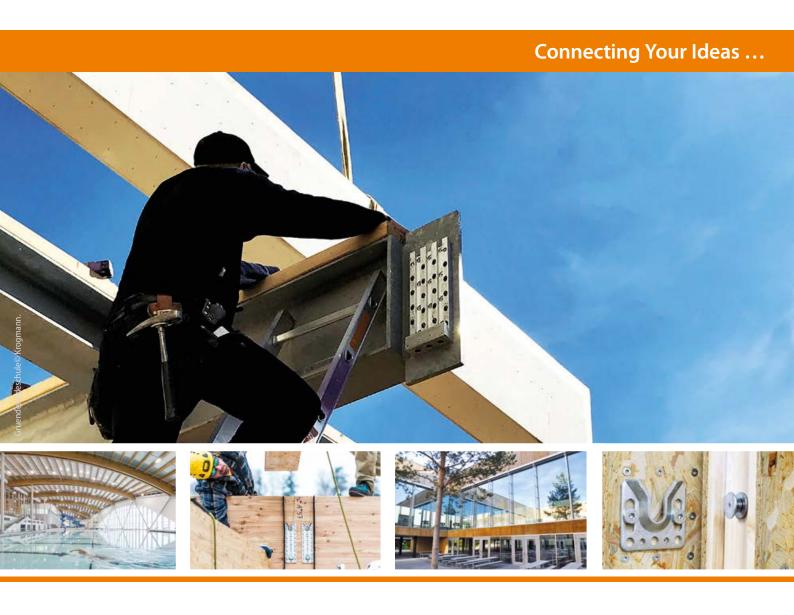
Connecting systems

for timber construction, wood curtain and prefabricated walls





Innovative solutions Made in Austria **Family Business** since 1983 Your business partner for timber frame mass timber constructions or curtain and prefabricated walls





Since our establishment in 1986, our family-owned business has been committed to pioneering innovative connectors for timber construction. We pride ourselves on using sustainable and, when possible, renewable materials, ensuring easy assembly and disassembly. At Knapp Connectors, we've long championed the circular principle, even before its widespread recognition.

In the ever-evolving landscape of architecture, durability, sustainability, and adaptability are paramount. Structures need to be resilient, environmentally friendly, and capable of being repurposed or reused. This requires connection systems that can seamlessly integrate with the principles of circular construction.

With this vision in mind, we've meticulously crafted a diverse range of connection systems tailored to meet the demands of timber and structural engineering. Our solutions offer innovative, sustainable, and circular approaches to various construction challenges.

Knapp Connectors are renowned for their easy prefabrication assembly, quick on-site installation, and hassle-free disassembly. They are not only reusable but also recyclable and can be upcycled, allowing for flexible modification, disassembly, and reconstruction as needed. Our materials are of the highest quality, boasting longevity, and some are even partly or wholly composed of renewable resources, like our Mateo timber nail.

At Knapp, we aim to be the trusted partner for architects and engineers looking to incorporate sustainable and resilient practices into their projects while ensuring long-term viability. We take pride in the diverse range of projects our valued customers have undertaken using our connectors.

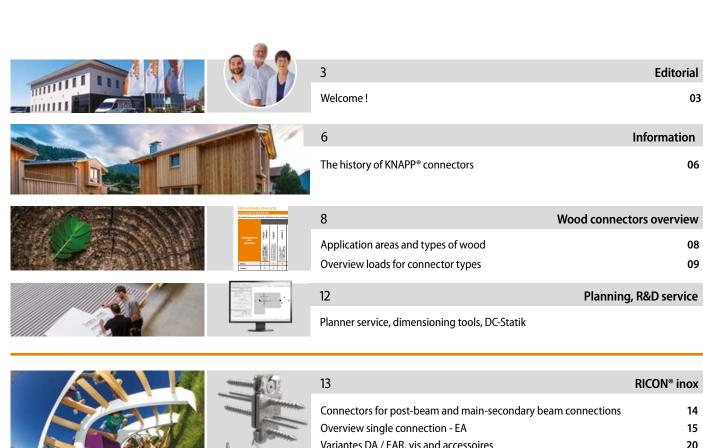
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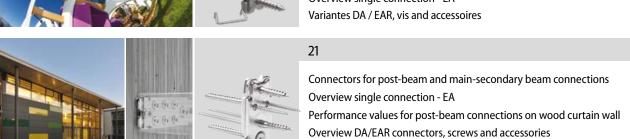
We're excited to share our new brochure and website, showcasing our wide array of both familiar and innovative connection systems, accompanied by numerous inspirational references. Our aim is to provide you with detailed insights and practical guidance for your construction needs.

Explore our product range, including RICON, GIGANT, WALCO, RICON S, MEGANT by T-JOINT, and MATEO, and join us in our commitment to staying ahead of industry trends. At Knapp Connectors, we're here to support you at every step of your construction journey.

Best regards,

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RICON® inox





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Guiding symbols: you will find the following symbols for orientation with e	each typ	oe of connector.	



Wood to wood connection



Wood to steel connection



Wood to concrete connection



Visible



Concealed



Allow prefabrication in workshop



Fire-resistance rating



Assembly from below



Assembly from above



Assembly every side-by-side



Assembly 3 or 4 sided



Certifications



KNAPP® - The main and secondary beams connecting revolution

KNAPP® connectors for future-oriented timber construction and engineered timber construction

supplier for innovative connecting systems in timber construction and timber engineering. We offer with GIGANT, RICON®, WALCO® V, RICON® S, MEGANT®

We are the Austrian manufacturer and

and T-JOINT a whole range of efficient

connecting systems.

All connecting systems have the European Approval (ETA) with CE marking, for many types of wood and modern wood materials and are externally monitored.

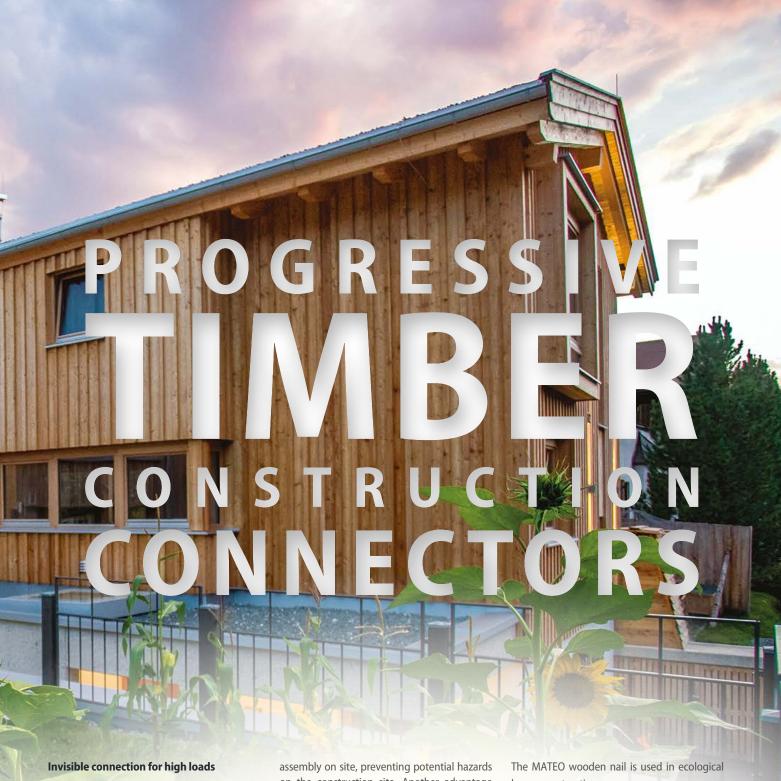
Architects, planners and manufacturers have the security of a European approved connecting system, which even meets the Swiss national building regulations.

The revolution

More than 20 years ago, we revolutionised endgrainfasteningsystems with, at the time, the only mechanical connector designed for main and secondary beams. We named it GIGANT and were the first on the European market to get German building approval for this field.

Tested, patented and approved

The proven and patented KNAPP® connecting systems can bear loads in all directions providing therefore the utmost safety and perfect functionality.



The RICON® S connectors extend the innovative product range and enable invisible and fast connections for loads up to 230 kN.

Heavy duty applications up to 768 kN are covered by the MEGANT® connectors.

High degree of prefabrication in house construction

The WALCO® V system has been designed for connecting timber walls in prefabricated houses and, like all KNAPP® timber connectors, can be structurally calculated. Connections are possible to wood, steel, concrete and masonry. The greatest advantage of the WALCO® V connector is enabling the whole precast wall production in the factory followed by a precise and fast on the construction site. Another advantage of the WALCO® V system is that wall openings, as required with conventional screw connections, are no longer needed.

This has the effect of a significantly tighter wall in direct comparison. Over the time, the system has been complemented by variable base plates for modular and facade walls and now with the new wall to floor anchor WALCO® L and T.

Product innovations

The T-JOINT angled cylinder connects perfectly rigid frame corners and tension joints by means of a transverse screw connection and is ideal for assembling carports.

house construction.

Analysis and Planner service

We offer a planning and dimensioning service to planners, structural engineers and architects.

You have the choice between an interactive load table, a dimensioning tool and a DC-Statik manufacturer's version of Dietrich's to create a pre-dimensioning yourself and our customized calculation service by our engineers.

Only close cooperation during the planning phase guarantees the efficient realisation of all projects. All timber construction connectors are available directly from KNAPP® or from selected sales partners and dealers.

Wood connectors overview

Applications for timber connecting systems

The chart provides a quick overview of the versatility and areas of application of all KNAPP $^{\circ}$ connectors.

	Connectors												
	p. 13	p. 21	p. 37	p. 47	p. 89	p. 109	p. 115	p. 127	p. 133	p. 141	p. 147	p. 153	p. 161
AREAS OF APPLICATION AND	RICON® inox	RICON®	GIGANT	RICON® S	MEGANT®	WALCO® Z	WALCO® V	WALCO®	WALCO® BOLT	WALCO® PIPE	WALCO® Land T	T-JOINT	MATEO
TYPES OF WOOD	9 9 9 9	00000			444	Cor y Cold . It							MANAGE
Balcony	•	•	•	•								•	
Carport	•	•	•	•					•			•	•
Curtain wall, wall mounting		•				•	•	•	•	•	•		•
Prefabricated house construction	•	•		•		•	•	•	•	•	•	•	•
Industrial buildings		•	•	•	•							•	
Wood-aluminum curtain walls	•	•	•										
Timber frame construction		•	•	•			•	•	•	•	•	•	•
Post and Beam construction		•	•	•	•						•		•
Mass Timber Construction				•	•						•	•	•
Modular building				•	•	•	•	•	•	•		•	•
Playground and sports equipment	•	•	•										•
Canopy, porch, pergola	•	•	•						•	•		•	
Winter garden, sunroom	•	•	•					•				•	
Solid wood (SCWD), Softwood (SWD), Hardwood (HWD)	•	•	•	•	•	•	•	•	•	•	•	•	•
Solid structural timber (KVH)	•	•	•	•		•	•	•	•	•	•	•	•
Glue Laminated Timber Beams (GLT)	•	•	•	•	•	•	•	•	•	•	•	•	•
Laminated veneer lumber LVL (KERTO®)	•	•	•	•	•	•	•	•			•	•	•
BauBuche		•	•	•	•							•	
Duo and Trio laminated beams	•	•	•	•	•	•	•	•	•	•			
Cross-laminated Timber (CLT)	•	•	•	•	•	•	•	•	•	•	•	•	•
MAGNUMBOARD® OSB						•	•						
Accoya	•	•		•								•	

BEAM HANGER SELECTION OVERVIEW (all RICON® ranges)

Pre-selection tool for using KNAPP® connectors on glulam beams GL24h

The overview allows a quick identification of the suitable KNAPP® connectors. The table shows the permissible loads for each system in relation to the minimum cross-section of the beam.

For more information on each connector, please refer to the pages indicated in the right-hand column of the table. Parameters such as geometry and special connections must be checked.

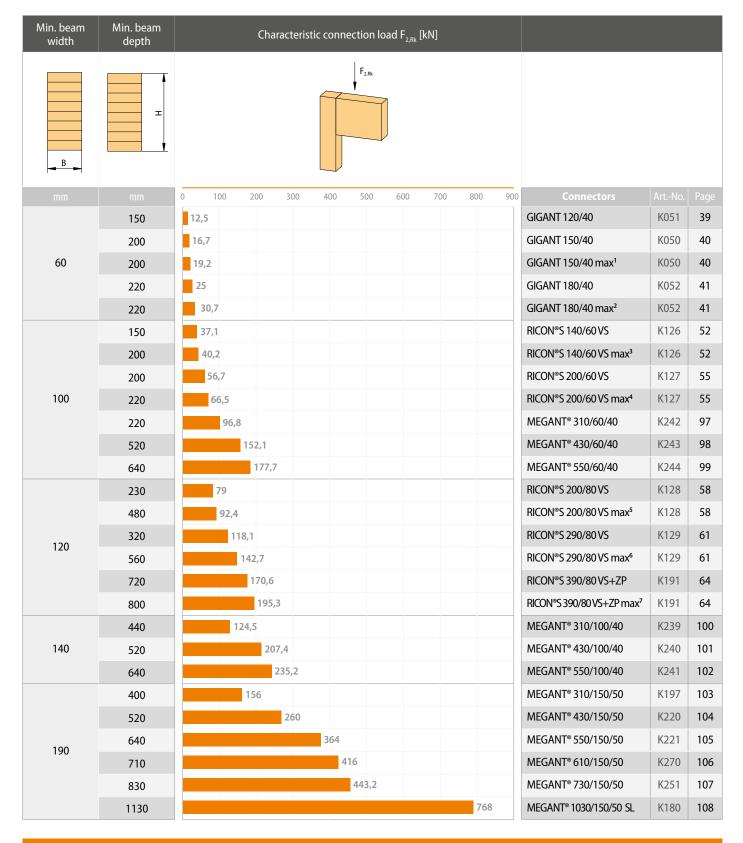


^{*}These RICON® stainless steel connectors are only available on request, for further information please contact our consultants directly.



CONNECTEURS CONSTRUCTION BOIS

Pre-selection tool for using KNAPP® connectors on glulam beams GL24h

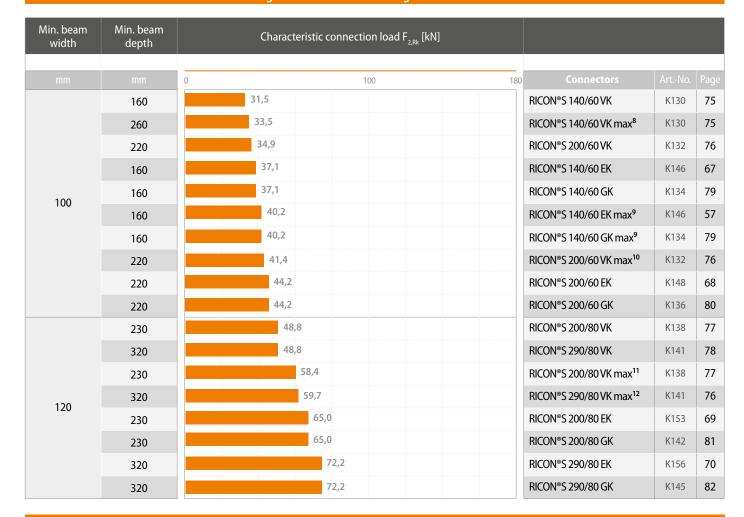


Screw connection alternatives (for higher load bearing capacities)

- $^{\rm 1}\,$ GIGANT 150x40 max with 4 CS-screws 10x200 in secondary beam
- ² GIGANT 180x40 max with 6 CS-screws 10x200 in secondary beam
- $^{3}\,$ RICON°S 140x60 VS max with 10 CS-screws 8x240 in secondary beam
- ⁴ RICON®S 200x60 VS max with 16 CS-screws 8x240 in secondary beam
- ⁵ RICON®S 200x80 VS max with 16 CS-screws 10x300 in secondary beam
- ⁶ RICON®S 290x80 VS max with 25 CS-screws 10x300 in secondary beam
- ⁷ RICON®S 390x80 VS+ZP max with 28 CS-screws 10x300 in secondary beam

RICON® S range

RICON®S EK GK - Pre-selection tool for using KNAPP® connectors on glulam beams GL24h

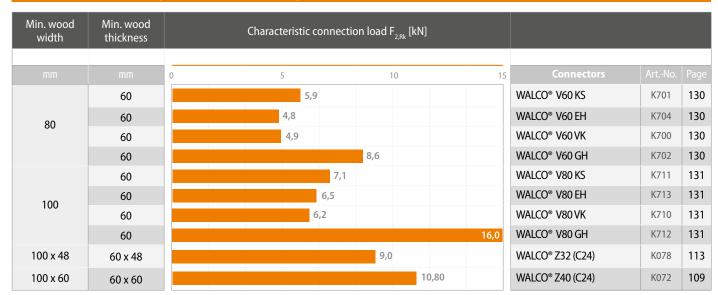


Screw connection alternatives (for higher load bearing capacities)

- ⁸ RICON®S 140x60 VK max with 8 CS-screws 8x240 in secondary beam
- ⁹ RICON®S 140x60 EK/GK max with 10 CS-screws 8x240 in secondary beam
- ¹⁰ RICON®S 200x60 VK max with 8 CS-screws 8x240 in secondary beam

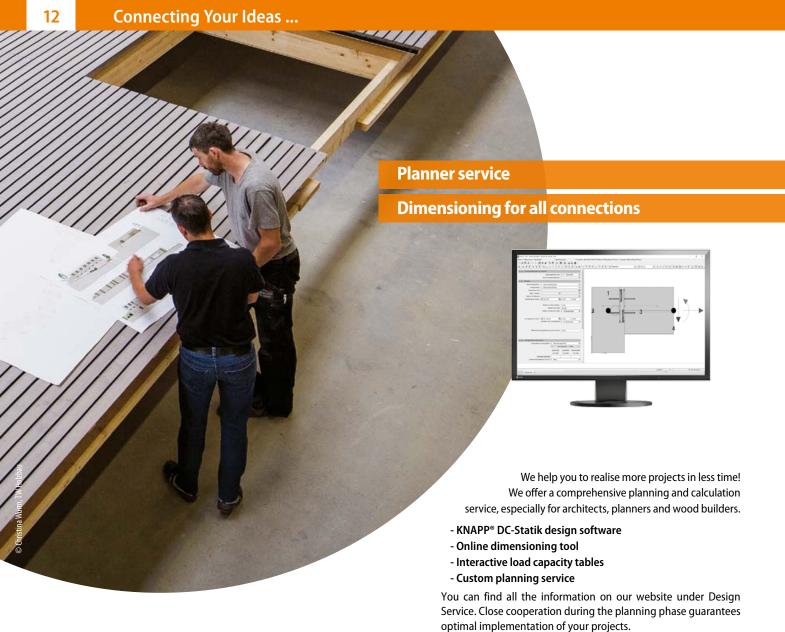
WALCO® range

Pre-selection tool for using KNAPP® connectors on glulam beams GL24h



¹¹ RICON®S 200x80 VK max with 9 CS-screws 10x300 in secondary beam

¹² RICON®S 290x80 VK max with 9 CS-screws 10x300 in secondary beam



Partner software

Recommended partner software for interfacing to machine processing:













We now offer our KNAPP® DC-Statik design software. KNAPP® DC-Statik is available for the connector products MEGANT®, GIGANT, RICON®, RICON® S and RICON® stainless steel. With this software you can easily create verifiable documents and calculate your projects safely! You can download the programme free of charge.



The timber construction and wall connectors are implemented and available in the DataStore of SEMA. The SEMA user is able to download the master data for the KNAPP® connection systems in the SEMA programme. The master data of the KNAPP® fasteners are easily accessible in the SEMA DataStore via the DataStore button. These are available in the languages German, English and French.



2D structural elements and their connection nodes are calculated with the structural analysis software from Wallner Mild und Dietrich structural analysis software. The connection nodes can be dimensioned with the Knapp connectors RICON®, GIGANT®, RICON®S and MEGANT®.



Wood connector

Made of A2 stainless steel with usage classification 3 Connecting up to 17,4 kN*

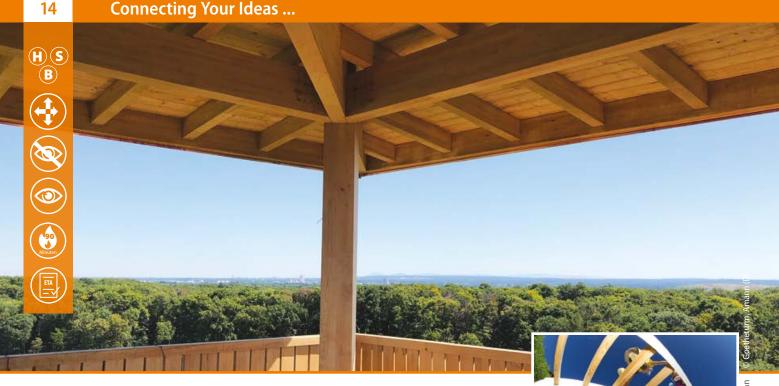
- I Minimum timber width up from 30 mm
- I Multiple disassembly and reassembly possible
- I Prefabrication in factory
- I Flexible installation from the outside and inside
- I Joint can be adjusted to correct possible tolerances
- I Secure connection with locking clip
- I Available as single and double connection

Available in 13 sizes and 3 versions.

The values only apply when used with original KNAPP® screws! Design values are available on our website under Planer Service.

* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA 10/0189 (2022/08/25), for glulam GL24h.



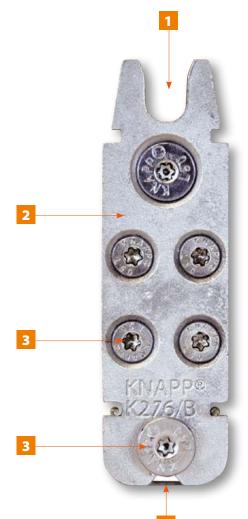


RICON® inox

- | Applications: visible and concealed connections
- Connections: Steel, concrete, wood materials and special wood species. e.g. oak, Douglas fir, larch and impregnated woods (Accoya)
- Indoor and outdoor applications: garden furniture, balcony, terrace roofing, carport, playgrounds and sports equipments, pergola and other structures in service class 1 to 3.



Corrosion resistance class 2 - Outdoors for pergolas, balconies, playground equipment and special types of wood.



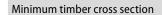
- The dovetail shape ensures optimum reception of the RICON® stainless steel retaining CS-screws. The short clamping distance makes it easy to hook in, while engaging the plates, ensuring tightness and fast assembly of the elements.
- RICON® consists of two identical plates made of A2 inox (stainless steel). Inox screws and locking clip are included.
- Ø 5 mm and Ø 8 mm RICON® CS-screws have a reinforced shank and collar for optimum strength and grip.
- The stainless spring steel locking clip can be installed into the locating slots prior to final assembly.
 It locks the connection against the slide-in direction and can be disassembled if needed.

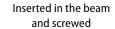
Fire rating: Fire resistance (EN 1995-1-2) through 3-4 sided concealed, joint-tight installation (R30 \geq 28 mm, R60 \geq 49 mm)

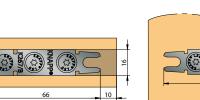


RICON® inox 66/16

(Dimensions in mm)







Built-in depth: 11-11,5 mm

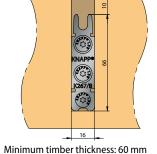
Screwed

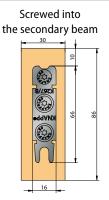
onto post

Minimum timber thickness: 50 mm

and screwed

Inserted in the main beam

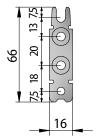




RICON® 66/16 inox - single connection (EA)

Art.-No. K267



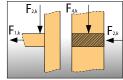


RICON®	Connection	Screw co	Screw connection		rge. [GL24h] R.1*
inox		Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]**
66/16	EA	3 CS 5x80	3 CS 5x50	3.5	4.8
1 locking clip: F _{3,Rk} = 1,0 kN			2 locki	ng clips: F _{3.Rk} =	2,0 kN

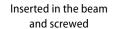
Minimum timber cross section: 30 x 86 mm

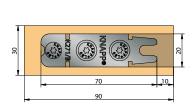
Alternative screws: **load varies.

3 CS-screws 5x25 3 CS-screws 5x30 3 CS-screws 5x50 3 CS-screws 5x60 * Homogeneous glulam - indoor



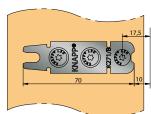
RICON® inox 70/20





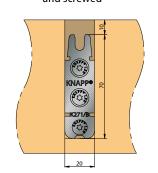
Built-in depth: 11-11,5 mm

Screwed onto post



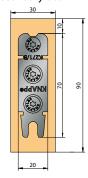
Minimum timber thickness: 50 mm

Inserted in the main beam and screwed



Minimum timber thickness: 60 mm

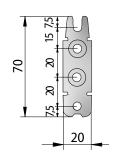
Screwed into the secondary beam



RICON® 70/20 inox - single connection (EA)

Art.-No. K271





RICON®	Connection	Screw co	nnection	Charact. cha C.SE	rge. [GL24h] [R.1*	
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]**	
70/20	EA	3 CS 5x80	3 CS 5x50	3.5	4.8	
1 locking clip: F _{3,Rk} = 1,0 kN			2 locking clips: F _{3,Rk} = 2,0 kN			

1 locking clip: $F_{3,Rk} = 1.0 \text{ kN}$

Minimum timber cross section: 30 x 90 mm

Alternative screws: **load varies.

3 CS-screws 5x25 3 CS-screws 5x30 3 CS-screws 5x50 3 CS-screws 5x60

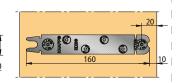
* Homogeneous glulam - indoor							
F _{1k} F _{2k} F _{2k}							

RICON® inox 25 (Dimensions in mm)

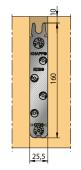
Minimum timber cross section

Inserted in the beam and screwed

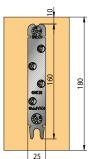
Screwed onto post



Inserted in the main beam and screwed



Screwed into the secondary beam



Built-in depth: 11-11,5 mm

Minimum timber thickness: 50 mm

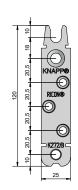
Minimum timber thickness: 60 mm

RICON® inox series 25

RICON® 120/25 inox - single connection (EA)

Art.-No. K272

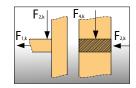




RICON®	Connection	Screw connection		Charact. charge. [GL24h] C.SER.1*		
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]	
120/25	EA	2 CS 8x80 3 CS 5x80	2 CS 8x50 3 CS 5x50	4.4	8.9	
1 locking clip: $F_{3,Rk} = 1.0 \text{ kN}$			2 locking clips: F _{3,Rk} = 2,0 kN			

Minimum timber cross section: 38 x 140 mm

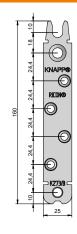
* Homogeneous glulam - indoor



RICON® 160/25 EA inox - single connection (EA)

Art.-No.K273

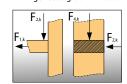




RICON®	Connection	Screw connection		Charact. charge. [GL24h] C.SER.1*		
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]	
160/25	EA	2 CS 8x80 4 CS 5x80	2 CS 8x50 4 CS 5x50	4.4	10.4	
1 locking clip: F _{2.04} = 1,0 kN			2 locking clips: F _{2.0k} = 2,0 kN			

Minimum timber cross section: 38 x 180 mm

* Homogeneous glulam - indoor



RICON® references

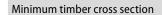


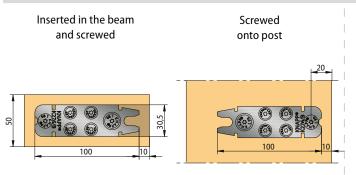




RICON® inox 30

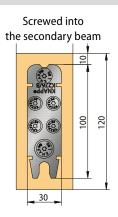
(Dimensions in mm)





Built-in depth: 11-11,5 mm Minimum timber thickness: 50 mm Inserted in the main beam and screwed

Minimum timber thickness: 60 mm

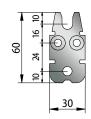


RICON® inox 30

RICON® 60/30 EA inox - single connection (EA)

Art.-No.K274

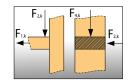




RICON®	Connection	Screw co	nnection	Charact. cha C.SE	
inox		Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
60/30	EA	2 CS 5x80 1 CS 8x80	2 CS 5x50 1 CS 8x50	4.4	5.2
1 locking clip: F _{2.51} = 1.9 kN			2 locki	na clips: F =	3.8 kN

Minimum timber cross section: 50 x 80 mm

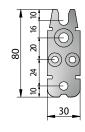
* Homogeneous glulam - indoor



RICON® 80/30 EA inox - single connection (EA)

Art.-No.K275

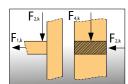




RICON®	Connection	Screw connection		Charact. charge. [GL24h] C.SER.1*		
inox		Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]	
80/30	EA	2 CS 8x80 2 CS 5x80	2 CS 8x50 2 CS 5x50	4.4	7.5	
1 locking clip: F _{3.0k} = 1.9 kN			2 locking clips: F _{3.Pk} = 3.8 kN			

Minimum timber cross section: 50 x 100 mm

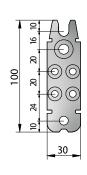
* Homogeneous glulam - indoor



RICON® 100/30 EA inox - single connection (EA)

Art.-No.K276

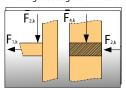




RICON®	Connection	Screw connection		Charact. charge. [GL24h] C.SER.1*		
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]	
100/30	EA	2 CS 8x80 4 CS 5x80	2 CS 8x50 4 CS 5x50	4.4	10.4	
1 locking clip: $F_{acc} = 1.9 \text{ kN}$			2 locki	ng clips: F _{a si} =	3.8 kN	

Minimum timber cross section: 50 x 120 mm

* Homogeneous glulam - indoor

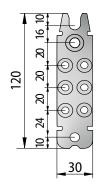


(Dimensions in mm)

RICON® 120/30 EA inox - single connection (EA)

Art.-No.K277

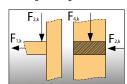




	RICON®	Connection	Screw co	nnection	Charact. cha C.SE	
	inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
Ī	120/30	EA	2 CS 8x80 6 CS 5x80	2 CS 8x50 6 CS 5x50	4.4	13.2
	1 locking clip: F _{3,Rk} = 1.9 kN			2 lock	ing clips: F _{3,Rk} =	3.8 kN

Minimum timber cross section: 50 x 140 mm

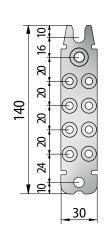
* Homogeneous glulam - indoor



RICON® 140/30 EA inox - single connection (EA)

Art.-No.K278

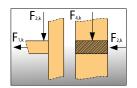




RICON®		Screw co	nnection	Charact. charge.	[GL24h] C.SER.1*
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
140/30	EA	2 CS 8x80 8 CS 5x80	2 CS 8x50 8 CS 5x50	4.4	16.1
1 locking clip: F _{3.Rk} = 1.9 kN			2 lock	ing clips: F _{3.Rk} = 3	3.8 kN

Minimum timber cross section: 50 x 160 mm

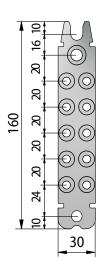
 $\hbox{* Homogeneous glulam - indoor}\\$



RICON® 160/30 EA inox - single connection (EA)

Art.-No.K279

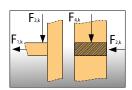




RICON®	Connection	Screw co	nnection	Charact. charge. [GL24h] C.SER.1*	
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
160/30	EA	2 CS 8x80 10 CS 5x80	2 CS 8x50 10 CS 5x50	4.4	17.4
1 locking clip: F _{3.Rk} = 1.9 kN			2 lock	ing clips: F _{3,Rk} = 3	3.8 kN

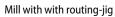
Minimum timber cross section: 50 x 180 mm

* Homogeneous glulam - indoor



Installing RICON® inox - Main-secondary beam connection type







Pre-drill and screw





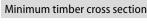
Assemble

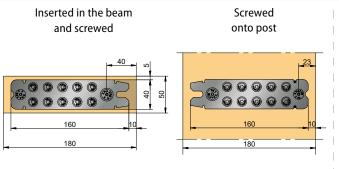


Secured connection using a locking clip

RICON® inox 40

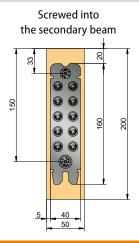
(Dimensions in mm)





Built-in depth: 11-11,5 mm

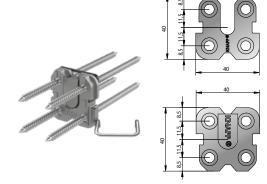
Inserted in the main beam and screwed 00 00 00 40



RICON® inox 40

RICON® 40/40 EA inox - single connection (EA)

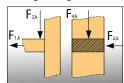
Art.-No.K378



RICON®	Connection	Screw co	nnection	Charact. cha C.SE	
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
40/40	EA	4 CS 5x80	4 CS 5x50	7.5	4.0
1 locking clip: F _{3,Rk} = 2.7 kN			2 locki	ing clips: F _{3,Rk} =	5.4 kN

Minimum timber cross section: 50 x 60 mm

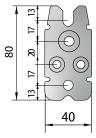
* Homogeneous glulam - indoor



RICON® 80/40 EA inox - single connection (EA)

Art.-No.K372

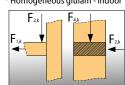




RICON®	C	Screw co	nnection	Charact. charge.	[GL24h] C.SER.1*
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
80/40	EA	2 CS 8x80 2 CS 5x80	2 CS 8x50 2 CS 5x50	4.4	7.5
1 locking clip: F _{3,Rk} = 2.7 kN			2 lock	ing clips: F _{3,Rk} =	5.4 kN

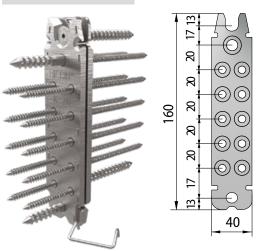
Minimum timber cross section: 50 x 100 mm

* Homogeneous glulam - indoor



RICON® 160/40 EA inox - single connection (EA)

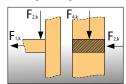
Art.-No.K376



RICON®		Screw co	nnection	Charact. charge. [[GL24h] C.SER.1*
inox	Connection	Joist	Header	F _{1,RK} [kN]	F _{2,RK} [kN]
160/40	EA	2 CS 8x80 10 CS 5x80	2 CS 8x50 10 CS 5x50	4.4	17.4
1 locking clip: $F_{3,Rk} = 2.7 \text{ kN}$			2 locki	ng clips: F _{3.Rk} =	5.4 kN

Minimum timber cross section: 50 x 180mm

* Homogeneous glulam - indoor



RICON® inox DA and EAR for all sizes

Double connection with connecting nuts and RICON® inox CS-screws (available upon request)

Single or double connection with inserts and RICON® inox CS-screws (available upon request)











RICON® inox screws

RICON® Self-tapping CS-screws with reinforced shaft (delivery includes CS-screws with the matching RICON® connectors)

 Art.-No. Z950
 Inox A2 CS-screws 5x50

 Art.-No. Z953
 Inox A2 CS-screws 8x50

Application: to screw the RICON® inox plate into the side grain of main beam/post.

Art.-No. Z952 Inox A2 CS-screws 5x80
Art.-No. Z954 Inox A2 CS-screws 8x80

Application: to screw the RICON® inox plate into the side grain of secondary beam/latch.



RICON® inox DA - EAR CS-screws

Art.-No. Z955 Inox A2 CS-screws M5x16 (for RICON® 60/40 DA)
Art.-No. Z956 Inox A2 CS-screws M8x18 (for RICON® DA and EAR)

Application: to mount RICON® plate in a cross joint double connector (DA or EAR).



minimin

RICON® DA connecting nuts

(delivery includes connecting nuts with the matching RICON® connectors)

Art.-No. K540 Connecting nut M5 8x48 50 mm post thickness
Art.-No. K541 Connecting nut M5 8x53 55 mm post thickness
Art.-No. K542 Connecting nut M5 8x58 60 mm post thickness
Art.-No. K543 Connecting nut M5 8x78 80 mm post thickness



Application: to mount RICON® inox 60/40 double connector (DA).

Art.-No. K544 Connecting nut M8 10x36 <50 mm post thickness Art.-No. K545 Connecting nut M8 10x48 50 mm post thickness Art.-No. K546 Connecting nut M8 10x53 55 mm post thickness Art.-No. K547 Connecting nut M8 10x58 60 mm post thickness Art.-No. K548 Connecting nut M8 10x68 70 mm post thickness Art.-No. K549 Connecting nut M8 10x78 80 mm post thickness



Application: to mount RICON® and RICON® inox bigger sizes double connectors (DA).

Insert RICON® inox EAR

(delivery for connecting nuts with the matching RICON® connectors are available upon request)

Art.-No. Z540 Insert M5x14 for RICON® 60/40

Art.-No. Z541 Insert M8x18

Application: to mount unique applications and post sizes.



Connector for curtain walls

Connecting post-beam curtain walls up to 700 kg as glass load and main to secondary beam up to 23 kN* as vertical load

- Minimum timber width up from 50 mm
- Can be assembled and disassembled at will, repeatedly
- I High degree of prefabrication in factory for fast and precise assembly on site
- Elements are assembled on site without the need for any further screw fastening
- Later adjustment of gap between joints
- I Compensating for structural tolerances
- Application also permitted on interlayer
- For 90°-45° screw connection along the grain



The values only apply when used with original KNAPP® screws! Design values are available on our website under Planer Service.

* Characteristic value F_{2,Rk} in slide-in direction according to ETA 10/0189 (2022/08/25), for hardwood D30 (e.g. oak).

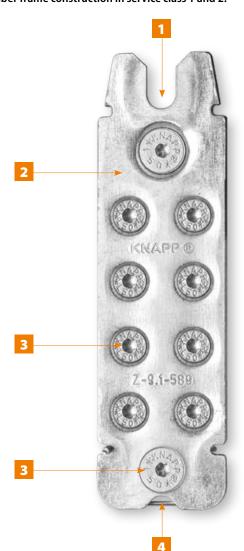




- Applications: concealed post-beam and main-secondary beam connections
- I Connections: wood materials e.g. laminated veneer lumber (Kerto®), BauBuche, hardwoods, steel and concrete
- Areas of application: aluminum-wood-glass curtain wall, winter garden, canopy, pergola, timber frame construction in service class 1 and 2.



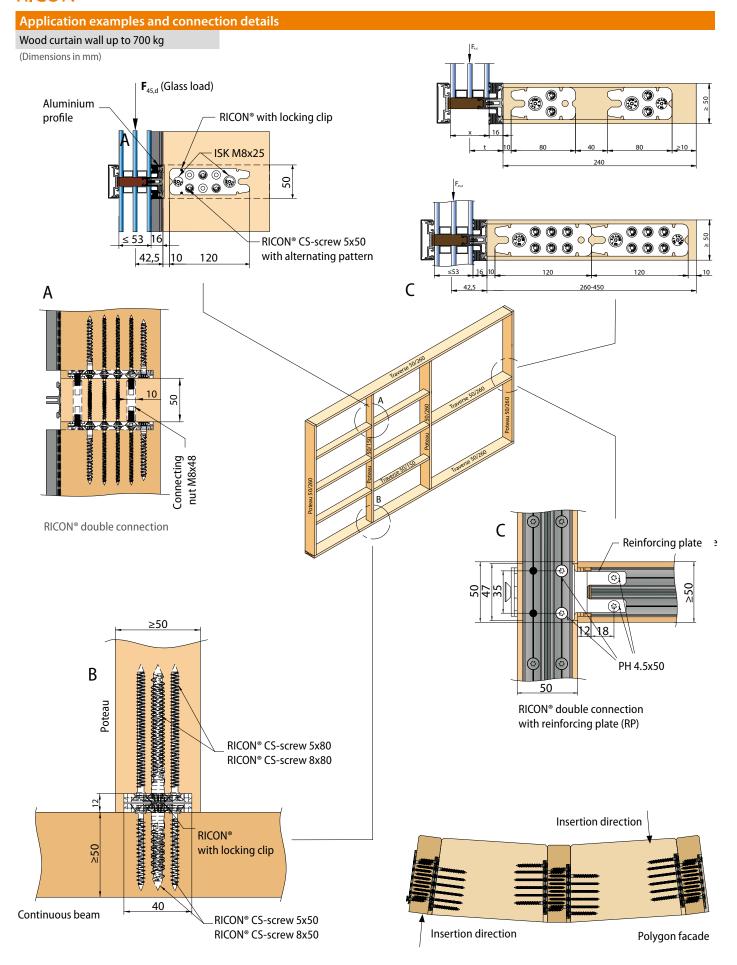
Installation example: RICON® Mensa Schloss Holte

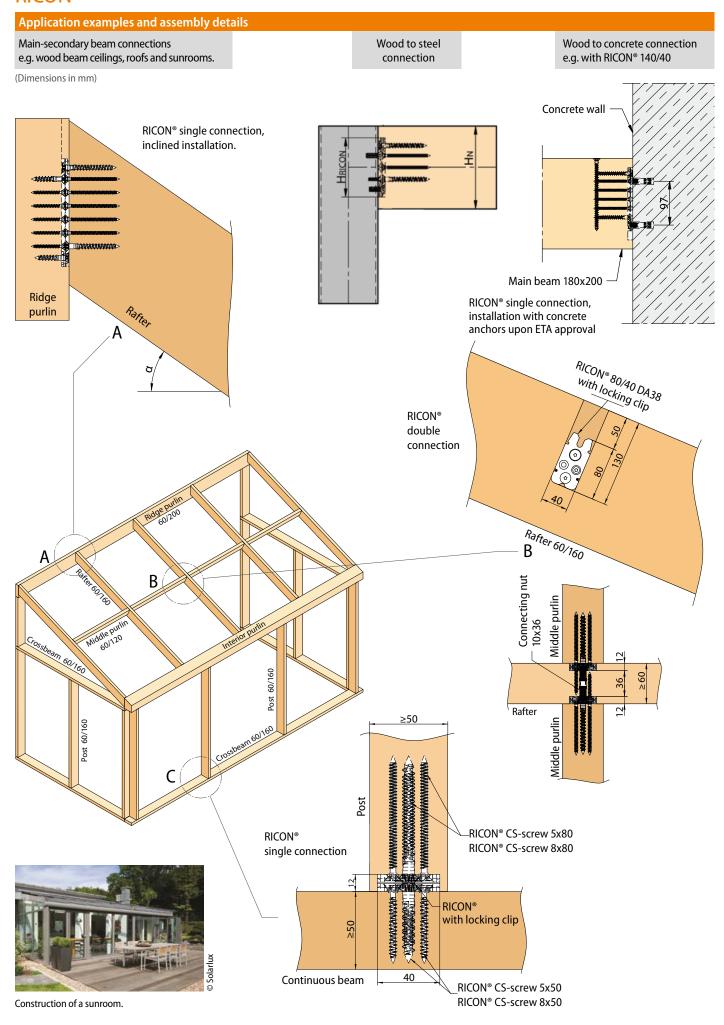


- The dovetail shape ensures optimum reception of the RICON® retaining CS-screws. The short clamping distance makes it easy to hook in, while engaging the plates, ensuring tightness and fast assembly of the elements.
- RICON® consists of two identical parts. It is made in Austria from a premium quality steel and is also available hot-dip galvanized.
- Ø 5 mm and Ø 8 mm RICON® CS-screws. These adjustable holding screws compensate fabrication tolerances. The reinforced shaft with integrated stop guarantees exact positioning.
- The stainless spring steel locking clip can be installed into the locating slots prior to final assembly. It locks the connection against the slide-indirection and can be released again.

Fire rating: Fire resistance (EN 1995-1-2) through 3-4 sided concealed, joint-tight installation (R30 \geq 28 mm, R60 \geq 49 mm)

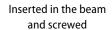


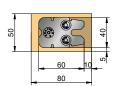




RICON® 60/40 (Dimensions in mm)

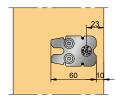
Minimum timber cross section





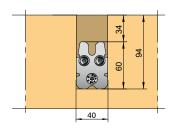
Built-in depth: 12-12.5 mm

Screwed onto post



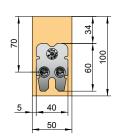
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



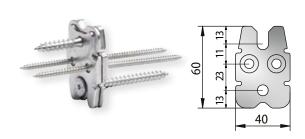
Min. width of of main beam: 60 mm

Screwed into the secondary beam

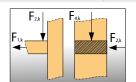


RICON® 60/40 EA - single connection

Art.-No. K360



Connector	Connection	Screw co	nnection	Charact. cha C.SE	
		Joist	Header	F _{1,RK} [kN]	F _{2,Rk} [kN]
60/40	EA	2 CS 5x80 1 CS 8x80	2 CS 5x50 1 CS 8x50	4.4	5.0
1 locking clip: F _{3,Rk} = 2.7 kN			2 locking clips: F _{3,Rk} = 5.15 kN		



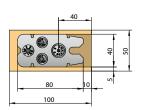
Minimum timber dimensions: 50 x 80 mm

Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

RICON® 80/40

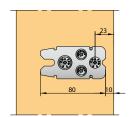
Minimum timber cross section

Inserted in the beam and screwed



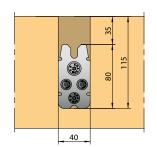
Built-in depth: 12 - 12.5 mm

Screwed onto post



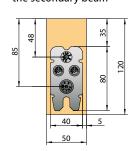
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



Min. width of of main beam: 60 mm

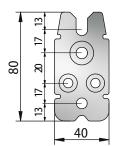
Screwed into the secondary beam



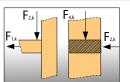
RICON® 80/40 EA - single connection

Art.-No. K361





Connector	Connection	Screw co	Screw connection		Charact. charge. [GL24h] C.SER.1*	
		Joist	Header	F _{1,RK} [kN]	F _{2,Rk} [kN]	
80/40	EA	2 CS 5x80 2 CS 8x80	2 CS 5x50 2 CS 8x50	4.4	7.3	
1 locking clip: F _{3.Rk} = 2.7 kN		2.7 kN	2 locki	ng clips: F _{3 Rk} =	5.4 kN	



Minimum timber dimensions: 50 x 100 mm

Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

^{*} alternatively, longer screws can be used in end grain.

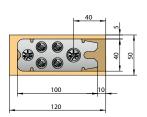
¹ CS-screw $8x160 - F_{2,RK} = 6.3 \text{ kN}$

^{*} alternatively, longer screws can be used in end grain. 2 CS-screws $8x160 - F_{2,Rk} = 10.3 kN$

RICON® 100/40 (Dimensions in mm)

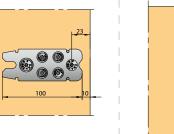
Minimum timber cross section

Inserted in the beam and screwed



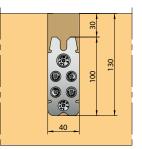
Built-in depth: 12-12.5 mm Min. width of beam and post: 50 mm

Screwed onto post

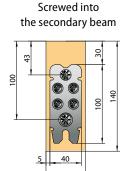


and screwed

Inserted in the main beam



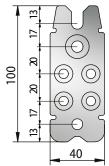
Min. width of of main beam: 60 mm



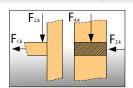
RICON® 100/40 EA - single connection

Art.-No. K362





Connector	Connection	Screw co	nnection	Charact. charge. [GL24h] C.SER.1*	
		Joist	Header	F _{1,RK} [kN]	F _{2,Rk} [kN]
100/40	EA	4 CS 5x80 2 CS 8x80	4 CS 5x50 2 CS 8x50	4.4	10.0
1 locking clip: F _{3,Rk} = 2.7 kN			2 locki	ng clips: F _{3,Rk} =	5.4 kN



Minimum timber dimensions: 50 x 120 mm

Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

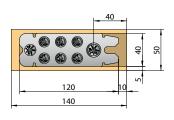
 $\mbox{\ensuremath{^{\ast}}}$ alternatively, longer screws can be used in end grain.

 $^{\circ}$ 2 CS-screws $8x160 - F_{_{2,RK}} = 13.9 \text{ kN}$

RICON® 120/40

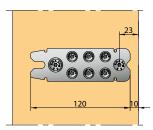
Minimum timber cross section

Inserted in the beam and screwed



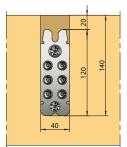
Built-in depth: 12-12.5 mm

Screwed onto post



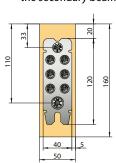
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



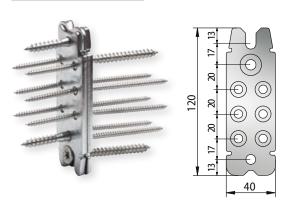
Min. width of of main beam: 60 mm

Screwed into the secondary beam

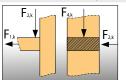


RICON® 120/40 EA - single connection

Art.-No. K363



Connector	Connection	Screw co	nnection	Charact. cha C.SE	
		Joist	Header	F _{1,RK} [kN]	F _{2,Rk} [kN]
120/40	EA	6 CS 5x80 2 CS 8x80	6 CS 5x50 2 CS 8x50	4.4	12.8
1 locking clip: F _{3,Rk} = 2.7 kN			2 locki	ing clips: F _{3,Rk} =	5.4 kN



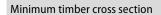
Minimum timber dimensions: 50 x 140 mm

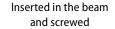
Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

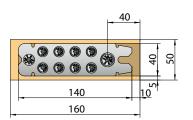
- * alternatively, longer screws can be used in end grain.
- $2 \text{ CS-screws } 8x160 F_{2, RK} = 16.6 \text{ kN}$

RICON® 140/40

(Dimensions in mm)

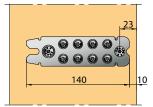






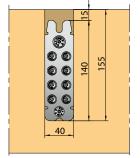
Built-in depth: 12-12.5 mm

Screwed onto post

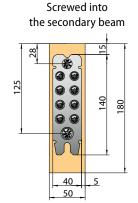


Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



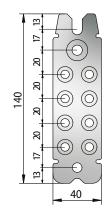
Min. width of of main beam: 60 mm



RICON® 140/40 EA - single connection

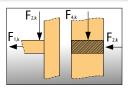
Art.-No. K365





Connector	Connection	Screw co	nnection	Charact. charge. [GL24h] C.SER.1*		
		Joist	Header	F _{1,RK} [kN]	F _{2,Rk} [kN]	
140/40	EA	8 CS 5x80 2 CS 8x80	8 CS 5x50 2 CS 8x50	4.4	15.5	
1 lock	ing clip: F _{3,Rk} = 2	2,7 kN	2 locki	ng clips: F _{3,Rk} =	ng clips: F _{3,Rk} = 5,4 kN	

125



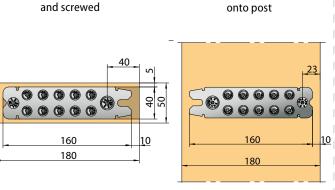
Minimum timber dimensions: 50 x 160 mm

Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

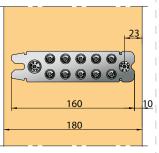
* alternatively, longer screws can be used in end grain.

2 CS-screws $8x160 - F_{2,RK} = 19,3 \text{ kN}$

Minimum timber cross section Inserted in the beam



Built-in depth: 12-12.5 mm

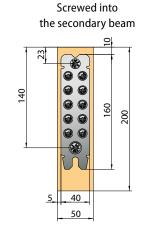


Screwed

Min. width of beam and post: 50 mm

Inserted in the main beam and screwed **6** 00 00

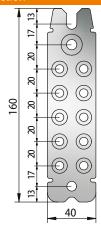
Min. width of of main beam: 60 mm



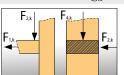
RICON® 160/40 EA - single connection

Art.-No. K364





Connector	Connection	Screw co	nnection	Charact. charge. [GL24h] C.SER.1*	
		Joist	Header	F _{1,RK} [kN]	F _{2,Rk} [kN]
160/40	EA	10 CS 5x80 2 CS 8x80	10 CS 5x50 2 CS 8x50	4.4	18.2
1 locking clip: F _{3,Rk} = 2.7 kN			2 locki	ng clips: F _{3,Rk} =	5.4 kN



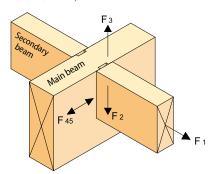
Minimum timber dimensions: 50 x 180 mm

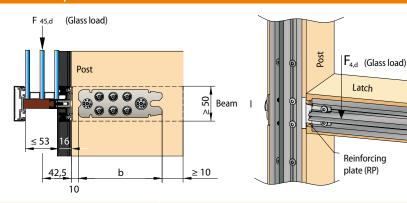
Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

- * alternatively, longer screws can be used in end grain.
- $2 \text{ CS-screws } 8x160 F_{2, RK} = 22.0 \text{ kN}$

Load bearing capacities for timber curtain wall example

(Dimensions in mm)





Timber		Characteristic values			Charact. cha	rge. [kN] F _{3,Rk}	Eccentric glass loads/post F _{4,Rd}		
RICON®	grade	F _{1,Rk} [kN]	F _{2,Rk} [kN]	Centred F _{45,Rk}	Locking	•	without VP [kg]	with VP [kg]	
		[KN]	[KN]	[kN]	1	2		[Kg1	
60/40	C24	4,1	4,7	5,2			43	317	
	GL24h	4,4	5,0	5,2	2,7	5,0	47	320	
	GL32h	4,9	5,5	5,2			52	326	
	C24	4,1	6,8	8,0			59	332	
80/40	GL24h	4,4	7,3	8,7	2,7	5,4	64	337	
	GL32h	4,9	8,1	9,7			71	345	
	C24	4,1	9,4	11,8			94	368	
100/40	GL24h	4,4	10,0	12,8	2,7	5,4	102	376	
	GL32h	4,9	11,0	14,3			114	388	
	C24	4,1	12,0	15,4			131	404	
120/40	GL24h	4,4	12,8	15,6	2,7	5,4	142	415	
	GL32h	4,9	14,0	15,6			158	432	
	C24	4,1	14,5	15,6			169	443	
140/40	GL24h	4,4	15,5	15,6	2,7	5,4	183	457	
	GL32h	4,9	16,9	15,6			205	478	
	C24	4,1	17,1	15,6			210	484	
160/40	GL24h	4,4	18,2	15,6	2,7	5,4	227	501	
	GL32h	4,9	19,9	15,6			254	528	
	C24	4,1	11,5	10,4			180	453	
2 x 80/40	GL24h	4,4	12,3	10,4	2,7	5,4	195	468	
		4,9	13,6	10,4			218	491	
	C24	4,1	16,6	15,6			270	543	
2 x 100/40	GL24h	4,4	17,8	15,6	2,7	5,4	292	566	
	GL32h	4,9	19,5	15,6			327	600	
	C24	4,1	21,8	15,6			356	630	
2 x 120/40	GL24h	4,4	23,2	15,6	2,7	5,4	385	659	
= /. 120, 10	GL32h	4,9	25,4	15,6			431	704	

Tested at the University of Karlsruhe (KIT), Building certification: ETA-10/0189

Monitored by Univ.-Prof. Dr.-Ing. Blaß. at the University of Karlsruhe (KIT) Research Center for Steel, Timber and Masonry.

F_{1, Rk}/F_{1, Rd} F_{2, Rk}/F_{2, Rd}

F_{45, Rk}/F_{45, Rd}

Characteristic/Design values of load-bearing capacity in the case of single stress perpendicular to the connector plate (tension)

Characteristic/Design values in slide-in direction

 $r_{3,RK}/r_{3,Rd}$ Characteristic/Design values in sinde-in direction $r_{3,RK}/r_{3,Rd}$ Characteristic/Design values against the slide-in direction

Characteristic/Design values perpendicular to slide-in direction

RICON® reinforcing plate (inox)**

MICON TE	illiorcing plai	te (IIIOX)							ucco.com	
K519	K523	K530	K531	K533	K534	K535	K536	K537	K538	ŀ
Schüco GP 50/50 50 mm*	Schüco GP 50/60 60 mm*	RP RP-tecline 50A0-HA	RP RP-tecline 60A0-HA	RP RP-tecline 80A0-HA	Gutmann P GF 50 50 mm*	Gutmann P GF 60 60 mm*	Gutmann P GF 80 80 mm*	RAICO GP 41 and 47 50 mm*	RAICO GP 41 and 47 60 mm*	(
		50mm*	60mm*	80mm*						

Application:

The reinforcing plate connects the base aluminium profiles and increases the load capacity of the post and beam connection. The reinforcing plate is available for different base profiles (see table). Reinforcing plates for other profiles on request.

*width of post and beam



Glazing up to 1100 kg with the Schüco AOC.TI curtain wall profile system:

In combination with RICON® connectors for the assembly of the wooden supporting structure and with the help of suitable glazing supports, this system allows glazing loads of up to 1,100 kg per crossbar.

K539 RAICO GP 67 80 mm*

www.schueco.com

^{**} Reinforcing plates are approved by the building authorities for all common systems as shown in ETA-10/0189.

RICON® DA and EAR for all sizes

Double connection with connecting nuts and RICON® CS-screws

Single- or dual connection with insert and RICON® CS-screws











RICON® screws

RICON® Self-tapping CS-screws with reinforced shaft (CS-screws are included with all RICON® connectors)

Application: to mount RICON plate into the side grain of main beam/post.

Art.-No. Z534 CS-screws 5x80
Art.-No. Z532 CS-screws 8x80
Art.-No. Z581 CS-screws 8x160

Application: to mount RICON plate into the end grain of secondary beam.



CS-screws (CS) RICON® DA

Art.-No. Z545 CS-screws RICON® M5x20 (for RICON® 60/40 DA)

Art.-No. Z548 CS-screws RICON® M8x25

Application: to mount RICON plate in a cross joint double connector application.



Connecting nuts RICON® DA

(Connecting nuts are included with all RICON DA connectors)

Art.-No. K540Connecting nut M5 8x4850 mm post thicknessArt.-No. K541Connecting nut M5 8x5355 mm post thicknessArt.-No. K542Connecting nut M5 8x5860 mm post thicknessArt.-No. K543Connecting nut M5 8x7880 mm post thickness



Application: to mount RICON® 60/40 double connector (DA).

ArtNo. K544	Connecting nut M8 10x36	<50 mm post thickness
ArtNo. K545	Connecting nut M8 10x48	50 mm post thickness
ArtNo. K546	Connecting nut M8 10x53	55 mm post thickness
ArtNo. K547	Connecting nut M8 10x58	60 mm post thickness
ArtNo. K548	Connecting nut M8 10x68	70 mm post thickness
ArtNo. K549	Connecting nut M8 10x78	80 mm post thickness



Application: to mount RICON 80/40 and bigger sizes double connectors.

Inserts RICON® EAR

(connecting inserts can be included upon request)

Art.-No. Z540 Insert M5x14 for RICON® 60/40

Art.-No. Z541 Insert M8x18

Application: for unique applications and post sizes.



RICON® accessories

Routing-jig for all RICON® sizes

Art.-No. K502 Routing-jig MULTI F40 (plywood)

Note: the routing-jig MULTI F is suitable for a \emptyset 30 mm bushing guide (for plunge router) and a \emptyset 15 mm TCT router cutter.

Application: for milling the pocket to recess connector for concealed mounting.



RICON® EA/DA drilling-jig guide (galvanized steel)

Art.-No. K621 K622 K623 K624 K629 K630 60/40 80/40 100/40 120/40 140/40 160/40

Application: for installation into the drilling-jig and exact pre-drilling of the positioning srews.



TCT slotting cutter

Art.-No. Z066 2 flute straight router bits Ø 15 mm, 25 mm length with Ø 8 mm shank

Application: to recess the rebate for RICON® and GIGANT.

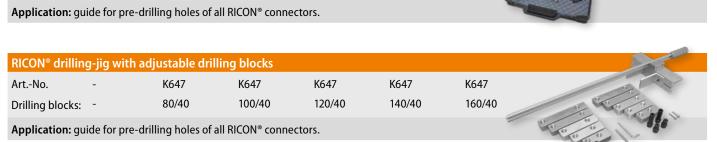


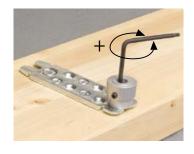
RICON® locking clip (stainless spring steel)

Art.-No. K064 RICON® locking clip

Application: to lock the connectors against slide-in direction. If necessary, the connection can be released again.

RICON® EA	/DA drilling-jig f	or post-bea	m connections				r in the second
ArtNo.	K634	K635	K636	K637	K638	K639	
	60/40 Set	80/40	100/40	120/40	140/40	160/40	
RICON® EA	/DA drilling-jig f	or header-j	oint connection	S			
ArtNo.	K634	K642	K643	K644	K645	K646	
	60/40 Set	80/40	100/40	120/40	140/40	160/40	





RICON® mounting set

Art.-No. K065 Consisting of: 1 RICON®-depth gauge incl.

1 Torx wrench T25 combined with Allen key SW5

age incl. Allen key SW5

Application: for fine tuning of RICON® CS-screws.

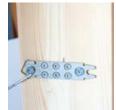
RICON® and RICON® inox

Post-beam connection for curtain walls (EA and DA)













Recess with routing-jig

Pre-drill with drilling-jig

Screw connection

Install the locking clip

Slide together

Secure connection with locking clip

Locking clip

Depending on load requirements, the locking clip can be inserted on one or onboth sides. If the connection is accessible, it can be unlocked.



To unlock the connection, it is necessary tobend up the locking clip in its center e.g. with a screwdriver.

Routing dimension RICON® inox								
Width	Height	Depth						
40.5 mm	variable	11.5 ^{+0,5} mm						
30.5 mm	variable	11.5 ^{+0,5} mm						
20.0 mm	80 mm	11.0 ^{+0,5} mm						
16.0 mm	66 mm	11.0 ^{+0,5} mm						

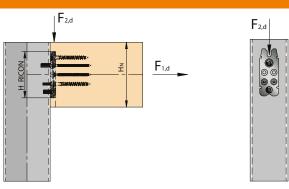
Routing dimension RICON® Width Height Depth 40 mm variable 12 mm

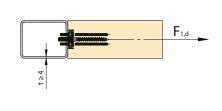
The recess can be routed on either side depending on the application. In this case (left picture), the connector plate is recessed into the beam/latch.



Rafter connection with RICON® 160/40.

RICON® wood to steel connection



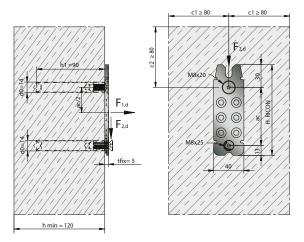


		Traction	Shear force			
KNAPP® connector	F _{t.Rk} [kN]* on 4 mm steel	F _{1,8k} [kN]* on glulam GL24h	F _{v,Rk} [kN]* on 4 mm steel	F _{2.8k} [kN]* on glulam GL24h		
RICON 60x40				5,0		
RICON 80x40 RICON 100x40 RICON 120x40				7,3		
	20.0	4,4	21.6	10,0		
	30,8	4,4	31,6	12,8		
RICON 140x40				15,5		
RICON 160x40				18,2		
	$\boldsymbol{F}_{t,Rd} = \boldsymbol{F}_{t,Rk} / \boldsymbol{\gamma}_{M,2}$	$F_{_{1,Rd}} = k_{_{mod}} x F_{_{1,Rk}}/\gamma_{_{M}}$	$\boldsymbol{F}_{v,Rd} = \boldsymbol{F}_{v,Rk} / \boldsymbol{\gamma}_{M,2}$	$F_{1,Rd} = k_{mod} \times F_{1,Rk} / \gamma_{M}$		
Sizing value	$Y_{M,2} = 1,25$	$Y_{M} = 1,3$	$Y_{M,2} = 1,25$	$Y_{M} = 1,3$		
calculation		k _{mod} = 0,8 KLED medium		k _{mod} = 0,8 KLED medium		
		k _{mod} = 0,9 KLED short		k _{mod} = 0,9 KLED short		
*Screw connection	2 CS M8x25	RICON® end-grain screw connection	2 CS M8x25	RICON® end-grain screw connection		
ociew connection	2 CS M5x20	CS 8x80, CS 5x80	2 CS M5x20	CS 8x80, CS 5x80		

RICON® wood to concrete connection

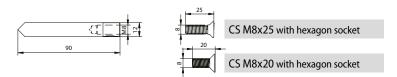
Header-joist connection with glued anchor

(Dimensions in mm)



Concrete strength class C20/25

fischer RG 12x90 M18 I (8.8) with CS M8x25 and CS M8x20 (zinc-coated steel)







Wood to concrete connection in slide-in direction F₂

${\sf F_2}$ load-bearing values in the direction of insertion										
	Concrete connection			Timber connection						
KNAPP® connector	F _{2,Rd,concrete}	Spacing	Wood	material	F _{2,Rd,timber}					
	Shear force F _{2,Rd,concrete} [kN]	Dowel spacing ac [mm]	Wood	Char. Density ρ _k	Characteristic	Characteristic values [kN]		Design values F _{2,Rd,} γ _M = 1,3 [kN]		
			type	LVDE I	$F_{2,KCC,Rk}$, $\gamma_M = 1,0$	F _{2,Rk}	k _{mod} = 0,6	k _{mod} = 0,8	k _{mod} = 0,9	
RICON® 100/40	14,00	C24 350		9,40	4,34	5,78	6,51			
RICON* 100/40	14,00	57,00	GL24h	385	14,00	10,00	4,62	6,15	6,92	
RICON® 120/40	19.00	77,00	C24	350	14,00	12,00	5,54	7,38	8,31	
NICON 120/40	18,00	77,00	GL24h	385		12,80	5,91	7,88	8,86	
RICON® 140/40	18,00	97,00 C24 350		14,50	6,69	8,92	10,04			
NICON 140/40	18,00 97,00 GL24h	385	10.00	15,50	7,15	9,54	10,73			
RICON® 160/40 18,00	18.00	117,00	C24	350	18,00	17,10	7,89	10,52	11,84	
	10,00		GL24h	385		18,20	8,40	11,20	12,60	

Service class: 1-2 $\gamma_{M,timber} = 1,3$

Calculation of F_{2,Rd} for timber-concrete connection:

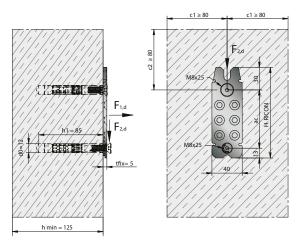
$$F_{2,Rk} = min \; \left\{ \begin{array}{l} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{array} \right. \qquad F_{2,Rk,\,timber} = min \; \left\{ \begin{array}{l} \min F_{2,KCC,\,Rk}/\gamma_M \\ \frac{\min F_{2,Rk} \cdot k_{\,\,mod}}{\gamma_{M,\,timber}} \end{array} \right.$$

Note:

The fischer anchors for KNAPP wood-to-concrete connections were determined according to the above tables and on the basis of a concrete class C20/25 with the fischer C-FIX calculation tool. They have been specially checked by fischer. Any cases outside the tables must be checked by KNAPP®, fischer or a competent engineer. In many cases, dimensioning with the C-FIX calculation tool is sufficient. The complete analysis of concrete fasteners is available on request from KNAPP® accepts no liability for the incorrect use of the tables in this document. The condition of the concrete elements (strength classes and surfaces) must be checked by a professional, KNAPP® accepts no responsibility for this. KNAPP® products and KNAPP® connectors must be installed in accordance with the respective installation rules and instructions as well as the respective Technical Assessments.

(Dimensions in mm)

Header-joist connection with heavy duty anchor



Concrete strength class C20/25

fischer FH II 12/M8 I (8.8) with CS M8x30 (zinc-coated steel)



Wood to concrete connection in slide-in direction F₃

F₂ load-bearing values in the direction of insertion Concrete connection **Timber connection Spacing Wood material KNAPP®** Char. Characteristic values [kN] Shear force Dowel spacing Wood $F_{2,Rd}$, $\gamma_M = 1,3 [kN]$ Density. ρ_ν [kg/m³] C24 9,40 4,34 5,78 6,51 350 RICON® 100/40 14,00 57,00 GL24h 385 10,00 4,62 6,15 6,92 14,00 C24 350 12,00 5,54 7,38 8,31 RICON® 120/40 16,00 77,00 GL24h 385 12,80 5,91 7,88 8.86 C24 350 14,50 6,69 8,92 10,04 RICON® 140/40 18,00 97,00 GL24h 385 15,50 7,15 9,54 10,73 18,00 C24 7,89 350 17,10 10,52 11,84 RICON® 160/40 18,00 117,00 GL24h 385 18,20 8,40 11,20 12,60

Service class : 1-2 $\gamma_{M,bois} = 1,3$

Calculation of F_{2 Rd} for timber-concrete connection:

$$F_{2,Rk} = min \; \left\{ \begin{array}{l} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{array} \right. \qquad F_{2,Rk,\,timber} = min \; \left\{ \begin{array}{l} \min F_{2,KCC,\,Rk}/\,\gamma_M \\ \frac{\min F_{2,RCC,\,Rk}}{\gamma_{M,\,timber}} \end{array} \right. \right.$$

Note

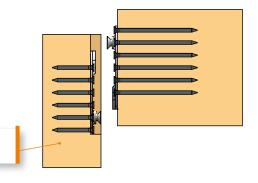
The fischer anchors for KNAPP wood-to-concrete connections were determined according to the above tables and on the basis of a concrete class C20/25 with the fischer C-FIX calculation tool. They have been specially checked by fischer. Any cases outside the tables must be checked by KNAPP®, fischer or a competent engineer. In many cases, dimensioning with the C-FIX calculation tool is sufficient. The complete analysis of concrete fasteners is available on request from KNAPP® accepts no liability for the incorrect use of the tables in this document. The condition of the concrete elements (strength classes and surfaces) must be checked by a professional, KNAPP® accepts no responsibility for this. KNAPP® products and KNAPP® connectors must be installed in accordance with the respective installation rules and instructions as well as the respective Technical Assessments.

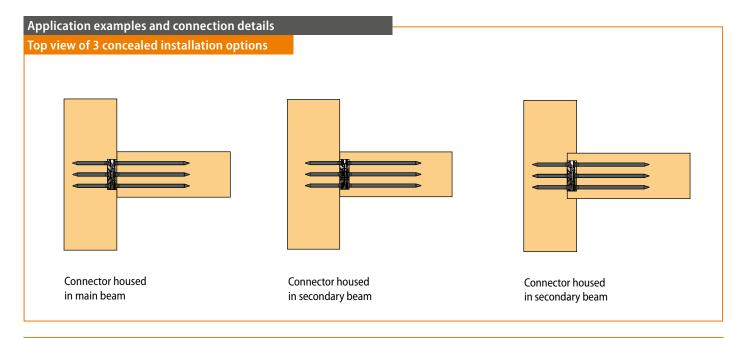
Connection types and fire rating

Connection options

- I The Beam Hanger System can be installed with various housing options to provide an architecturally appealing and fully concealed connection in mass timber elements.
- I This concealed arrangement also helps provide fire protection, as explained in the following sections.

Typical concealed configuration achieved through routing for fire-rated connections





Fire protection

- Due to the concealed installation of the connectors on three or four sides, the wooden cover can provide the appropriate fire protection.
- Due to the joint-tight connection, no additional coverings or fire or fire protection tapes are required. According to EN 1995-1-2 point 3.4.3.1 the joint must not exceed 2 mm.
- If, due to manufacturing tolerances or for installation reasons, larger joints are required (2 10 mm), PROMASEAL®-PL* intumescent sealant can be used as protection. The flexible joint tape is placed around the connector, expands and fills the joint in the event of fire in the event of fire, thus protecting the connector.
- According to Eurocode EN 1995-1-2 5, 30 minutes of fire resistance requires a wood covering of 60 minutes 49 mm, 90 minutes 70 mm, 120 minutes 91 mm (see calculations on page 35).
- In special situations (e.g. where the wood overlap is not respected), combustion can be reduced by using Promat PROMADUR** transparent fireproof paint. In the event of fire, the material expands and forms a protective insulating foam that delays combustion by 6 to 17 min (depending on the thickness of the paint) and allows smaller sections of wood to be used.



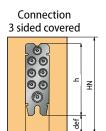


RICON®S connector after 120 minutes and MEGANT® connector after 60 minutes fire tests. The wood is charred all around. The connectors withstood the the vertical load applied in the fire test.

^{*} For more information on the use and specification of fire protection materials, please contact our Planer Service department.

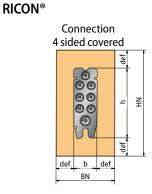
Connectors

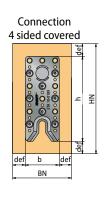
Fire resistance / Fire protection



b

BN





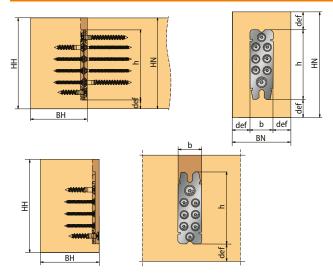
- Fully concealed connections (3 4 sides) possible where required by architect or fire code consultant.
- Jointless connection (joint < 2 mm according to EN 1995-1-2 chap. 3.4.3.1) => no additional covers or fire protection tapes required.
- According to EN 1995-1-2 ch. 4, 28 mm of timber covering is required for 30 minutes of fire resistance. Higher coverages are also possible through larger timber cross-sections for R60, R90 and R120.

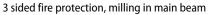
Calculation of the protecting wood covering for the fire resistance of the KNAPP® connectors according to EN 1995-1-2 ch. 4:

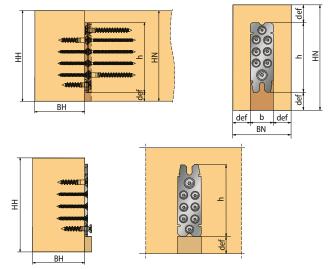
Common formula: $d_{ef} = \beta_n \cdot t + k_0 \cdot d_0$

Mass burning rate β_n :		
Softwood and beach glulam with charact. density $\rho_k \ge 290 \text{ kg/m}^3$	$\beta_n = 0.7 \text{ mm/min}$	
Softwood and beach solid wood with charact. density $\rho_k \ge 290 \text{ kg/m}^3$	$\beta_n = 0.8 \text{ mm/min}$	
Hardwood and Hardwood glulam with charact. density $\rho_k \ge 290 \text{ kg/m}^3$	$\beta_n = 0.7 \text{ mm/min}$	
Hardwood and Hardwood glulam with charact. density $\rho_k \ge 450 \text{ kg/m}^3$	$\beta_n = 0.55 \text{ mm/min}$	
LVL with charact. density $\rho_k \ge 480 \text{ kg/m}^3$	$\beta_n = 0.7 \text{ mm/min}$	
Duration of fire exposure	t = 30, 60, 90, 120 min	
Temperature-dependent reduction factor for strength and stiffness properties	$k_0 = 1 \ (t \ge 20 \ min)$	
Time factor	$k_0 = t / 20 (t < 20 min)$	
Layer depth with the strength and stiffness properties equal to zero	$d_0 = 7 \text{ mm}$	
Softwood Gluelam, Beach solid wood and laminated wood		
Wood overlap for 30 minutes fire resistance	$d_{ef} = 0.7 \times 30 + 1.0 \times 7 =$	28 mm for R30
Wood overlap for 60 minutes fire resistance	$d_{ef} = 0.7 \times 60 + 1.0 \times 7 =$	49 mm for R60
Wood overlap for 90 minutes fire resistance	$d_{ef} = 0.7 \times 90 + 1.0 \times 7 =$	70 mm for R90
Wood overlap for 120 minutes fire resistance	$d_{ef} = 0.7 \times 120 + 1.0 \times 7 =$	91 mm for R120
Solid Hardwood and Hardwood Gluelam (e.g. oak):		
Wood overlap for 30 minutes fire resistance	$d_{ef} = 0.55 \times 30 + 1.0 \times 7 =$	23,5 mm for R30
Wood overlap for 60 minutes fire resistance	$d_{ef} = 0.55 \times 60 + 1.0 \times 7 =$	40 mm for R60
Wood overlap for 90 minutes fire resistance	$d_{ef} = 0.55 \times 90 + 1.0 \times 7 =$	56,5 mm for R90
Wood overlap for 120 minutes fire resistance	$d_{ef} = 0.55 \times 120 + 1.0 \times 7 =$	73 mm for R120

Connectors installation options







3 sided fire protection, milling in secondary beam

RICON® EA Startbox

RICON® Boxes - for post-beam and main-secondary beam connections up to 23.4 kN









TCT slotting Rout cutter 15x25 mm MU

Routing-jig MULTI F





Drilling-jig

Depth gauge Locking clip

Applications: Curtain wall, Winter garden, carport, etc.

1 depth gauge, CS-screws and

Each RICON® Box includes: 6, 12 or 24 pairs RICON®, 1 HM routing cutter, 1 routing-jig MULTI F 40/R,



1 drilling-jig,

the locking clips



RICON® EA Box | Art.-No. K364/B 6 pairs of 60/40 EA, 80/40 EA, 100/40 EA and 120/40 EA, 24 locking clips and RICON® CS-screws

RICON® EA 60 Box

Art.-No. K366

24 pairs of RICON 60/40

48 CS-screws RICON® 5x50 mm

48 CS-screws RICON® 5x80 mm

24 CS-screws RICON® 8x50 mm

24 CS-screws RICON® 8x80 mm

24 locking clips

RICON® EA 100 Box

Art.-No. K368

24 pairs of RICON® 100/40

96 CS-screws RICON® 5x50 mm

96 CS-screws RICON® 5x80 mm

48 CS-screws RICON® 8x50 mm

48 CS-screws RICON® 8x80 mm

24 locking clips

RICON® EA 140 Box

Art.-No. K370

12 pairs of RICON® 140/40

96 CS-screws RICON® 5x50 mm

96 CS-screws RICON® 5x80 mm

24 CS-screws RICON® 8x50 mm

24 CS-screws RICON® 8x80 mm

12 locking clips

RICON® EA 80 Box

Art.-No. K367

24 pairs of RICON® 80/40

48 CS-screws RICON® 5x50 mm

48 CS-screws RICON® 5x80 mm

48 CS-screws RICON® 8x50 mm

48 CS-screws RICON® 8x80 mm

24 locking clips

RICON® EA 120 Box

Art.-No. K369

12 pairs of RICON® 120/40

72 CS-screws RICON® 5x50 mm

72 CS-screws RICON® 5x80 mm

24 CS-screws RICON® 8x50 mm

24 CS-screws RICON® 8x80 mm

12 locking clips

RICON® EA 160 Box



12 pairs of RICON® 160/40 120 CS-screws RICON® 5x50 mm 120 CS-screws RICON® 5x80 mm 24 CS-screws RICON® 8x50 mm 24 CS-screws RICON® 8x80 mm 12 locking clips

RICON® is also available in A2 stainless steel up to 17.4 kN and in 13 sizes.

T-JOINT Box

T-JOINT Box - for inclined screw connection

Art.-No. Z606/Box

T-JOINT (Startbox)

50 T-JOINT 20, 25 CS-screws 6x100 mm, 25 CS-screws 6x120 mm, 1 drilling-jig T-JOINT D20, 1 ajustable drilling-jig, 1 HM drill bit 20 mm depth stop, 1 HSS drill bit 6/160 mm

Applications: angle cylinder for flush 30° and 45° angled screw connections with rigid connections and tensile joints.





Beam Hangers

Connecting main / secondary beams and column up to 39 kN*

- I Timber width up from 60mm
- | Multiple disassembly and reassembly possible
- I High degree of prefabrication for rapid on-site assembly
- I Load-bearing In all directions
- Short hooking way only 50 mm
- I Tight joints self-tightening due to permanent permanent contact pressure
- I Locking clip secures the connection against the slide-in direction (e.g. wind suction)

Available in 3 sizes.

The values only apply when used with original KNAPP® screws! Design values are available on our website under Planer Service.

* Characteristic value F_{2,8k} in slide-in direction according to ETA 10/0189 (2022/08/25), for hardwood D30 (e.g. oak).

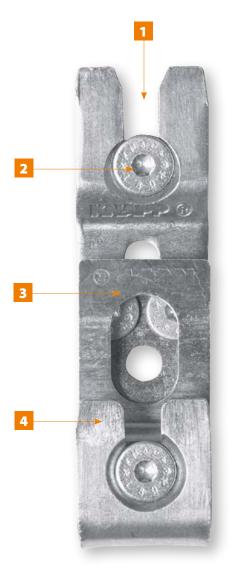


GIGANT

- I Applications: concealed main-secondary beam connections
- I Connection: wood materials e.g. hardwoods (e.g. oak)
- I Areas of application: hall construction, timber frame construction, timber frame construction, canopy, pergola



Safe, simple and quick assembly.



- The dovetail receiving bracket catches the counter bracket and CS-screw with ease, while the angle on the dovetail ensures a self-tightening connection.
- Ø10 mm self-tapping CS-screws guarantee fast installation and the reinforced shank provides an additional strong connection.
- 3 Locking clip latches the connector against the slide-in direction.
- GIGANT is made of premium quality steel and blue galvanized and produced in Austria. Hot-dip galvanizing is available upon request.

Fire rating: Fire resistance (EN 1995-1-2) through 3-4 sided concealed, joint-tight installation (R30 \geq 28 mm, R60 \geq 49 mm)

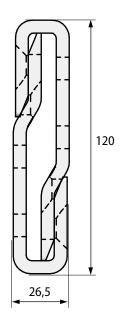


GIGANT 120/40

Application examples and connection details

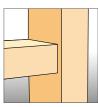
Art.-No. K051

(Dimensions in mm)

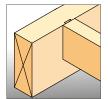


		Screw co	nnection	Charact. values [GL24h]			
Connector	Connection	Joint	Header	F _{1,Rk} [kN]	F _{2,Rk} [kN]		
120/40	without locking clip	3 x CS 10x120	3 x CS 10x80	12,5	12,5		
120/40	without locking clip	3 x CS 10x200	3 x CS 10x80	14,0	12,5		
120/40	with locking clip	3 x CS 10x120	3 x CS 10x80	12,5	12,5		
Clip lock: F _{3,Rk} = 12,0 kN							

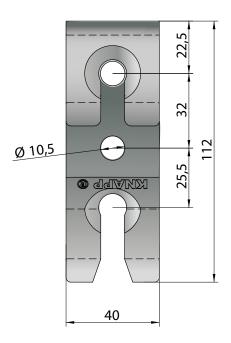
Minimum timber dimensions with/without locking clip: 60 x 150 mm



Single connection for post-latch connections



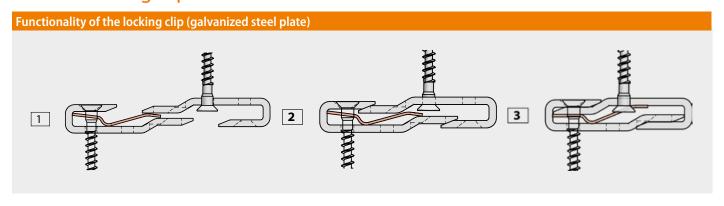
Single connection: Header thickness from 100 mm; Joint thickness from 60 mm





Standard screw connection without locking clip

GIGANT locking clip

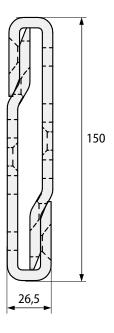


GIGANT 150/40

Application examples and connection details

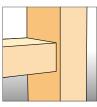
Art.-No. K050

(Dimensions in mm)

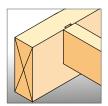


		Screw co	nnoction	Charact. val	uos [GL 24b]				
Connector	Connection	Sciew co		Cilaract. vai	ues [GL2411] 				
Connector	Connection	Joint	Header	F _{1,Rk} [kN]	F _{2,Rk} [kN]				
150/40	without locking clip	4 x CS 10x120	4 x CS 10x80	12,5	16,7				
150/40	without locking clip	4 x CS 10x200	4 x CS 10x80	14,0	19,2				
150/40	with locking clip	4 x CS 10x120	4 x CS 10x80	12,5	16,7				
	Clip lock: F _{3,Rk} = 12,0 kN								

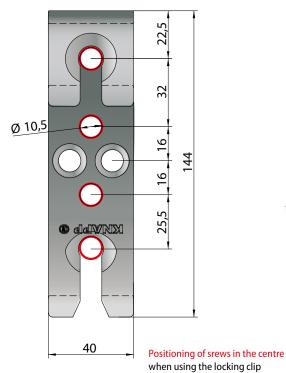
Minimum timber dimensions without locking clip: $80 \times 200 \text{ mm}$ Minimum timber dimensions with locking clip: $60 \times 200 \text{ mm}$



Single connection for post-latch connections



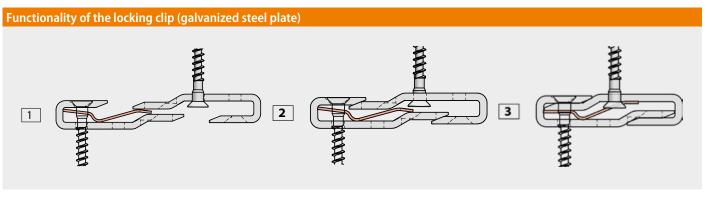
Single connection: Header thickness from 100 mm; Joint thickness from 60 mm





Standard screw connection without locking clip

GIGANT locking clip

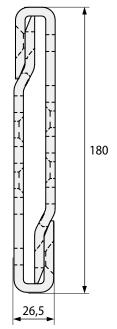


GIGANT 180/40

Application examples and connection details

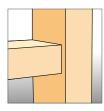
Art.-No. K052

(Dimensions in mm)

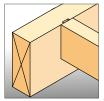


		Screw connection			ues [GL24h]		
Connector	Connection	Joint	Header	F _{1,Rk} [kN]	F _{2,Rk} [kN]		
180/40	without locking clip	6 x CS 10x120	6 x CS 10x80	12,5	25,0		
180/40	without locking clip	6 x CS 10x200	6 x CS 10x80	14,0	30,7		
180/40	with locking clip	5 x CS 10x120	6 x CS 10x80	12,5	20,8		
Clip lock: F _{3,Rk} = 12,0 kN							

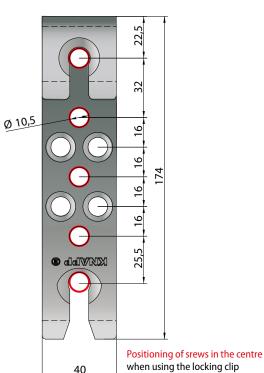
Minimum timber dimensions without locking clip: $80 \times 220 \text{ mm}$ Minimum timber dimensions withlocking clip: $60 \times 220 \text{ mm}$



Single connection for post-latch connections



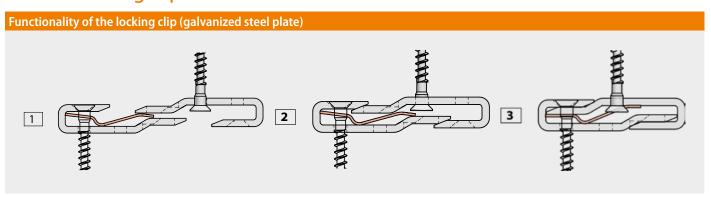
Single connection: Header thickness from 100 mm; Joint thickness from 60 mm





Standard screw connection without locking clip

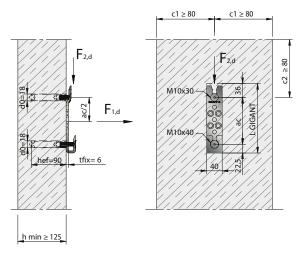
GIGANT locking clip



GIGANT 150/40 and 180/40 wood to concrete connection

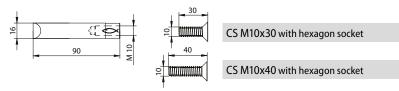
Wood to concrete connection with injection mortar

(Dimensions in mm)



Concrete C20/25

fischer RG 16x90 M10 I (8.8) with CS M10x30 and CS M10x40 (zinc plated steel)



fischer Superbond-System: FIS SB 390 S

Drill hole diameter $d_0 = 18 \text{ mm}$ Drill hole depth $h_1 = 90 \text{ mm}$ Total fixing thickness $t_{fix} = 6 \text{ mm}$

Spacing $a_c =$ see table below

Minimal edge distance $c_{1,min} = c_{2,min} = 80 \text{ mm}$ Minimal concrete wall thickness $h_{min} = 125 \text{ mm}$

Approval: ETA-12/0258



F ₂ Load direction in	F ₂ Load direction in the direction of insertion													
	Concrete connection		Timber connection											
KNAPP®	F _{2,Rd,concrete}	Distances	Wood	material		F	2,Rd,timber							
Connectors	Shear force	Dowel spacing	Wood	Char. density ρ,		ues [kN]		Design value _{Rd} γ _м = 1,3 [k						
	F _{2,Rd,concrete} [kN]	ac [mm]	type [kg/m³]	$F_{2,KCC,Rk}$, $\gamma_M = 1,0$		k _{mod} = 0,6	k _{mod} = 0,8	$k_{mod} = 0.9$						
GIGANT 150/40 *	10.00	90	C24	350		15,4	7,1	9,5	10,7					
Concrete: 2 RG M10 I	18,00	90	GL24h	385	24,0	16,7	7,7	10,3	11,6					
GIGANT 150/40 max **	18,00	90	C24	350	24,0	17,7	8,2	10,9	12,3					
Concrete: 2 RG M10 I	10,00	90	GL24h	385		19,2	8,9	11,8	13,3					
GIGANT 180/40 *	22,00	122	C24	350		23,1	10,7	14,2	16,0					
Concrete: 2 RG M10 I	22,00	122	GL24h	385	22.0	25,0	11,5	15,4	17,3					
GIGANT 180/40 max **	22.00	122	C24	350	33,0	28,3	13,1	17,4	19,6					
Concrete: 2 RG M10 I	22,00	22,00	22,00	22,00	22,00	22,00	122	GL24h	385		30,7	14,2	18,9	21,3

^{*} GIGANT standard screw connection in end-grain with CS-screws 10x120

Service class timber: 1-2

$$\gamma_{M,timber}=1,3$$

Calculation of F_{2,Rd} for timber-concrete connection:

$$F_{2,Rk} = min \; \left\{ \begin{array}{l} \min \; F_{2,Rd, \, timber} \\ \min \; F_{2,Rd, \, concrete} \end{array} \right. \qquad F_{2,Rk, \, timber} = min \; \left\{ \begin{array}{l} \min \; F_{2,RCC, \, Rk} / \gamma_M \\ \frac{\min \; F_{2,Rd, \, concrete} }{\gamma_{M, \, timber}} \end{array} \right.$$

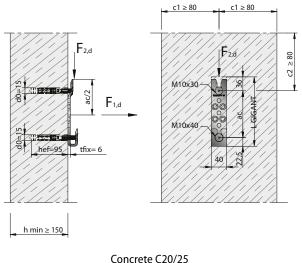
Notes

The fischer anchors for KNAPP® wood-concrete connections were defined with the dimensions shown on the drawings and a concrete strength class of C20/25. The calculations were made with the C-FIX design tool and verified by fischer. All other configurations must be checked. This can be done by KNAPP®, fischer or a professional (engineer or competent technician). KNAPP® accepts no liability for the inappropriate use of the value tables given in this catalogue. The condition of the concrete element (concrete strength class and surface) must be checked by a specialist. KNAPP® accepts no liability in this respect. KNAPP® products and connectors must be installed according to the installation instructions manuals. KNAPP® - fischer wood-concrete joints must be made in accordance with their respective ETA technical evaluations.

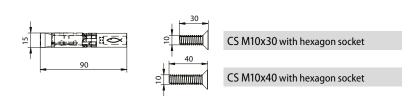
^{**} GIGANT maximal screw connection in end-grain with CS-screws 10x200

Header-joist connection with bolt anchor

(Dimensions in mm)



fischer RG 16x90 M10 I (8.8) with CS M10x30 and CS M10x40 (zinc plated steel)



Minimal concrete wall thickness $h_{min} = 150 \text{ mm}$ Approval: ETA-07/0025, Option 1

F₂ Load direction in the direction of insertion

2											
	Concrete co	onnection	Timber connection								
KNAPP®	F _{2,Rd,concrete}	Distances	Wood	material		F	2,Rd,timber				
Connectors		Dowel spacing	owel spacing Wood Char. density ρ _ε		Charact. val	Charact. values [kN]		Design values F _{2,Rd,} γ _M = 1,3 [kN]			
	F _{2,Rd,concrete} [kN]	ac [mm]	1 1006 1 1	$F_{2,KCC,Rk}$, $\gamma_M = 1,0$	F _{2,Rk}	kmod = 0,6	kmod = 0,8	kmod = 0,9			
GIGANT 180/40 *	21.00	122	C24	350		23,1	10,7	14,2	16,0		
Concrete: 2 RG M10 I	21,00	122	GL24h	385	22.0	25,0	11,5	15,4	17,3		
GIGANT 180/40 max **	21.00	422	C24	350	33,0	28,3	13,1	17,4	19,6		
Concrete: 2 RG M10 I		122	GL24h	385		30,7	14,2	18,9	21,3		

- * GIGANT standard screw connection in end-grain with CS-screws 10x120
- ** GIGANT maximal screw connection in end-grain with CS-screws 10x200

Service class timber: 1-2

 $\gamma_{M.timber} = 1.3$

Calculation of $F_{2,Rd}$ for timber-concrete connection:

$$F_{2,Rk} = min \; \left\{ \begin{array}{l} min \; F_{2,Rd, \, timber} \\ min \; F_{2,Rd, \, concrete} \end{array} \right. \qquad F_{2,Rk, \, timber} = min \; \left\{ \begin{array}{l} min \; F_{2,RCC, \, Rk} / \gamma_M \\ \frac{min \; F_{2,Rk} \cdot k_{mod}}{\gamma_{M, \, timber}} \end{array} \right.$$

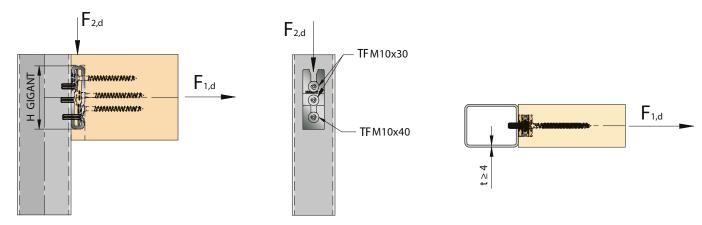
Note

The fischer anchors for KNAPP® wood-concrete connections were defined with the dimensions shown on the drawings and a concrete strength class of C20/25. The calculations were made with the C-FIX design tool and verified by fischer. All other configurations must be checked. This can be done by KNAPP®, fischer or a professional (engineer or competent technician). KNAPP® accepts no liability for the inappropriate use of the value tables given in this catalogue. The condition of the concrete element (concrete strength class and surface) must be checked by a specialist. KNAPP® accepts no liability in this respect. KNAPP® products and connectors must be installed according to the installation instructions manuals. KNAPP® - fischer wood-concrete joints must be made in accordance with their respective ETA technical evaluations.

GIGANT wood to steel connection

Main and secondary beam and post and beam connections.

(Dimensions in mm)



VALADD@		Traction		Shear force
KNAPP® Connectors	F _{t,Rk} [kN]* on 4 mm steel	F _{i,sk} [kN]* on glulam GL24h	F _{v,Rk} [kN]* on 4 mm steel	F _{z.Rk} [kN]* on glulam GL24h
GIGANT 120/40 *		12,5		12,5
GIGANT 120/40 max **		14,0		12,5
GIGANT 150/40 *	57.0	12,5	20.4	16,7
GIGANT 150/40 max **	57,0	14,0	38,4	19,2
GIGANT 180/40 *		12,5		25,0
GIGANT 180/40 max **		14,0		30,7
	$\boldsymbol{F}_{t,Rd} \! = \boldsymbol{F}_{t,Rk} / \boldsymbol{\gamma}_{M,2}$	$F_{_{1,Rd}} = k_{_{mod}} x F_{_{1,Rk}} / \gamma_{_M}$	$\boldsymbol{F}_{v,Rd} = \boldsymbol{F}_{v,Rk} / \gamma_{M,2}$	$F_{_{1,Rd}} = k_{_{mod}} x F_{_{1,Rk}} / \gamma_{_M}$
Sizing value	$Y_{M,2} = 1,25$	$Y_M = 1.3$	$Y_{M,2} = 1,25$	$\gamma_{M} = 1.3$
calculation		k _{mod} = 0,8 LDC medium		k _{mod} = 0,8 LDC medium
		k _{mod} = 0,9 LDC short		k _{mod} = 0,9 LDC short
	2 CS M10x30	End-grain screw connection	2 CS M10x30	End-grain screw connection
Screw connection *	1 CS M10x40	Self-tapping CS-screw 10xx120 / CS 10x200 for max	1 CS M10x40	CS 10x120 / CS 10x200 for max

^{*} GIGANT standard screw connection in end-grain with CS 10x120

Service class timber: 1-2









^{**} GIGANT maximal screw connection in end-grain with CS 10x200

GIGANT

Installation

Manufacturing with CNC joinery machine is possible – all datas are available on the standard CNC joinery machine programs. Milling with KNAPP® routing-jig.







Mill

Pre-drill header

Screw on connector



Pre-drill secondary beam



Screw on connector



Optionally installed with locking clip



Easy assembling without jamming







GIGANT routing dimension							
Width Length Depth							
40 mm variable 26,5 mm							

Recommended software partners for machine processing:









Vis GIGANT

KNAPP® self-tapping CS-screws with reinforced shaft (GIGANT comes in a set including CS-screws)

Art.-No.Z523 CS-screw 10x80

Art.-No.Z524 CS-screw 10x120 (end grain and CLT)

Art.-No.Z583 CS-screw 10x200

Application: pour le vissage de GIGANT sur les poutres principales (poteaux) ou secondaires (traverses).

GIGANT

GIGANT locking clip (galvanized steel plate)

Art.-No.Z525 GIGANT Locking Clip

Application: to latch the connection against the slide-in direction.



GIGANT accessories

Routing-jig for all GIGANT sizes

Art.-No. K502 MULTI F40 Routing-jig (plywood)

Note: The MULTI F40 routing template is designed for the use of a Ø30 mm copying

sleeve (for router) and a Ø15 mm TCT straight router bit. MULTI F is adjustable depending on wood sizes.

Application: for milling the pocket to recess GIGANT.

TCT slotting cutter

Art.-No. Z068 TCT straight slotting bit with Ø15 mm, 40 mm length and Ø12 mm shank

Application: for milling the pocket to recess GIGANT.



GIGANT drilling-jig (galvanized steel)

Art.-No. K631 Drilling-jig guide GIGANT 120
Art.-No. K632 Drilling-jig guide GIGANT 150
Art.-No. K633 Drilling-jig guide GIGANT 180

 $\textbf{Application:} \ place \ into \ \textbf{MULTIF} \ routing \ jig \ for \ exact \ positioning \ and \ pre-drilling \ of \ GIGANT \ CS-screws.$



GIGANT drilling-jig (adjustable)

Art.-No. K463 Drilling-jig GIGANT 120
Art.-No. K464 Drilling-jig GIGANT 150
Art.-No. K465 Drilling-jig GIGANT 180

Jig with hardened drill bushes for Ø6 mm

Application: for pre-drilling of GIGANT CS-screws.



Connectors for timber construction engineering

Connecting main and secondary beams up to 230 kN*

- Minimum timber width up from 100 mm
- | Multiple disassembly and reassembly possible
- I High degree of prefabrication for industrial production
- I Simple screw connection without pre-drilling
- Can be assembled crosswise, lengthwise and diagonally
- Assembly made easy due to V-shaped bracket and only 35 mm hook way
- Installation tolerances due to adjustable collar bolts
- I Three- and four-sided concealed connection
- Secured connection against the direction of insertion with matching locking clip

Available in 5 sizes and 4 versions.

The values only apply when used with original KNAPP® screws! Design values are available on our website under Planer Service.

* Characteristic value F_{2,8k} in slide-in direction according to ETA 10/0189 (2022/08/25), for hardwood D30 (e.g. oak).



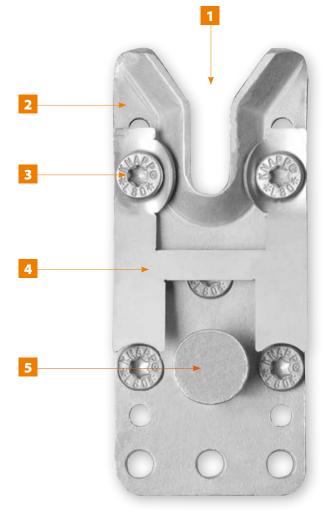


RICON®S

- I Applications: concealed main-secondary beam connections.
- I Connections: wood to wood, wood to steel, steel to steel, and wood to concrete
- I Applications: timber engineering, timber frame, timber frame and hall construction
- Service class 1 and 2



Installation example: pillar connection, Sky project, Sophia in the South of France.



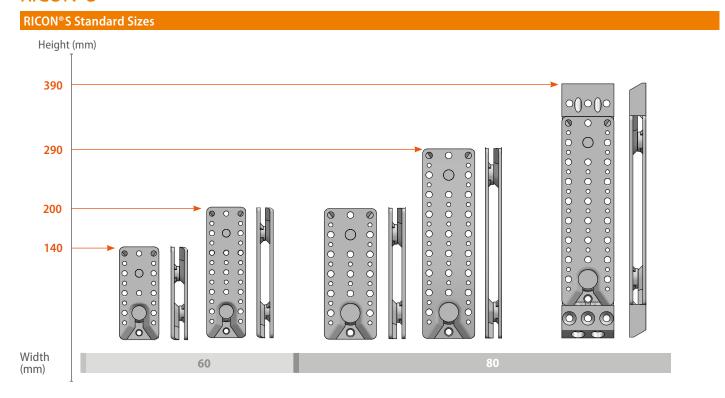
- The V-shaped receiver provides perfect catch of the collar bolt.
 The strong tension and the short slide-in alleviates the connecting and guarantees joint sealing.
- RICON® S is made of premium quality steel, hot-dip galvanized and produced in Germany.
- KNAPP® CS-screws with cut point for extra fast starting and screw connection. The reinforced shaft provides a force-fit connection.
- The RICON®S locking clip, made from stainless spring steel, locks the connection against slide-in direction and can optionally be used for stress against slide-in direction or wind suction.
- VS = welded collar bolt, for highest load capacities
 EK = retaining screw collar bolt, for tolerance adjustment
 VK = screwed collar bolt, for moderate charge capacities
 GK = spring-loaded collar bolt for special assembly requirements

Fire rating: Fire resistance (EN 1995-1-2) through 3-4 sided concealed, joint-tight installation (R30 \geq 28 mm, R60 \geq 49 mm)

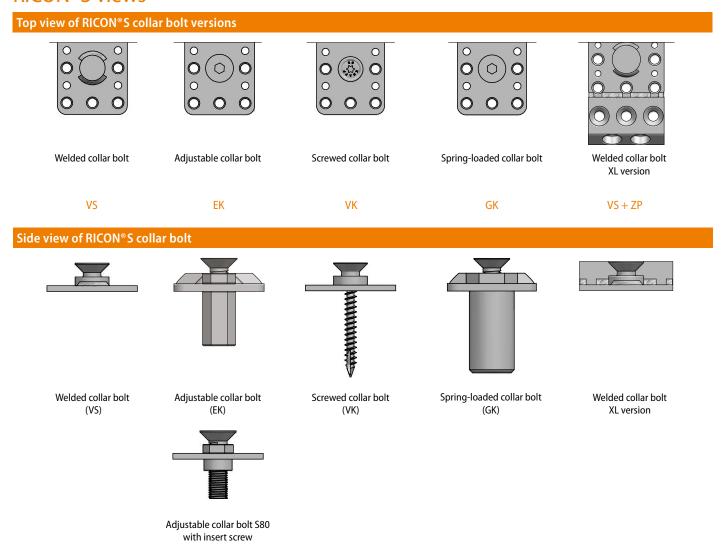




RICON®S



RICON®S views



Ridge beam 240/1640

Rafter 100/400

RICON®S Application examples and connection details Ridged roof with purlins and post and beam connections Single connection (Dimensions in mm) Header Main/secondary beam joint with RICON® S Full-thread, self-tapping Single and double connection screwsfor lateral compression reinforcements of main and/or secondary beam Joist Joist Header Column Saddle roof gluelan beam **Double connection** Joist Joist Header Two-pieces column RICON® S60: RICON® EK with Fit bolt/thread bar adjustable collar bolt Ø 8 mm with jam nut M8 RICON® S80: **6**0000000 Fit bolt/thread bar Column/Post Ø 10 mm with jam nut M10 RICON® S housed into a rafter - totally concealed RICON® S Connection RICON®S60 200x60 VK Hall roof of carpentry S. Hinrichsen (Germany) _Rafter 100/400 Rafter 100/400 RICON® S housed into the ridge beam- totally concealed

1640

Rafter 100/400

RICON®S

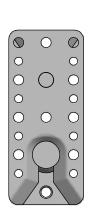
Timber engineering Steel connection Connecting header with timber frame construction or cross-laminated timber wall (Dimensions in mm) Header Beam Solive 200/360, e=100 cm, BS11 4,50 Interlayer I Ridge node for dome 4,50 Main/ Secondary Beam Cross-laminated timber wall Main floor footprint Alternative ways to connect RICON® S 200x80 connection of a secondary beam Ceiling of a timber frame construction Joist 120/240 Steel I-beam post IPE 240, ST 37 Header 120/360 Post 140/140 2 RICON® S with 11 PB 10x160 each Beam 140/240, e = 1,00 m connection to post with RICON® S 200x80 Header 140/360 connection to post with RICON® S 290x80

RICON® S 60 VS

RICON®S 140/60 VS - Welded collar bolt header-joist connection

Art.-No.K126

(Dimensions in mm)





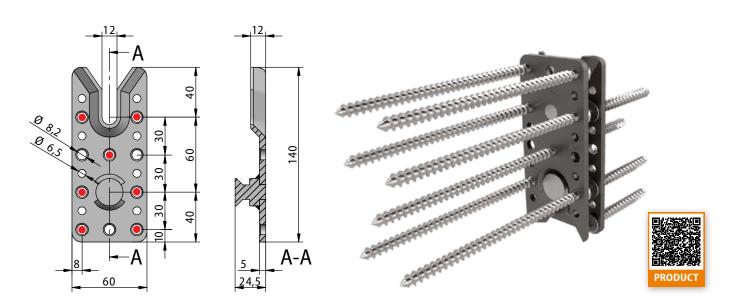
	Collar	Screw co	Charact. values					
ArtNo.	RICON® S	bolt	Joist	Header	[GL24h] F _{2,Rk} [kN]			
K126 MIN •	140/60	VS	7 x CS 8x160	7 x CS 8x80	26.9			
K126 ST	140/60	VS	10 x CS 8x160	10 x CS 8x80	37.1			
K126 MAX	140/60	VS	10 x CS 8x240	10 x CS 8x80	40.2			
Axial tension: $F_{1,Rk} = 31.5 \text{ kN}$								
	Clip lock: $F_{3,Rk} = 18.0 \text{ kN}$							

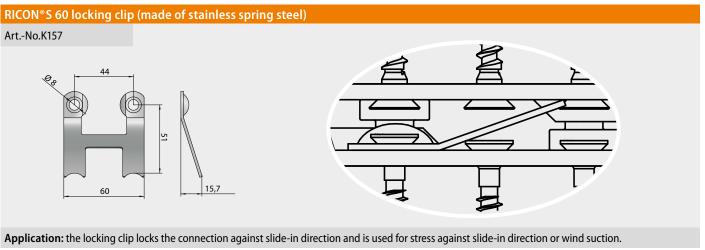
MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: 100 x 160 mm

All design values are available on our website under the Planner Service tab.







RICON®S 140/60 VS - Welded collar bolt post connection

Art.-No. K126

(Dimensions in mm)

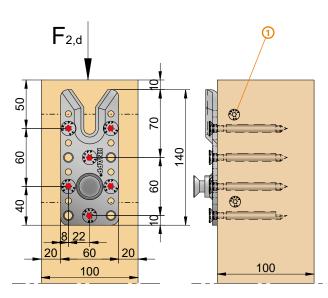


RICON® S	Collar bolt	Screw connection Joist Column		Charact. values [GL24h] F _{2,Rk} [kN]				
140/60	VS	6 x CS 8x80	10 x CS 8x160	27.2				
140/60	VS	8 x CS 8x80	10 x CS 8x160	29.7				
Axial tension: $F_{1,Rk} = 31.5 \text{ kN}$								
Clip lock: $F_{3,Rk} = 18.0 \text{ kN}$								
	140/60 140/60	140/60 VS 140/60 VS Axial tens	RICON® S Collar bolt Joist 140/60 VS 6 x CS 8x80 140/60 VS 8 x CS 8x80 Axial tension: F _{1,Rk} = 31.5 Clip lock: F _{3,Rk} = 18.0 kl	RICON® S Collar bolt Joist Column 140/60 VS 6 x CS 8x80 10 x CS 8x160 140/60 VS 8 x CS 8x80 10 x CS 8x160 Axial tension: F _{1,Rk} = 31.5 kN Clip lock: F _{3,Rk} = 18.0 kN				

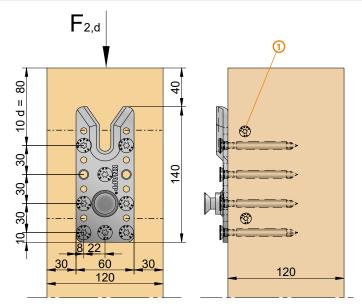
MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: MIN = 100×100 mm ST = 120×120 mm All design values are available on our website under the Planner Service tab.









ST. screw connection in column

1 Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON°S screws used. These bolts should have the same length as the column cross-section width.





RICON®S 140/60 VS - Welded collar bolt double post connection

Art.-No.K126

(Dimensions in mm)

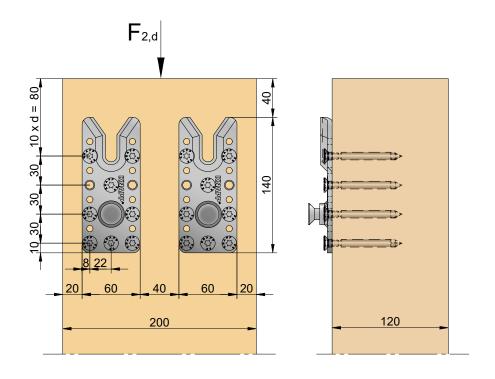


		DIGOUS COLlar		nnection	Charact. values		
ArtNo.	RICON® S	bolt	Joist	Column	[GL24h] F _{2,Rk} [kN]		
K126 ST	2x 140/60	VS	16x CS 8x80	20 x CS 8x160	57.6		
Axial tension: F _{1,Rk} = 63 kN							
2 clip locks: F _{3,Rk} = 36 kN							

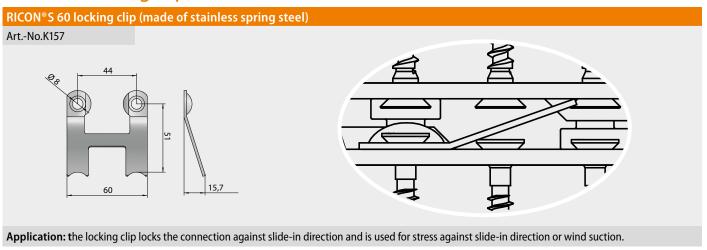
ST = standard screw cxn.

All design values are available on our website under the Planner Service tab.





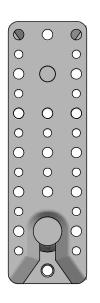


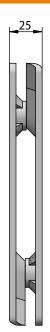


RICON®S 200/60 VS - Welded collar bolt header-joist connection

Art.-No.K127

(Dimensions in mm)





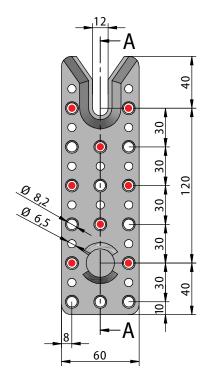
ArtNo. RICON® S	Collar	Screw co	Charact. values					
RICON® S	bolt	Joist	Header	[GL24h] F _{2,Rk} [kN]				
200/60	VS	8 x CS 8x160	8 x CS 8x80	30.4				
200/60	VS	16 x CS 8x160	16 x CS 8x80	56.7				
200/60	VS	16 x CS 8x240	16 x CS 8x80	66.5				
Axial tension: F _{1,Rk} = 31.5 kN								
Clip lock: $F_{3,Rk} = 18.0 \text{ kN}$								
	200/60 200/60	200/60 VS 200/60 VS 200/60 VS Axial tens	RICON® S Collar bolt Joist 200/60 VS 8 x CS 8x160 200/60 VS 16 x CS 8x160 200/60 VS 16 x CS 8x240 Axial tension: F _{1,Rk} = 31.5	200/60				

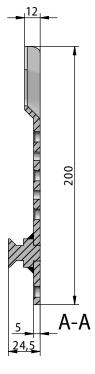
MIN = minimum screw cxn. ST = standard screw cxn. MAX = maximum screw cxn.

Min. timber cross-section: 100 x 220 mm

All design values are available on our website under the Planner Service tab.







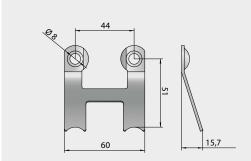


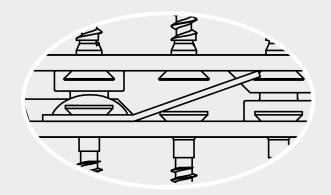


RICON®S locking clip

Art.-No.K157

RICON®S 60 locking clip (made of stainless spring steel)





RICON®S 200/60 VS - Welded collar bolt post connection

Art.-No.K127

(Dimensions in mm)

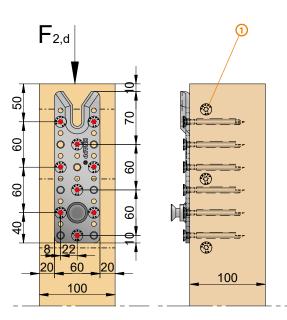


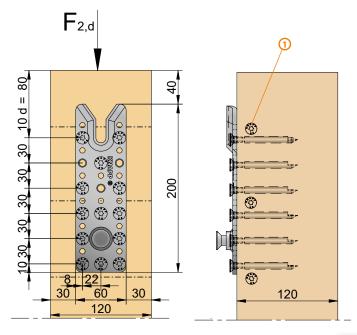
ArtNo.	RICON® S	Collar bolt	Screw connection Joist Column		Charact. values [GL24h] F _{2,Rk} [kN]			
K126 MIN •	200/60	VS	9 x CS 8x80	16 x CS 8x160	43.0			
K126 ST	200/60	VS	13 x CS 8x80	16 x CS 8x160	51.7			
Axial tension: F _{1,Rk} = 31.5 kN								
Clip lock: F _{3,Rk} = 18.0 kN								

MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: $MIN = 100 \times 100 \text{ mm}$ $ST = 120 \times 120 \text{ mm}$ All design values are available on our website under the Planner Service tab.

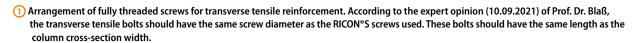






MIN. screw connection in column

ST. screw connection in column





RICON®S locking clip

RICON®S 200/60 VS - Welded collar bolt double post connection

Art.-No.K127

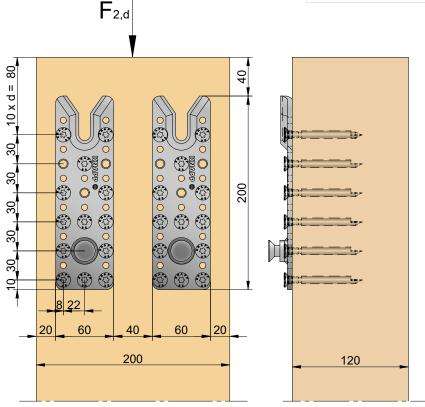
(Dimensions in mm)



ST = standard screw cxn.

All design values are available on our website under the Planner Service tab.

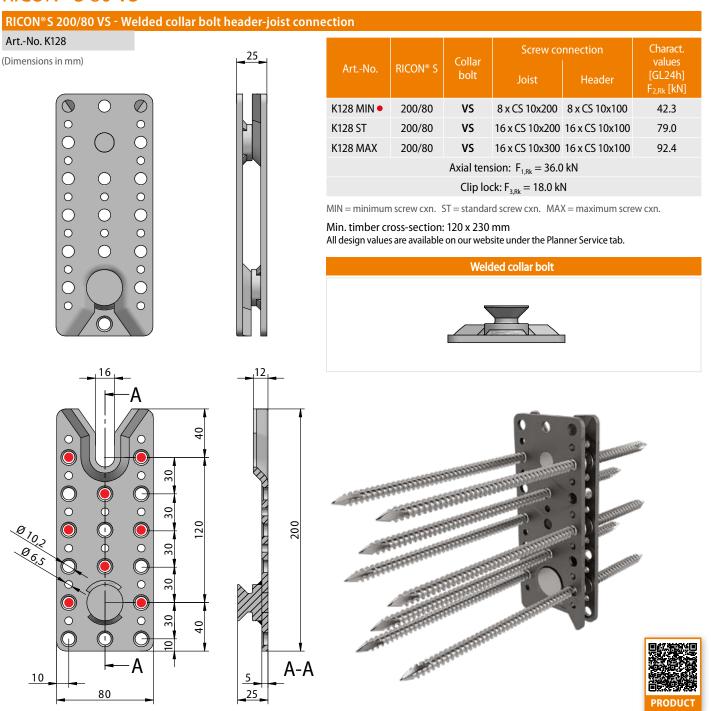


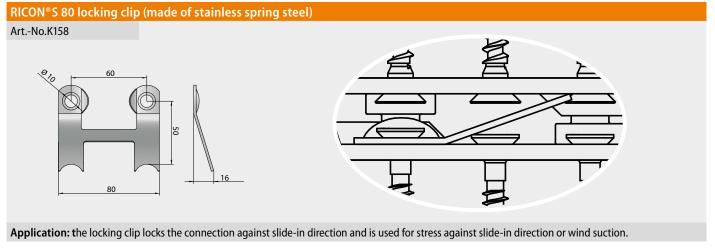






RICON® S 80 VS





RICON®S 200/80 VS - Welded collar bolt post connection

Art.-No. K128

(Dimensions in mm)

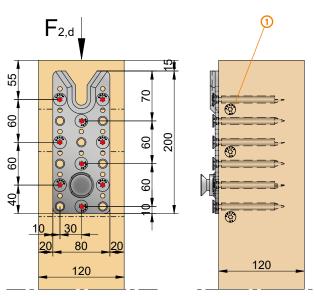


		Screw c		nnection	Charact. values	
ArtNo.		RICON® S	kicon* S bolt	Joist	Column	[GL24h] F _{2,Rk} [kN]
K128 MIN •	200/80	VS	9 x CS 10x100	16 x CS 8x160	56.8	
K128 ST	200/80	VS	13 x CS 10x100	16 x CS 8x160	68.3	
Axial tension: $F_{1,Rk} = 36.0 \text{ kN}$						
Clip lock: F _{3.8k} = 18.0 kN						

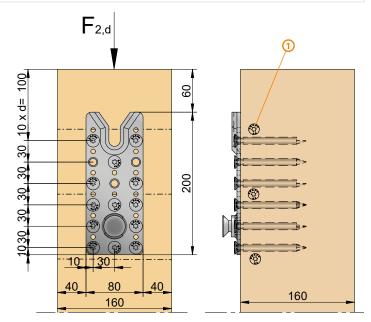
MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: $MIN = 120 \times 120 \text{ mm}$ $ST = 160 \times 160 \text{ mm}$ All design values are available on our website under the Planner Service tab.

Welded collar bolt







ST. screw connection in column

1 Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section width.



RICON®S locking clip

RICON®S 200/80 VS - Welded collar bolt double post connection

Art.-No. K128

(Dimensions in mm)



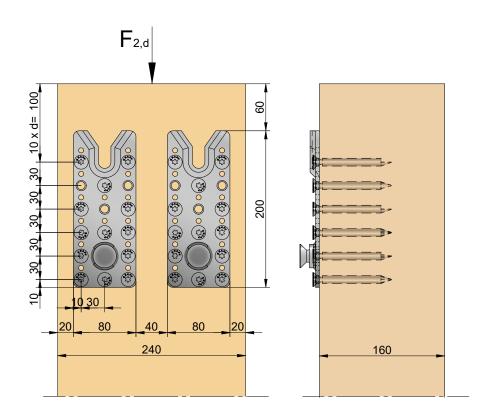
		Collar		Screw connection		
ArtNo.	RICON® S	bolt	Joist	Column	values [GL24h] F _{2,Rk} [kN]	
K128 ST	2x 200/80	VS	26x CS 10x100	32 x CS 10x160	136.6	
		Axial ten	nsion: $F_{1,Rk} = 63$	kN		
2 clip locks: F _{3,Rk} = 36 kN						

ST = standard screw cxn.

Min. timber cross-section: 240x160 mm

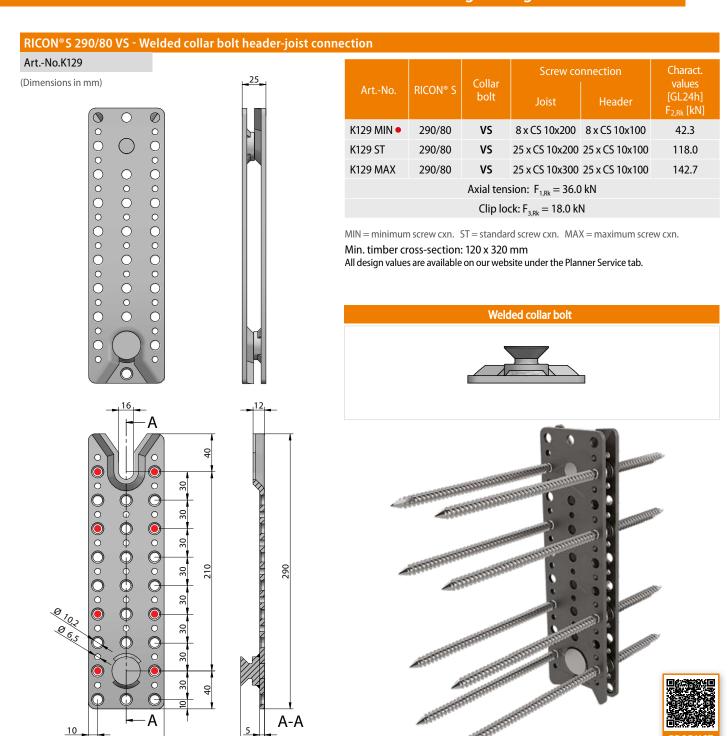
All design values are available on our website under the Planner Service tab.

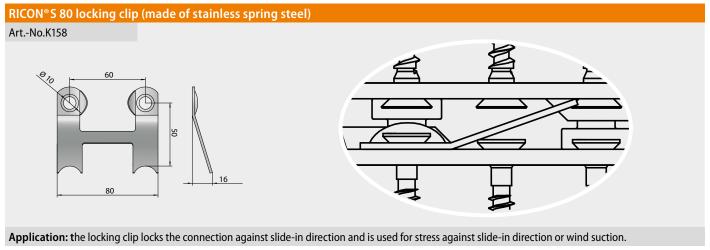












RICON® S 290/80 VS - Welded collar bolt post connection

Art.-No.K129

(Dimensions in mm)

(Dimensions in mm)

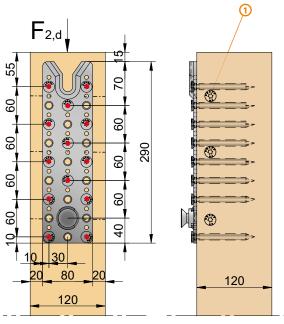


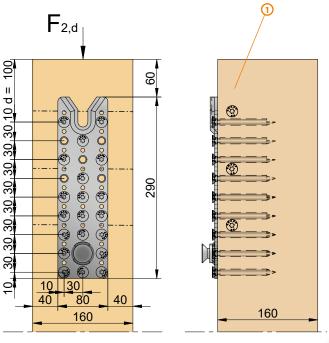
ArtNo.	RICON® S	Collar bolt	Screw co	nnection Column	Charact. values [GL24h] F _{2,Rk} [kN]		
K129 MIN •	290/80	VS	13 x CS 10x100	25 x CS 10x200	84.4		
K129 ST	290/80	VS	20 x CS 10x100	25 x CS 10x200	108.5		
Axial tension: F _{1,Rk} = 36.0 kN							
Clip lock: F _{3,Rk} = 18.0 kN							

MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: MIN = 240x160 mm ST = 240x160 mm All design values are available on our website under the Planner Service tab.







MIN. screw connection in column

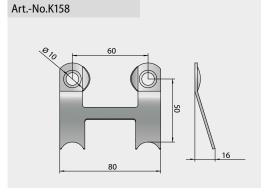
ST. screw connection in column

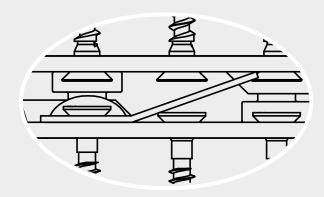


1 Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section width.

RICON®S locking clip

RICON®S 80 locking clip (made of stainless spring steel)





RICON®S 290/80 VS - Welded collar bolt double post connection



 $F_{2,d}$

Art.-No.K129

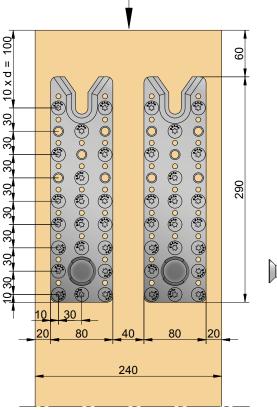
	RICON® S	Collar	Screw co	Charact. values		
ArtNo.			bolt	Joist	Column	[GL24h] F _{2,Rk} [kN]
K129 ST	2x 290/80	VS	40 x CS 10x100	240x160	216.9	
		Axial ter	nsion: $F_{1,Rk} = 63 \text{ l}$	kN		
2 clip locks: F _{3,Rk} = 36 kN						

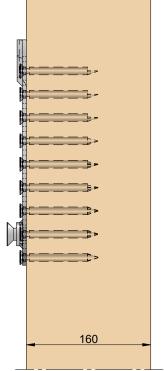
ST = standard screw cxn.

Min. timber cross-section: ST = 240x160 mm

All design values are available on our website under the Planner Service tab.

Welded collar bolt

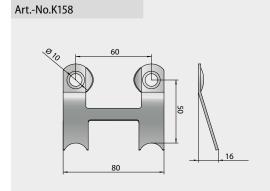


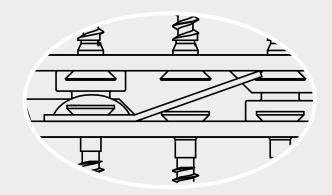




RICON®S locking clip

RICON®S 80 locking clip (made of stainless spring steel)

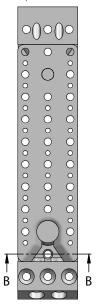


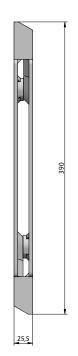


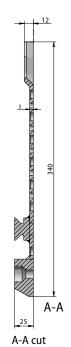
RICON®S 390/80 VS ZP - header-joint 30° screw connection

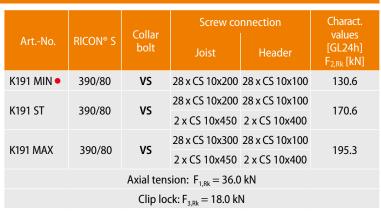
Art.-No.K191

(Dimensions in mm)









MIN = minimum screw cxn. ST = standard screw cxn. MAX = maximum screw cxn.

Min. timber cross-section: $120 \times 720 \text{ mm}$ ou $160 \times 520 \text{ mm}$ All design values are available on our website under the Planner Service tab.

Welded collar bolt B-B cut View with additional plate

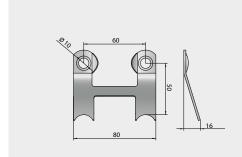


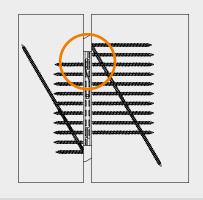


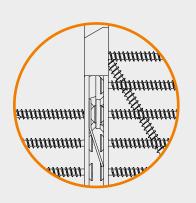
RICON®S locking clip

Art.-No.K158

RICON®S 80 locking clip (made of stainless spring steel)







RICON® S390/80 VS - post 30° screw connection

Art.-No.K191

(Dimensions in mm)

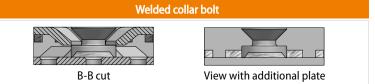


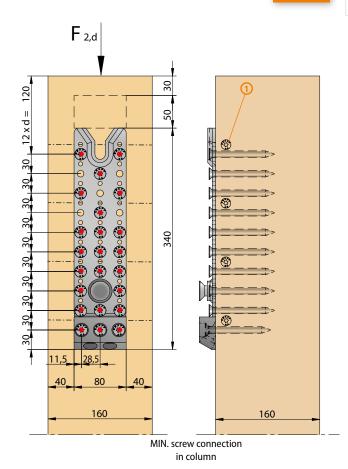
	Art -NO RICONS C -	Collar bolt	Screw co	Charact. values		
ArtNo.			Joist	Column	[GL24h] F _{2,Rk} [kN]	
K191 MIN •	390/80	VS	23 x CS 10x100	28 x CS 10x200 2 x CS 10x450	124.8	
K191 ST	390/80	VS		28 x CS 10x200 2 x CS 10x450	164.8	
Axial tension: $F_{1,Rk} = 36.0 \text{ kN}$						
Clip lock: $F_{3,Rk} = 18.0 \text{ kN}$						

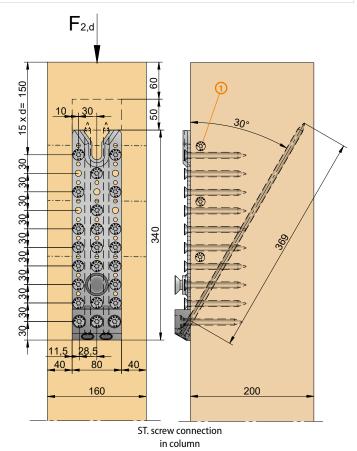
MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: $160 \times 160 \text{ mm}$ ou $160 \times 200 \text{ mm}$ All design values are available on our website under the Planner Service tab.

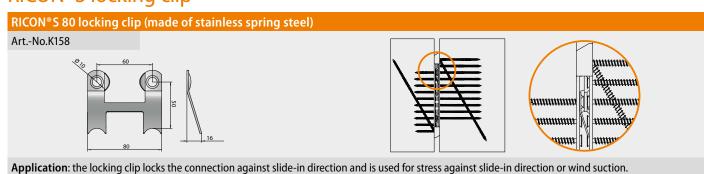








1 Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON°S screws used. These bolts should have the same length as the column cross-section width.



RICON®S 390/80 VS ZP - post 30° screw double connection

Art.-No.K191

(Dimensions in mm)



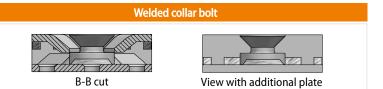
ArtNo. RICON® S		Collar	Screw co	Charact. values [GL24h] F _{2,Rk} [kN]		
	bolt	Joist	Column			
K191 MIN •	390/80	VS	46 x CS 10x100	56 x CS 10x200	249.8	
KI9I WIIIN	390/60			4 x CS 10x450	249.0	
K191 ST	390/80	VS	46 x CS 10x100	58 x CS 10x200	164.8	
וכופוא	(1915) 390/80		46 x CS 10x400	4 x CS 10x450	104.8	
Axial tension: $F_{1,Rk} = 36.0 \text{ kN}$						
Clip lock: $F_{3,Rk} = 18.0 \text{ kN}$						

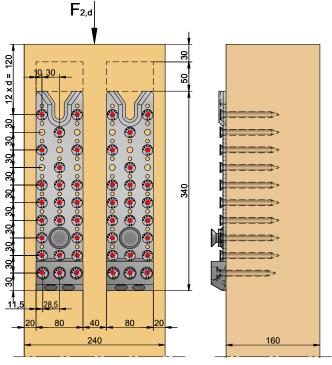
MIN = minimum screw cxn. ST = standard screw cxn.

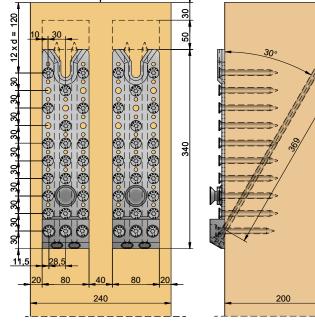
 $F_{2,d}$

Min. timber cross-section: $240 \times 160 \text{ mm}$ ou $240 \times 200 \text{ mm}$ All design values are available on our website under the Planner Service tab.



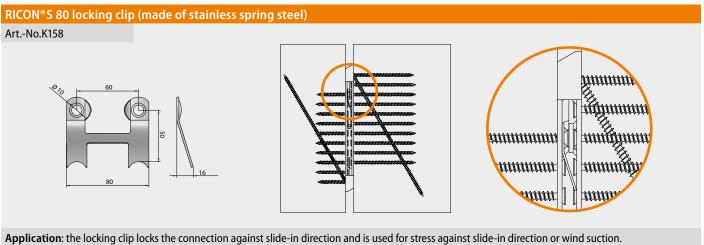






MIN. screw connection in column

ST. screw connection in column

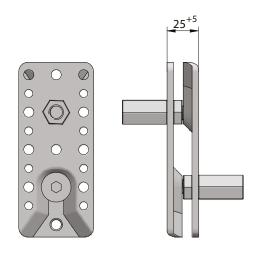


RICON®S 60 EK

RICON®S 140/60 EK - Adjustable collar bolt

Art.-No.K146

(Dimensions in mm)

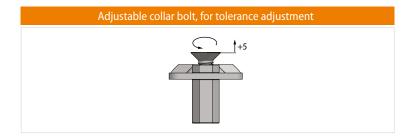


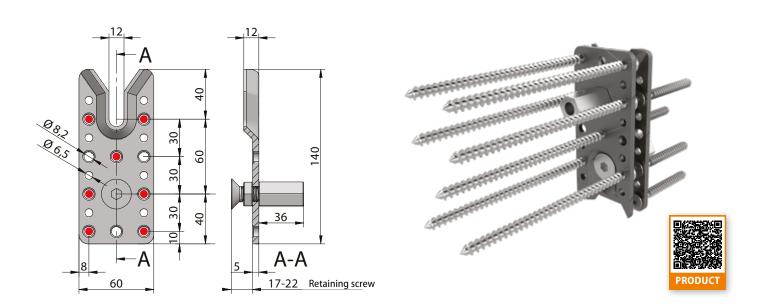
ArtNo.	RICON® S	Collar bolt	Screw co Joist	nnection Header	Charact. values [GL24h]	
					F _{2,Rk} [kN]	
K146 MIN •	140/60	EK M12	7 x CS 8x160	7 x CS 8x80	26.9	
K146 ST	140/60	EK M12	10 x CS 8x160	10 x CS 8x80	37.1	
K146 MAX	140/60	EK M12	10 x CS 8x240	10 x CS 8x80	40.2	
Axial tension: F _{1,Rk} = 31.5 kN						
		Clip loo	$F_{3,Rk} = 18.0 \text{ k}$	N		

MIN = minimum screw cxn. ST = standard screw cxn. MAX = maximum screw cxn.

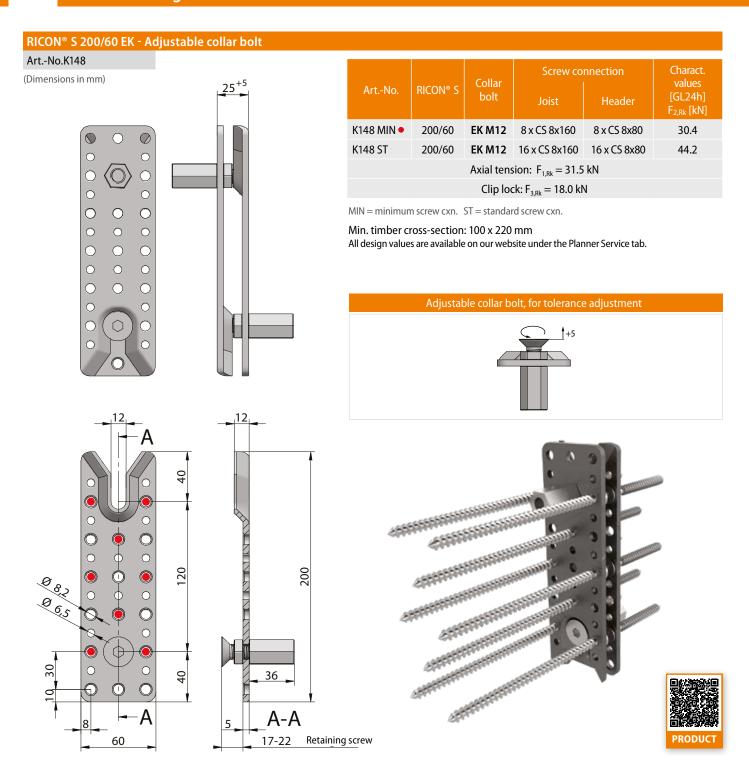
Min. timber cross-section: 100 x 160 mm

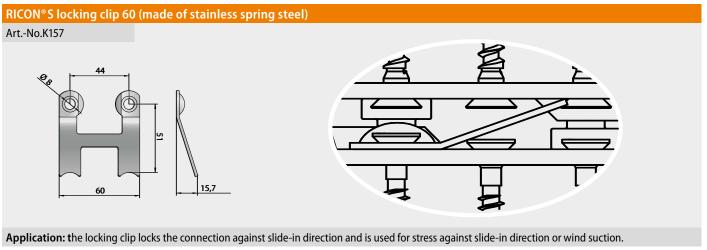
All design values are available on our website under the Planner Service tab.



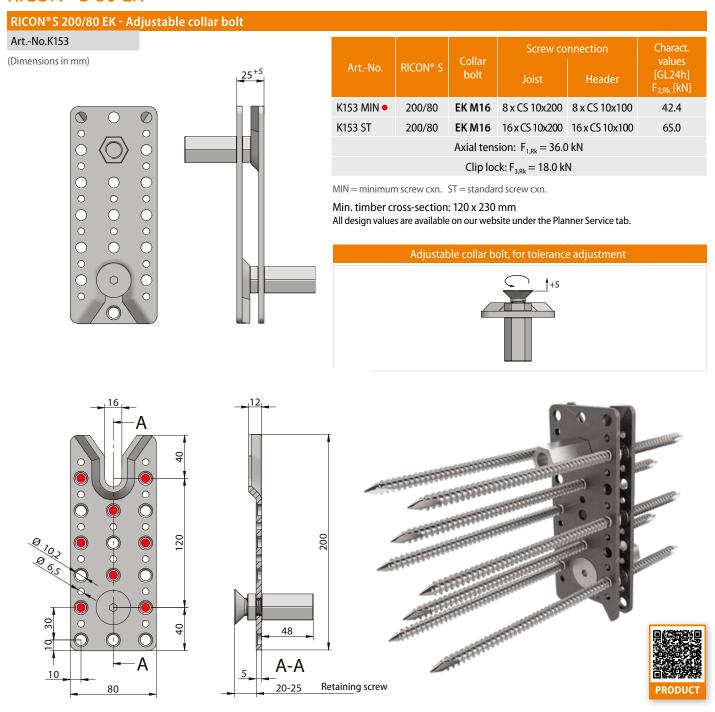




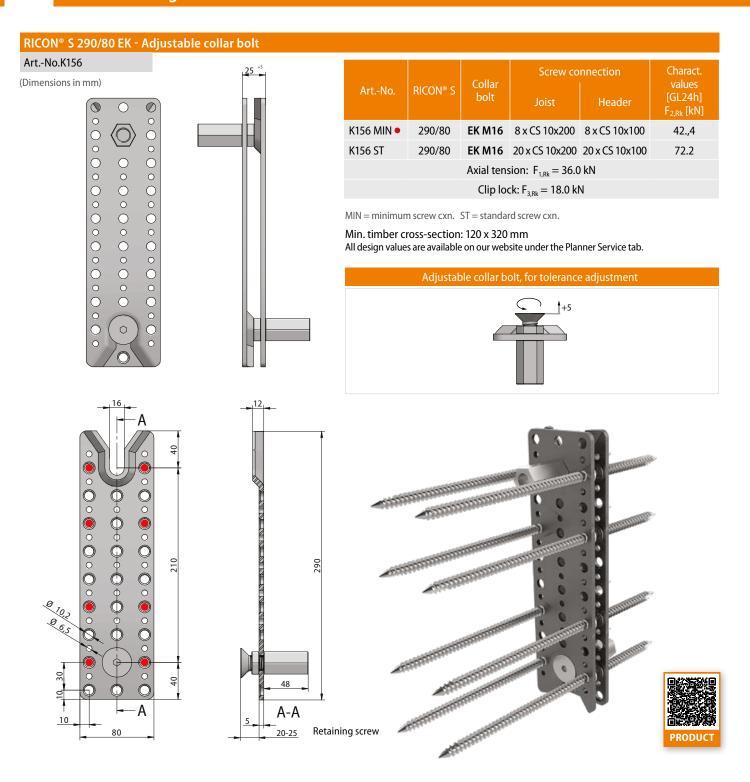


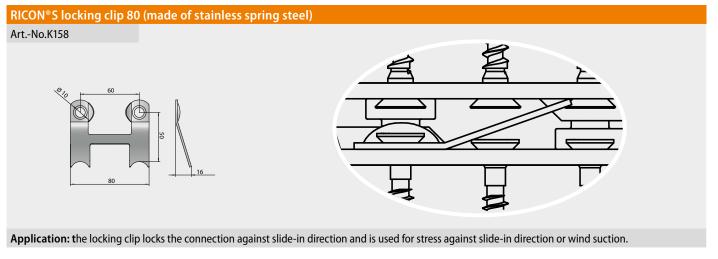


RICON® S 80 EK







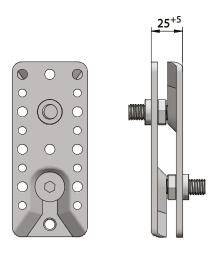


RICON®S 60 EK

RICON® S 140/60 EK M12 - Adjustable collar bolt and insert screw

Art.-No.K280

(Dimensions in mm)



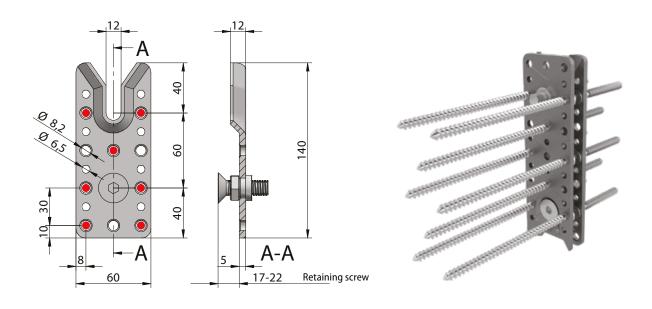
	RICON® S	RICON® S Collar bolt	Screw co	Charact. values		
ArtNo.			Joist	Header	[GL24h] F _{2,Rk} [kN]	
K280 MIN •	140/60	EK M12	7 x CS 8x160	7 x CS 8x80	26.9	
K280 ST	140/60	EK M12	10 x CS 8x160	10 x CS 8x80	37.1	
K280 MAX	140/60	EK M12	10 x CS 8x240	10 x CS 8x80	40.2	
Axial tension: F _{1,Rk} = 31.5 kN						
		Clip loo	$F_{3,Rk} = 18.0 \text{ k}$	N		

MIN = minimum screw cxn. ST = standard screw cxn. MAX = maximum screw cxn.

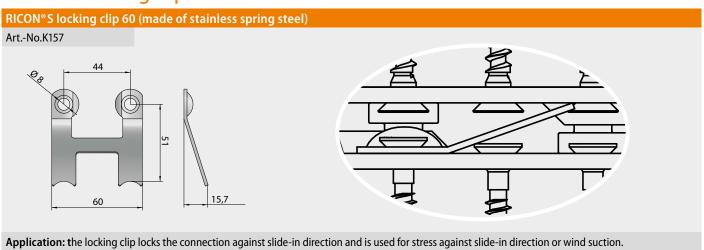
Min. timber cross-section: 100 x 160 mm

All design values are available on our website under the Planner Service tab.





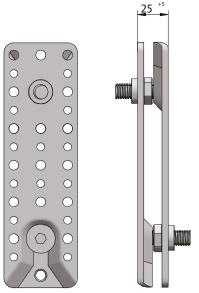




RICON®S 200/60 EK M12 - Adjustable collar bolt and insert screw

Art.-No.K281

(Dimensions in mm)

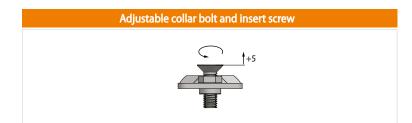


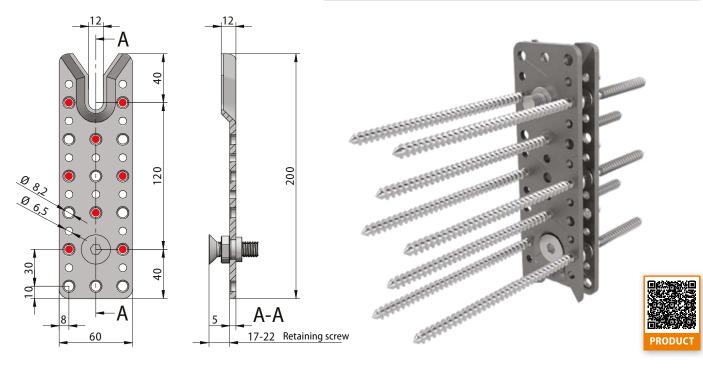
	RICON® S	Collar	Screw co	Charact. values			
ArtNo.		RICON® S	CON® S bolt	Joist	Header	[GL24h] F _{2,Rk} [kN]	
K281 MIN •	200/60	EK M12	8 x CS 8x160	8 x CS 8x80	30.4		
K281 ST	200/60	EK M12	16 x CS 8x160	16 x CS 8x80	44.2		
Axial tension: $F_{1,Rk} = 31.5 \text{ kN}$							
	Clip lock: F _{3,Rk} = 18.0 kN						

MIN = minimum screw cxn. ST = standard screw cxn.

Min. timber cross-section: 100 x 220 mm

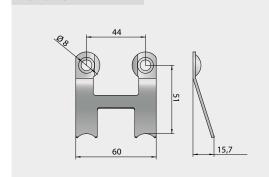
All design values are available on our website under the Planner Service tab.

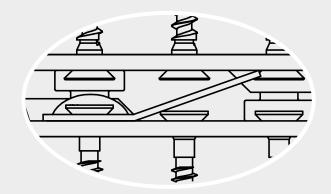




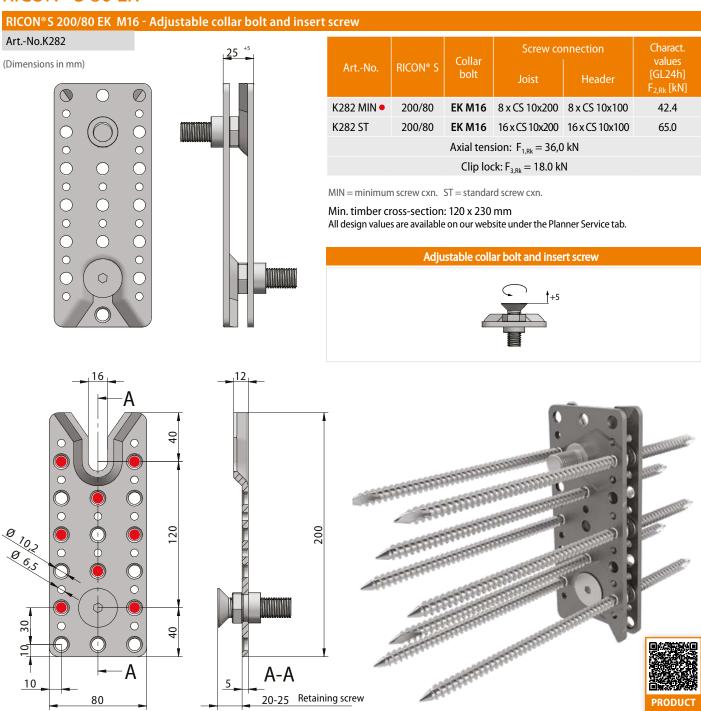
RICON®S locking clip

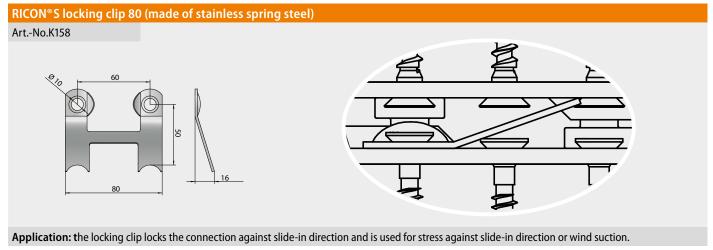
RICON°S locking clip 60 (made of stainless spring steel) Art.-No.K157

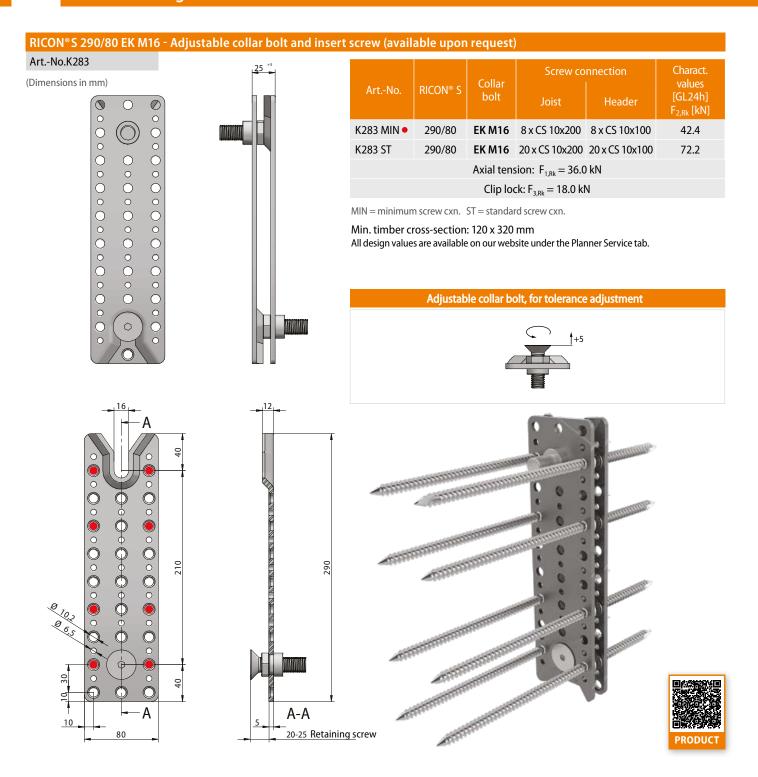


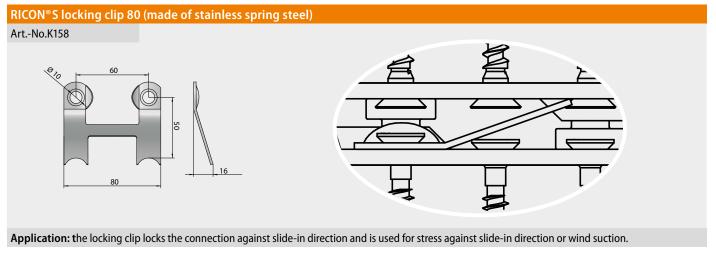


RICON® S 80 EK







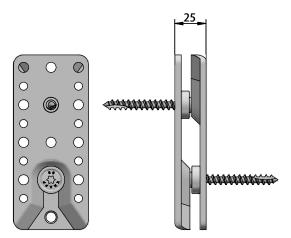


RICON®S 60 VK

RICON®S 140/60 VK - Screwed collar bolt

Art.-No.K130

(Dimensions in mm)



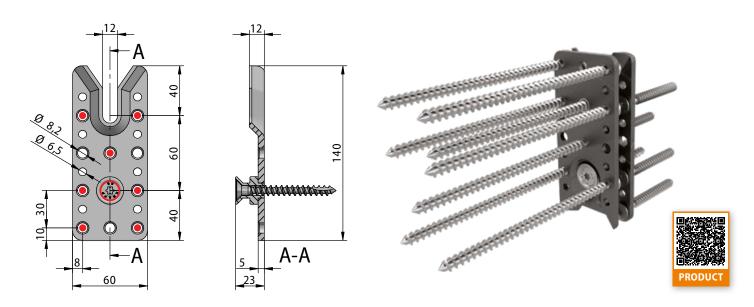
Aut. No. DICOL		Collar	Screw co	nnection	Charact. values				
ArtNo.	RICON® S	bolt	Joist Header	Header	[GL24h] F _{2,Rk} [kN]				
K130 ST	140/60	VK D12	8 x CS 8x160	8 x CS 8x80	31.5				
K130 MAX	140/60	VK D12	8 x CS 8x240	8 x CS 8x80	33.5				
Axial tension: $F_{1.Rk} = 13.0 \text{ kN}$									
Clip lock: F _{3,Rk} = 18.0 kN									

MIN = minimum screw cxn. ST = standard screw cxn.

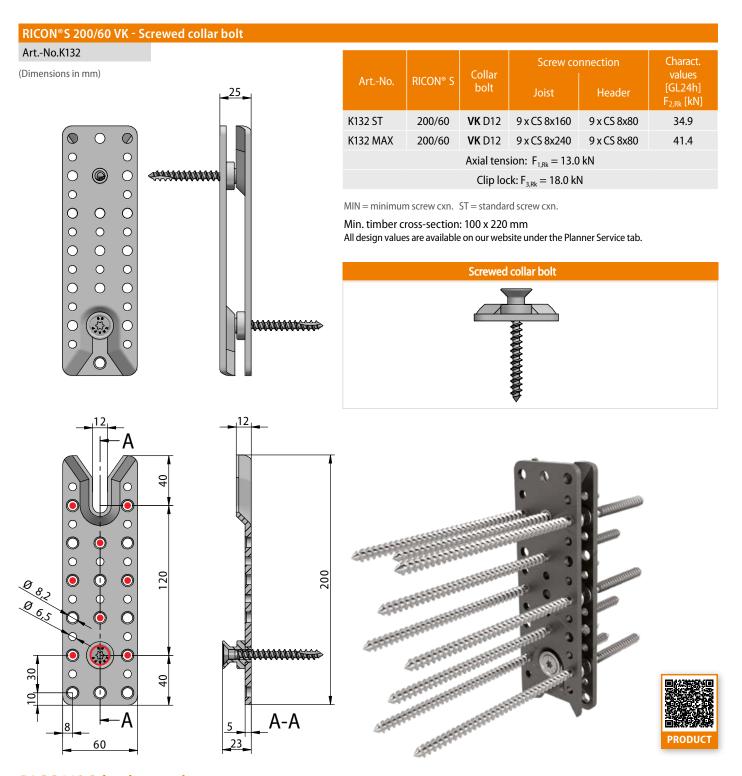
Min. timber cross-section: 100 x 160 mm

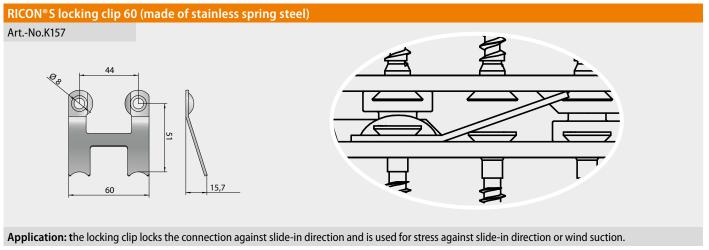
All design values are available on our website under the Planner Service tab.



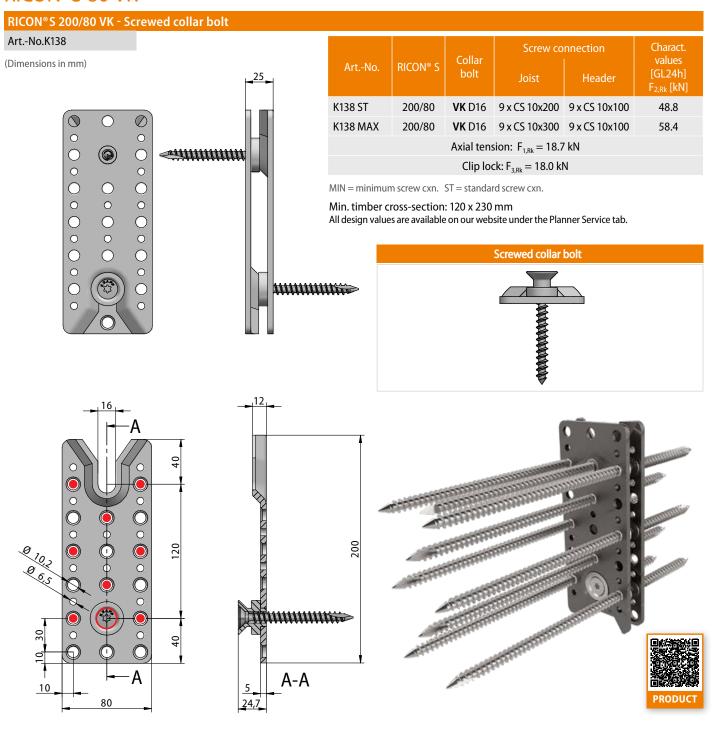






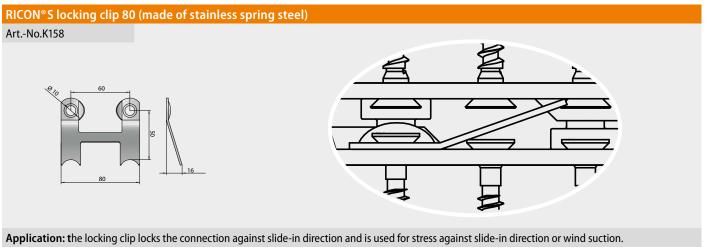


RICON®S 80 VK







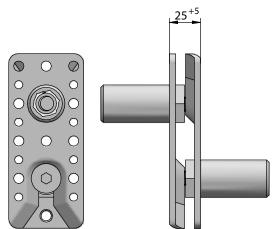


RICON®S 60 GK

RICON®S 140/60 GK - Spring-loaded collar bolt

Art.-No.K134

(Dimensions in mm)



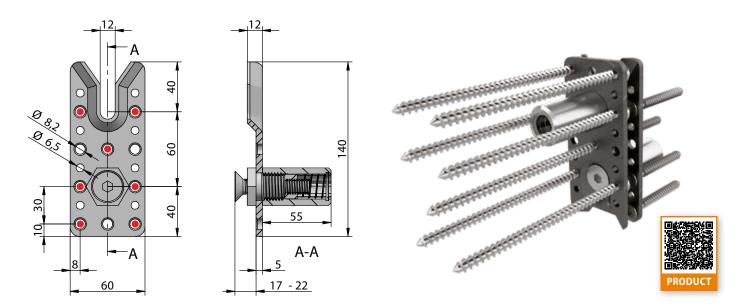
ArtNo.	RICON® S	Collar bolt	Screw co Joist	nnection Header	Charact. values [GL24h] F _{2,Rk} [kN]				
K134 MIN •	140/60	GK D12	7 x CS 8x160	7 x CS 8x80	26.9				
K134 ST	140/60	GK D12	10 x CS 8x160	10 x CS 8x80	37.1				
K134 MAX	140/60	GK D12	10 x CS 8x240	10 x CS 8x80	40.2				
Axial tension: F _{1,Rk} = 31.5 kN									
		Clip loo	$F_{3,Rk} = 18.0 \text{ k}$	N					

MIN = minimum screw cxn. ST = standard screw cxn. MAX = maximum screw cxn.

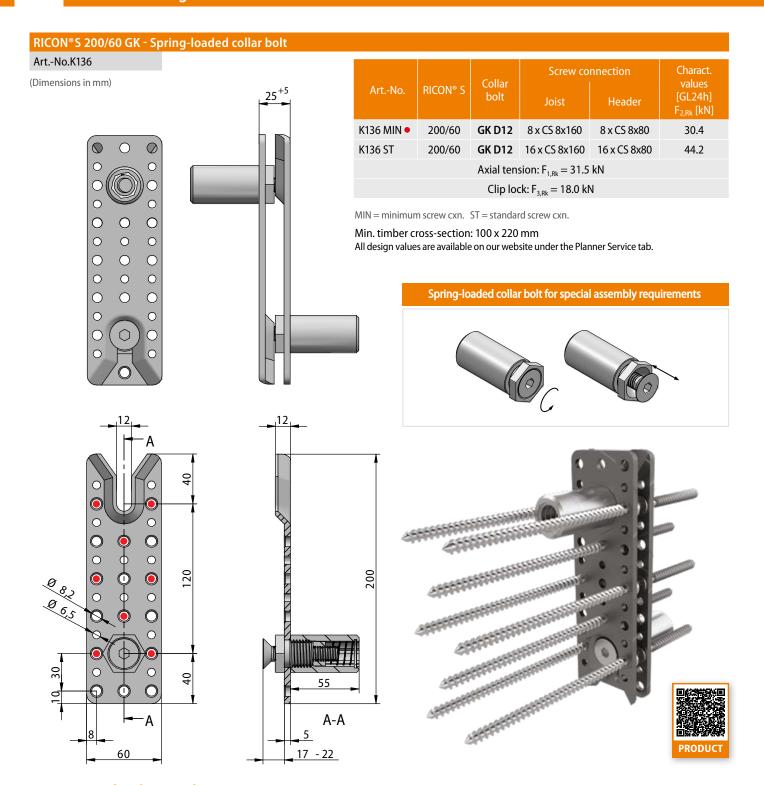
Min. timber cross-section: 100 x 160 mm

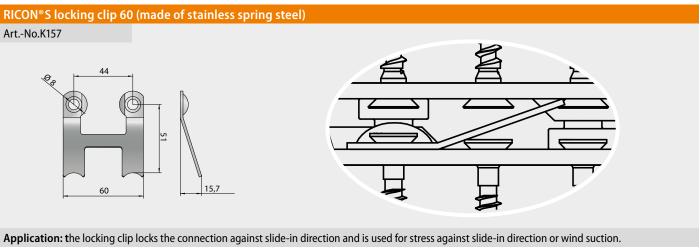
All design values are available on our website under the Planner Service tab.



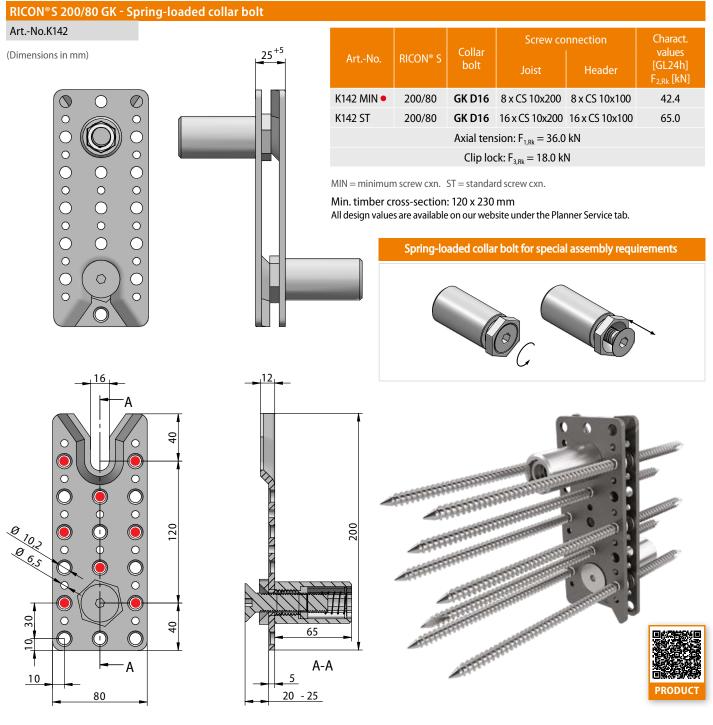


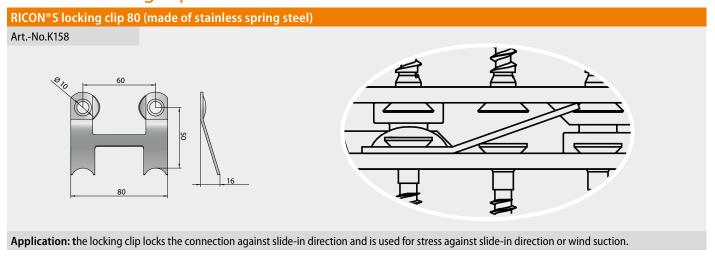


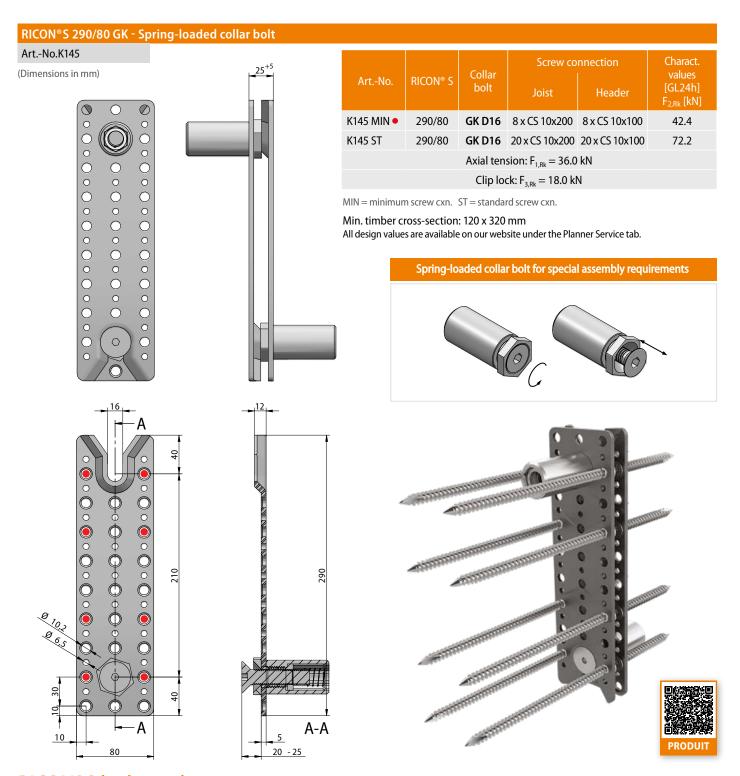


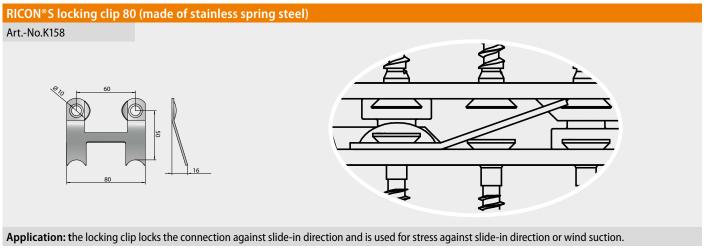


RICON®S 80 GK









RICON®S screws

Self-tapping CS-screws RICON® S60 (RICON® S supplied with the respective CS-screws)

Art.-No.Z580 Self-tapping CS-screw 8x80
Art.-No.Z581 Self-tapping CS-screw 8x160
Art.-No.Z530 Self-tapping CS-screw 8x240



Application: to screw the RICON®S into the main beam (mullion) or secondary beam (transom).

CS-screws RICON® S80 with cut point (RICON® S supplied with the respective CS-screws)

Art.-No.Z582 Self-tapping CS-screw 10xx100
Art.-No.Z583 Self-tapping CS-screw 10xx200
Art.-No.Z651 Self-tapping CS-screw 10xx300



Application: to screw the RICON®S into the main beam (mullion) or secondary beam (transom).

RICON®S accessories

Routing-jig for RICON® S 60 / S 80

Art.-No.K510 Routing-jig MULTI F60 (plywood) for all RICON® S60 sizes

Art.-No.K511 Routing-jig MULTI F80 (plywood) for all RICON® S80 sizes

Tip: The MULTI F routing-jig is suitable for a Ø 30 mm guide bushing (for plunge router) and Ø 15 mm TCT straight router bit. MULTI F is adjustable depending on wood sizes.

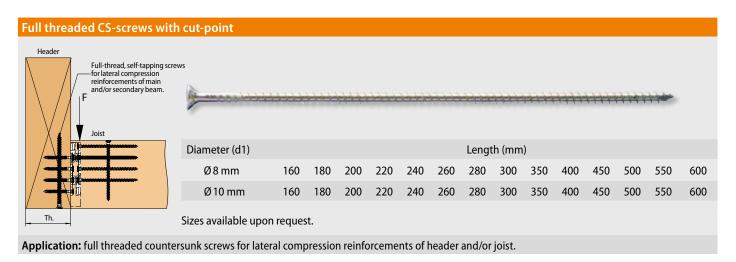
Application: or milling with concealed mounting.

TCT slotting cutter

Art.-No.Z068 TCT slotting cutter Ø15, Length of 40 mm and Ø12 mm shaft

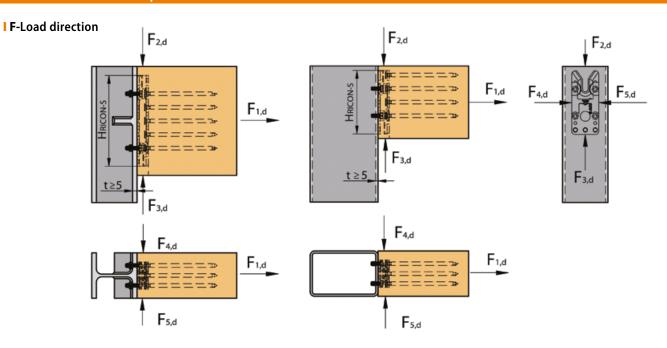
Application: to recess the rebate for RICON® S.





RICON®S steel to timber connection

Beam connections to steel pillar



Wood to steel connection in slide-in direction F₂

Load bearing capacities in the direction of insertion

	Tensile force in s	secondary beam	Shear force			
KNAPP® Connectors	F _{t,Rk} [kN]* F _{1,Rk} [kN]* on 5 mm steel on glulam GL24h		F _{v.Rk} [kN]* on 5 mm steel	F _{z,Rk} [kN]* on glulam GL24h		
RICON® S 140x60 EK* /VS 4 screws M8x20 10 CS 8x160	72.4	31.5	42.2	37.1		
RICON® S 200x60 EK*/VS 6 screws M8x20 16 CS 8x160	108.6	31.5				
RICON® S 200x80 EK* /VS 4 screws M10x20 16 CS 10x200	90.5	36.0	111.4	EK: 65.0 VS: 79.1		
RICON® S 290x80 EK*/VS 6 screws M10x20 25 CS 10x200	135.7	36.0	167.0	EK: 72.2 VS: 118.2		
RICON® S 390x80 VS+ZP 6 vis M10x20 28 CS 10x200 2 CS 10x450	135.7	36.0	167.0	170.9		
Sizing value calculation	Y _{M,2} = 1.25	$\gamma_{\rm M} = 1.3$ $k_{\rm mod} = 0.8 \text{KLED medium}$ $k_{\rm mod} = 0.9 \text{KLED short}$	Y _{M,2} = 1.25	$\gamma_{M} = 1.3$ $k_{mod} = 0.8$ KLED medium $k_{mod} = 0.9$ KLED short		

^{*} The indicated values are applicable to the RICON® S EK version (retaining screw collar bolt with insert screw).

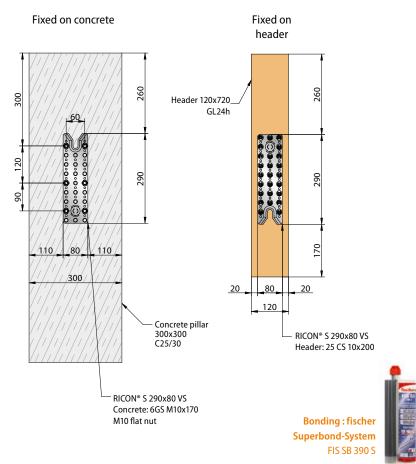
Notes about pages 85 to 87.

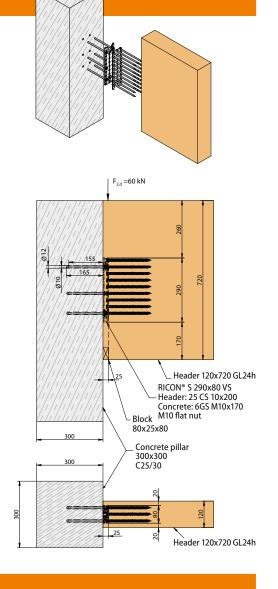
The fischer anchors for KNAPP® wood-concrete connections were defined with the dimensions shown on the drawings and a concrete strength class of C20/25. The calculations were made with the C-FIX design tool and verified by fischer. All other configurations must be checked. This can be done by KNAPP®, fischer or a professional (engineer or competent technician). KNAPP® accepts no liability for the inappropriate use of the value tables given in this catalogue. The condition of the concrete element (concrete strength class and surface) must be checked by a specialist. KNAPP® accepts no liability in this respect. KNAPP® products and connectors must be installed according to the installation instructions manuals. KNAPP® - fischer wood-concrete joints must be made in accordance with their respective ETA technical evaluations.

RICON®S timber to concrete connection

Timber Engineering

(Dimensions in mm)

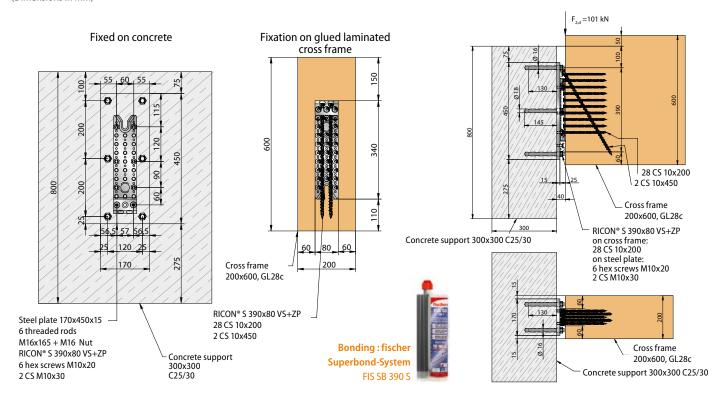




RICON®S

Timber Engineering

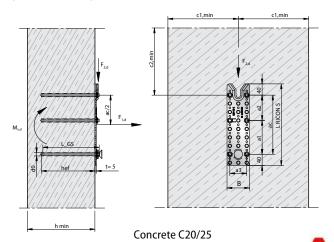
(Dimensions in mm)



RICON® S 60 and 80 VS timber to concrete connection

Beam to concrete connection

(Dimensions in mm)



Distance	Distar	Distances for RICON® S Version VS concrete connection						
Distance	140x60 [mm]	200x60 [mm]	200x80 [mm]	290x80 [mm]				
Spacing a _c	60	120	120	210				
Spacing a₁	60	60	60	120				
Spacing a₂	0	60	60	90				
Spacing a₃	44	44	60	60				
Drill hole diameter d₀	10	10	12	12				
Anchorage depth h _{ef}	140	140	160	160				
Diameter threaded rod d _{GS}	M8	M8	M10	M10				
Length threaded rod L _{GS}	150	150	170	170				
Minimal edge distance c _{1,min}	∞	∞	∞	∞				
Minimal edge distance c _{2,min}	100	100	100	135				
Minimal concrete thickness h _{min}	170	170	190	190				

fischer Approval: ETA-12/0258 (fischer)

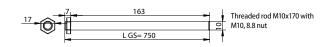
fischer Superbond-System FIS SB 390 S

I RICON®S 60: threaded rod M8x150 with M8, 8.8 nut



fischer Superbond-System FIS SB 390 S

RICON®S 80: threaded rod M10x170 with M10, 8.8 nut



F ₂ Load direction in the	direction of	insertion							
	Concrete	connection			Timber o	onnection			
KNAPP®	F _{2,Rd,concrete}	Distances	Wood	Wood material		F	2,Rd,timber		
Connectors	Shear force F 2,Rd,concrete	Bending moment with e = 0,025 m M _{v.Rd.concrete} [kNm]	Wood	Char. density ρ,	Charact. val			Design value $\gamma_{M} = 1.3$ [k	s :N]
	[kN]		type	[kg/m³] ¯	$F_{2,KCC,Rk}$, $\gamma_M = 1,0$		$k_{mod} = 0.6$	k _{mod} = 0,8	$k_{mod} = 0.9$
RICON® S 140/60 VS ST	34,00	0,85	C24	350	60	34,9	16,1	21,5	24,2
Concrete: 4 threaded rods M8x150	34,00	0,83	GL24h	385	00	37,1	17,1	22,8	25,7
RICON® S 140/60 VS MAX	34,00	0,85	C24	350	60	37,8	17,4	23,3	26,2
Concrete: 4 threaded rods M8x150	34,00	0,63	GL24h	385	00	40,2	18,6	24,7	27,8
RICON® S 200/60 VS ST	50,00	1,25	C24	350	60	53,3	24,6	32,8	36,9
Concrete: 6 threaded rods M8x150	30,00	1,23	GL24h	385	00	56,7	26,2	34,9	39,3
RICON® S 200/60 VS MAX	50,00	1,25	C24	350	60	62,7	28,9	38,6	43,4
Concrete: 6 threaded rods M8x150	30,00	1,23	GL24h	385	00	66,5	30,7	40,9	46,0
RICON® S 200/80 VS ST	68,00	1,70	C24	350	99	74,7	34,5	46,0	51,7
Concrete: 6 threaded rods M10x170	00,00	1,70	GL24h	385	99	79,1	36,5	48,7	54,8
RICON® S 200/80 VS MAX	68,00	1,70	C24	350	99	87,1	40,2	53,6	60,3
Concrete: 6 threaded rods M10x170	00,00	1,70	GL24h	385	99	92,4	42,6	56,9	64,0
RICON® S 290/80 VS ST	95,00	2 20	C24	350	99	111,2	51,3	68,4	77,0
Concrete: 6 threaded rods M10x170	95,00	2,38	GL24h	385	99	118,2	54,6	72,7	81,8
RICON® S 290/80 VS MAX	95,00	2 20	C24	350	99	134,7	62,2	82,9	93,3
Concrete: 6 threaded rods M10x170	95,00	2,38	GL24h	385	99	142,7	65,9	87,8	98,8
RICON® S 390/80 VS ST	110.00	2,75	C24	350	180	162,8	75,2	100,2	112,7
Concrete: 6 threaded rods M10x170	110,00	2,73	GL24h	385	100	170,6	78,7	105,0	118,1
RICON® S 390/80 VS MAX	110,00	2,75	C24	350	180	187,5	86,1	114,7	129,1
Concrete: 6 threaded rods M10x170	110,00	2,13	GL24h	385	100	195,3	90,1	120,2	135,2

Number of screws in joist are given on pages 52 to 66. Service class timber: 1-2

 $\gamma_{M,timber} = 1,3$

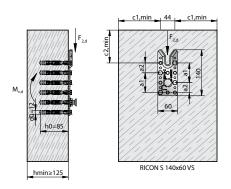
Calculation of $F_{2,Rd}$ for timber-concrete connection: $\label{eq:f2Rd} F_{_{2,Rd}} = min \; \left\{ \begin{array}{l} \min \; F_{_{2,Rd,\,timber}} \\ \min \; F_{_{2,Rd,\,b\acute{e}ton}} \end{array} \right.$

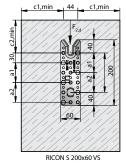
rection: $F_{2,Rd, \text{ timber}} = \min \begin{cases} \min F_{2,RCC, Rk} / \gamma_M \\ \frac{\min F_{2,Rk} \cdot k_{mod}}{\gamma_{M, \text{ timber}}} \end{cases}$

Fixation RICON® S 60 and 80 VS timber to concrete connection

Beam to concrete connection

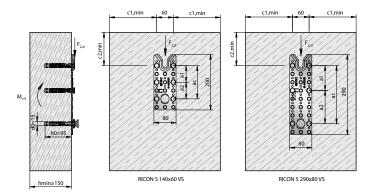
(Dimensions in mm)





Distance	Distances for RICON® S Version VS concrete connection								
Distance	140x60 [mm]	200x60 [mm]	200x80 [mm]	290x80 [mm]					
Spacing a _c	60	120	120	210					
Spacing a ₁	60	60	60	90					
Spacing a₂	30	60	60	120					
Spacing a₃	44	44	60	60					
Drill hole diameter d₀	12	12	15	15					
Anchorage depth h _{ef}	85	85	95	95					
Diameter threaded rod d _{GS}	M8x20	M8x20	M10x20	M10x20					
Minimal edge distance c _{1,min}	∞	∞	∞	∞					
Minimal edge distance c _{2,min}	100	100	120	120					
$\label{eq:minimal} \mbox{Minimal concrete thickness $h_{\mbox{\scriptsize min}}$}$	125	125	150	150					

fischer Approval: ETA-07/0025 and ENSO



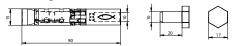
I RICON®S 60:

fischer high performance anchor FH II 12/ M8 I (8.8) with hexagon screw M8x20



I RICON®S 80:

fischer High performance anchor FH II 15/ M10 I (8.8) with hexagon screw M10x20



F_2 Load direction in the direction of insertion

	Concrete	connection			Timber o	onnection					
KNAPP®	F _{2,Rd,concrete}	Distances	Wood	material	F _{2,Rd,timber}						
Connectors	Shear force F _{2,Rd,concrete}	Bending moment with e = 0,025 m	Wood	Char. density ρ _κ	Charact. val			Design value: _{Rd,} γ _M = 1,3 [k	s N]		
	2,Rd,concrete [kN]	M _{v,Rd,concrete} [kNm]	type	[kg/m³]	$F_{2,KCC,Rk}$, $\gamma_M = 1,0$	F _{2,Rk}	$k_{mod} = 0.6$	k _{mod} = 0,8	k _{mod} = 0,9		
RICON® S 140/60 VS ST	22,00	0,55	C24	350	60	34,9	16,1	21,5	24,2		
Concrete: 4 FH II 12/M8 I	22,00	0,55	GL24h	385	00	37,1	17,1	22,8	25,7		
RICON® S 140/60 VS MAX	22,00	0,55	C24	350	60	37,8	17,4	23,3	26,2		
Concrete: 4 FH II 12/M8 I	22,00	0,55	GL24h	385	00	40,2	18,6	24,7	27,8		
RICON® S 200/60 VS ST	35,00	0,88	C24	350	60	53,3	24,6	32,8	36,9		
Concrete: 6 FH II 12/M8 I	33,00		GL24h	385		56,7	26,2	34,9	39,3		
RICON® S 200/60 VS MAX	35,00	0,88	C24	350	60	62,7	28,9	38,6	43,4		
Concrete: 6 FH II 12/M8 I	33,00	0,00	GL24h	385	00	66,5	30,7	40,9	46,0		
RICON® S 200/80 VS ST	44,00	1,10	C24	350	99	74,7	34,5	46,0	51,7		
Concrete: 6 FH II 15/M10 I	44,00	1,10	GL24h	385	99	79,1	36,5	48,7	54,8		
RICON® S 200/80 VS MAX	44,00	1,10	C24	350	99	87,1	40,2	53,6	60,3		
Concrete: 6 FH II 15/M10 I	44,00	1,10	GL24h	385	99	92,4	42,6	56,9	64,0		
RICON® S 290/80 VS ST	60,00	1,50	C24	350	99	111,2	51,3	68,4	77,0		
Concrete: 6 FH II 15/M10 I	00,00	1,30	GL24h	385	99	118,2	54,6	72,7	81,8		
RICON® S 290/80 VS MAX	60,00	1,50	C24	350	99	134,7	62,2	82,9	93,3		
Concrete: 6 FH II 15/M10 I	00,00	1,50	GL24h	385	99	142,7	65,9	87,8	98,8		

Number of screws in joist are given on pages 52 to 66.

Service class timber: 1-2

 $\gamma_{\text{M,timber}} = 1.3$

Calculation of $F_{2,Rd}$ for timber-concrete connection:

$$F_{2,Rk} = min \; \left\{ \begin{array}{l} \min F_{2,Rd, \, timber} \\ \min F_{2,Rd, \, concrete} \end{array} \right. \qquad F_{2,Rk, \, bois} = min \; \left\{ \begin{array}{l} \min F_{2,RCC, \, Rk} / \gamma_M \\ \frac{\min F_{2,Rk} \cdot k_{mod}}{\gamma_{M, \, timber}} \end{array} \right.$$

RICON®S

Fabrication

- I Routing machine with KNAPP® routing-jig.
- Fabrication with CNC joinery machine possible all data for the standard CNC joinery machine programs are included.



CNC joinery machine



The milling template and router make a 60 mm or 80 mm wide and 25 mm deep cutout on the secondary beam (length according to the assembly instructions).

Min. routing dimensions for RICON® S60 / S80									
Width	Length	Depth (VS, VK, EK, GK)							
60 mm / 80 mm	variable	25 mm							

Installation RICON® S VK



Position the plate and the screws



Screw on RICON®S on Header

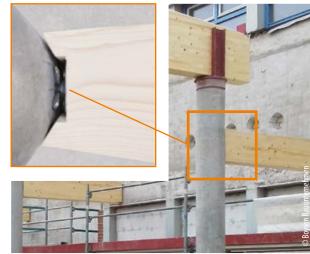


Screw on RICON®S counter part on joist

RICON®S wood to seel connection



RICON®S 290/80 - timber to steel connection



RICON®S - timber to concrete connection

The heavy-duty system for timber construction engineering

Connecting main beam to secondary beam up to 768 kN*

- I Wood width up from 100 mm
- I Invisible finition d'assemblage impeccable
- I Démontage and remontage sans dommage
- I Préfabrication très avancée de la production
- I Montage possible dans tous les sens sans coincement
- I Reprend des efforts sur tous les axes
- I Accroche facile and rapide, distance d'emboitement seulement 20 mm
- I Résistant au feu (EN 1995-1-2)



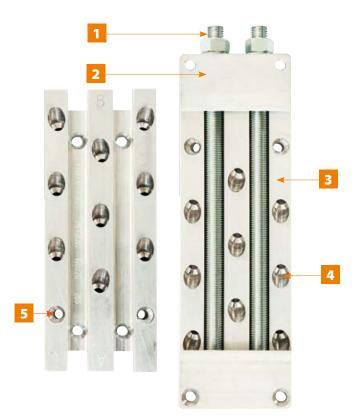
The values only apply when used with original KNAPP® screws! Design values are available on our website under Planner Service.

* Characteristic value F2,Rk in slide-in direction according to ETA ETA-15/0667 (2023/08/16), for glulam GL24.



- I Applications: concealed main-secondary beam connections
- I Connection: wood to wood and wood to concrete and steel
- I Areas of application: timber engineering, multi-storey timber construction
- Service class 1 and 2





- Threaded rod with washers and hexagonal nuts transmit the tensile forces.
- Tapered aluminium clamping jaws transfer the vertical and tensile forces from the secondary beam to the main beam and form a tight joint between the two connector plates. In addition, the clamping jaws can be used to rest the beam the during assembly.
- Connector plates made of high-strength aluminium with fastening holes for fully threaded screws at 45° and 90° angle.
- Biaxially inclined screw pattern to avoid splitting of the main beam or column.
- Horizontal screws for transferring the tensile forces from the clamping moment.

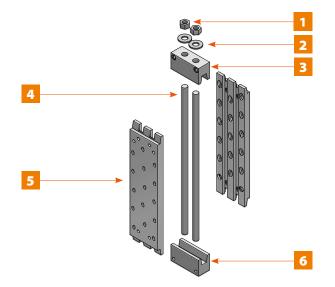
Fire protection: fire resistance (EN 1995-1-2) through 3-4 sided concealed, tight-joint mounting (R30 \geq 28 mm, R60 \geq 49 mm)





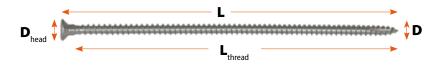
Connector components

Position	Description
1	Hexagonal nut
2	Washers
3	Clamping jaw (without thread)
4	Threaded rod
5	Connector plate x 2
6	Bottom clamping jaw (with thread)



Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Type	D_{head}						D		Bits
7 ii ti 1131	.,,pc	mm	[in]	mm	[in]	mm	[in]	mm	[in]	
Z581	Self-tapping CS-screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	Self-tapping CS-screw	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z670/Z675	Self-tapping CS-screw	15	0.59	120	9.45	105	4.13	8	0.31	Torx 40

Application examples and connection details



With only 2 cm of hooking way, an installation in recesses of concrete walls can be done.

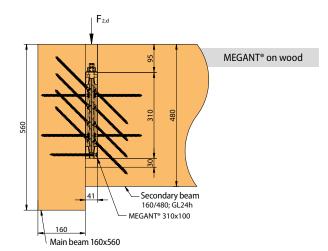


Three-sided concealed assembly by milling into the secondary beam. MEGANT* is fixed to the main beam with no need for milling.





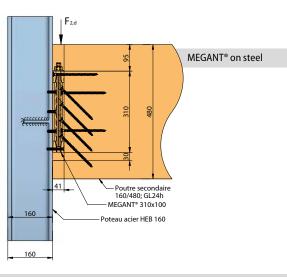
MEGANT® angled connection.







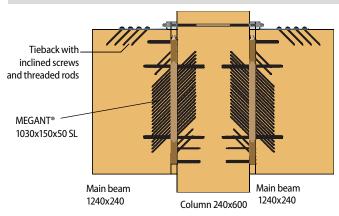
MEGANT® steel connection.





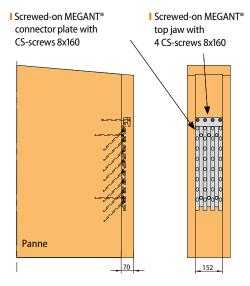
Top flush double-sided main and secondary beam MEGANT® connection.

Double-sided beam column connection with MEGANT®

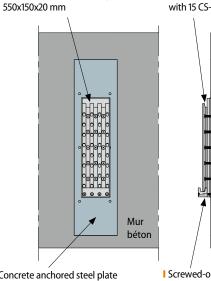


Wood to concrete and steel connection

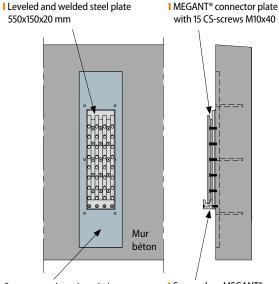
Example of a sloped beam/concrete connection with MEGANT®



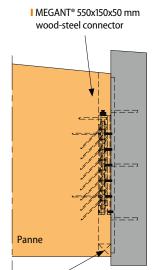
I Milled groove, e.g. 152x70 mm for 3-sided concealed MEGANT® connection



I Concrete anchored steel plate e.g. 240x980x20 mm



Screwed-on MEGANT® bottom jaw with 4 CS-screws M8x80



I Wooden block for covering 4th side of 3-sided concealed MEGANT® connection

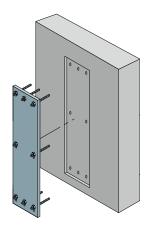
Examples of anchor plate concrete connection



MEGANT® concrete connection.

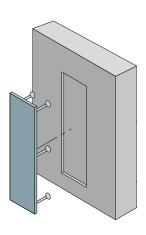


Adhesive: fischer Superbond-System FIS SB 390 S

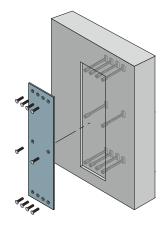


I Concrete connection with glued-in threaded rods for levelling the fischer steel plate - optionally set in recessed concrete. Bonded with fischer Superbond System: FIS SB 390 S

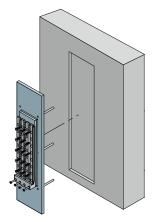
www.fischer-international.com/en/



SBKL anchor plate from Peikko (DE) Steel plate embedded in concrete. www.peikko.de



I Halfen HSC-B steel construction connection with CS screw connection set in recessed concrete. www.halfen.com



I Sloped beam attached to concrete. The welded steel plate gives additional support as well as a surface for connecting the MEGANT® with screws.

The anchoring of the anchor steel plate can be done e.g. with HALFEN HSC-B steel construction connection according to approval Z-1.8-1974, or with fischer Superbond FIS SB 390 S glued-in threaded rods. The required structural analysis for this concrete connection must be carried out by a structural engineer on site.

In the case of a steel plate levelled and installed precisely in the concrete structure, this steel plate can serve as an anchor plate for the concrete connection and thus a complex welding on site can be avoided. This means that the MEGANT® connector only has to be screwed onto the levelled anchor plate.

Load bearing capacity values for MEGANT installed on softwood, according to ETA-15/0667 (22.04.2025)

MEGANT® 60 series - Aluminium EN AW 6082

MEGANT®	Softwood material	Characteristic load bearing capacity and stiffness in softwood with KNAPP® screws 8 x 160 mm								
mm		F _{1,KCC,Rk}	F _{1,Rk}	F _{2,KCC,Rk} kN	F _{2,Rk}	F _{3,Rk}	F _{4KCC,Rk} kN	F _{4,Rk}	M _{tor,Rk} kNm	K _{tor,ser}
240 60 40	C24		18,0		85,7	35,0	36,9	32,0	2,5	200
310x60x40	GL24h		20,3		92,4	37,3		33,6	2,7	227
430x60x40	C24	26.6	18,8	150,4 1)	134,6	44,5	40,6	50,4	5,4	639
4500000040	GL24h	36,6	20,3	$130,1 \cdot f_{R2}^{2)}$	145,3	46,7	40,0	52,8	5,8	723
550x60x40	C24		18,8		183,5*	53,6	44.2	68,7	9,5	1 569
33UXOUX4U	GL24h		20,3		198,1*	56,5	44,3	72,0	10,2	1 775

*F_{2,Rk} Limited to 176,4 kN as F_{t,Rk} of the M20 threaded rod (8.8)

F_{1,KCC,Rk}/F_{1,Rk} Characteristic load bearing capacity (aluminium failure/wood failure) in direction of secondary beam

F_{2,KCC,Rk}/F_{2,Rk} Characteristic load bearing capacity (aluminium failure/wood failure) in direction of insertion

 ${\sf F}_{_{{\sf R}\,{\sf R}k}}$ Characteristic load bearing capacity (wood failure) against direction of insertion

 $F_{4,RCC,Rk}/F_{4,Rk} \quad Characteristic load bearing capacity (aluminium failure/wood failure) perpendicular to direction of insertion failure. \\$

 ${\rm M_{tor}}$ Characteristic rotation moment

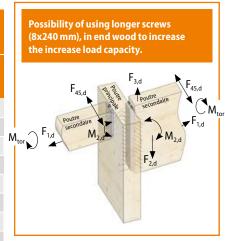
MEGANT® 100 series - Aluminium EN AW 6082

MEGANT®	Softwood material		Characteristic load bearing capacity and stiffness in softwood with KNAPP® screws 8 x 160 mm							
mm		F _{1,KCC,Rk}	F _{1,Rk}	F _{2,KCC,Rk}	F _{2,Rk} kN	F _{3,Rk}	F _{4KCC,Rk}	F _{4,Rk}	M _{tor,Rk} kNm	K _{tor,ser} kNm/rad
21010040	C24		29,3		110,1	51,5	62.4	41,2	4,1	346
310x100x40	GL24h		31,6		118,8	54,4	62,4	43,2	4,4	391
430x100x40	C24	EE 2	29,3	224,2 1)*	183,5	65,2	68,6	68,7	8,5	1 066
450X100X40	GL24h	55,3	31,6	$206,6 \cdot f_{R2}^{2)*}$	198,1	68,8	00,0	72,0	9,2	1 206
550x100x40	C24		29,3		257,0*	78,9	74.0	96,1	14,7	2 443
550X100X40	GL24h		31,7		277,3*	83,2	74,9	100,8	15,9	2 764

 $^{^{*}}$ F_{2,Rk} Limited to 226,1 kN as F_{t,Rk} of the 2 x M16 threaded rods (8.8) (critical for the Megant 550x100x40!)

MEGANT® 150 series – Aluminium EN AW 6082

MEGANT®	Material		Characteristic load bearing capacity and stiffness in softwood with KNAPP® screws 8 x 160 mm							
		F _{1,KCC,Rk}	F _{1,Rk}	F _{2,KCC,Rk}	F _{2,Rk}	F _{3,Rk}	F _{4KCC,Rk}	F _{4,Rk}	$M_{tor,Rk}$	K _{tor,ser}
mm		kN	kN	kN	kN	kN	kN	kN	kNm	kNm/rad
210~150~50	C24		38,5		146,4 ³⁾	57,9	60.0	54,9	3,9	304
310x150x50	GL24h		41,5		158,8 ³⁾	61,1	68,0	57,6	4,2	344
420~150~50	C24		38,5		243,94)	76,2	74.0	91,6	12,3	1 594
430x150x50	GL24h		41,5		263,3 ⁴⁾	80,3	74,8	96,0	13,3	1 803
FF0v1F0vF0	C24		38,5	375,0 ¹)	341,5 5)	94,6		128,2	20,7	3 488
550x150x50	GL24h	74.2	41,5	$366,5 \cdot f_{R2}^{2}$	368,65)	99,5		134,4	22,3	3 946
C10::150::50	C24	74,3	38,5		390,3 ⁵⁾	94,6		128,2	20,7	3 488
610x150x50	GL24h		41,5		421,25)	99,5	01.6	134,4	22,3	3 946
72015050	C24		38,5		487,95)	94,6	81,6	128,2	20,7	3 488
730x150x50	GL24h		41,5		526,5 ⁵⁾	99,5		134,4	22,3	3 946
1030x150x50	C24		38,8	650	585,5 ⁵⁾	94,7		128,2	20,7	3 488
SL	GL24h		41,9	650	631,85)	99,6		134,4	22,3	3 946



 $^{^{3)}}$ $F_{2,Rk}$ limited to 176,4 kN as $F_{t,Rk}$ of the M20 threaded rod (8.8)

¹⁾ F_{2,KCC,Rk} For torsional fixed header

 $^{^{2)}}$ F_{2,KCC,Rk}· f_{R2} For not torsional fixed header and f_{R2} according to page 44 ETA-15/0667 (22.04.2025)

⁴⁾ F_{2,Rk} limited to 352,8 kN as F_{t,Rk} of the 2 x M20 threaded rods (8.8)

⁵⁾ F_{2,Rk} limited to 529,1 kN as F_{t,Rk} of the 3 x M20 threaded rods (8.8)

Load bearing capacity values for MEGANT installed on hardwood, according to ETA-15/0667 (22.04.2025)

MEGANT® 60 series – Aluminium EN AW 6082

MEGANT®	Hardwood material	Characteristic load bearing capacity and stiffness in hardwood with ASSY PLUS VG screws 8 x 160 mm according to ETA-11/0190									
mm		F _{1,KCC,Rk}	F _{1,Rk} kN	F _{2,KCC,Rk} kN	F _{2,Rk}	F _{3,Rk} kN	F _{4KCC,Rk} kN	F _{4,Rk} kN	M _{tor,Rk} kNm	K _{tor,ser} kNm/rad	
310x60x40	$\rho_k = 530 \text{ kg/m}^3$		11,2		107,0	59,2	26.0	63,3	3,3	275	
310x00x40	$\rho_k = 590 \text{ kg/m}^3$		10,5		116,6	62,3	36,9	67,8	3,5	293	
430x60x40	$\rho_k = 530 \text{ kg/m}^3$	26.6	10,5	150,4 1)	168,1	77,7	40.6	99,4	7,0	811	
4500000040	$\rho_k = 590 \text{ kg/m}^3$	36,6	10,5	$130,1 \cdot f_{R2}^{2}$	183,2	82,2	40,6	106,5	7,5	843	
550x60x40	$\rho_k = 530 \text{ kg/m}^3$		10,5		229,3	96,6	442	135,6	12,4	1991	
	$\rho_k = 590 \text{ kg/m}^3$		10,5		249,8	102,1	44,3	145,3	13,2	2070	

*F_{2,Rk} Limited to 176,4 kN as F_{t,Rk} of the M20 threaded rod (8.8)

F_{1,KCC,Rk}/F_{1,Rk} Characteristic load bearing capacity (aluminium failure/wood failure) in direction of secondary beam

 $F_{2,KCC,Rk}/F_{2,Rk} \quad Characteristic load bearing capacity (aluminium failure/wood failure) in direction of insertion$

 ${\sf F_{3,Rk}} \qquad \qquad {\sf Characteristic \, load \, bearing \, capacity \, (wood \, failure) \, against \, direction \, of \, insertion}$

 $F_{4,RCC,Rk}/F_{4,Rk} \quad Characteristic load bearing capacity (aluminium failure/wood failure) perpendicular to direction of insertion$

 ${\rm M_{tor}}$ Characteristic rotation moment

MEGANT® 100 series - Aluminium EN AW 6082

MEGANT®	Hardwood material	Characteristic load bearing capacity and stiffness in hardwood with ASSY PLUS VG screws 8 x 160 mm according to ETA-11/0190								
mm		F _{1,KCC,Rk}	F _{1,Rk}	F _{2,KCC,Rk} kN	F _{2,Rk} kN	F _{3,Rk} kN	F _{4KCC,Rk} kN	F _{4,Rk} kN	M _{tor,Rk} kNm	K _{tor,ser} kNm/rad
210~100~40	$\rho_k = 530 \text{ kg/m}^3$		17,4		137,6	84,4	62.4	81,4	5,3	474
310x100x40	$\rho_k = 590 \text{ kg/m}^3$		17,4		149,9	89,4	62,4	87,2	5,7	505
420v100v40	$\rho_k = 530 \text{ kg/m}^3$	EE 2	17,4	224,2 1)*	229,3	112,7	60.6	135,6	11,1	1353
430x100x40 550x100x40	$\rho_k = 590 \text{ kg/m}^3$	55,3	17,4	$206,6 \cdot f_{R2}^{2)*}$	249,8	119,2	68,6	145,3	11,9	1406
	$\rho_k = 530 \text{ kg/m}^3$		17,4		321,0*	141,0	74.0	189,8	19,3	3101
	$\rho_k = 590 \text{ kg/m}^3$		16,7		349,7*	148,7	74,9	203,4	20,5	3223

 $^{^*}F_{2,Rk}$ Limited to 226,1 kN as $F_{t,Rk}$ of the 2 x M16 threaded rods (8.8) (critical for the Megant 550x100x40!)

MEGANT® 150 series – Aluminium EN AW 6082

	eries – Aluminium Ei	Characteristic load bearing capacity and stiffness in hardwood with ASSY PLUS VG screws 8 x 160 mm according to ETA-11/0190									
MEGANT® mm	Hardwood material	F _{1,KCC,Rk}	F _{1,Rk}	F _{2,KCC,Rk}	F _{2,Rk}	F _{3,Rk}	F _{4KCC,Rk}	F _{4,Rk} kN	M _{tor,Rk} kNm	K _{tor,ser}	
	$\rho_k = 530 \text{ kg/m}^3$		22,5		183,4³)	98,1		108,5	5,1	417	
310x150x50	$\rho_k = 590 \text{ kg/m}^3$		22,5		199,9³)	103,8	68,0	116,2	5,4	444	
120 150 50	$\rho_k = 530 \text{ kg/m}^3$		22,5	375,0 ¹) 366,5 · f _{R2} ²⁾	305,74)	135,8	74.0	180,8	16,1	2023	
430x150x50	$\rho_k = 590 \text{ kg/m}^3$		21,8		333,1 4)	143,3	74,8	193,7	17,2	2103	
550-450-50	$\rho_k = 530 \text{ kg/m}^3$		22,5		428,05)	173,5		253,1	27,0	4427	
550x150x50	$\rho_k = 590 \text{ kg/m}^3$		21,8		466,35)	183,1		271,2	28,8	4601	
610x150x50	$\rho_k = 530 \text{ kg/m}^3$	74,3	22,5		489,15)	173,5		253,1	27,0	4427	
010X150X50	$\rho_k = 590 \text{ kg/m}^3$		21,8		532,9 ⁵⁾	183,1	01.6	271,2	28,8	4601	
720×150×50	$\rho_k = 530 \text{ kg/m}^3$		22,5		611,45)	173,5	81,6	253,1	27,0	4427	
730x150x50	$\rho_k = 590 \text{ kg/m}^3$		21,8		666,25)	183,1		271,2	28,8	4601	
1020v1E0vE0 CI	$\rho_k = 530 \text{ kg/m}^3$		22,2		733,75)	173,4		253,1	27,0	4427	
1030x150x50 SL	$\rho_k = 590 \text{ kg/m}^3$		22,2	650	799,4 ⁵⁾	183,3		271,2	28,8	4601	

A combination review of the different load directions shall be carried out in accordance with ETA-15/0667 (2025). In addition, consideration of the clamping moments $M_{2,Rd}$ resulting from the torsion spring stiffness $K_{2,\phi}$, if must be calculated in the design of the connection. For this purpose, instructions with the corresponding formula can be found in the European Technical Assessment ETA.

 $^{^{1)}}$ $F_{2,KCC,Rk}$ For torsional fixed header

 $^{^{2)}}$ $F_{2,KCC,Rk} \cdot f_{R2} \;\;$ For not torsional fixed header and f_{R2} according to page44 ETA-15/0667 (22.04.2025)

MEGANT® (Dimensions in mm)

Assembly procedure



13:00 | After lifting and aligning the laminated beam,



13:05 | Snap-fit: For threading and dropping, MEGANT® is put into position. MEGANT® requires only 2 cm.



13:08 | Threaded rods inserted and screwed into the bottom jaw.



13:09 | Tighten hexagonal nuts.



13:11 | Connection completed.

MEGANT®

Fire protection

- I Due to the concealed installation of the connectors on three or four sides, appropriate fire protection can be achieved via the corresponding timber cover.
- I No additional covers or fire protection strips are required. According to EN 1995-1-2 point 3.4.3.1, but the joint can not exceed a maximum of 2 mm.
- I If, due to manufacturing tolerances or for installation reasons, larger joints are required required (2 - 10 mm), PROMASEAL intumescent sealant can be used. PROMASEAL®-PL* intumescent sealant can be used for protection. The flexible sealing strip is placed around the connector, expands and fills the gap in the event of fire, thus in the event of fire, thus protecting the connector.
- According to EN 1995-1-2, 28 mm wood cover is required for fire rating of 30 mm., 49 mm for 60 min., 70 mm for 90 min., and 120 minutes for 91 mm (see calculation example on page 35).
- In special situations (e.g. due to non-compliance with the timber cover), the connector can be additionally protected against heat with a can be reduced with Promat PROMADUR®* clear fireproof paint. In the event of fire, the material expands and forms a protective insulating foam that delays combustion by 6 to 17 min (depending on the thickness of the paint) and allows smaller sections of wood to be used.





Fire test results after more than one hour. The section of wood is charred all around the connector. It guaranteed its integrity and its ability to withstand the force exerted.

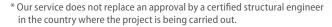
PLANNER SERVICE

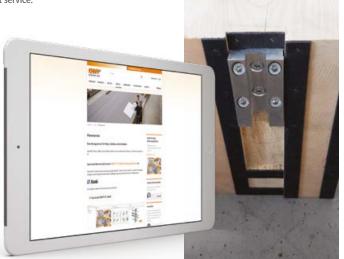
You have a project and want to use **KNAPP®** connectors?

Take advantage of our customized planning service.

KNAPP® offers a comprehensive planning and calculation service for all structural engineers, architects, and project managers.

We provide three benefits: an interactive load table, a dimensioning tool, and our calculation service by our in-house engineers.





Strips of self-adhesive intumescent joint are laid around the connector and then stapled.



The 10 mm joint is closed by swelling intumescent seal, allowing the which allows the connector to be protected even after 120 min of fire.

MEGANT® 310/60/40

Technical details

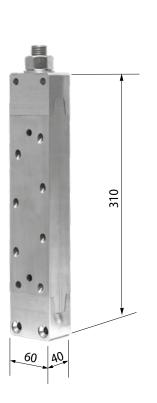
Art.-No.K242

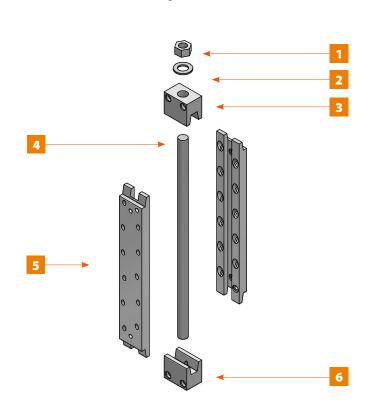
(Dimensions in mm)

MEGANT® 60 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characterist	ic values [kN]	
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}
L x B x H 310x60x40	B x H 100x440	20,3	92,4	37,3	33,6

The full range of resistance values can be found online on our website.

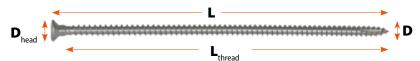




Pos.	Description	Pos.	Description
1	1 hexagonal nut M20	4	1 threaded rod M20x340
2	1 washer M20	5	2 connector plates 250x60x20
3	1 top clamping jaw (without thread) 60x50x40	6	1 bottom clamping jaw (with thread) 60x50x40

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D,			L	L _{th}		ı	D	Bits
711 2. 140.	Quartity	1,450	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	Dies
Z581	14	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	5	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	5	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connec	ction on ha	rdwood									
Z670/Z675	24	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 430/60/40

Technical details

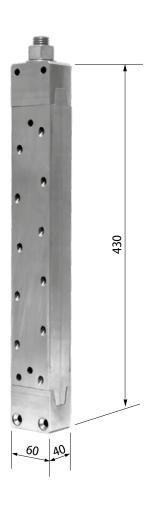
Art.-No.K243

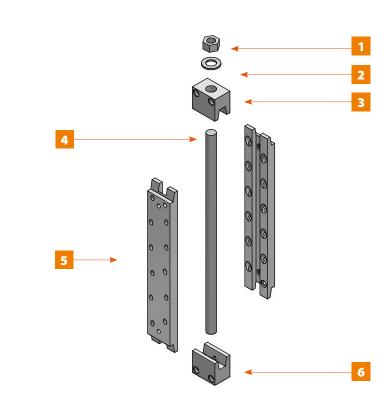
(Dimensions in mm)

MEGANT® 60 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characterist	ic values [kN]	
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}
430x60x40	100x520	20,3	143,3	46,7	52,8

The full range of resistance values can be found online on our website.

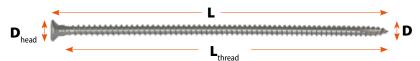




Pos.	Description	Pos.	Description
1	1 hexagonal nut M20	4	1 threaded rod M20x340
2	1 washer M20	5	2 connector plates 370x60x20
3	1 top clamping jaw (without thread) 60x50x40	6	1 bottom clamping jaw (with thread) 60x50x40

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



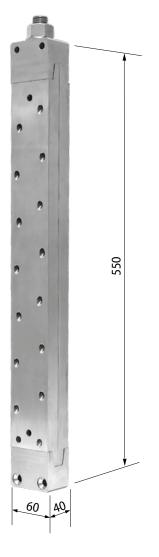
ArtNo.	Quantity	Туре	D,			L	L _{th}		1	D	Bits
711 (. 140.	Quartity	1,950	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	Ditts
Z581	22	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	5	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	5	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connec	ction on har	rdwood									
Z670/Z675	32	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 550/60/40

Technical details

Art.-No.K244

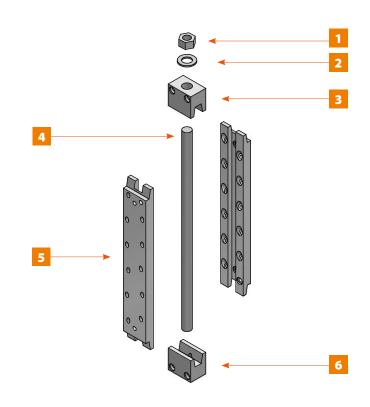
(Dimensions in mm)



MEGANT® 60 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characterist	ic values [kN]	
MEGANT®	beam height ([mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}
550x60x40	100x640	20,3	198,1	56,5	72,0

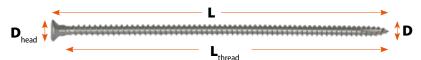
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	1 hexagonal nut M20	4	1 threaded rod M20x580
2	1 washer M20	5	2 connector plates 490x60x20
3	1 top clamping jaw (without thread) 60x50x40	6	1 bottom clamping jaw (with thread) 60x50x40

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D,	nead		L	L _{th}	read	ı	D	Bits
711 2. 140.	Quartity	1,950	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	Dies
Z581	30	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	5	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	5	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	40	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 310/100/40

Technical details

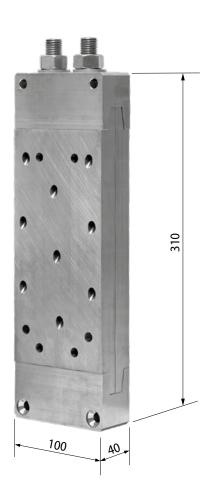
Art.-No.K239

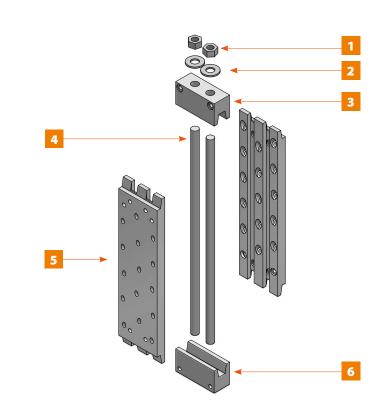
(Dimensions in mm)

MEGANT® 100 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characteristic values [kN]						
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}				
310x100x40	140x440	31,6	118,8	54,4	43,2				

The full range of resistance values can be found online on our website.

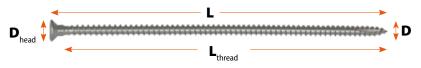




Pos.	Description	Pos.	Description
1	2 hexagonal nuts M16	4	2 threaded rods M16x340
2	2 washers M16	5	2 connector plates 250x100x20
3	1 top clamping jaw (without thread) 100x50x40	6	1 bottom clamping jaw (with thread) 100x50x40

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D,	nead	1	L	L _{th}	read	ı	D	Bits
711 2. 140.	Quartity	1,950	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	Ditts
Z581	18	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	6	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	10	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connec	Screw connection on hardwood										
Z670/Z675	34	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 430/100/40

Technical details

Art.-No.K240

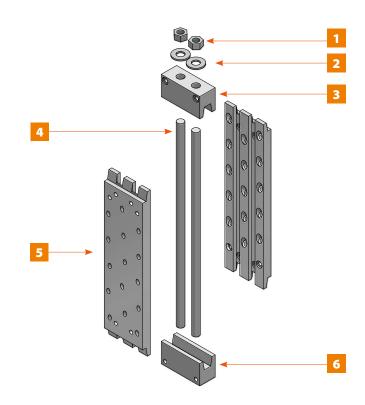
(Dimensions in mm)

100 49

MEGANT® 100 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary	Characteristic values [kN]						
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}			
430x100x40	140x520	31,6	198,1	68,8	72,0			

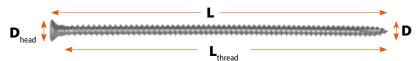
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	2 hexagonal nuts M16	4	2 threaded rods M16x460
2	2 washers M16	5	2 connector plates 370x100x20
3	1 top clamping jaw (without thread) 100x50x40	6	1 bottom clamping jaw (with thread) 100x50x40

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



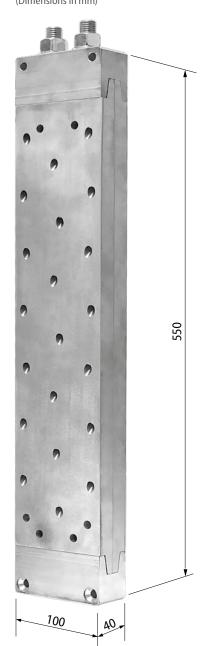
ArtNo.	Quantity	Туре	D	iead		L	L _{th}	read	ı	D	Bits
7 1 10		.,,,,	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
Z581	30	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	6	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	10	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	46	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 550/100/40

Technical details

Art.-No.K241

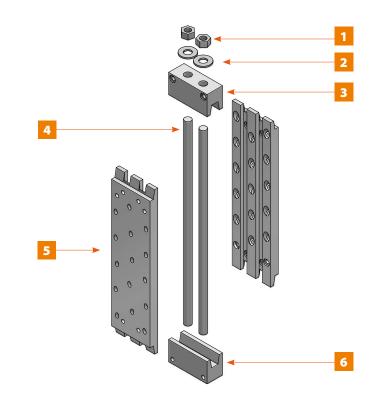
(Dimensions in mm)



MEGANT® 100 - load capacities with 8x160 screws, timber quality GL24h

		Min. secondary	Characteristic values [kN]						
MEGANT		beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}			
550x100x	40	140x640	31,7	277,3	83,2	100,8			

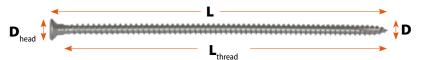
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	2 hexagonal nuts M16	4	2 threaded rods M16x580
2	2 washers M16	5	2 connector plates 490x100x20
3	1 top clamping jaw (without thread) 100x50x40	6	1 bottom clamping jaw (with thread) 100x50x40

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D,			L	L _{th}		ı	D	Bits
711 (1 1 1 1 0 1	Quarterly	.,,,,	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	5.03
Z581	42	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	6	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	10	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw conne	Screw connection on hardwood										
Z670/Z675	58	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 310/150/50

Technical details

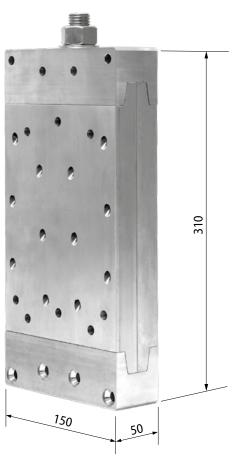
Art.-No.K197

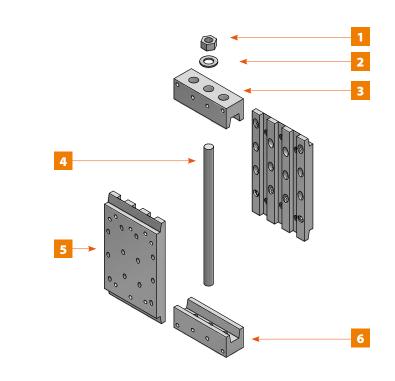
(Dimensions in mm)

MEGANT® 150 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary	Characteristic values [kN]						
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}			
310x150x50	190x440	41,5	158,8	61,1	57,6			

The full range of resistance values can be found online on our website.

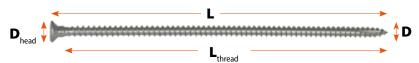




Pos.	Description	Pos.	Description
1	1-2 hexagonal nut(s) M20	4	1-2 threaded rods M20x340
2	1-2 washers M20	5	2 connector plates 250x150x25
3	1 top clamping jaw (without thread) 150x50x50	6	1 bottom clamping jaw (with thread) 150x50x50

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D,		1	L	L _{th}			D	Bits
711 (1 1 1 (3)	Quartity	.,,,,,	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	Ditto
Z581	24	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	12	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	12	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connec	Screw connection on hardwood										
Z670/Z675	48	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 430/150/50

Technical details

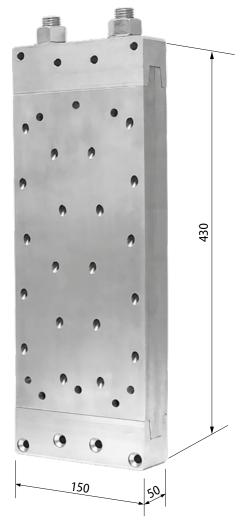
Art.-No.K220

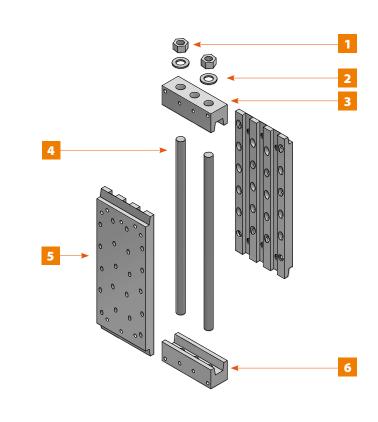
(Dimensions in mm)

MEGANT® 150 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characteristic values [kN]							
MEGANT [®]	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}					
430x150x50	190x520	41.5	263.3	80.3	96.0					

The full range of resistance values can be found online on our website.

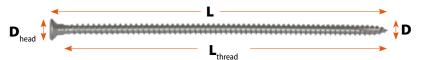




Pos.	Description	Pos.	Description
1	2-3 hexagonal nuts M20	4	2-3 threaded rods M20x460
2	2-3 washers M20	5	2 connector plates 370x150x25
3	1 top clamping jaw (without thread) 150x50x50	6	1 bottom clamping jaw (with thread) 150x50x50

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D,			L	L _{th}		ı	D	Bits
711 (. 110.	Quartity	1,950	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	Dies
Z581	40	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	12	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	12	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	64	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 550/150/50

Technical details

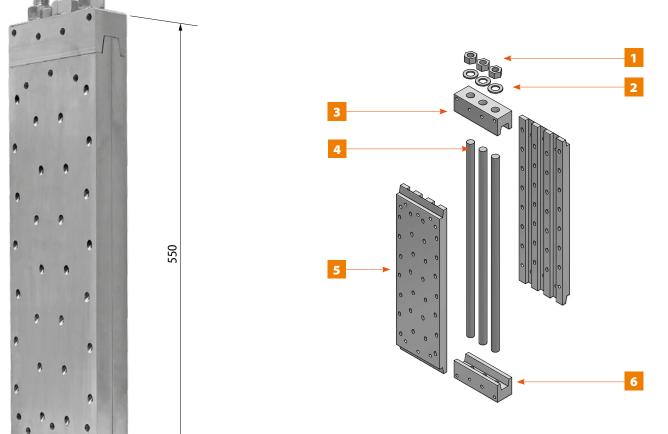
Art.-No.K221

(Dimensions in mm)

MEGANT® 150 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characteristic values [kN]							
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}					
550x150x50	190x640	41,5	368,6	99,5	134,4					

The full range of resistance values can be found online on our website.

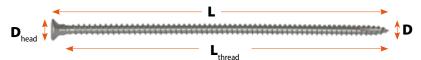


Pos.	Description	Pos.	Description
1	3 hexagonal nuts M20	4	3 threaded rods M20x580
2	3 washers M20	5	2 connector plates 490x150x25
3	1 top clamping jaw (without thread) 150x50x50	6	1 bottom clamping jaw (with thread) 150x50x50

Vis MEGANT®

150

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



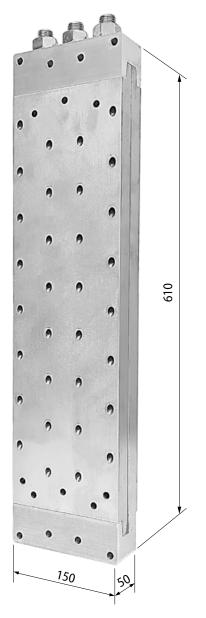
ArtNo.	Quantity	Туре	D	nead		Ļ	L _{th}	read	l	D	Bits
		71	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
Z581	56	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	12	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	12	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	80	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 610/150/50

Technical details

Art.-No. K180

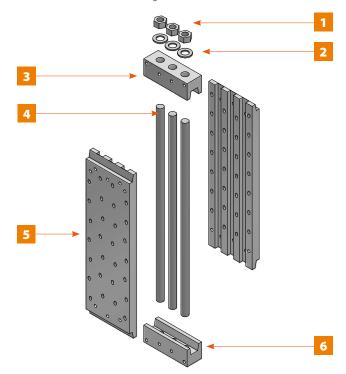
(Dimensions in mm)



MEGANT® 150 load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characteristic values [kN]							
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}					
610x150x50	190x710	41,5	421,2	99,5	134,4					

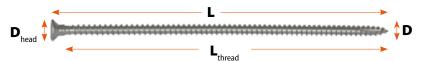
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	3 hexagonal nuts M20	4	3 threaded rods M20x640
2	3 washers M 20	5	2 connector plates 550x150x25
3	1 top clamping jaw (without thread) 150x50x50	6	1 bottom clamping jaw (with thread) 150x50x50

MEGANT® screws

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



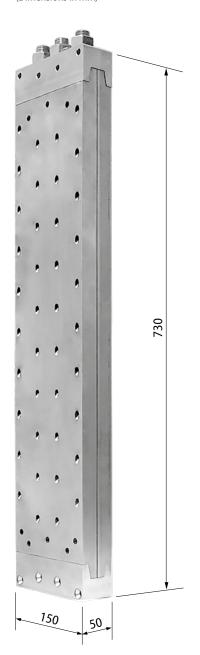
ArtNo.	Quantity	Туре	D,		1	L	L _{th}		ı	D	Bits
711 (1 1 1 1 0 1	Quarterly	1,760	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	5.03
Z581	64	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	12	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	12	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	88	ASSY CS screws for hardwoods	15	0.59	160	6.30	141	5.55	8	0.31	Torx 40

MEGANT® 730/150/50

Technical details

Art.-No.K251

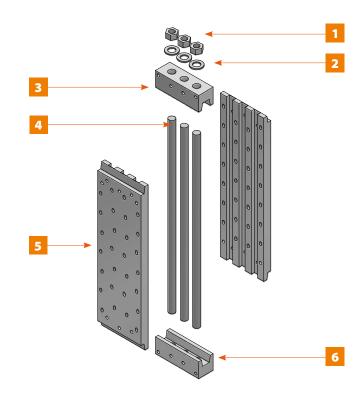
(Dimensions in mm)



MEGANT® 150 - load capacities with 8x160 screws, timber quality GL24h

	Min. secondary		Characteristic values [kN]							
MEGANT®	beam height [mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}					
730x150x50	190x830	41,5	526,5	99,5	134,4					

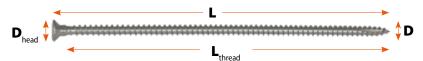
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	3 hexagonal nuts M20	4	3 threaded rods M20x760
2	2 3 washers M20 1 top clamping jaw (without thread) 150x50x50		2 connector plates 670x150x25
3			1 bottom clamping jaw (with thread) 150x50x50

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



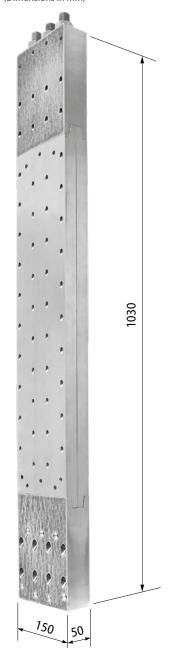
ArtNo.	Quantity	Туре	D _{head}		L		L		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
Z581	80	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	12	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	12	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	104	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

MEGANT® 1030/150/50 SL

Technical details

Art.-No.K180

(Dimensions in mm)

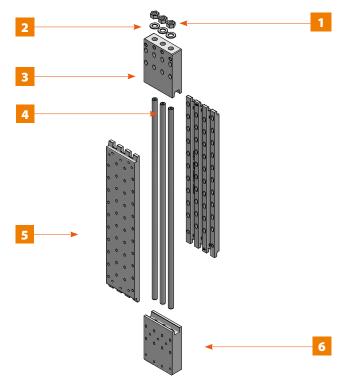


MEGANT® 150 - load capacities with 8x160 screws, timber quality GL24h

MEGANT®	Min. secondary beam height	Characteristic values [kN]							
WEGANT	[mm]	max F _{1,Rk}	max F _{2,Rk}	max F _{3,Rk}	max F _{45,Rk}				
1030x150x50 SL*	190x1130	43,0	611,6*	100,0	134,4				
1030x150x50 SL**	190x1130	43,0	611,6**	100,0	134,4				

- * MEGANT* 1030x150x50, calculated with angled screws 8x160 and horizontal screws 8x240/8x160 on GL24h (k_{mod} = 0,9 γ_{M} = 1,3)
- ** MEGANT® 1030x150x50, calculated with 8x240 slant screws and 8x240/8x160 horizontal screws on GL24h (k_{mod} = 0,9 γ_u = 1,3)

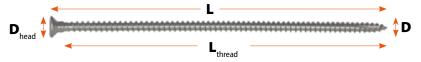
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	3 hexagonal nuts M20	4	3 threaded rods M20x920
2	3 washers M20	5	2 connector plates 670x150x25
3	1 top clamping jaw (without thread) 150x200x50	6	1 bottom clamping jaw (with thread) 150x200x50

Vis MEGANT®

MEGANT® self-tapping CS-screw (corresponding CS-screws are included with MEGANT®)



ArtNo.	Quantity	Туре	D _{head}		L		L		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
Z581	96	Angled CS screw	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Z530	12	CS horizontal screws	15	0.59	240	9.45	225	8.86	8	0.31	Torx 40
Z581	15	CS horizontal screws	15	0.59	160	6.30	145	5.70	8	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	123	ASSY CS screws for hardwoods	15	0.59	160	9.45	141	5.55	8	0.31	Torx 40

Flexible connector for extreme loads

Force transmission up to 950 kN*

- I Hinged connection
- I Transmitting extreme loads
- I Hidden or visible assembly
- I Tolerance on beam length up to 4.4 mm per connector
- | Well suited for long beams

Available in four sizes and two versions.

* The values only apply when used with original KNAPP® screws! Design values can be found at on our website under planner service.



- I Connections: timber-wood, timber-steel, timber-concrete
- I Areas of application: timber engineering, multi-storey timber construction
- Service class 1-2



Installation example MEGANT® S:

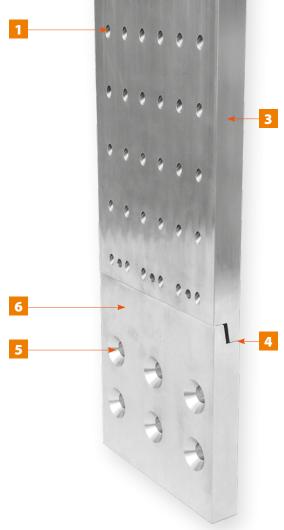


- High-strength aluminium connection plate 30 mm thick, to transmit forces to the secondary beam up to 950 kN.
- The flexible joint contains sufficient freedom of movement to compensate the bending of the secondary beam and any length tolerances of up to 4.4 mm per connector.
- Horizontal holes for M16 countersunk screws.
- Bottom connection plate for fixing to main beams or columns, in wood, steel or concrete.

Available in four sizes and two versions:

Wood to wood connection versions: 1180x200x30 and 680x200x30

Wood to steel or concrete connection versions: 930x200x30 and 530x200x30

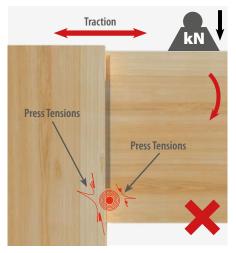




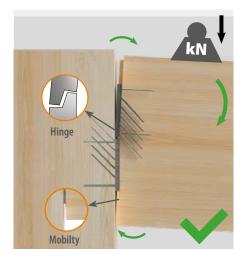
MEGANT®S

Flexible connector for extreme loads

Beams' flexing comparison







Stiff, non-articulated connection

MEGANT®S - not strained

MEGANT®S – bending of the secondary beam due to the load pressure

MEGANT® S, the latest extension to the MEGANT® connectors' family, has been designed for constructions which require the transmission of high loads, up to 950 kN.

Thanks to its streamlined, ingenious design, it allows the secondary beam to bend under load, avoiding any problems with the torsion spring stiffness. The MEGANT® S connector is an ideal solution for long glue laminated beam connections.







MEGANT® S is made up of two overlapping connection plates and can be used to fix timber beams to all usual construction materials:

- Wood to wood connections
 - Solid structure timber (softwood or hardwood)
 - Glued laminated timber (softwood or hardwood)
 - Laminated veneer lumber (Kerto / BauBuche)
- Wood to steel connections
- Wood to concrete connections



Timber wall connector

Connecting timber frame constructions up to 10,8 kN*

- Timber width from 60 mm
- High level of prefabrication
- Simple and easy the wall panels are plugged together,
- Self-tightening, stable and invisible the structure is stable from the first corner onwards
- Wood frame <mark>and plywood board walls frictionally interconnected</mark>

Available in 2 sizes.

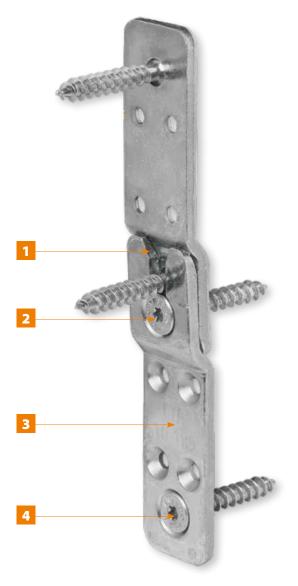
Design values are available on our website under Planer Service.

* Characteristic value F_{2,Rk} in slide-in direction, valid only with the use of original KNAPP* CS screws 10x60 mm, on C24 according to ETA 10/0189 (2022/08/25).



- I Connections: solid woods, derived timber products e.g. CLT
- Areas of application: timber frame and timber panel construction, and CLT walls, and buildings
- | Service class 1 and 2





- The stop bevels and the guiding slot for the KNAPP® CS retaining screws bring the connector parts into position and on tension.
- The KNAPP® CS-retaining screw allows for adjustments to the compression of joints.
- WALCO® Z40 consists of two identical connector parts and is made of high quality steel in Austria.
- The Ø 10 mm CS-screws with integrated drilling tip enable rapid fastening with screws; the reinforced shaft provides friction-locked connection.

concealed, joint-tight installation (R30 \geq 28 mm, R60 \geq 49 mm)



WALCO® Z40 : W ≥ 60 mm D= 15 mm

W ≥ 60 mm $D = 15 \, \text{mm}$

WALCO® Z40 Application examples and connection details Timber frame construction Precast walls with CLT walls (Dimensions in mm) Detail A₃: CLT exterior wall corner В WALCO® Z40 2 CS-screws 10x60 2 CS-screws 10x80 Office 2 Meeting WALCO® Z40: room W ≥ 95 mm D = 15 mm D Workshop/ Ε Warehouse Detail C: CLT exterior and interior wall connection terior CLT wall joint WALCO® Z40 W ≥ 80 mm Exterior CLT wall joint WAI CO* 740 Office 1 Lobby Detail A₂: Timber frame exterior wall Detail A₁: Detail E: CLT wall mitre connection Timber frame exterior wall WALCO® Z40: VALCO® Z40 W ≥ 60 mm D = 15 mm . WALCO® Z40 4 CS-screws 10x80 WALCO® Z40 $W \ge 60 \text{ mm}$ D = 15 mmDetail B: Timber frame exterior wall column Detail C: Timber frame exterior and interior wall connection Detail B: CLT exterior wall column connection Timber panel connection nstruction WALCO® Z40: internal wall WALCO® Z40 with WALCO® Z40 L ≥ 60 mm WALCO® Z40 D≥60 mm WALCO® Z40 W ≥ 60 mm D = 15 mm w w Detail E : Timber frame wall mitre Detail D: Timber frame interior wall connection Detail D: CLT interior wall connection connection WALCO® Z40 WALCO® Z40 _____

WALCO® Z40

WALCO® Z40 - Partial screw connection



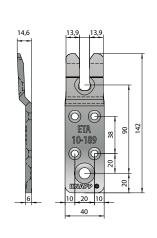
Screw connection Wall 1 Wall 2 2x 2x CS 10x60 mm CS 10x60 mm

Full screw connection: 8x 6 x 50 mm

Minimum timber cross section: L. $x Ep. = 60 \times 60 \text{ mm}$

Art.-No. K072

WALCO® Z40 - Full screw connection

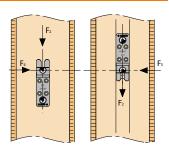


Tensile values*

	Characte	ristic tensile v	alues F _{1,Rk} [kN] for timber g	rade C24 and	above	
	Minimum timber	No interlayer		OSB ≤ 2	2 mm**	Plasterboard ≤ 22 mm***	
Connector	cross section [mm]	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection
WALCO® Z40	Internal wall : 60x60 External wall : 100x60	4,73	4,73	4,73	4,73	4,73	4,73

Ch	Characteristic shear values in the direction of insertion F _{2,Rk} [kN] for timber grade C24 and above										
	Minimum timber cross section [mm]	No interlayer		OSB ≤ 2	2 mm**	Plasterboard ≤ 22 mm***					
Connector		Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection				
WALCO® Z40	Internal wall : 60x60 External wall : 100x60	10,8	10,8	10,8	10,8	7,60	10,8				

Charact	Characteristic shear values perpendicular to the direction of insertion F _{45,8k} [kN] for timber grade C24 and above										
	Minimum timber	No interlayer		OSB ≤ 2	2 mm**	Plasterboard ≤ 22 mm***					
Connector	cross section [mm]	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection				
WALCO® Z40	Internal wall : 60x60 External wall : 100x60	4,41	4,41	4,41	4,41	3,14	3,93				



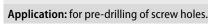
	Values of K _{mod}										
Serv. class	LDC*	GLT	OSB/3 OSB/4	Plaster board							
	Permanent	0,6	0,4	0,2							
	Long	0,7	0,5	0,4							
1	Medium	0,8	0,7	0,6							
	Short	0,9	0,9	0,8							
	Very short to short	1,0	1,0	0,95							
	Very short	1,1	1,1	1,1							
	YΜ	1,3	1,3	1,3							

- * Load Duration Class
- * The load capacity values F_{1,Rk}; F_{2,Rk} and F_{45,Rk} have been updated according to the expert report of 30.06.2021, in connection with ETA-10/0189 (2019/10/11).
- ** OSB/3 or OSB/4 thickness up to 22 mm according to EN 300 or ETA
- *** Plasterboard thickness up to 22 mm according to EN 15283-2 or ETA

For the determination of $F_{45,Rd}$ when fixing to intermediate materials, the k_{mod} and γ_M factors of the materials are to be taken into account.

Drilling-template WALCO® Z (Aluminium)

Art.-No. K466 Drilling-template WALCO® Z40
Art.-No. K486 Drilling-template WALCO® Z32

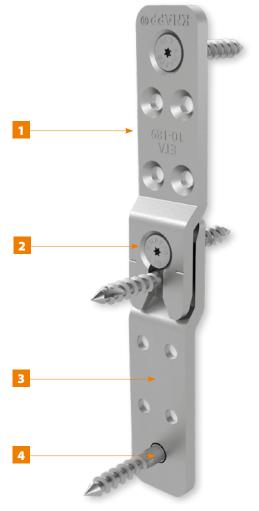






WALCO® Z32

- I Connector for narrow wall joints (32 mm, 1.26 inches) in timber frame, timber panel construction, posts and beams, and cross laminated timber walls (e.g. 38 x 89 mm or 2x4 inches)
- I Service class 1 and 2





- The stop bevels and the guiding slot for the KNAPP® SC retaining screws bring the connector parts into position and on tension.
- The KNAPP® CS-retaining screw allows for adjustments to the compression of joints.
- WALCO® Z32 consists of two identical connector parts and is made in Austria in high-quality steel.
- The Ø8 mm CS-screws with integrated drilling tip enable rapid fastening with screws; the reinforced shaft provides friction-locked connection.

Fire rating: Fire resistance (EN 1995-1-2) through 3-4 sided concealed, joint-tight installation (R30 \geq 28 mm, R60 \geq 49 mm)

WALCO® Z32

WALCO® Z32 - Partial screw connection



Screw connection							
Mur 1	Mur 2						
2x TF 8x50 mm	2x TF 8x50 mm						

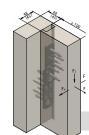
Full screw connection: 8x 5x 50 mm

Minimum timber cross section: L. x Ep. = 2 x 4 Inch (50 x 100 mm)

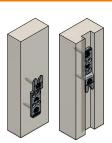
WALCO® Z32 - Full screw connection Art.-No. K168

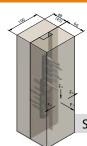
Examples and connection details





Corner connection





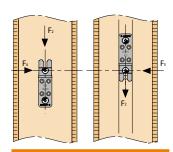
Straight connection

Tensile values*

Characteristic tensile values F _{1,Rk} [kN] for timber grade C24 and above										
		Minimum timber	No interlayer		OSB ≤ 2	2 mm**	Plasterboard ≤ 22 mm***			
	Connector	cross section [mm]	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection		
	WALCO® Z32	Internal wall : 60x60 External wall : 100x60	3,64	3,64	3,64	3,64	3,64	3,64		

C	Characteristic resistance in the direction of insertion $F_{2,Rk}$ [kN] for timber grade C24 and above										
	Minimum timber	No interlayer		OSB ≤ 2	2 mm**	Plasterboard ≤ 22 mm***					
Connector	or cross section [mm]	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection				
WALCO® Z32	Internal wall : 60x60 External wall : 100x60	8,20	9,0	8,56	9,0	5,96	9,0				

Charac	Characteristic resistance perpendicular to the direction of insertion $F_{4s,Rk}$ [kN] for timber grade C24 and above										
	Minimum timber	No inte	No interlayer		2 mm**	Plasterboard ≤ 22 mm***					
Connector	cross section [mm]	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection				
WALCO® Z32	Internal wall : 60x60 External wall : 100x60	3,39	3,76	3,70	3,76	2,52	3,12				



Value of K _{mod}										
Serv. class	Plaster board									
	Permanent	0,6	0,4	0,2						
	Long	0,7	0,5	0,4						
1	Medium	0,8	0,7	0,6						
•	Short	0,9	0,9	0,8						
	Very short Short	1,0	1,0	0,95						
	Very short	1,1	1,1	1,1						
	γ_{M}	1,3	1,3	1,3						

- * Load Duration Class
- * The load capacity values $F_{1,Rk}$; $F_{2,Rk}$ and $F_{45,Rk}$ have been updated according to the expert report of 30.06.2021, in connection with ETA-10/0189 (2019/10/11).
- ** OSB/3 or OSB/4 thickness up to 22 mm according to EN 300 or ETA
- *** Plasterboard thickness up to 22 mm according to EN 15283-2 or ETA

For the determination of $F_{45,Rd}$ when fixing to intermediate materials, the k_{mod} and γ_M factors of the materials are to be taken into account.

KNAPP® CS-screws (WALCO® Z40 will be supplied with the corresponding CS-screws) Art.-No. Z533 and Z534 KNAPP® CS-screw 5x50 and 5x80 with drill point and reinforced shank Application: for fixing the connector parts into the studs. Art.-No. Z531 KNAPP® CS-screw 8x50 with drill point and reinforced shank Application: fixing the connector parts into the studs. Art.-No. Z532 KNAPP® CS-screw 8x80 with drill point and reinforced shank. Application: When screwing through wood-based panels and cross-laminated timber walls (detail B page 111).

Connecting systems for prefabricated walls

Connecting timber frame constructions up to 16 kN*

- Timber width from 80 mm
- Fast and accurate assembly on site fully prefabricated walls are assembled without any screwing or nailing
- I Stable from the first wall corner
- I Quick and easy assembly through the spacious V-shaped bracket
- I Collar screw and collar bolt are screwed directly into the building component with or without intermediate layer
- Hanging of end walls and later insertion of intermediate walls
- I Adjustment of joint spacings e.g. for gaskets
- No milling necessary for panel thicknesses 13/15 mm

Available in 2 sizes and 5 versions.

Design values are available on our website under Planer Service.

* Characteristic value F_{2,8k} in slide-in direction, valid only with the use of original KNAPP° CS screws, on C24 according ETA 10/0189 (2022/08/25). Data refers to the use of 3 original KNAPP° hexagon head screws.

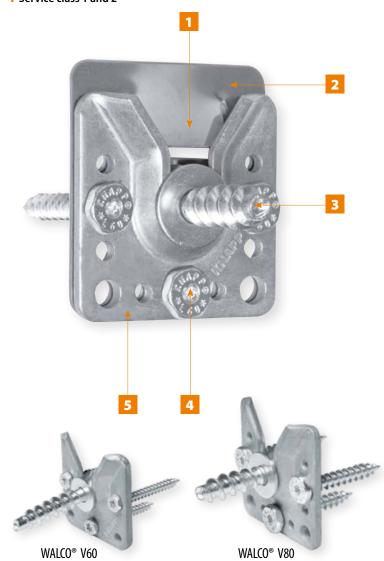




WALCO® V

- I Applications: concealed wall connections
- I Connections: solid wood, glulam, CLT, MAGNUMBOARD® OSB, steel and concrete
- I Areas of application: timber frame construction and prefabricated house construction
- I Service class 1 and 2





- The generous v-shaped bracket slides the holding screw into place.
- The WALCO® V locking clip (optional) made of stainless spring steel locks against the slide-in direction, thereby transferring the transmission of the anchor tensile force Z_A from one wall to the next.
- The WALCO® V holding screw is the counter part to the connector. Available in 4 versions.
- WALCO® V hexagon head screws for screwing with Torx or hexagon nut.
- WALCO® V is made in Germany from high-quality hot-dip galvanised steel.

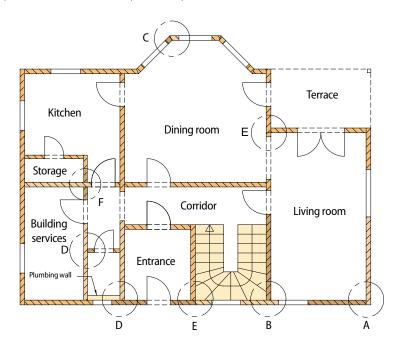
Fire protection: fire resistance (EN 1995-1-2) through 3-sided concealed, tight-joint mounting (R30 \geq 28 mm, R60 \geq 49 mm)

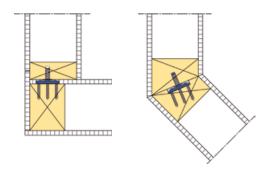


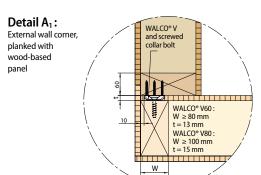


Application examples and connection details

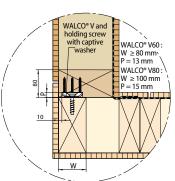
(Dimensions in mm - W = WIDTH, t = THICKNESS)







Detail A₂:Exterior wall corner with vapor barrier (PE- Im)



WALCO® V and holding screw with captive washer

Detail B:

Connection of exterior with interior wall

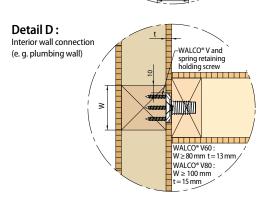
WALCO® V and holding screw with captive washer

WALCO® V and WALCO® V 60:

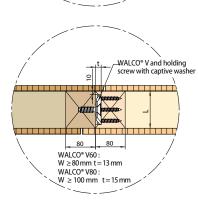
W ≥ 80 mm
t = 13 mm
WALCO® V80:

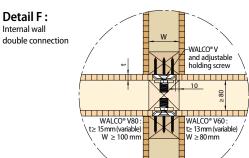
W ≥ 100 mm
t = 15 mm

Detail C: Exterior wall mitre joint



Detail E:Straight joint for exterior or interior walls





Load-bearing capacities for WALCO® V with collar screw (KS)

KNAPP® Connectors	Timber Characteristic val		values	$ \begin{array}{c c} \text{Design values} & \text{Design values} \\ \hline F_{1,Rd} [kN] & F_{2,Rd} [kN] \\ \hline \\ k_{mod} [SC^* 1+2] \\ \end{array} $		Design values F _{3,Rd} [kN] k _{mod} [SC* 1+2]	Design values F _{45,Rd} [kN] k _{mod} [SC* 1+2]			
		F _{1,Rk} [kN]	F _{2,Rk} [kN]	F _{45,Rk} [kN]	0,9	0,6	0,9	0,9	0,6	0,9
	C24	6,49	5,94	3,88	4,49	2,74	4,11	1,3	1,79	2,69
WALCO® V60 KS	GL24h	7,00	6,53	4,27	4,85	3,01	4,52		1,97	2,96
	CLT	6,93	6,45	4,22	4,80	2,98	4,47		1,95	2,92
	C24	7,08	7,10	4,46	4,90	3,28	4,92		2,06	3,09
WALCO® V80 KS	GL24h	7,64	7,81	4,91	5,29	3,60	5,41	1,3	2,27	3,40
	CLT	7,56	7,71	4,85	5,23	3,56	5,34		2,24	3,36

*SC = service class

Design values for tension

Design values in direction of insertion

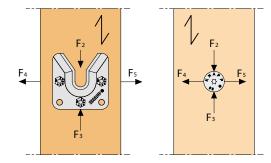
 $F_{3,Rd}$ Design values against the direction of insertion

F_{45 Rd} Design values perpendicular to the direction of insertion

 k_{mod} Modification factors depending on material, load duration and service class

 $k_{\rm mod}=0,6 >> {\rm Permanent} \ (more \ than \ 10 \ years for example \ self \ weight)$ $k_{\rm mod}=0,8 >> {\rm Medium} \ term \ (1 \ week-6 \ months for example \ imposed \ floor \ load), snow \ load)$

 $k_{mod} = 0.9 =>$ Short term (shorter than one week, for example snow- and wind load)



The characteristic values and design values for each load direction on solid wood, glued laminated timber and other wood materials are available on our website under the Planner Service tab or on request.

Practical examples

The values listed below are given as an example and calculated according to EN 1991-1-4. The following table gives you recommendations regarding the wall length $\bf W$ in addition to the wind load wd and also the number of installed connectors. The wind load w_d =0,6 kN/m² to the designed wind load of German midland wind area 1 (impact pressure $q = 0.5 \text{ kN/m}^2$, aerodynamics factor c_{pe} =0,8, v=102 km/h). The listed wind loads are referring to the following wind areas:

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

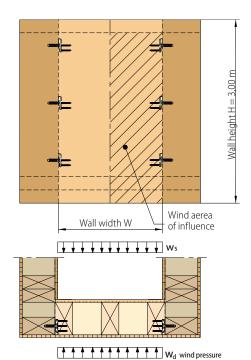
 $W_d = 1.5 \text{ kN/m}^2 \text{ (q} = 1.25 \text{ kN/m}^2, C_{pe} = 0.8, v = 160 \text{ km/h)}$

 $w_d = 1,\!9 \text{ kN/m}^2 \, (q = 1,\!55 \text{ kN/m}^2, c_{pe} = 0,\!8, v = 179 \text{km/h}) \, 18 \, \text{m} < \text{H} <= 25 \, \text{m}$

Derivation: $w_d = \gamma Q \cdot c_{pe} \cdot q = \gamma Q = 1.5$

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] Designed wind load [kN/m²]						
		$w_d = 0.6$	$w_d = 1.0$	$w_d = 1,5$	$w_d = 1.9$			
3		9,0	5,4	3,6	2,8			
4	WALCO® V60 KS	12,0	7,2	4,8	3,8			
5		14,9	9,0	6,0	4,7			
3	WALCO® V80 KS	10,3	6,2	4,1	3,3			
4		13,7	8,2	5,5	4,3			
5		17,2	10,3	6,9	5,4			



The graph shows the load directions and installation. Design values given in the table below should be used for structural analysis according to EC5 (EN 1995-1-1). The values listed below are given as examples and valid for Germany only!

Permissible load values with interlayer

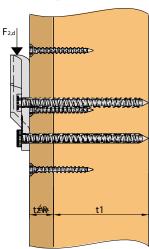
WALCO® V directly to intermediate layer (cladding) attached:

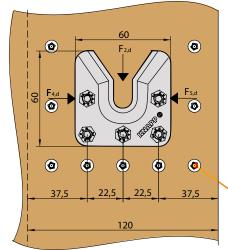
When fixing the WALCO® V connector to an intermediate layer, the design values listed below come into effect, these refere to the ETA-10/0189 and on the DIN 1995-1-1 (EC5). The values are subdivided into the different load duration classes (LDC) and the load directions. In addition, it should be noted that the intermediate layer is force-fitted to the timber stud with screws, nails or staples (see picture below).

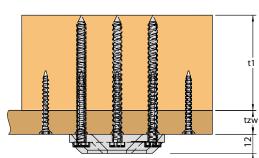
		WALCO® V60	with 5 screws	6x80 1 scre	w 12x60	WALCO® VV80 with 5 screws 10x80 1 screw 16x60				
Thickness t _{zw}	Interlayer/	Design value	s of load-beari	ing capacity	F _{Rd} [kN]	Design values of load-bearing capacity F _{Rd} [kN]				
[mm]	Stud	F _{2,Rd} [kN] [permanent]	F _{2,Rd} [kN] [medium]	F _{2,Rd} [kN] [short]	F _{45,Rd} [kN] [short]	F _{2,Rd} [kN] [permanent]	F _{2,Rd} [kN] [medium]	F _{2,Rd} [kN] [short]	F _{45,Rd} [kN] [short]	
12	Plasterboard / C24	1,4	2,8	3,4	2.7	2,1	4,2	4.0	2.1	
15		1,5	3,0	3,7	2,7	2,3	4,4	4,9	3,1	
12	OSB Plate /	2,4	3,7	4,1	2.7	2,8	4,4	4,9	2.1	
15	C24	2,2	3,7	4,1	2,7	2,8	4,4	4,9	3,1	
13	Particleboard /	1,9	3,3	4,0	2,7	2,3	3,9	4,8	2.1	
19	C24	1,8	3,1	3,8	2,7	2,3	4,0	4,0	3,1	
13	Particleboard /	2,7	2.7	4.1	2.7	3,3	4,4	4.0	2.1	
15	C24	2,/	3,7	4,1	2,7	3,3	4,4	4,9	3,1	

WALCO® V60







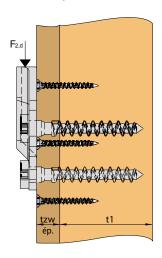


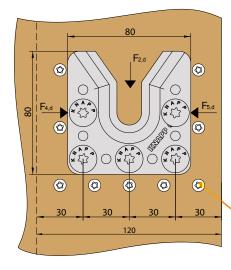
Additional attachment of the Interlayer for transmission of forces into post with screws, nails or staples.

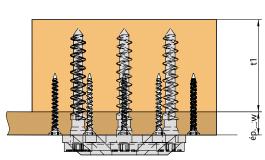
 $t_{zw} \le 26 \text{ mm}$

WALCO® V80

(Dimensions in mm)







Additional attachment of the Interlayer for transmission of forces into post with screws, nails or staples.

 $t_{zw} \le 26 \text{ mm}$

WALCO® V80

Characteristic values of load-bearing capacity for WALCO® V with collar screw (KS) on MAGNUMBOARD® OSB

KNAPP® Minimal wall thickness [mm]	(Characteristic values of of load-bearing capacity F _{Rk} on MAGNUM BOARD® OSB						
	Tensile force F _{1,Rk} [kN]		Shear force F _{2,Rk} [kN]		Shear force F _{45,Rk} [kN]]			
	F _{1,0,Rk}	F _{1,90,Rk}	F _{2,0,Rk}	F _{2,90,Rk}	F _{45,0,Rk}	F _{45,90,Rk}		
WALCO® V80 KS	100	3,5	8,8	3,7	5,3	3,7	5,3	

F_{1,0,Rk} Tensile force in **MAGNUM**BOARD® OSB end-grain timber

F_{1,90,Rk} Tensile force in **MAGNUM**BOARD® OSB side timber

F_{45,0,Rk} Shear force perpendicular to the direction of insertion in **MAGNUM**BOARD® OSB end grain Shear force perpendicular to the direction of insertion in **MAGNUM**BOARD® OSB side timber

Note

The load-bearing values have been calculated according to ETA 10-0189 (2019/10/11).

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Tensile force F₁ design values

	Tens	ile force F _{1,0,Rd} in MAGI	NUMBOARD® OSB end	grain depending on t	he load duration class	(LDC)
KNAPP® Connector	permanent	long	medium	short	short/very short	very short
Commetton	$k_{mod} = 0.4$	$k_{mod} = 0,5$	$k_{mod} = 0.7$	k _{mod} =0,9	k _{mod} = 1,0	$k_{mod} = 1,1$
WALCO® V80 KS	1,08	1,34	1,88	2,42	2,69	2,96

KNAPP® .	Tensile force $F_{1,90Rd}$ in MAGNUM BOARD® OSB wide face in dependence of the load duration (LDC)							
Connector	permanent	long	short	short/very short	very short			
	$k_{mod} = 0.4$	$k_{mod} = 0,5$	$k_{mod} = 0.7$	k _{mod} =0,9	k _{mod} = 1,0	k _{mod} =1,1		
WALCO® V80 KS	2,72 3,40 4,76 6,11 6,79 7,47							

Shear force F₂ design values in direction of insertion

I/ALA DD®	Shear force F _{2,0,Rd} in MAGNUMBOARD® OSB end grain depending on the load duration (LDC)							
KNAPP® Connector	permanent	long	medium	short	short/very short	very short		
	$k_{mod} = 0.4$	k _{mod} = 0,5	$k_{mod} = 0.7$	k _{mod} =0,9	k _{mod} = 1,0	k _{mod} =1,1		
WALCO® V80 KS	1,14	1,43	2,00	2,57	2,85	3,14		

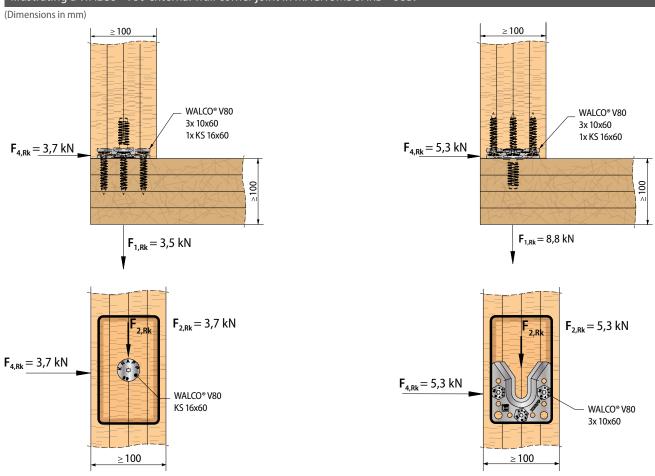
LALA DD®	Shear force F _{2,90,Rd} in MAGNUMBOARD® OSB wide face depending on the load duration (LDC)							
KNAPP® - Connector	permanent	long	medium	short	short/very short	very short		
Connection	$k_{mod} = 0.4$	$k_{mod} = 0.5$	$k_{mod} = 0.7$	$k_{mod} = 0.9$	k _{mod} = 1,0	k _{mod} =1,1		
WALCO® V80 KS	1,63	2,04	2,85	3,67	4,08	4,48		

Shear force F₄₅ design values of perpendicular to the direction of insertion

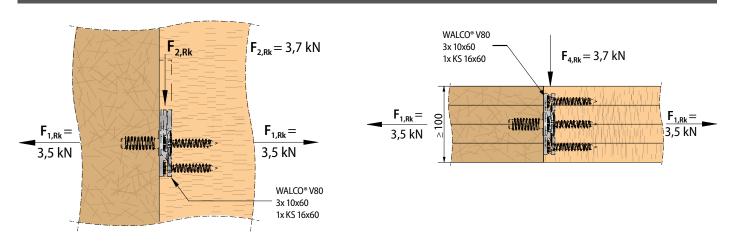
I/MADD@	Shear force F _{45,0,Rd} in MAGNUMBOARD® OSB end grain depending on the load duration class (LDC)						
KNAPP® Connector	permanent	long	medium	short	short/very short	very short	
	$k_{mod} = 0.4$	$k_{mod} = 0.5$	$k_{mod} = 0.7$	k _{mod} =0,9	$k_{mod} = 1,0$	k _{mod} =1,1	
WALCO® V80 KS	1,14	1,43	2,00	2,57	2,85	3,14	

I/ALA DD®	Shear	Shear force F _{45,90,Rd} in MAGNUMBOARD® OSB side timber depending on the load duration class (LDC)						
KNAPP® Connector	permanent	long	medium	short	short/very short	very short		
	$k_{mod} = 0.4$	k _{mod} = 0,5	$k_{mod} = 0.7$	k _{mod} =0,9	k _{mod} = 1,0	k _{mod} =1,1		
WALCO® V80 KS	1,63	2,04	2,85	3,67	4,08	4,48		

Illustrating a WALCO® V80 external wall corner joint in MAGNUMBOARD® OSB:



Illustrating a WALCO® V80 external wall joint in MAGNUMBOARD® OSB:



WALCO® V60

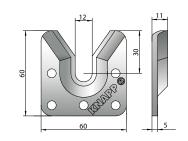
WALCO® V60 includes holding screw and hex-head wood screws

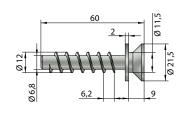
(Dimensions in mm)

Holding bolt	Screws	Characteristic values [C24]				
wall#1	wall #2	F _{2,Rk} [kN]	F _{45,Rk} [kN]	F _{1,Rk} [kN]		
KS 12x60	3 screws 6x50	5,9	3,9	6,5		
VK D12	3 screws 6x50	4,9	3,2	6,4		
EH M12	3 screws 6x50	4,8	2,9	4,7		
GH M12	3 screws 6x50	8,6	5,4	7,1		

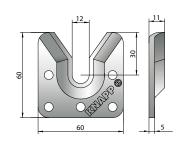
Minimum timber cross section: L x t = 80 x 60 mm

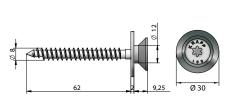
WALCO® V60 (KS) collar screw Art.-No.K102



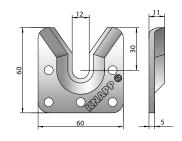


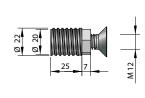
WALCO® V60 (VK) collar bolt Art.-No.K108



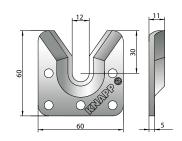


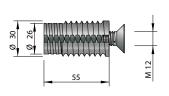












WALCO® V80

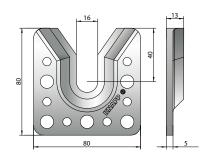
WALCO® V80 includes holding screw and hex-head wood screws

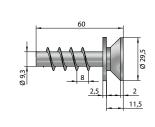
(Dimensions in mm)

Holding bolt	Screws	Characteristic values [C24]				
wall#1	wall #2	F _{2,Rk} [kN]	F _{45,Rk} [kN]	F _{1,Rk} [kN]		
KS 16x60	3 screws 10x60	7,1	4,5	7,1		
VK D16	3 screws 10x60	6,2	4,1	7,1		
EH M16	3 screws 10x60	6,5	3,7	6,0		
GH M16	3 screws 10x60	16,0	9,1	10,0		

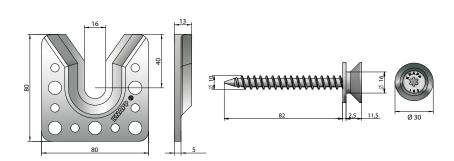
Minimum timber cross section: L x t = 100 x 60 mm



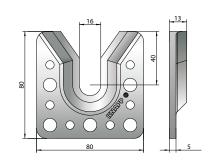


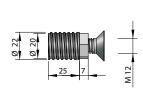




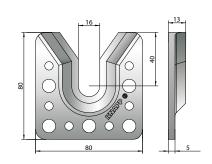
















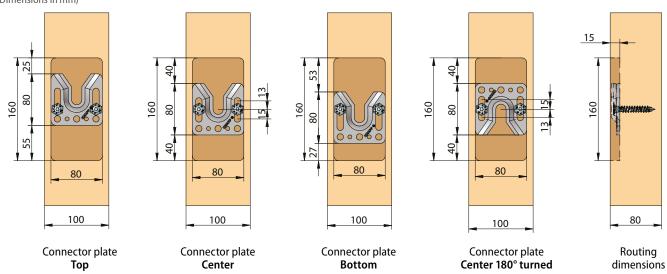
WALCO® V80 oblong-hole

- I Stable and invisible connection for prefabricated wall elements made of wood and CLT wall, as well as connections to wood, steel and concrete.
- I Re-adjustment possible due to the slotted holes
- I Positioning tolerance +/- 15 mm in height and +/- 2 mm in width for later compensation of unevenness on the building site
- Load-bearing in the direction of tension as well as at right angles to the direction of insertion

Installation example: WALCO® V

Adjustability

(Dimensions in mm)



Load values

		Min. cross	Charact values		Design values F _{45,Rd} [kN]		
Connector	Timber grade	section of square	Citatact. Values	k _{mod} [service class 1+2]			
		timber	F _{45,Rk} [kN]	0,9	1,0		
	C24	100x60 for KS	4,46	3,09	3,43		
WALCO® V 80 oblong hole	GL24h	.24h and 100x80 for oblong	4,91	3,40	3,78		
J	CLT	hole plate	4,85	3,36	3,73		

CLT with characteristic bulk density $r_k \ge 380 \text{ kg/m}^3$

Load direction F_2 and F_3 cannot be used due to the connector's adjustability.



Installation example: WALCO® V
Oblonghole directly bolted on a OSB board.

WALCO® V hexagonal - head, self-tapping wood screws Art.-No. Z550 V60 hex-head wood screw 6x50 Art.-No. Z551 V80 hex-head wood screw 10x60 Application: to screw on WALCO® V.

Accessories



 $\label{policy} \textbf{Application:} \ \text{for pre-drilling the pilot holes for exact assembly}.$



Application: locks and can be loaded against the insertion direction, e.g. when connecting anchor tensile forces.

WALCO® V PH-screws

Art.-No. Z521 PH screw 10x80
Art.-No. Z522 PH screw 10x120

No. Z522 PH screw 10x120

Application: for special solutions such as cladding or angled screw connections.

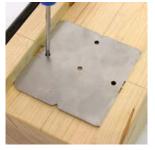


WALCO® V

Installation

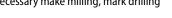
- I Simple and fast fabrication with router and optional KNAPP® marking template.
- Installation with CNC joinery machine possible all data for the standard CNC joinery machine programs is included.

WALCO® V milling dimensions							
Width Length Depth							
V60	60 mm	80 mm	13 mm				
V80	80 mm	100 mm	15 mm				
V80L	80 mm	160 mm	15 mm				



If necessary make milling, mark drilling









Pre-drill assembly instructions



CNC joinery machine, router or portable router









Fasten the WALCO® V to the wood and screw in the WALCO® V retaining screw.

Project pictures









Connectors for facade and modular building

Load-bearing up to 8 kN*

- I Thanks to slotted holes, even faster and more precise assembly on site is possible
- I Compensation for structural irregularities later by means of positioning tolerance of +/- 15 mm in height and +/- 2 mm in width
- I The connector is load-bearing in tensile direction
- I Solid and concealede



Design values are available on our website under Planer

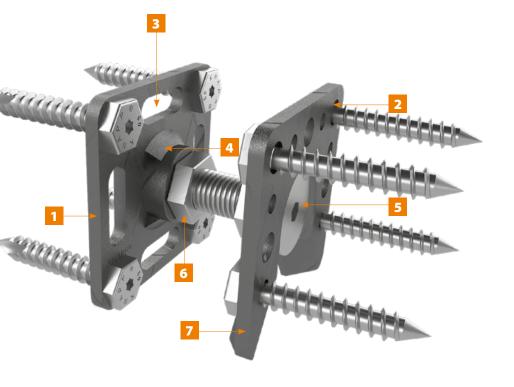
* Characteristic value F_{2,Rk} in slide-in direction, valid only with the use of original KNAPP® screws, according to ETA-10/0189 (2022/08/25), for glulam GL24h.





Installation example: ORF-Studio, Oberstdorf, DE.

- I Applications: concealed and adjustable connectors for facades, wall elements and modular building
- I Connections: for prefabricated wall elements made of wood, CLT or similar, as well as connections of wood to steel or concrete
- I Areas of application: in prefabricated timber house construction, modular construction and facade elements
- | Service class 1 and 2



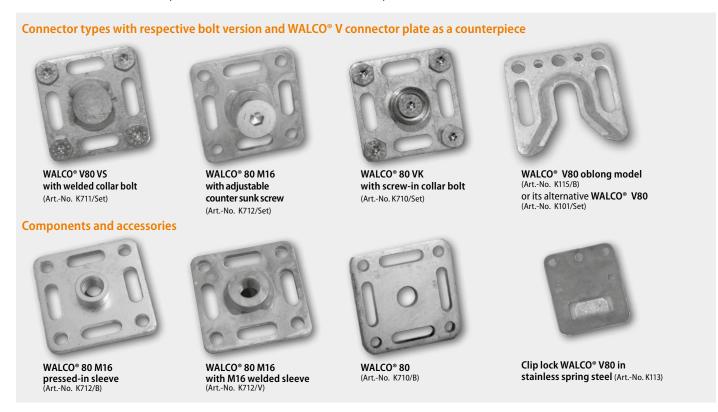
- WALCO® 80 M16 or WALCO® 60 M12
- 4-point screw
- Slotted hole screw connection, adjustment optional
- Welded threaded sleeve
- Retaining screw adjustable
- 6 Lock nut
- WALCO® V80 or WALCO® V60

The locking screw, secured with a locknut, transmits the tensile forces.

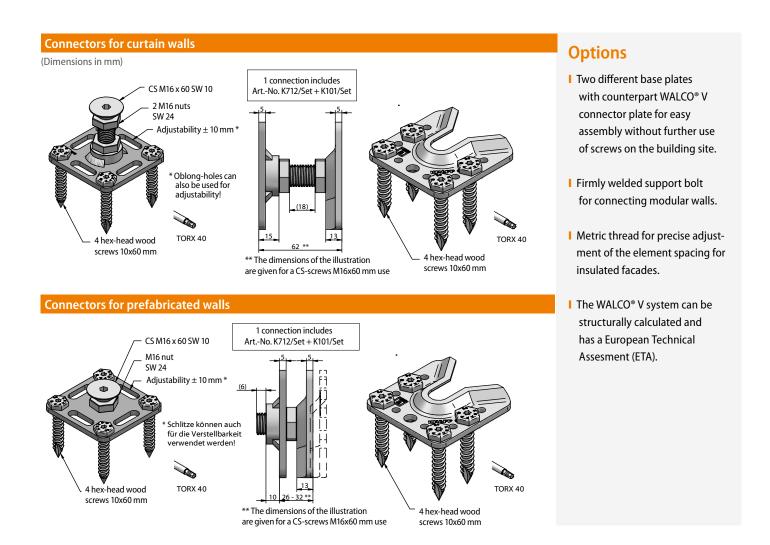


Areas of application and connector types

Universal connections to solid wood, wood-based materials such as CLT or OSB boards, steel or concrete for wood widths of 80 mm and more.



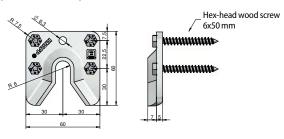
The base plates are optionally adjustable via slotted holes and the joint distances are adjustable. Possible construction tolerances can be compensated. An optional locking flap made of stainless spring steel, which cannot be seen from the outside, locks and secures the respective connection with a click for loads against the direction of insertion. WALCO® V (hot-dip galvanized steel) is available in sizes 60 and 80 mm.



WALCO® 60

WALCO® 60 with holding screw or collar bolt

(Dimensions in mm)



^{*} Hex = hex-head wood screw

 $F_{1,Rk}$ = Characteristic values (tension)

F_{2.Rk} = Characteristic values in direction of insertion

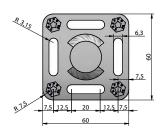
 $F_{45,Rk}$ = Characteristic values perpendicular to the direction of insertion

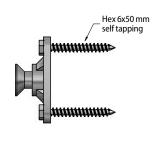
Compostor	Screws	Screws	Characteristic values [C24]		
Connector	on wall #1	on wall #1 on wall #2	F _{1,Rk} [kN]	F _{2,Rk} [kN]	F _{45,Rk} [kN]
WALCO® V60 WALCO® 60 VS	WALCO® V60 4 Hex 6x50*	WALCO® V60 VS 4 Hex 6x50*	2,55	4,52	7,57
WALCO® V60 WALCO® 60 VK	WALCO® V60 4 Hex 6x50*	WALCO® 60 VK 4 Hex 6x50* 1 CS 8x80	0,80	4,52	7,57
WALCO® V60 WALCO® 60 EH	WALCO® V60 4 Hex 6x50*	WALCO® 60 EH 4 Hex 6x50*	2,55	2,65	6,21
WALCO® V60 WALCO® 60 EH	WALCO® V60 4 Hex 6x50*	WALCO® 60 EH 4 Hex 6x50*	2,55	2,65	6,21

Min. timber cross-section: $WxH = 80 \times 60 \text{ mm}$

WALCO® V60 and WALCO® 60 with welded collar bolt (VS)





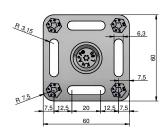


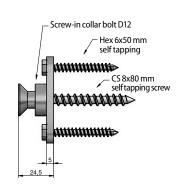
WALCO® V60 and WALCO® 60 with screw-in collar bolt (VK)





Art.-No.K700/Set





WALCO® V60 and WALCO® 60 with welded sleeve and adjustable counter sunk screw M12 (EH

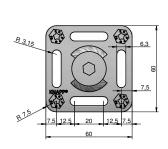


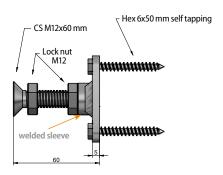
Art.-No.K100/Set



Art.-No.K704/Set

Art.-No.K702/Set

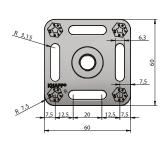


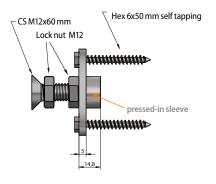


WALCO® V60 and WALCO® 60 pressed-in sleeve with adjustable counter sunk screw M12 (EH)



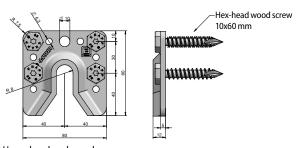






WALCO® 80

WALCO® 80 with holding screw or collar bolt



* Hex = hex-head wood screw

 $F_{1,Rk} = Characteristic values (tension)$

 $F_{2,Rk}$ = Characteristic values in direction of insertion

 $F_{45,Rk}$ = Characteristic values perpendicular to the direction of insertion

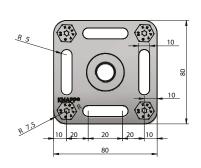
Connector	Screws	Screws	Characteristic values [C24]			
Connector	on wall #1	on wall #2	F _{1,Rk} [kN]	F _{2,Rk} [kN]	F _{45,Rk} [kN]	
WALCO® V80 WALCO® 80 VS	WALCO® V80 4 Hex 10x60*	WALCO® V80 VS 4 Hex 10x60*	3,62	7,58	14,18	
WALCO® V80 WALCO® 80 VK	WALCO® V80 4 Hex 10x60*	WALCO® 80 VK 4 Hex 10x60* 1 CS 10x100	2,61	7,88	14,18	
WALCO® V80 WALCO® 80 EH	WALCO® V80 4 Hex 10x60*	WALCO® 80 EH 4 Hex 10x60*	3,62	3,30	11,90	
WALCO® V80 WALCO® 80 EK	WALCO® V80 4 Hex 10x60*	WALCO® 80 EH 4 Hex 10x60*	3,62	3,30	11,90	

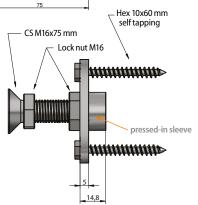
Min. timber cross-section: $WxH = 100 \times 60 \text{ mm}$

WALCO® V80 and WALCO® 80 with welded collar bolt (VS) Hex 10x60 mm Art.-No.K101/Set Art.-No.K711/Set self tapping \sim WALCO® V80 and WALCO® 80 with screw-in collar bolt (VK) Screw-in collar bolt D16 Hex 10x60 mm self tapping Art.-No.K101/Set Art.-No.K710/Set CS 10x100 mm self tapping screw WALCO® V80 and WALCO® 80 with welded sleeve and adjustable counter sunk screw M12 (EH) Hex 10x60 mm self tapping Art.-No.K101/Set Art.-No.K712/Set CS M16x75 mm Lock nut M16 mmmm> Hex 10x60 mm self tapping WALCO® V80 and WALCO® 80 pressed-in sleeve with adjustable counter sunk screw M12 (EH) CS M16x75 mm Art.-No.K713/Set























Anchoring system

Anchoring timber-framed walls, up to 24,4 kN*

- I Timber width from 100 mm
- I Highly advanced production prefabrication
- I Anchoring by simply interlocking the wall elements
- I Very strong anchoring
- I Disassembly and reassembly without damage

Available in 3 versions.

Design values are available on our website under Planer

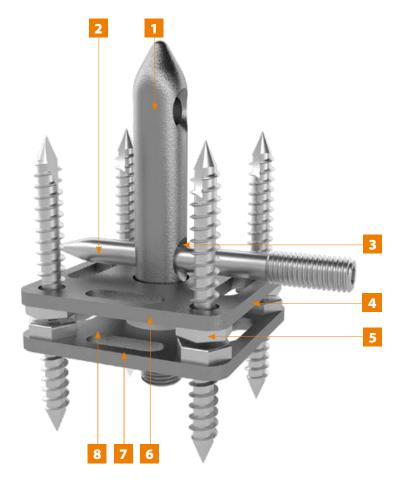
* Characteristic value F_{1,Rk} in tension, valid only with the use of 4 original KNAPP* CS screws 10x60 mm, on C24 according ETA-23/0670 (2023/09/25).





WALCO® BOLT

- I Stable and concealed connection for prefabricated wall elements made of wood and CLT, as well as connections between wood, steel and concrete.
- I The slotted holes of the WALCO® 80 base plate allow for readjustment when attached with screws
- I Loadable with tension as well as perpendicular to the insertion direction
- | Service class 1 and 2



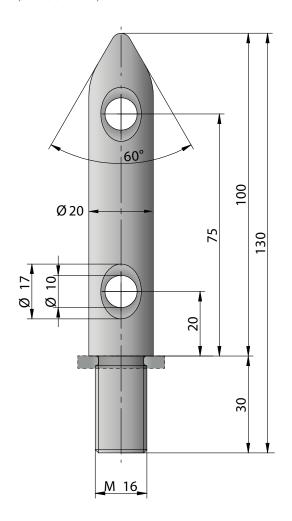
- Installation example: fixing carport rafters, Austria.
- Ø20 mm bolts for anchoring and connecting wall elements
- Clamping bolt for securing and tightening the wall elements
- Hole for allowing the clamping bolt to fix the wall to the floor
- WALCO® 80 base plate VS D22 increases the stability and the strength of the system
- Hex screw 10x60 mm
- Spring washer M16
- WALCO® 80 with M16 welded sleeve
- Oblong holes for vertical or horizontal adjustments (optional)

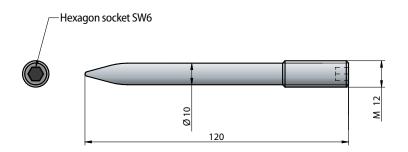


Dimensions - WALCO® BOLT D20 L100

Art.-No.K909

(Dimensions in mm)





Technical details - WALCO® BOLT A130

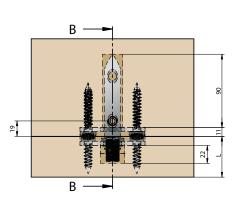
Art.-No.K900

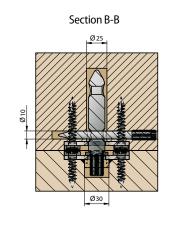


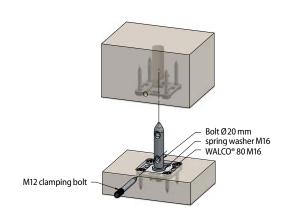
Pos.	Description	ArtNo.
1	Ø 20 mm bolt	K909
2	M12x120 clamping bolt	K908
4	WALCO® 80 VS D22 base plate	K712
5	Hex screw 10x60 mm	Z551
6	Spring washer M16	Z895
7	WALCO® 80 with M16 welded sleeve	K712/V

Installation options

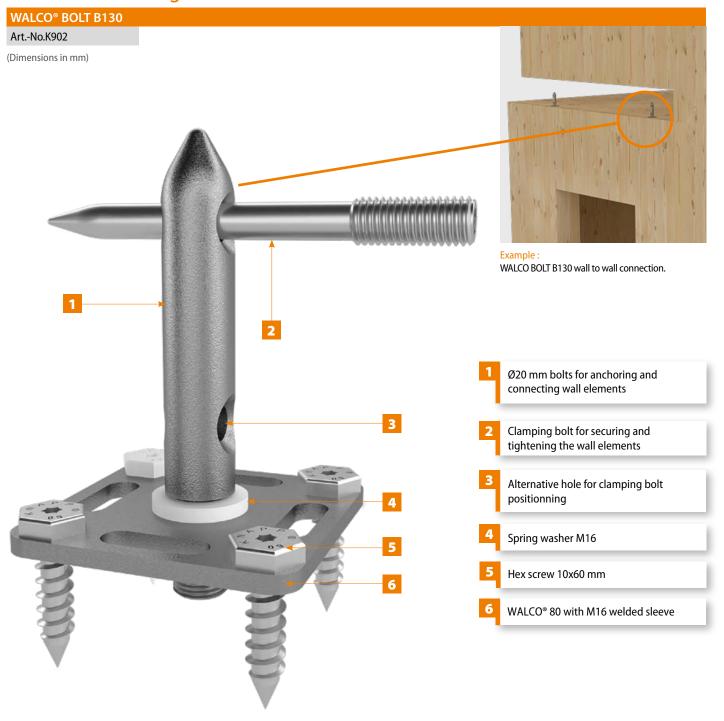


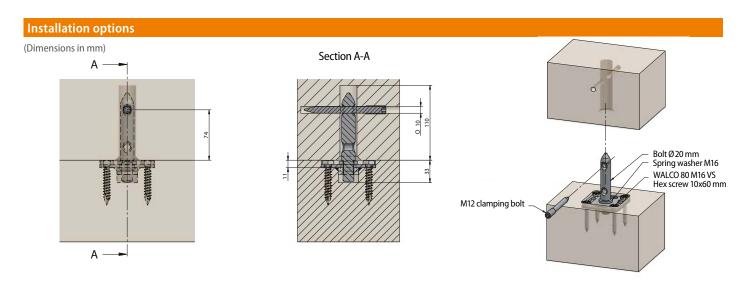






WALCO® BOLT Single D20





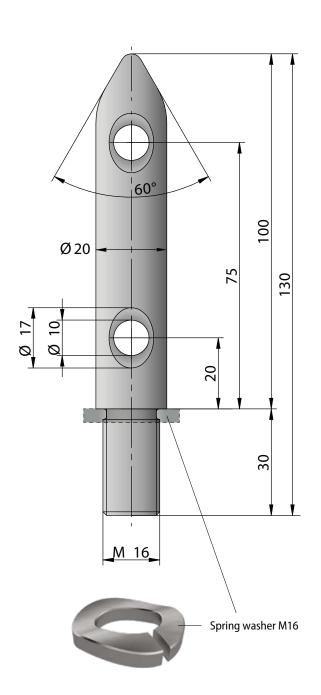
Dimensions - WALCO® BOLT B130

Art.-No.K902

(Dimensions in mm)

Technical details - WALCO® BOLT B130*

Art.-No.K902



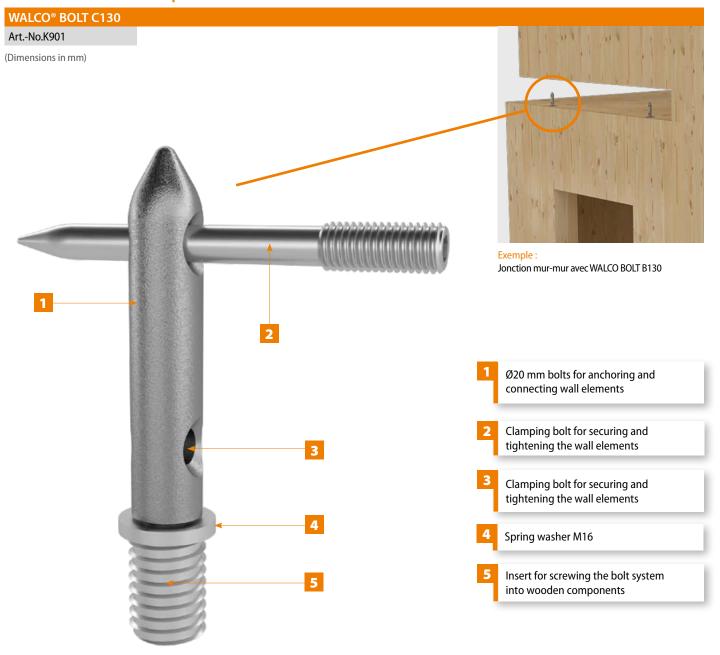


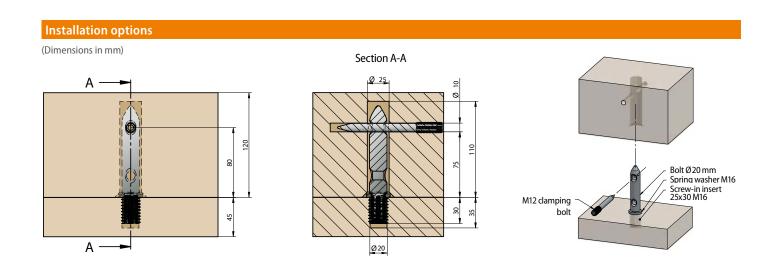
Pos.	Description	ArtNo.
1	Ø 20 mm bolt	K909
2	M12x120 clamping bolt	K908
3	Clamping bolt alternative bore	_
4	Spring washer M16	Z895
5	Hex screw 10x60 mm	Z551
6	WALCO® 80 with M16 welded sleeve	K712/V

WALCO® BOLT D20



WALCO® BOLT simple D20





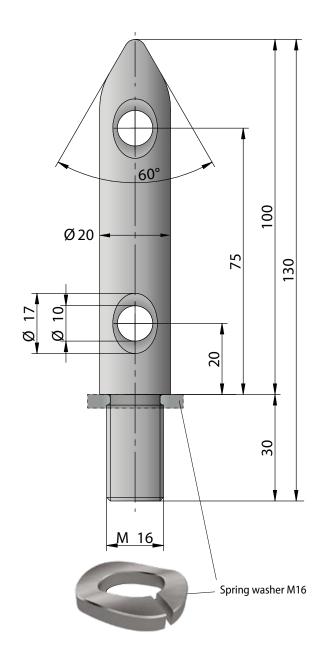
Dimensions - WALCO® BOLT C130

Art.-No.K901

(Dimensions in mm)

Technical details - WALCO® BOLT C130

Art.-No.K901





Pos.	Description	ArtNo.
1	Ø 20 mm bolt	K909
2	M12x120 clamping bolt	K908
3	Clamping bolt bore	_
4	Spring washer M16	Z895
5	Insert D25/40	Z644

WALCO® BOLT D20





WALCO® BOLT

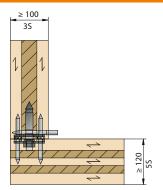
Performance data

WALCO BOLT A130: 4 screws 10x60 (wall) and 4 screws 10x60 (wfloor)			Tensile characteristic resistance values	Tensile design value F _{1,Rd} [kN]					
Element	Timber grade	Dimensions [mm]	Screwdriving	F _{1,Rk} [kN]	kmod =0,6	kmod =0,7	kmod =0,8	kmod =0,9	kmod =1,0
Wall	CLT (350 kg/m ³)	100 (3S)	90°	21.00	9.69	11.31	12.92	14.54	16.15
Floor	CLT (350 kg/m ³)	≥ 120 (5S)	90°						
Wall	CLT (400 kg/m ³)	100 (3S)	90°	23.37	10.79	12.58	14.38	16.18	17,98
Floor	CLT (400 kg/m ³)	≥ 120 (5S)	90°						
Wall	CLT (350 kg/m ³)	100 (5S)	0°	6.30	2.91	3.39	3.88	4.36	4.85
Floor	CLT (350 kg/m ³)	≥ 120 (5S)	90°						
Wall	CLT (400 kg/m ³)	100 (5S)	0°	7.01	3.24	3.77	4.31	4.85	5.39
Floor	CLT (400 kg/m ³)	≥ 120 (5S)	90°						

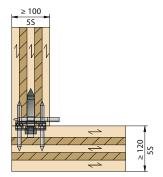
0° butt screw connection

■ 90° through-wire screw connection

WALCO® BOLT A130



■ 90° through-wire screw connection on CLT



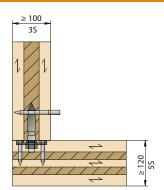
0° butt screw connection on CLT

WALCO BOLT B130 and C130: Clamping bolt (wall/joist) and B130, C130 bolt (floor)			Tensile characteristic resistance values	Tensile design value F _{1,Rd} [kN]					
Element	Timber grade	Dimensions [mm]	Screwdriving	F _{1,Rk} [kN]	kmod =0,6	kmod =0,7	kmod =0,8	kmod =0,9	kmod =1,0
Wall	CLT (350 kg/m ³)	100 (3S)	90°	7.20	3.32	3.88	4.43	4.99	5.54
Floor	CLT (350 kg/m ³)	≥ 120 (5S)	90°						
Wall	CLT (400 kg/m ³)	100 (3S)	90°	7.76	3.58	4.18	4.78	5.37	5.97
Floor	CLT (400 kg/m ³)	≥ 120 (5S)	90°						
Wall	Gl24c	100	90°	7.37	3.40	3.97	4.54	5.10	5.67
Floor	CLT (350 kg/m ³)	≥ 120 (5S)	90°						
Wall	GL24h	100	90°	7.50	3.50	4.09	4.67	5.26	5.84
Floor	CLT (400 kg/m ³)	≥ 120 (5S)	90°	7.59					

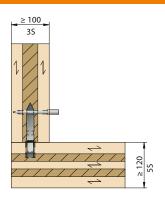
0° butt screw connection

■ 90° through-wire screw connection

WALCO® BOLT B130



WALCO® BOLT C130



Anchoring system

Anchoring of timber-frame walls and posts, up to 19,6 kN*

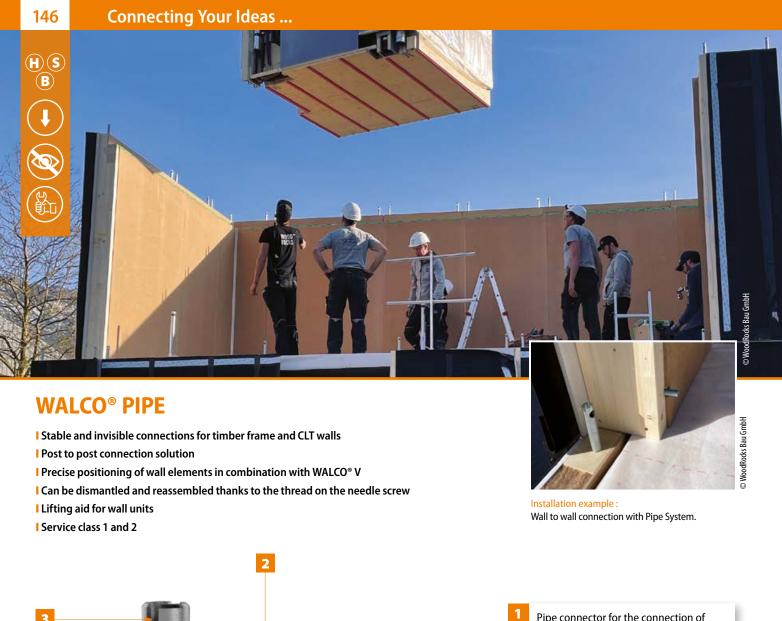
- I Timber width from 100 mm
- I Highly advanced production prefabrication
- Anchoring by simply interlocking the wall elements
- I Very strong anchoring
- I Disassembly and reassembly without damage
- I Use of the system for lifting

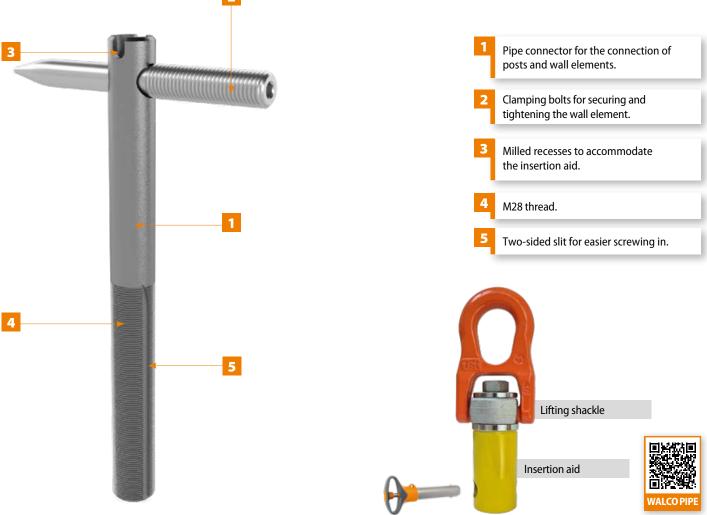
Available in 2 sizes.

The load-bearing capacity values of the connectors are available on our website in the research and design section.

* Tensile characteristic values F1,Rk for WALCO PIPE C300 on CLT 400 Kg/m³, in accordance with ETA-23/0670 (2023/09/25).



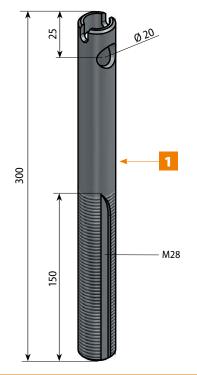


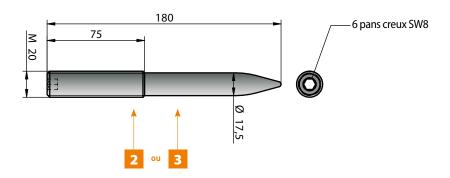


Technical details

Art.-No.K903 and K904

(Dimensions in mm)





Pos.	Description	ArtNo.
1	Tube 300 M28	K905
2	Clamping bolt with thread Ø 18x180	K906
3	Clamping bolt without thread Ø 18x180	K907

N.B.: mèches adaptées disponibles sur demande.

Installation example Art.-No.K903 and K904 Art.-No.K911 and K906 (Dimensions in mm) Ø30 Ø30 ۱_P 50 Ø 18 Ø18 Perçage Ø 18 Perçage Ø 30 160 120 120 250 100 150 160 Perçage Ø 26 Ø26 Ø 26 * ... La résistance des composants peut être adaptée en fonction de la profondeur de vissage du tube dans l'élément bois. I Pas du filetage 3 mm.

WALCO® PIPE M28



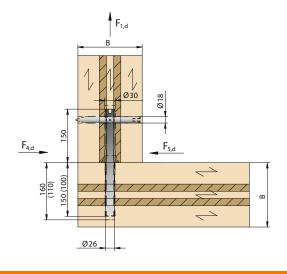
WALCO® PIPE

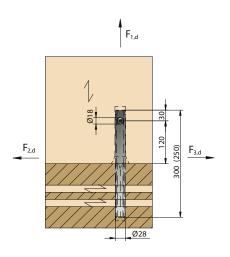
T		
Tensii	le resistance val	iues 🗗

							Tensile de	esign valu	e F _{1,Rd} [kN]	
WALCO PIPE	Element	Timber grade	Dimensions [mm]	Screwdriving	F _{1,Rk} [kN]	kmod =0,6	kmod =0,7	kmod =0,8	kmod =0,9	kmod =1,0
C250	Wall	CLT (350 kg/m³) NH C24	100 (3S) 80x180	0°	14.00	6.16	7.54	8.62	9.69	10.77
C230	Floor	CLT (350 kg/m ³) NH C24"	140 (5S) 120x180	90°	14.00	6.46	7.54	8.02		10.77
6250	Wall	CLT (400 kg/m ³)	100 (3S)	0°	15.50	7.19	0.20	9.59	10.,79	11.00
C250	Floor	CLT (400 kg/m ³)	140 (5S)	90°	15.58		8.39			11.98
C250	Post base	GL24h	80x180	0°	9.07	4.19	4.88	5.58	6.28	6.98
C230	Post top	GL24h	80x180	0°	9.07	4.19	4.00	5.56	0.20	0.96
C300	Wall	CLT (350 kg/m³) NH C24"	100 (3S) 80x180	0°	10 10	8.35	9.75	11.14	12.53	12.02
C300	Floor	CLT (350 kg/m ³) NH C24"	200 (5S) 180x180	90°	18.10					13.92
C200	Wall	CLT (400 kg/m ³)	100 (3S)	0°	10.63	0.06	10.56	12.07	12.50	15.00
C300	Floor	CLT (400 kg/m ³)	200 (5S)	90°	19.62	9.06	10.56	12.07	13.58	15.09
C300	Post base	GL24h	80x180	0°	12.60	6 20	722	0 27	0.42	10.46
C300	Post top	GL24h	80x180	0° 13.60		6.28	7.32	8.37	9.42	10.46

0° butt screw connection

■ 90° through-wire screw connection





Shear strength values F_2 / F_3 , in the plane of the wall

			Tensile characteristic resistance values	Te	nsile desig	jn value F	_{2,Rd} / F _{3,Rd} [k	:N]		
WALCO PIPE	Element	Timber grade	Dimensions [mm]	Screwdriving	$F_{2,Rk}/F_{3,Rk}[kN]$	kmod =0,6	kmod =0,7	kmod =0,8	kmod =0,9	kmod =1,0
C250	Wall	CLT (350 kg/m ³)	100 (3S)	0°	11.85	5.47	6.38	7.29	8.20	9.12
C230	Floor	CLT (350 kg/m ³)	140 (5S)	90°	11.85	J. 4 /	0.50	1.29	0.20	9.12
C250	Wall	CLT (400 kg/m ³)	100 (3S)	0°	12.89	5.95	6.94	7.93	8.92	9.92
C230	Floor	CLT (400 kg/m ³)	140 (5S)	90°	12.09					9.92
C300	Wall	CLT (350 kg/m ³)	100 (3S)	0°	14.10	6.51	7.59	8.68	9.76	10.85
C300	Floor	CLT (350 kg/m ³)	200 (5S)	90°	14.10	0.51	7.59	0.00	9.76	10.65
C300	Wall	CLT (400 kg/m ³)	100 (3S)	0°	15.50	710	8.38	0.50	10.77	11.97
C300	Floor	CLT (400 kg/m ³)	200 (5S)	200 (5S) 90°	7.18	0.38	9.58	10.77	11.97	

Shear strength values F_4 / F_5 , perpendicular to the plane of the wall

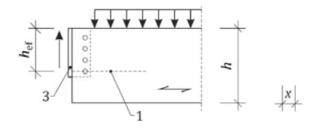
			Tensile characteristic resistance values		Tensile de	sign value	F _{45,Rd} [kN]			
WALCO PIPE	Element	Timber grade	Dimensions [mm]	Screwdriving	F _{45,Rk} [kN]	kmod =0,6	kmod =0,7	kmod =0,8	kmod =0,9	kmod =1,0
C250	Wall	CLT (350 kg/m ³)	100 (3S)	0°	8.42	3.89	4.53	5.18	5.83	6.48
C230	Floor	CLT (350 kg/m ³)	140 (5S)	90°	0.42	3.09	4.55	5.10	5.05	0.46
C250	Wall	CLT (400 kg/m ³)	100 (3S)	0°	8.42	3.89	4.53	5.18	5.83	6.48
C230	Floor	CLT (400 kg/m ³)	140 (5S)	90°	0.42					0.40
C300	Wall	CLT (350 kg/m ³)	100 (3S)	0°	8.42	3.89	4.53	5.18	5.83	6.48
C300	Floor	CLT (350 kg/m ³)	200 (5S)	90°	0.42	3.09	4.55	5.10	5.65	0.46
C300	Wall	CLT (400 kg/m ³)	100 (3S)	0°	0.42	2.00	2.00 4.52	Г 10	T 02	6.40
C300	Floor	CLT (400 kg/m ³)	200 (5S)	90°	8.42	3.89	4.53	5.18	5.83	6.48

0° butt screw connection

■ 90° through-wire screw connection

The position is decisive for the justification of the F_{45,Rk} load:

$$F_{45,Rk} = min \begin{cases} F_{23,Rk} \\ k_v \cdot f_{v,k} \cdot b \cdot h_{ef} \end{cases}$$
1,5



Tensile and shear strength values for the WALCO® PIPE lifting device

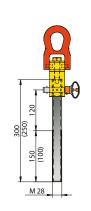
WLL_{tension} (WALCO Lifting Load Tension) Tensile strength of the WALCO® PIPE lifting device

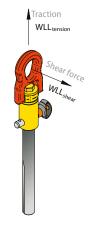
					WALCO® PIPE pull-off	Load-splitting
WALCO PIPE	Element	Timber grade	Dimensions [mm]	Screwdriving	WLL _{tension} [kN]	WLL _{tension} [kN]
6250	Wall	CLT (350 kg/m ³)	100 (3S)	0°	1.10	
C250	Floor	CLT (350 kg/m ³)	140 (5S)	90°	3.20	4.10
C250	Wall	CLT (400 kg/m ³)	100 (3S)	0°	1.30	
C250	Floor	CLT (400 kg/m ³)	140 (5S)	90°	3.50	4.10
C200	Wall	CLT (350 kg/m ³)	100 (3S)	0°	1.70	
C300	Floor	CLT (350 kg/m ³)	200 (5S)	90°	4.80	7.60
C200	Wall	CLT (400 kg/m ³)	100 (3S)	0°	1.90	
C300	Floor	CLT (400 kg/m ³)	200 (5S)	90°	5.30	7.60

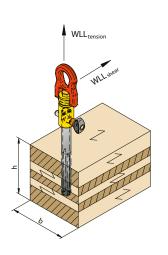
0° butt screw connection

■ 90° through-wire screw connection

$$WLL_{tension} = min \ \begin{cases} K_{ax} \cdot 4.800 \cdot \left(\frac{\rho_{k}}{350}\right)^{0.8} \\ \\ \frac{h}{4.4 \cdot (h - 150)} \cdot \left(6.5 + \frac{18 \cdot 150^{2}}{h^{2}}\right) \cdot (t_{ef} \cdot h)^{0.8} \cdot f_{t,90,k} \end{cases}$$





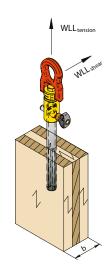




The load values refer to the expert report dated 30.05.2023 (Professeur Dr.-lng H.J. Blaß)

WLL_{shear} (WALCO® Lifting Tension Load) calculation example for the WALCO® PIPE lifting device

C300		
28	mm	
150	mm	
165	mm	
486000	Nmm	
100	mm	
200	mm (2 x h)	
CLT	Bois de fil	
350	kg/m³	
90	0	
20,66	N/mm ²	$= 0.082 \times (1-0.01 \times d) \times \rho_k$
4,67	N/mm ²	= $0.4 \times 0.082 \times (1-0.01 \times d) \times rk / (1.35 + 0.015 \times d)$
	28 150 165 486000 100 200 CLT 350 90 20,66	28 mm 150 mm 165 mm 486000 Nmm 100 mm 200 mm (2 x h) CLT Bois de fil 350 kg/m³ 90 ° 20,66 N/mm²



Load values refer to the expert report as of 30.05.2023 (Professeur Dr.-Ing H.J. Blaß)

Checking the resistance of CLT to splitting using WLL shear on WALCO® PIPE:

C	LT wall thickness CLT h =	100	mm		
	CLT wall width CLT b =	200	mm (2 x h)		
	Shear strength $f_{v,k}$ =	2	N/mm ²		(1
	Height h _{ef} =	50	mm		$K_{n} = \min \left\{ \begin{array}{c} K_{n} \left(1 + \frac{1,5}{\sqrt{h}} \right)^{1.5} \end{array} \right.$
	$a=h_{ef}/h=$	0,5			$K_{v} = \min \left\{ \begin{array}{c} K_{n} \left(\frac{1+\sqrt{h}}{\sqrt{h}} \right) \end{array} \right.$
	Distance x =	215	mm		$\sqrt{h} \sqrt{a(1-a)} + 0.8 \frac{x}{h} \sqrt{\frac{1}{a}}$
	Coefficient k _n =	6,5	(CLT)		$\sqrt{h} \sqrt{a(1-a)} + 0.8 \frac{h}{h} \sqrt{a}$
F	Reducing coefficient k _v =	0,234	(EN 1995-1-1 (Gl. 6.62)		
	Shear force $WLL_{shear} =$	0,71	kN	$=(k_v x)$	$(f_{v,k} \times b \times h_{ef})/6,6$
	Shear force $WLL_{shear} =$	1,95	$kN = f_{h,90,k} x 6,36 x mir$	า {65,8 ;	$(165^2 + (34700 / f_{h,90,k})^{0,5} - 165)$

Min. shear. $WLL_{shear} = 0.71$ kN

WLL_{shear} = min $\begin{cases} K_{ax} \cdot 6,36 \cdot min \\ \frac{k_{v} \cdot f_{v,k} \cdot b \cdot h_{ef}}{6,6} \end{cases} = \begin{cases} \frac{65,8}{\sqrt{165^{2} + \frac{34.700}{f_{h,k}}}} - 165 \end{cases}$

Combined analysis:

 $\left(\frac{F_{\text{Ed, tension}}}{F_{\text{WLL, tension}}}\right)^2 + \left(\frac{F_{\text{Ed, shear}}}{F_{\text{WLL, shear}}}\right)^2 \le 1$

Note: to increase the WLL_{shear} load-bearing capacity on CLT, it is necessary to add full-thread screws on the face of the wall next to WALCO® PIPE. These prevent the CLT walls or floors from splitting!

Reference project









Anchoring solution for timber walls

L and T-shaped connector, anchoring timber-frame walls up to 10.8 kN

- I Prefabrication of the wall modules in the factory
- I Absorption of tensile and shear forces through the anchoring in the wall axis
- I Stable fastening of the walls by means of tie rods and angle bracket
- I Space-saving transport
- I Easy adjustment of the walls on site
- I Short assembly time of up to 15-20 minutes time saving per wall element (compared with conventional conventional bracket solutions)

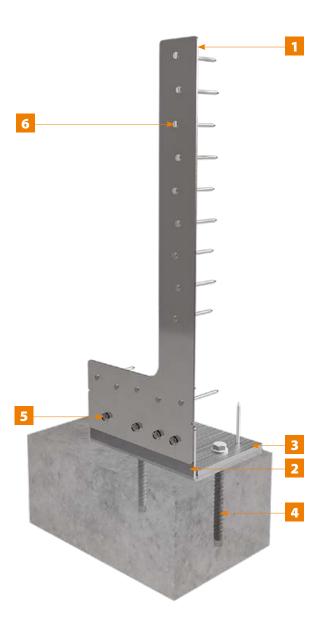
Available in 1 size and 2 versions.

Design values are available on our website under Planer

Valeurs de résistance WALCO® L and T suivant ETA 10-0189 (2022/08/25).



Installation example: Mounted on wall element.



- Hot-dip galvanised 3 mm sheet steel. Silver finish.
- 4 mm galvanised steel anchor bracket
- 10 mm Reinforcement pressure plate to ensure very high load bearing capacity
- Concrete screw 12x130 requires a small drilling depth
- Self-tapping hexagonal screw M8x25 for force-locking fastening and backlash-free connection.
- Ring shank connecting nails 4x75 for quick processing with nailing equipment

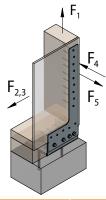


Our Planner service does not replace approval by an authorised structural engineer.



WALCO® L

Tensile load values F_{1.Rd} for tension anchor WALCO® L with fischer ULTRACUT FBS II concrete screw





FBS II 12x130 70/55/30 US, galvanised steel								
Drill diameter $d_0 =$	12 mm							
Drill depth $h_2 =$	140 mm							
Calculated anchoring depth h _{ef} =	81 mm							
Installation depth $h_{nom} =$	100 mm							
Minimum edge distance $C_{2,min} = 0$	73 mm							
Reinforcement plate thickness t =	10+4 = 14 mm							
	ETA-15/0352,							

Approval: Option 1

		es in NH C24 ete C20/25	Design values in NH C24 and concrete C25/30			
KNAPP® connector	Minimum cross-section Stud [mm]	Cladding [mm]	Max. tensile load F _{1,Rd} [kN] LDC: short	Max. tensile load F _{1,Rd} [kN] LDC: short/very short	Max. tensile load F _{1,Rd} [kN] LDC: short	Max. tensile load F _{1,Rd} [kN] LDC: short/very short
	80x145	12 mm OSB 3 / OSB 4	16,84	17,31	16,84	17,31
	SWD C24	Chipboard	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
WALCO® L	80x145	15 mm OSB 3 / OSB 4	17,20	17,31	17,20	17,31
9 Ring shank nails 4x75 in stud	SWD C24	Chipboard	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
5 Ring shank nails 4x75 in sill plate 4 Hexagonal screws M8x25	80x145	18 mm	17,30	17,31	17,20	17,31
2 Concrete screws 12x130 *	SWD C24	OSB 3 / OSB 4 Chipboard	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
	80x145	22 mm	16,90	17,31	17,20	17,31
	SWD C24	OSB 3 / OSB 4 Chipboard	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
	80x145 SWD C24	9 mm Plywood	15,22	16,25	15,22	16,25
			$F_{B,t,Rd}=20,00$	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
	80x145 SWD C24	12 mm	15,48	16,53	15,48	16,53
WALCO® L		Plywood	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
9 Ring shank nails 4x75 in stud 5 Ring shank nails 4x75 in sill plate	80x145	15 mm	15,54	16,57	15,54	16,57
4 Hexagonal screws M8x25	SWD C24	Plywood	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
2 Concrete 12x130 *	80x145	18 mm	15,51	16,52	15,51	16,52
	SWD C24	Plywood	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
	80x145	22 mm	15,35	16,29	15,35	16,29
	SWD C24	Plywood	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
	80x145	12 mm	14,74	16,09	14,74	16,09
WALCO® L	SWD C24	GKB / GKF	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd}=22,30$	$F_{B,t,Rd} = 22,30$
9 Ring shank nails 4x75 in stud 5 Ring shank nails 4x75 in sill plate	80x145	15 mm	15,91	17,31	15,91	17,31
4 Hexagonal screws M8x25	SWD C24	GKB / GKF	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$
2 Concrete 12x130 *	80x145	18 mm	17,10	17,31	17,10	17,31
	SWD C24	GKB / GKF	$F_{B,t,Rd}=20,00$	$F_{B,t,Rd} = 20,00$	$F_{B,t,Rd} = 22,30$	$F_{B,t,Rd} = 22,30$

^{*}The table shows the load values F_{B,LRd} of the fischer ULTRACUT FBS II concrete screws 12x130 70/55/30 US in concrete C20/25 and C25/30. If other concrete screws are used, these load values must be adjusted and, if necessary, verified again.

Proof for the tensile load direction F_1 : ($F_{1,Ed}/F_{1,Rd}$) ≤ 1.0

LDC Load duration class

Short period (exposure shorter than one week) short short/very short short/very short period (new LDC for wind in NA)

Rated value of the tensile load $F_{1,Ed}$

(existing tensile load from the timber stud wall) Measurement value of the tensile load carrying capacity $F_{1,Rd}$

of the WALCO® L connector

Design value of the tensile load of concrete screw $F_{B,t,Ed}$

Parameters for determining the axial load of the concrete

screw/ concrete anchor

According to ETA approval or DIN EN 300 or DIN EN 12369-1 OSB 3 / OSB 4

Chipboard According to ETA approval or DIN EN 312

According to ETA approval or DIN 20000-1:2017-06 (softwood) Plywood Gypsum plasterboards/fiber reinforced plasterboard according to ETA GKB / GKF

Verification for tensile load in concrete anchor: $(F_{B,t,Ed} / F_{B,t,Rd}) \le 1.0$ Tensile load in concrete anchor: $F_{B,t,Ed} = F_{1,Ed} \times k_t = F_{1,Ed} \times 1.4$

Calculation example:

WALCO® L tie rod connection is installed in an 80x145 mm NH C24 stud with 15 mm OSB planking and C20/25 concrete floor slab.

 $Der \, WALCO^{\circ} \, L \, is \, loaded \, by \, a \, tensile \, load \, F_{1,Ed} = 14 \, kN \, (LDC: short/ \, very \, short). \, The \, k_t \, value$ for the off-centre tension connection in the concrete floor slab for the WALCO® L is 1,4.

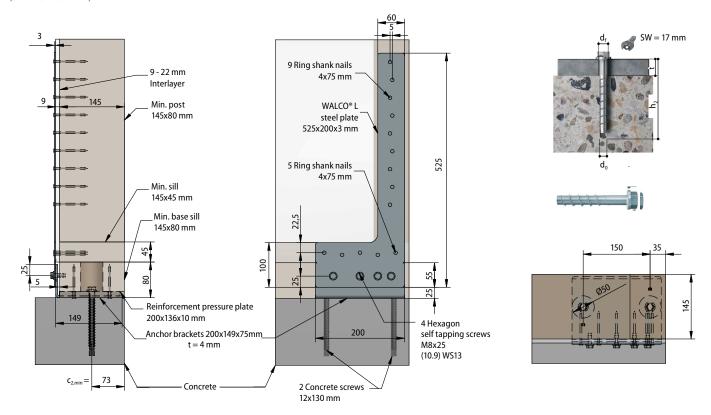
Timber stud verification: $(F_{B,t,Ed}/F_{B,t,Ed}) \le 1,0$ (14,0/17,3) = 0,81 < 1,7Tensile load in the concrete another: $F_{B,t,Ed} = F_{1,Ed} \times k_t = F_{1,Ed} \times 1,4 = 14 \times 1,4 = 19,6 \text{ kN}$ (14,0/17,3) = 0,81 < 1,0**Concrete anchor verification:** $(F_{B,t,Ed} / F_{B,t,Rd}) \le 1,0$ (19,6/20) = 0,98 < 1,0

The load values for the concrete anchor/concrete screw in the concrete substructure can be designed separately using a design programme, e.g. C-FIX from fischer. The WALCO® L can also be loaded and designed in other load directions F_{23} , F_4 und F_5 . These verifications with the WALCO® L load values can be found in the ETA 10-0189 approval.

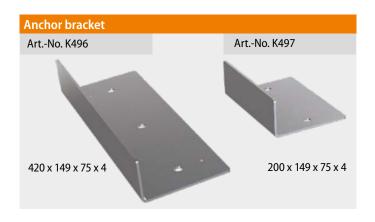
WALCO® **L** - Anchoring connector for timber walls

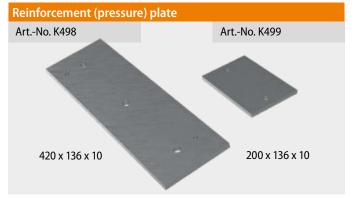
WALCO® L

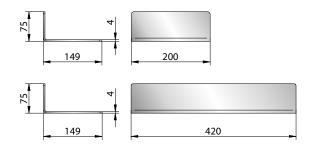
(Dimensions in mm)



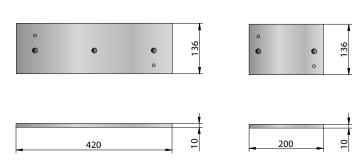
I Hot-dip galvanised sheet steel - 3mm for left and right position







• 4 mm galvanized steel anchor bracket with pre-drilled fastening holes.



I 10 mm galvanized steel strengthening plate with pre-drilled fastening holes.



WALCO® **L** - Anchoring connector for timber walls

WALCO® L - Single connection Art.-No.K495/EA

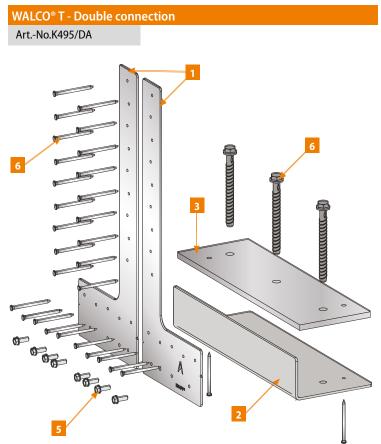
The Hexagon screws M8x25 5, require pre-drilling with Ø 7.4 mm into side of anchor bracket 2 for on-site assembly.

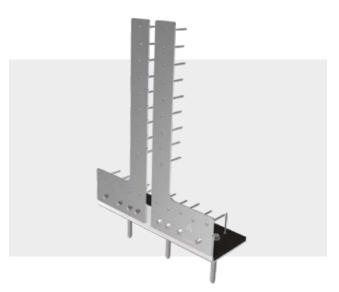


WALCO® L Set - Parts list single connector K495/EA

	ArtNo.	Description	Quantity					
1	K495	Steel plate 3 mm thick	1 piece					
2	K497	Anchor bracket 200/4 mm	1 piece					
3	K499	Reinforcement plate 200/10 mm	1 piece					
4	Z850	Ring shank nail 4x75 mm	16 pieces					
5	Z648	Hexagon screw M8x25 mm	4 pieces					
6	Z852	Concrete screw 12x130 mm	2 pieces					





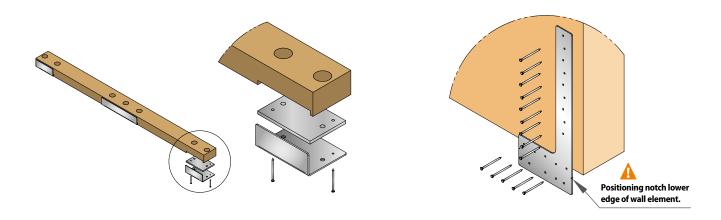


WALCO® T Set - Parts list double connector K495/DA

	ArtNo.	Description	Quantity
1	K495	Steel plate 3 mm thick	2 pieces
2	K496	Anchor bracket 420/4 mm	1 piece
3	K498	Reinforcement plate 420/10 mm	1 piece
4	Z850	Ring shank nail 4x75	30 pieces
5	Z648	Hexagon screw M8x25 mm	8 pieces
6	Z852	Concrete screw 12x130	3 pieces

WALCO® Installation

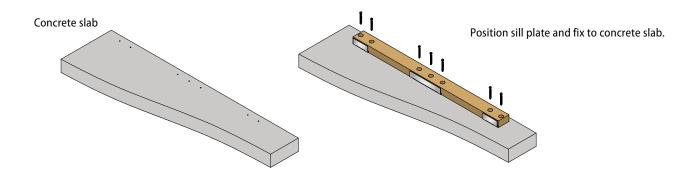
Prefabrication in factory



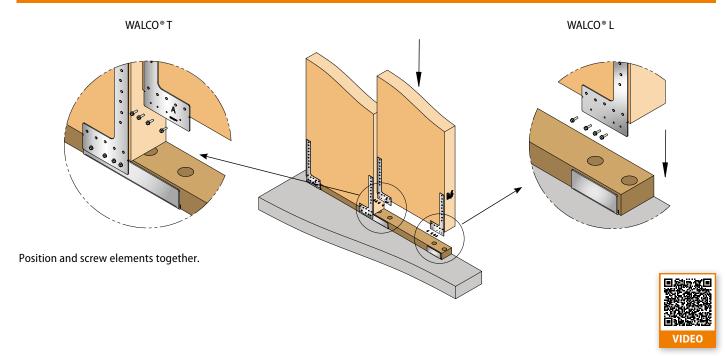
Mounting the anchor bracket with his reinforcement plate on the sill plate.

Mounting the L-shaped steel plate to wall element using the anchor nails.

Anchor bracket and sill plate installation on site



Wall installation



Angled connection cylinder

Three-dimensional screw joint cylinder up to 26 kN* for diagonal screw connection

- I Flush no protruding connector parts
- Readjustable
- I Dismantling and reassembly possible
- I High degree of prefabrication
- I Easy to install simple positioning in the drill hole

Available in 5 sizes and 2 versions.

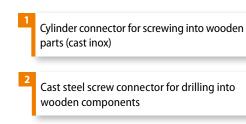
The values only apply when used with original KNAPP® screws! Design values are available on our website under Planner Service.

* Characteristic value $F_{t,Rk}$ applies to T-Joint D40 W30 in CLT walls.

KNAPP

T-JOINT

- I Applications: for flush 30° and 45° inclined screw connections, for bending resistant connections, floor connections and tension and wall joints as well as straight and angled connections.
- I Connection: BSH, CLT, BauBuche, solid structural timber, MHM (solid timber wall), steel and timber tension joints.
- Areas of application: Ideal for timber construction, house building, pergola, carport and tensile force transmission in combination with steel ties for rigid connections (rafters of roof overhangs), timber stud walls and additional fastening of wooden panels of cantilevered canopies.
- I Service class 1, 2 and 3.



- Suitable for Ø8 to Ø12 mm countersunk screws
- Optimum load distribution of the tensile force over the base and cylinder surface
- Countersunk screw hole Ø5 to Ø6 mm for positioning and/or additional fixing

T-JOINT can be used alone or in combination with RICON® Connectors, RICON® S, WALCO® V and MEGANT®.





Installation example: T-JOINT D20 Hellabrunn Wildlife Park, Germany.



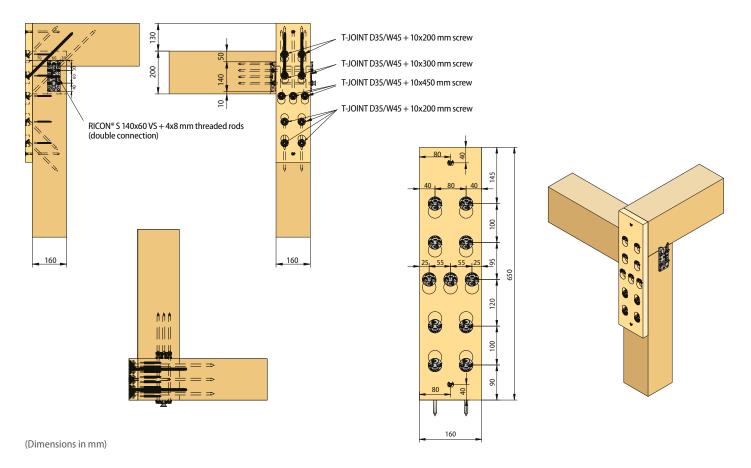
Installation



With T-JOINT D35 W30 fastened hardwood tension ties for BSH tension joints.



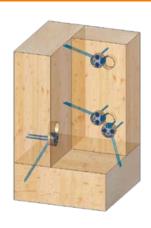
Carport without brace.



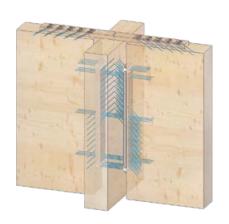
Connection details



T-JOINT D35 W30 fastened hardwood tension ties for BSH tension joints.



Corner tensile connection with T-JOINT D35 W30.

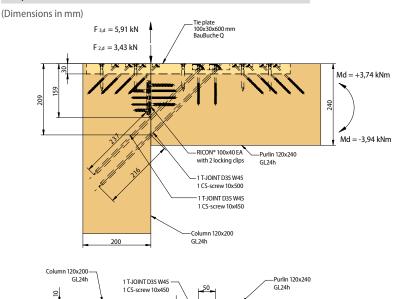


MEGANT® main secondary beam connection with T-JOINT D35 W30 screwed-on hardwood tensile ties.

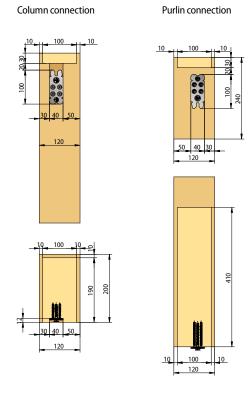
T-JOINT

T-JOINT D35 W45 installation examples and connection details

Tie plate with T-JOINT D35 W45 and T-JOINT D20 W45



-8 T-JOINT D20 W45



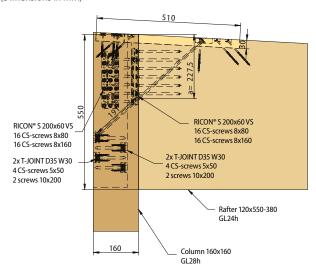
T-JOINT D35 W45 installation examples and connection details

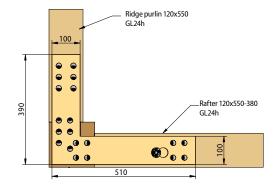
1 T-JOINT D35 W45 1 CS-screw 10x500

Rigid connection with T-Joint and tie plate

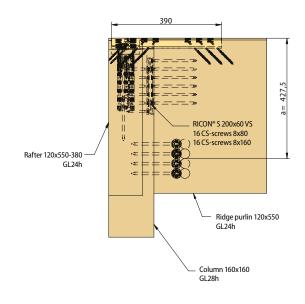
8 T-JOINT D20 W45

(Dimensions in mm)





Rigid column-beam connection





Installation examples

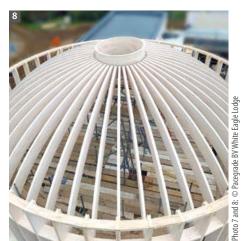


















Installation



Manual processing with KNAPP® drilling templates.



T-JOINT D20 Drill hole approx. 3 mm deep



Pre-drill at an angle using the KNAPP® drilling template.



Screw on T-JOINT D20.



T-JOINT D30 or D35 prepositioned with 2 CS-screws Ø 5 mm¹.



Screw on T-JOINT.



T-JOINT screwed in place.

T-JOINT holes dim.				
T-JOINT Ø		Length	Depth	
20	20mm		9,5 mm	
30	30mm	57mm	18mm	
35	35 mm	65 mm	18mm	
35 (45°)	35 mm	50mm	18mm	
40	40mm	_	3mm	
40	40 mm	75 mm	18 mm	

The T-JOINT makes it possible to produce inclined screw connections with exactly defined and repeatable screw angles in a statically calculable way.

The connection is very easy to handle, increases the degree of prefabrication and reduces assembly times as considerably fewer screws are required.

T-JOINT D20



T-JOINT D30



T-JOINT D35



T-JOINT D20/W45 - Galvanised cast steel

	1 John Bed W 13 Garvanised case steel			
ArtNo. Z606		KNAPP® T-JOINT Ø 20 mm, 45° screw angle		
		Recommended screws:		
		KNAPP® CS-screws 6x100 mm (ArtNo. Z494) or		
		KNAPP® CS-screws 6x120 mm (ArtNo. Z495)		

T-JOINT D30/W30 - Galvanised cast steel			
ArtNo. Z617	KNAPP® T-JOINT Ø 30 mm, angle de screw 30°		
	Recommended screws: KNAPP® CS-screws 5x50 mm with reinforced shaft (ArtNo. Z533) or KNAPP® CS-screws 5x80 mm with reinforced shaft (ArtNo. Z534) Fixing: 2 screws are required for pre-assembling the T-JOINT D30.		
	KNAPP® CS-screws 8x160 mm with reinforced shaft (ArtNo. Z581) or KNAPP® CS-screws 8x240 mm with reinforced shaft (ArtNo. Z672) or KNAPP® CS-screws 10x200 mm with reinforced shaft (ArtNo. Z583)		

T-JOINT D35/30 and D35/45- inox

ArtNo. Z402	KNAPP® T-JOINT Ø 35 mm, 30° screw angle
ArtNo. Z403	KNAPP® T-JOINT Ø 35 mm, 45° screw angle Application: for steep approach angles for diagonal screw connections.
	Recommended screws: KNAPP® CS-screws 5x50 mm with reinforced shaft (ArtNo. Z533) or KNAPP® CS-screws 5x80 mm with reinforced shaft (ArtNo. Z534) Fixing: 2 screws are required for pre-assembling the T-JOINT D35.
	KNAPP® CS-screws 8x160 mm with reinforced shaft (ArtNo. Z581) or KNAPP® CS-screws 8x240 mm with reinforced shaft (ArtNo. Z672) or KNAPP® CS-screws 10x200 mm with reinforced shaft (ArtNo. Z583)
	Works with screws up to Ø 12 mm.

Accessories	
ArtNo. K256	Drilling template D20, 45° screw angle
ArtNo. K258 K566 K567	Drilling template D30, 30° (K258); D35, 30° (K566); D35, 45° (K567)
ArtNo. K563	Adjustable drilling template (for UNO 30, DUO 30, DUO 35 and T-JOINT)
ArtNo. Z075/20	HM drill bit 20 mm (for T-JOINT D20) HM drill bit 30 mm (ArtNo. Z070); 35 mm (ArtNo. Z071) with depth stop (for T-JOINT)

¹ Pre-drilling of the fixing screws only for hardwood.

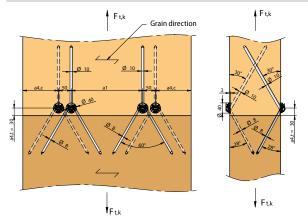
T-JOINT D40



T-JOINT D40/W30			
ArtNo. Z404	KNAPP® T-JOINT Ø 40mm, 30° screw angle Fixing: for tension and bending joints of two timber components by means of diagonal screw connection from both sides.		
	Recommended screws: KNAPP® CS-screws 8x120 mm with reinforced shaft (ArtNo. Z670), KNAPP® CS-screws 8x160 mm with reinforced shaft (ArtNo. Z673), KNAPP® CS-screws 8x200 mm with reinforced shaft (ArtNo. Z671) or KNAPP® CS-screws 8x240 mm with reinforced shaft (ArtNo. Z672) Application: 2 pieces are required for pre-assembly of the T-JOINT D40.		
	KNAPP® CS-screws 10x200 mm with reinforced shaft (ArtNo. Z583) or KNAPP® CS-screws 10x300 mm with reinforced shaft (ArtNo. Z651)		

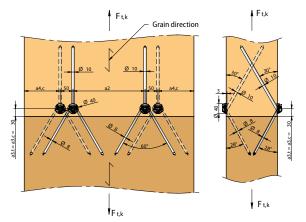
Application examples and connection details of T-JOINT D40 W30

Assembly of 2 CLT wall elements



 $\begin{aligned} a_1 &= 2 \text{ x } L_{8mm} \text{ x } \text{sin} 30^\circ + 40 \text{ mm} \\ a_{4,c} &= L_{8mm} \text{ x } \text{sin} 30^\circ + 20 \text{ mm} \\ L_{8mm} &= \text{Length of } 8 \text{ mm screw} \end{aligned}$

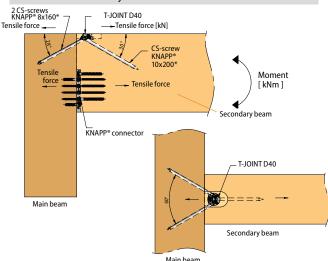
Legend for edge end distances for load perpendicular to the direction of the grain.



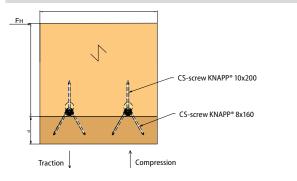
$$\begin{split} a_2 &= 2~x~L_{8mm}~x~sin30^\circ + 40~mm\\ a_{4,c} &= L_{8mm}~x~sin30^\circ + 20~mm\\ L_{8mm} &= Length~of~8~mm~screw \end{split}$$

Legend for edge end distances for load parallel to the direction of the grain.

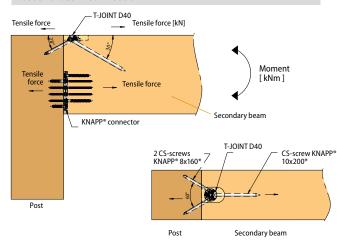
Main beam - secondary beam connection



Tensile connection of CLT floor to wall



Post and beam connection



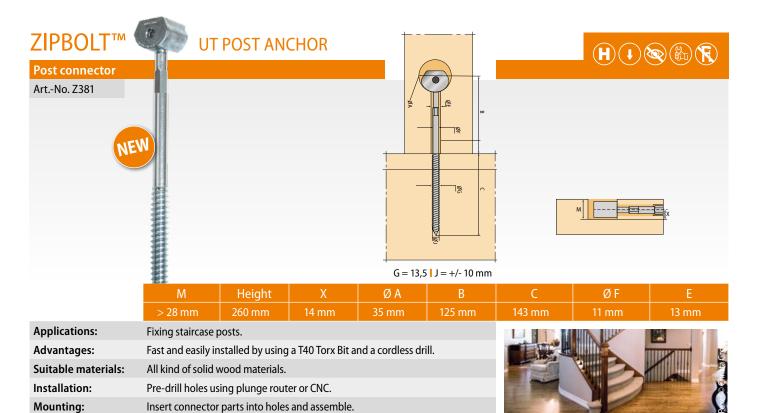
Bending joint of CLT ceiling elements

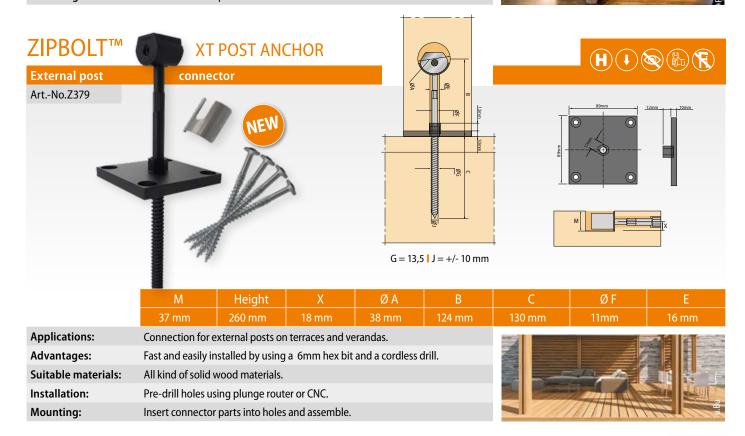


Meet our partner

I Applications: for fixing indoor and outdoor posts and railings, for staircases, verandas, terraces and balconies









Timber peg connector made of solid hardwood

Timber construction nail, connecting up to 11,4 kN*

- I Timber width from 80 mm
- I Drilling in the factory or on site
- I Sustainable and durable
- Sophisticated natural look
- I Force-locking and self-tightening connection
- I Two to three steps pre-lockable and self-centring
- | Metal-free connection

Available in 1 size and 2 types of wood.

Find all the resistance data on our website.

* $F_{2.Rk}$ characteristic value with MATEO ash timber peg on CLT.



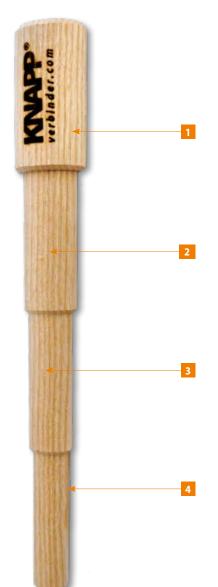


MATEO

- I Applications: visible connection in ecological house construction
- I Connections: wood-wood, solid wood, wood-based materials e.g. CLT
- I Areas of application: traditional house building, renovation



Installation example: CLT walls installation.



- Ø 40 round nail head
- Stepped shaft (1st step Ø 30)
- Woodturned (2nd step Ø 25)
- Solid hardwood (3rd step Ø 20)

The MATEO wooden peg is available made of ash (Art.-No. K304) and beech (Art.-No. K303).

Ash: tough and ductile (deformable) load-bearing up to 0.8 tonnes (transverse to grain direction F_2).

Beech: even higher load-bearing capacity up to 1 ton (see load table on the next pages)

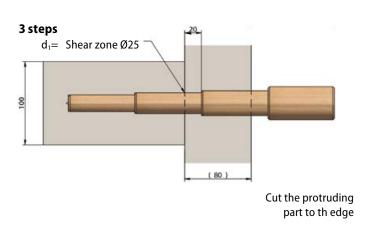
Dimensionally stable at 7-8 % moisture content.

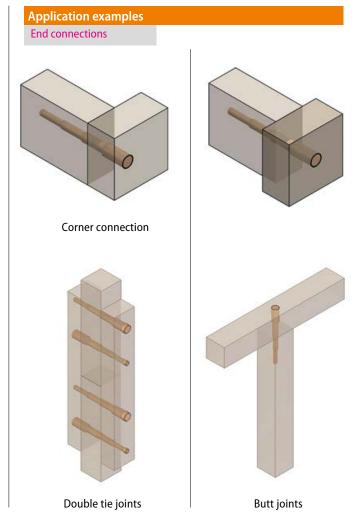
After installation, the peg expands and holds the components firmly together. Glued with waterproof glue, higher pull-out values can be achieved and the connection can be secured additionally.



MATEO

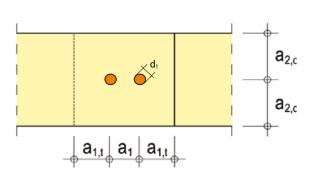
Options of application (Dimensions in mm) 4 steps d₁= Shear zone Ø30 On edge





Measurements Art.-No. K303 and K304 80 mm Ø 30 80 mm Ø 25 80 mm Ø 20 HS stepped drill

Minimum distances



Intervals : $a_{1,t} = a_1 = a_{2,c} = 2 \times d_1$

 d_1 = Mateo shear zone diameter..

For CNC systems, we can match the drills according to your needs.

MATEO

Tested shear zones at Ø 25 and 30 mm

Ø 40 Shear zone Ø 30 Shear zone Ø 25

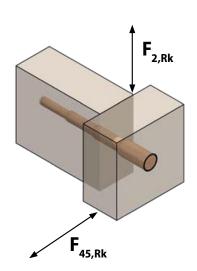
Loadbearing capacities on shear force of side wood/end grain

Timber grade	Wood species	Ø d ₁ Shear zone [mm]	F _{2,Rk} [kN]	Min. wood thickness [mm]
C24	Ash Beech	30	9,8 10,5	80 100
GL24h	Ash Beech	30	10,3 11,0	80 100
BSPH	Ash Beech	30	11,4 12,2	70 80

Timber grade	Wood species	Ø d ₁ Shear zone [mm]	F _{2,Rk} [kN]	Min. wood thickness [mm]
C24	Ash Beech	25	7,0 7,6	70 70
GL24h	Ash Beech	25	7,4 7,9	70 70
BSPH	Ash Beech	25	8,2 8,8	60 60

The $\rm F_{45,Rk}$ depends on the width of the secondary beam, for smaller width its value will be smaller.

Source of the calculation formulas: Blaß, H.J.; Ernst, H.; Werner, H. "Connections with wooden pins - Investigations on load-bearing capacity" p. 630-631.



Installation



Manual drilling using a stepped drill bit or industrial drilling on a CNC machine



Drive in until it stops



Insert the peg up to the nail head



Cut and sand the excess part

Outdoor connectors

I Invisible fastening systems for terraces, cladding and wall cladding indoors and out







Garden furniture built with KNAPP® dowels



Terrace built with QUATRO 65

Overview of Knapp solutions for outdoor use:

The following items are available in our catalogue for interior and exterior fittings, window construction and wood structures







Made of highly resistant composite plastic Ouatro 65/25 Art.-No.K081

Quatro 65/30 Art.-No.K080





ZIPBOLTTM **Exterior Slipfix**

For outdoor handrails Art.-No.Z374





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DUO 30 inox A5 Inox A5 hook connector



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Art.-No.K350 Art.-No.K350/P Mini Pack

Art.-No.K121 Goupille de verrouillage A2 (option)



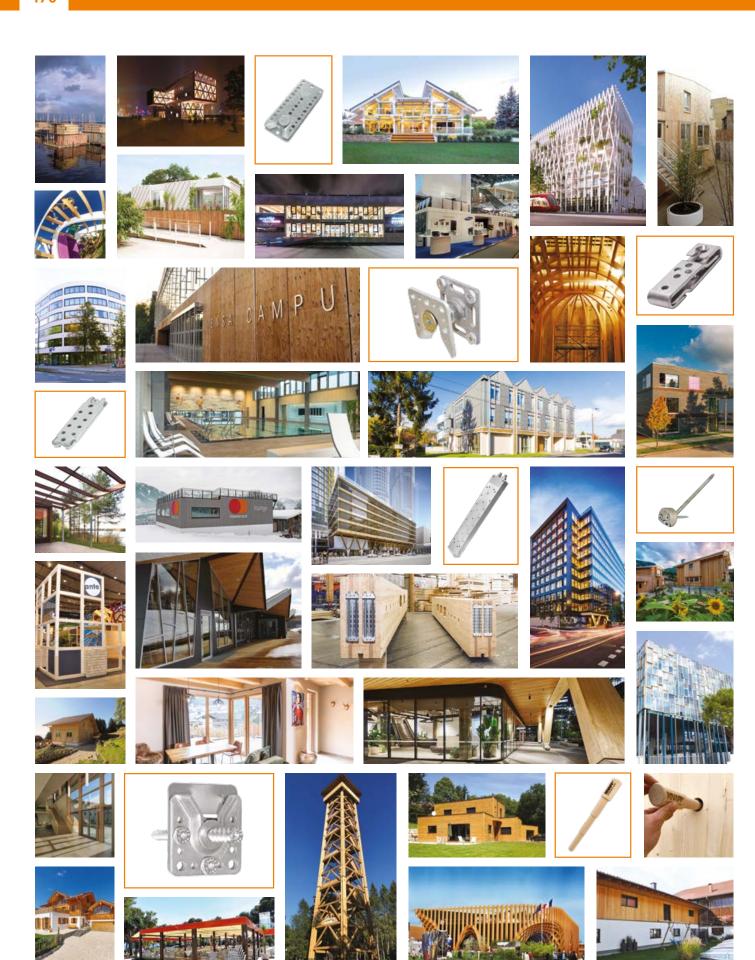
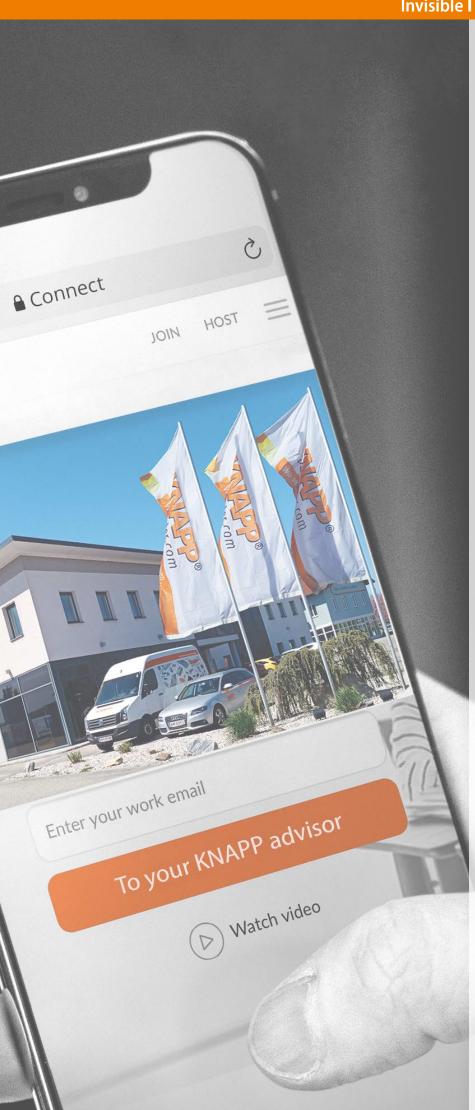


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+43 (0) 7474 / 799 10 CleUr d'idées, +43 (0) 7474 / 799 10 28

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Knapp GmbH | Wassergasse 31 | A-3324 Euratsfeld Tél.: +43 (0)7474 / 799 10 | Fax: +43 (0)7474 / 799 10 99

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