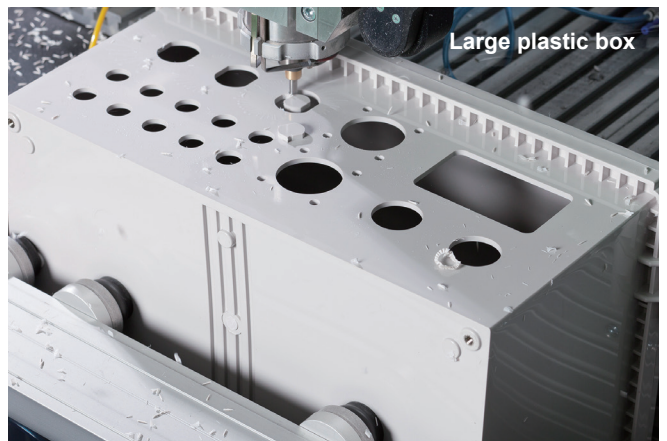
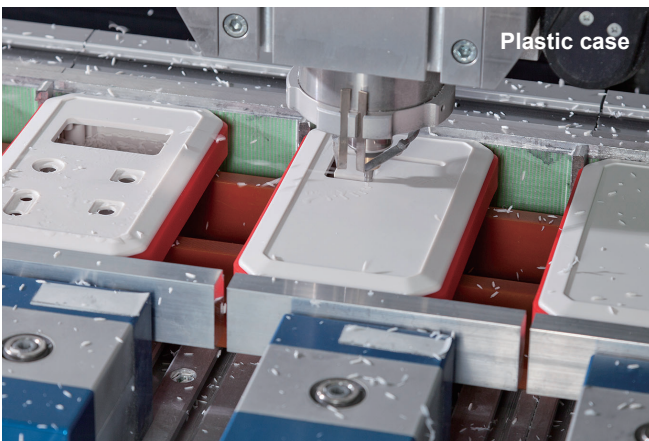
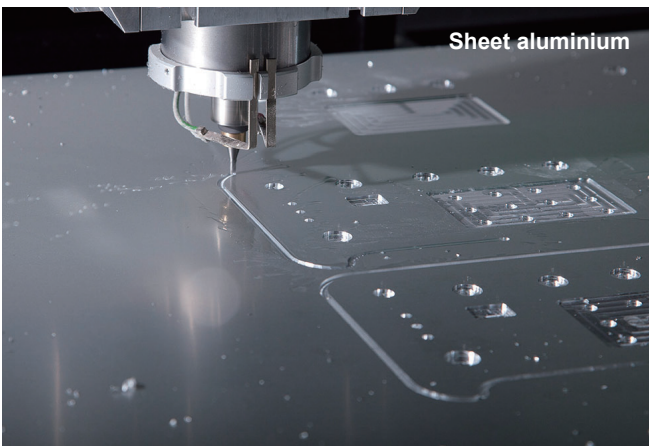
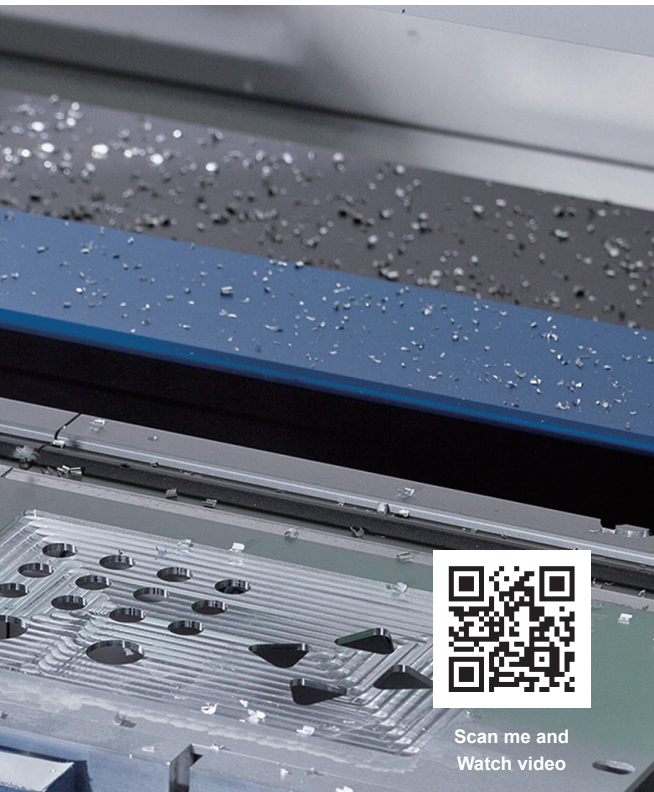


CNC Machining

CNC milling is a form of computer controlled machining. Similar in operation to drilling and cutting, it is able to create various hole styles and shapes by using a rotating cutting tool to bore into the object.





Feature

- Mainly used for plastic, aluminium die-cast, and aluminium extrusion material.
- Able to perform milling for various shapes and sizes. No mold is required for processing.
- Able to perform text engraving and/or hole threading.



Milling Radius and Milling Speed

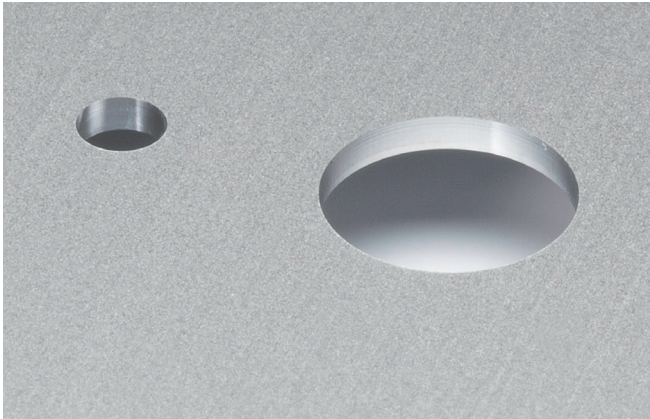
Smaller milling radius requires a finer tool.
 A finer tool requires slower milling speed to prevent tool breakage.
 R0.5 (Φ1.0mm tool) requires very slow milling speed, hence increasing costs.
 Larger milling radius is recommended for less expensive machining cost.

Radius	Tool Diameter	Milling Speed
0.5	1.0	Very Slow
1.0	2.0	Slow
1.5	3.0	Fair
2.0	4.0	Fast
3.0	6.0	Fast



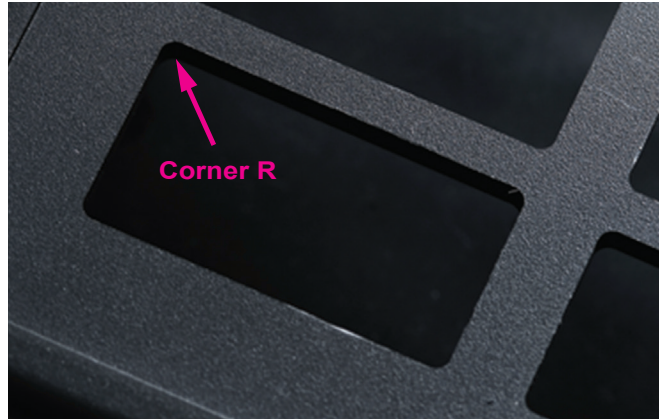
Details of Machine Cut

Circular milling



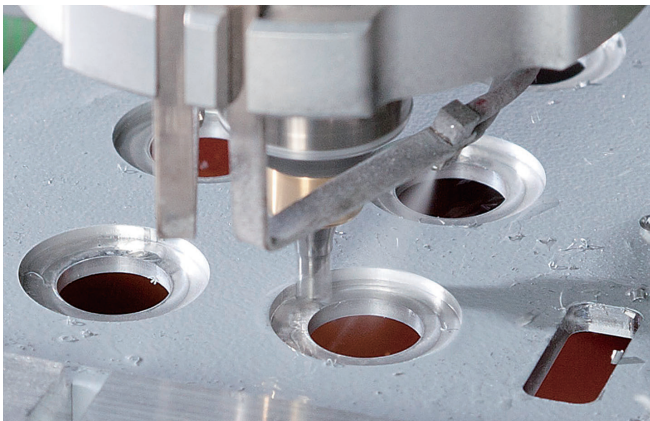
Circular hole milling is possible from $\Phi 1.0\text{mm}$.

Rectangular milling (Regular R1.0)

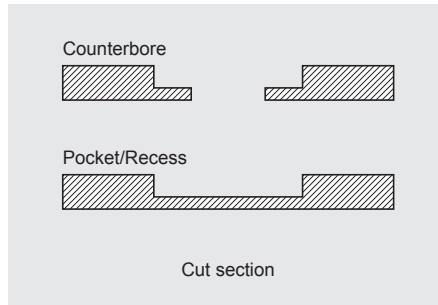


All milling with corners / edges shall have a standard R1.0 radius (smallest R0.5 radius possible).

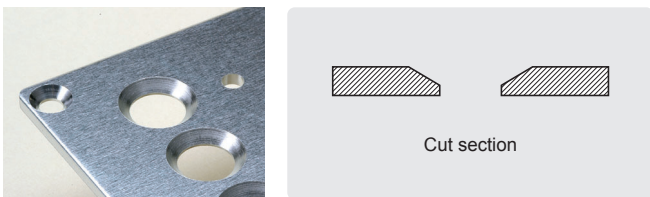
Recess / Counterbore milling



Recess milling is where the milling goes only part way and does not create a through-hole.
Useful for when installing connectors on thick material, making a recess for attaching stickers, overlays or acrylic panels, peeling off the surface for conductivity, etc.
Recess milling without creating a through-hole is often called

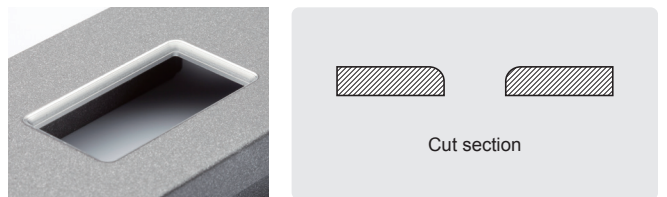


Tapered edges / Countersunk



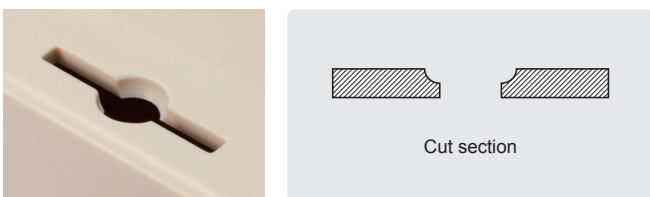
Tapered edges / countersunk can be milled on request.

Rounded edges



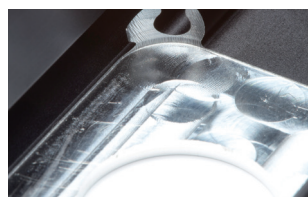
Rounded edges can be milled on request.

Milling with Ball-nose tool



Using ball nose tool for 3 dimensional contoured shapes.

Flattening



Flattening unwanted protrusion. (eg; back of frame et cetera.).

Standoff modification

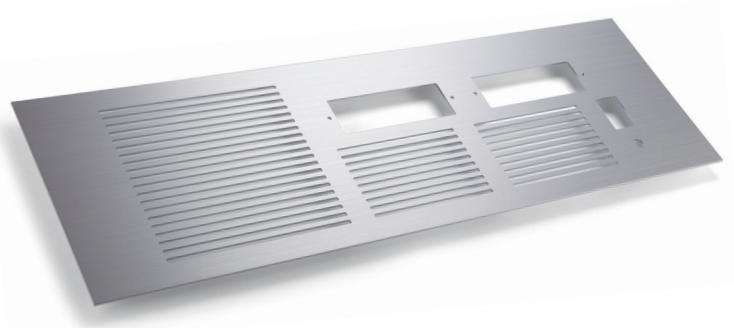


Lowering or eliminating standoffs on inner side of an enclosure.

LASER CUTTING

Laser cutting utilizes a laser to perform cutting on an object, allowing various types and shapes of holes to be cut.

New fiber laser machine allows the processing of aluminium sheets with both high precision and speed. Processing of Pure Aluminium 1050 is also possible with minimal burr as compared to conventional CO² laser machines, which causes excessive burring.

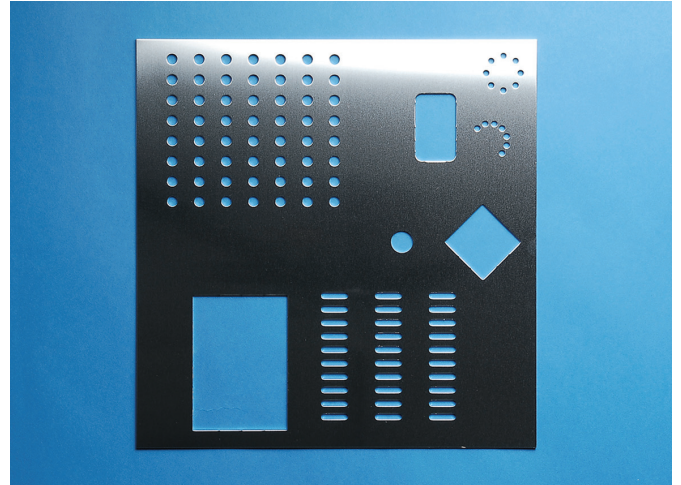
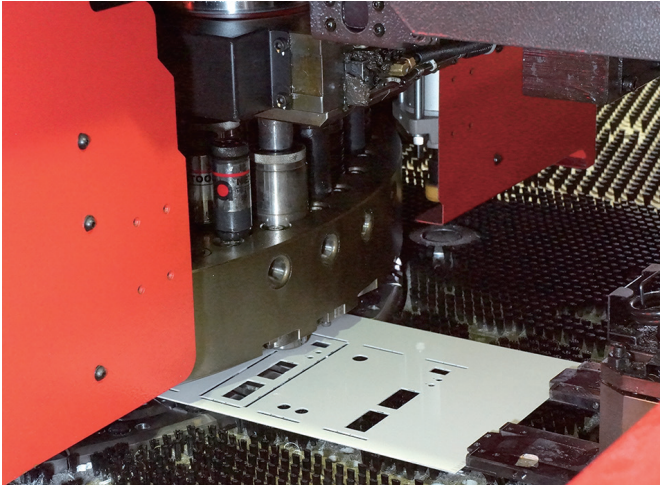


PUNCHING PRESS

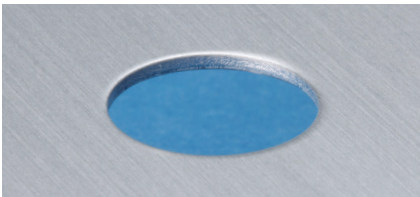
What is punching press? It is a type of machine press used to cut holes in material via the use of various sized die sets.

Punching press allows the realization of high cost performance due to its high speed automated turret punching process, which significantly reduces machining lead-time.

Due to its ability to create designated sized holes by means of rapid multiple hole punches, this enables it to punch holes of various sizes and types quickly and efficiently.

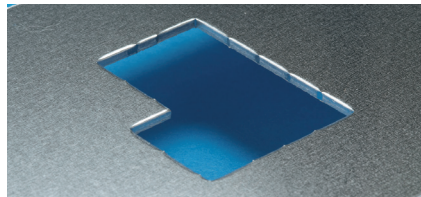


Circular hole



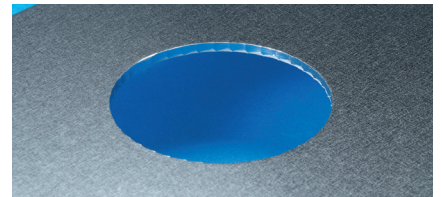
Circular holes as small as 1.0mm in diameter can be punched.

Nibbling press (rectangle)



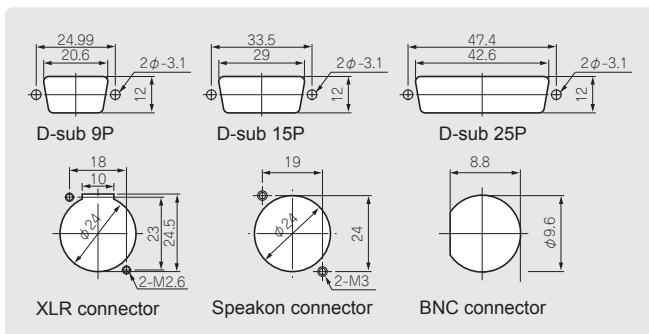
Complex or large rectangular shapes can be punched out with multiple presses.

Nibbling press (round)

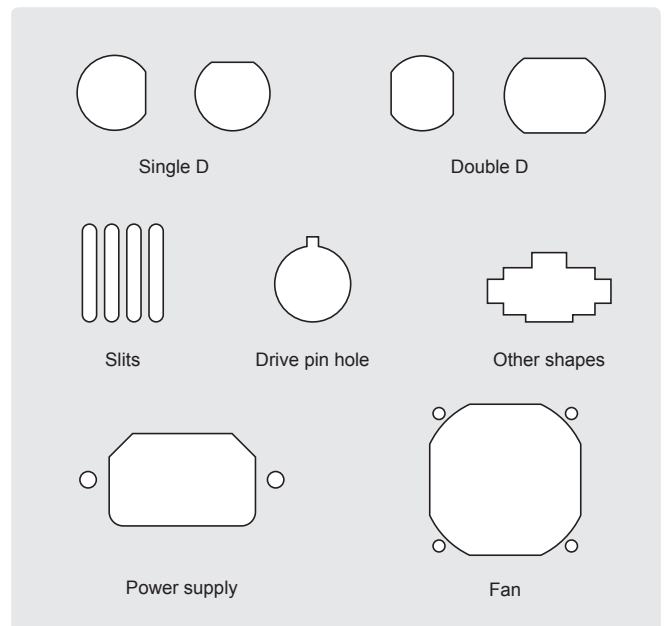


Punching of large circular holes with multiple smaller die strokes.

Common connector shapes



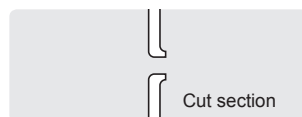
Unique shapes



Burring punch



Increasing surface area on a thin metallic sheet for screw threads to bore into.



STANDARD TOLERANCE for MACHINING SERVICES

Our standard tolerance for machining services.

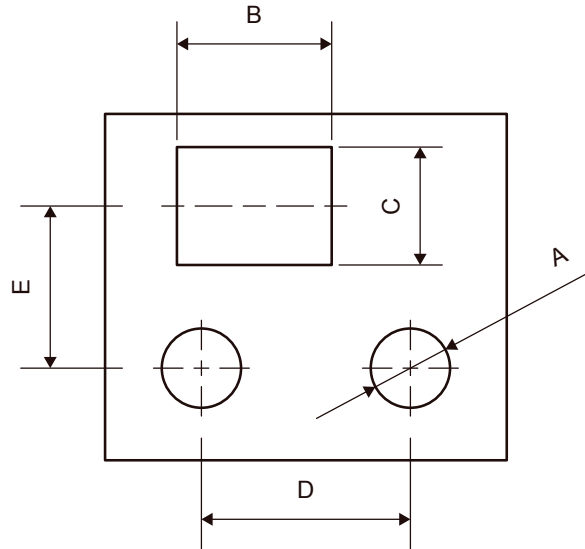
Hole/Cut Size • Hole/Cut Distance

Hole/Cut Size (A • B • C)

Dimension	Tolerance
0.5 ~ 3.0	±0.2
3.1 ~ 6.0	±0.2
6.1 ~ 30.0	±0.2
30.1 ~ 120.0	±0.3
120.1 ~ 400.0	±0.5
400.1 ~ 1,000.0	±0.8

Hole/Cut Distance (D • E)

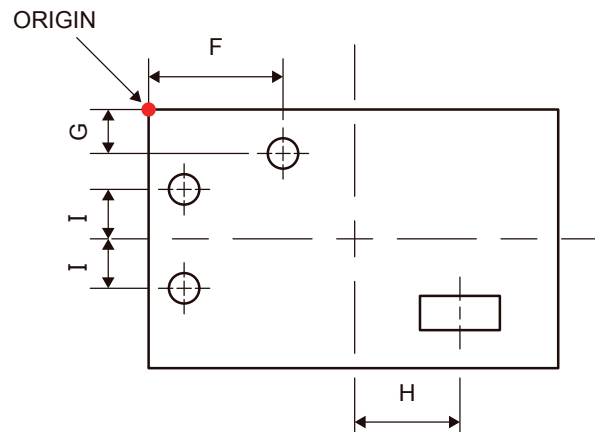
Dimension	Tolerance
0.5 ~ 3.0	±0.2
3.1 ~ 6.0	±0.2
6.1 ~ 30.0	±0.2
30.1 ~ 120.0	±0.4
120.1 ~ 400.0	±0.6
400.1 ~ 1,000.0	±0.8



Distance on Panel - F and G from ORIGIN • H and I from centerline

Punch Press • Laser Cutting (F • G • H • I)

Dimension	Tolerance
0. ~ 3.0	±0.2
3.1 ~ 6.0	±0.2
6.1 ~ 30.0	±0.2
30.1 ~ 400.0	±0.5
400.1 ~ 1,000.0	±0.6



CNC Machining (F • G)

Dimension	Tolerance
0.5 ~ 3.0	±0.3
3.1 ~ 6.0	±0.3
6.1 ~ 30.0	±0.4
30.1 ~ 120.0	±0.6
120.1 ~ 400.0	±0.8
400.1 ~ 1,000.0	±1.0

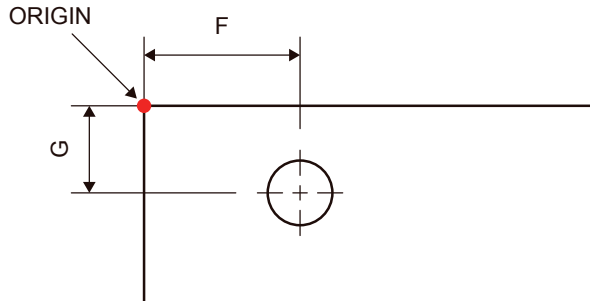
CNC Machining (H • I)

Dimension	Tolerance
0.5 ~ 3.0	±0.5
3.1 ~ 6.0	±0.5
6.1 ~ 30.0	±0.6
30.1 ~ 120.0	±0.8
120.1 ~ 400.0	±1.0
400.1 ~ 1,000.0	±1.2

Distance on Enclosure - F and G from ORIGIN

Material : Extruded Aluminum (F · G)

Dimension	Tolerance
0.5 ~ 3.0	±0.5
3.1 ~ 6.0	±0.5
6.1 ~ 30.0	±0.6
30.1 ~ 120.0	±0.8
120.1 ~ 400.0	±1.0
400.1 ~ 1,000.0	±1.2



Material : Aluminum Diecast (F · G)

Dimension	Tolerance
0.5 ~ 3.0	±1.3
3.1 ~ 6.0	±1.3
6.1 ~ 30.0	±1.4
30.1 ~ 120.0	±1.6
120.1 ~ 400.0	±1.8
400.1 ~ 1,000.0	±2.0

Material : Plastic (F · G)

Dimension	Tolerance
0.5 ~ 3.0	±0.5
3.1 ~ 6.0	±0.5
6.1 ~ 30.0	±0.6
30.1 ~ 120.0	±0.8
120.1 ~ 400.0	±1.0
400.1 ~ 1,000.0	±1.2

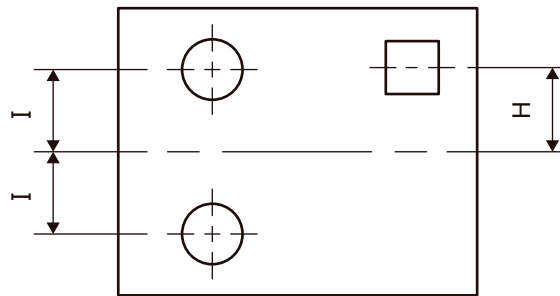
Material : Plastic on BCAP, BCPC, BCAR, BCPR and BCPK series (F · G)

Dimension	Tolerance
0.5 ~ 3.0	±1.1
3.1 ~ 6.0	±1.1
6.1 ~ 30.0	±1.2
30.1 ~ 120.0	±1.4
120.1 ~ 400.0	±1.6
400.1 ~ 1,000.0	±1.8

Distance on Enclosure - H and I from Centerline

Material : Extruded Aluminum (H · I)

Dimension	Tolerance
0.5 ~ 3.0	±0.8
3.1 ~ 6.0	±0.8
6.1 ~ 30.0	±0.9
30.1 ~ 120.0	±1.1
120.1 ~ 400.0	±1.3
400.1 ~ 1,000.0	±1.5



Material : Aluminum Diecast (H · I)

Dimension	Tolerance
0.5 ~ 3.0	±2.4
3.1 ~ 6.0	±2.4
6.1 ~ 30.0	±2.5
30.1 ~ 120.0	±2.7
120.1 ~ 400.0	±2.9
400.1 ~ 1,000.0	±3.1

Material : Plastic (H · I)

Dimension	Tolerance
0.5 ~ 3.0	±0.9
3.1 ~ 6.0	±0.9
6.1 ~ 30.0	±1.0
30.1 ~ 120.0	±1.2
120.1 ~ 400.0	±1.4
400.1 ~ 1,000.0	±1.6

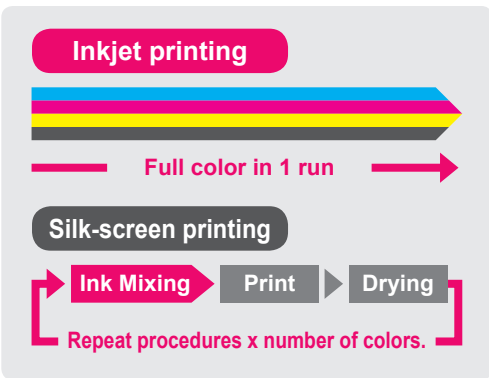
Material : Plastic on BCAP, BCPC, BCAR, BCPR and BCPK series (H · I)

Dimension	Tolerance
0.5 ~ 3.0	±2.1
3.1 ~ 6.0	±2.1
6.1 ~ 30.0	±2.2
30.1 ~ 120.0	±2.3
120.1 ~ 400.0	±2.5
400.1 ~ 1,000.0	±2.8

INKJET PRINTING



Full color digitally designed image can be printed in 1 run.
No cost difference regardless of the number of colors used.



Low printing cost
Full color print possible in small quantities

Inkjet printing	1 run only for full color print			
Printing cost Full color				
Silk-screen printing	Printing cost x number of colors			
Printing cost Color 1	Printing cost Color 2	Printing cost Color 3	Printing cost Color 4	

High quality printing of photo image and color gradation.

Print photo images in maximum 1,800 x 1,800 dpi quality.

Pictures, logos and unique designs with color gradation can be recreated in a high quality print.



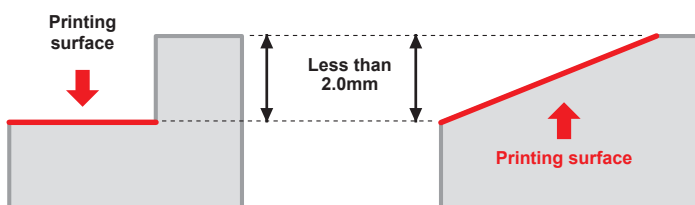
Maximum printable enclosure size



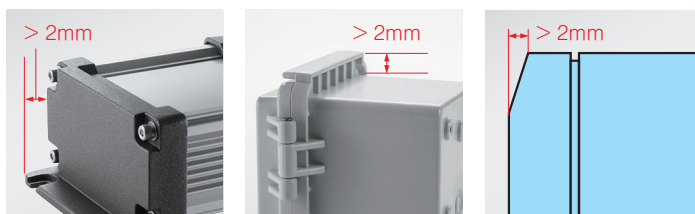
Printable on surfaces with height differential

Printing is possible on recessed, sloped and rounded sections.

Gap difference is less than 2.0mm.



*Not suitable if height difference is more than 2.0mm.



Printed example






PRINT FILE REQUIREMENTS

Recommended data formats

Guidelines for Print File

.ai	.eps	.pdf (1:1 scale)
		

	<ul style="list-style-type: none"> • All text should be outlined. • Color profile in CMYK mode. • Color should be specified in CMYK mode. • Add enclosure print face outline to specify print position.
	<ul style="list-style-type: none"> • All text should be outlined. • Color profile in CMYK mode. • Color should be adjusted accordingly. • Add enclosure print face outline to specify print position. • Transparent effects etc cannot be printed. • Adobe Illustrator software is recommended for editing .eps file.
	<ul style="list-style-type: none"> • All text should be outlined. • Color profile in CMYK mode. • Color should be adjusted accordingly. • Add enclosure print face outline to specify print position. • Ensure that the aspect ratio is correct. • Print data may be distorted if edited using CAD software, or other non-graphics specialized software. • Adobe Illustrator software is recommended for editing .pdf file.

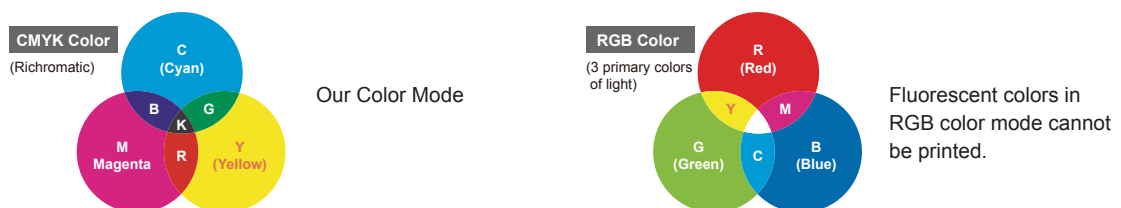
OUTLINING TEXT

"Outlining is a method where normal font/texts are converted to vector graphics. If a typeface that TAKACHI does not have installed is used, the data may be incorrectly printed. Ensure that all text are properly outlined; if not, a similar installed typeface will be randomly chosen."



CMYK COLOR MODE

Printing is processed in CMYK + W color mode. Create your print file in CMYK color mode. If RGB color mode is used, print may be darker than actual specified color when converted to CMYK color mode.



● LOGO and MARKS

Images which are cut and pasted will be pixelated when magnified, or printed.
To avoid pixelated images, ensure that the data is created with a vector software.
Additional fees for data creation may be required if print data is not suitable to be used for printing.



Coarse image data



Printed image

[Vector Data] Image clarity remains unchanged even when magnified.



[Raster Data] Image clarity worsens (pixels become visible) when magnified.



● PDF Data

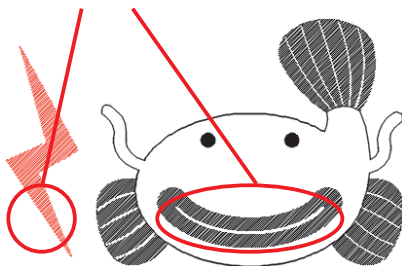
Images on scanned pdf cannot be used for printing.
Text, shapes etc. have to be embedded in the print file.



If the text has not been embedded properly, the font may be randomly converted.

When converting from a DWG to PDF file, the print quality will be the same as viewing a pdf file on a PC.
Utilizing Adobe Acrobat (or Acrobat Reader) to convert the data will also yield a similar result.

Created as filled areas, but have white lines through-out.



This will be printed as-is based on received pdf file.



Blurred and jagged contour lines when using acrobat conversion software.



TAKACHI

LASER MARKING SERVICE

Printing what used to be
impossible into a reality!

レーザーマーキング
はじめました。

CASE BOX RACK & CUSTOM



**CASE BOX RACK & CUSTOM
TAKACHI ELECTRONICS ENCLOSURE CO., LTD.**

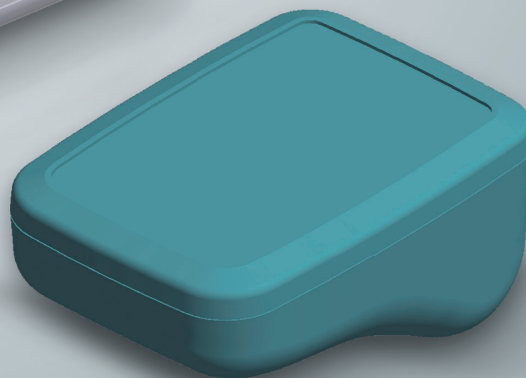
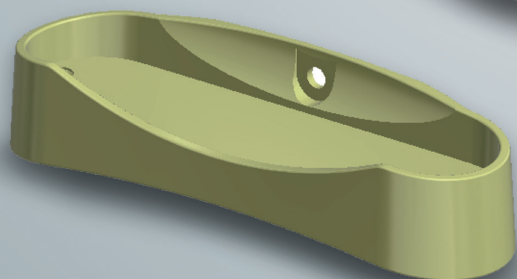
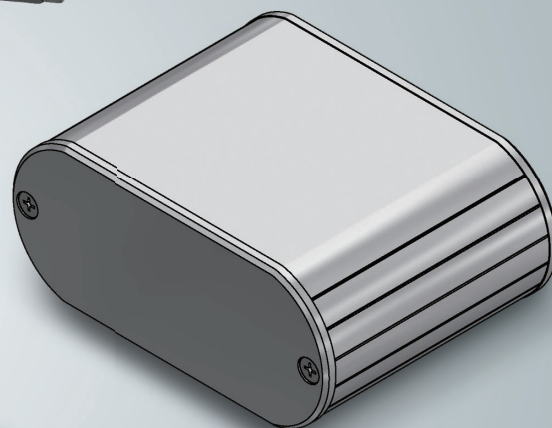
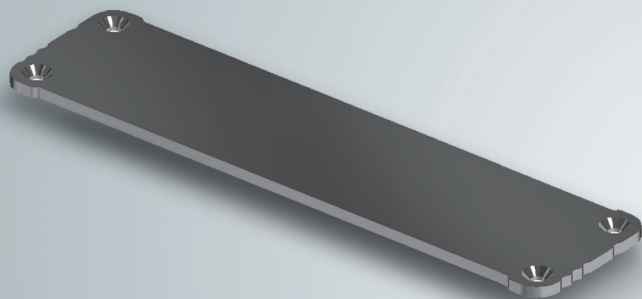
LASER MARKING SERVICE

Laser marking is a process that utilizes a focused beam of light to mark the surface of an object, by altering the material's properties and appearance.

It can also be performed on uneven, curved, and even inclined surfaces.



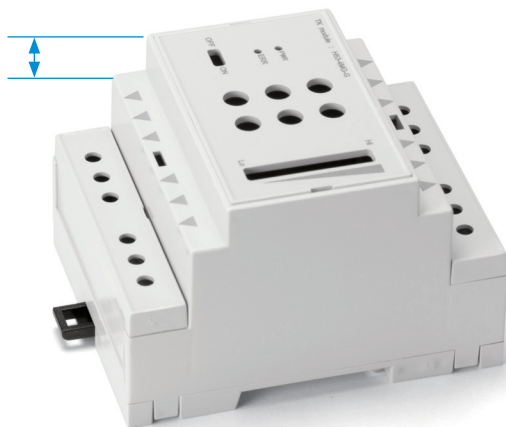
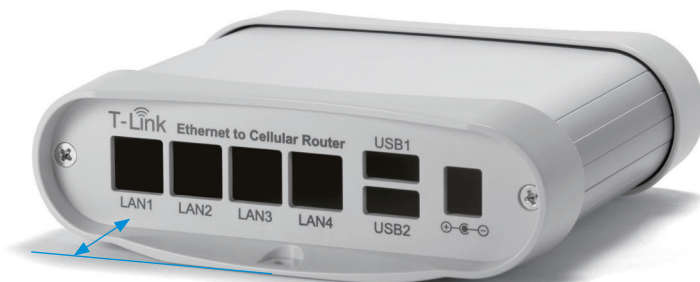
Video available



Feature 1

Print on Uneven Surface

Possible to print to the surfaces with a height difference of 3.5mm or more where inkjet and silkscreen printing are not able to.



Feature2

High Class Finish on Metallic Enclosures

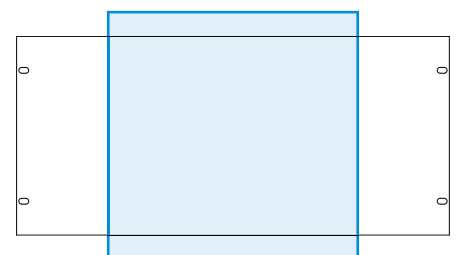
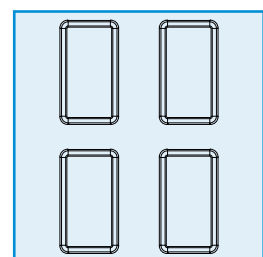
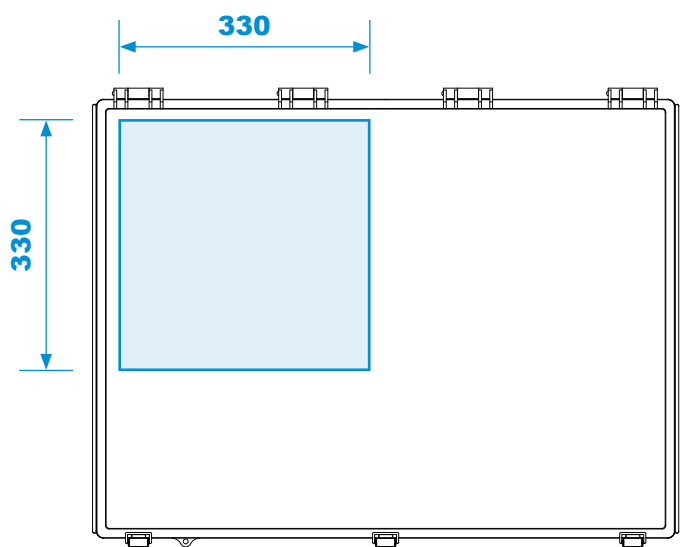
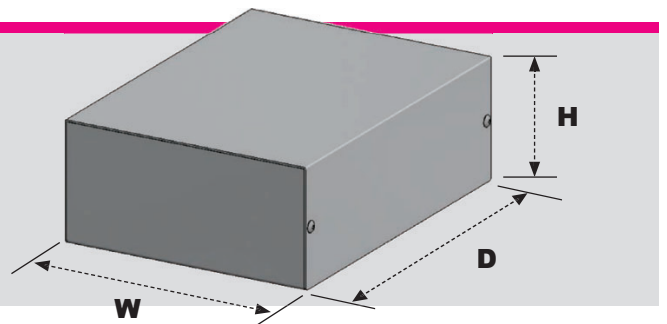
Due to the laser marking the surface directly, it gives metallic enclosures a high class finish.
Optimal solution to achieve a high class look and distinctive image on you products.



Printable Area and Material

- 330mm x 330mm (for 1 process)
- Material : Aluminum, Stainless-steel, Plastic, and others.
- Print larger area than 330mm x 330mm can be done with Inkjet or Silkscreen printing.

Maximum Printable Area



Partial marking can be done on larger enclosures or panels exceeding printable area.

● Grade of Laser marking finishing by Material



- Aluminum - Unfinished
- Good (*Light shade)



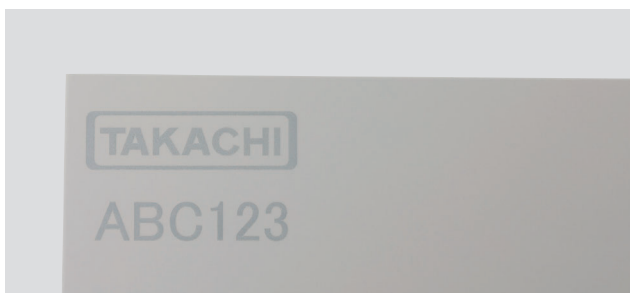
- Aluminum - Silver anodized
- Very Good



- Aluminum - Black anodized or painted
- Very Good



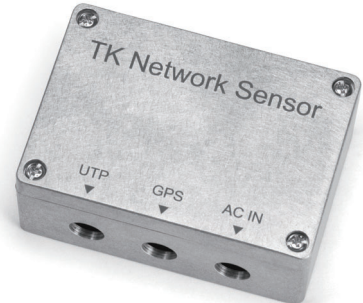
- Aluminum - Silver painted
- Very Good



- Aluminum - Light gray painted
- Good (*Light shade)



- Stainless steel - Unfinished
- Good (*Light shade)



- Aluminum diecast - Unfinished
- Good



- Aluminum diecast - Silver painted
- Good

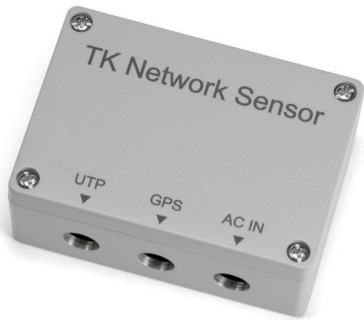


- Aluminum diecast - Black painted
- Good

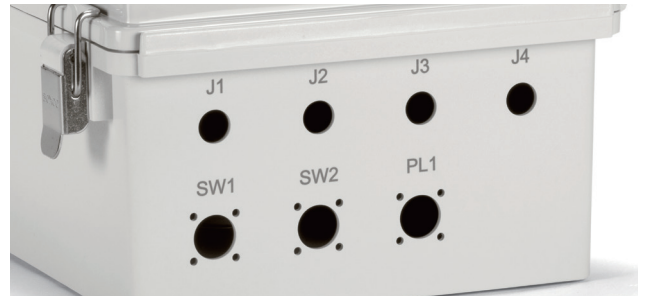


- Aluminum diecast - Metallic gray painted
- Fair (*Very light shade)

● Grade of Laser marking finishing by Material



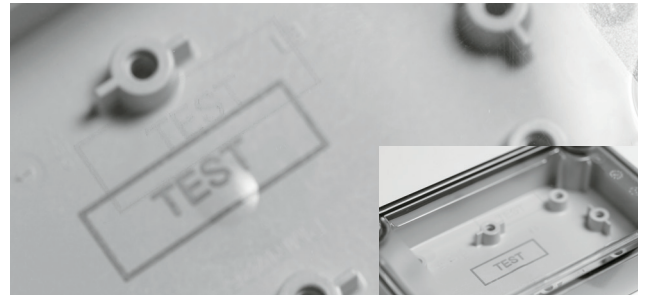
- Aluminum diecast - Light gray painted
- Good (*Shade may vary by production batch)



- Polycarbonate - Light gray
- Good (*Shade may vary by production batch)



- ABS/Flame resistant ABS - White
- Good (*Shade may vary by production batch)



- Polycarbonate - Transparent
- Not Good (Laser passes through the material, marking the internal surface)



- ABS/Flame resistant ABS - Light gray
- Fair (*Shade may vary by production batch)



- ASA - White gray
- Good (*Shade may vary by production batch)



- ABS/Flame resistant ABS - Dark gray
- Fair (*Shade may vary by production batch)



- ABS - Painted
- Not Good (Low visibility)



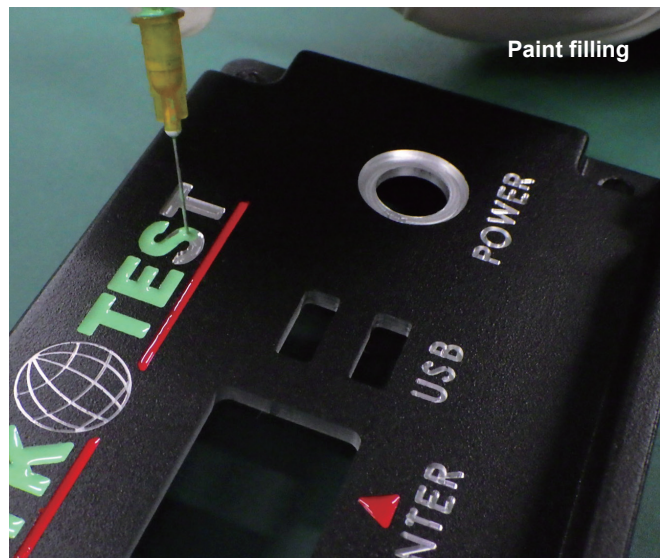
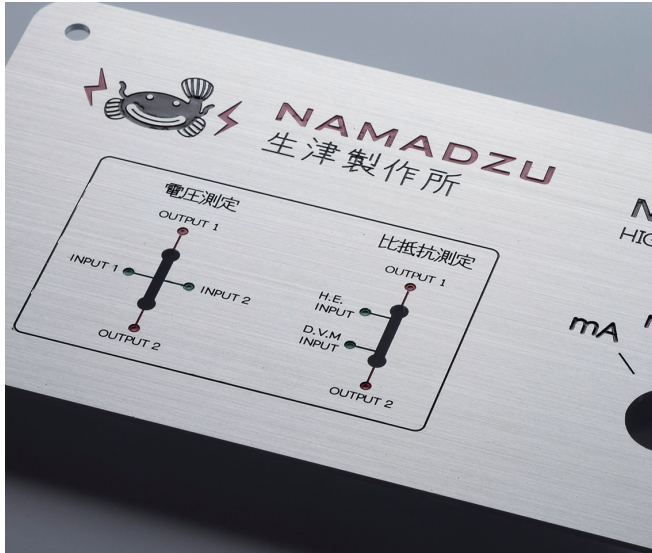
- ABS/Flame resistant ABS - Black
- Fair (*Shade may vary by production batch)



- ABS - Other color
- Not Good (Low visibility)

ENGRAVING

By having the drill-head slightly milling the surface, the engraving of fine text or complex designs is able to be performed on a variety of surfaces, be it flat, curved, and so on. Suitable for small batch print, and/or simple lettering. Font shall be similar to VAG Rounded font type.



Digital Printed Overlay

Layers

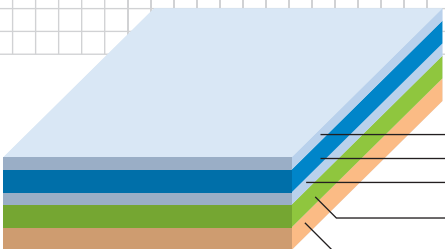
Embossing for buttons can be formed.

Digital full color printed film layer

Laminated film layer

Double-sided tape layer
Standard type
Waterproof type
(Equivalent to IP67)

Waterproof type is equivalent to IP67 protection class. **IP67**



Layer details

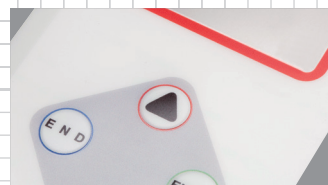
Layer	Material	Thickness	
Protective layer	Polypropylene	0.040mm	
Printed film layer	PET	0.198mm	
Laminated film layer	PET	0.016mm	
Double-sided tape layer	Standard	Acrylic	0.17mm
	Waterproof	Acrylic	0.15mm
Paper liner	Paper	-	

Transparent windows can be made.

Surface finish



Glossy type



Matte type

Glossy type is recommended if transparent window is required.

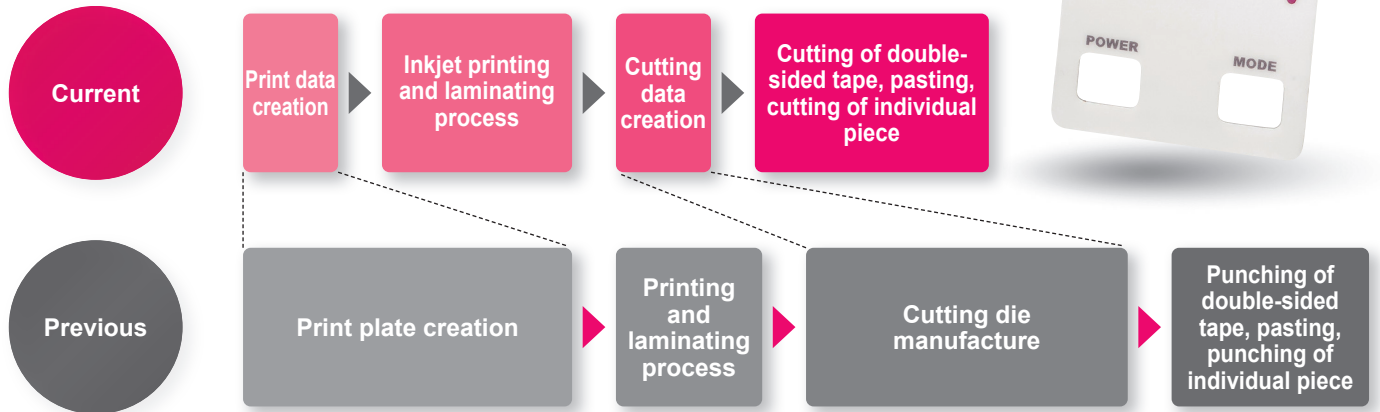
Overview

Advantages

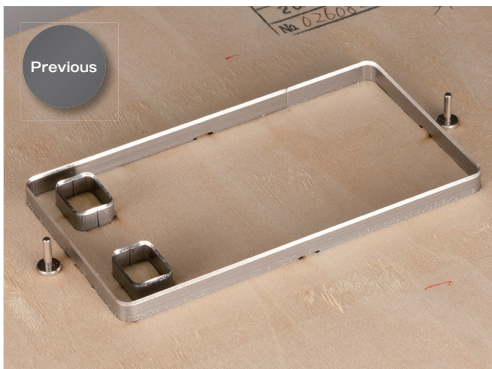


Feature 1 Punch die and print plates can be eliminated.

● Comparison of current and previous manufacturing methods



● Digital cutting plotter machine for sheet cutting

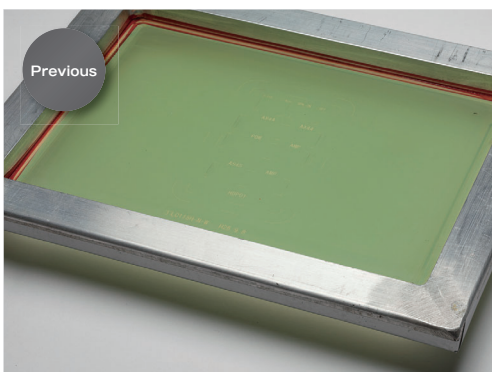


Significant cost is incurred in the preparation and manufacture of the cutting die.

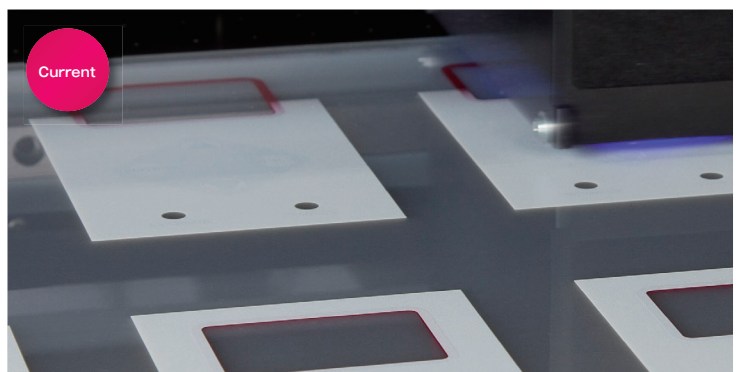


Cutting the sheet to size is made possible via our cutting plotter machine, thus cutting die manufacture process can be eliminated.

● By utilizing inkjet printing, huge initial cost for plate making can be reduced.



Silk-screen plate for each color is required for printing.

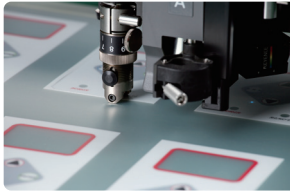


Digital inkjet printer can eliminate the print plate creation. No cost difference regardless of print being single, or multi color.

Feature 2 Why are the initial costs low?

3 reasons for low initial costs

Reason 1



Cutting process



Avoiding the cost for cutting die manufacturing via our in-house cutting plotter.

Reason 2

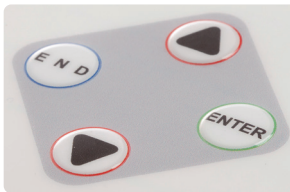


Printing process



Saving the cost for print plates via utilization of our in-house digital inkjet printer.

Reason 3



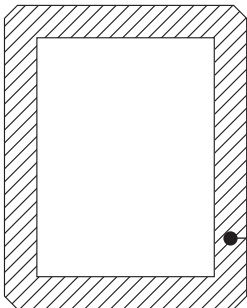
Embossing process



Reducing the cost for the embossing die via our new die manufacturing process.

Feature 3 Waterproof type

Waterproof double-sided tape layer is available.



Conditions : Enclosure must be waterproof type.

Example : WH145-25-N-M2

10mm spacing around the edge is required.

Waterproof type is equivalent to IP67 protection class.

IP67



Recessed top

Recess machining can be done for overlay sheet fitting.



Flat surface



Recess machining



Attaching the overlay sheet.

OVERLAY SHEET EXAMPLES



IP67 HAND-HELD ENCLOSURE
WH SERIES



PLASTIC ENCLOSURE with SILICONE PROTECTOR
TWS SERIES



HAND-HELD CASE with SHOCK-PROOF SILICONE COVER
LCT SERIES



IP67 NETWORK PLASTIC BOX
WP SERIES



PORTABLE PLASTIC CASE
PS SERIES

OVERLAY SHEET EXAMPLES



ALUMINIUM PANEL CASE with CORNER GUARD
EXP SERIES



IP67 ALUMINIUM ENCLOSURE with SILICONE PROTECTOR
AWP SERIES



HIGH-END DESIGN ALUMINIUM CASE
HD SERIES



IP67 FLANGED ALUMINIUM ENCLOSURE
AW SERIES



WATERPROOF PORTABLE CASE
NANO SERIES



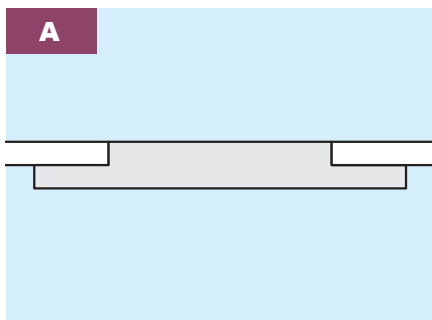
DESKTOP ENCLOSURE with STAND HANDLE
MSN SERIES

ACRYLIC DISPLAY WINDOW MOUNTING

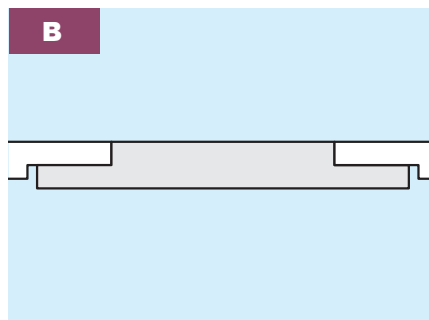
Acrylic display window mounting service is possible, but requires milling to be performed on the enclosure. Transparent and Gray Smoke acrylic types are available. *Notes : Ask for other colors.



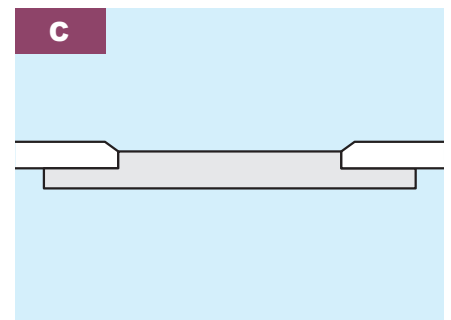
3 Different Mounting Finishes



- Standard installation.
- Suitable for enclosures with material thickness from 1.0mm to 2.0mm
- Cost efficient.



- Flat finish can be achieved on both sides regardless of the panel thickness of the enclosure
- Suitable for enclosures with higher material thickness.

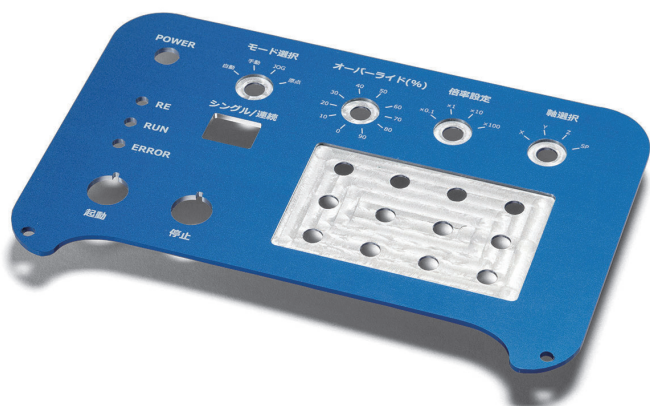


- A flushed recessed display design can be achieved with sloped edges.
- Suitable the enclosures with higher material thickness.

CUSTOM ANODIZATION

Anodization is an electrochemical process that converts the aluminium surface into a decorative, durable, corrosion-resistant, anodic oxide finish.

We can process custom color anodization such as blue, green, red, purple and so on.

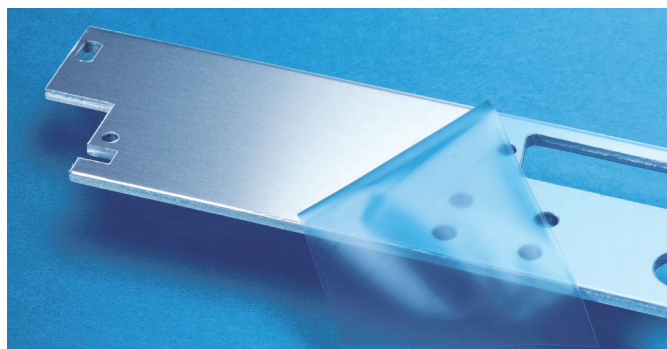


Color Anodization

After anodization processing, a color solvent is introduced into micropores on the surface of the anodized aluminum.

Once the sealing treatment is performed, it leaves a durable color on the surface of the aluminium, which when compared with plating, the advantage is that the color will not be easily worn off.

*Shades of color can be vary by processing lot.



Clear Alodine Finish

Clear chromate conversion coating on aluminum. Conductivity can be achieved.

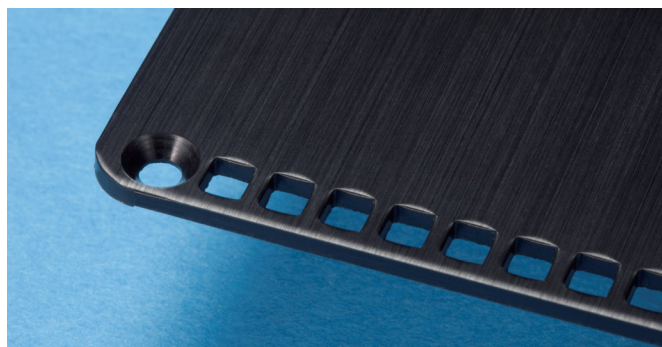
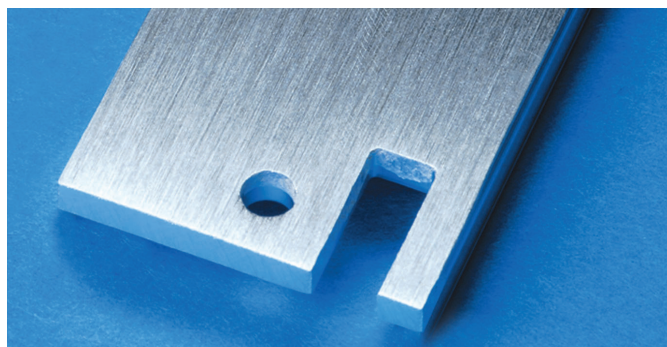
*Anodization / Clear Alodine Finish cannot be done on aluminium diecast parts.

CUSTOM HAIRLINE FINISH

Aesthetically brushed finish on aluminium or stainless steel.

Making small scratches or fingerprint caused by daily use less noticeable.

Emphasizing metallic feel of the material and used for high class products.



CUSTOM PAINTING



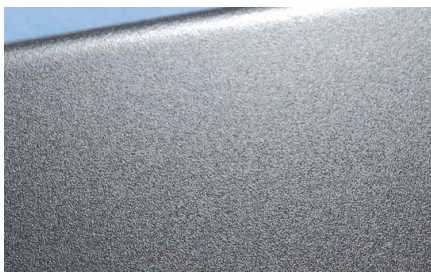
■ Suitable for Painting

Any plastic and metal enclosures/cases.

■ Color Specification

Specify color number in Pantone, RAL or Munsell Color System.

*for RAL and Munsell, a similar color tone will be chosen.



● One Tone Painting

Tiny aluminum particles in the paint provides an even texture on the surface, giving it the look of a high class product.



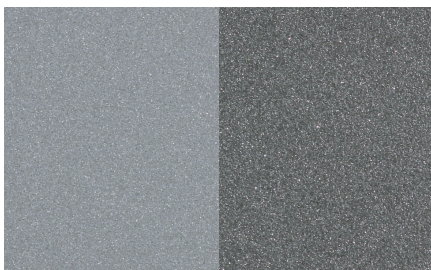
● Powder Coating

Powder paint material adheres using static electricity. Environmentally safe painting method without solvent use.



● Paint on Plastic

Optimal solution for covering molding marks (weld, flow mark), or to have improved color visibility.



● Metallic Painting

Paint with metallic gloss. Powder aluminum or other metals are present in the resin. Provides a glossy finish and a higher class look.



● Conductive Coating

Recommended if conductivity is required. A special resin containing nickel filler or powder copper for conductivity is contained in it.

● Weather Resistant

Coating specially blended resin based on urethane for weather resistant purposes. Maintaining the gloss of the products and reducing color fade and degradation.



Clinching Fastener

Self-clinching Standoff / Stud / Nut

Easy attaching of self-clinching fasteners into simple through-holes.

Need standoffs for mounting PCB/ Components in metallic enclosures.



Using threaded standoffs.



Self-clinching standoffs reduces assembly processes.

Need studs in/on aluminium enclosures.



A screw fastened with a nut and used as a stud.



Self-clinching stud makes for a flat and beautiful finish.

Need tough thread hole(s) on 1.0mm thick aluminium.



Using burred holes.



Self-clinching nuts provide tougher thread holes.

● A wide variety of self-clinching fasteners are available for selection.



ST · STS series

Self-clinching Standoffs
(Through-hole type)



SB · SBS series

Self-clinching Standoffs
(Blind type)



NM · NS series

Self-clinching nuts
(Round type)



NR series

Self-clinching nuts
(Hex type)



CS series

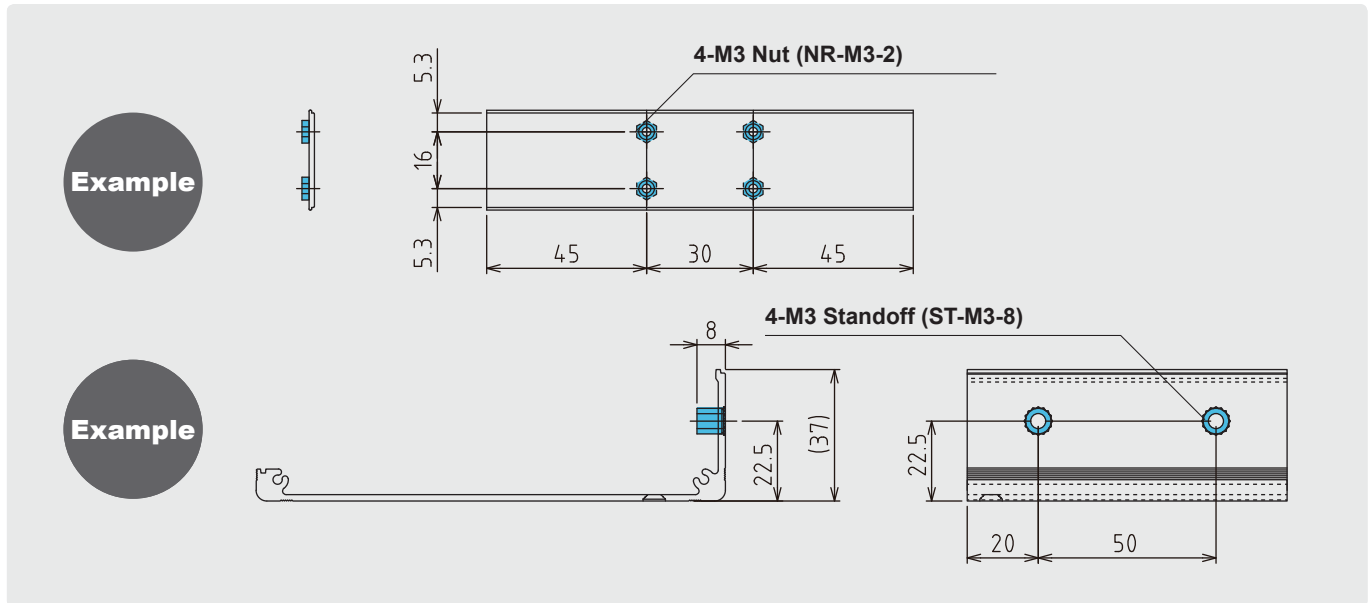
Self-clinching studs



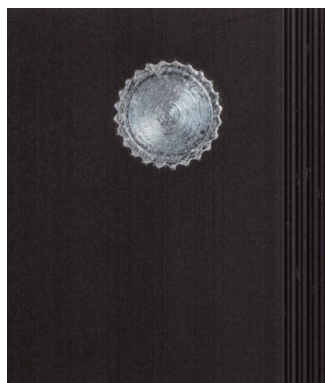
BN series

Self-clinching nuts
(Blind type)

● See "Thread and length size chart" on page clinching-3 to clinching-6. Kindly specify and put the relevant "Part #" in your drawings.



EXAMPLE



ST · STS Through-hole type

SB · SBS Blind type



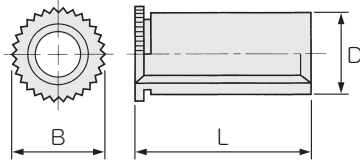
Thread and length size chart

ST·STS series

Standoffs (Through-hole type)



Drawing



Material : Steel / Trivalent zinc plated
Stainless steel / Passivated

For length (L) up to 12mm, it will be fully threaded.
For length (L) 13mm or longer, threading is only up to 10mm.

All dimensions are in mm

Part # (Steel)	Part # (Stainless steel)	Thread code	Thread pitch	D -0.08	B +/-0.2	L +/-0.1	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance							
ST-M2-6		M2	0.4	4.18	5.2	6	1.0	4.2	6.0							
ST-M2-8	8															
ST-M2-10	10															
ST-M2-12	12															
ST-M2.5-6		M2.5	0.45	4.18	5.2	6	1.0	4.2	6.0							
ST-M2.5-8	8															
ST-M2.5-10	10															
ST-M2.5-12	12															
ST-M3-3	STS-M3-3	M3	0.5	6.18	7.2	3	1.0	6.2	7.0							
ST-M3-4	STS-M3-4					4										
ST-M3-5	STS-M3-5					5										
ST-M3-6	STS-M3-6					6										
ST-M3-7	STS-M3-7					7										
ST-M3-8	STS-M3-8					8										
ST-M3-9	STS-M3-9					9										
ST-M3-10	STS-M3-10					10										
ST-M3-11	STS-M3-11					11										
ST-M3-12	STS-M3-12					12										
ST-M3-13						13										
ST-M3-14						14										
ST-M3-15						15										
ST-M3-16						16										
ST-M3-17						17										
ST-M3-18						18										
ST-M3-20						20										
ST-M4-6	STS-M4-6					M4				0.7	7.18	8.2	6	1.0	7.2	8.0
ST-M4-7													7			
ST-M4-8	STS-M4-8												8			
ST-M4-9	STS-M4-9	9														
ST-M4-10	STS-M4-10	10														
ST-M4-12		12														
ST-M4-14		14														
ST-M4-16		16														
ST-M5-6		M5	0.8	7.18	8.2	6	1.0	7.2	8.0							
ST-M5-8						8										
ST-M5-10						10										
ST-M5-12						12										

*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary.
Only available together with installation services. Not available separately.

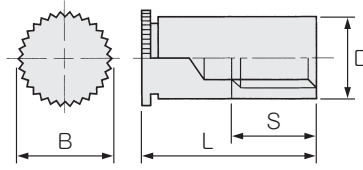
Thread and length size chart

SB·SBS series

Standoffs (Blind type)



Drawing



Material : Steel / Trivalent zinc plated
Stainless steel / Passivated

All dimensions are in mm

Part # (Steel)	Part # (Stainless steel)	Thread code	Thread pitch	D -0.08	B +/-0.2	L +/-0.1	Minimum S	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance
SB-M2-6		M2	0.4	4.18	5.2	6	3	1.0	4.2	6.0
SB-M2-8						8	4			
SB-M2-10						10	4			
SB-M2-12						12	5			
SB-M2.5-6		M2.5	0.45	4.18	5.2	6	3	1.0	4.2	6.0
SB-M2.5-8						8	4			
SB-M2.5-10						10	4			
SB-M2.5-12						12	5			
SB-M3-6	SBS-M3-6	M3	0.5	6.18	7.2	6	3	1.0	6.2	7.0
SB-M3-7	SBS-M3-7					7	3			
SB-M3-8	SBS-M3-8					8	4			
SB-M3-9	SBS-M3-9					9	4			
SB-M3-10	SBS-M3-10					10	4			
SB-M3-11						11	4			
SB-M3-12	SBS-M3-12					12	5			
SB-M3-13						13	5			
SB-M3-14	SBS-M3-14					14	6.5			
SB-M3-15						15	6.5			
SB-M3-16	SBS-M3-16					16	6.5			
SB-M3-17						17	6.5			
SB-M3-18						18	9.5			
SB-M3-20						20	9.5			
SB-M4-6	SBS-M4-6	M4	0.7	7.18	8.2	6	3	1.0	7.2	8.0
SB-M4-7						7	3			
SB-M4-8	SBS-M4-8					8	4			
SB-M4-9						9	4			
SB-M4-10	SBS-M4-10					10	4			
SB-M4-12						12	5			
SB-M4-14						14	6.5			
SB-M4-16						16	6.5			
SB-M5-8		M5	0.8	7.18	8.2	8	4	1.0	7.2	8.0
SB-M5-10						10	4			
SB-M5-12						12	5			

*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary. Only available together with installation services. Not available separately.

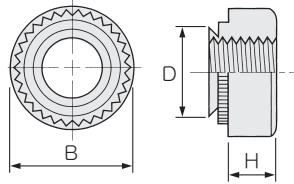
Thread and length size chart

NM·NS series

Nuts (Round through-hole type)



Drawing



Material : Steel / Trivalent zinc plated
Stainless steel / Passivated

All dimensions are in mm

Part # (Steel)	Part # (Stainless steel)	Thread code	Thread pitch	Maximum D	B +/-0.2	H +/-0.1	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance
NM-M2-1		M2	0.4	4.22	6.3	1.5	1.0	4.25	4.8
NM-M2.5-1		M 2.5	0.45	4.22	6.3	1.5	1.0	4.25	4.8
NM-M2.5-2	1.4								
NM-M3-1	NS-M3-1	M3	0.5	4.22	6.3	1.5	1.0	4.25	4.8
NM-M3-2							1.4		
NM-M4-1	NS-M4-1	M4	0.7	5.38	7.9	2.0	1.0	5.4	6.9
NM-M4-2							1.4		
NM-M5-1	NS-M5-1	M5	0.8	6.38	8.7	2.0	1.0	6.4	7.1
NM-M5-2							1.4		

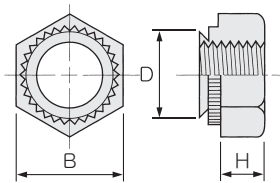
*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary.
Only available together with installation services. Not available separately.

NR series

Nuts (Hex through-hole type)



Drawing



Material : Steel / Trivalent zinc plated

All dimensions are in mm

Part #	Thread code	Thread pitch	Maximum D	B -0.2	H +/-0.1	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance
NR-M2-1	M2	0.4	4.45	5.5	2.0	1.0	4.5	4.5
NR-M2.5-1	M 2.5	0.45	4.45	5.5	2.0	1.0	4.5	4.5
NR-M3-1	M3	0.5	4.45	5.5	2.0	1.0	4.5	4.5
NR-M3-2						1.4		
NR-M4-1	M4	0.7	5.45	7.0	2.2	1.0	5.5	5.5
NR-M4-2						1.4		
NR-M5-1	M5	0.8	6.45	8.0	3.0	1.0	6.5	6.5
NR-M5-2						1.4		

*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary.
Only available together with installation services. Not available separately.

Thread and length size chart

CS series Studs (Flush-head type)

Material : Steel / Trivalent zinc plated

Drawing

All dimensions are in mm

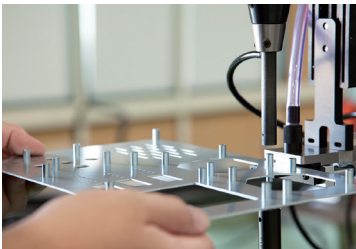
Part #	Thread code	Thread pitch	D +/-0.4	Maximum H	L +/-0.4	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance
CS-M3-8	M3	0.5	4.6	2.1	8	t1.0	3.0	5.6
CS-M3-10					10			
CS-M3-12					12			
CS-M3-15					15			
CS-M4-8	M4	0.7	5.9	2.4	8	t1.0	4.0	7.2
CS-M4-10					10			
CS-M4-12					12			
CS-M4-15					15			

*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary. Only available together with installation services. Not available separately.

BN series Nuts (Blind type)

Material : Steel / Trivalent zinc plated

Drawing



A specialized press machine for clinching is utilized to ensure that the standoffs / studs / nuts are securely attached.

All dimensions are in mm

Part #	Thread code	Thread pitch	Maximum D	Maximum A	B +/-0.25	Minimum S	H +/-0.25	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance
BN-M3-1	M3	0.5	4.22	3.8	6.35	5.3	9.6	1.0	4.25	4.8
BN-M3-2								1.4		
BN-M4-1	M4	0.7	5.38	5.2	7.95	6.8	11.2	1.0	5.4	6.9
BN-M4-2								1.4		

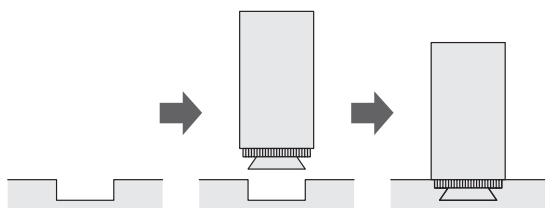
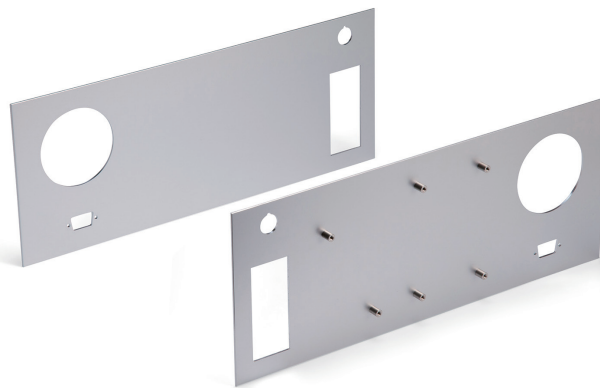
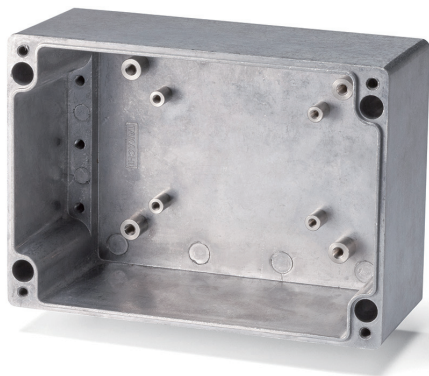
*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary. Only available together with installation services. Not available separately.

Clinching fastener

Concealed-head Self-clinching Standoffs (Non-through-hole type)

Installed into recessed pockets so that one side of the panel remains unmarred. Standoffs can be mounted onto 1.5mm or thicker material without requiring a through-hole to be milled.

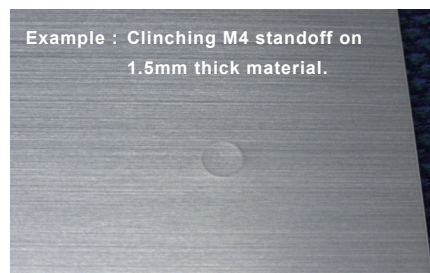
Concealed-head standoffs/studs ensure that the IP rating (if the enclosure is a waterproof series) is maintained.



Concealed-head standoffs/studs give an aesthetically better finish on the enclosure. A recess cut is made on the internal side, and the standoffs are press-inserted in.

Mounting Mark Visibility

板厚	取付跡	
	M3	M4
1.5mm	△	×
2.0mm	◎	○
2.5mm	◎	◎
3.0mm~	◎	◎



Mounting is possible on 1.5mm thick material. Mounting mark would be almost invisible on 2.5mm or thicker material.

- ◎ Almost invisible
- Barely visible
- △ Somewhat visible
- × Very visible

All dimensions are in mm

MK series **Concealed-head Clinching Standoffs**

Drawing

Material : Steel / Nickel plated

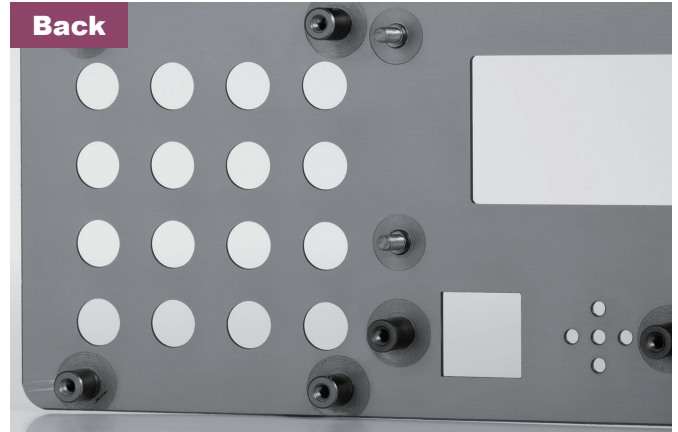
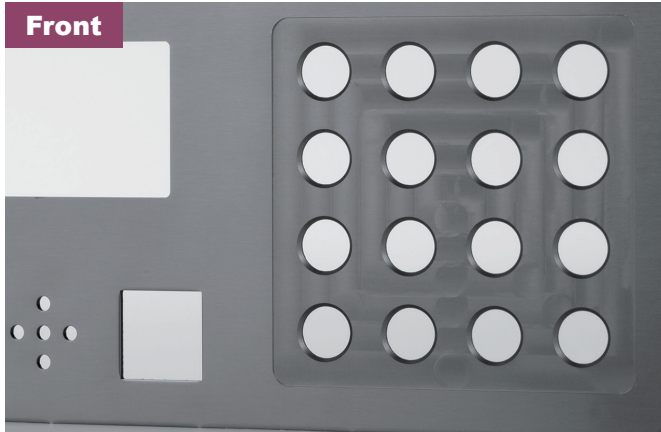
Part #	Thread code	Thread pitch	Maximum D	B +/-0.1	H +0 -0.1	L +/-0.1	Min. sheet thickness	Hole size +0.08 / -0	*Minimum distance								
MK-M3-3	M 3	0.5	4.45	6.0	0.95	3	1.5	4.5	4.5								
MK-M3-4						4											
MK-M3-5						5											
MK-M3-6						6											
MK-M3-7						7											
MK-M3-8						8											
MK-M3-9						9											
MK-M3-10						10											
MK-M3-11						11											
MK-M3-12						12											
MK-M4-3						M 4				0.7	5.45	8.0	0.95	3	1.5	5.5	5.5
MK-M4-4														4			
MK-M4-5	5																
MK-M4-6	6																
MK-M4-7	7																
MK-M4-8	8																
MK-M4-10	10																
MK-M4-12	12																
MK-M4-14	14																

*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary. Only available together with installation services. Not available separately.

Aluminium stud welding

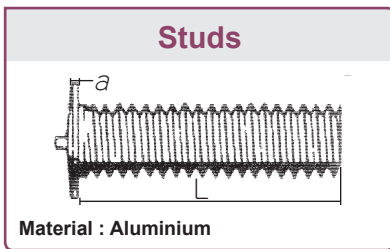
Welded Fasteners

Welded fasteners on aluminium objects.
Standoffs and studs with little surface weld marks can be achieved.



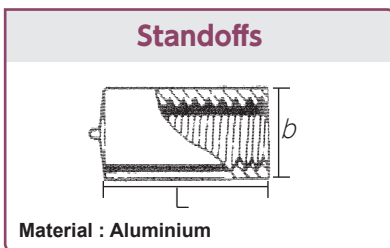
Weld marks may be more visible on plates thinner than 2.0mm.

All dimensions are in mm



Part #	Thread code	Thread pitch	a	L +/-0.2	*Minimum distance
AMS-M3-8	M3	0.5	0.8 ± 0.1	8	7.0
AMS-M3-10				10	
AMS-M3-12				12	
AMS-M3-15				15	
AMS-M4-8	M4	0.7	0.8 ± 0.1	8	7.0
AMS-M4-10				10	
AMS-M4-12				12	
AMS-M4-15				15	

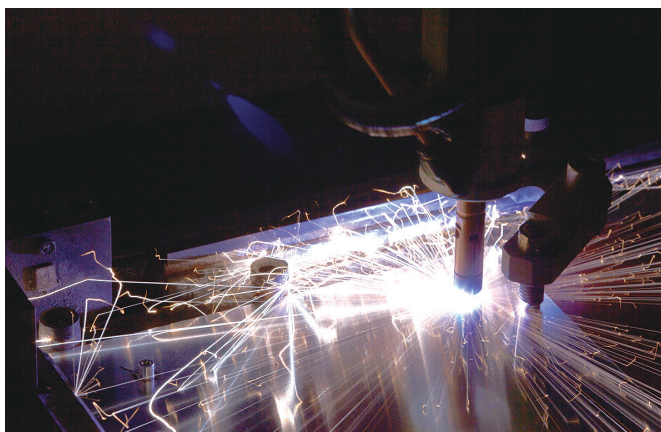
*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary.



Part #	Thread code	Thread pitch	b	L +/-0.2	Available screw length	*Minimum distance
AFS-M3-5	M3	0.5	6	5	2.0	7.0
AFS-M3-6				6	2.5	
AFS-M3-7				7	3.5	
AFS-M3-8				8	4.5	
AFS-M3-9				9	5.5	
AFS-M4-8	M4	0.7	8	8	3.5	7.0
AFS-M4-10				10	5.5	
AFS-M4-12				12	7.5	

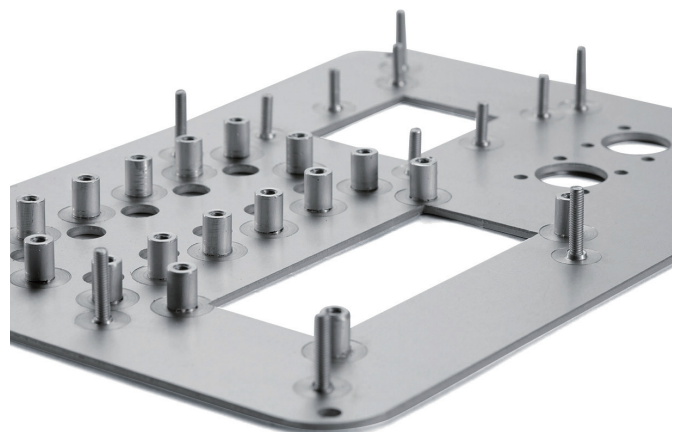
*Minimum distance = Minimum distance from hole center to edge. Installation requirements vary.

Welding



Stainless steel and steel weld fasteners are also available. Please inquire for more details.

Example



Only available together with installation services. Not available separately.

Insert Nuts and Heliserts (for plastic)

Inserts for plastic

Simple and easy way for stable fastening.
Simply insert the nuts into the bosses, and it will be refastenable.

LINE-UP

Press-in inserts



Material : Brass / Unfinished

Part #	Size	Hole size in bosses	Length (mm)
SP-M3	M3×0.5P	8 ~ 10	5.3
SP-M4	M4×0.7P	9.5 ~ 12	7.4
SP-M5	M5×0.8P	12 ~ 14	8.3

Threaded inserts



Material : Brass / Nickel plated

Part #	Size	Hole size in bosses	Length (mm)
IRB-2603S	M2.6×0.45P	5.5 ~ 6	3.0
IRB-304S	M3×0.5P	5.5 ~ 6	4.0
IRB-404S	M4×0.7P	6 ~ 10	4.0

Heliserts



Material : Stainless steel / Unfinished

Part #	Size	Hole size in bosses	Length (mm)
2TNM-M2	M2×0.4P	4 ~ 5	2.0
2TMN-M2.6	M2.6×0.45P	4.8 ~ 6	2.6
2TMN-M3	M3×0.5P	4.8 ~ 6	3.0

Comparison chart

Point \ Method	Press-in inserts	Threaded inserts	Heliserts
Strength	○	◎	◎
Cost	◎	▲	▲
Boss size	▲	○	◎

◎ : Excellent ○ : Good ▲ : Average

EXAMPLE

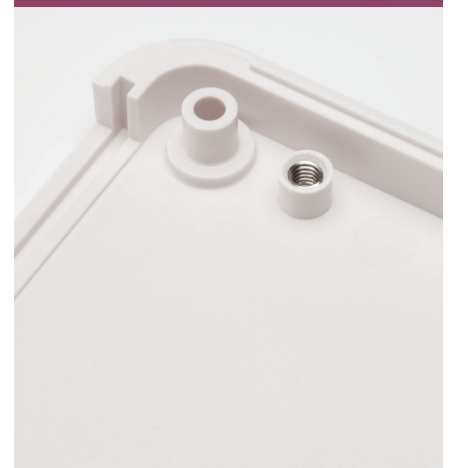
Press-in inserts



Threaded inserts

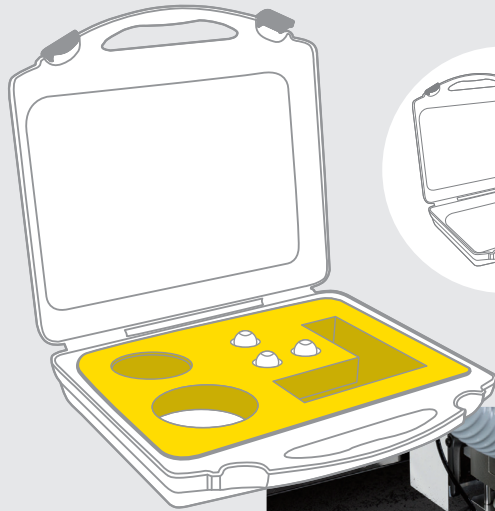


Heliserts

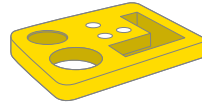


CNC Foam Milling

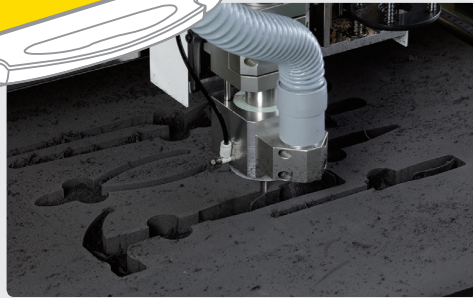
Customize based on how you want it to be!



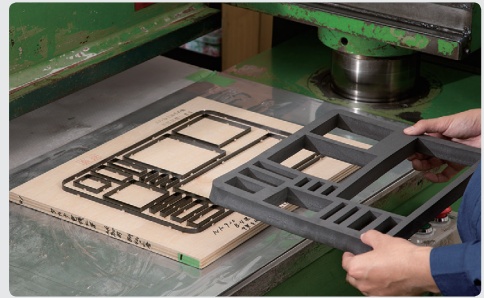
+



+



CNC foam cutting machine enables quick and cost-effective hole milling service.



For mass production, cost-effective mold press cutting is also available.

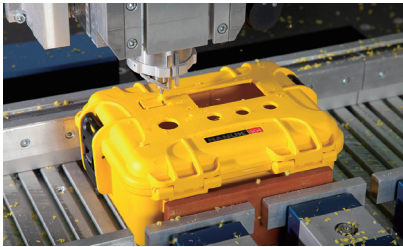
APPLICATION EXAMPLE



CNC Machining • Printing Service for Case

CNC Machining

■ CNC machining for your switch, connector, display and so on is possible from just 1 piece.



Printing Service

■ Digital inkjet printing, silkscreen printing and nameplate sticker printing is possible from just 1 piece.

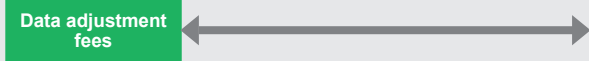
Low initial cost
No plate processing fee

Inkjet printing

Low printing cost for small quantities.

● Data adjustment fees may be charged again if significant changes are required on your repeat order.

● If the data in recommended format is provided



● Data or images other than recommended formats



Silk-screen initial tooling

Low printing cost for large quantity single color print.



Recommended data formats

PDF (.pdf -100%)		Vector file (.ai)		EPS (.eps)	
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Initial cost can be reduced with the recommended formats.



Able to Inkjet print on rigid urethane foam.

APPLICATION EXAMPLE

