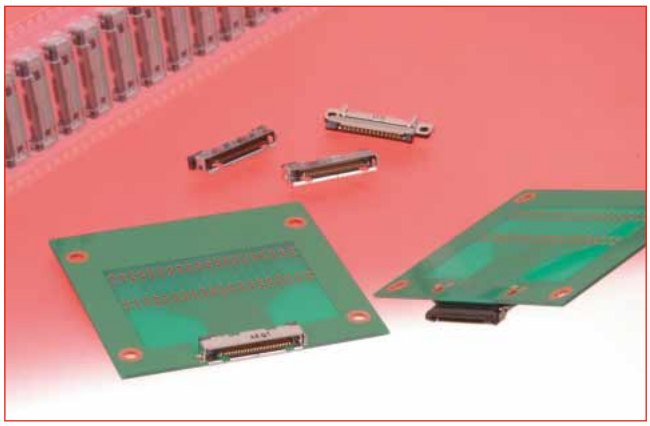
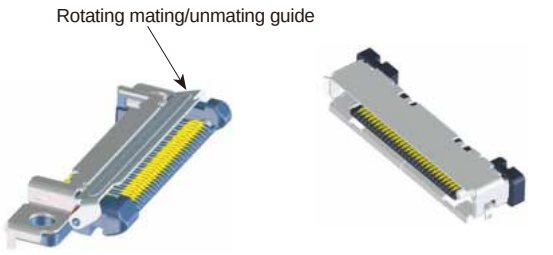
Low-Angle Mating / Unmating Interface Connectors

EX60B Series





Plug
(Cradle mount)

Receptacle
(Portable device mount)

Features

1. Angle Mating / Unmating

The cradle mount plug incorporates a unique rotating mating/unmating guide allowing the portable device to be placed or removed at an angle, up to 20° max. In addition, the angle mating force is approximately 3N(29 pos.), with extremely low unmating forces.

2. High durability

Bellow configuration of the contacts guarantees 10,000 angle mating/unmating cycles, without any degradation of electrical and mechanical performance.

3. High-Speed Data Transfer

A full eye pattern is maintained at a speed of 2.5 G bps, making it applicable for high-speed differential signals of the USB 2.0 and PCI-EXPRESS.

4. Secure attachment

Standard or extended flange versions of the receptacle can be mounted directly to the portable device's case. The cradle mount plug is attached using screws.

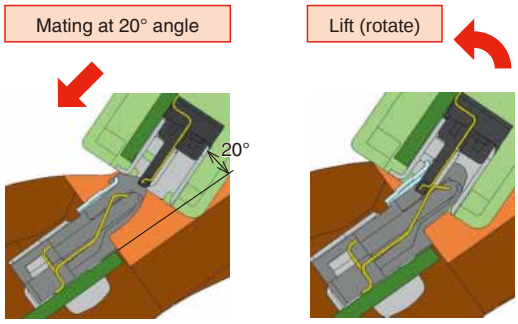
5. Low profile - Space-Saving

Small size (4 mm high × 6.8 mm deep) of the Receptacle allows efficient use of space in a portable device.

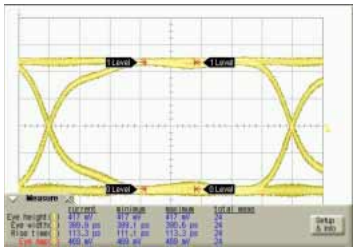
Applications

PDA and POS terminals, electronic books, tablet PCs, mobile TVs, media players, digital cameras and other devices requiring high durability angle mating/unmating connectors.

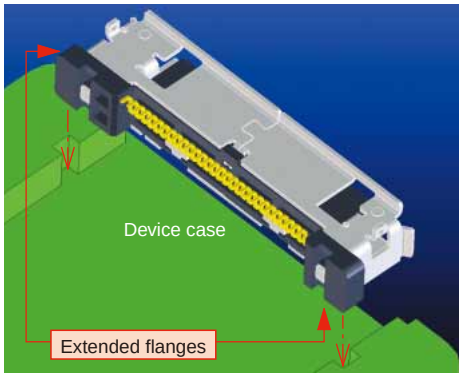
Angle mating/unmating



High speed data transfer
2.5 Gbps Eye Pattern Output Waveform



Extended flange mounting



Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

■Specifications

Rating	Current raring 0.5A	Operating temperature range −55℃ to +85℃
	Voltage rating 125V AC	

Characteristic	Specification	Conditions
1.Insulation resistance	1000MΩ min.	250V DC
2.Dielectric withstanding voltage	No flashover or insulation breakdown.	250V AC/ one minute
3.Contact resistance	60mΩ max.	100mA DC
4.Vibration	No electrical discontinuity of 1μ sec. max. Contact resistance: 100mΩ max.	Frequency: 10 to 55 Hz, single amplitude of 0.75mm, for 2 hours in 6 axis.
5.Shock	No electrical discontinuity of 1μ sec. max. Contact resistance: 100mΩ max.	Acceleration of 490 m/s², 11 ms duration, sine half-wave waveform, 3 cycles in each of the 6 axis.
6. Mating/un-mating forces	Mating: 10N max. (Horizontal), 5N max. (At 20° angle) Un-mating: 10N max. (Horizontal), 2N max. (At 20° angle)	With corresponding connector.
7.Durability (mating/un-mating)	Contact resistance: 100mΩ max.	5000 cycles (Straight mating) 10000 cycles (At 20° angle)
8.Temperature cycle	Contact resistance: 100mΩ max. Insulation resistance: 1000M Ω min.	Temperature : -55℃ → +15℃ to +35℃ → +85℃ → +15℃ to +35℃ Time (Minutes) : 30 → 2 to 3 → 30 → 2 to 3 5 cycles
9.Humidity	Contact resistance: 100mΩ max. Insulation resistance: 5MΩ min.(Dry state)	96 hours at temperature of 60℃ and humidity of 90% to 95%.
10.Salt spray	No corrosions	5% salt water solution for 48 hours

Note: Includes temperature rise caused by the current flow.

■Materials/ Finish

●Receptacles (Portable device mount)

Component	Material	Finish	Remarks
Insulator	LCP	Color: Black	UL94V-0
Contacts	Copper alloy	Contact area: Gold plated	——
Metal shield	Stainless steel	Tin plated	——

●Plugs (Cradle mount)

Component	Material	Finish	Remarks
Insulator	Polyamide	Color: Black	UL94V-0
Contacts	Copper alloy	Contact area: Gold plated	——
Metal shield	Stainless steel	Tin-plated	——
Guide	Stainless steel	——	——
Spring	Stainless steel	——	——

■Ordering information

●Receptacles (Portable device mount)

EX 60 B - 29 P - FL
❶ ❷ ❶ ❸ ❹ ❺

●Plugs (Cradle mount)

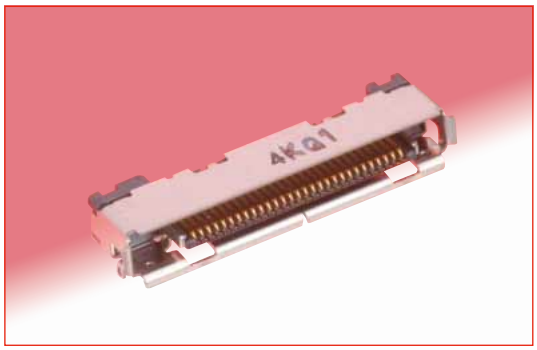
EX 60 B - 29 S
❶ ❷ ❶ ❸ ❹

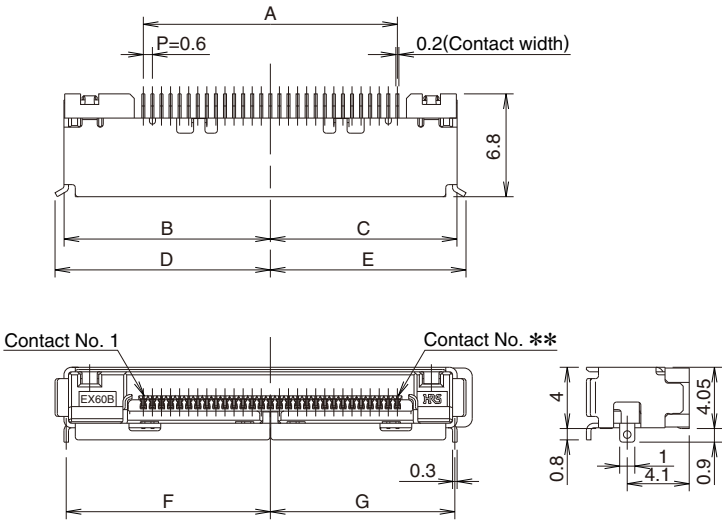
❶ Series name		: EXB
❷ Termination type		: 60 : Right angle SMT
❸ Number of contacts		: 15, 29
❹ Contact type	P	: Male contact (Receptacle = device mount)
	S	: Female contact (Plug = cradle mount)
❺ Option	FL	: Extended flanges

Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

■Receptacles

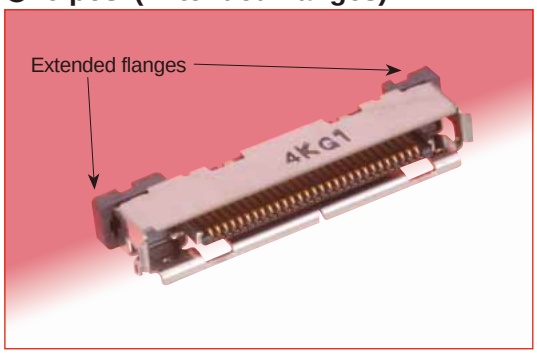
●15 pos., 29 pos. (Standard)

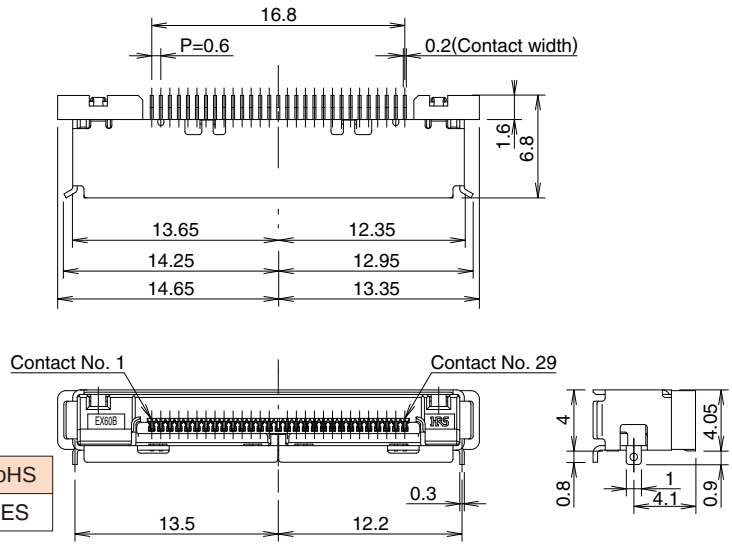




Part number	CL No.	HRS No.	A	B	C	D	E	F	G	RoHS
EX60B-29P	29	CL232-0611-5	16.8	13.65	12.35	14.25	12.95	13.5	12.2	YES
EX60B-15P	15	CL232-0621-9	8.4	9.45	8.15	10.05	8.75	9.3	8.0	

●29 pos. (Extended flanges)

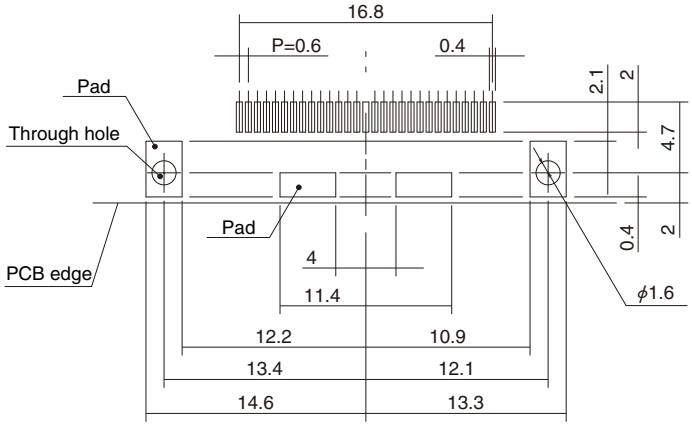




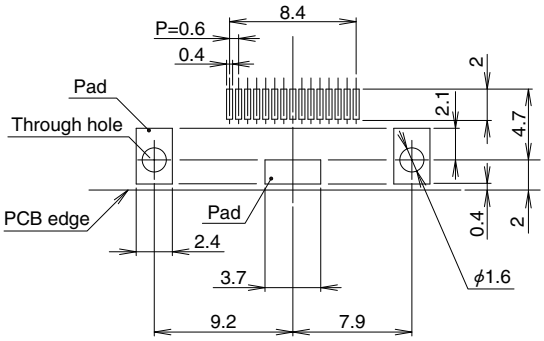
Part number	CL No.	RoHS
EX60B-29P-FL	232-0612-8	YES

◆Recommended PCB mounting pattern

●EX60B-29P and EX60B-29P-FL

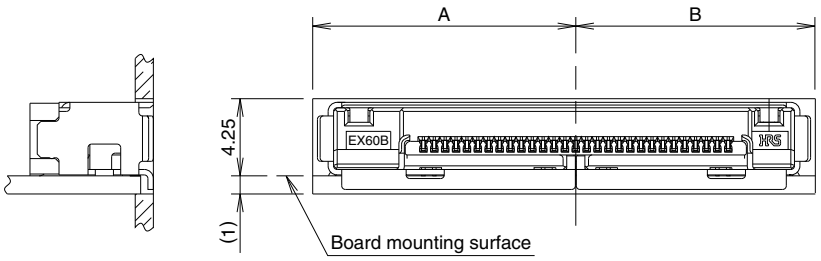


●EX60B-15P



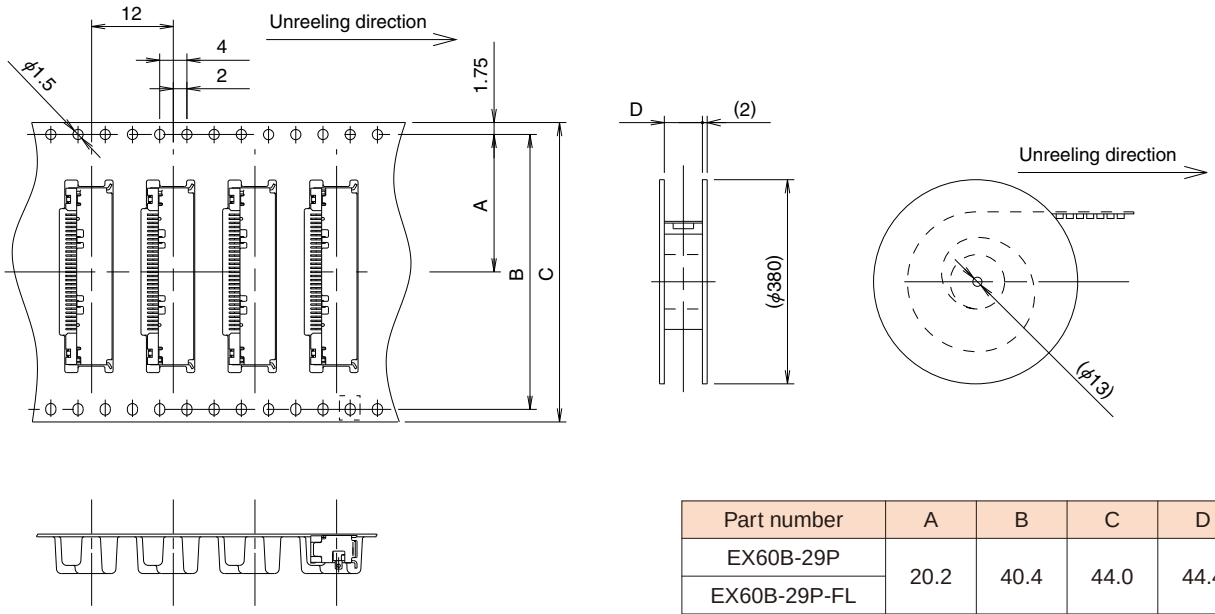
Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

■Portable device case cutout



Part number	A	B
EX60B-29P	14.5	13.2
EX60B-29P-FL		
EX60B-15P	10.3	9

■Packaging specifications



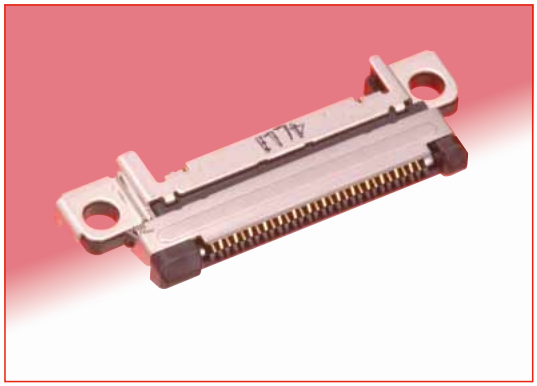
Part number	A	B	C	D
EX60B-29P	20.2	40.4	44.0	44.4
EX60B-29P-FL				
EX60B-15P	14.2	28.4	32.0	32.4

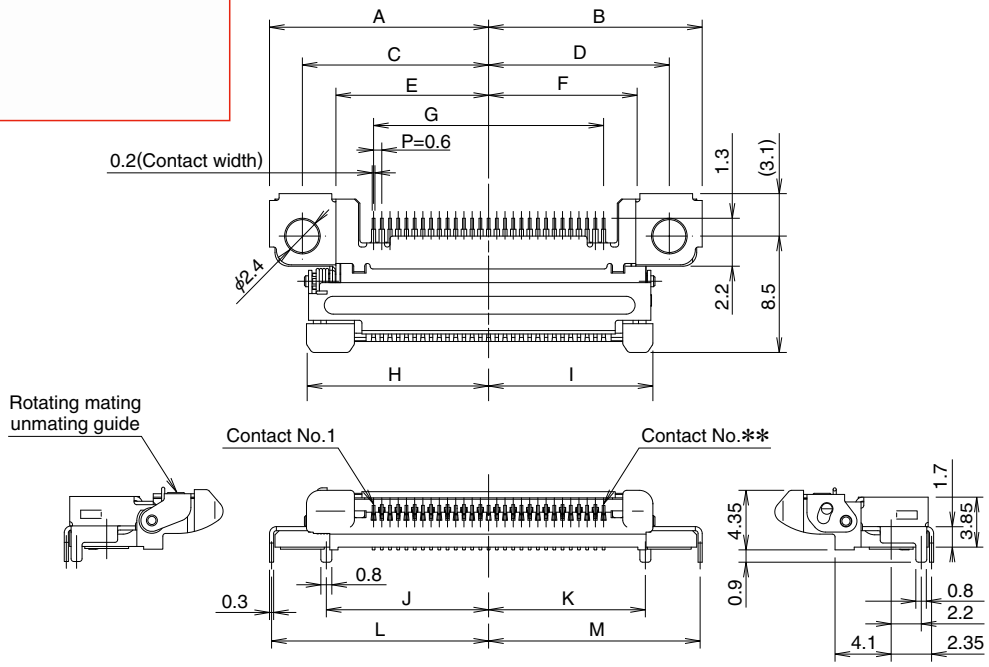
Note: 1,200 pieces per reel.

Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

■Plug (Cradle mount)

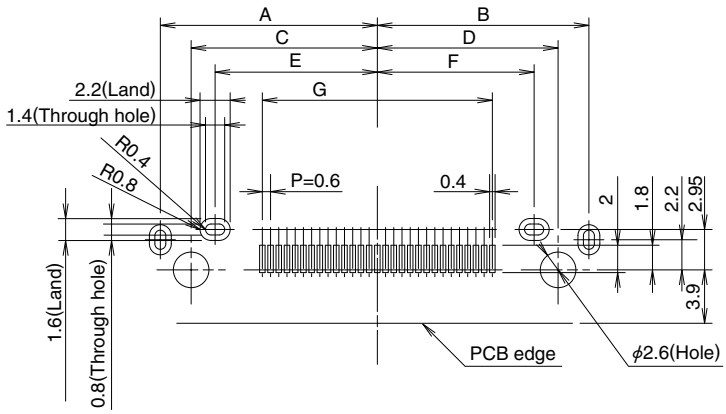
●15 pos., 29 pos.





Part number	Number of contacts	HRS No.	A	B	C	D	E	F	G	H	I	J	K	L	M	RoHS
EX60B-29S	29	CL232-0613-0	(16.0)	(15.6)	13.6	13.2	11.15	10.75	16.8	13.3	12.0	11.85	11.45	15.85	15.45	YES
EX60B-15S	15	CL232-0622-1	(11.8)	(11.4)	9.4	9.0	6.95	6.55	8.4	9.1	7.8	7.65	7.25	11.65	11.25	

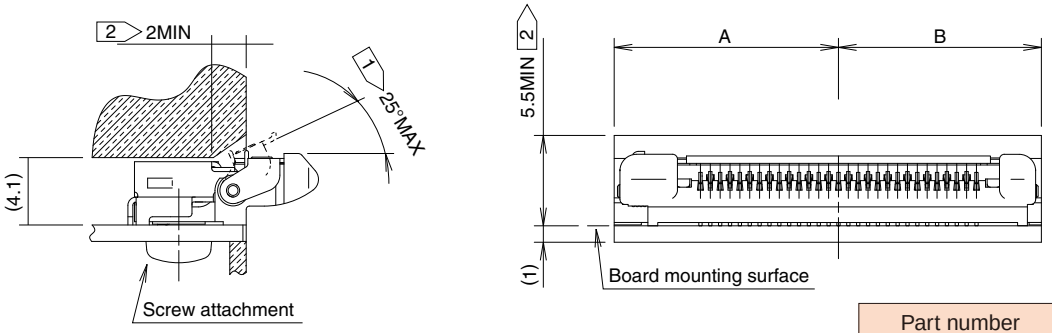
■Recommended PCB mounting pattern



Part number	A	B	C	D	E	F	G
EX60B-29S	15.85	15.45	13.6	13.2	11.85	11.45	16.8
EX60B-15S	11.65	11.25	9.4	9.0	7.65	7.25	8.4

Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

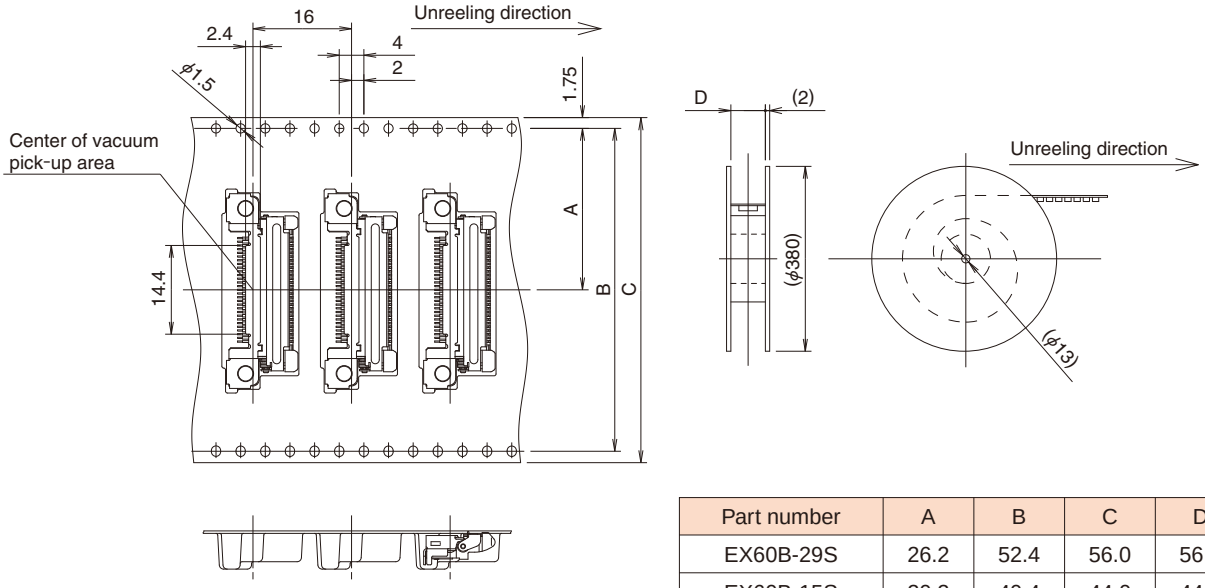
■Cradle case mounting recommendations - Plug



Part number	A	B
EX60B-29S	13.65	12.35
EX60B-15S	9.45	8.15

Notes 1 The maximum opening angle of the rotating mating/unmating guide is 25°. Do not exceed this angle.
Notes 2 Device's case must have the recommended cutout dimensions.
Assure that there is no interference with the free movement and operation of the mating/unmating guide.
Notes 3 Use screw (not supplied) to attach the receptacle to the case.

■Packaging Specifications (Plug, EX60B-29S)

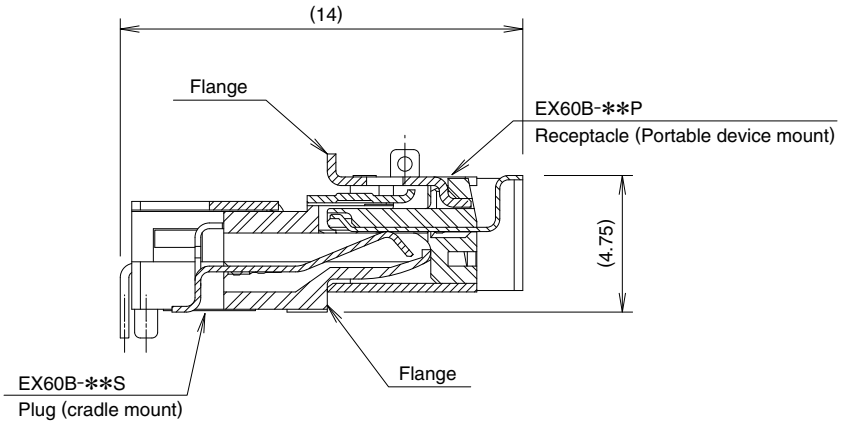


Part number	A	B	C	D
EX60B-29S	26.2	52.4	56.0	56.4
EX60B-15S	20.2	40.4	44.0	44.4

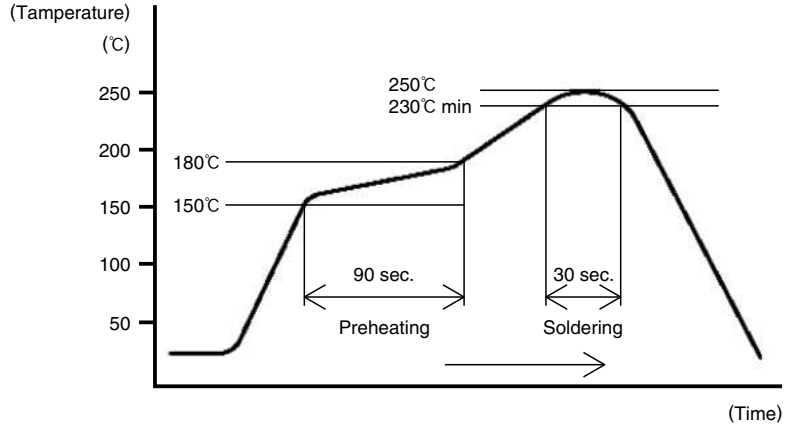
Note: 800 pieces per reel.

Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

■Mating cross-section



■Recommended Temperature Profile



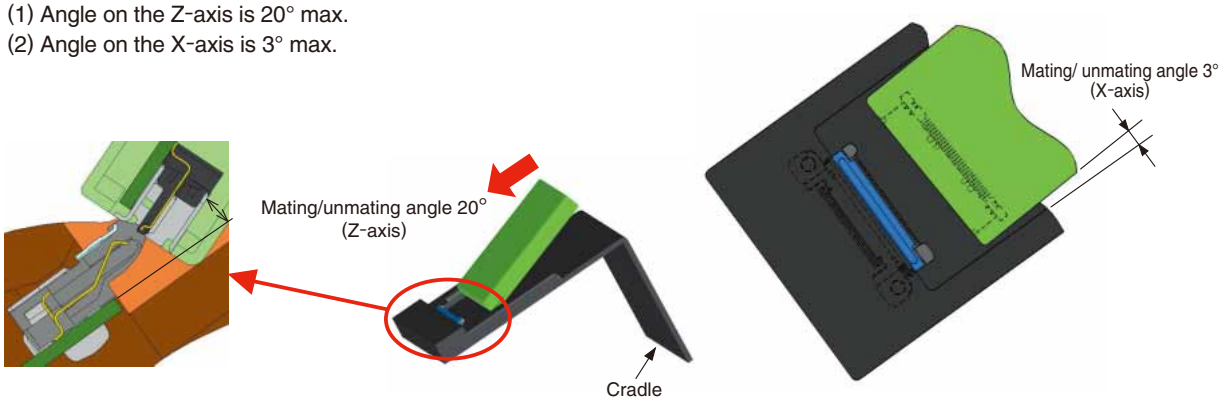
Note 1: Up to 2 cycles of Reflow soldering are possible under the same conditions, provided that there is a return to normal temperature between the first and second cycle.

Note 2: The temperature profile indicates the board surface temperature at the point of contacts with the connector terminals.

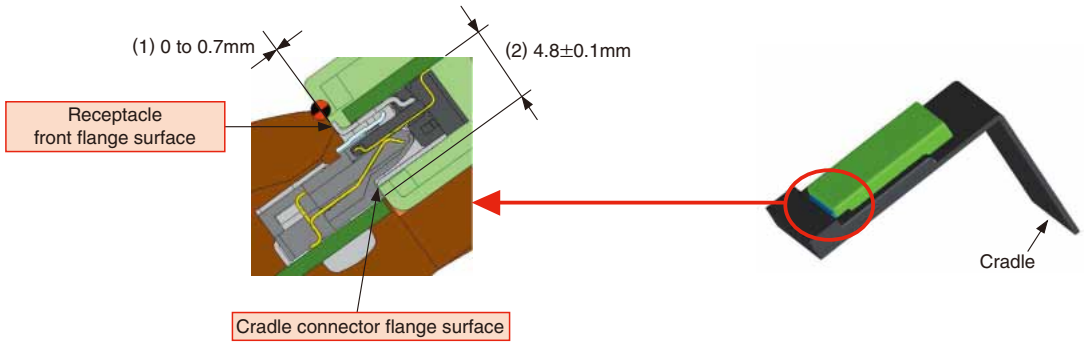
Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

■Portable device case and cradle design requirements

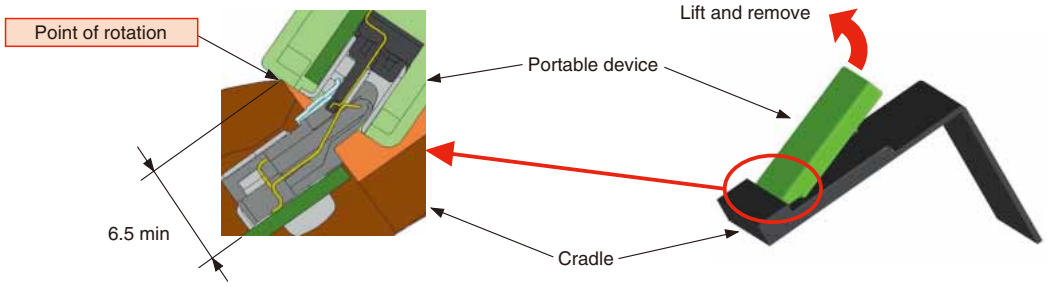
1. Mating/unmating angles (see illustrations below)
   (1) Angle on the Z-axis is 20° max.
   (2) Angle on the X-axis is 3° max.



2.Dimensional requirements
   (1) Distance between the flanges of the receptacle and plug: 0 to 0.7 mm.
   (2) Distance between the PCB mounting surface of the plug (cradle) and the PCB surface of the receptacle (portable device): 4.8±0.1 mm.



3.Portable device removal
   The point of the rotation of the portable device during it's removal from the cradle should be at the distance of 6.5 mm min. as illustrated below.



Apr.1.2024 Copyright 2024 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

Creative Links to World Electronics
HRS
HIROSE ELECTRIC CO.,LTD.
6-3,Nakagawa Chuoh-2-Chome,Tsuzuki-Ku,Yokohama-Shi 224-8540,JAPAN
TEL: +81-45-620-3526 Fax: +81-45-591-3726
http://www.hirose.com
http://www.hirose-connectors.com

The characteristics and the specifications contained herein are for reference purpose. Please refer to the latest customer drawings prior to use.
The contents of this catalog are current as of date of 3/2014. Contents are subject to change without notice for the purpose of improvements.