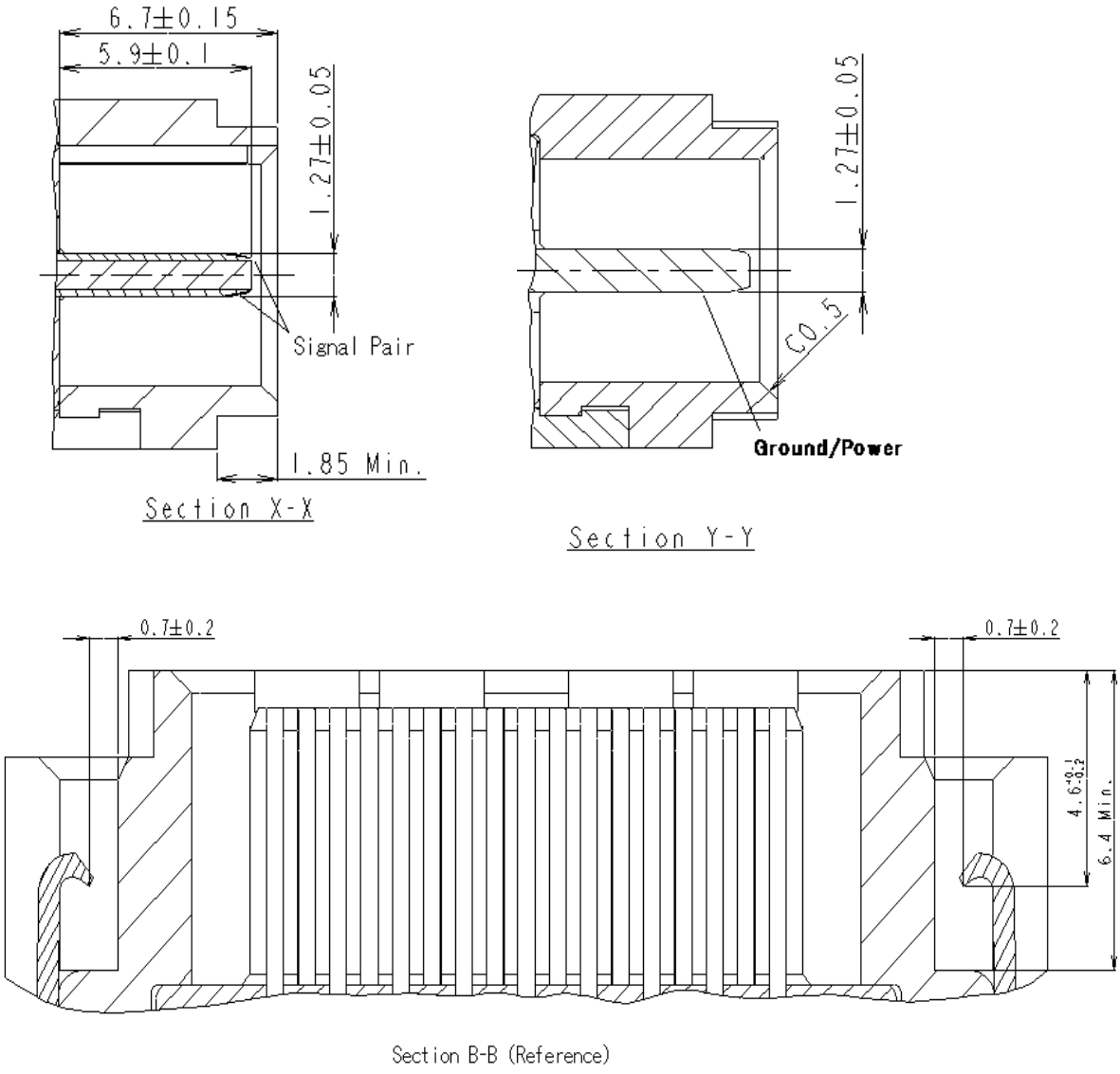
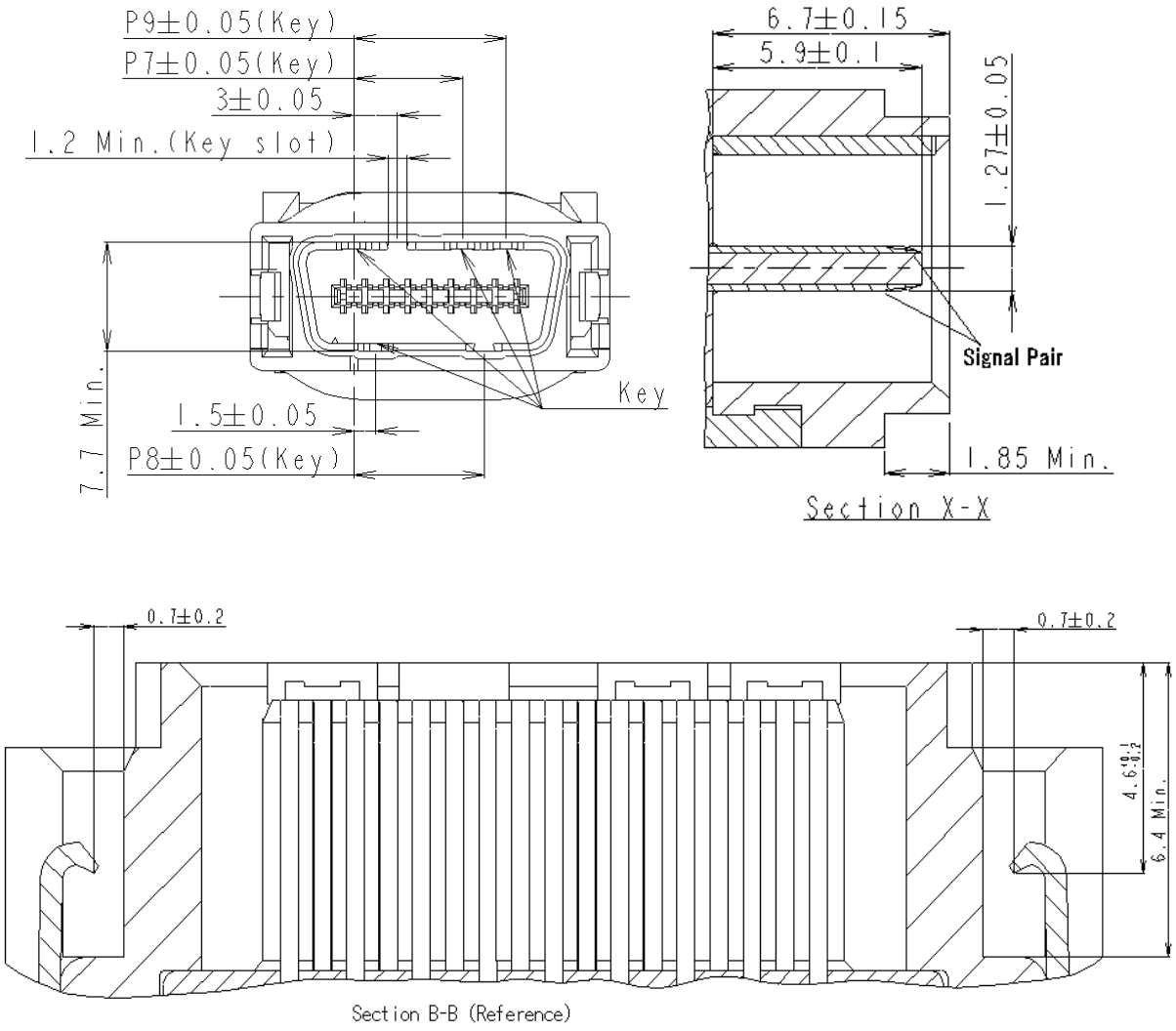


Figure 10-Latch Plug Dimensions (With Key Slots/Without Key)

5.6.3 Latch Plug (With Keys/Slots)



NOTE – Each dimension is indicated in Table 13.

Figure 11 – Latch Plug Dimensions (With Keys/Slots)

Table 13 – Dimension Table of Latch Plug (With Keys/Slots)

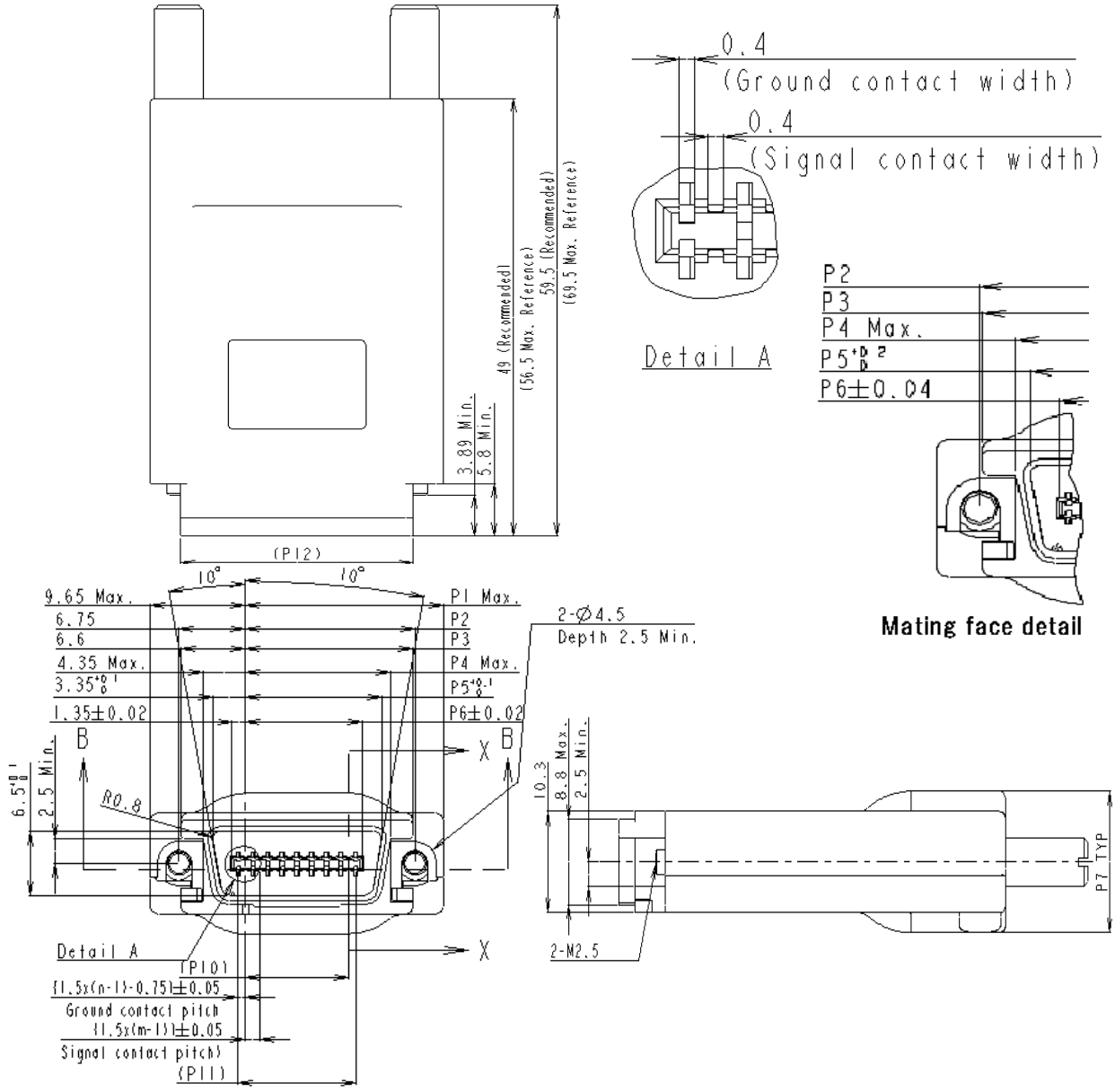
TYPE	m	n	P7	P8	P9
4X	1~8	1~9	7.5	9.0	10.5
12X	1~24	1~25	31.5	33.0	34.5

1 The key slot of latch plug should not hold or mate with the key of jack screw plug.

2 The key of latch plug should not be able to be held or mated with the slot of jack screw plug.

5.7 Jack Screw Plug Dimensional requirements

5.7.1 Jack Screw Plug (Without Key Slot)



NOTE – Each dimension is indicated in Table 14.

Figure 12 – Jack Screw Plug Dimensions (Without Key Slot)

Table 14 – Dimension Table of Jack Screw Plug (Without Key Slot)

TYPE	m	n	P1	P2	P3	P4	P5	P6	P7	P10	P11	P12
4X	1~8	1~9	20.15	17.25	17.1	14.85	13.85	11.85	14.4*	10.5	12.0	23.7
12X	1~24	1~25	44.15	41.25	41.1	38.85	37.85	35.85	21.0**	34.5	36.0	47.7

NOTE – * Recommendation:14.4mm(TYP), Reference: 16.0mm maximum.

NOTE – **Recommendation:21.0mm(TYP), Reference: 22.0mm maximum.

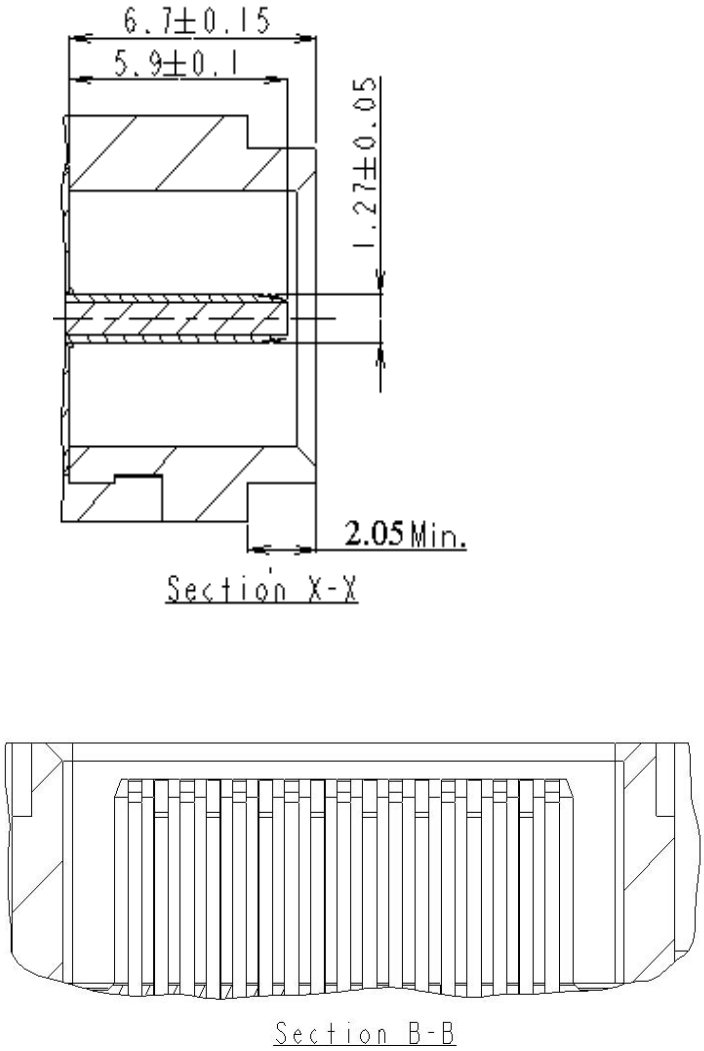
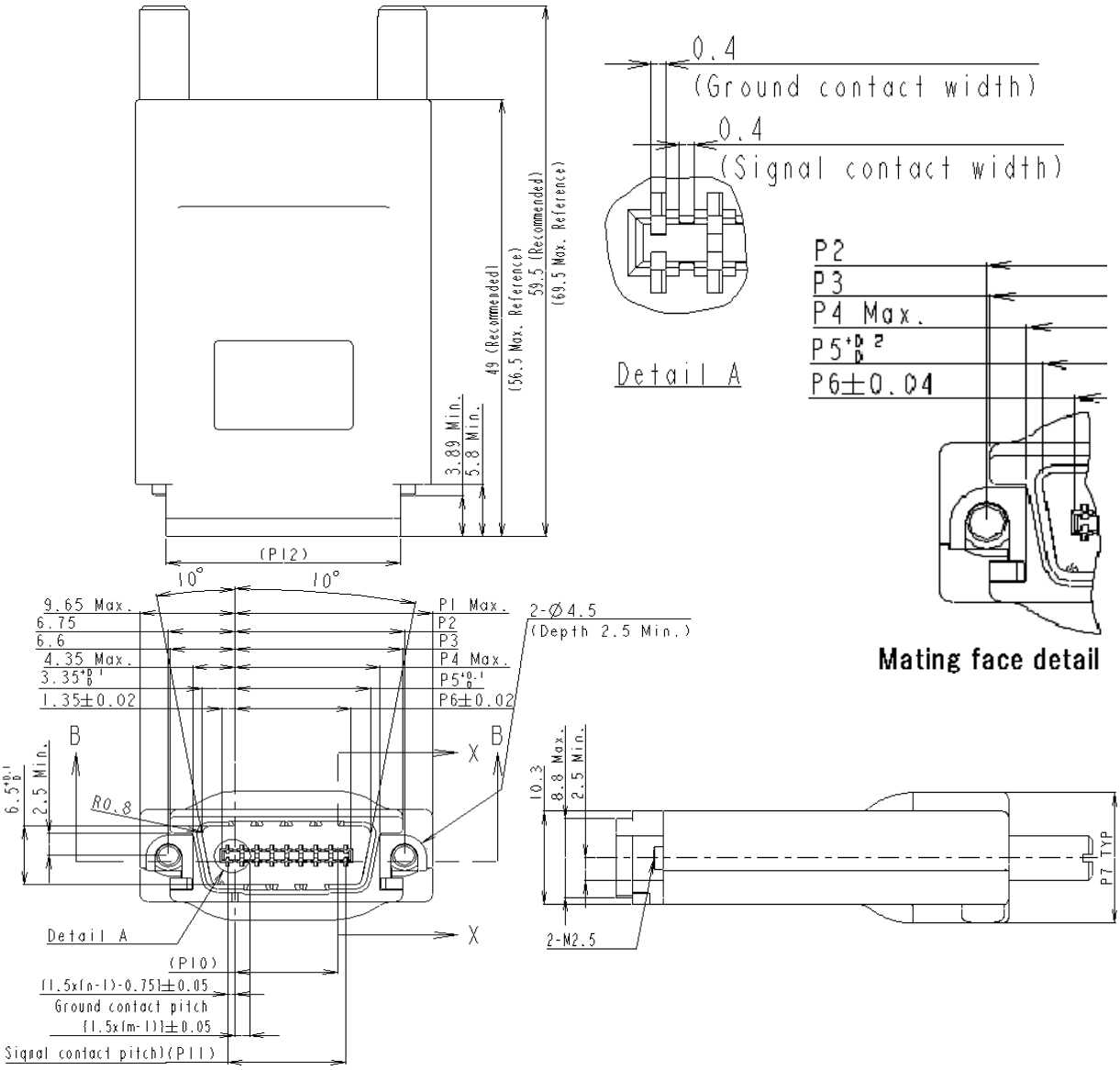


Figure 12-Jack Screw Plug Dimensions (Without Key Slot)

5.7.2 Jack Screw Plug (With Key Slot/Without Key)



NOTE – Each dimension is indicated in Table 15.

Figure 13 – Jack Screw Plug Dimensions (With Key Slots/Without Key)

Table 15 – Dimension Table of Jack Screw Plug (With Key Slots/Without Key)

TYPE	m	n	P1	P2	P3	P4	P5	P6	P7	P10	P11	P12
4X	1~8	1~9	20.15	17.25	17.1	14.85	13.85	11.85	14.4*	10.5	12.0	23.7
12X	1~24	1~25	44.15	41.25	41.1	38.85	37.85	35.85	21.0**	34.5	36.0	47.7

NOTE – * Recommendation:14.4mm(TYP), Reference: 16.0mm maximum.

NOTE – **Recommendation:21.0mm(TYP), Reference: 22.0mm maximum.

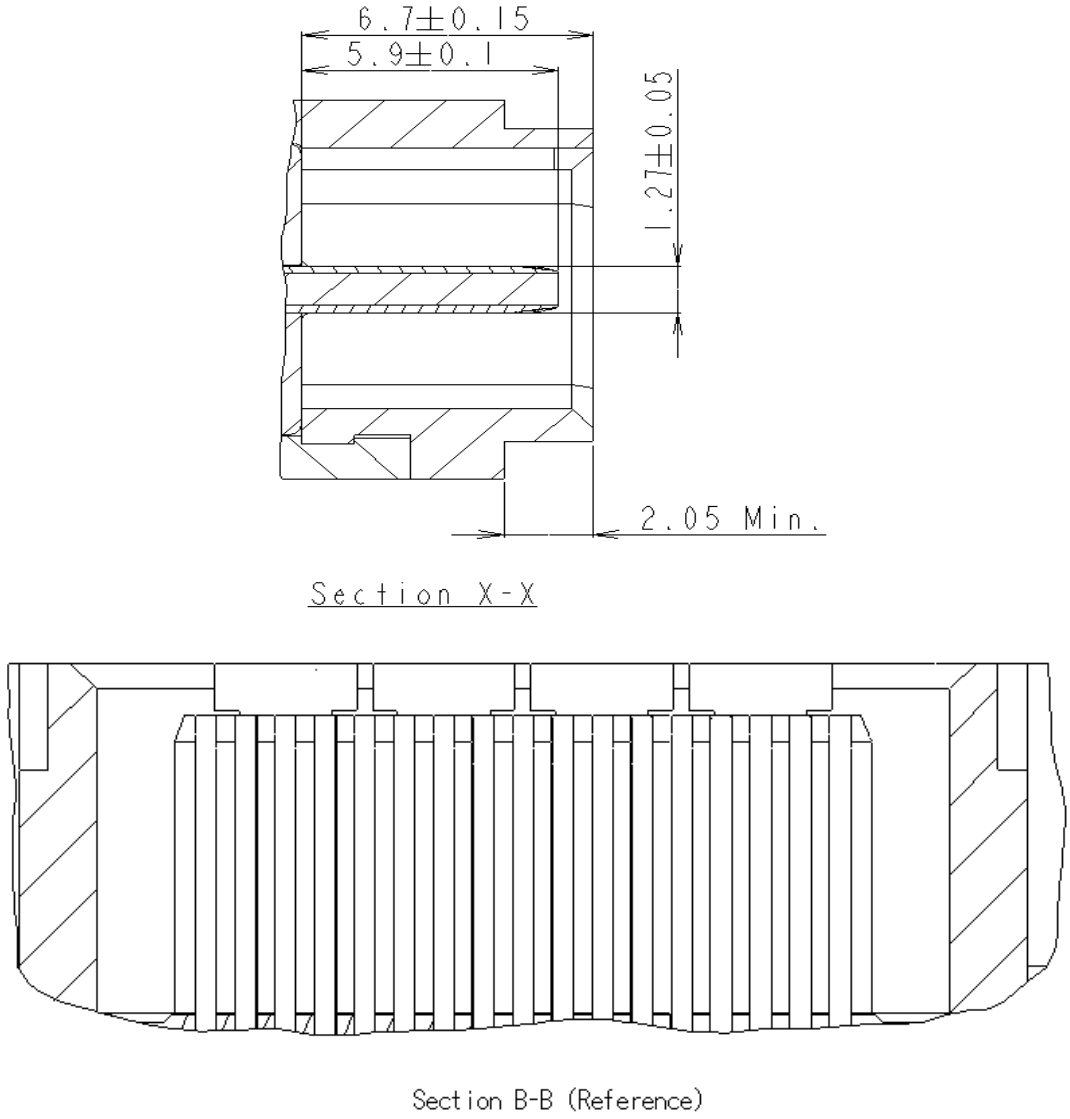
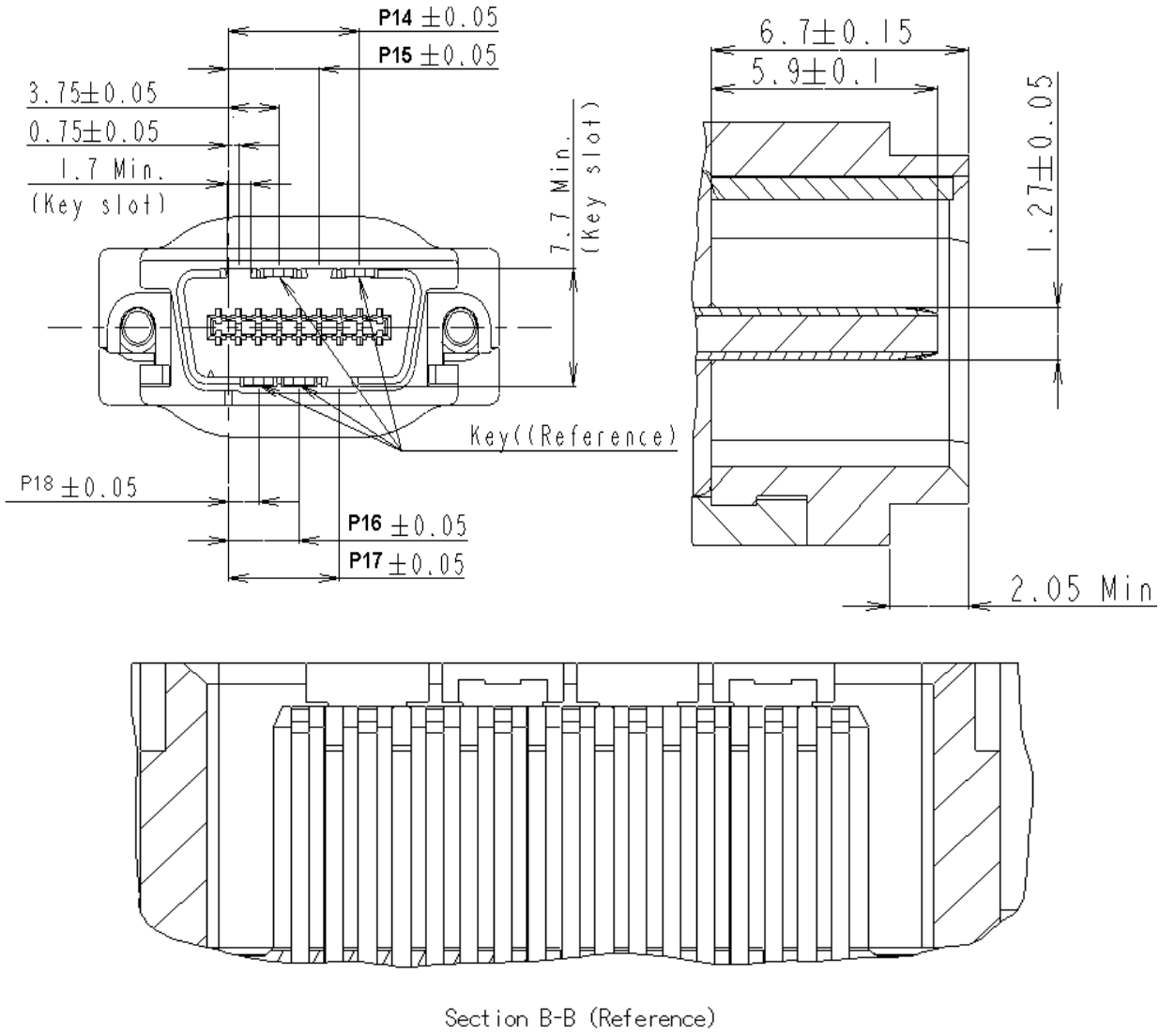


Figure 13- Jack Screw Plug Dimensions (With Key Slots/Without Key)

5.7.3 Jack Screw Plug (With Keys/Slots)



NOTE – Each dimension is indicated in Table 16.

Figure 14 – Jack Screw Plug Dimensions (With Keys/Slots)

Table 16 – Dimension Table of Jack Screw Plug (With Keys/Slots)

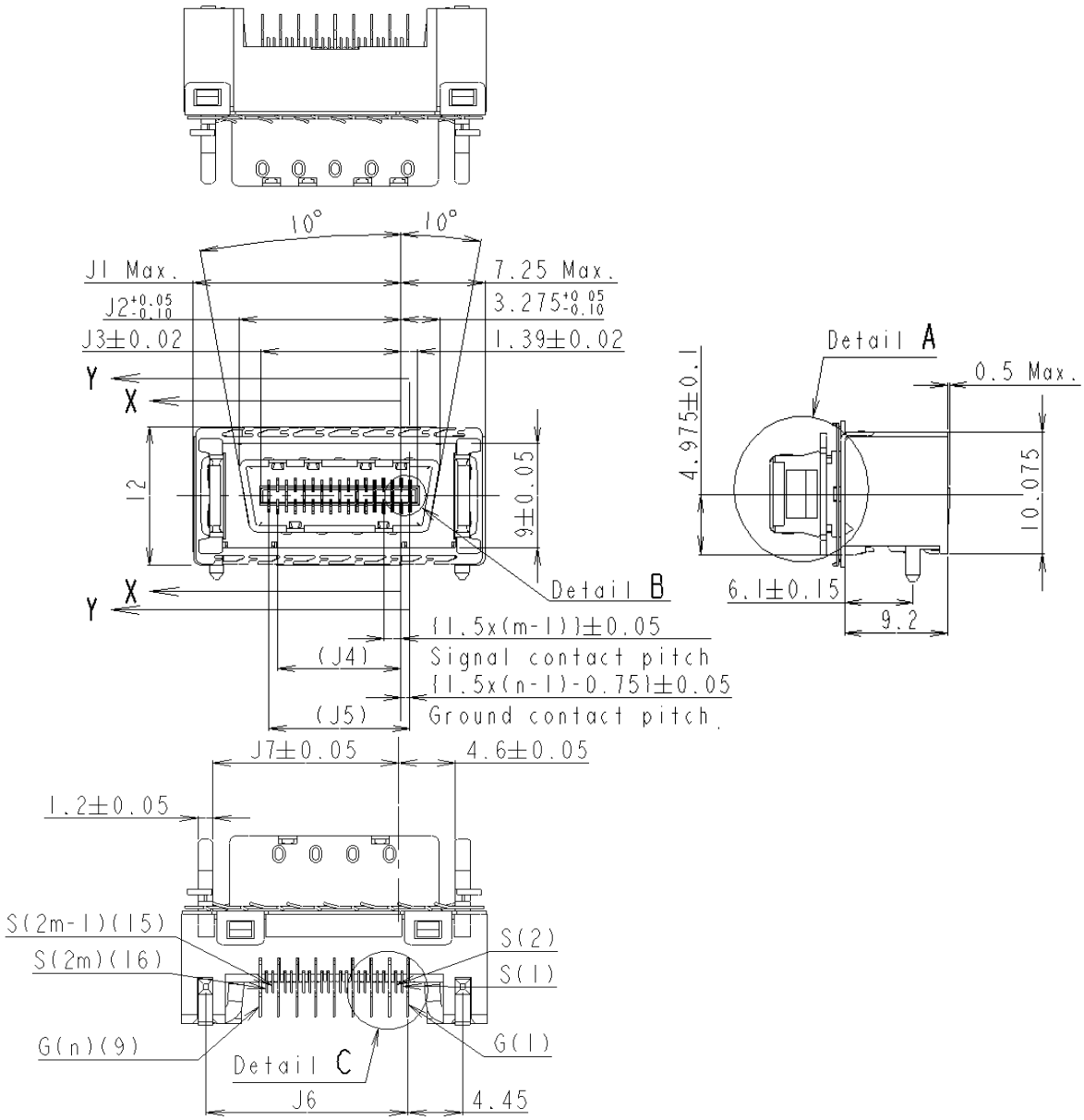
TYPE	m	n	P14	P15	P16	P17	P18
4X	1~8	1~9	9.75	6.75	5.25	8.25	2.25
12X	1~24	1~25	33.75	30.75	17.25	20.25	14.25

1 The key slot of jack screw plug should not hold or mate with the key of latch plug.

2 The key of jack screw plug should not be able to be inserted into the slot of latch plug.

5.8 Latch Receptacle Dimensional requirements

5.8.1 latch Receptacle (Without Key)



NOTE – Each dimension is indicated in Table 17.

Figure 15 – Latch Receptacle Dimensions (Without Key)

Table 17 – Dimension Table of Latch Receptacle (Without Key)

TYPE	m	n	J1	J2	J3	J4	J5	J6	J7
4X	1~8	1~9	17.75	13.775	11.89	10.5	12.0	16.45	15.1
12X	1~24	1~25	41.75	37.775	35.89	34.5	36.0	40.45	39.1

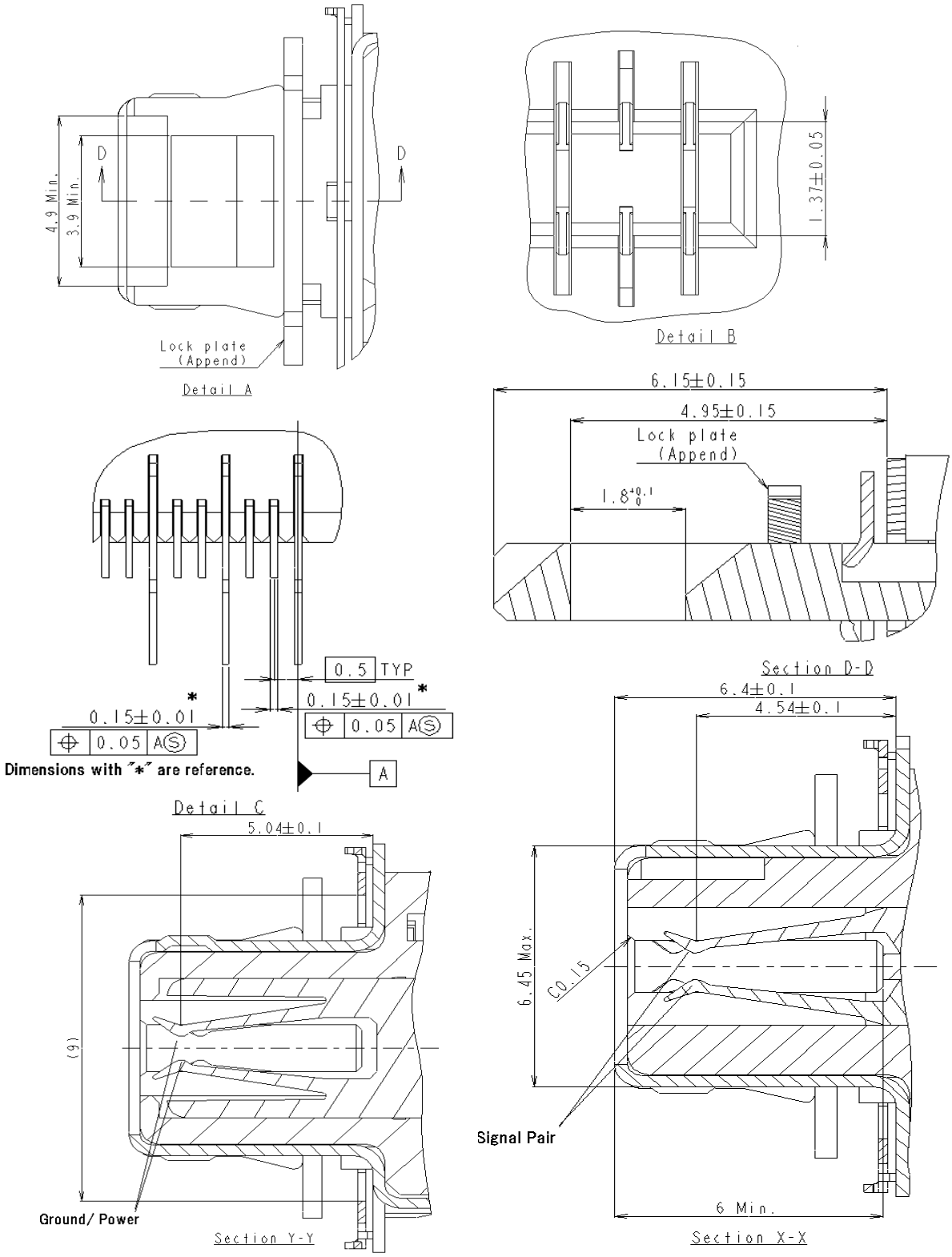
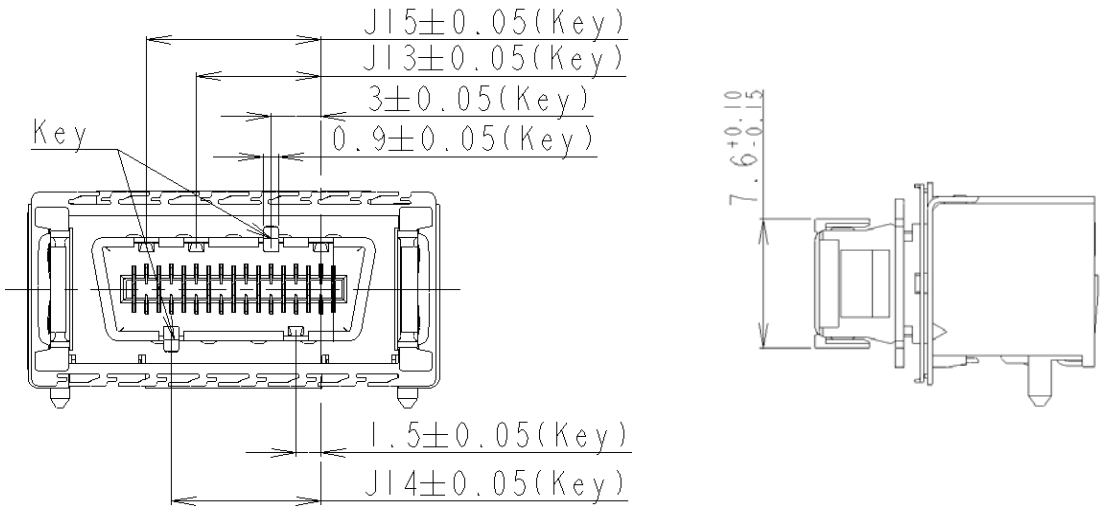


Figure 15-Latch Receptacle Dimensions (Without Key)

5.8.2 latch Receptacle (With Keys)



NOTE – Each dimension is indicated in Table 18.

Figure 16 – Latch Receptacle Dimensions (With Keys)

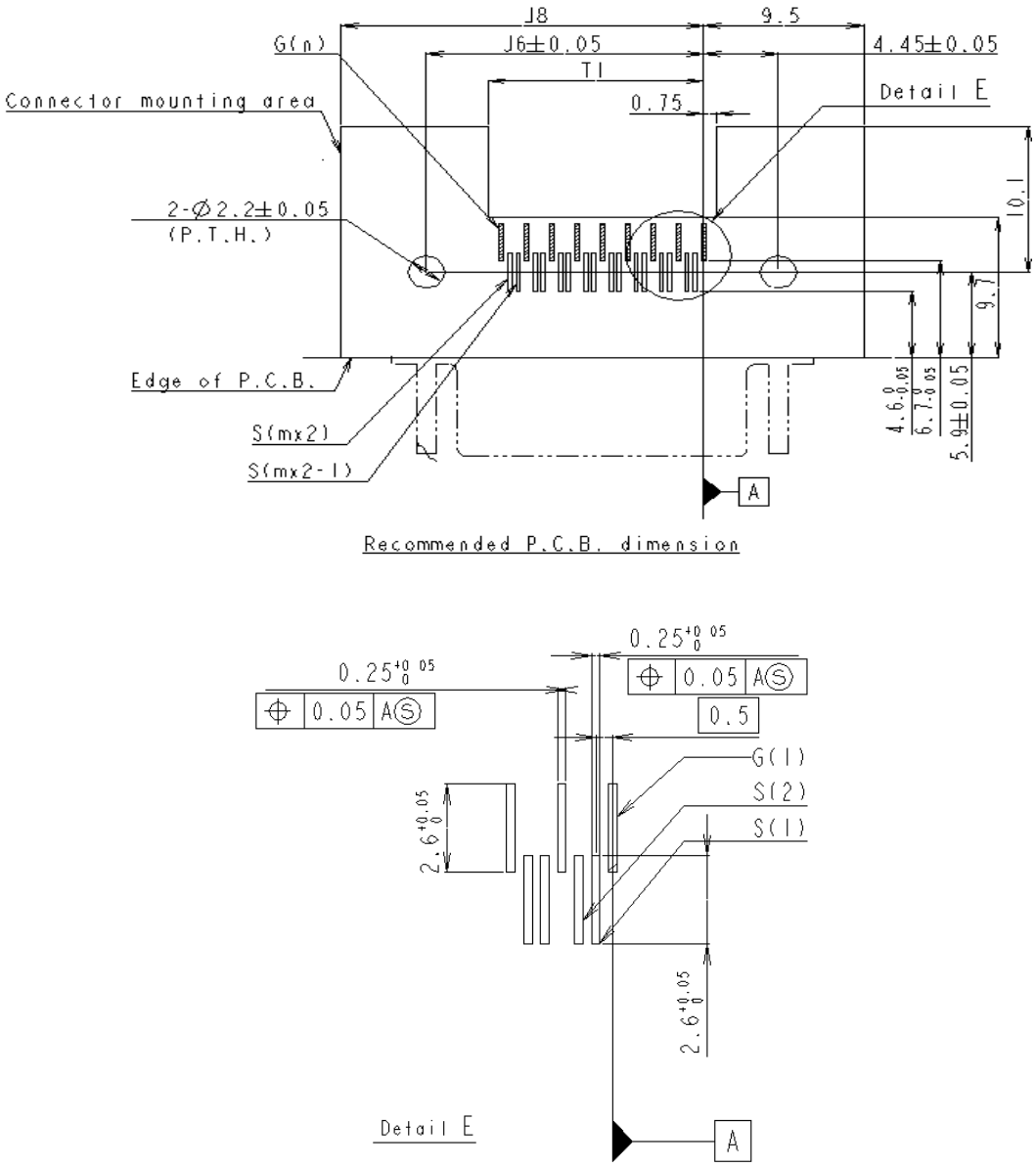
Table 18 – Dimension Table of Latch Receptacle (With Keys)

TYPE	m	n	J13	J14	J15
4X	1~8	1~9	7.5	9.0	10.5
12X	1~24	1~25	31.5	33.0	34.5

1 The key slot of latch receptacle should not hold or mate with the key of jack screw receptacle.

2 The key of latch receptacle should not be able to be held or mated with the slot of jack screw receptacle.

5.8.3 latch Receptacle Termination Side



NOTE – 1 Each dimension is indicated in Table 19.

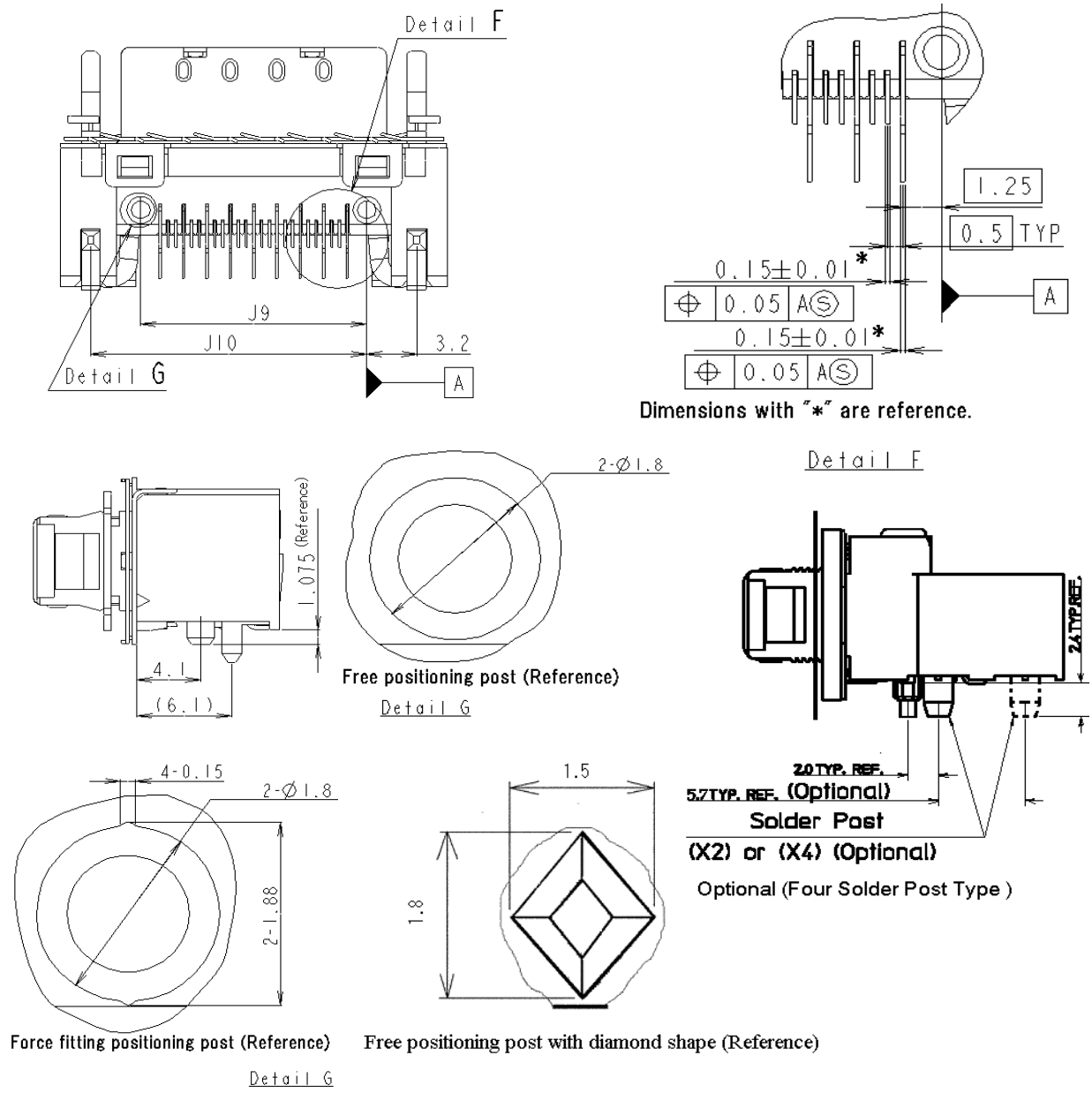
NOTE – 2 These dimensions are common to both of with and without key type.

Figure 17 – Latch Receptacle Termination (PCB) Dimensions (Recommendation)

Table 19 – Dimension Table of Latch Receptacle Termination (PCB)

TYPE	m	n	J6	J8	T1
4X	1~8	1~9	16.45	21.5	12.75
12X	1~24	1~25	40.45	45.5	36.75

5.8.4 latch Receptacle (With positioning Posts)



NOTE – 1 Each dimension is indicated in Table 20.

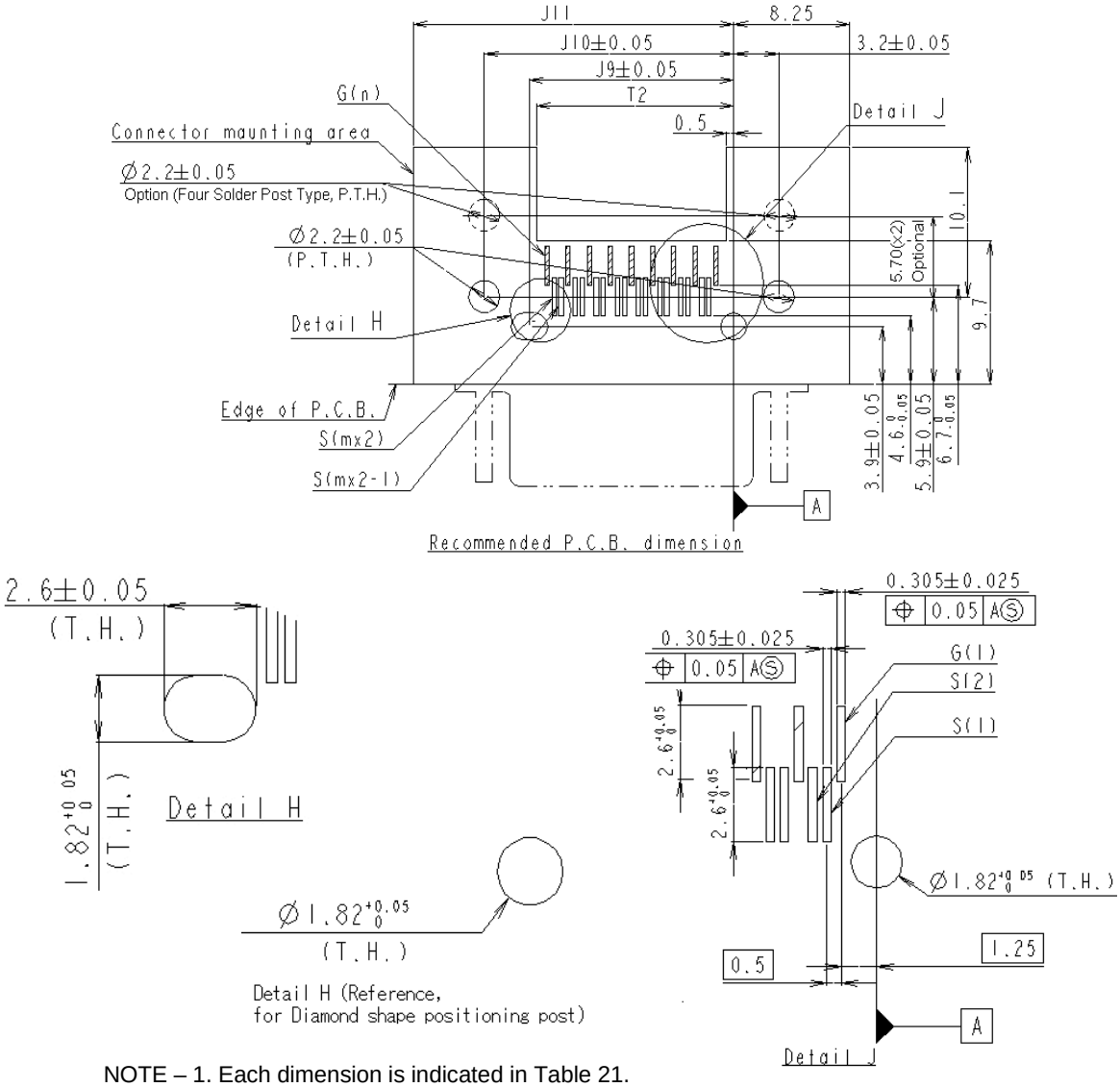
NOTE – 2 These dimensions are common to both of with and without key type.

Figure 18 – Latch Receptacle (With Positioning Posts) Dimensions

Table 20 – Dimension Table of Latch Receptacle (With Positioning Posts)

TYPE	m	n	J9	J10
4X	1~8	1~9	14.5	17.7
12X	1~24	1~25	38.5	41.7

5.8.5 latch Receptacle (With positioning Posts) Termination Side



NOTE – 1. Each dimension is indicated in Table 21.

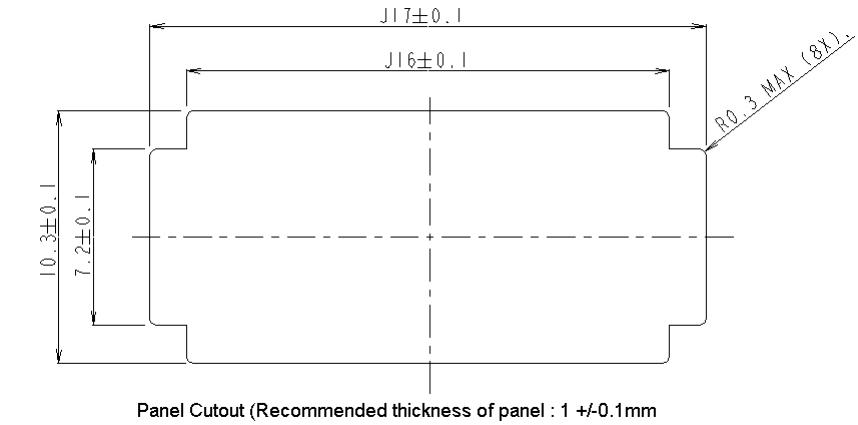
NOTE – 2. These dimensions are common to both of with and without key type.

Figure 19 – Latch Receptacle (With Positioning Posts) Termination (PCB) Dimensions (Recommendation)

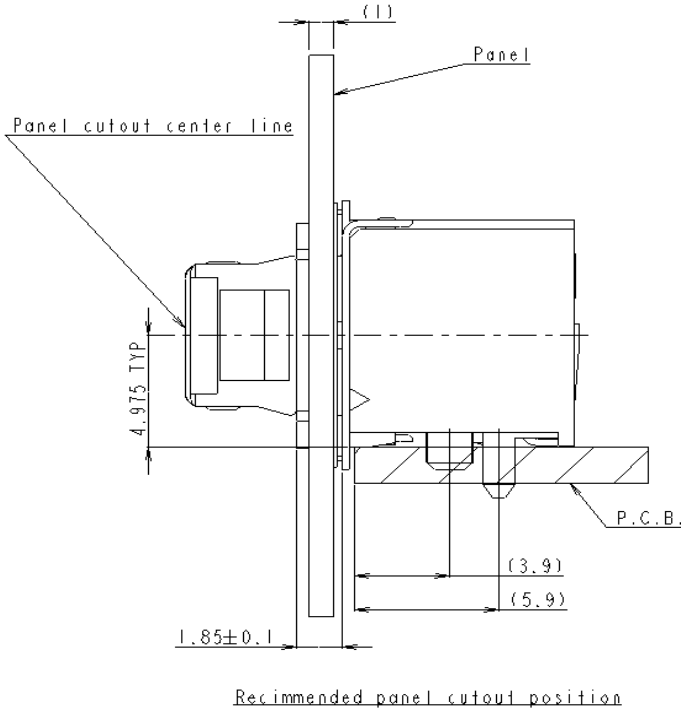
Table 21 – Dimension Table of Latch Receptacle (With Positioning Posts) Termination (PCB)

TYPE	m	n	J9	J10	J11	T2
4X	1~8	1~9	14.5	17.7	22.75	14.0
12X	1~24	1~25	38.5	41.7	46.75	38.0

5.8.7 latch Receptacle Panel Cutout/Assembly



Panel Cutout (Recommended thickness of panel : 1 +/-0.1mm



Recimmended panel cutout position

NOTE – 1. Each dimension is indicated in Table 22.

NOTE – 2. These dimensions are common to both of with and without key type.

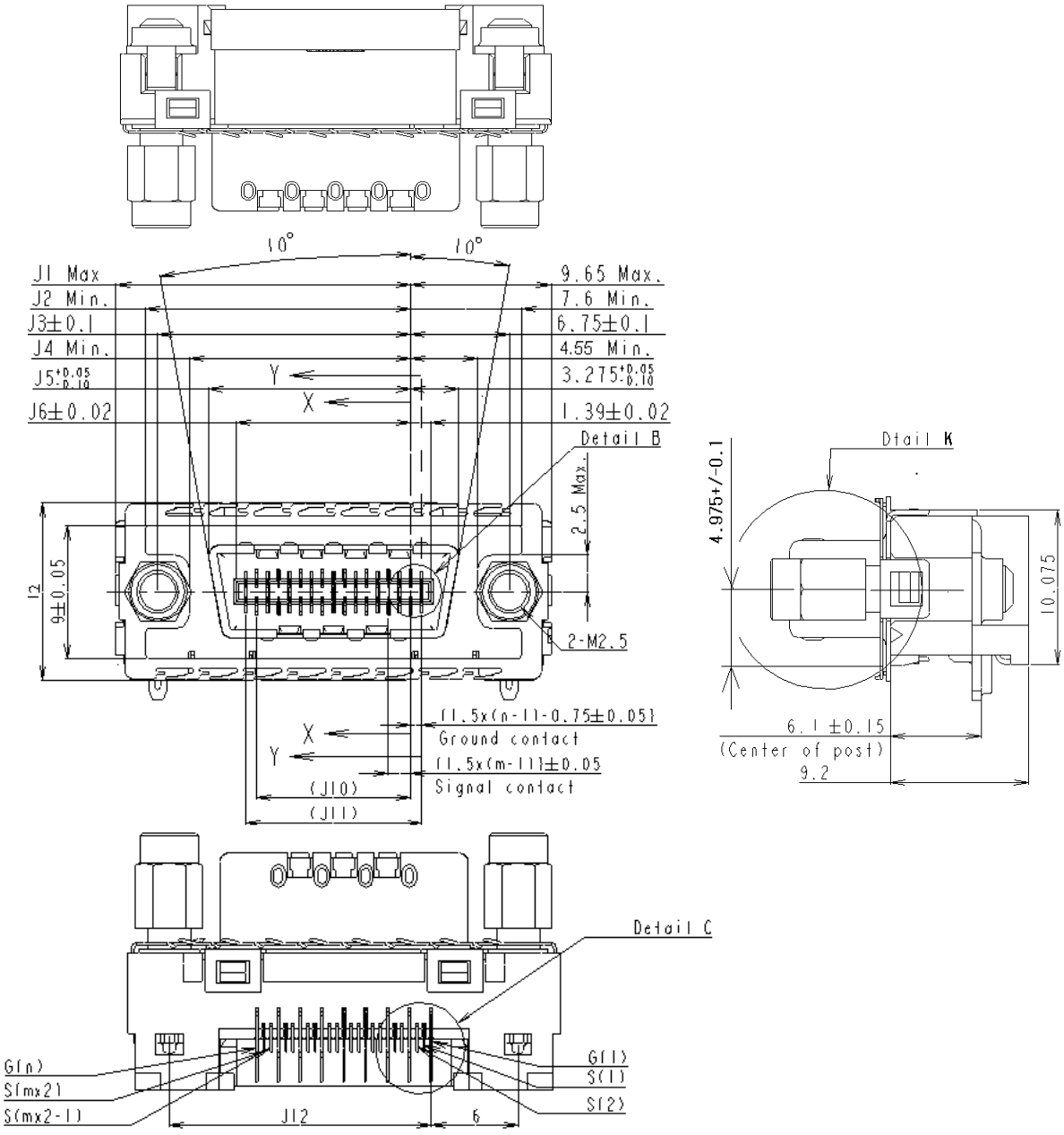
Figure 20 – Latch Receptacle Panel Cutout / Assembly Dimensions

Table 22 – Dimension Table of Latch Receptacle Panel Cutout

TYPE	J16	J17
4X	19.7	22.7
12X	43.7	46.7

5.9 Jack Screw Receptacle Dimensional requirements

5.9.1 Jack Screw Receptacle (Without Key)



NOTE – Each dimension is indicated in Table 23.

Figure 21 – Jack Screw Receptacle dimensions (Without Key)

Table 23 – Dimension Table of Jack Screw Receptacle (Without Key)

TYPE	m	n	J1	J2	J3	J4	J5	J6	J10	J11	J12
4X	1~8	1~9	20.15	18.1	17.25	15.05	13.775	11.89	10.5	12.0	18.0
12X	1~24	1~25	44.15	42.1	41.25	39.05	37.775	35.89	34.5	36.0	42.0

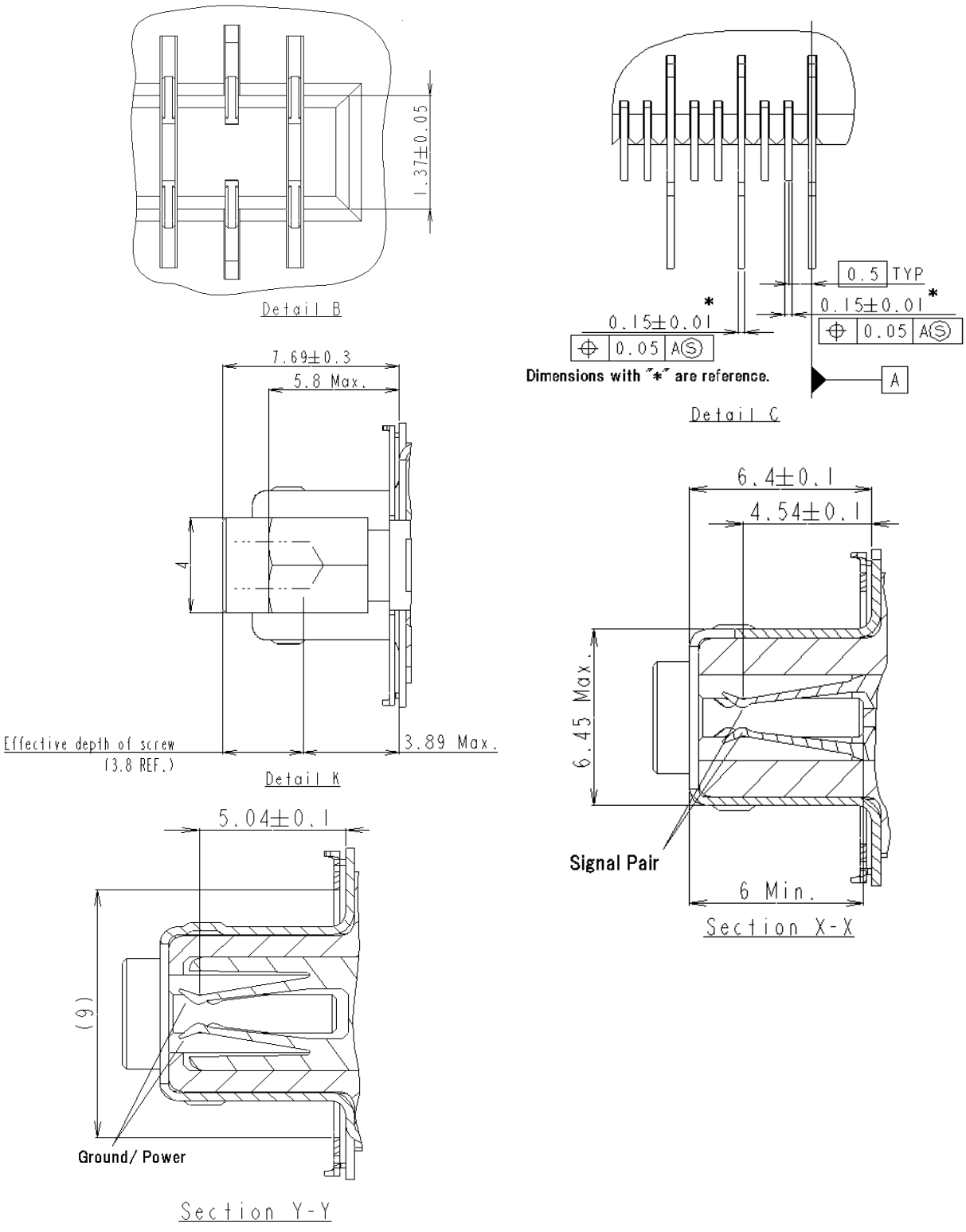
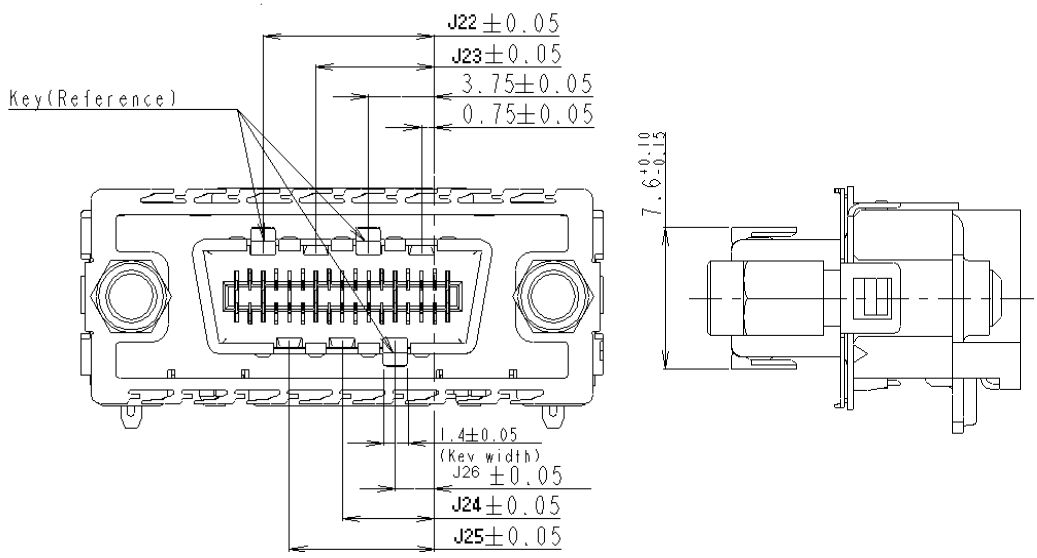


Figure 21-Jack Screw Receptacle dimensions (Without Key)

5.9.2 Jack Screw Receptacle (With Keys)



NOTE – Each dimension is indicated in Table 24.

Figure 22 – Jack Screw Receptacle dimensions (With Keys)

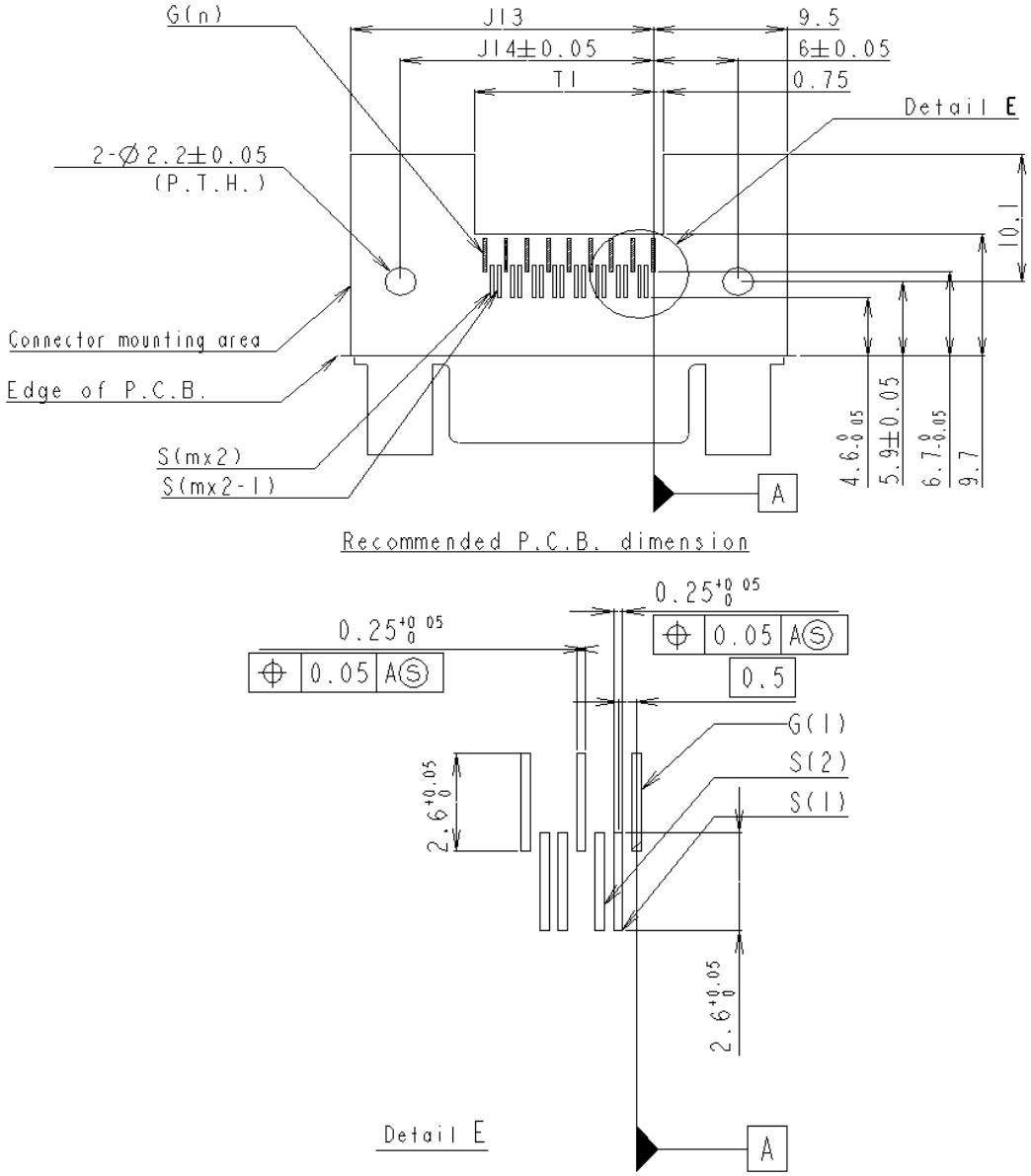
Table 24 – Dimension Table of Jack Screw Receptacle (With Keys)

TYPE	m	n	J22	J23	J24	J25	J26
4X	1~8	1~9	9.75	6.75	5.25	8.25	2.25
12X	1~24	1~25	33.75	30.75	17.25	20.25	14.25

1 The key slot of jack screw receptacle should not hold or mate with the key of latch receptacle.

2 The key of jack screw receptacle should not be able to be inserted into the slot of latch receptacle.

5.9.3 Jack Screw Receptacle Termination Side



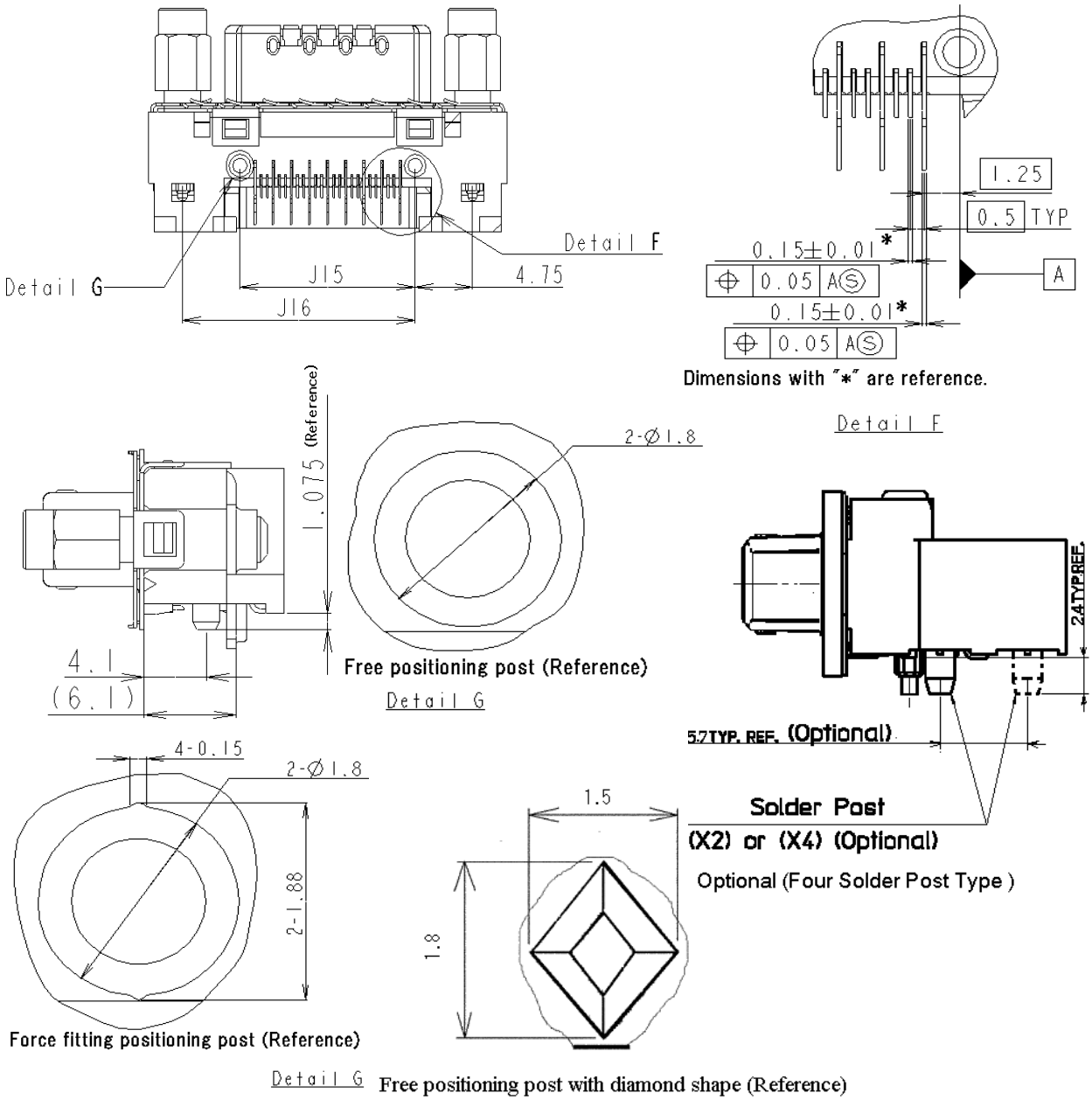
NOTE – Each dimension is indicated in Table 25.

Figure 23 – Jack Screw Receptacle Termination (PCB) Dimensions (Recommendation)

Table 25 – Dimension Table of Jack Screw Receptacle Termination (PCB) Dimension

TYPE	m	n	J13	J14	T1
4X	1~8	1~9	21.5	18.0	12.75
12X	1~24	1~25	45.5	42.0	36.75

5.9.4 Jack Screw Receptacle (With positioning Posts) Termination Side



NOTE – 1. Each dimension is indicated in Table 26.

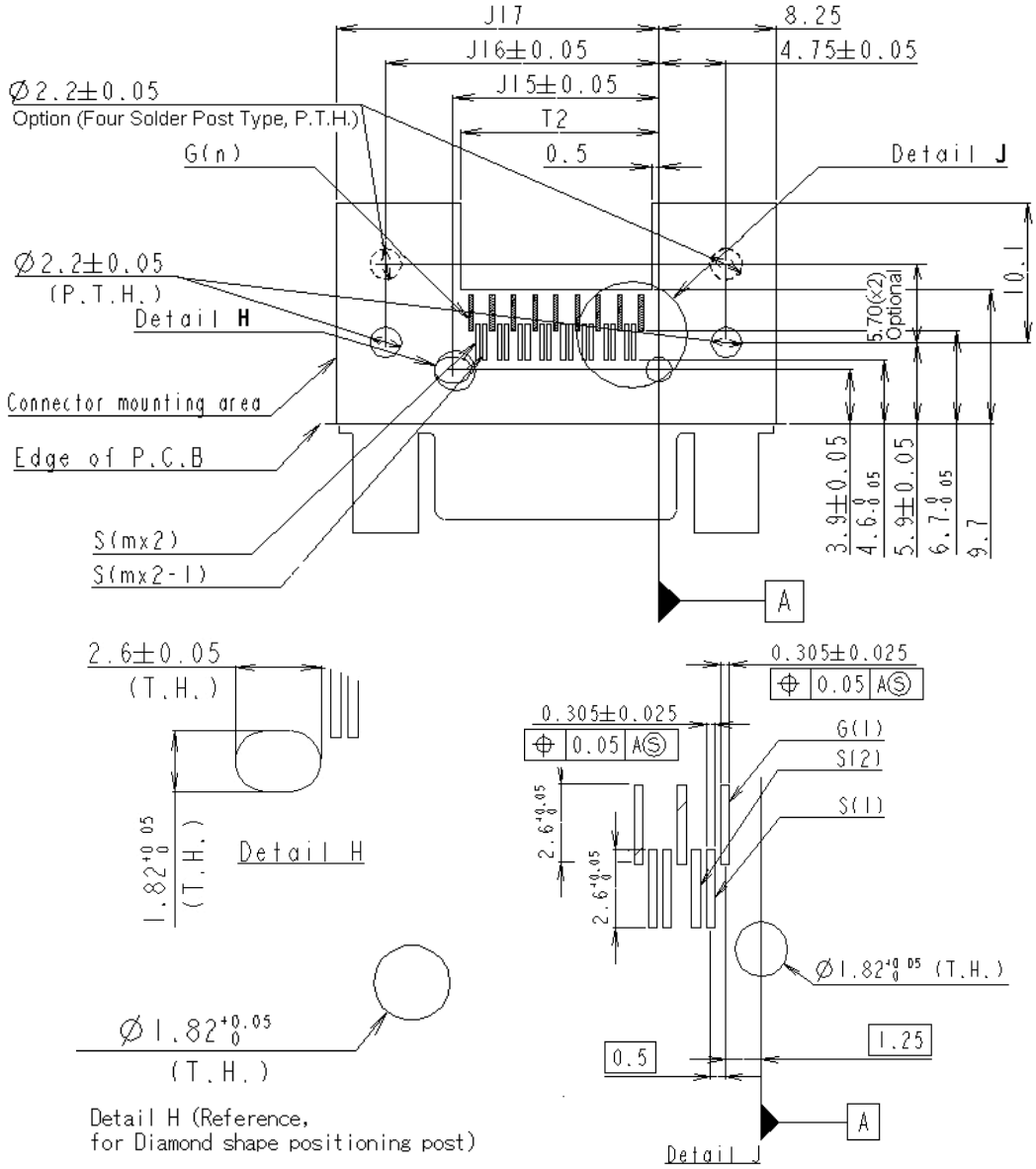
NOTE – 2. These dimensions are common to both of with and without key type.

Figure 24 – Jack Screw Receptacle (With Positioning Posts) Dimensions

Table 26 – Dimension Table Jack Screw Receptacle (With Positioning Posts)

TYPE	m	n	J15	J16	J17	T2
4X	1~8	1~9	14.5	19.25	22.75	14.0
12X	1~24	1~25	38.5	43.25	46.75	38.0

5.9.5 Jack Screw Receptacle (With positioning Posts) Termination Side

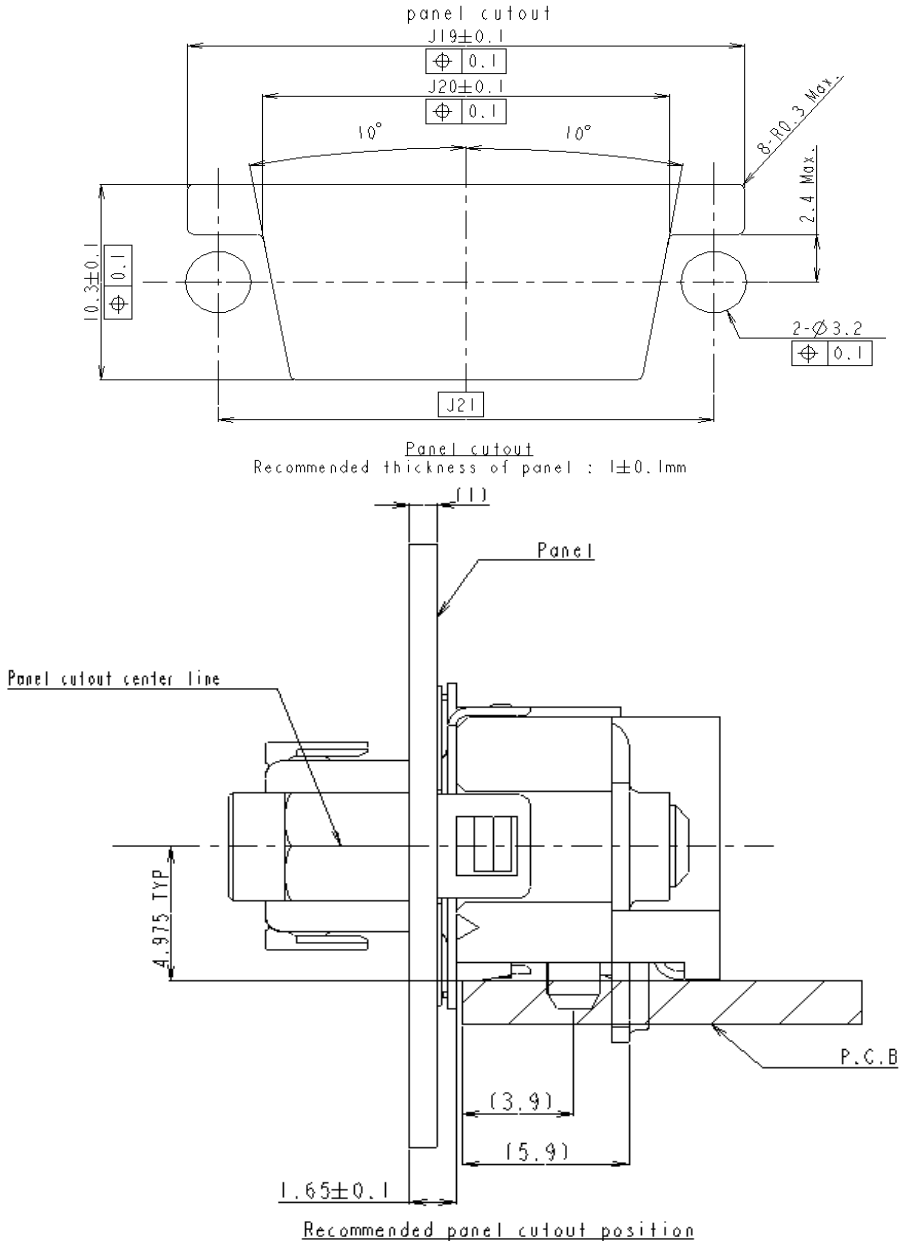


NOTE – 1. Each dimension is indicated in Table 26.

NOTE – 2. These dimensions are common to both of with and without key type.

Figure 25 – Jack Screw Receptacle (With Positioning Posts) Termination (PCB) Dimensions (Recommendation)

5.9.6 Jack Screw Receptacle Panel Cutout/Assembly



NOTE – 1. Each dimension is indicated in Table 27.

NOTE – 2. These dimensions are common to both of with and without key type.

Figure 26 – Jack Screw Receptacle Panel Cutout / Assembly Dimensions

Table 27 – Dimension Table Jack Screw Receptacle (With Positioning Posts)

TYPE	m	n	J19	J20	J21
4X	1~8	1~9	27.0	19.7	24.0
12X	1~24	1~25	51.0	43.7	48.0