ALUMEGA

PINNED CONNECTION FOR POST AND BEAM

POST AND BEAM

ALUMEGA standardizes the beam-to-beam and beam-to-post connections for post-and-beam systems, even with large spans. Modular components and various fastening possibilities solve all types of connections on timber, concrete or steel.

TOLERANCE AND ASSEMBLY

Axial tolerance up to 8 mm (±4 mm) to accommodate installation inaccuracies. The upper countersink allows using a bolt as a positioning aid. The connection can be pre-assembled in the factory and completed on site with bolts.

ROTATIONAL COMPATIBILITY

Slotted holes allow for rotation of the connector and ensure hinged structural behaviour. The rotation of the connector is compatible with the inter-story drift caused by earthquake and wind actions, reducing momentum transfer and structural damage.

HP

HV

JV

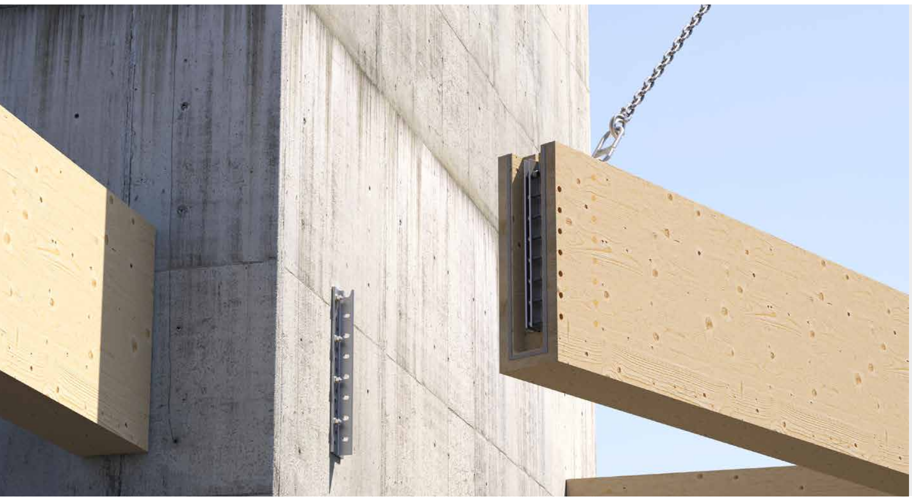
JS

CHARACTERISTICS

FOCUS	concealed joints
TIMBER SECTIONS	from 132 x 333 mm to 280 x 2000 mm
STRENGTH	$R_{v,k}$ up to 690 kN with one connector $R_{v,k}$ up to 2070 kN with three connectors side by side
FASTENERS	HBS PLATE, KOS, VGS, VGU, STA, SBD, LBS, INA, VIN-FIX

VIDEO

Scan the QR Code and watch the video on our YouTube channel



MATERIAL

EN AW-6082 aluminium alloy.

FIELDS OF USE

Concealed joints for beams in timber-to-timber, timber-to-concrete or timber-to-steel configuration. Suitable for floors and post-and-beam constructions, even with large spans.
Suitable for beams in:

- softwood and hardwood glulam
- LVL
- beech LVL

FIRE

The numerous installation methods always allow for safe concealed installation and subsequent fire protection. FIRE STRIPE GRAPHITE can be used to seal the joist-header interface, maximising safety against fire hazards.

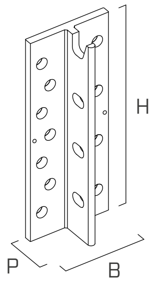
HYBRID STRUCTURES

The HP version can be fixed on timber, concrete or steel. Ideal for hybrid timber-to-concrete or timber-to-steel structures.

CODES AND DIMENSIONS

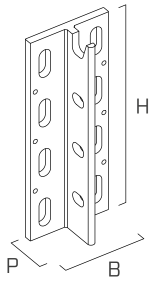
HP - main element connector (**H**EADER) for timber (HBS**P** screws), concrete and steel

CODE	B x H x P [mm]	pcs
ALUMEGA240HP	95 x 240 x 50	1
ALUMEGA360HP	95 x 360 x 50	1
ALUMEGA480HP	95 x 480 x 50	1
ALUMEGA600HP	95 x 600 x 50	1
ALUMEGA720HP	95 x 720 x 50	1
ALUMEGA840HP	95 x 840 x 50	1



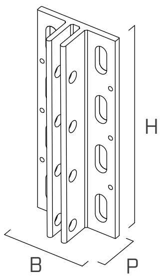
HV - main element connector (**H**EADER) for timber with inclined **V**GS screws

CODE	B x H x P [mm]	pcs
ALUMEGA240HV	95 x 240 x 50	1
ALUMEGA360HV	95 x 360 x 50	1
ALUMEGA480HV	95 x 480 x 50	1
ALUMEGA600HV	95 x 600 x 50	1
ALUMEGA720HV	95 x 720 x 50	1
ALUMEGA840HV	95 x 840 x 50	1



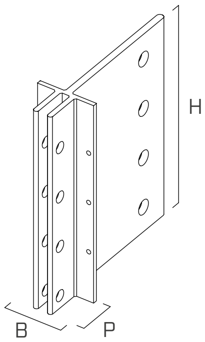
JV - beam connector (**J**OIST) with inclined **V**GS screws

CODE	B x H x P [mm]	pcs
ALUMEGA240JV	95 x 240 x 49	1
ALUMEGA360JV	95 x 360 x 49	1
ALUMEGA480JV	95 x 480 x 49	1
ALUMEGA600JV	95 x 600 x 49	1
ALUMEGA720JV	95 x 720 x 49	1
ALUMEGA840JV	95 x 840 x 49	1



JS - beam connector (**J**OIST) with **S**TA/**S**BD dowels

CODE	B x H x P [mm]	pcs
ALUMEGA240JS	68 x 240 x 49	1
ALUMEGA360JS	68 x 360 x 49	1
ALUMEGA480JS	68 x 480 x 49	1
ALUMEGA600JS	68 x 600 x 49	1
ALUMEGA720JS	68 x 720 x 49	1
ALUMEGA840JS	68 x 840 x 49	1



The connectors can be cut in multiples of 60 mm, respecting the minimum height of 240 mm.
For example, it is possible to obtain two ALUMEGA JV connectors with H = 300 mm from the ALUMEGA600JV connector.

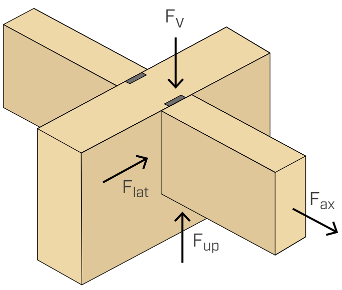
MATERIAL AND DURABILITY

ALUMEGA: EN AW-6082° aluminium alloy.
To be used in service classes 1 and 2 (EN 1995-1-1).

FIELD OF USE

- Concealed joints for beams in timber-to-timber, timber-to-concrete or timber-to-steel configuration.

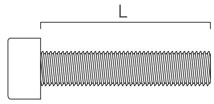
EXTERNAL LOADS



ADDITIONAL PRODUCTS - FASTENING

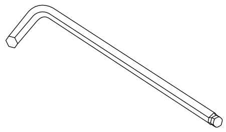
MEGABOLT - cylindrical head bolt with hexagon socket

CODE	material	d_1 [mm]	L [mm]	pcs
MEGABOLT12030	steel class 8.8 zinc plated ISO 4762	M12	30	100
MEGABOLT12150		M12	150	50
MEGABOLT12270		M12	270	25



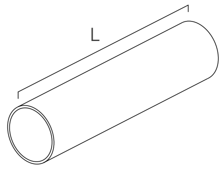
HEX WRENCH 10 mm

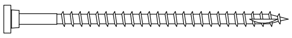
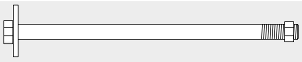
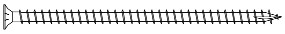
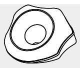
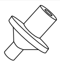
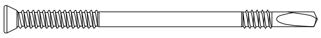
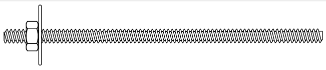
CODE	d_1 [mm]	L [mm]	pcs
HEX10L234	10	234	1



ALUMEGA JIG - assembly jig

CODE	distance between ALUMEGA HP, HV and JV side by side	distance between ALUMEGA JS side by side	L [mm]	pcs
JIGALUMEGA10	10	37	82 - 97	6 + 6
JIGALUMEGA22	22	49	94 - 109	6 + 6



product	description		d [mm]	support	reference connector
HBS PLATE	pan head screw for plates		10		ALUMEGA HP
KOS	hexagonal head bolt		12		ALUMEGA HP
VGS	fully threaded countersunk screw		9		ALUMEGA HV ALUMEGA JV
VGU	45° washer for VGS		VGS Ø9		ALUMEGA HV ALUMEGA JV
JIG VGU	JIG VGU template		VGS Ø9		ALUMEGA HV ALUMEGA JV
STA	smooth dowel		16		ALUMEGA JS
SBD	self-drilling dowel		7,5		ALUMEGA JS
LBS	round head screw for plates		5		ALUMEGA HP ALUMEGA HV ALUMEGA JV ALUMEGA JS
INA	the threaded rod for chemical anchors		12		ALUMEGA HP
VIN-FIX	chemical anchor		-		ALUMEGA HP

RELATED PRODUCTS

TAPS

FIRE STRIPE GRAPHITE

FIRE SEALING SILICONE

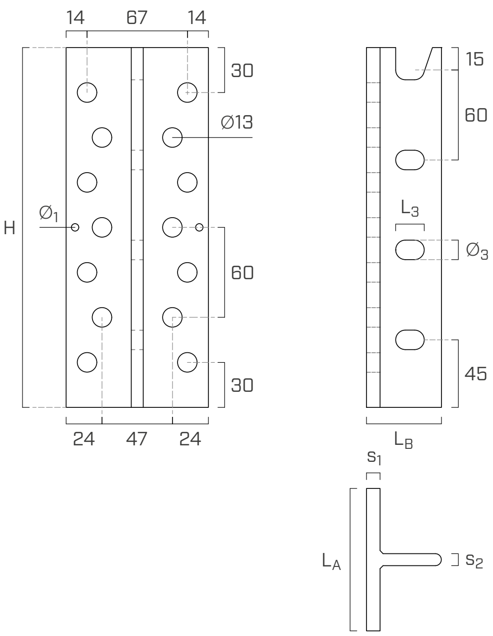
MS SEAL

FIRE SEALING ACRYLIC

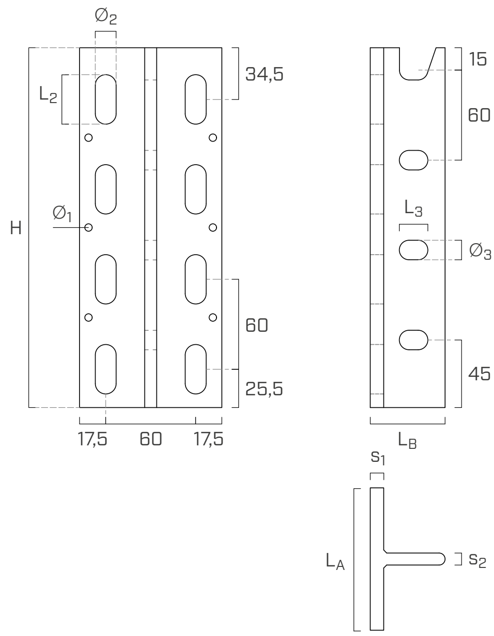
Find out more at www.rothoblaas.com.

GEOMETRY

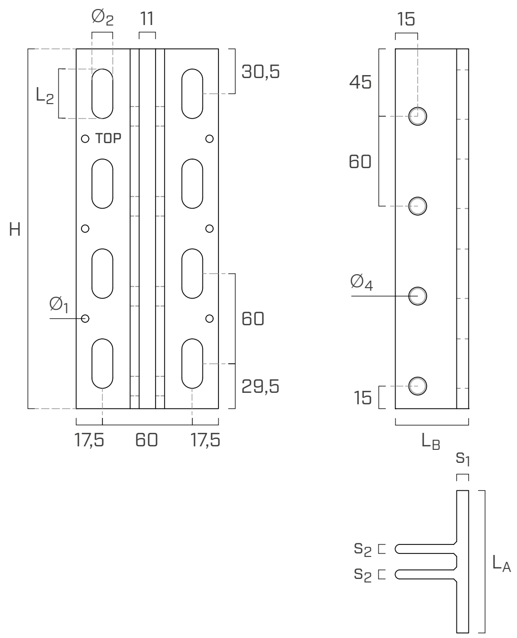
HP - main element connector (**H**EADER) for timber (HBS**P** screws), concrete and steel



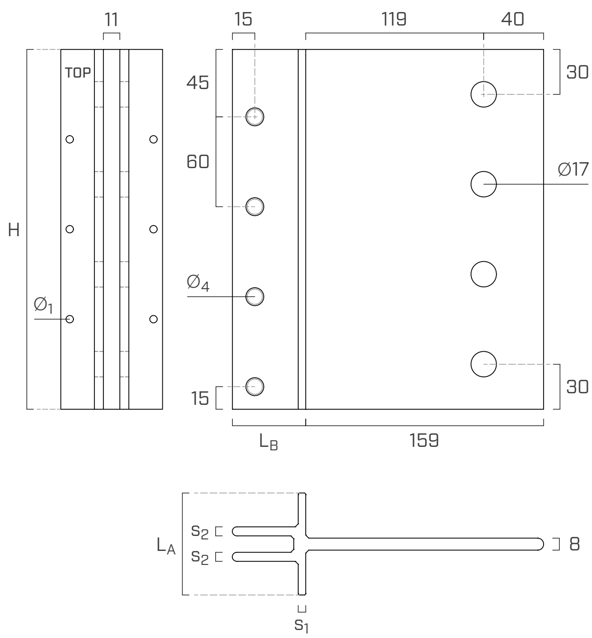
HV - main element connector (**H**EADER) for timber with inclined **V**GS screws



JV - beam connector (**J**OIST) with inclined **V**GS screws



JS - beam connector (**J**OIST) with **S**TA/**S**BD dowels



			ALUMEGA HP	ALUMEGA HV	ALUMEGA JV	ALUMEGA JS
flange thickness	s_1	[mm]	9	9	8	5
web thickness	s_2	[mm]	8	8	6	6
flange length	L_A	[mm]	95	95	95	68
blade length	L_B	[mm]	50	50	49	49
small flange-holes	$Ø_1$	[mm]	5	5	5	5
wing slotted holes	$Ø_2$ x L_2	[mm]	-	Ø14 x 33	Ø14 x 33	-
core slotted holes	$Ø_3$ x L_3	[mm]	Ø13 x 20	Ø13 x 20	-	-
core threaded holes	$Ø_4$	[mm]	-	-	M12	M12

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FASTENING OPTIONS

Two main beam connector types (HP and HV) and two secondary beam connector types (JV and JS) are available. Fastening options offer design freedom in terms of structural element cross-sections and strengths.

HP - main element connector (**H**EADER) for timber (HBS**P** screws), concrete and steel

CODE	HBS PLATE Ø10 [pcs]	partial fastening[1] KOS Ø12 [pcs]	VIN-FIX anchor Ø12 x 245 [pcs]	bolt Ø12 [pcs]
ALUMEGA240HP	14	8	6	6
ALUMEGA360HP	22	12	8	8
ALUMEGA480HP	30	16	12	10
ALUMEGA600HP	38	20	16	12
ALUMEGA720HP	46	24	18	14
ALUMEGA840HP	54	28	20	16

[1] Use the two outer rows of holes.

HV - main element connector (**H**EADER) for timber with inclined **V**GS screws

CODE	total fastening VGS Ø9 + VGU945 $[n_{screw} + n_{washer}]$	partial fastening[2] VGS Ø9 + VGU945 $[n_{screw} + n_{washer}]$	LBS Ø5 x 70[3] [pcs]
ALUMEGA240HV	8 + 8	6 + 6	4
ALUMEGA360HV	12 + 12	10 + 10	6
ALUMEGA480HV	16 + 16	14 + 14	8
ALUMEGA600HV	20 + 20	18 + 18	10
ALUMEGA720HV	24 + 24	22 + 22	12
ALUMEGA840HV	28 + 28	26 + 26	14

[2] Do not use the first row of holes.
[3] LBS screws do not have a structural function, they prevent the connector from sliding during insertion of the VGS screws and during handling.

JV - beam connector (**J**OIST) with inclined **V**GS screws

CODE	total fastening VGS Ø9 + VGU945 $[n_{screw} + n_{washer}]$	partial fastening[4] VGS Ø9 + VGU945 $[n_{screw} + n_{washer}]$	LBS Ø5 x 70[5] [pcs]
ALUMEGA240JV	8 + 8	6 + 6	4
ALUMEGA360JV	12 + 12	10 + 10	6
ALUMEGA480JV	16 + 16	14 + 14	8
ALUMEGA600JV	20 + 20	18 + 18	10
ALUMEGA720JV	24 + 24	22 + 22	12
ALUMEGA840JV	28 + 28	26 + 26	14

[4] Do not use the last row of holes.
[5] LBS screws do not have a structural function, they prevent the connector from sliding during insertion of the VGS screws and during handling.

JS - beam connector (**J**OIST) with **S**TA/**S**BD dowels

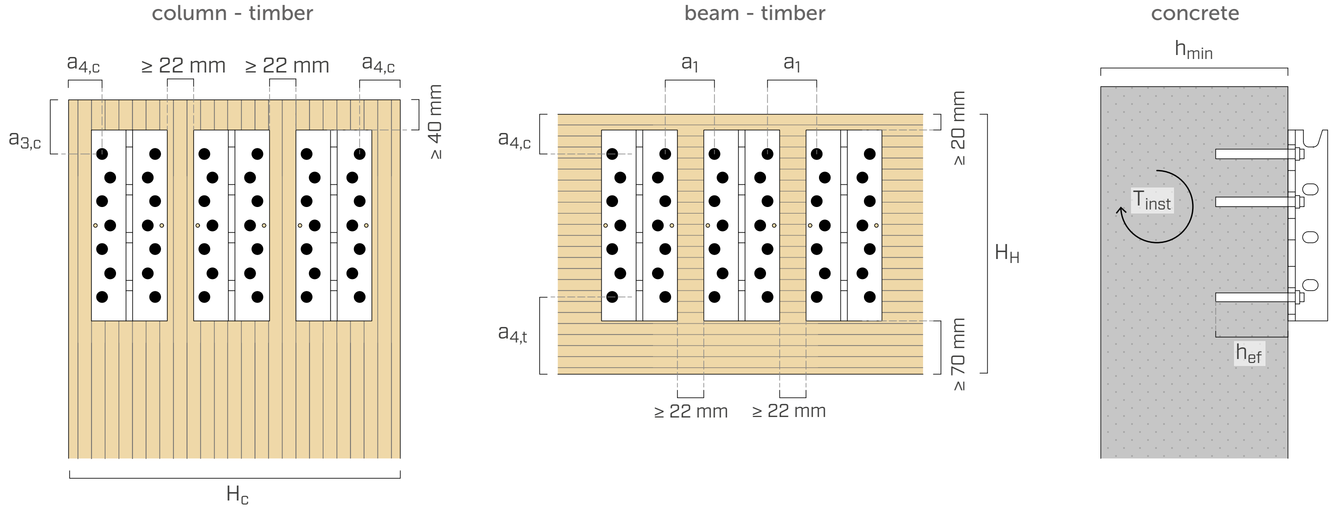
CODE	STA Ø16 [pcs]	SBD Ø7,5 [pcs]
ALUMEGA240JS	4	14
ALUMEGA360JS	6	22
ALUMEGA480JS	8	30
ALUMEGA600JS	10	38
ALUMEGA720JS	12	46
ALUMEGA840JS	14	54

MEGABOLT

H [mm]	total fastening MEGABOLT Ø12 [pcs]
240	4
360	6
480	8
600	10
720	12
840	14

ALUMEGA HP | INSTALLATION

MINIMUM DISTANCES AND DIMENSIONS



$H_c \geq 139$ mm for single connector, $H_c \geq 256$ mm for double connector, $H_c \geq 373$ mm for triple connector.
Primary beam height $H_H \geq H + 90$mm, where H is the connector height.
The spacing between connectors refers to timber elements with density $\rho_k \leq 420$ kg/m^3, screws inserted without pre-drilling hole and for Fv and Fup stresses.
For other configurations refer to ETA.

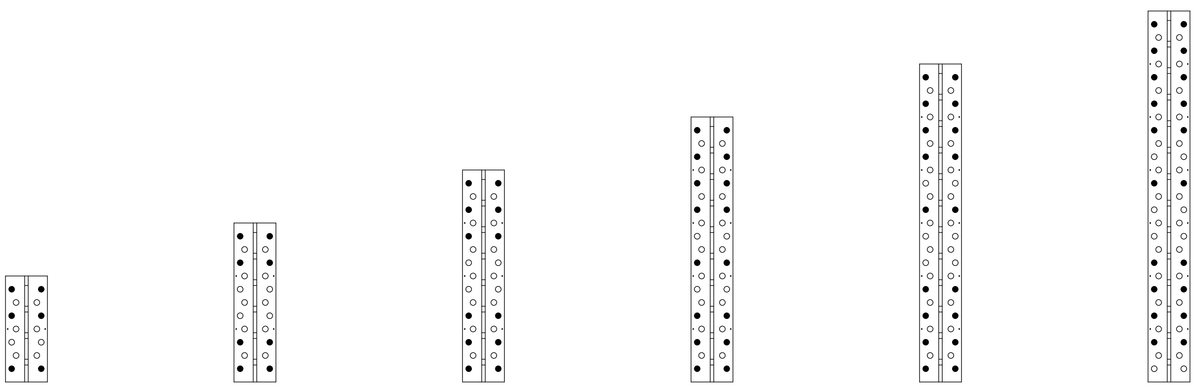
ALUMEGA HP - single connector

main element - timber			HBS PLATE Ø10			
			post load-to-grain angle α = 0°		beam load-to-grain angle α = 90°	
screw-screw	a_1	[mm]	-	-	≥ 5·d	≥ 50
screw-unloaded end	$a_{3,c}$	[mm]	≥ 7·d	≥ 70	-	-
screw-stressed edge	$a_{4,t}$	[mm]	-	-	≥ 10·d	≥ 100
screw-unloaded edge	$a_{4,c}$	[mm]	≥ 3,6·d	≥ 36	≥ 5·d	≥ 50

concrete			chemical anchor VIN-FIX Ø12
minimum support thickness	h_{min}	[mm]	h_{ef} + 30 ≥ 100
concrete hole diameter	d_0	[mm]	14
tightening torque	T_{inst}	[Nm]	40

h_{ef} = effective anchoring depth in concrete

DOWELLING PATTERNS ON CONCRETE



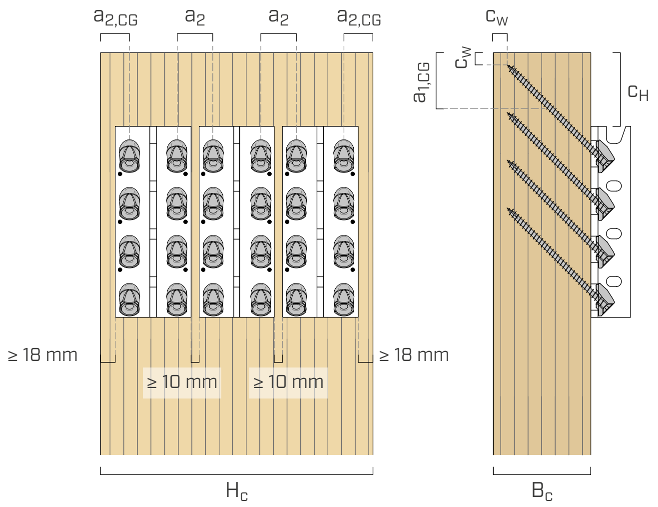
ALUMEGA240HP ALUMEGA360HP ALUMEGA480HP ALUMEGA600HP ALUMEGA720HP ALUMEGA840HP

Depending on stress, minimum concrete thickness and edge distances, different dowelling patterns can be used; we recommend using the free Concrete Anchors software (www.rothoblaas.it).

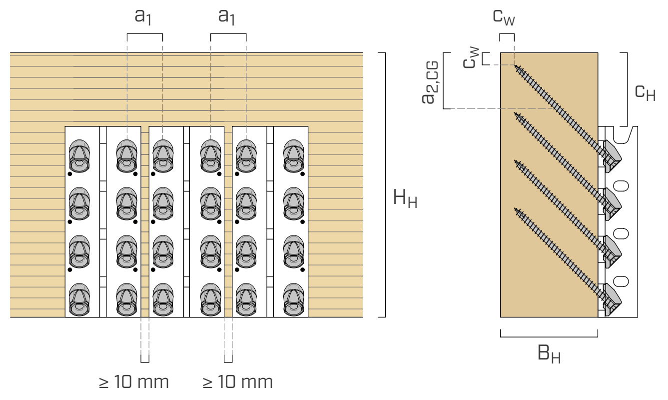
ALUMEGA HV | INSTALLATION

MINIMUM DISTANCES AND DIMENSIONS

total fastening on column



total fastening on main beam



ALUMEGA HV - single connector

H	VGS Ø9 x 180			VGS Ø9 x 240			VGS Ø9 x 300		
	post	main beam		post	main beam		post	main beam	
	B_c x H_c	B_H x H_H	c_H	B_c x H_c	B_H x H_H	c_H	B_c x H_c	B_H x H_H	c_H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
240	118 x 132	118 x 328	88	159 x 132	159 x 371	131	201 x 132	201 x 413	173
360	118 x 132	118 x 448		159 x 132	159 x 491		201 x 132	201 x 533	
480	118 x 132	118 x 568		159 x 132	159 x 611		201 x 132	201 x 653	
600	118 x 132	118 x 688		159 x 132	159 x 731		201 x 132	201 x 773	
720	118 x 132	118 x 808		159 x 132	159 x 851		201 x 132	201 x 893	
840	118 x 132	118 x 928		159 x 132	159 x 971		201 x 132	201 x 1013	

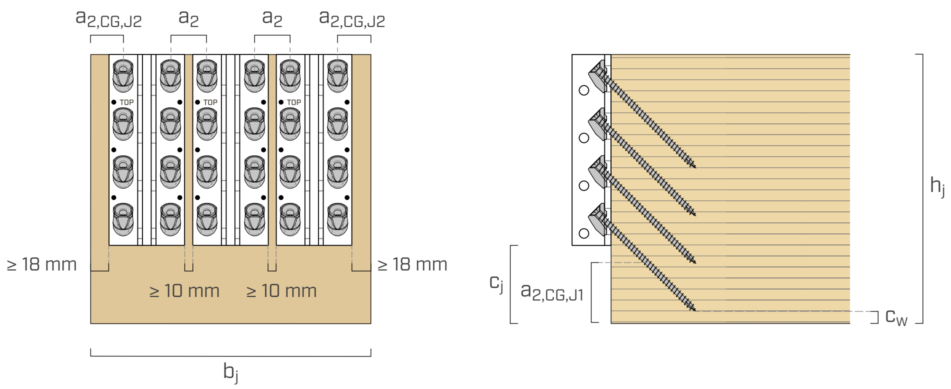
main element - timber			VGS Ø9	
screw-screw	a_1	[mm]	≥ 5·d	≥ 45
screw-screw	a_2	[mm]	≥ 5·d	≥ 45
screw-column end	$a_{1,CG}$	[mm]	≥ 8,4·d	≥ 76
beam/column screw-edge	$a_{2,CG}$	[mm]	≥ 4·d	≥ 36

NOTES

- The distances $a_{1,CG}$ and $a_{2,CG}$ refer to the centre of gravity of the threaded part of the screw in the timber element.
- In addition to the stated minimum distances $a_{1,CG}$ and $a_{2,CG}$, it is recommended to use a $c_W \geq 10$ mm timber cover.
- The minimum length of VGS screws is 180 mm.
- $H_c \geq 237$ mm for double connector, $H_c \geq 342$ mm for triple connector.
- The spacing between connectors refers to timber elements with density $\rho_k \leq 420$ kg/m^3, screws inserted without pre-drilling hole and for stresses F_v, F_{ax} and F_{up}. For other configurations refer to ETA.

MINIMUM DISTANCES AND DIMENSIONS

total fastening on secondary beam



ALUMEGA JV - single connector

H	VGS Ø9 x 180		VGS Ø9 x 240		VGS Ø9 x 300	
	b_j x h_j	c_j	b_j x h_j	c_j	b_j x h_j	c_j
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
240	132 x 333		132 x 376		132 x 418	
360	132 x 453		132 x 496		132 x 538	
480	132 x 573	93	132 x 616	136	132 x 658	178
600	132 x 693		132 x 736		132 x 778	
720	132 x 813		132 x 856		132 x 898	
840	132 x 933		132 x 976		132 x 1018	

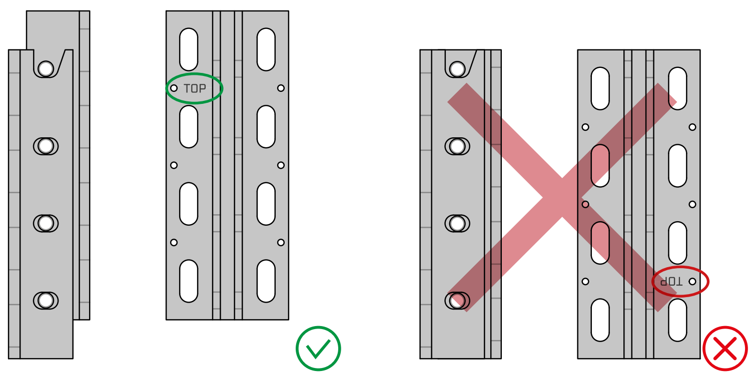
secondary beam - timber			VGS Ø9	
screw-screw	a_2	[mm]	$\geq 5 \cdot d$	≥ 45
screw-beam edge	$a_{2,CG,J1}$	[mm]	$\geq 8{,}4 \cdot d$	≥ 76
screw-beam edge	$a_{2,CG,J2}$	[mm]	$\geq 4 \cdot d$	≥ 36

NOTES

- The distances $a_{2,CG,J1}$ and $a_{2,CG,J2}$ refer to the centre of gravity of the threaded part of the screw in the timber element.
- In addition to the minimum distance $a_{2,CG,J1}$ indicated, it is recommended to use a $c_w \geq 10$ mm timber cover.
- The minimum length of VGS screws is 180 mm.
- $b_j \geq 237$ mm for double connector, $b_j \geq 342$ mm for triple connector.
- The spacing between connectors refers to timber elements with density $\rho_k \leq 420$ kg/m^3, screws inserted without pre-drilling hole and for stresses F_v, F_{ax} and F_{up}. For other configurations refer to ETA.

CONNECTION BETWEEN CONNECTORS

Make sure that the **JV** and **JS** connectors are correctly installed to the secondary beam, referring to the "**TOP**" marking on the product.



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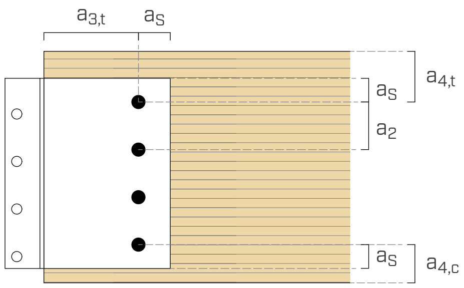
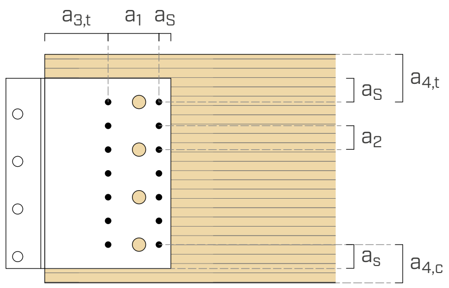
ALUMEGA JS | INSTALLATION

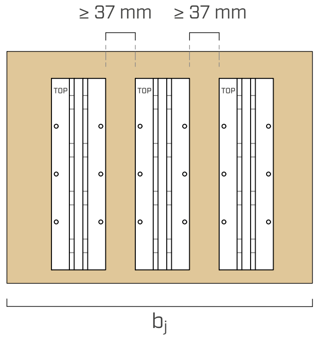
MINIMUM DISTANCES AND DIMENSIONS

STA smooth dowel Ø16



self-drilling dowel SBD Ø7,5





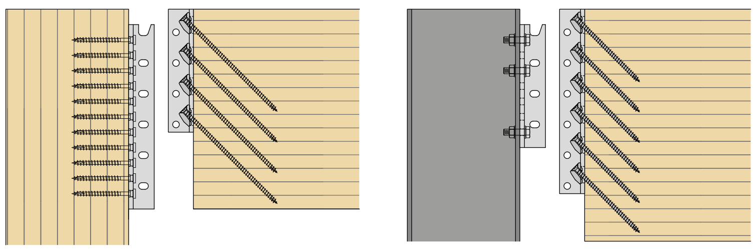
Spacing between ALUMEGA JS side-by-side ≥ 37 mm meets the minimum spacing requirement of 10 mm between HV connectors on beam and column. If the JS connector is attached to an HP connector on beam and column, the minimum spacing between connectors is 49 mm.

secondary beam - timber				SBD Ø7,5	STA Ø16
dowel-dowel	a_1 (1)	[mm]	≥ 3·d | ≥ 5·d	≥ 23 | ≥ 38	-
dowel-dowel	a_2	[mm]	≥ 3·d	≥ 23	≥ 48
dowel-beam end	$a_{3,t}$	[mm]	max (7 d; 80 mm)	≥ 80	≥ 112
dowel-top of beam	$a_{4,t}$	[mm]	≥ 4·d	≥ 30	≥ 64
dowel-bottom of beam	$a_{4,c}$	[mm]	≥ 3·d	≥ 23	≥ 48
dowel-bracket edge	a_s (2)	[mm]	≥ 1,2·d_0 (3)	≥ 10	≥ 21

(1) Spacing between SBD dowels parallel to the fibre for load-to-grain angle α = 90° (F_v or F_{up} stress) and α = 0° (F_{ax} stress) respectively.
(2) It is advisable to pay special attention to the positioning of the SBD dowels with respect to the distance from the bracket edge, using a guide hole if necessary.
(3) Hole diameter.

ASSEMBLY OF CONNECTORS OF DIFFERENT HEIGHTS

ALUMEGA360HP ALUMEGA240JV ALUMEGA240HP ALUMEGA360JV

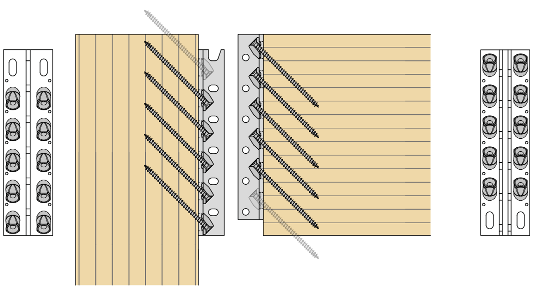


post beam steel column beam

A secondary beam connector (JV and JS) may be attached to a main element connector (HV and HP) of a different height. The configurations shown allow for balancing the strengths between the HP and JV connectors, and limit the extension of the inclined screws beyond the outline of the connectors (example on the left). The final strength is the minimum between the strength of the connectors and the bolts.

PARTIAL FASTENING FOR **HV** AND **JV** CONNECTORS

ALUMEGA360HV ALUMEGA360JV

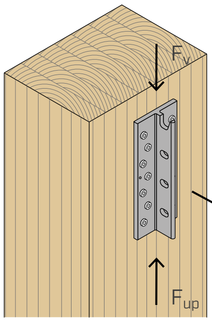


post beam

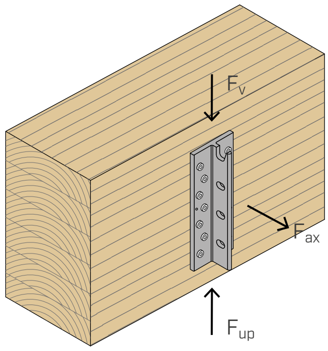
Partial fastening is permitted for the HV and JV connectors by omitting the first and last row of screws, respectively. This configuration is particularly favourable for beam-to-column connections, with the column extrados aligned with the beam extrados.

STATIC VALUES | **ALUMEGA HP** | F_v - F_{ax} - F_{up}

post



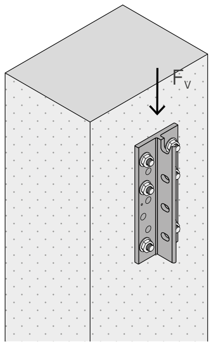
main beam



	$R_{v,k} \mid R_{up,k}$								$R_{ax,k}$	
	$R_{v,k\ timber}$ - $R_{up,k\ timber}$				$R_{v,k\ alu}$		$R_{up,k\ alu}$		$R_{ax,k\ timber}$	$R_{ax,k\ alu}$ (1)
	post		main beam		total fastening	per bolt	total fastening	per bolt		
H	HBSP Ø10 x 100	HBSP Ø10 x 180	HBSP Ø10 x 100	HBSP Ø10 x 180	MEGABOLT M12	MEGABOLT M12	MEGABOLT M12	MEGABOLT M12	HBSP Ø10 x 180	Total
[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
240	87	116	104	139	188	47,0	139	46,3	159	100
360	134	175	168	222	286	47,7	237	47,4	239	167
480	178	233	232	304	384	48,0	335	47,9	315	223
600	221	288	295	386	483	48,3	433	48,2	390	279
720	263	343	358	468	581	48,4	532	48,3	463	335
840	304	396	421	550	679	48,5	630	48,5	535	391

(1) Strength referred to total fastening with MEGABOLT M12.

STATIC VALUES | **ALUMEGA HP** | F_v



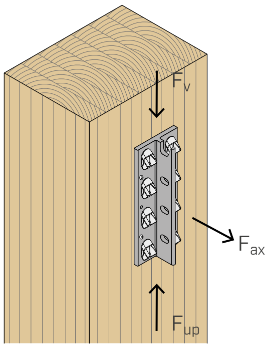
CONNECTOR		$R_{v,d\ concrete}$					
		H=240	H=360	H=480	H=600	H=720	H=840
	fastening	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
ALUMEGA HP	VIN-FIX anchor Ø12 x 245	157	213	322	429	486	541

NOTES

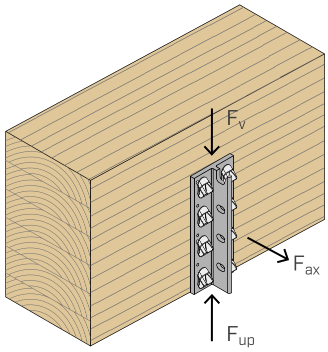
- In the calculation, C25/30 concrete with thin reinforcement was considered in the absence of distances from the edge.
- Chemical anchor VIN-FIX according to ETA-20/0363 with threaded rods (type INA) of minimum steel class 8.8 with h_{ef} = 225 mm.
- The values in the table are design values referring to the dowelling patterns on page 8.
- Aluminium-side strength must be verified in accordance with ETA.
- Refer to ETA for the calculation of $F_{ax,d}$, $F_{up,d}$ and $F_{lat,d}$.

STATIC VALUES | **ALUMEGA HV** | F_v - F_{ax} - F_{up}

post



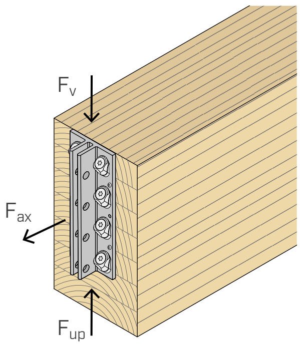
main beam



	$R_{v,k}$					$R_{ax,k}$			$R_{up,k}$
	$R_{v,k\ screw}$			$R_{v,k\ alu}$		$R_{ax,k\ timber}$ (3)	$R_{ax,k\ alu}$		$R_{up,k\ timber}$ (2)
	$R_{v,k\ timber}$ (1)(2)		$R_{tens,45,k}$	total fastening	per bolt		total fastening	per bolt	
H	VGS Ø9 x 180	VGS Ø9 x 300	VGS Ø9	MEGABOLT M12	MEGABOLT M12	VGS Ø9	MEGABOLT M12	MEGABOLT M12	VGS Ø9
[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
240	122	218	179	188	47,0	$38 + 0{,}8 \cdot F_{v,Ek}$	100	33,4	32
360	166	297	244	286	47,7	$57 + 0{,}8 \cdot F_{v,Ek}$	167	33,4	48
480	221	396	325	384	48,0	$76 + 0{,}8 \cdot F_{v,Ek}$	234	33,4	64
600	276	495	406	483	48,3	$94 + 0{,}8 \cdot F_{v,Ek}$	300	33,4	80
720	332	593	488	581	48,4	$113 + 0{,}8 \cdot F_{v,Ek}$	367	33,4	96
840	387	692	569	679	48,5	$132 + 0{,}8 \cdot F_{v,Ek}$	434	33,4	112

STATIC VALUES | **ALUMEGA JV** | F_v - F_{ax} - F_{up}

secondary beam



	$R_{v,k}$					$R_{ax,k}$			$R_{up,k}$
	$R_{v,k\ screw}$			$R_{v,k\ alu}$		$R_{ax,k\ timber}$ (3)	$R_{ax,k\ alu}$		$R_{up,k\ timber}$ (2)
	$R_{v,k\ timber}$ (1)(2)		$R_{tens,45,k}$	total fastening	per bolt		total fastening	per bolt	
H	VGS Ø9 x 180	VGS Ø9 x 300	VGS Ø9	MEGABOLT M12	MEGABOLT M12	VGS Ø9	MEGABOLT M12	MEGABOLT M12	VGS Ø9
[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
240	122	218	179	188	47,0	$29 + 0{,}8 \cdot F_{v,Ek}$	100	33,4	18
360	166	297	244	286	47,7	$44 + 0{,}8 \cdot F_{v,Ek}$	167	33,4	26
480	221	396	325	384	48,0	$59 + 0{,}8 \cdot F_{v,Ek}$	234	33,4	35
600	276	495	406	483	48,3	$73 + 0{,}8 \cdot F_{v,Ek}$	300	33,4	44
720	332	593	488	581	48,4	$88 + 0{,}8 \cdot F_{v,Ek}$	367	33,4	53
840	387	692	569	679	48,5	$103 + 0{,}8 \cdot F_{v,Ek}$	434	33,4	62

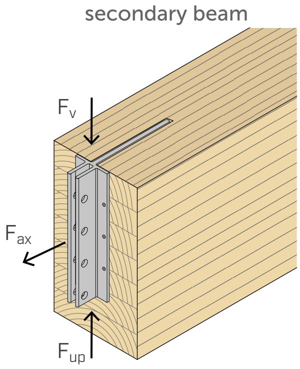
NOTES

(1) For intermediate values of the screw length, it is possible to interpolate linearly.

(2) The $R_{v,k\ timber}$ and $R_{up,k\ timber}$ strengths for partial fastening can be determined by multiplying by the following ratio: (number of screws for partial fastening)/(number of screws for total fastening).

(3) $F_{v,Ek}$ is the characteristic permanent action in the F_v direction. The design value is derived according to EN 1990 $F_{v,Ed} = F_{v,Ek} \cdot \gamma_{G,inf}$.

STATIC VALUES | **ALUMEGA JS** | F_v - F_{ax} - F_{up}



	$R_{v,k}$ | $R_{up,k}$						$R_{ax,k}$			
	$R_{v,k\ timber}$ - $R_{up,k\ timber}$		$R_{v,k\ alu}$		$R_{up,k\ alu}$		$R_{ax,k\ timber}$		$R_{ax,k\ alu}$	
			total fastening	per bolt	total fastening	per bolt			total fastening	per bolt
H	STA Ø16 x 240	SBD Ø7.5 x 195	MEGABOLT M12	MEGABOLT M12	MEGABOLT M12	MEGABOLT M12	STA Ø16 x 240	SBD Ø7.5 x 195	MEGABOLT M12	MEGABOLT M12
[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
240	77	89	188	47,0	139	46,3	164	164	100	33,4
360	143	173	286	47,7	237	47,4	245	258	167	33,4
480	208	267	384	48,0	335	47,9	327	352	234	33,4
600	272	365	483	48,3	433	48,2	409	445	300	33,4
720	334	463	581	48,4	532	48,3	491	539	367	33,4
840	398	560	679	48,5	630	48,5	573	633	434	33,4

NOTES

- The values provided are calculated with a grooving in the 10 mm thick timber.
- The values provided are in accordance with the patterns on page 11. For SBD dowels a_1 = 64 mm, $a_{3,t}$ = 80 mm, a_s = 15 mm (side bracket edge) and a_s = 30 mm (bottom/top bracket edge).

GENERAL PRINCIPLES

- The distances indicated in the installation section are minimum dimensions of structural elements, for screws inserted without pre-drilling hole, and do not take fire resistance requirements into account.
- For the calculation process a timber characteristic density ρ_k = 385 kg/m^3 has been considered.
- The coefficients k_{mod}, γ_M and γ_{M2} should be taken according to the current regulations used for the calculation.
- Dimensioning and verification of timber and concrete elements must be carried out separately.
- Characteristic values are consistent with EN 1995-1-1, EN 1999-1-1 and in accordance with ETA.
- The following verification shall be satisfied for combined loading:

$$\left(\frac{F_{ax,d}}{R_{ax,d}}\right)^2 + \left(\frac{F_{v,d}}{R_{v,d}}\right)^2 + \left(\frac{F_{up,d}}{R_{up,d}}\right)^2 + \left(\frac{F_{lat,d}}{R_{lat,d}}\right)^2 \leq 1$$

- $F_{v,d}$ and $F_{up,d}$ are forces acting in opposite directions. Therefore only one of the forces $F_{v,d}$ and $F_{up,d}$ can act in combination with the forces $F_{ax,d}$ or $F_{lat,d}$. Refer to ETA for the calculation of $F_{lat,d}$.
- The $F_{ax,d}$ strength is activated as a result of the initial sliding given by the slotted holes.
- Refer to ETA for the sliding modulus.

SIDE-BY-SIDE CONNECTORS

- Particular attention must be paid to alignment during installation, in order to avoid different stresses between connectors. The use of the JIGALUMEGA assembly template is recommended.
- The total strength of a connection consisting of up to three side-by-side connectors is the sum of the strength of the individual connectors.

ALUMEGA HP - ALUMEGA JS

- Design values can be obtained from characteristic values as follows:

$$R_{v,Rd} = min \begin{cases} \frac{R_{v,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{v,k\ alu}}{\gamma_{M2}} \end{cases} \qquad R_{up,Rd} = min \begin{cases} \frac{R_{up,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{up,k\ alu}}{\gamma_{M2}} \end{cases}$$

$$R_{ax,Rd} = min \begin{cases} \frac{R_{ax,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{ax,k\ alu}}{\gamma_{M2}} \end{cases}$$

- For F_{ax} stresses, the splitting of the main beam or column caused by forces perpendicular to the fibre (ALUMEGA HP) must be checked separately.
- The end of the secondary beam must be in contact with the wing of the JS connector.

ALUMEGA HV - ALUMEGA JV

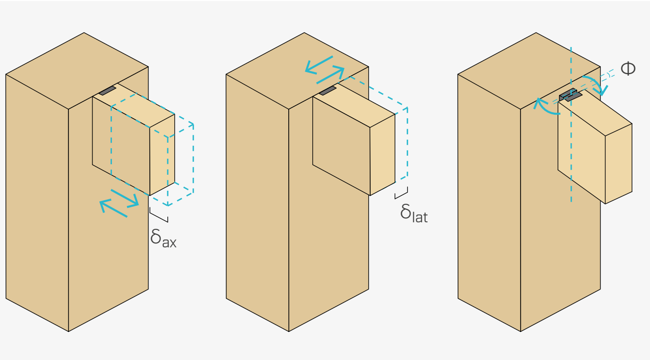
- Design values can be obtained from characteristic values as follows:

$$R_{v,Rd} = min \begin{cases} \frac{R_{v,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{tens,45,k}}{\gamma_{M2}} \\ \frac{R_{v,k\ alu}}{\gamma_{M2}} \end{cases} \qquad R_{up,Rd} = \frac{R_{up,k\ timber} \cdot k_{mod}}{\gamma_M}$$

$$R_{ax,Rd} = min \begin{cases} \frac{R_{ax,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{ax,k\ alu}}{\gamma_{M2}} \end{cases}$$

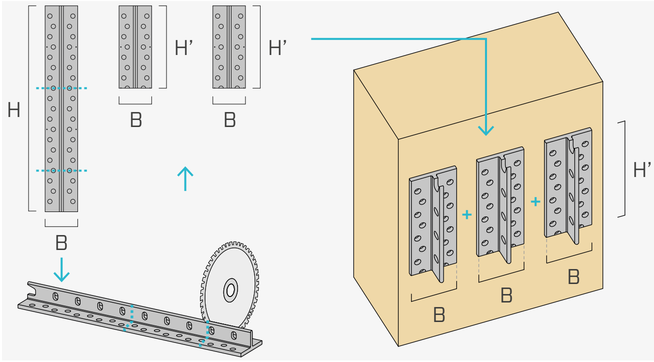
MAIN CHARACTERISTICS

ASSEMBLY TOLERANCE



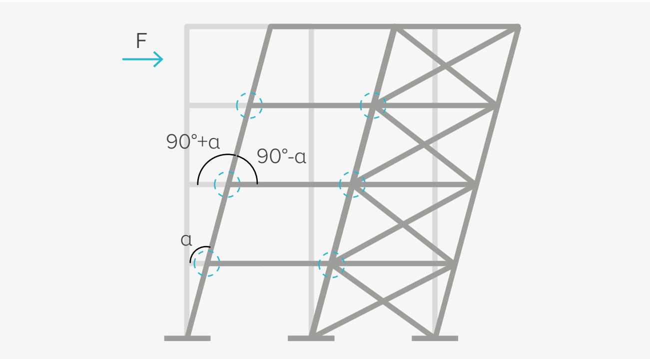
It offers the greatest assembly tolerance of any high-strength connector on the market:
δ_{ax} = 8 mm (± 4 mm), δ_{lat} = 3 mm (± 1,5 mm) and Φ = ± 6°.

MODULARITY



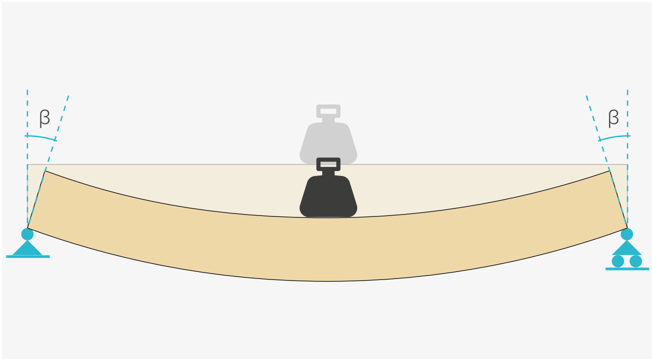
Available in 6 standard sizes (heights); the height H can be changed due to the modular connector geometry. In addition, connectors can be placed side-by-side to meet geometric or strength requirements.

INTER-STOREY DRIFT FOR HORIZONTAL ACTIONS



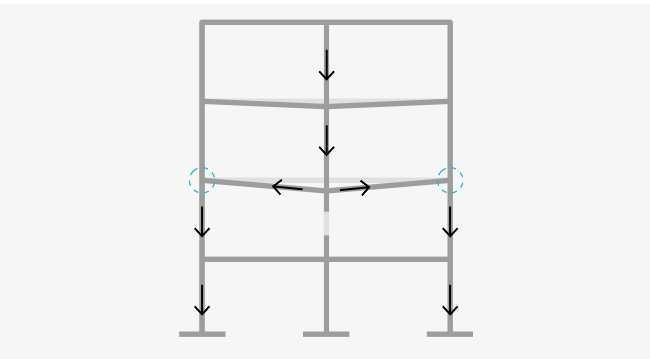
The rotation of the connector is compatible with the inter-story drift caused by earthquake or wind actions and helps reducing momentum transfer and structural damage.

ROTATION FOR GRAVITATIONAL LOADS



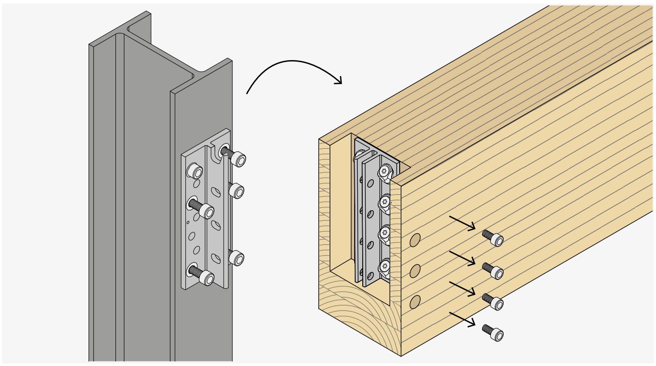
For gravitational loads, the connector has a hinged structural behaviour and ensures free rotation at the ends of the beam.

STRUCTURAL STRENGTH



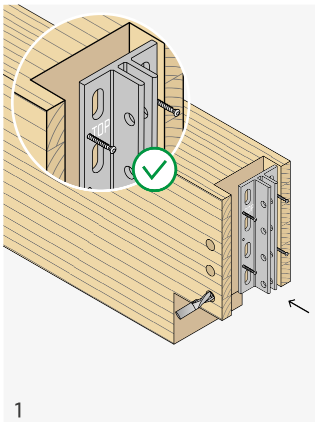
The connector withstands high axial tensile forces, allowing the catenary effect to develop in accidental situations. This contributes to the structural strength of the building, ensuring greater safety and resistance.

DISASSEMBLY



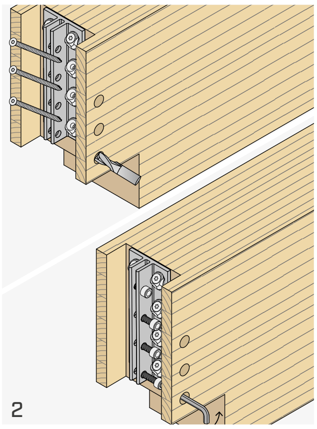
Particularly suitable for facilitating the dismantling of temporary structures or structures that have reached the end of their useful life. The connection with ALUMEGA can be easily disassembled by removing the MEGABOLT bolts, thus simplifying the separation of components (Design for Disassembly).

"TOP-DOWN" INSTALLATION WITH GROOVING IN THE SECONDARY BEAM



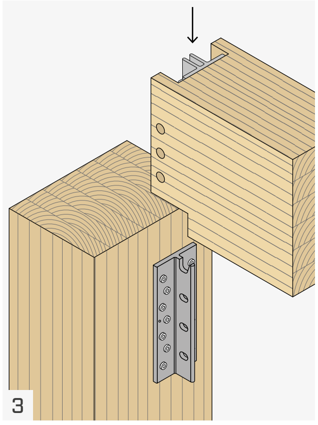
1

Make the grooving in the secondary beam and drill the holes (min. Ø25) for the MEGABOLT bolts. Position the ALUMEGA JV connector on the secondary beam paying particular attention to the correct orientation with reference to the "TOP" marking on the connector. Fasten the Ø5 LBS positioning screws.



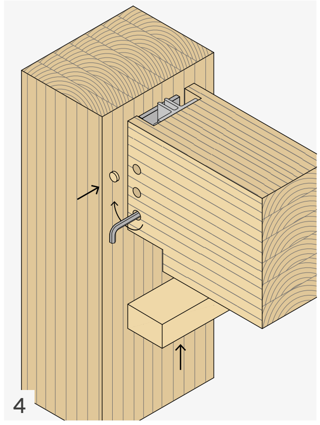
2

Place the VGU washer in the slotted hole and, using the JIG-VGU jig, drill a Ø5 guide hole with a minimum length of 20 mm. Install the VGS screw and respect the 45° angle of insertion. Insert the MEGABOLT bolts in the following way: the first bolt must pass completely through both cores of the connector, while the other bolts must only pass through the first core.



3

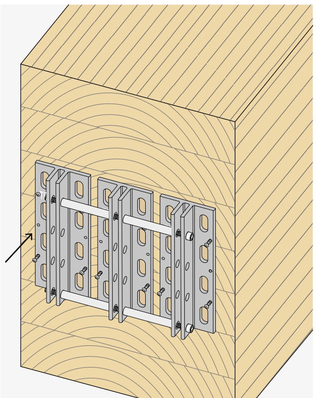
Position the ALUMEGA HP connector on the column, fasten the Ø5 LBS positioning screws (optional) and the HBS PLATE screws. Hook the secondary beam from top to bottom using the upper positioning countersink in the ALUMEGA HP connector.



4

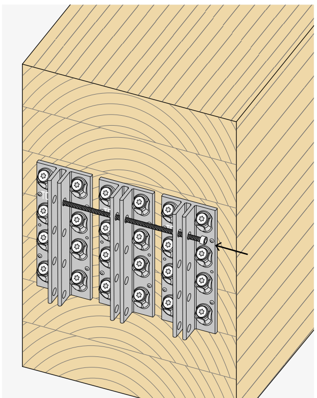
Fully tighten the MEGABOLT bolts with a 10 mm hexagonal wrench.
Place the TAP timber plugs in the circular holes and insert the closing board, hiding the connection for fire resistance requirements.

"TOP-DOWN" INSTALLATION WITH GROOVING IN THE COLUMN



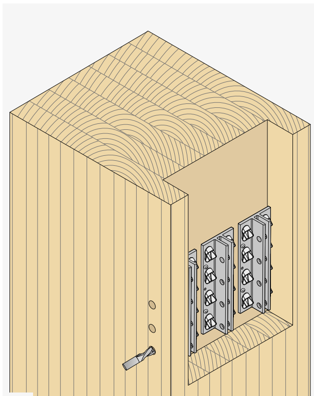
1

Place the three JV connectors assembled with template and bolts on the secondary beam. Once the Ø5 LBS positioning screws are fastened, remove the jigs and bolts.



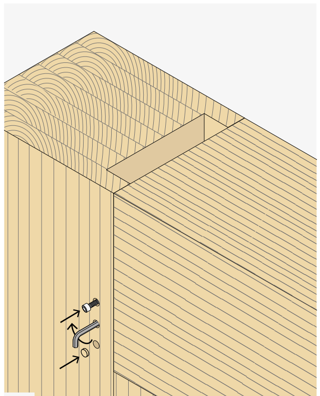
2

Place the VGU washer in the slotted hole and, using the JIG-VGU jig, drill a Ø5 guide hole with a minimum length of 20 mm. Install the VGS screw and respect the 45° angle of insertion. Insert the upper MEGABOLT bolt through the three JV connectors.



3

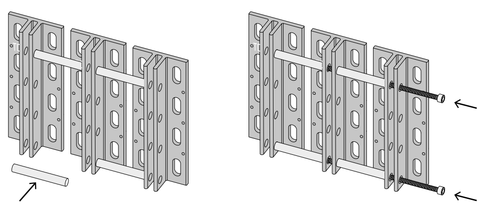
Make the grooving in the column and drill the holes (min. Ø25) for the MEGABOLT bolts. Use the jig for positioning the ALUMEGA HV connectors. Fasten the Ø5 LBS positioning screws. Place the VGU washer in the slotted hole and, using the JIG-VGU jig, drill a Ø5 guide hole with a minimum length of 20 mm. Install the VGS screw and respect the 45° angle of insertion.



4

Hook the secondary beam from top to bottom using the upper positioning countersink in the ALUMEGA HP connectors.
Insert the remaining MEGABOLT bolts and screw them in completely with a 10 mm hexagonal wrench.

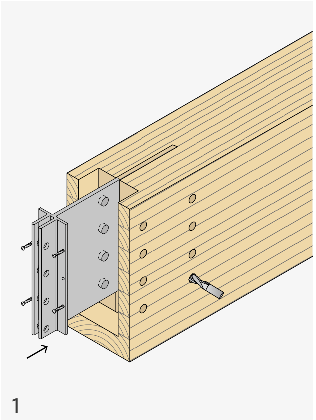
0



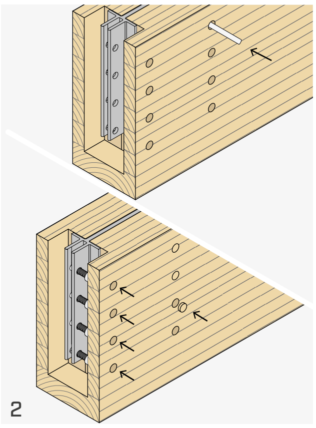
JIG INSTALLATION

Place the JV connectors side by side and position the jigs at two rows of M12 holes in the connectors. Insert the MEGABOLT bolts through the M12 threaded holes, taking care to maintain the alignment between connectors.
The use of the jig for HP and HV connectors is similar, it is recommended to use M12 nuts to avoid MEGABOLT bolts slipping out during installation.

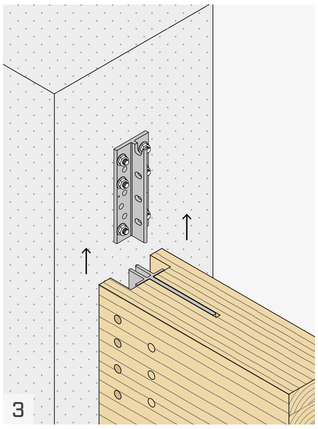
"BOTTOM-UP" INSTALLATION WITH GROOVING IN THE SECONDARY BEAM



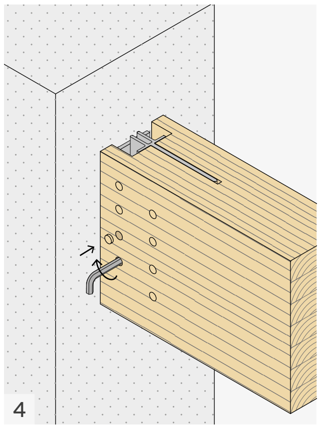
Carry out the grooving at partial height in the secondary beam and drill the holes for the MEGABOLT bolts (min. Ø25) and the STA dowels Ø16. Position the ALUMEGA JS connector on the secondary beam paying particular attention to the correct orientation with reference to the "TOP" marking on the connector. Fasten the Ø5 LBS positioning screws (optional).



Insert STA dowels Ø16 and then close with TAPS timber plugs. Insert the MEGABOLT bolts through the first core of the connector.

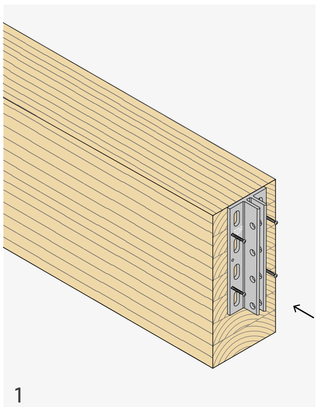


Place the ALUMEGA HP connector on concrete with INA threaded rods Ø12 and VIN-FIX resin, according to the installation instructions. Lift the secondary beam from the bottom upwards, and only screw the upper MEGABOLT bolt fully in when the ALUMEGA JS connector is positioned above the ALUMEGA HP connector.

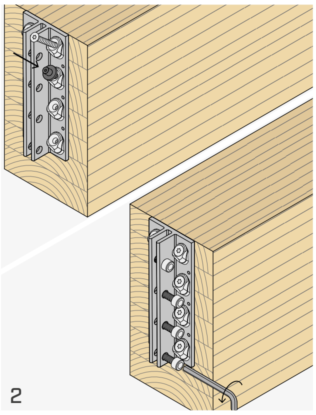


Hook the secondary beam from top to bottom using the upper positioning countersink in the ALUMEGA HP connector.
Fully screw in the remaining MEGABOLT bolts with a 10 mm hexagonal wrench and insert the TAPS timber plugs into the round holes.

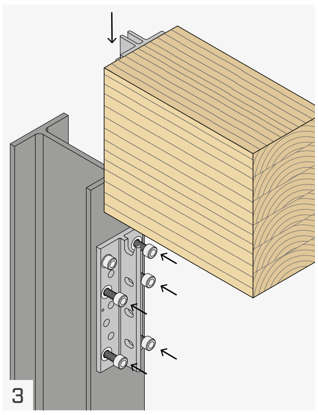
VISIBLE "TOP-DOWN" INSTALLATION



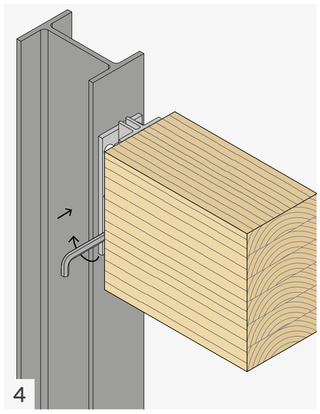
Place the ALUMEGA JV connector on the secondary beam, paying particular attention to the orientation according to the "TOP" marking on the connector. Then, fasten the Ø5 LBS positioning screws.



Place the VGU washer in the slotted hole and, using the JIG-VGU jig, drill a Ø5 guide hole with a minimum length of 20 mm.
Install the VGS screw and respect the 45° angle of insertion.
Insert the MEGABOLT bolts in the following way: the first bolt must pass completely through both cores of the connector, while the other bolts must only pass through the first core.



Fasten the ALUMEGA HP connector to steel using M12 bolts.
Hook the secondary beam from top to bottom using the upper positioning countersink in the ALUMEGA HP connector.



Fully tighten the MEGABOLT bolts with a 10 mm hexagonal wrench.