

Connection systems

for smart structural engineering

A great reliable connection.

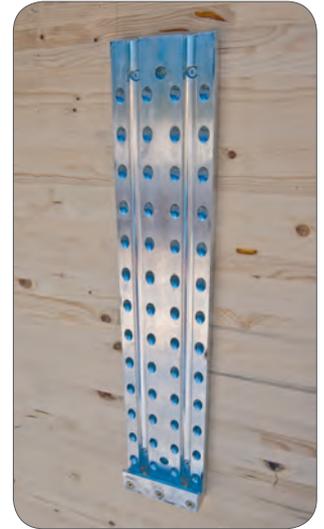


 knapp-connectors.com/northamerica

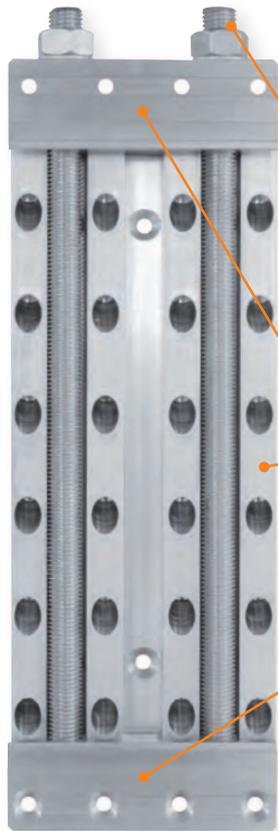
KNAPP®
connectors.com

MEGANT® | The heavy duty system for engineered connections up to 500 kN

- Load range – standard sizes up to 341 kN, custom solutions up to 500 kN
- Connections for wood to wood, wood to steel and wood to concrete
- Load rated in all directions
- Fire ratings achievable when connector is housed
- Unique – installation possible from any direction
- Short hook-in – only 20 mm (3/4") – parallel lowering of main / secondary beam not necessary
- Installation – reduced crane time through high degree of prefabrication
- Dismountable – installed to connect and rebuild
- Minimum required timber width only 100 mm (3-15/16")



Installation example:
Screw connection at main beam.



**No jamming
when mounting!**

Threaded rod with washers and nuts.

Machined aluminum base plate.
Screw holes at 45° and 90°.

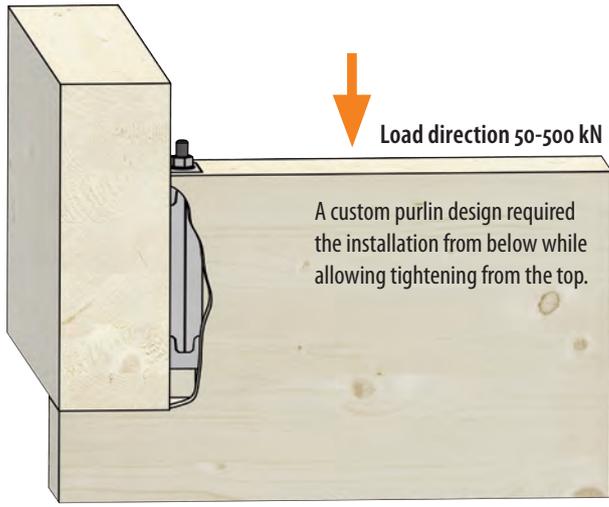
Tapered, self tightening aluminum clamping jaws with 90°
screw holes for easy installation and higher horizontal capacity.



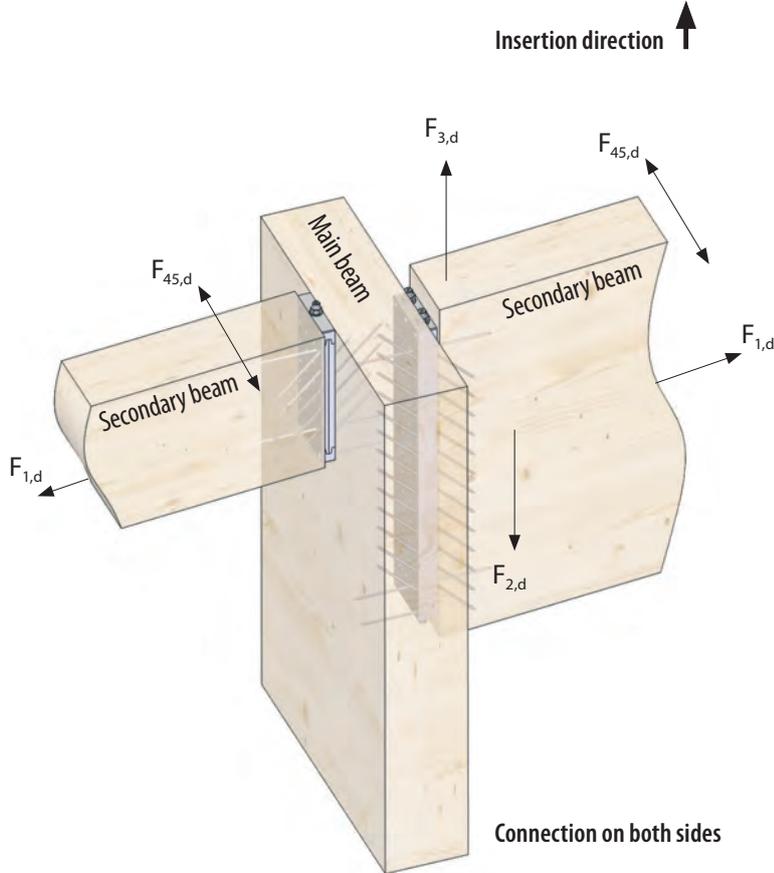
MEGANT® 290x60x40 11-7/16"x 2-3/8"x1-9/16"	MEGANT® 405x60x40 15-15/16"x 2-3/8"x1-9/16"	MEGANT® 520x60x40 20-1/2"x 2-3/8"x1-9/16"	MEGANT® 290x100x40 11-3/8"x 3-15/16"x1-9/16"	MEGANT® 405x100x40 15-15/16"x 3-15/16"x1-9/16"	MEGANT® 520x100x40 20-1/2"x 3-15/16"x1-9/16"	MEGANT® 280x150x50 11"x 5-15/16"x2"	MEGANT® 430x150x50 16-15/16"x 5-15/16"x2"	MEGANT® 550x150x50 21-1/2"x 5-15/16"x2"
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MEGANT® – flexible

Application examples and details



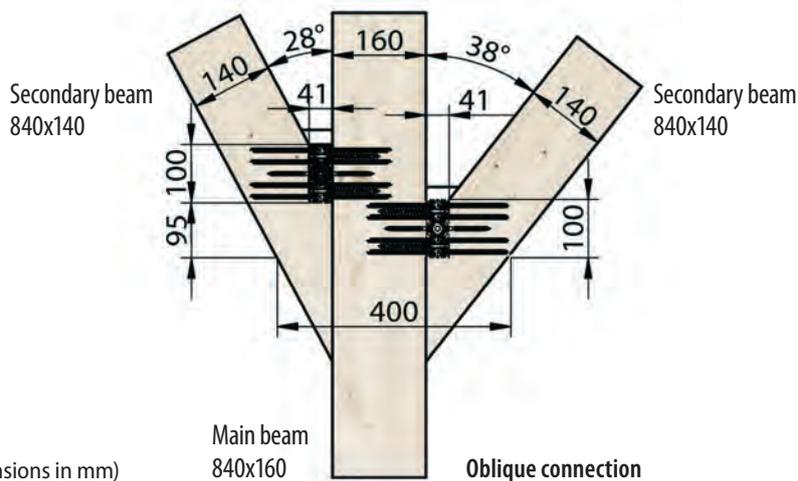
Fully concealed connector in housing.



Fully installed structural connectors and beams.



With only 2 cm of hook-in travel required for assembly, a beam was installed first in an opening of the concrete wall and then hooked-in with MEGANT®.



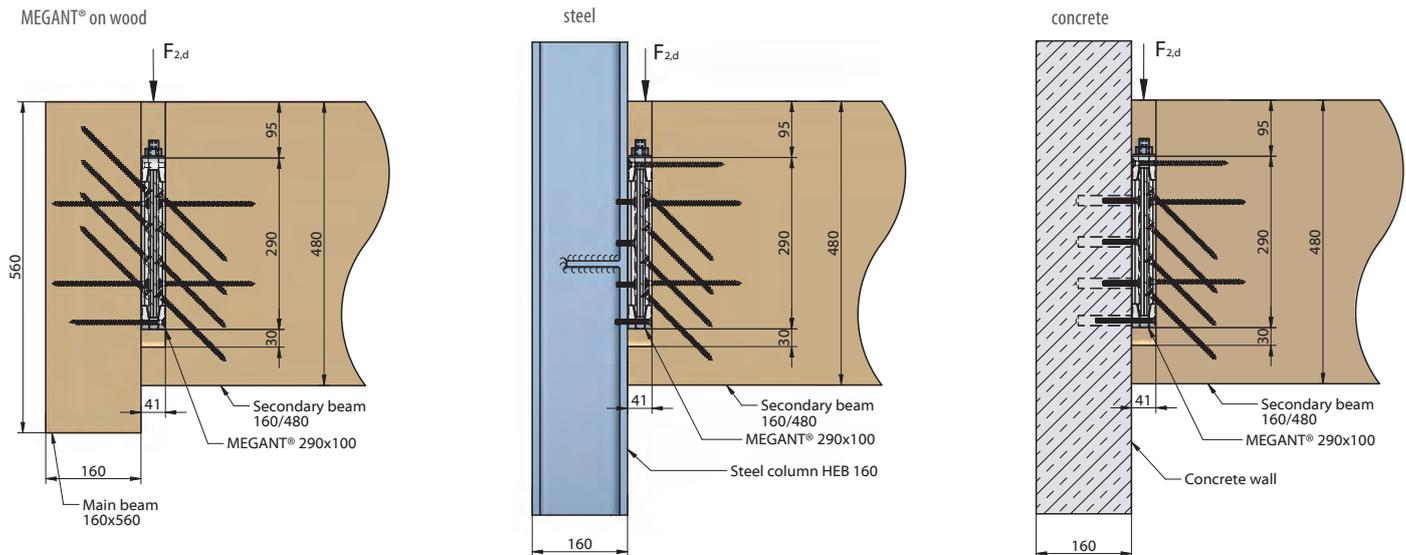
(All Dimensions in mm)



MEGANT® oblique connection.

MEGANT® – flexible

Application examples and connection details



MEGANT® – not visible – fire protected

Fire protection

- Fully concealed connections (3 sides) possible where required by architect or fire code consultant.
- Jointless connection - no additional covers or fire protection ribbons required.
- According to DIN4102-2 for 30 minutes fire resistance 20 mm (13/16") wood cover is required.
- Follow local fire protection requirements listed in the IBC or NBCC.



MEGANT® drilling-jig

MEGANT®

Art.-No. Ko8030663/00001	Drilling-jig MEGANT® 290x60x40 11-7/16" x 2-3/8" x 1-9/16"
Art.-No. Ko8030664/00001	Drilling-jig MEGANT® 405x60x40 15-15/16" x 2-3/8" x 1-9/16"
Art.-No. Ko8030665/00001	Drilling-jig MEGANT® 520x60x40 20-1/2" x 2-3/8" x 1-9/16"
Art.-No. Ko8030666/00001	Drilling-jig MEGANT® 290x100x40 11-3/8" x 3-15/16" x 1-9/16"
Art.-No. Ko8030667/00001	Drilling-jig MEGANT® 405x100x40 15-15/16" x 3-15/16" x 1-9/16"
Art.-No. Ko8030668/00001	Drilling-jig MEGANT® 520x100x40 20-1/2" x 3-15/16" x 1-9/16"
Art.-No. Ko8030669/00001	Drilling-jig MEGANT® 280x150x50 11" x 5-15/16" x 2"
Art.-No. Ko8030670/00001	Drilling-jig MEGANT® 430x150x50 16-15/16" x 5-15/16" x 2"
Art.-No. Ko8030671/00001	Drilling-jig MEGANT® 550x150x50 21-1/2" x 5-15/16" x 2"



Application:

Pre-drilling of the 90° positioning screws for precise installation.

MEGANT® screws – German made

ASSY VG plus CSK with self tapping tip (MEGANT® is supplied with appropriate screws)

CSK 8x160 5/16" x 6-1/4"



Application : For the positioning and inclined screwing as well as mounting of the clamping jaw of MEGANT®.

Overview MEGANT® – design values

Dimensioning according to ETA 10/0189 and O 86

MEGANT® 60 - design values with screws 8x160

Min. 100 mm timber width in secondary beam

Art.-No.	Connector	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)
K216	290x60x40	440	12,8	7,7	81,0	48,6
K217	405x60x40	520	10,4	6,2	116,0	69,6
K218	520x60x40	640	7,5	4,5	129,0	77,4

MEGANT® 100 - design values with screws 8x160

Min. 142 mm timber width in secondary beam

Art.-No.	Connector	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)
K222	290x100x40	440	23,9	14,3	116,0	69,6
K223	405x100x40	520	23,9	14,3	167,0	100,2
K224	520x100x40	640	23,9	14,3	211,0	126,6

MEGANT® 150 - design values with screws 8x160

Min. 194 mm timber width in secondary beam

Art.-No.	Connector	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)
K219	280x150x50	360	33,8	20,3	109,0	65,4
K220	430x150x50	520	33,8	20,3	204,0	122,4
K221	550x150x50	640	33,8	20,3	265,0	159,0
Custom special sizes of MEGANT® on request (Example Listed sizes)						
720x150x50	780	33,8	20,3	352,0	211,2	
830x150x50	895	33,8	20,3	409,0	245,4	
950x150x50	1010	22,0	13,2	465,0	279,0	
1060x150x50	1125	12,3	7,4	521,0	312,6	

Maximum load F_1 and F_2 combination yields to lower values.

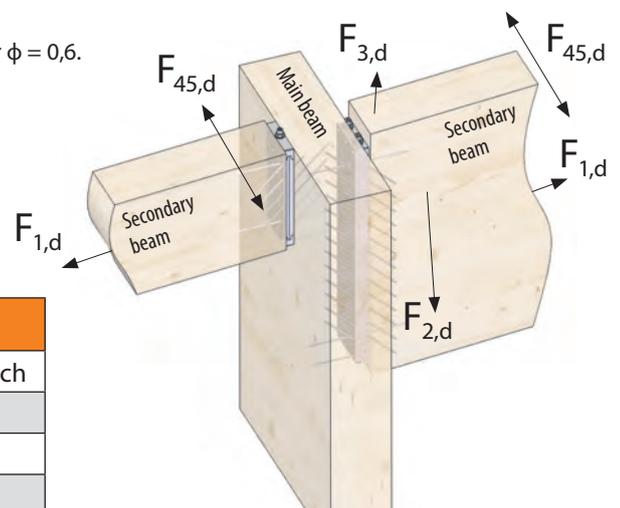
The factored values are based on load duration $KD = 1,0$ (standard terms), service condition $KSF = 1,0$ and treatment $KT = 1,0$ and material resistance factor $\phi = 0,6$.

- $F_{1,Rk}$ (unfactored) unfactored tension capacity (parallel to beam)
- $F_{1,Rd}$ (factored) factored tension capacity (parallel to beam)
- $F_{2,Rk}$ (unfactored) unfactored capacity in insert direction
- $F_{2,Rd}$ (factored) factored capacity in insert direction

Contact your local technical support for assistance.

Correction Factor f for other wood types				
Wood types	SPF	CLT	Glulam spruce-pine	D Fir-Larch
Mean over dry density	0,42	0,42	0,44	0,49
5 th % fractile of density	0,35	0,35	0,37	0,41
Correction factor f	0,95	0,95	1,00	1,11

Note: m.o.d.d. x 0,84 = 5th % fractile of density, m.o.d.d. => mean oven dry density



Connection on both sides

MEGANT® – only 9 minutes to install

Assembly procedure



1.16 pm | After rafters are dropped in place, the MEGANT® connection is hooked-in.



1.21 pm | Only 3/4" of travel required for MEGANT®.



1.23 pm | Insert the threaded rods and install nuts and washers.



1.24 pm | Tighten nuts. Connection is now ready to be loaded.



1.25 pm | Finished connection.

MEGANT® – customized

Custom solutions for forces up to 500 kN

In house engineers provide comprehensive technical support.

MEGANT® for 420 kN

Example: Storage facility Großarl (Austria)



Oblique connections

Example: Restaurant Schnepfenried (France)



MEGANT® – individual solutions

Selected reference projects



Object: Rebuilding of a Restaurant in Schnepfenried (France); **Building:** 1970s; **Redevelopment:** 2012-2013; **Client:** SMA Syndicat mixte d'aménagement des stations de montagne de la vallée de Munster, F-68140 Munster; **Architect:** Ateliers d-Form, F-68230 Soultzbach Les Bains, www.atelier-d-form.com; **Static:** Optime Ingénierie, 68230 Soultzbach Les Bains, contact@optime-be.com; **Timber construction:** Dattler, 20 rue des Prés, 68640 Feldbach, www.dattler.fr; **Reconstructed surface:** 1050 m²; **Usable area:** 1050 m²



Object: Storage hall of a biomass heat and power station, A-5611 Großarl, Salzburg (Austria); **Load:** 420 kN; **Client:** HHG Großarl, A-5611 Großarl, www.heizkraft.at; **Architect:** Rohmoser Plan, A-5600 St. Johann im Pongau, www.rohmoserplan.com; **Static:** FS1 Fiedler Stöffler Ziviltechniker GmbH, A-6020 Innsbruck, www.fs1-gmbh.at; **Timber construction:** Unterkofler Plan & Bau GmbH, Zimmerei und Tischlerei, A-5611 Großarl, www.unterkofler.at

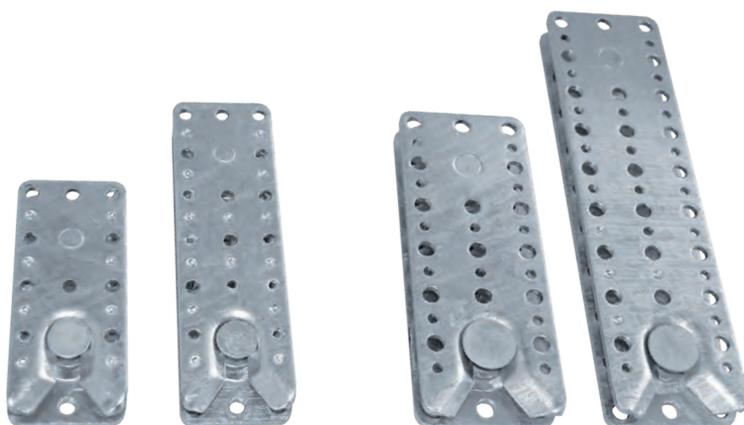
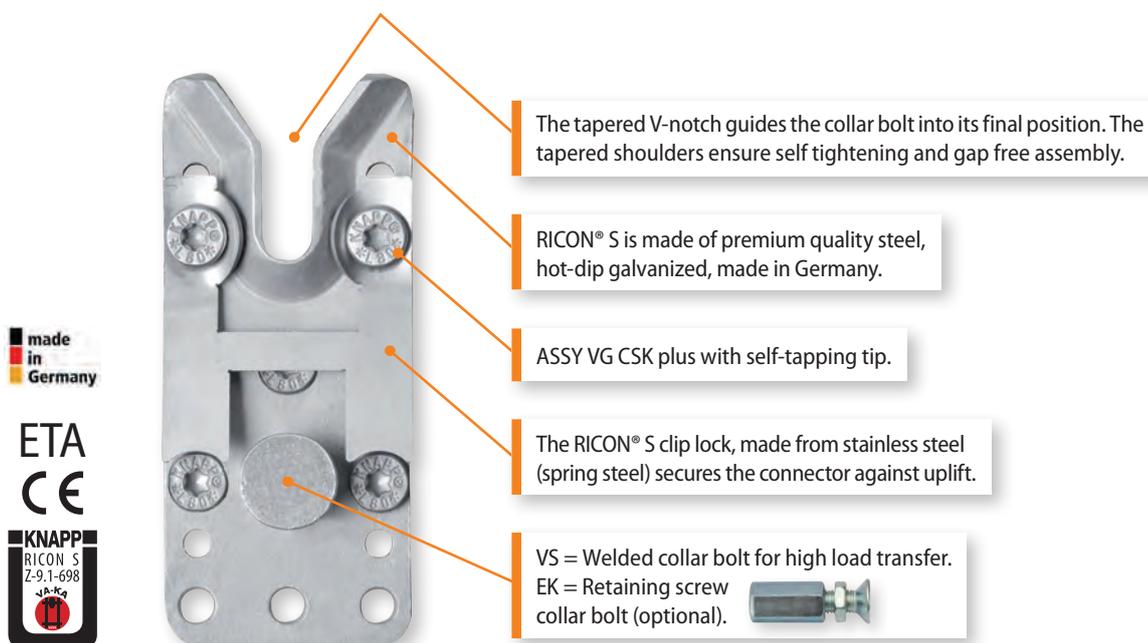


Object: Generationenhaus in Starnberg (Germany); **Architect/Static/Timber construction:** Regnauer Hausbau GmbH & Co. KG; **Building Time:** approx 5 month; **Structure:** Solid wood joist construction; **Usable area:** approx 330 m²; **Enclosed space:** approx 1.770 m³

RICON® S | The connector for loads up to 100 kN

System advantages:

- RICON® S high capacity standard connections in residential and commercial construction
- High degree of pre-manufacturing shortens installation and construction time
- Connections for wood to wood, wood to steel and wood to concrete
- Easy installation through tapered V-notch and collar bolt
- 35 mm (1-3/8") parallel lowering of main / secondary beam not necessary
- Three- and four-sided concealed connection
- Fire resistance (DIN 4102-2) 4-sided concealed mounting (30 minute or 60 minute fire rating) – obey your local fire code
- Simple screwing – no predrilling required
- Resistance against uplift forces through installation of clip lock
- Minimum required timber width only 100 mm (3-15/16")



RICON® S60 VS
140x60x25
5-1/2"x2-3/8"x1"

RICON® S60 VS
200x60x25
7-7/8"x2-3/8"x1"

RICON® S80 VS
200x80x25
7-7/8"x3-1/8"x1"

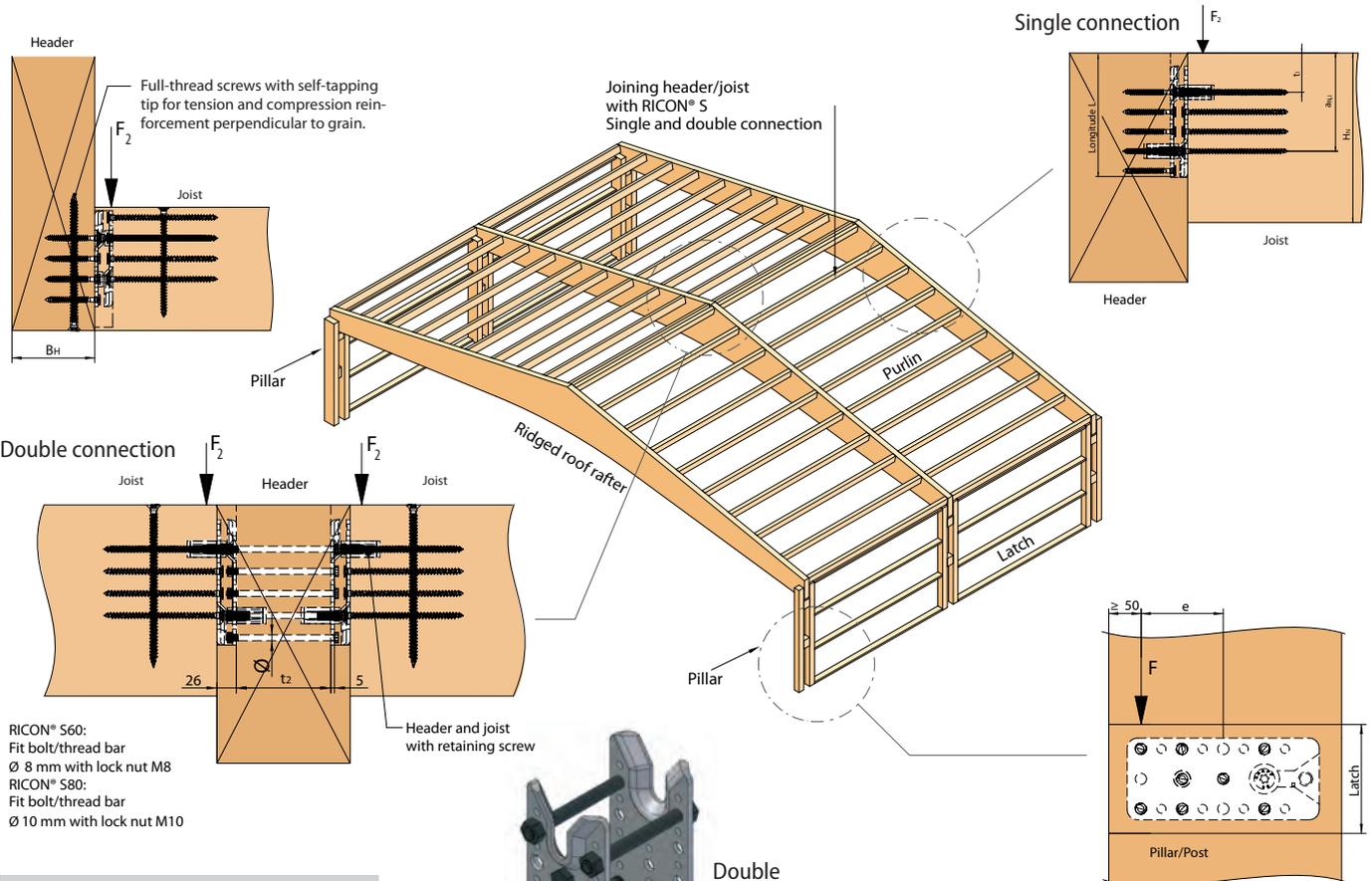
RICON® S80 VS
290x80x25
11-7/16"x3-1/8"x1"



RICON® S – variety

Application examples and connection details

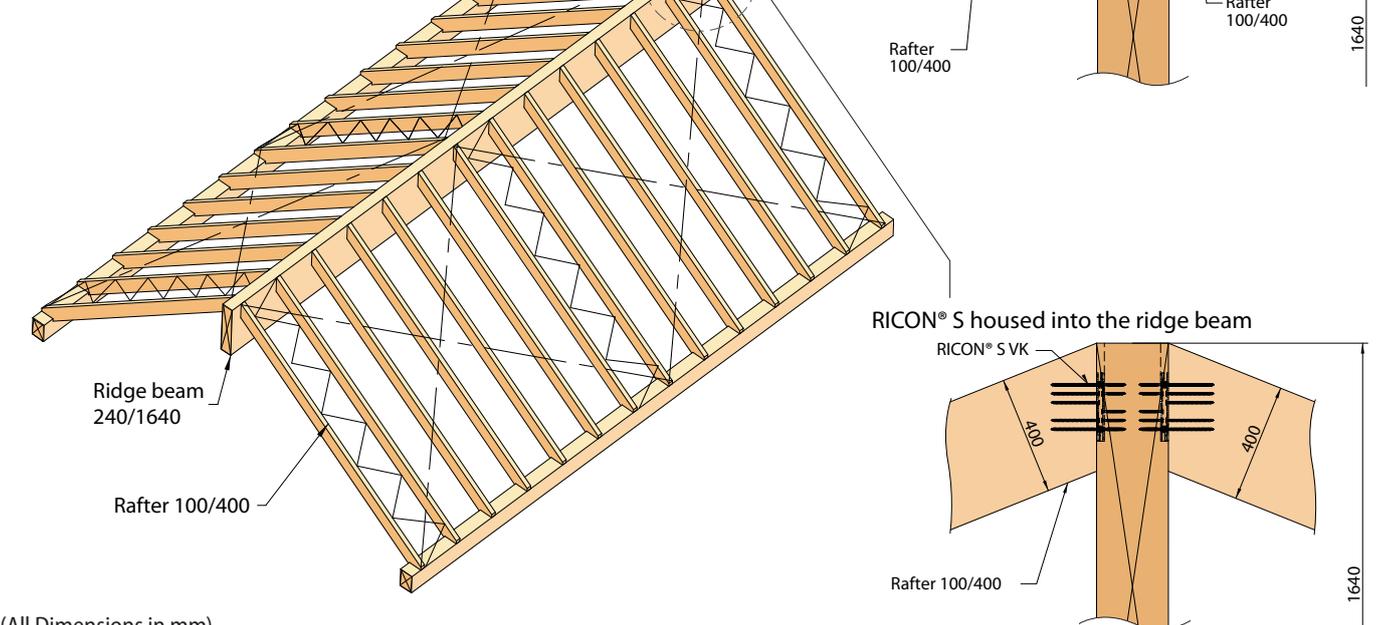
Ridged roof with purlins and latch connections



Roof structure with RICON® S ridge purlin/rafter connection



Roof structure of carpentry S. Hinrichsen (Germany)



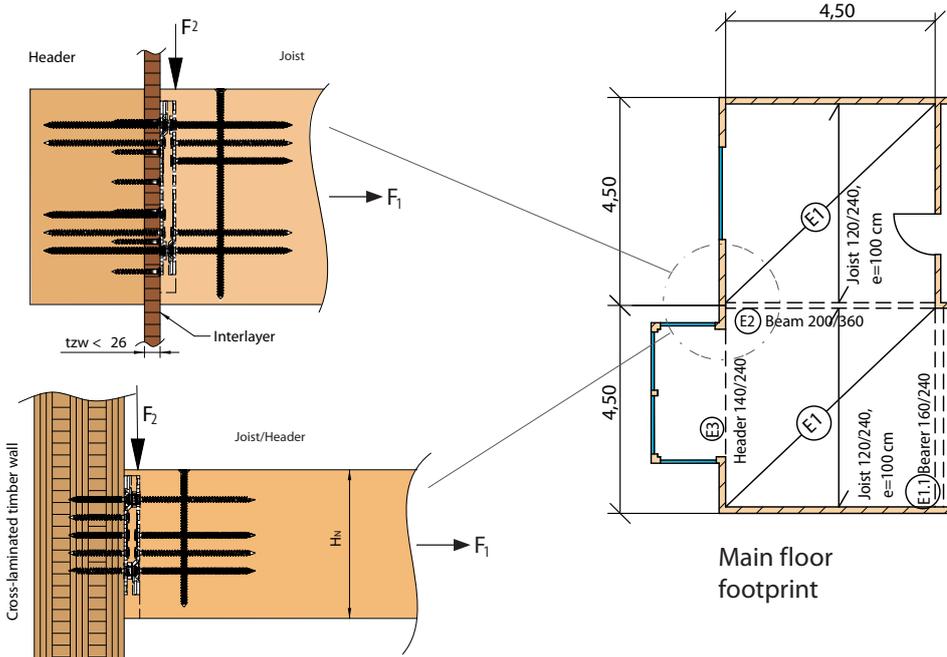
(All Dimensions in mm)

RICON® S – flexible

Application prefabricated wall assemblies

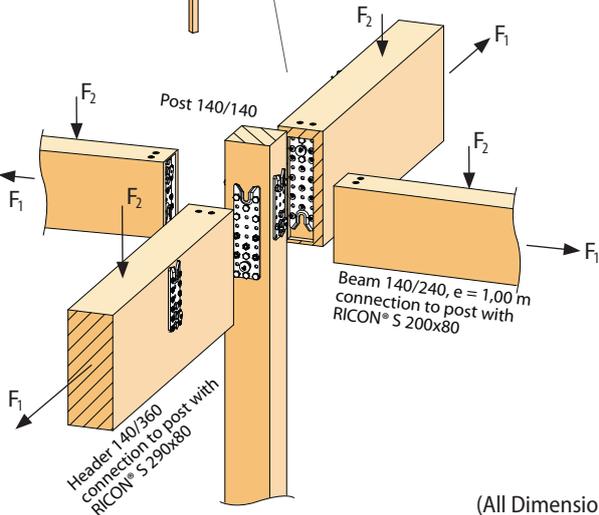
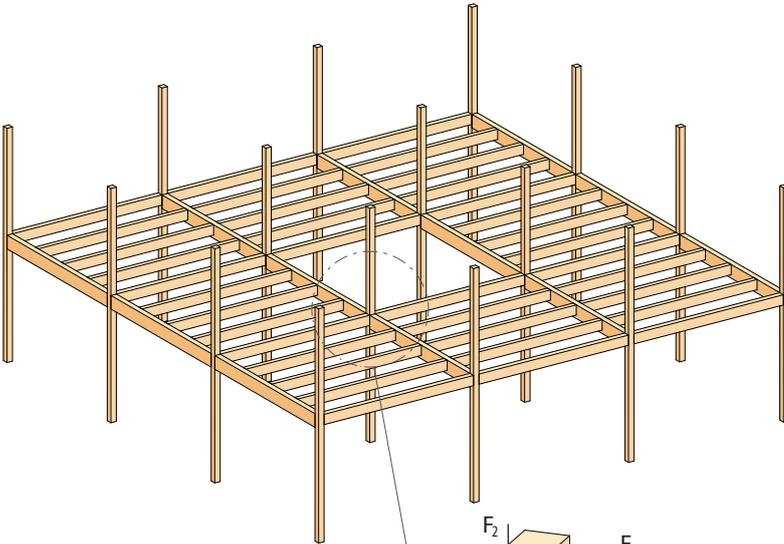
Connecting header with timber frame or cross-laminated timber wall

Steel to wood connection

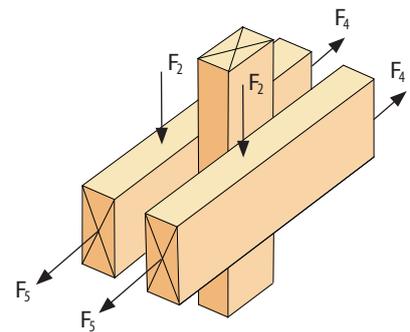
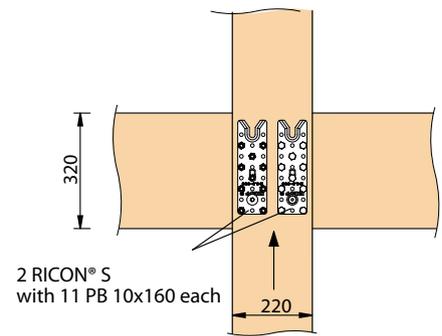
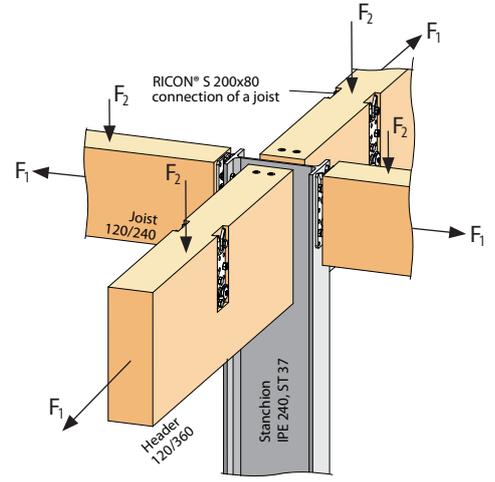


First node for dome

Typical timber frame structure or post and beam



(All Dimensions in mm)



Alternative connections

Overview RICON® S VS – design values

Dimensioning according to ETA 10/0189 and O 86

RICON® S60 - design values

Art.-No.	Connector	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5 th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K146	140x60 EK	100x160	31,3	18,8	35,4	21,2	29,6	17,8
K148	200x60 EK	100x220	31,3	18,8	44,0	26,4	33,3	20,0
K126	140x60 VS	100x160	31,3	18,8	46,3	27,8	35,1	21,1
K127	200x60 VS	100x220	31,3	18,8	60,0	36,0	39,9	23,9

RICON® S80 - design values

Art.-No.	Connector	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5 th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K153	200x80 EK	120x230	36,0	21,6	61,9	37,1	52,6	31,6
K156	290x80 EK	120x320	36,0	21,6	61,9	37,1	54,1	32,5
K128	200x80 VS	120x230	36,0	21,6	100,0	60,0	71,4	42,8
K129	290x80 VS	120x320	36,0	21,6	100,0	60,0	75,3	45,2

The factored values are based on load duration $KD = 1,0$ (standard terms), service condition $KSF = 1,0$ and treatment $KT = 1,0$ and material resistance factor $\phi = 0,6$.

- $F_{1,Rk}$ (unfactored) unfactored tension capacity (parallel to beam)
- $F_{1,Rd}$ (factored) factored tension capacity (parallel to beam)
- $F_{2,Rk}$ (unfactored) unfactored capacity in insert direction
- $F_{2,Rd}$ (factored) factored capacity in insert direction
- $F_{45,Rk}$ (unfactored) unfactored capacity perpendicular insert direction
- $F_{45,Rd}$ (factored) factored capacity perpendicular insert direction

Correction Factor f for other wood types

See page 5.

Contact your local technical support for assistance.



Connector	Collar bolt	Screws	
		Joist	Header
140/60	VS Welded	10 x ASSY VG CSK 8x160	10 x ASSY VG CSK 8x80
140/60 d12	EK M12	7 x ASSY VG CSK 8x160	7 x ASSY VG CSK 8x80

VS = RICON® S with welded collar bolt.
EK = RICON® S with retaining screw collar bolt

Minimum timber dimensions 100x160 mm

Number of screws can be reduced due to the load.



Connector	Collar bolt	Screws	
		Joist	Header
200/80	VS Welded	14 x ASSY VG CSK 10x200	14 x ASSY VG CSK 10x100
200/80 d16	EK M16	8 x ASSY VG CSK 10x200	8 x ASSY VG CSK 10x100

VS = RICON® S with welded collar bolt.
EK = RICON® S with retaining screw collar bolt

Minimum timber dimensions 120x320 mm

Number of screws can be reduced due to the load.

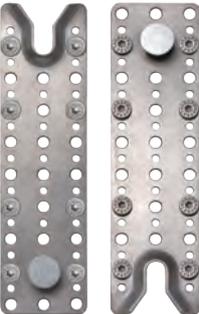


Connector	Collar bolt	Screws	
		Joist	Header
200/60	VS Welded	12 x ASSY VG CSK 8x160	12 x ASSY VG CSK 8x80
200/60 d12	EK M12	8 x ASSY VG CSK 8x160	8 x ASSY VG CSK 8x80

VS = RICON® S with welded collar bolt.
EK = RICON® S with retaining screw collar bolt

Minimum timber dimensions 100x220 mm

Number of screws can be reduced due to the load.



Connector	Collar bolt	Screws	
		Joist	Header
290/80	VS Welded	14 x ASSY VG CSK 10x200	14 x ASSY VG CSK 10x100
290/80 d16	EK M16	8 x ASSY VG CSK 10x200	8 x ASSY VG CSK 10x100

VS = RICON® S with welded collar bolt.
EK = RICON® S with retaining screw collar bolt

Minimum timber dimensions 120x230 mm

Number of screws can be reduced due to the load.

Characteristic value in the insertion direction tested and apply only with the use of original CSK-screws according to ETA 11/0190.

RICON® S screws

ASSY VG plus CSK with self tapping tip (RICON® S is supplied with appropriate screws)

CSK 8x80 mm or longer 5/16" x 3-1/8"
 CSK 8x160 mm 5/16" x 6-1/4"



Application: Screws for side grain (8x80) or end grain (8x160).

ASSY VG plus CSK with self tapping tip (RICON® S is supplied with appropriate screws)

CSK 10x100 mm or longer 3/8" x 4"
 CSK 10x200 mm 3/8" x 7-7/8"



Application: Screws for side grain (10x100) or end grain (10x200).

RICON® S Accessories

RICON® S routing-jig S60, S80

Art.-No. K510 Routing-jig MULTI F60

Art.-No. K511 Routing-jig MULTI F80

Advice: The routing-jig MULTI F is suitable for a Ø = 30 mm guide bush (for plunge router) and a Ø = 15 mm TCT finger mill with 12 mm shaft.



Application: To cut notch, recess or housing into end grain and/or longitude for RICON® S60 and S80.

TCT finger mill cutter

Art.-No. Zo68 TCT finger mill Ø = 15, length = 40 mm and Ø = 12 mm shaft

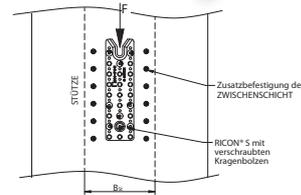
Application: To cut notch, recess the rebate for RICON® S.



ASSY Kombi with self tapping tip

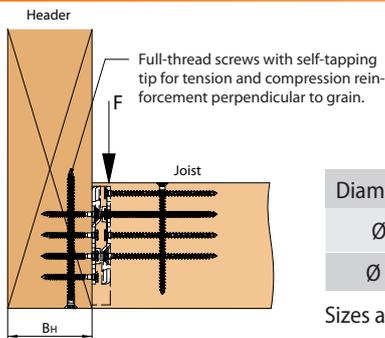
10x120 mm 3/8 x 4-3/4

Application: For special applications such as additional planking up to 26 mm (1").



Additional planking as shown on p.10:
 E.g. Gypsum-board, OSB, Plywood, Particleboard

Full threaded CSR-screws with self-tapping tip



Diameter (d1)	Length (mm)															
Ø = 8 mm	160	180	200	220	240	260	280	300	320	340	360	380	430	480	530	580
Ø = 10 mm	160	180	200	220	240	260	280	300	320	340	360	380	430	480	530	580

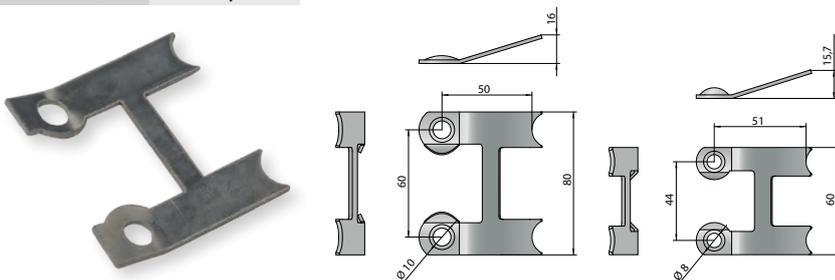
Sizes available on request.

Application: Full threaded countersunk screws for perpendicular to grain tension and compression reinforcement.

RICON® S clip lock (made of stainless spring steel)

Art.-No. K157 S60: clip lock

Art.-No. K158 S80: clip lock



Application: The clip lock secures against uplift and is used for loads against slide-in direction e.g. wind suction.

RICON® S

Installation

- Router with KNAPP® routing-jig
- Installation with CNC joinery machine possible – all data for the standard CNC joinery machine programmes are included.



1) CNC joinery machine 2) Position the screws 3) Drive in screws 4) Screw on counter part

Construction manuals, .DXF drawings for RICON® S-System or contact our technical support team, please visit: www.knapp-connectors.com/ricons

RICON® S

Selected reference projects



Objective: Dorfgemeinschaftshaus Hünstetten-Oberlibbach; **Architect:** Planungsbüro Peichl Project, Fulda; **General contractor:** C + P Schlüsselfertiges Bauen GmbH & Co. KG, **Structural Engineer:** Ing.-Büro; Sturmius Feuerstein, Petersberg; **Test Engineer:** Kind & Partner, Prof. Dr.-Ing. Steffen Kind, Wiesbaden; **Timber construction:** Sängler Holzbau GmbH & Co. KG; **Detail and workshop planning timber:** W. u. J. Derix GmbH & Co



Objective: Chapelle de la Puret  (Chapel of Purity) (F) **Architects:** Jacques de Welle and Emmanuel de Foresta, Spiridon Kakavas and Antonios lionis (Project manager); **Planning:** C dric Roth-Meyer, www.intuitionbois.com; **Client representative:** Elisabeth H riard-Dubreuill; **Client:** Metropole orthodoxe grecque, Paris; **Execution:** C dric Roth-Meyer, Bastien Milhau, Fr d ric Tourneux, Matthias Pfister



Objective: Company Building Stora Enso (A)

GIGANT® | The connector for main and secondary beam up to 29,2 kN

System advantages:

- Highly loadable – Load resistance in four directions
- Short hooking way – used in residential and commercial timber frame structures, prefabricated houses
- Self-tightening
- Fire resistance (DIN 4102-2) by 4-sided concealed mounting (R30 ≥ 20 mm, R60 ≥ 40 mm)
- Optional locking clip secures against uplift
- Dismountable
- Minimum required timber width only 60 mm (2-3/8")



The V-shaped and the beveled fork part make it very easy to position and assemble the connector.

Specially designed screws (10 mm) with reinforced shaft and cut point for fast and accurate installation.

The clip lock automatically locks in all load directions
Hint: Use only the center holes of the opposite connector half to fasten it.

GIGANT is made of premium quality steel, is blue galvanised or optional hot-dip galvanised and made in Austria.

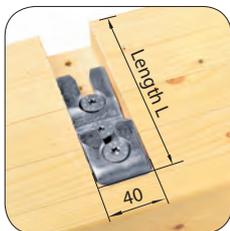
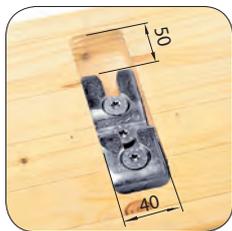


Installation example:
Screw on the main and secondary beams.



Connection options

The GIGANT offers three different mounting options and these can be used both on main or secondary beam.



Visible



Position



Screw on



Locks after hooking against the insertion direction

Variants

The GIGANT is blue galvanised and on request hot dip galvanised.



GIGANT blue galvanized



GIGANT hot-dip galvanized

GIGANT 120/40
120x40x26
4-3/4"x1-9/16"x1"

GIGANT 150/40
150x40x26
5-15/16"x1-9/16"x1"

GIGANT 180/40
180x40x26
7"x1-9/16"x1"

Overview GIGANT – design values

Dimensioning according to ETA 10/0189 and O 86

GIGANT - design values

Min. 60 mm timber width in secondary beam

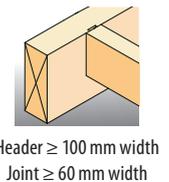
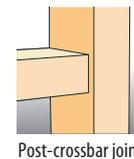
Art.-No.	Connector without clip lock	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5 th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K051	120x40	145	12,4	7,4	12,4	7,4	11,6	7,0
K050	150x40	180	12,4	7,4	19,5	11,7	15,4	9,2
K052	180x40	215	12,4	7,4	24,4	14,6	19,7	11,8

Min. 60 mm timber width in secondary beam

Art.-No.	Connector with clip lock	Min. secondary beam height [mm]	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5 th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K050	150x40	180	12,4	7,4	19,2	11,5	12,8	7,7
K052	180x40	215	12,4	7,4	29,2	17,5	20,0	12,0

The factored values are based on load duration $KD = 1,0$ (standard terms), service condition $KSF = 1,0$ and treatment $KT = 1,0$ and material resistance factor $\phi = 0,6$.

- $F_{1,Rk}$ (unfactored) unfactored tension capacity (parallel to beam)
- $F_{1,Rd}$ (factored) factored tension capacity (parallel to beam)
- $F_{2,Rk}$ (unfactored) unfactored capacity in insert direction
- $F_{2,Rd}$ (factored) factored capacity in insert direction
- $F_{45,Rk}$ (unfactored) unfactored capacity perpendicular insert direction
- $F_{45,Rd}$ (factored) factored capacity perpendicular insert direction



Contact your local technical support for assistance.



Correction Factor f for other wood types				
Wood types	SPF	CLT	Glulam spruce-pine	D Fir-Larch
Mean over dry density	0,42	0,42	0,44	0,49
5 th % fractile of density	0,35	0,35	0,37	0,41
Correction factor f	0,95	0,95	1,00	1,11

Note: m.o.d.d. x 0,84 = 5th % fractile of density, m.o.d.d. => mean oven dry density

Number of Screws/Sizes	
End grain	Longitudinal
GIGANT 120/40 3 KNAPP® CS-screws 10x120	3 KNAPP® CS-screws 10x80 or 3 KNAPP® CS-screws 10x120 for cross-laminated timber
Clip lock (optional locking feature)	
Fasten clip lock with the first screw of the connector half in the header.	
GIGANT 150/40 4 KNAPP® CS-screws 10x120	4 KNAPP® CS-screws 10x80 or 4 KNAPP® CS-screws 10x120 for cross-laminated timber
Clip lock (optional locking feature)	
Fasten clip lock with the first screw of the connector half in the header. Hint: To fasten onto wood use only the center holes of the connector half on the joint.	
GIGANT 180/40 6 KNAPP® CS-screws 10x120 or 5 KNAPP® CS-screws 10x120 with locking clip	6 KNAPP® CS-screws 10x80 or 6 KNAPP® CS-screws 10x120 for cross-laminated timber
Clip lock (optional locking feature)	
Fasten clip lock with the first screw of the connector half in the header. Hint: To fasten onto wood use only the center holes of the connector half on the joint.	

Characteristic value in the insertion direction tested and apply only with the use of original CSK-screws according to ETA 11/0190.

GIGANT screws

KNAPP® CS-screws (with reinforced shaft and cut-point) (GIGANT comes with matching CS-screws)

Art.-No. Z523 CS-screw 10x80 3/8" x 3-1/8"

Art.-No. Z524 CS-screw 10x120 3/8" x 4-3/4"



Application: For screwing the GIGANT in side grain (10x80) e.g. end grain (10x120).

GIGANT Accessories

Routing-jig GIGANT MULTI F40 (suitable for all sizes of GIGANT)

Art.-No. K502 Routing-jig (plywood)

Advice: All routing-jigs MULTI F are suitable for a $\varnothing = 30$ mm guide bush (for plunge router) and a $\varnothing = 15$ mm TCT finger mill cutter with $\varnothing = 12$ mm shaft.



Application: To recess the rebate in case of concealed installation, to copy screw positions on counterpart.

TCT finger mill cutter

Art.-No. Z068 TCT finger mill $\varnothing = 15$, length = 40 mm and $\varnothing = 12$ mm shaft

Application: To cut notch, recess the rebate for RICON® S.



Drilling-jig GIGANT (made of steel)

Art.-No. K631 Drilling-jig GIGANT 120 4-3/4"x1-9/16"x1"

Art.-No. K632 Drilling-jig GIGANT 150 5-15/16"x1-9/16"x1"

Art.-No. K633 Drilling-jig GIGANT 180 7"x1-9/16"x1"

Application: In conjunction with the routing jig to predrill screws.



Drilling-jig GIGANT (adjustable)

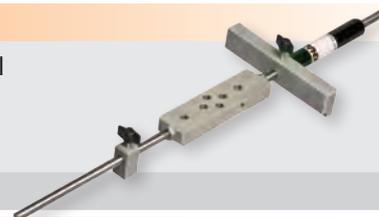
Art.-No. K463 Drilling-jig GIGANT 120 4-3/4"x1-9/16"x1"

Art.-No. K464 Drilling-jig GIGANT 150 5-15/16"x1-9/16"x1"

Art.-No. K465 Drilling-jig GIGANT 180 7"x1-9/16"x1"

Jig with hardened drill bushes for $\varnothing = 6$ mm

Application: Marking and pre-drilling of holes.



Clip lock GIGANT

Art.-No. Z525 Clip lock made of 2 mm steel, zinc galvanised and special coated.

Application: The clip lock secures against uplift and is used for loads against slide-in direction e.g. wind suction.



GIGANT

Installation

Installation with CNC joinery machine possible – all data for the standard CNC joinery machine programs are included.

Router with KNAPP® routing-jig

Rebate length L for header without lateral compression reinforcements in reference of the height H_N of the joint.

Joint height H_N [mm]	GIGANT 120/40	GIGANT 150/40	GIGANT 180/40
	Length L		
	[mm]	[mm]	[mm]
150	145	-	-
160	155	-	-
180	170	-	-
200	185	180	-
220	200	195	215
240	210	210	215
260	-	225	225
280	-	240	240
300	-	250	255
320	-	-	270
360	-	-	295



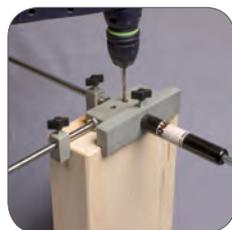
1) Routing



2) Pre-drilling header



3) Screw on



4) Predrilling joint



5) Screw on counterpart



6) Assemble

RICON® | The connector for post/latch and header/joint connections up to 28 kN

System advantages:

- | Approved for eccentric loads up to 850kg glass load
- | Always jointing – RICON® is adjustable to compensate timber tolerances
- | Connections for wood to wood, wood to steel and wood to concrete
- | Flexible installation – from outside to inside or reverse
- | Versatile – can be used for single and double connection
- | Unique – for polygon facades
- | Minimum required timber width only 50 mm (2")



Connection options: Single and double connection.



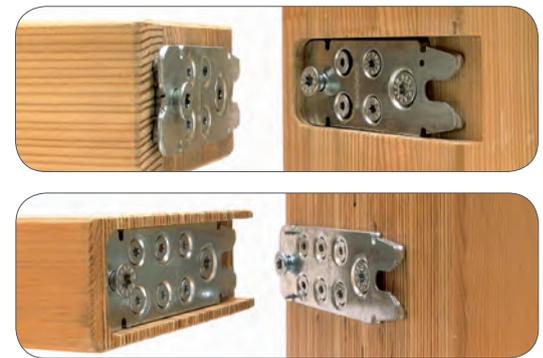
The dove-tail stamping makes it very easy to catch the CS-screws and slide-in the connector. It also ensures gap free assembly.

RICON® consists of two identical parts. It is made of premium quality steel and is hot-dip galvanized and made in Austria.

Ø = 5 mm CS-screws. Adjustable Ø = 8 mm RICON® CS-holding screws compensate timber tolerances. The reinforced shaft with integrated stop guarantees exact positioning.

Before final assembly, clip in the stainless spring steel stirrup into the locating slots. It locks the connection against the slide in direction and can be released again.

RICON® 60/40 60x40x12 2-3/8" x1-9/16"x1/2"	RICON® 80/40 80x40x12 3-1/8" x1-9/16"x1/2"	RICON® 100/40 100x40x12 3-15/16" x1-9/16"x1/2"	RICON® 120/40 120x40x12 4-3/4" x1-9/16"x1/2"	RICON® 140/40 140x40x12 5-1/2" x1-9/16"x1/2"	RICON® 160/40 160x40x12 6-5/16" x1-9/16"x1/2"



The RICON® can be milled in post and also in latch.



Reference projects with RICON® (Germany, China, Austria)

More Information in our KNAPP®-Brochure "Wood-Glass-Facades":
knapp-connectors.com/northamerica

WALCO® V | The connector for prefab wall up to 8,3 kN

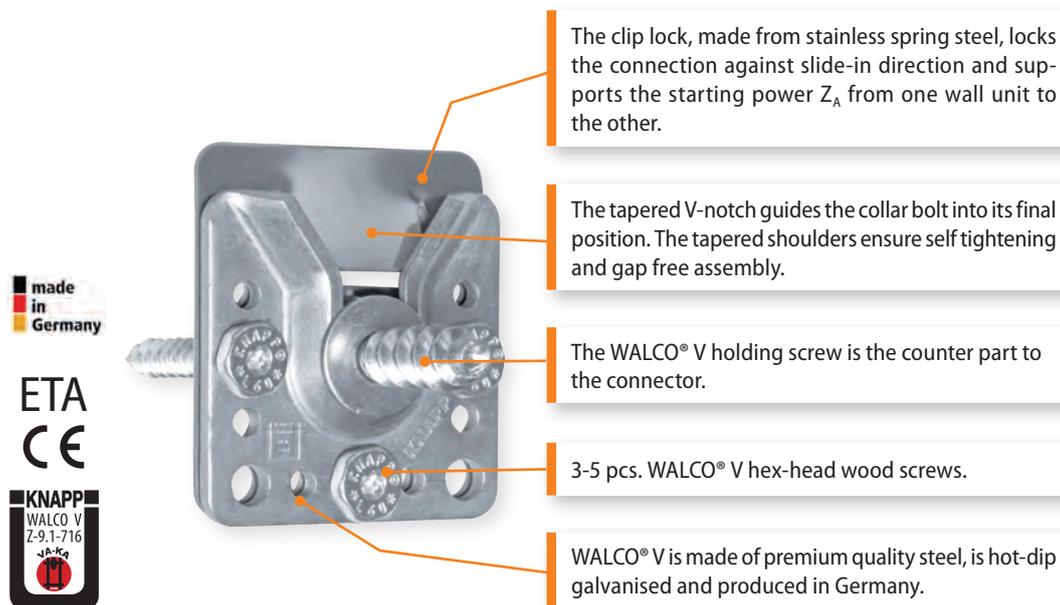
System advantages:

- Fast and accurate – stable connection after hook-in
- Assemble of prefabricated walls without screwing on site
- Connections for wood to wood, wood to steel and wood to concrete
- Connector thickness 13/15 mm
- Easy installation through tapered V-notch and holding screw
- Adjustment of joint spacing
e.g. for seals and readjustment of building tolerances
- Screwed directly onto studs or with interlayer (e.g. OSB)
- Minimum required timber width only 80 mm (3-1/8")



WALCO® V60
60x60x13
2-3/8"x2-3/8"x1/2"

WALCO® V80
80x80x15
3-1/8"x3-1/8"x5/8"



Installation example:
Mounted on the wall with double-sided element seals.



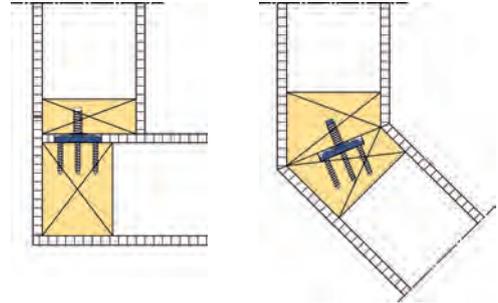
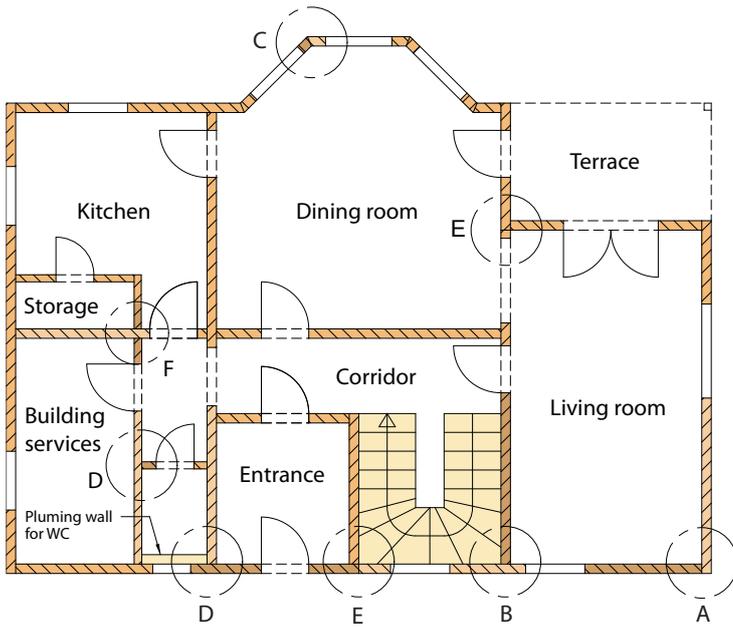
Installation example:
Mounted on the wall element.



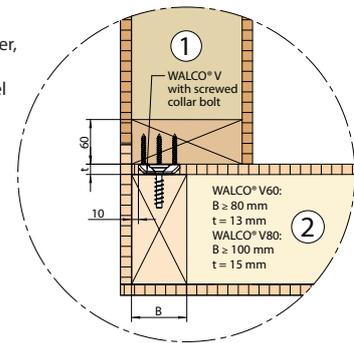
Boat House | Water-Holiday-World „Im Jaich“ | Rügen (DE)

WALCO® V60 / V80

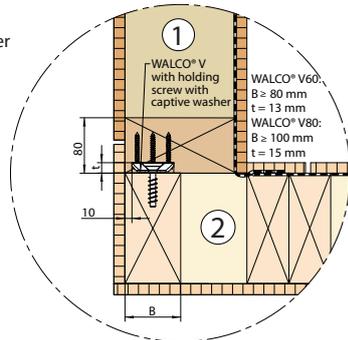
Application examples and connection details



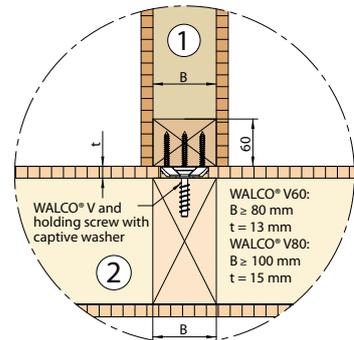
Detail A:
External wall corner,
planked with
wood-based panel



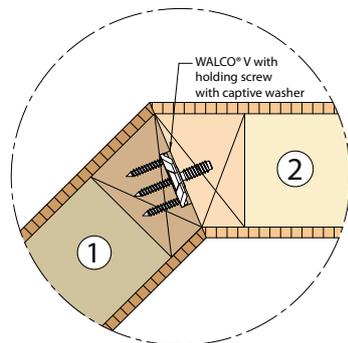
Detail A:
External wall corner
with vapor barrier
(PE-Im)



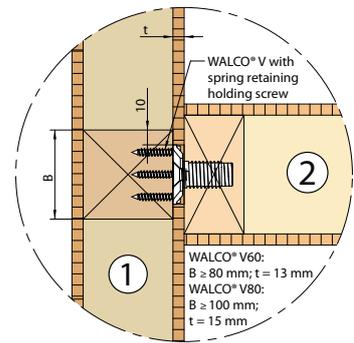
Detail B:
Internal wall
connected
to external wall



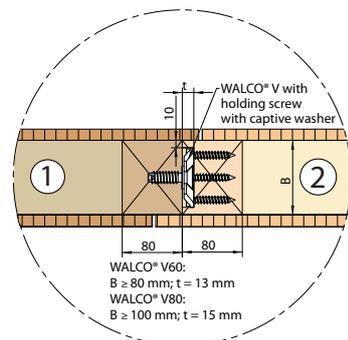
Detail C:
External wall
mitre corner



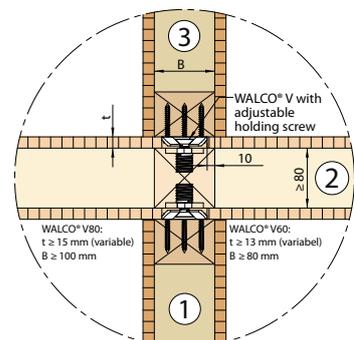
Detail D:
Internal wall
connection (e.g.
plumbing wall)



Detail E:
External wall
straight joint.
Internal wall
straight joint.



Detail F:
Internal wall
crossing



(All Dimensions in mm)

Overview WALCO® V – design values

Dimensioning according to ETA 10/0189 and O 86

WALCO® V60 - design values

Min. 80 mm timber width of stud

Art.-No.	Connector	Wood types	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K102	WALCO® V60	SPF	5,9	3,5	5,0	3,0	3,9	2,3
		CLT	5,9	3,5			3,9	2,3
		Glulam spruce pine	6,3	3,8			4,1	2,5
		D Fir-Larch	6,9	4,1			4,6	2,8

WALCO® V80 - design values

Min. 100 mm timber width of stud

Art.-No.	Connector	Wood types	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K103	WALCO® V80	SPF	7,1	4,3	5,0	3,0	4,5	2,7
		CLT	7,1	4,3			4,5	2,7
		Glulam spruce pine	7,5	4,5			4,8	2,9
		D Fir-Larch	8,3	5,0			5,3	3,2

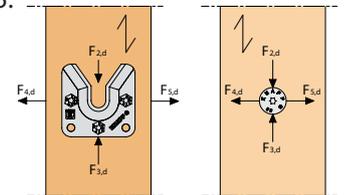
The factored values are based on load duration $KD = 1,0$ (standard terms), service condition $KSF = 1,0$ and treatment $KT = 1,0$ and material resistance factor $\phi = 0,6$.

$F_{1,Rk}$ (unfactored)	unfactored tension capacity (parallel to beam)
$F_{1,Rd}$ (factored)	factored tension capacity (parallel to beam)
$F_{2,Rk}$ (unfactored)	unfactored capacity in insert direction
$F_{2,Rd}$ (factored)	factored capacity in insert direction
$F_{45,Rk}$ (unfactored)	unfactored capacity perpendicular insert direction
$F_{45,Rd}$ (factored)	factored capacity perpendicular insert direction

Contact your local technical support for assistance.

Correction Factor f for other wood types

See page 5.



Practical example

Wind Load Canada:

$w_d = 0,6 \text{ kN/m}^2$ ($q = 0,5 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 102 \text{ km/h}$)

$w_d = 1,0 \text{ kN/m}^2$ ($q = 0,8 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 129 \text{ km/h}$)

$w_d = 1,5 \text{ kN/m}^2$ ($q = 1,25 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 160 \text{ km/h}$)

$w_d = 1,9 \text{ kN/m}^2$ ($q = 1,55 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 179 \text{ km/h}$)

$$w_d = \gamma_Q \cdot c_{pe} \cdot q = 1,5 \cdot c_{pe} \cdot q$$

Table 1: Wall width B in dependence of the number of connectors and wind load

We recommend min. 3 WALCO® V connectors for external wall corner.

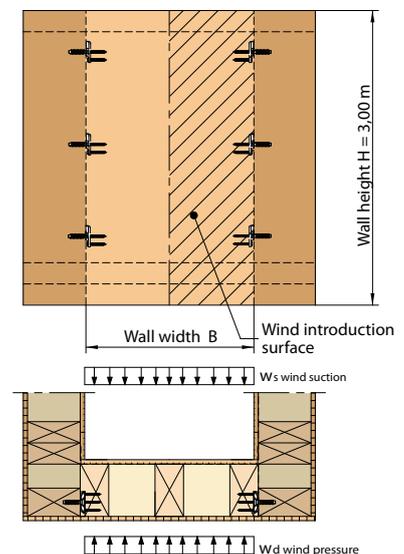
Qty/joint	Connector	Max. length of wall B [m]			
		Factored wind load [kN/m ²]			
		$w_d = 0,6$	$w_d = 1,0$	$w_d = 1,5$	$w_d = 1,9$
3	WALCO® V60	7,7	4,6	3,1	2,4
4	3 scr. 6x50	10,2	6,1	4,1	3,2
5	1 scr. 12x60	12,8	7,7	5,1	4,0
3	WALCO® V80	9,0	5,4	3,6	2,8
4	3 scr. 10x60	12,0	7,2	4,8	3,8
5	1 scr. 16x60	15,0	9,0	6,0	4,7

Factor $f = 100\%$, Wall height $H = 3,00 \text{ m}$

$F_{45}(\text{factored}) = 2,30 \text{ kN}$ (WALCO® V60 Connection)

$F_{45}(\text{factored}) = 2,70 \text{ kN}$ (WALCO® V80 Connection)

$$B = \frac{2 \cdot f \cdot n \cdot F_{45}(\text{factored})}{H \cdot w_d}$$



The graph shows the load directions and installation. Design values given in the table below should be used for structural analysis according to EC5 (EN1995-1-1).

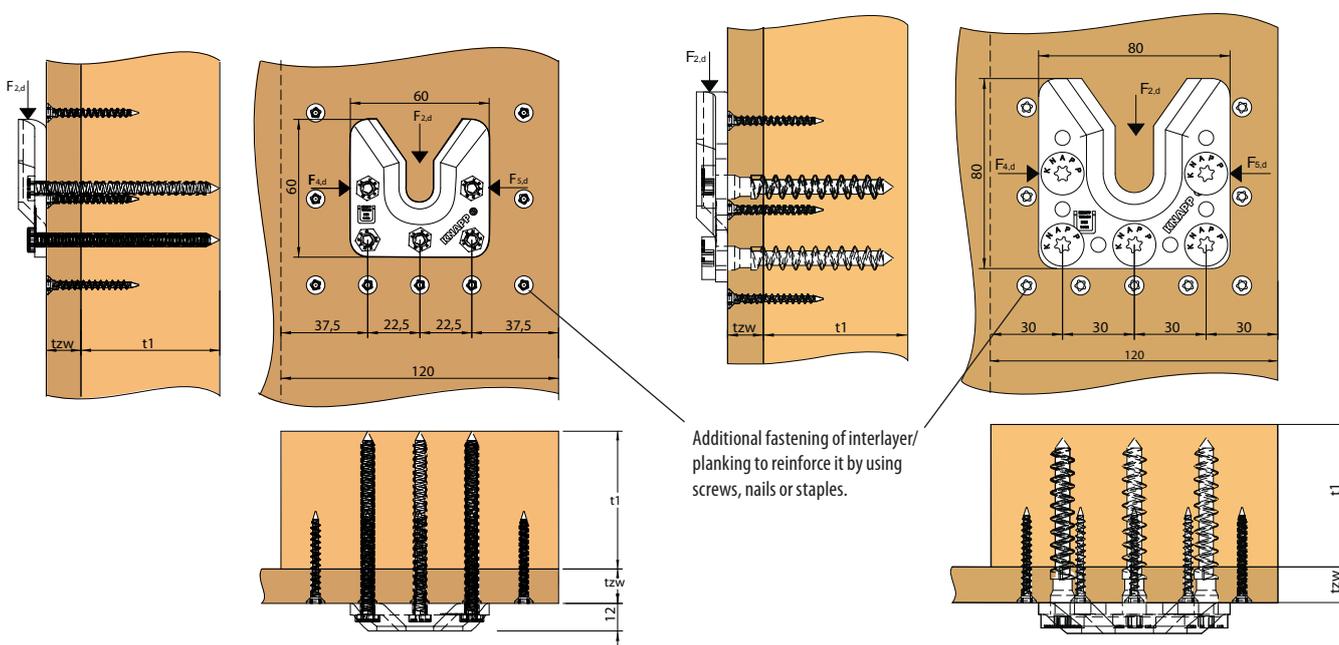
WALCO® V60 / V80

Design values in and perpendicular to insert direction with interlayer according to ETA 10/0189 and EN 1995

Thickness t_{zw} [mm]	Interlayer/ Stud	WALCO® V60 5 screws 6x80 1 screw 12x60				WALCO® V80 5 screws 10x80 1 screw 16x60			
		Design values of load-bearing capacity F_{Rd} [kN]				Design values of load-bearing capacity F_{Rd} [kN]			
		$F_{2,Rd}$ [[permanent]	$F_{2,Rd}$ [medium]	$F_{2,Rd}$ [short]	$F_{45,Rd}$ [short]	$F_{2,Rd}$ [[permanent]	$F_{2,Rd}$ [medium]	$F_{2,Rd}$ [short]	$F_{45,Rd}$ [short]
18	Gypsum Board / SPF	2,1	3,7	4,1	2,7	3,0	4,4	4,9	3,1
15		1,6	3,3	4,0		2,8			
22	OSB / SPF	2,2	3,7	4,1	2,7	3,3	4,4	4,9	3,1
15		2,3	3,9	4,1		3,3			
19	Particleboard / SPF	2,4	3,7	4,1	2,7	2,9	4,4	4,9	3,1
15		1,9	3,3	4,0		2,8			
19	Plywood / SPF	2,7	3,7	4,1	2,7	3,3	4,4	4,9	3,1
15									

WALCO® V60

WALCO® V80

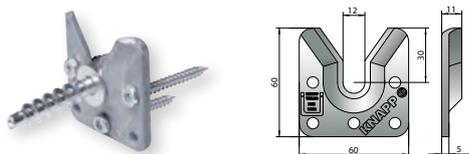


WALCO® V directly to intermediate layer (cladding) attached:

When screwing the WALCO® V connector directly to an intermediate layer, the unfactored values listed below can be used, these relate to the European Technical Approval ETA-10/0189 and on DIN 1052/EN 1995-1-1 (2010). The values are given for the different load directions. Note that the interlayer has to be connected with screws, nails or staples to the wooden stand (see picture above).

WALCO® V60 incl. holding screw and hex-head wood screws

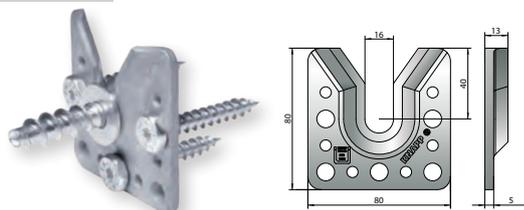
Art.-Nr. KS: K102



Holding screw	Hex-head wood screws	5 th % fractile [SPF, CLT]		
		$F_{2,Rk}$ [kN] (unfactored)	$F_{45,Rk}$ [kN] (unfactored)	$F_{1,Rk}$ [kN] (unfactored)
KS 12x60	3 pcs. 6x50	5,9	3,9	6,5

WALCO® V80 incl. holding screw and hex-head wood screws

Art.-Nr. KS: K103

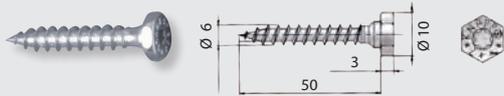


Holding screw	Hex-head wood screws	5 th % fractile [SPF, CLT]		
		$F_{2,Rk}$ [kN] (unfactored)	$F_{45,Rk}$ [kN] (unfactored)	$F_{1,Rk}$ [kN] (unfactored)
KS 16x60	3 pcs. 10x60	7,1	4,5	7,1

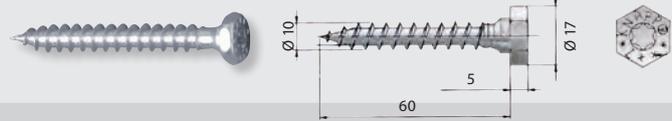
WALCO® V60 / V80

WALCO® V hex-head wood screws

Art.-No. Z550 V60 Hex-head wood screw 6x50 1/4" x 2"



Art.-No. Z551 V80 Hex-head wood screw 10x60 3/8" x 2-3/8"



Application: To screw on WALCO® V.

WALCO® V holding screws

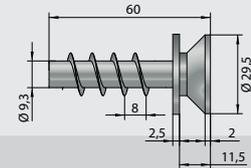
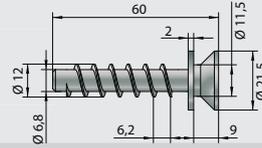
Holding screw with captive washer (KS)

Art.-No. Z552 V60 KS 12x60 1/2" x 2-3/8"

Art.-No. Z553 V80 KS 16x60 5/8" x 2-3/8"



WALCO® V60 / V80



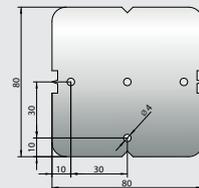
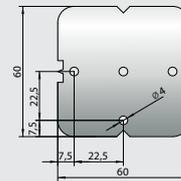
Application: The WALCO® V holding screw is the counter part to the connector.

Accessories

WALCO® V drilling-jig (made of steel)

Art.-No. K578 V60 drilling-jig 60x60 2-3/8" x 2-3/8" x 1/2"

Art.-No. K579 V80 drilling-jig 80x80 3-1/8" x 3-1/8" x 5/8"

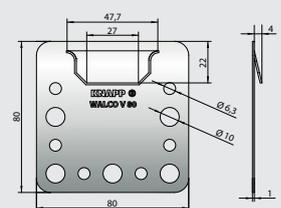
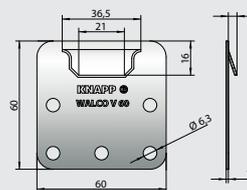


Application: Pre-drilling of the screws for precise installation.

WALCO® V clip lock (made of stainless steel)

Art.-No. K112 V60 clip lock 60x60 2-3/8" x 2-3/8" x 1/2"

Art.-No. K113 V80 clip lock 80x80 3-1/8" x 3-1/8" x 5/8"



Application: The clip lock secures against uplift and is used for loads against slide-in direction e.g. wind suction.

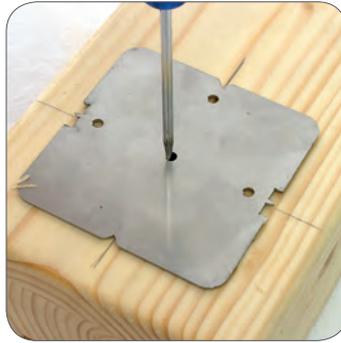
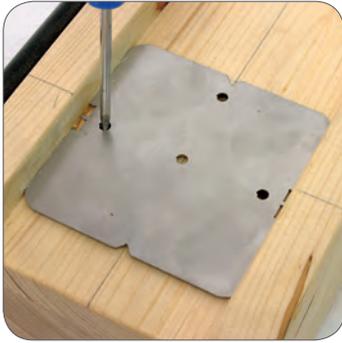


Four-storied wooden house in Bad Aibling (Germany)

WALCO® V

Installation

- Simple and fast installation with routing machine and optional KNAPP® template.
- Installation with CNC joinery machine possible – all data for the standard CNC joinery machine programmes are included.



1) If necessary make milling, mark drilling positions.



Milling with routing machine



2) Pre-drill screws (see installation instructions).



3) Screw on WALCO® V with the provided screws and retaining screw in counterpart.



Helicopter assembly of a house on the Rigi mountain (Switzerland)

Contact:

MyTiCon Timber Connectors Inc.

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BC V3W 9G2

☎ Sales: (604) 349 - TICO (8426)

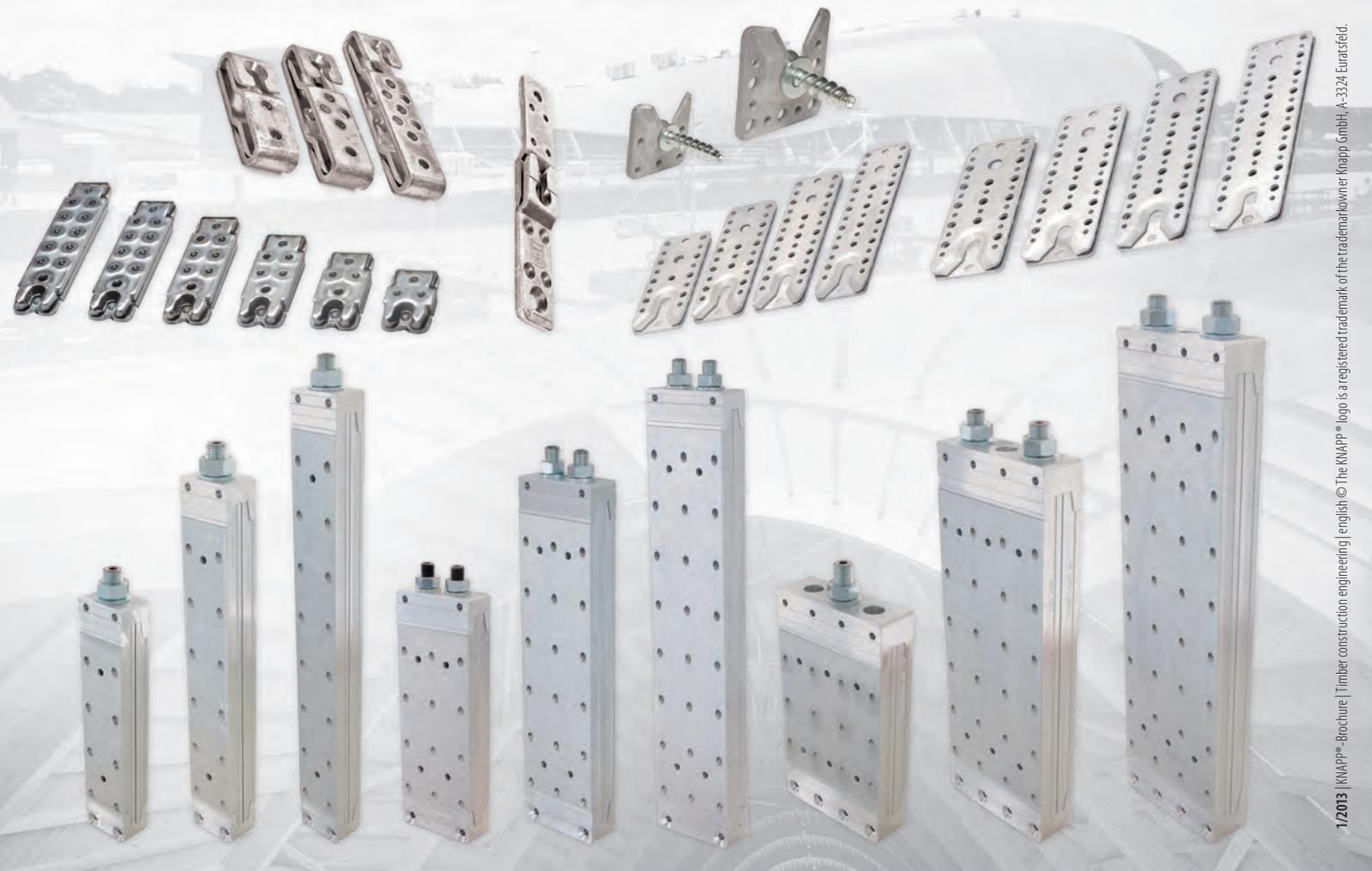
☎ Tech: (604) 347 - 7049

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