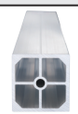
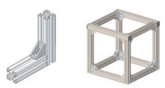
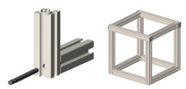
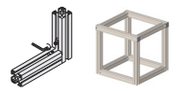
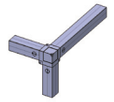
Aluminum Extrusion Types and Parts Selection

Aluminum Extrusion Types and Characteristics

	HFS Series	HFSL Series	EFS Series	NFS (NEFS, NFSL) Series	GFS Series	SLF Series
Photo						
Material	A6N01SS-T5	A6N01SS-T5	A6N01SS-T5	A6063S-T5	A6061SS-T6 Equivalent	A6063SS-T5
Features	Standard cross section shape.	Lightweight and economical extrusions. Suitable for use when light weight and economical price are given priority over strength.	Have rigidity equivalent to HFS Series yet lighter and more economical.	Material change to A6063S-T5 led to significant price reduction. The Cross Section Shape and Cross Sectional Moment of Inertia are the same as those of HFS, HFSL and EFS Series. Stress and tensile strength decrease due to material change. The color may vary slightly.*	These thick extrusions offer high rigidity and are suitable for use in high load.	Has 4 slotless flat enclosures. Excels in sanitary control since dust is not collected in slots. Various accessories for aluminum extrusions can be utilized by combining with Slot Type (SLFT6-4040, etc.)
Surface Treatment	Clear Anodize (HFS) Black Anodize (HFSB) Clear Coating (CAF) Baked Paint (Yellow) (HFSY)	Clear Anodize Black Anodize	Clear Anodize (EFS) Black Anodize (EFSB)	Clear Anodize Black Anodize	Clear Anodize	Clear Anodize
Representative Product	HFS8-4040	HFSL8-4040	EFS8-4040	NFS5-2020 (Different Material of HFS5-2020) NEFS8-4040 (Different Material of EFS8-4040) NFSL6-3030 (Different Material of HFSL6-3030)	GFS8-100100	SLF6-4040 (No Slot Type) SLFC6-4040 (1 Slot Type)

* Aluminum extrusion colors may slightly vary depending on the materials.

Aluminum Extrusions Connection Method

Connection Method	Bracket Connection	Blind Joint Connection	Blind Brackets Connection	Screw Connection	SLF Series Connection
Connection Examples					
Features	The standard and economical connection method. Cover plates can be mounted by adding taps on the brackets.	A connection method that produces clean corners. Suitable for sections where equipment is loaded and unloaded or doors are to be mounted. Note that alterations are required to the extrusions, and available for limited extrusion models only. For applicable extrusions, see each product page. ☞ P.551, 601, 659, 705	Brackets are hidden inside of slots producing clean corners. Alterations are not required. However, allowable load is smaller than that of bracket connections.	Connections only with screws can be achieved by applying tapping and counterbore alterations on the extrusions.	• Connection with dedicated joints • Screw Connection See "Features of SLF Series" for details. ☞ P.725
Representative Product	HBLFSN6, HBLTS6, etc.	HCJ6, HMJ6, etc.	HBLBS6, HABLBS6, etc.	-	-

Selection of Related Parts

Numbers of applicable related parts are decided at the time of selecting aluminum extrusions.
When selecting related parts, see No. as reference.

(Ex.) When assembling with HFS6-3030 aluminum extrusions of 6 series

Brackets
HBLFSN6
HBLTS6 or Others

Blind Brackets
Blind Joint
HBLBS6
HSJ6 or Others

Nut
HNTT6-Tapped Hole Dia.
HNTAT6-Tapped Hole Dia. or Others

Extrusion End Caps and Covers
HFC6-3030-Color
HSCA6-Color or Others

Casters and Leveling Mounts
HAJPS6
HCFT6-60 or Others

Door Parts
HHPSN6
HMGN6 or Others

Other Accessories
HFCC6
LCSA6-Shaft Hole Dia. or Others

Many products can be used for both 8 series and 8-45 series.

Pre-Assembly Insertion Nut HNTT8-8
→ It can be used with 8 series.
→ It can be used with 8-45 series.

• Various related parts can be installed to the aluminum extrusion structure according to the usage.

Aluminum Extrusion Tolerance Data

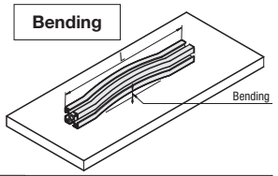
Aluminum Extrusion JIS Standards

• Bend Tolerance (Special Grade)

Unit: mm

Diameter of Circumscribed Circle mm	Minimum Thickness mm	Per Arbitrary Section of 300mm Length	per Full Length (L) mm
38 or less	2.4 or less	1.3 or less	1.3 x $\frac{L}{300}$ or Less
	Over 2.4	0.3 or less	0.3 x $\frac{L}{300}$ or Less
Over 38 to 300 or less	-	0.3 or less	0.3 x $\frac{L}{300}$ or Less
Over 300	-	0.5 or less	0.5 x $\frac{L}{300}$ or Less

Bending



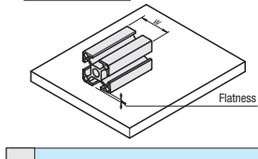
Note
• Given values are for extrusions placed on flat surfaces with minimized bends by own weight.
• When the overall length is not an integral multiple of 300mm, determine the tolerance by rounding up the remainder length to 300mm.

• Flatness Tolerance

Unit: mm

Shape Type / Minimum Thickness of Measurement Point Width	General Shape	Hollow Shape	
	-	4.7mm or Less	Over 4.7mm
25mm or Less	0.10 or less	0.15 or less	0.10 or less
Over 25mm	0.004xW or Less	0.006xW or Less	0.004xW or Less
Per Arbitrary Section of 25mm Width	0.10 or less	0.15 or less	0.10 or less

Flatness



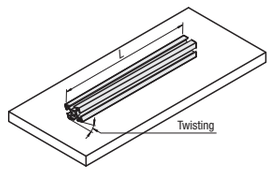
Note Not Applicable to the plane including open section.

• Twist Tolerance

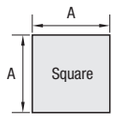
Unit: degree

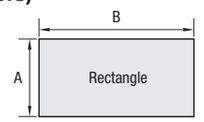
Diameter of Circumscribed Circle mm	Length	
	Per Arbitrary Section of 300mm Length	per Full Length (L) mm
38 or less	1 or less	1 x $\frac{L}{300}$ or Less; However, Max. Value is 7
Over 38 to 76 or less	1/2 or less	$\frac{1}{2}$ x $\frac{L}{300}$ or Less; However, Max. Value 5
Over 76	1/4 or less	$\frac{1}{4}$ x $\frac{L}{300}$ or Less; However, Max. Value 3

Twisting



Reference: Tolerance of Outer Dimension (JIS)





Unit: mm

Outer Dimension Tolerance (JIS)	A Dimension
HFS5-2020	±0.41
HFS5-4040	±0.54
HFS6-3030	
HFS6-6060	±0.86
HFS8-4040	±0.54
HFS8-8080	±0.86
HFS8-4545	±0.60
HFS8-9090	±0.86

Outer Dimension Tolerance (JIS)	A Dimension	B Dimension
HFS5-2040	±0.41	±0.54
HFS6-3060	±0.54	±0.86
HFS8-4080		
HFS8-4590	±0.60	

*MISUMI Aluminum Extrusions are within JIS dimension tolerance above.

Mechanical Properties of Aluminum Extrusions

	JIS Standard (Reference)	JIS Standard (Reference)	Actual Measurement	JIS Standard (Reference)
Series	HFS Series	GFS Series		NFS Series
Material (JIS Symbol)	A6N01SS-T5	A6061SS-T6 Equivalent		A6063S-T5
Tensile Strength (N/mm²)	245 or more	265 or more	278	155 or more
Proof Stress (N/mm²)	205 or more	245 or more	247	110 or more
Longitudinal Elastic Modulus (N/mm²)	69972	69972		69972
Brinell Hardness (HB)	88	88		88
Surface Treatment	Anodize 9μm or more	Anodize 9μm or more		Anodize 9μm or more

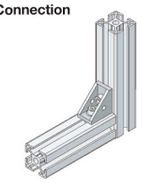
Blind Joints - Overview

For 6 Series (Slot Width 8mm) Aluminum Extrusions

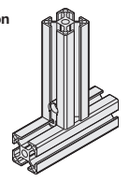
Features of Blind Joints

Connection inside of the extrusions provides good apearance.
Also convenient where interference inside of the corners are not desired or panels need to be inserted into the extrusion slots.

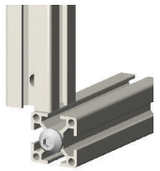
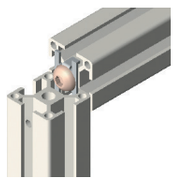
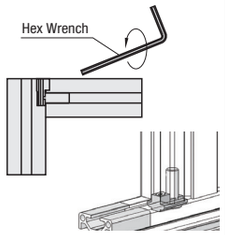
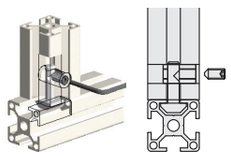
Bracket Connection

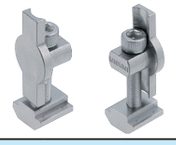
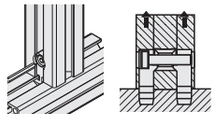
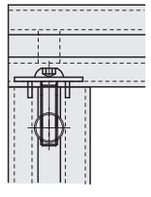
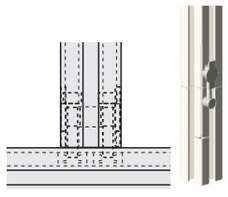
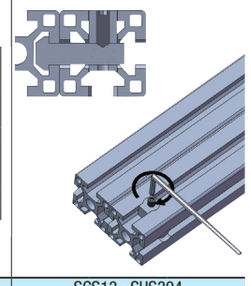


Blind Joint Connection



Product List

Product Name	Tapping Joints	Screw Joints	Simple Joints	Center Joint
Product Photo				
Features	·Tapping is not necessary. ·Most economical Blind Joints.	·Joint Plate enables secure and economical connection.	·Wrench holes are not required. Requires only one screw for tightening.	·Most standard Blind Joints usable with various types of aluminum extrusions.
Installation Diagram				
Material	SWCH-18A	Steel or SUS304	S45C, SCM435	SCS13
Representative Type	HTJ	HCJ	HUJ	HMJ
Applicable Extrusion No.	5 **6** 8	5 **6** 8 8-45	**6**	5 **6** 8 8-45
Page	P.602	P.603	P.604	P.605
Alterations (pages) required for extrsions	Wrench Hole P.759	Tapping / Wrench Hole P.757, P.754	Tapping P.757	M Hole P.766

Product Name	Post-Assembly Insertion Double Joints	Single Joints	Pre-Assembly Insertion Double Joints	Parallel Joints
Product Photo				
Features	·Connects securely at two locations. Tightest connection can be achieved of all Blind Joints.	·D holes added on the extrusions do not penetrate to the flat surface. Blind Joints with very good appearance.	·Can be used for various applications such as to extend extrusions as well as mounting to plates.	·Extrusions can be connected in parallel.
Installation Diagram				
Material	SCS13 / SUS304 Equivalent	Steel or SUS304	SUS316 Equivalent / SUS304	SCS13・SUS304
Representative Type	HPJN	HSJ	HDJSN	HLJ
Applicable Extrusion No.	5 **6** 8 8-45	**6** 8 8-45	**6** 8 8-45	5 **6** 8
Page	P.607	P.609	P.611	P.613
Alterations (pages) required for extrsions	M Hole P.766	Wrench Hole / D Hole P.759, 764	S Hole P.765	L Hole P.767

Blind Joint Components

Tapping Joints / TJ Plates / Torx Bits for 6 Series (Slot Width 8mm) Aluminum Extrusions

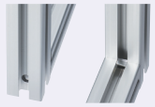
Alterations necessary to use this component

Wrench Hole
P.759

Features: Necessary alteration is only for wrench holes. Most economical Blind Joints. Dedicated Torx Bit is required for tightening.

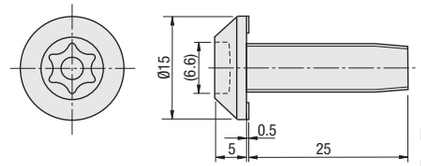
Tapping Joints

(Reference)Corner section when using this joint



RoHS

HTJ



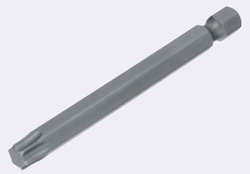
- Tapping on the extrusion is not necessary.

M Material: SWCH-18A (Carburized)
S Surface Treatment: Trivalent Chromate
*SWCH-18A (Cold Forged Carbon Steel Wire)

Part Number Type	Part Number No.	Torx Bit	Applicable Extrusion (Pilot Hole Dia.)	Proper Tightening Torque (Max.)	Unit Price 1~99 pc(s).	Volume Discount Rate 100~200
HTJ	6	HTJXL40	Ø6.8	24N・m		

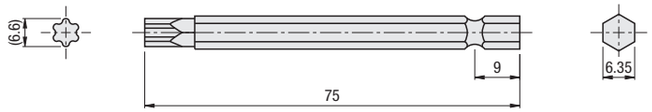
Tapping Joints	Applicable Extrusion No.				[Exception] Extrusion Not Available
HTJ6	6-3030*	6-3060	6-3090	6-30120	*Curved HFSR6-3030 cannot be used, because Wrench Hole Machining is not allowed. Not applicable to HFS6-5050, HFSB6-5050, HFSL6-5050, HFST6-5050, NFS6-5050, HFS6-6060, HFSB6-6060, HFST6-6060, NFS6-6060, NFSB6-6060, HFS6-50100, HFSB6-50100, NFS6-50100.
	6-5050	6-50100	6-100100		
	6-6060	6-60120			

Torx Bit



RoHS

HTJXL



M Material: SNCM447

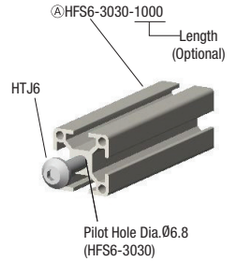
Part Number Type	Part Number No.	Applicable Drive for Torx Bit	Unit Price 1 ~ 9 pc(s).	Volume Discount Rate 10~50
HTJXL	40	T40		

Ordering Example

Part Number
HTJ6
HTJXL40

Example

How to Connect Tapping Joints (Tapped holes are not required for extrusion connection.)

Step	1	2	3
Description	Tighten temporarily the tapping joint on extrusion end face. (Refer to appropriate tightening torque above.)	Pass the head of tapping joint through the slot of Extrusion Ⓑ, and slide it down to the bottom of Ⓐ.	Pass the Torx Bit through wrench hole, and tighten it by a motorized screw driver.
Tapping Joints	 * Tapped holes are not required.