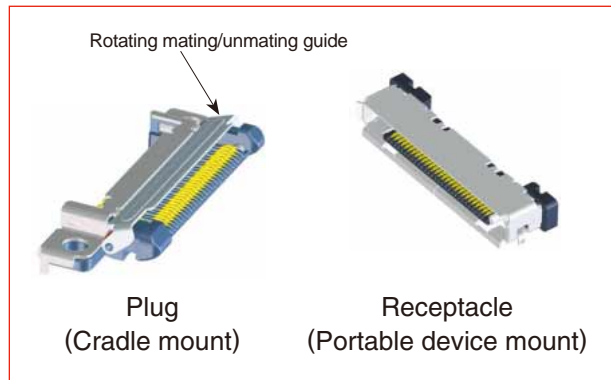
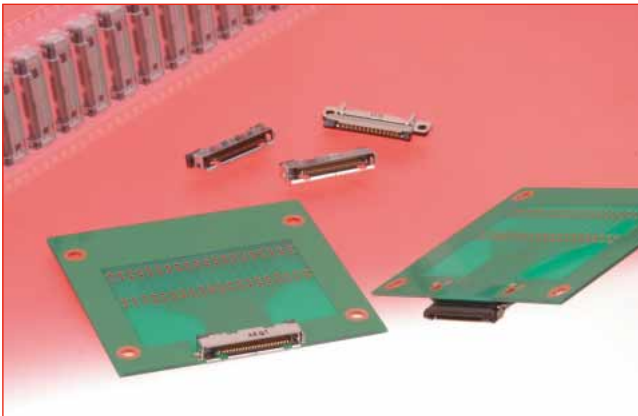


Low-Angle Mating / Unmating Interface Connectors

EX60B Series



■ 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 Gbps, 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.

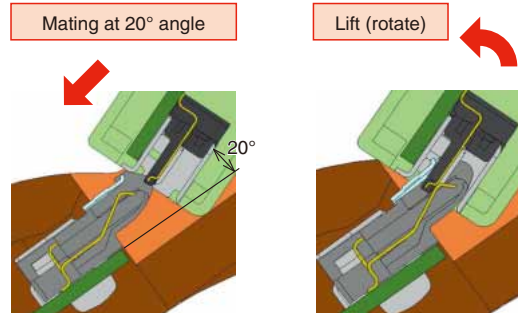
5. Low profile - Space-Saving

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

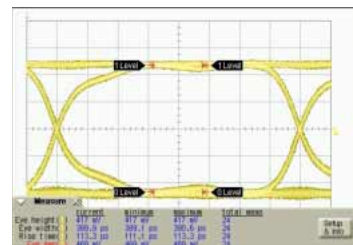
■ Applications

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

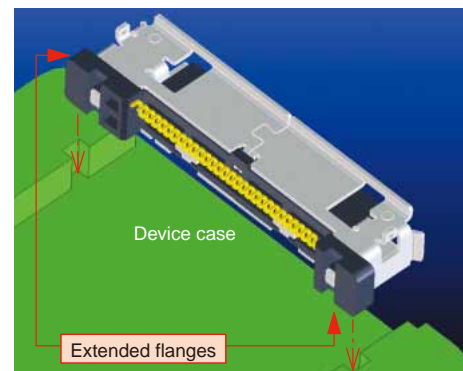
Angle mating/unmating



High speed data transfer 2.5 Gbps Eye Pattern Output Waveform



Extended flange mounting



■ Specifications

| | | |
|--------|------------------------|--|
| Rating | Current rating 0.5A | Operating temperature range -55°C to +85°C |
| | 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/s ² , 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°C → +15°C to +35°C → +85°C → +15°C to +35°C 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°C 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
 ① ② ① ③ ④ ⑤

● Plugs (Cradle mount)

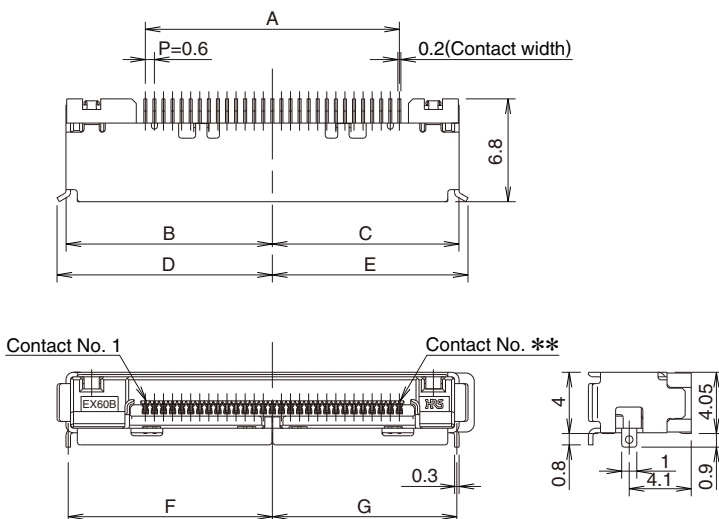
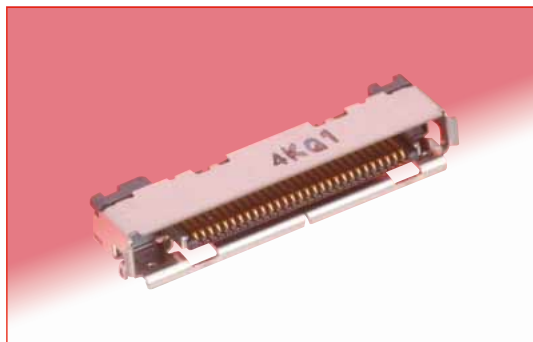
EX 60 B - 29 S
 ① ② ① ③ ④

| | |
|----------------------|--|
| ① Series name | : EXB |
| ② Termination type | : 60 : Right angle SMT |
| ③ Number of contacts | : 15, 29 |
| ④ Contact type | P : Male contact (Receptacle = device mount) S : Female contact (Plug = cradle mount) |
| ⑤ Option | FL : Extended flanges |

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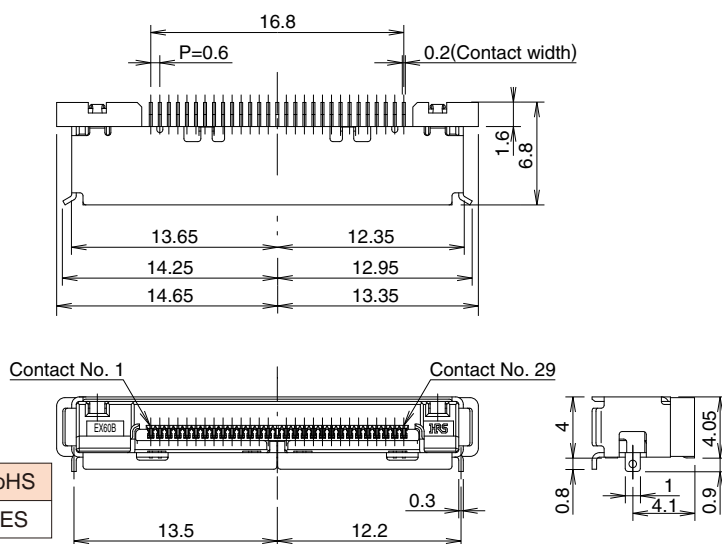
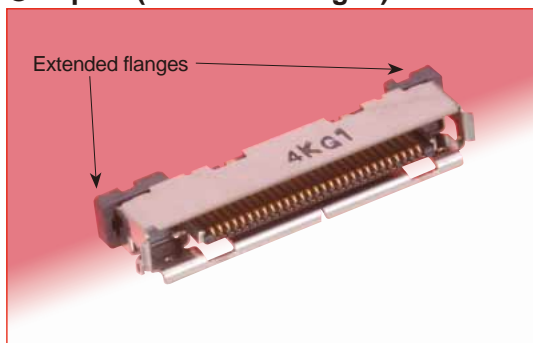
■ Receptacles

● 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 | |

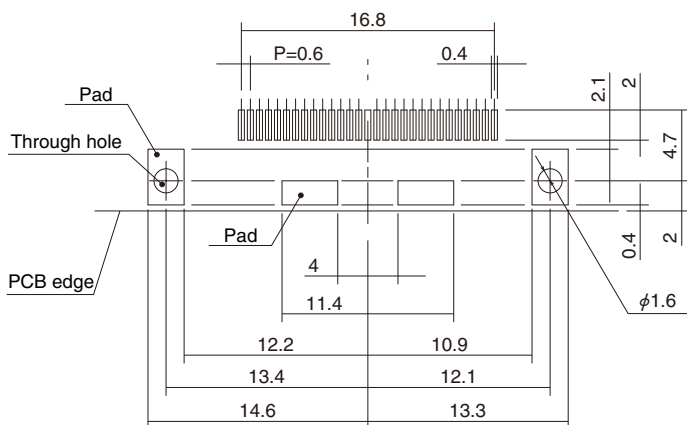
● 29 pos. (Extended flanges)



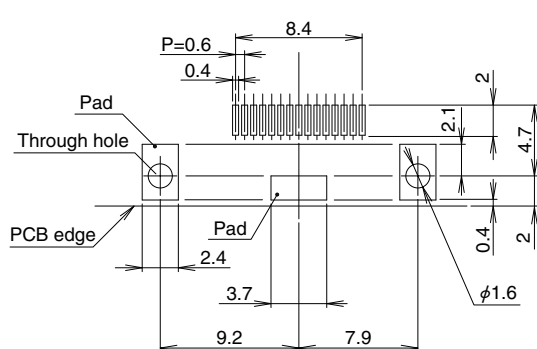
| Part number | CL No. | RoHS |
|--------------|------------|------|
| EX60B-29P-FL | 232-0612-8 | YES |

◆ Recommended PCB mounting pattern

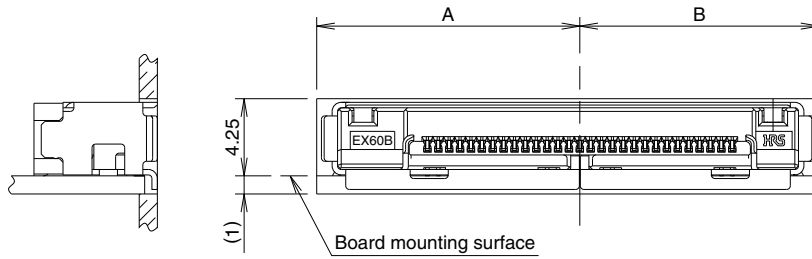
● EX60B-29P and EX60B-29P-FL



● EX60B-15P

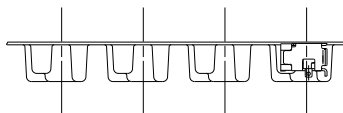
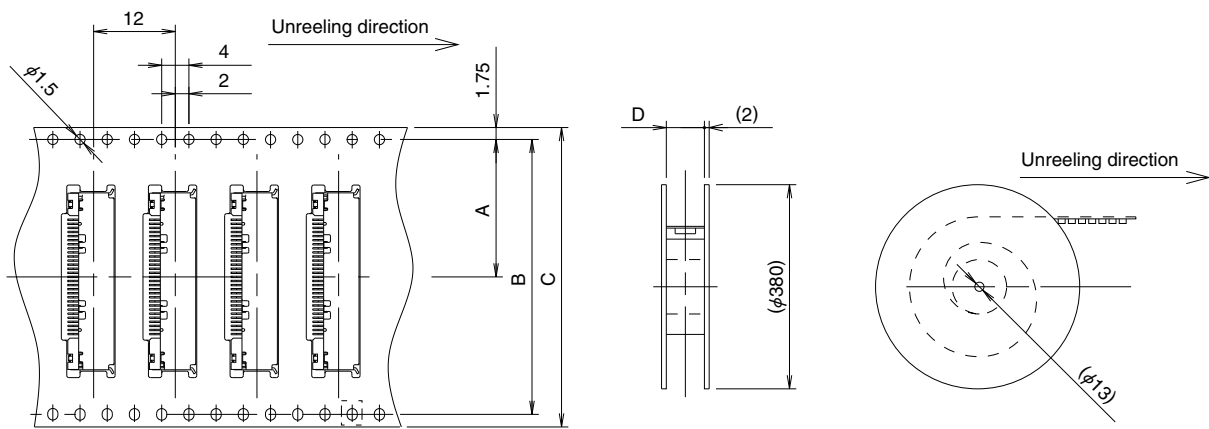


Portable device case cutout



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

Packaging specifications

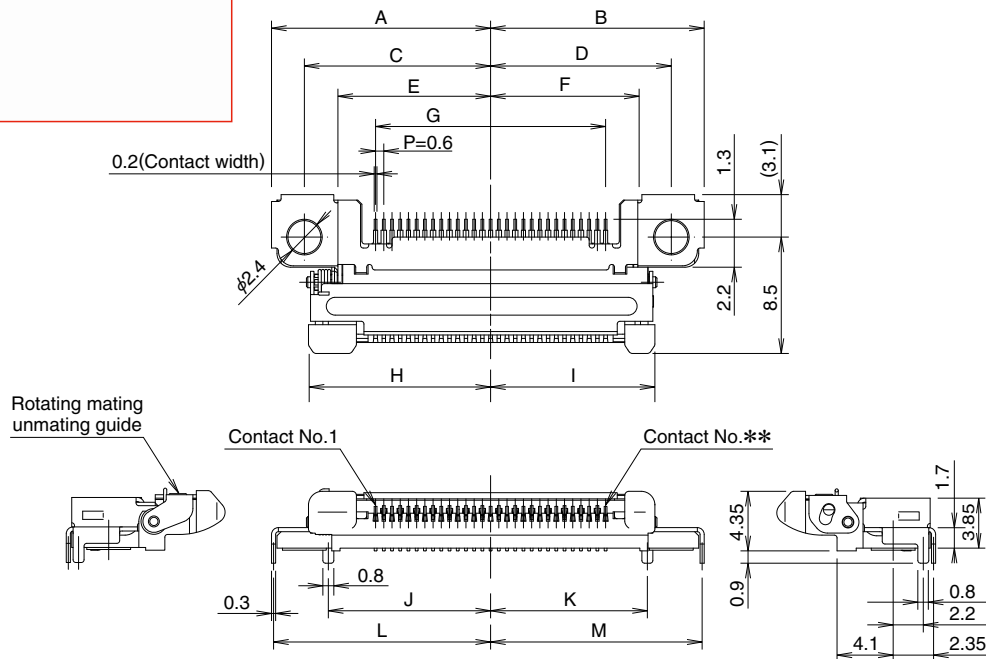
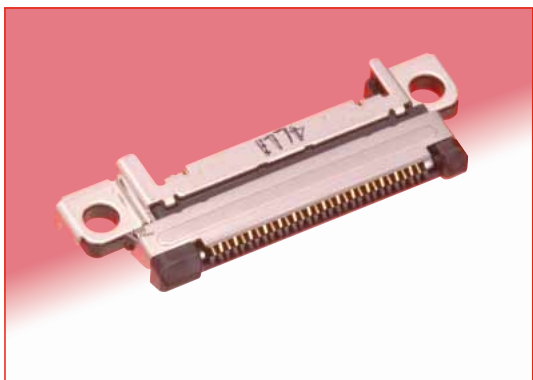


| Part number | A | B | C | D |
|--------------|------|------|------|------|
| EX60B-29P | 20.2 | 40.4 | 44.0 | 44.4 |
| EX60B-29P-FL | | | | |
| EX60B-15P | 14.2 | 28.4 | 32.0 | 32.4 |

Note: 1,200 pieces per reel.

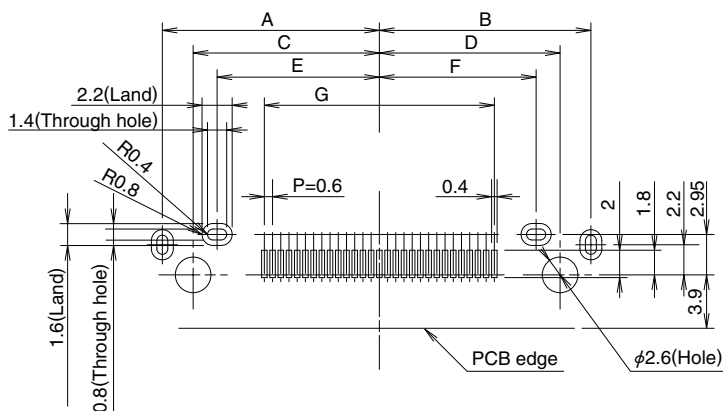
■ Plug (Cradle mount)

● 15 pos., 29 pos.



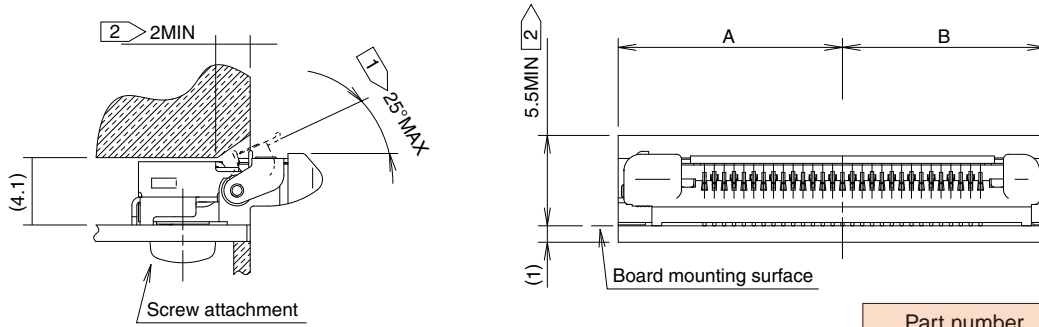
| Part number | Number of contacts | HRS No. | A | B | C | D | E | F | G | H | I | J | K | L | M | RoHS |
|-------------|--------------------|--------------|--------|--------|------|------|-------|-------|------|------|------|-------|-------|-------|-------|------|
| EX60B-29S | 29 | CL232-0613-0 | (16.0) | (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 |

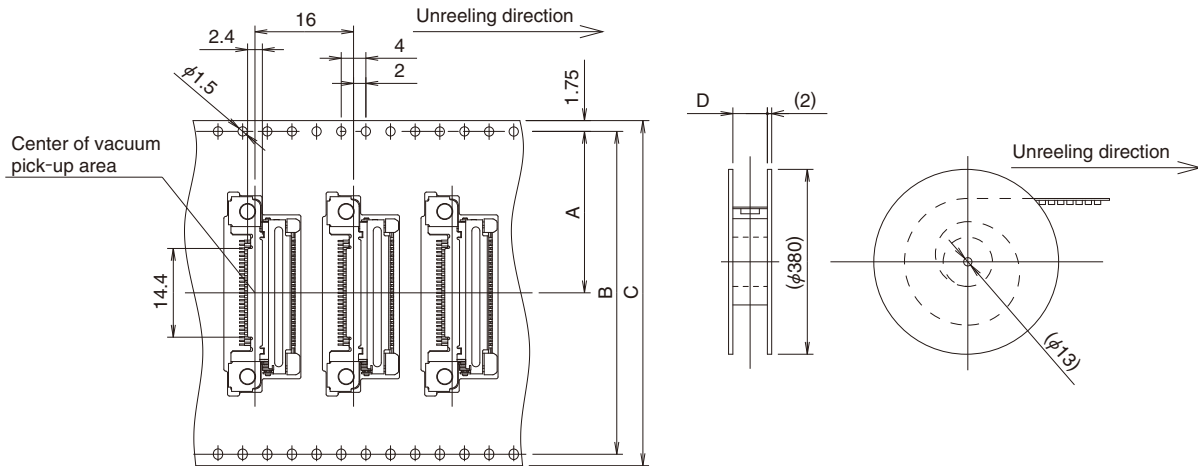
■ Cradle case mounting recommendations - Plug



| 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.
 Assume 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.

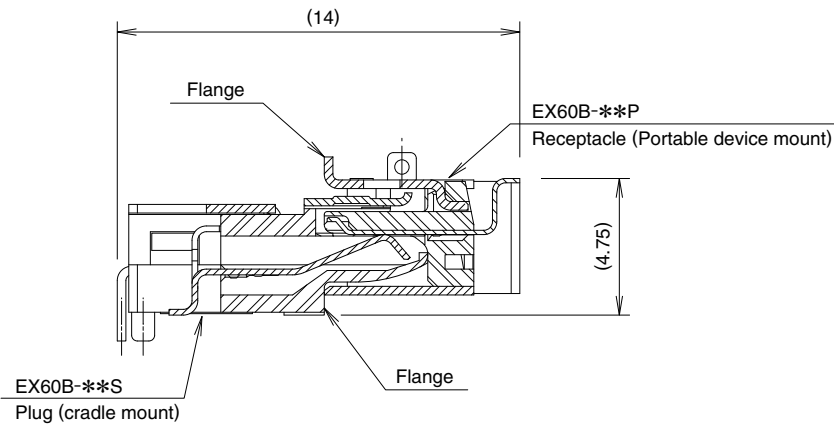
■ Packaging Specifications (Plug, EX60B-29S)



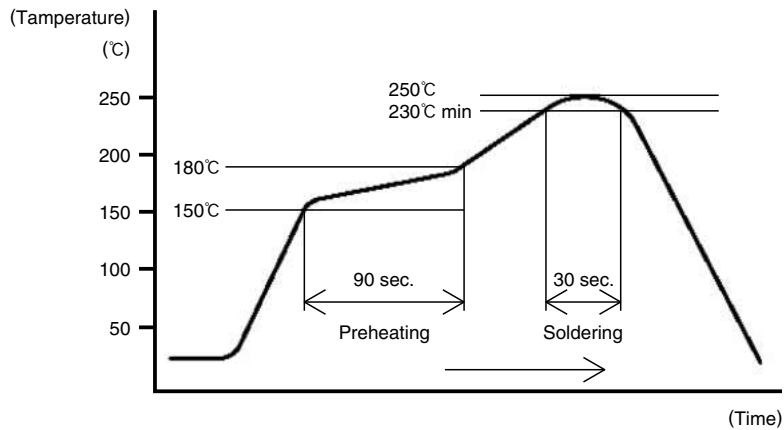
| Part number | A | B | C | D |
|-------------|------|------|------|------|
| EX60B-29S | 26.2 | 52.4 | 56.0 | 56.4 |
| EX60B-15S | 20.2 | 40.4 | 44.0 | 44.4 |

Note: 800 pieces per reel.

■ Mating cross-section



■ Recommended Temperature Profile



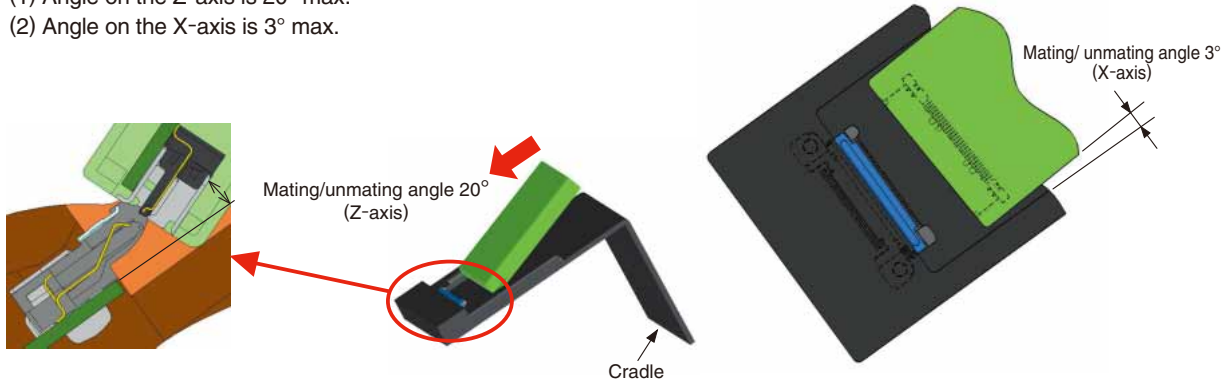
Note 1: Up to 2 cycles of Reflow soldering are possible under the same conditions, provided that there is a return to normal temperature between the first and second cycle.

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

Portable device case and cradle design requirements

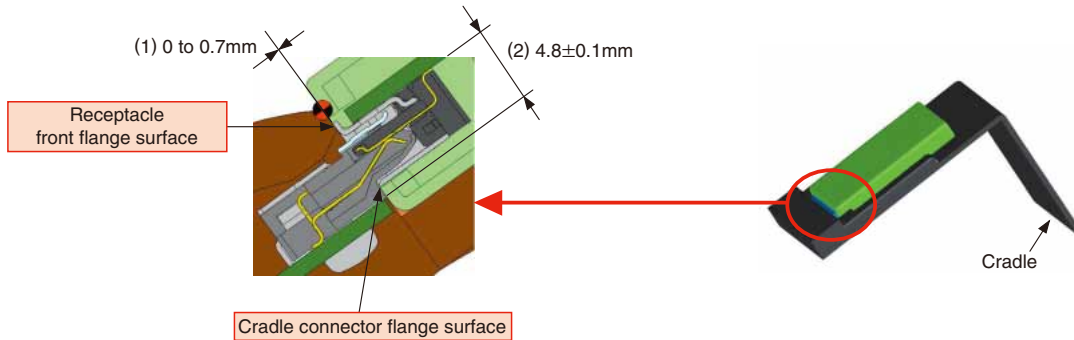
1. Mating/unmating angles (see illustrations below)

- (1) Angle on the Z-axis is 20° max.
- (2) Angle on the X-axis is 3° max.



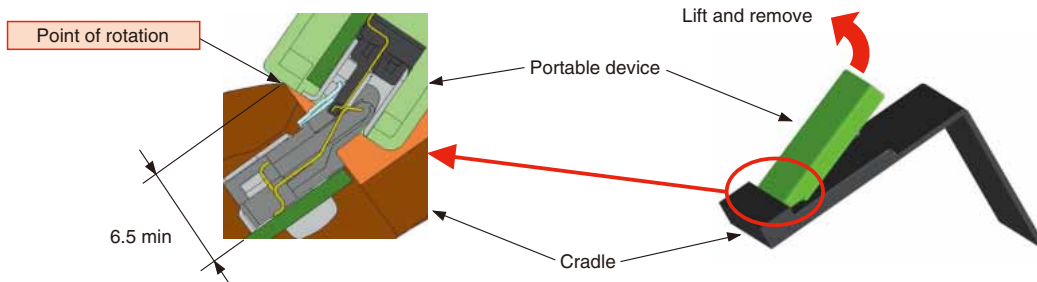
2. Dimensional requirements

- (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.



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

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