

# Connecting Systems

for modern Mass Timber Construction

Connecting Your Ideas ...



CE ETA

**KNAPP**®  
*connectors.com*



Friedrich Knapp  
CEO

## Welcome to the World of KNAPP®!

As a manufacturer of patented connecting systems, we develop and produce high-quality products that are distributed worldwide. Not only our connecting systems convince, they also inspire you with the wide range of applications. The comprehensive service offers the possibility to find the best, most efficient and innovative solution for the realization of your projects. On the following pages, you will find our connecting systems for modern timber construction. Every connector allows a high level of prefabrication and possesses the CE Marking in accordance with European certification of standards. Regular external inspections guarantee maximum security for planners, architects, manufacturers and owners.

## Our Service

The KNAPP®-Team provides competent advice and excellent service for your projects.

■ We offer a full coverage service by representatives in Germany and Austria. You will find the right contact person easily and quickly.

 [www.knapp-connectors.com](http://www.knapp-connectors.com)

■ You can reach our internal consultants in Germany and Austria, Monday – Tuesday 8 a.m. to 4.30 p.m. and on Friday 8 a.m. to 12 a.m.

■ You can reach our global sales manager on phone +43 (0)664 / 88 51 52 87 or E-Mail : [info@knapp-connectors.com](mailto:info@knapp-connectors.com)

 [www.knapp-connectors.com/contacts](http://www.knapp-connectors.com/contacts)

## Our Planner Service



■ We offer comprehensive planning and structural-engineering calculations for architects, planners and structural engineers. We also offer statics pre-dimensioning and help you find the right connector from KNAPP®. Take advantage of our engineers' consulting, our "know-how", and many years of experience. You can also use the pre-measurement tool from our website.

 [www.knapp-connectors.com/planner](http://www.knapp-connectors.com/planner)

■ Our online store is available 24/7. Here you will find comprehensive information about our products and services. After one time registration, you will be able to use the download area.

 [www.knapp-connectors.com/downloads](http://www.knapp-connectors.com/downloads)



▶▶▶ Planner service

## KNAPP® online-store | Order around the clock



You want to be flexible and order at any time? No problem! In our online-store you can easily find the most fitting connecting system for any purpose and send your order by one mouse click.

After a quick registration, you can immediately start buying online.

 [www.knapp-connectors.com](http://www.knapp-connectors.com)



24/7  
▶▶▶ online-store

## KNAPP® offers the right connection for the areas of:

■ Timber Frame Construction ■ Post-beam wood-glass-facade ■ Prefab walls ■ Mass Timber Construction ■ Door- and window construction  
■ Furniture and interior design ■ Glued glass elements for timber and metal construction

 More information  
[www.knapp-connectors.com/downloads](http://www.knapp-connectors.com/downloads)





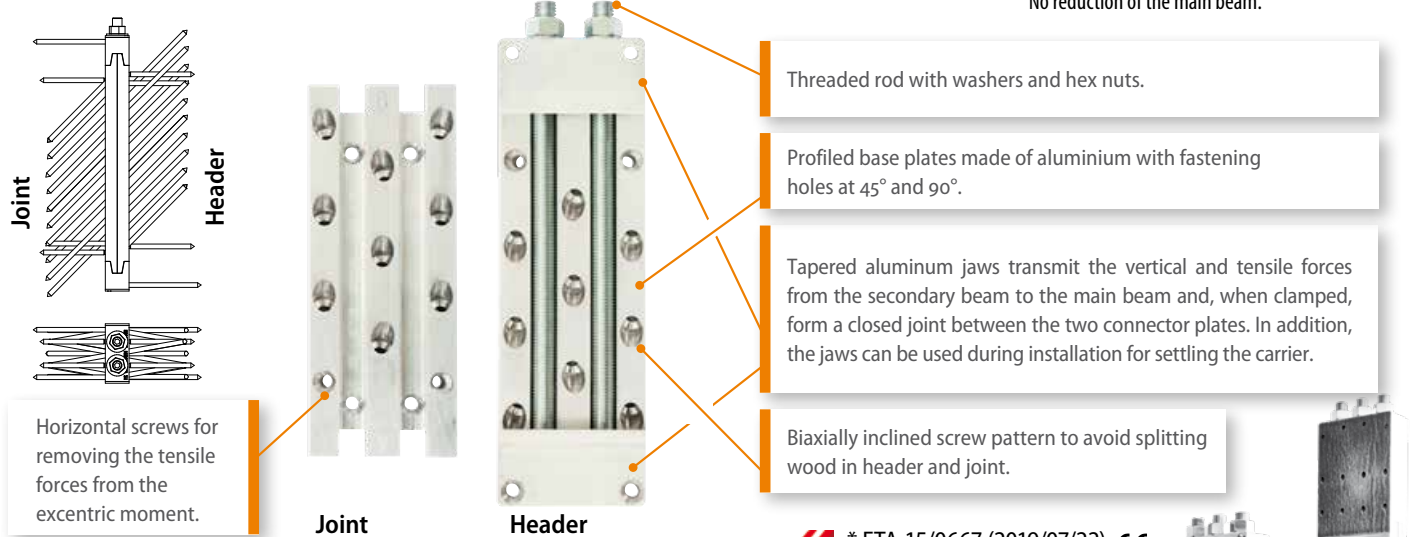
## MEGANT® | The heavy-duty connector for timber construction engineering up to 768 kN

### System advantages:

- Load range – standard sizes up to 443 kN, customized solutions up to 768 kN
- Minimum timber width from 100 mm
- Connection options – on wood, steel or concrete
- Unique – mounting possible from all directions without tilting
- Loadable in all directions
- Fire protection – three sided concealed jointless installation
- Short crane times by a high degree of prefabrication – only 2 cm hooking way
- Demountable – installed to connect and rebuild

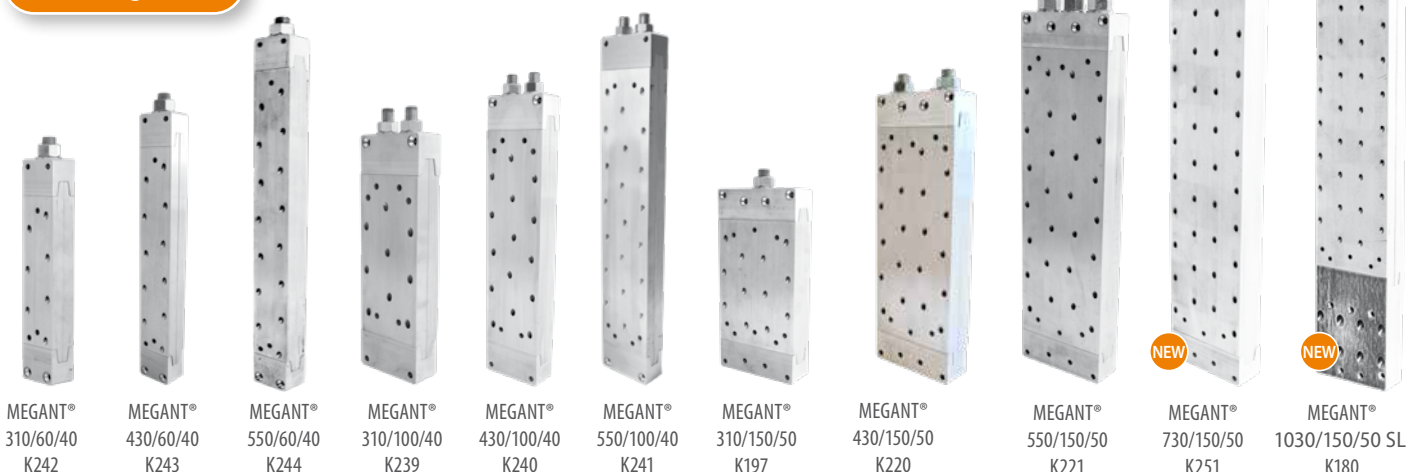


Installation example with MEGANT®:  
No reduction of the main beam.



\* ETA-15/0667 (2019/07/22) CE

No tilting when mounting!





## RICON®

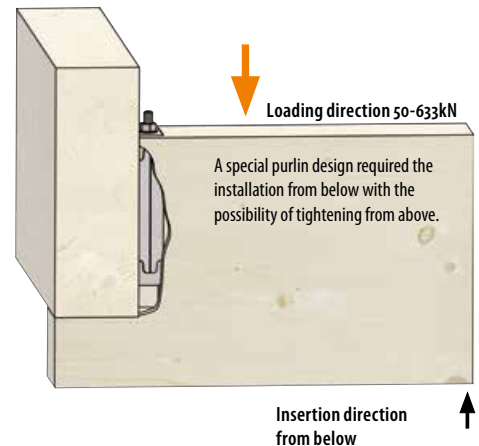
## Application examples and connection details



With only 2 cm hooking way, a mounting in cutouts of concrete walls can be done.

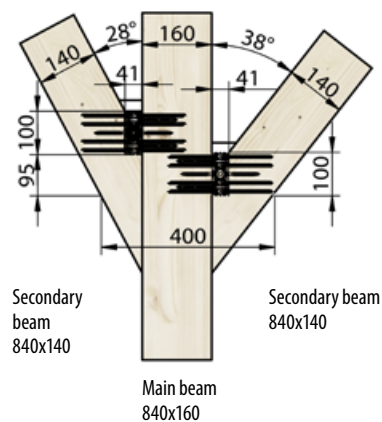


Installation concealed on three sides by milling the secondary beam. MEGANT® is mounted on the main beam without milling.

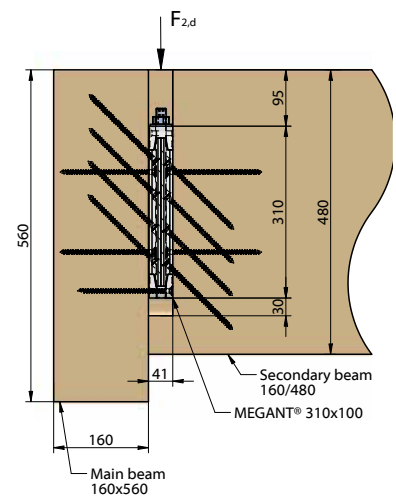


MEGANT® oblique connection.

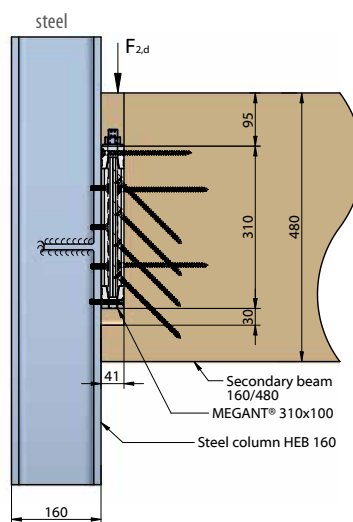
Double-sided MEGANT® oblique connection



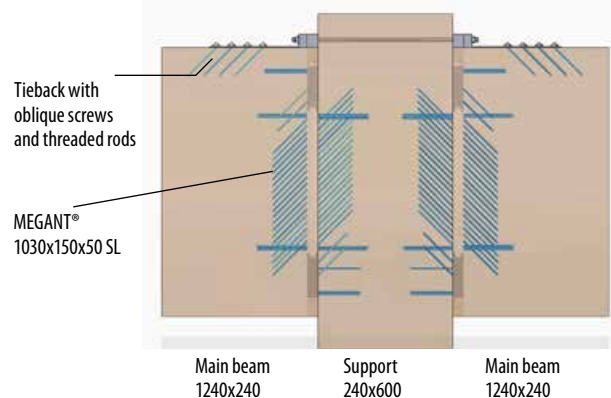
MEGANT® on wood



MEGANT® steel connection.



Double-sided main support Post connection with MEGANT®



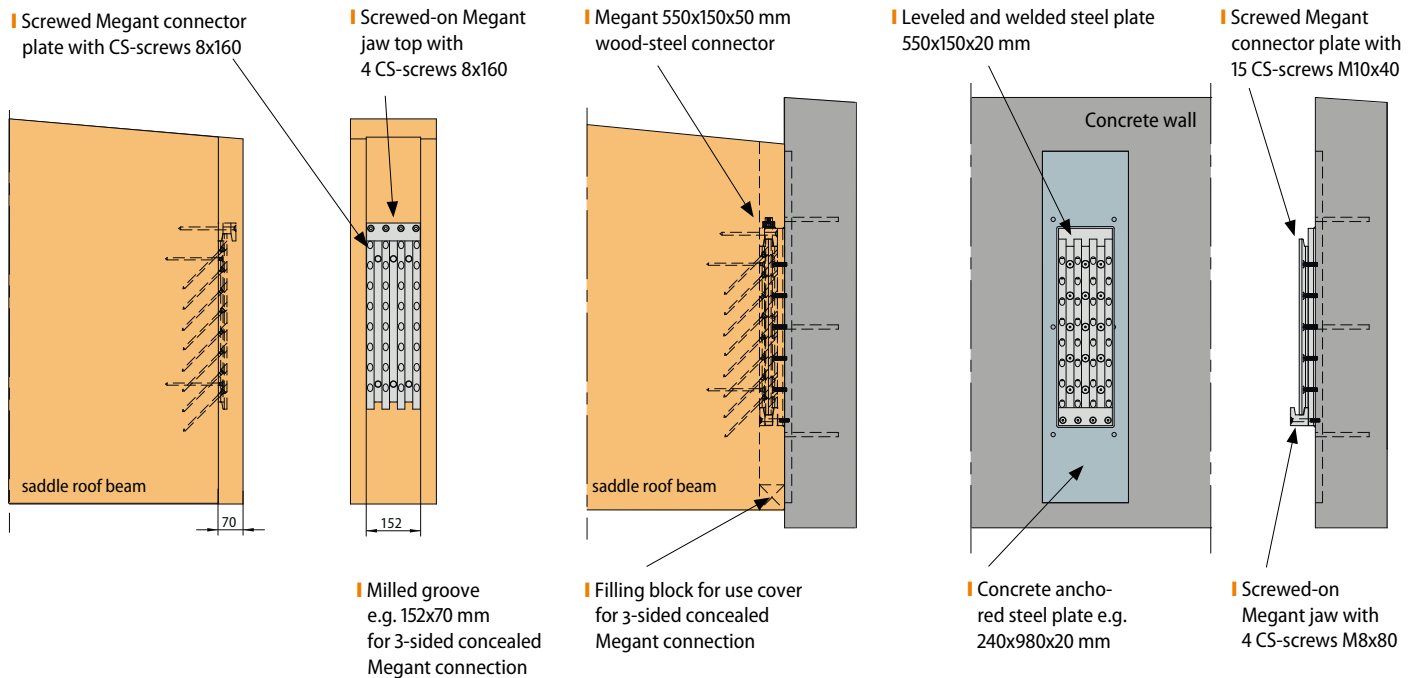
Connection finished: The secondary beams are placed in the clamping jaws.

MEGANT®

ETA-15/0667 (2019/07/22) CE

Wood-steel with concrete connection

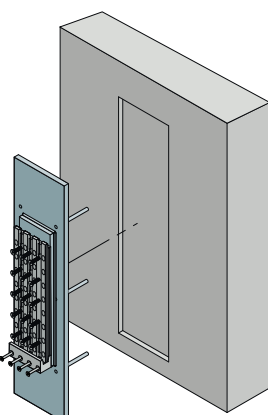
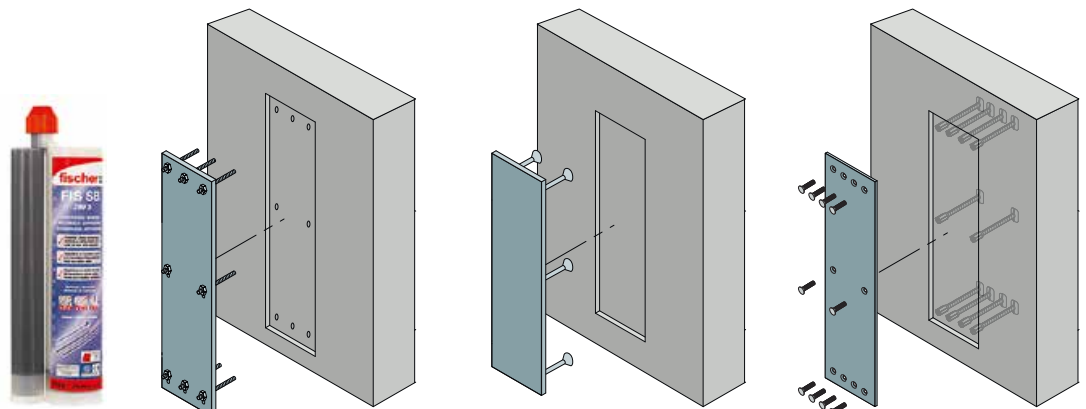
Example of a saddle roof beam/concrete connection with MEGANT®



Examples of anchor plate concrete connection



MEGANT® concrete connection.



Adhesive:  
Fischer Superbond system  
FIS SB 390 S

Concrete connection with glued-in threaded rods for leveling the steel plate from Fischer - optionally recessed in-depth. Glued with Fischer Superbond system: FIS SB 390 S  
[www.fischer.at](http://www.fischer.at)

SBKL anchor plate from Peikko (DE) Steel plate flush mounted.  
[www.peikko.de](http://www.peikko.de)

Halfen HSC-B steel construction plate. Flush mounted with CS-screws.  
[www.halfen.com](http://www.halfen.com)

Mounting of the anchor steel plate can e.g. be done with HALFEN HSC-B steel construction plate according to certification Z-1.8-1974, or with FISCHER Superbond FIS SB 390 S glued-in threaded rods. The necessary structural documentation for this concrete connection is to be carried out by the structural engineer on site. With a flush-mounted steel plate in the concrete component, the MEGANT® connector can simply be screwed onto the steel plate and therefore, difficult and time-consuming welding on site can be avoided.

## MEGANT®

### Assembly procedure



**13:16** | After aligning the secondary beam, MEGANT® is hooked.



**13:21** | For threading and dropping, MEGANT® requires only 2 cm.



**13:23** | Insert the threaded rods and drill them into the caps.



**13:24** | Tighten the nuts.



**13:25** | Connection finished.

## MEGANT®

### Fire protection

- | Is an invisible connection required or particular requirements for fire protection, the system can be easily processed on 3 sides covered.
- | Jointless connection - no additional covers or fire protection ribbons required.
- | According to EN 1995-1-2 28 mm wood covering are required for 30 minutes fire resistance. Even a higher fire resistance (i.e. R60) is possible.
- | Fire protection coverings for R60 / R90, the connector is sheathed with Firestrip Interdense type 15 in addition to the wooden cover.
- | Firestrip Interdense Type 15 has been validated by ETA -16 / 0811
- | The Firestrip encases the MEGANT® connector from all six sides, and foams up to 150 ° C.  
From 300 ° C the jacket offers the full foaming performance.



Results of fire resistance after one hour.



MEGANT® with fire protection Firestrip Interdense Type 15 to protect the connector from heat in case of fire.

### Planner service

You have a project and want to use KNAPP® connectors? Benefit from our calculation service. As part of the project, our engineers create a preliminary dimensioning\* with the recommendation for the appropriate connectors. Send us the connection details and loads of your construction project.

\*Our service does not replace acceptance by a certified structural engineer.

## MEGANT® screws

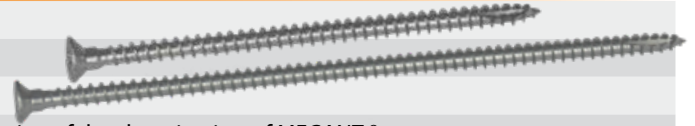
CS-screws with cut point (MEGANT® is supplied with the appropriate CS-screws)

Art.-No. Z670 CS-screw 8x120

Art.-No. Z581 CS-screw 8x160

Art.-No. Z530 CS-screw 8x240

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



## MEGANT®

Overview, static values

### MEGANT® 60 - Static values with screws 8x160 in timber quality GL24h

Connector	Min. secondary beam height [mm]	Characteristic values [kN]			
		max $F_{1,Rk}$	max $F_{2,Rk}$	max $F_{3,Rk}$	max $F_{45,Rk}$
310x60x40	100x440	20,4	96,8	29,1	33,6
430x60x40	100x520		152,0	38,7	40,6
550x60x40	100x640		177,7	48,3	44,3

### MEGANT® 100 - Static values with screws 8x160 in timber quality GL24h

Connector	Min. secondary beam height [mm]	Characteristic values [kN]			
		max $F_{1,Rk}$	max $F_{2,Rk}$	max $F_{3,Rk}$	max $F_{45,Rk}$
310x100x40	140x440	31,7	124,0	46,2	43,2
430x100x40	140x520		207,0	60,6	68,6
550x100x40	140x640		235,2	75,0	74,9

### MEGANT® 150 - Static values with screws 8x160 in timber quality GL24h

Connector	Min. secondary beam height [mm]	Characteristic values [kN]			
		max F <sub>1,Rk</sub>	max F <sub>2,Rk</sub>	max F <sub>3,Rk</sub>	max F <sub>45,Rk</sub>
310x150x50	190x410	43,0	156,0	61,6	57,6
430x150x50	190x520		260,0	80,8	74,8
550x150x50	190x640		364,0	100,0	81,6
730x150x50	190x830		443,2	100,0	81,6
Custom solutions of MEGANT® Special sizes on request (Examples on the list)					
850x150x50	190x950	43,0	443,2	100,0	81,6
1030x150x50 SL	190x1130		604,0	100,0	81,6
1030x150x50 SL*	190x1130		768,0*	100,0	81,6
1090x150x50	190x1190		443,2	100,0	81,6

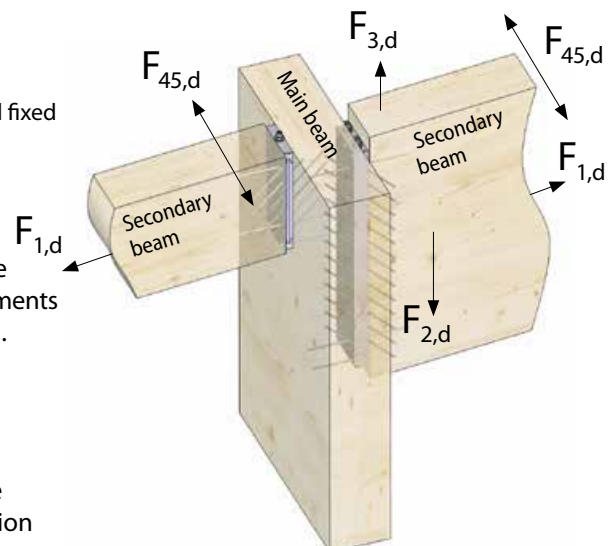
\* The MEGANT® is completely screwed into GL24h with 8x240!

- $F_{1,Rk}$  Characteristic values for traction
- $F_{2,Rk}$  Characteristic values in direction of insertion (table values for torsional fixed header)
- $F_{3,Rk}$  Characteristic values against the direction of insertion
- $F_{45,Rk}$  Characteristic values perpendicular to the direction of insertion

A proof of a combination of the different load bearing directions of force has to be done according to ETA-15/0667. Furthermore, the clamping moments  $M_{2,Rd}$  as a result of the torsional spring stiffness  $K_{2,\varphi}$  has to be considered. You can find the Formula derivations in the ETA certification.

### Planner 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.



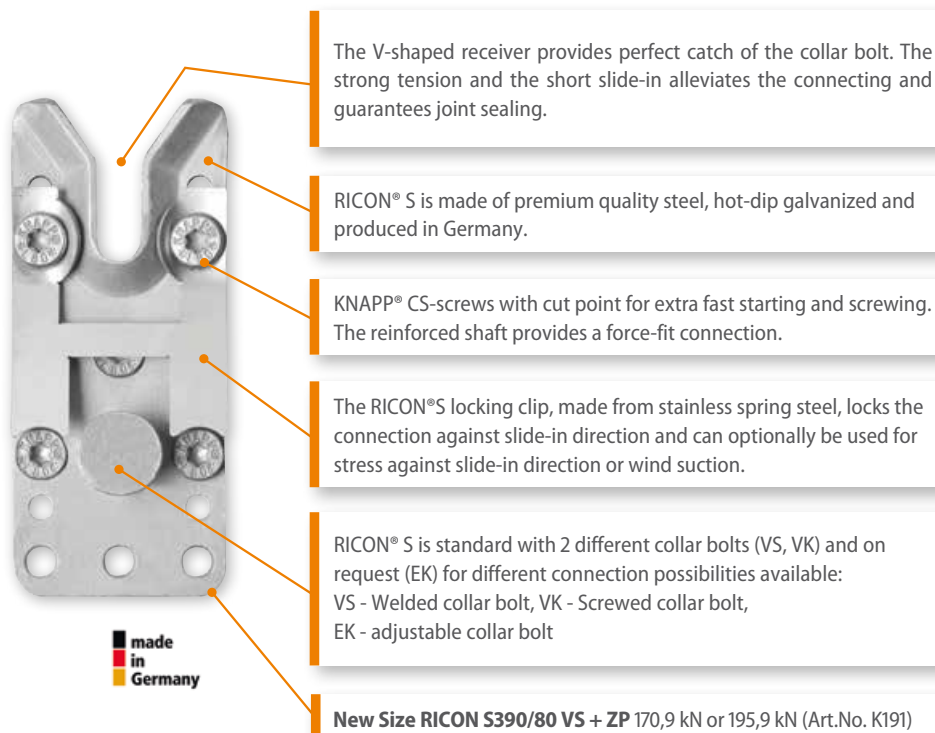




## RICON® S | The connector for main and secondary beam up to 230 kN\*

### System advantages:

- | Connector for timber frame, wood frame buildings and halls
- | Timber width from 100 mm upwards
- | Universally applicable to timber, steel or concrete
- | Simple screwing without predrilling
- | Easy hooking by large V-shaping – only 3,5 cm hooking way
- | Three and four-sided concealed connection
- | High fire resistance through three- and four-sided concealed mounting (R30 ≥ 28 mm, R60 ≥ 49 mm)
- | Adjustable collar bolt up to 5mm length tolerance at full load capacity
- | ETA additionally with hardwood material and BauBuche (Beech LVL)



### More information:

[www.knapp-connectors.com/products/ricon-s](http://www.knapp-connectors.com/products/ricon-s)

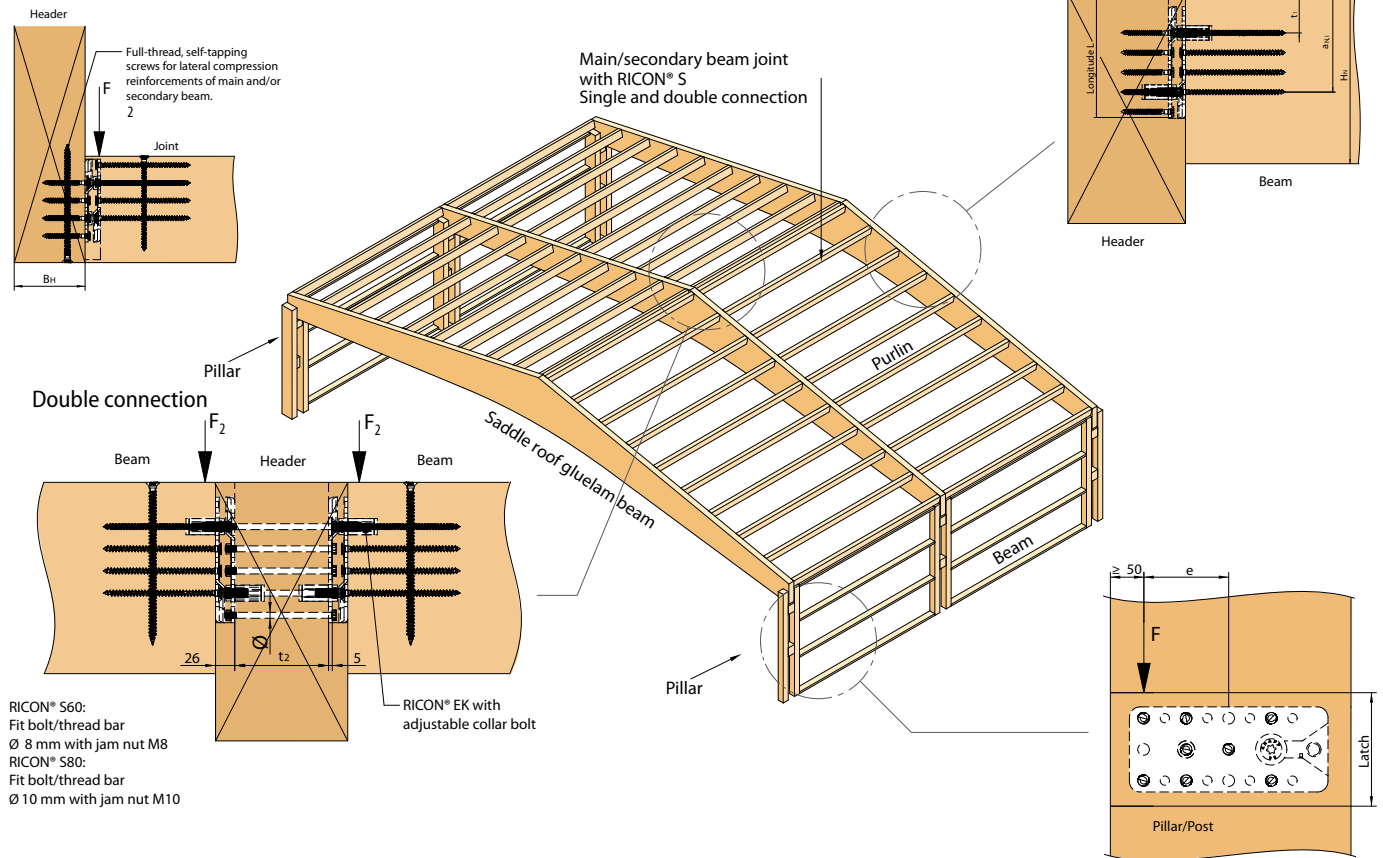
\*Charact. load carrying capacity  $F_{2,Rk}$  in insertion direction applies only to the use of original KNAPP® CS-screws according to ETA 10/0189 (2019/10/11).



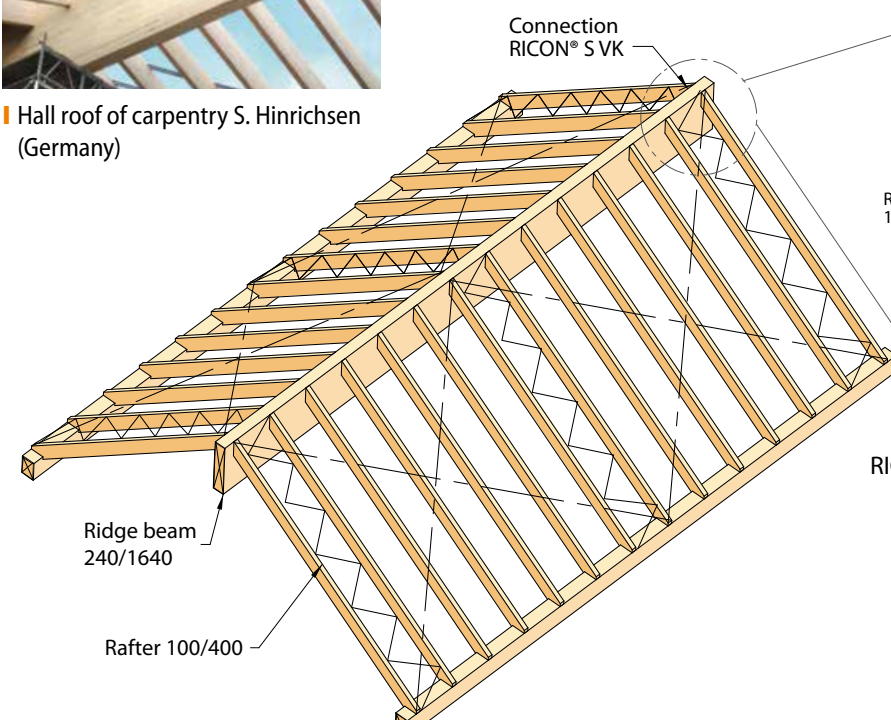
# RICON® S

## Application examples and connection details

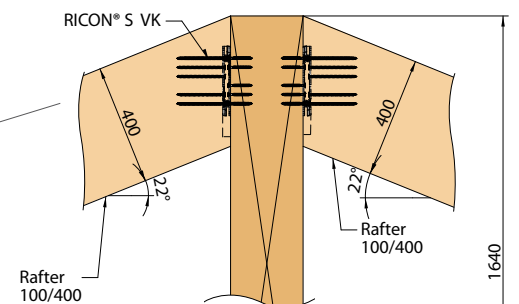
### Ridged roof with purlins and latch connections



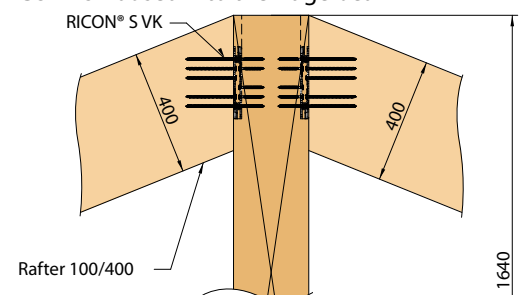
Hall roof of carpentry S. Hinrichsen (Germany)



### RICON® S housed into a rafter



### RICON® S housed into the ridge beam

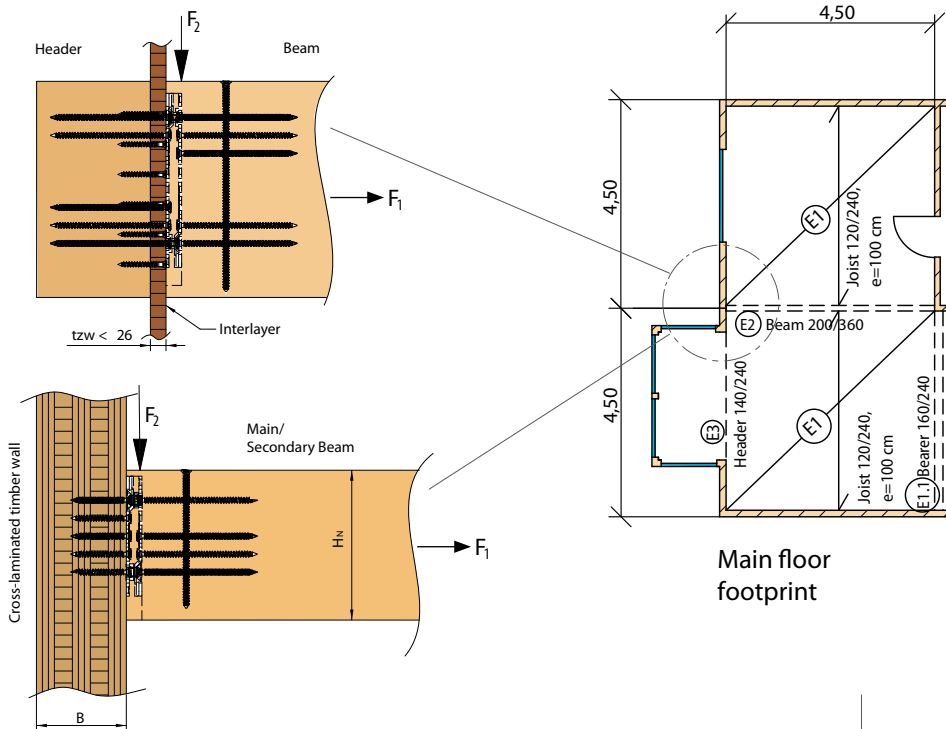


(All dimensions in mm)

## RICON® S

## Application prefabricated houses

Connecting header with timber frame construction or cross-laminated timber wall

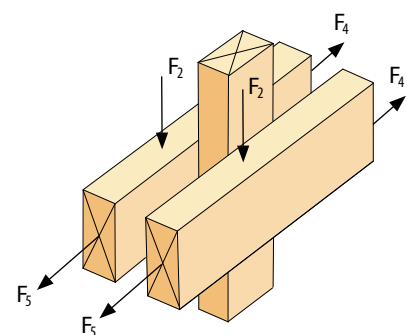
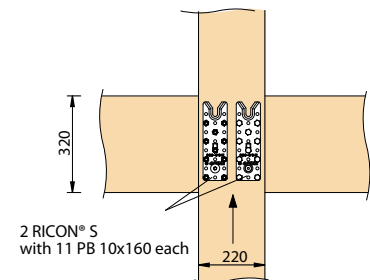
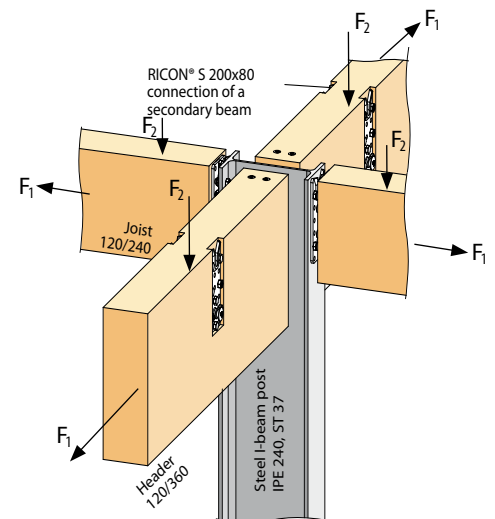
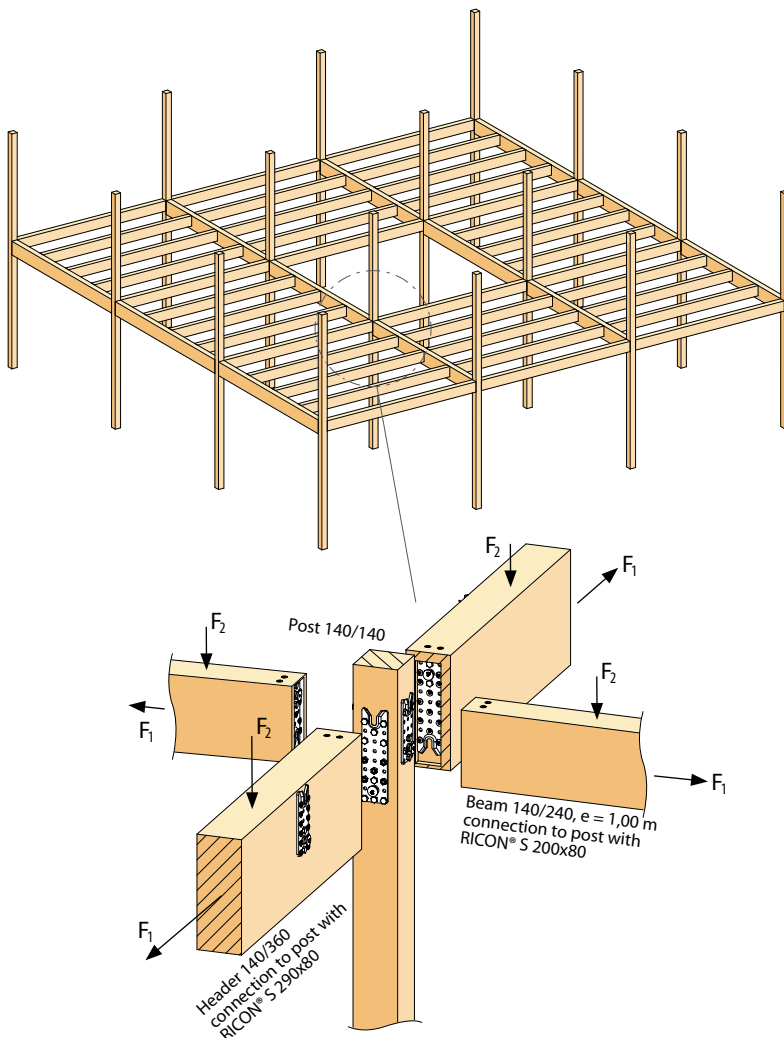


## Steel connection



First node for dome

## Ceiling of a timber frame construction



## Alternative ways to connect

## RICON® S60

Characteristic values for dimensioning can be taken from our Website.

### RICON® S 140/60 - Collar bolts and screwing

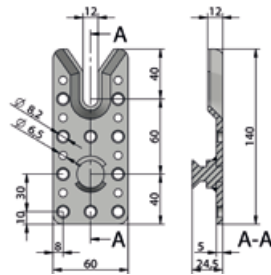
Art.-No. VS: K126 / EK: K146

Header

Joint



Minimum screwing: n = 10



Connector	Collar bolt	Screwing		Charact. values [GL24h]F <sub>2,Rk</sub> [kN]
		Joint	Header	
140/60	VS	10 x CS 8x160	10 x CS 8x80	37,1

Available on request:

140/60	EK M12	10 x CS 8x160	10 x CS 8x80	37,1
Clip lock: F <sub>3,Rk</sub> = 18,0 kN				

Minimum timber cross section: 100 x 160 mm

**Alternatively longer screws in the end grain possible:**

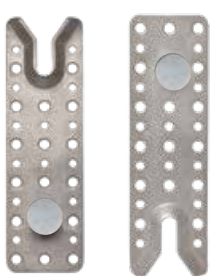
RICON® CS-screws 8x240 mm (F<sub>2,Rk</sub> 40,2 kN\*)

### RICON® S 200/60 - Collar bolts and screwing

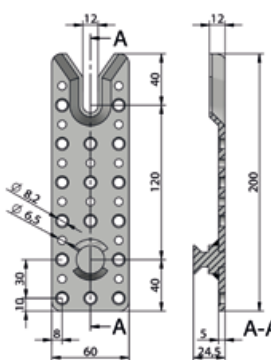
Art.-No. VS: K127 / EK: K148

Header

Joint



Minimum screwing: n = 16



Connector	Collar bolt	Screwing		Charact. values [GL24h]F <sub>2,Rk</sub> [kN]
		Joint	Header	
200/60	VS	16 x CS 8x160	16 x CS 8x80	56,7

Available on request:

200/60	EK M12	16 x CS 8x160	16 x CS 8x80	44,2
Clip lock: F <sub>3,Rk</sub> = 18,0 kN				

Minimum timber cross section: 100 x 220 mm

**Alternatively longer screws in the end grain possible:**

RICON® CS-screws 8x240 mm (F<sub>2,Rk</sub> 66,5 kN\*)

## RICON® S80

### RICON® S 200/80 - Collar bolts and screwing

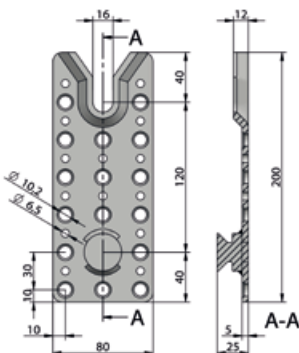
Art.-No. VS: K128 / EK: K153

Header

Joint



Minimum screwing: n = 16



Connector	Collar bolt	Screwing		Charact. values [GL24h] F <sub>2,Rk</sub> [kN]
		Joint	Header	
200/80	VS	16 x CS 10x200	16 x CS 10x100	79,1

Available on request:

200/80	EK M16	16 x CS 10x200	16 x CS 10x100	65,0
Clip lock: F <sub>3,Rk</sub> = 18,0 kN				

Minimum timber cross section: 120 x 230 mm

**Alternatively longer screws in the end grain possible:**

RICON® CS-screws 10x300mm (F<sub>2,Rk</sub> 92,4 kN\*)



RICON® S milled on three sides in the secondary beam



Installation of the secondary support with support by means of RICON® S

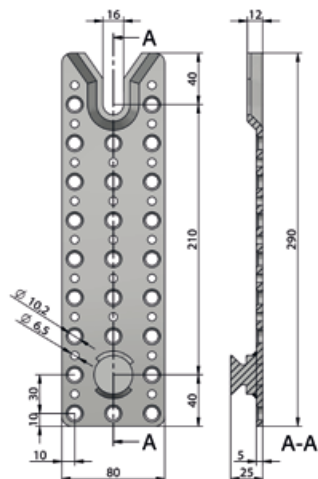


## RICON® S 290/80 - Collar bolts and screwing

Art.-No. VS: K129 / EK: K156

Header

Joint



Connector	Collar bolt	Screwing		Charact. values [GL24h] $F_{2,Rk}$ [kN]
		Joint	Header	
290/80	VS	25 x CS 10x200	25 x CS 10x100	118,2

Available on request:

290/80	EK M16	20 x CS 10x200	20 x CS 10x100	72,2
Clip lock: $F_{3,Rk} = 18,0$ kN				

Minimum timber cross section: 120 x 320 mm

Alternatively longer screws in the end grain possible:  
RICON® CS-screws 10x300 mm ( $F_{2,Rk}$  128,7 kN\*)

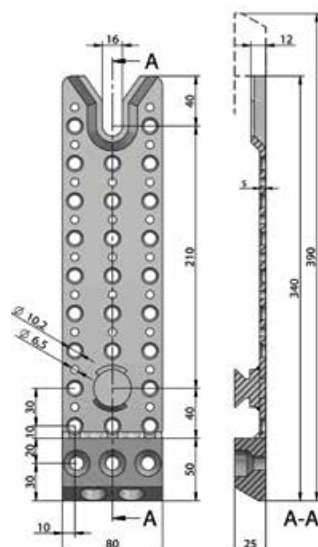
Minimum screwing: n = 25

## RICON® S390/80 - Collar bolts and screwing

Art.-No. VS: K191

Header

Joint



Connector	Collar bolt	Screwing		Charact. values [GL24h] $F_{2,Rk}$ [kN]
		Joint	Header	
390/80	VS ZP	28 x CS 10x200	28 x CS 10x100	170,9
		2 x CS 10x450	2 x CS 10x400	

Available on request:

Clip lock:  $F_{3,Rk} = 18,0$  kN

Minimum timber cross section: 120 x 420 mm  
160 x 520 mm

Alternatively longer screws in the end grain possible:  
RICON® CS-screws 10x300 mm ( $F_{2,Rk}$  195,9 kN\*)

Minimum screwing: n = 28



RICON® S and MEGANT® connectors are used in the project of Aide et Soins à Domicile, Belgium von Holzbau: [www.petermueller.be](http://www.petermueller.be),  
Architect: [www.atelierlanotte.be](http://www.atelierlanotte.be). Details: [www.knapp-verbinder.com/produkte/ingenieurholzbau/](http://www.knapp-verbinder.com/produkte/ingenieurholzbau/)

## RICON® S screws

### CS-screws RICON® S60 with cut point (RICON® S will supplied with the appropriate CS-screws)

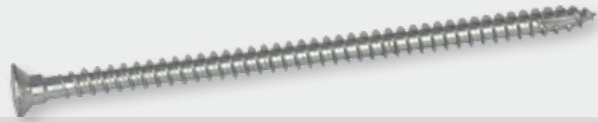
Art.-No. Z580	CS-screw 8x80 with patented half-peak
Art.-No. Z581	CS-screw 8x160 with patented half-peak
Art.-No. Z530	CS-screw 8x240 with patented half-peak



**Application:** To screw in longitude (8x80) or end grain (8x160). Zum Verschrauben des RICON® S im Haupt- (Pfosten) bzw. Nebenträger (Riegel).

### CS-screws RICON® S80 with cut point (RICON® S will supplied with the appropriate CS-screws)

Art.-No. Z582	CS-screw 10x100 with patented half-peak
Art.-No. Z583	CS-screw 10x200 with patented half-peak
Art.-No. Z651	CS-screw 10x300 with patented half-peak



**Application:** For screwing RICON® S into main (post) or secondary beam (latch).

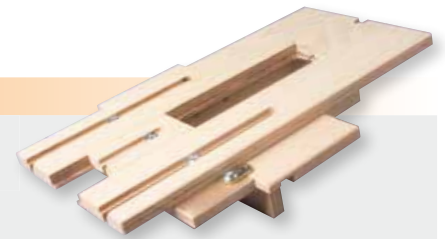
## RICON® S Accessories

### Routing-jig RICON® S60/S80

Art.-No. K510	Routing-jig MULTI F60 (plywood) for all RICON® S60 sizes
Art.-No. K511	Routing-jig MULTI F80 (plywood) for all RICON® S60 sizes

**Advice:** The routing-jig MULTI F is suitable for a  $\varnothing = 30$  mm guide bush (for plunge router) and a  $\varnothing = 15$  mm TCT router cutter.

**Application:** For milling in concealed mounting.



### TCT-router cutter

Art.-No. Z068	TCT router cutter $\varnothing = 15$ , Length = 40 mm and $\varnothing = 12$ mm shaft
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**Application:** To recess the rebate for RICON® S.



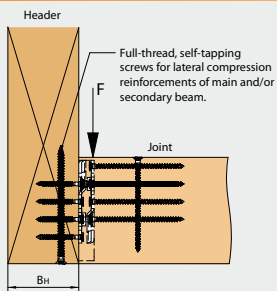
### Pan head screws RICON® S80

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



**Application:** For screwing the interlayer on slanted screw connections.

### Full threaded CS-screws with cut-point



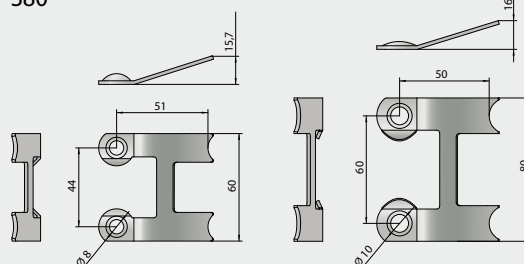
Diameter (d1)	Length (mm)															
$\varnothing = 8$ mm	160	180	200	220	240	260	280	300	350	400	450	500	550	600		
$\varnothing = 10$ mm	160	180	200	220	240	260	280	300	350	400	450	500	550	600		

Sizes available on request.

**Application:** Full threaded countersunk screws for lateral compression reinforcements of header and/or joint.

### Clip lock RICON® S (made of stainless spring steel)

Art.-No. K157	Clip lock RICON® S60
Art.-No. K158	Clip lock RICON® S80



**Application:** The clip lock locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

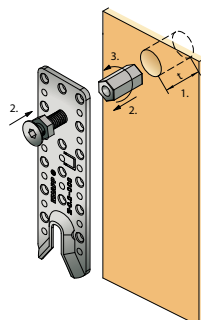
## RICON® S collar bolt

### Retaining screw collar bolt (EK) - Available upon request

Art.-No. Z558 S60: EK M12  
Art.-No. Z559 S80: EK M16

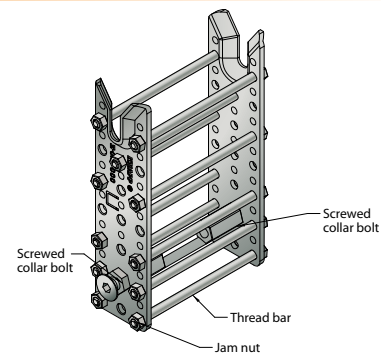
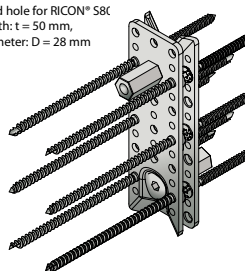


1. Bore blind hole
2. Fasten socket head screw with coupling nut and jam nut to the connector
3. Adjust height and tighten up
4. Plug connectors in blind hole and fasten with RICON® S CS-screws



Blind hole for RICON® S60  
Depth:  $t = 40$  mm,  
Diameter:  $D = 22$  mm

Blind hole for RICON® S80  
Depth:  $t = 50$  mm,  
Diameter:  $D = 28$  mm



#### Application:

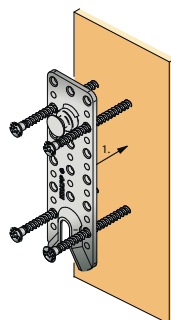
Retaining screw collar bolt for connections to concrete and/or wood components for timber engineering. Coupling nuts are used to connect pieces of threaded rod, anchor bolt or connecting bolts.

### Welded collar bolt (VS) - Standard

RICON® S60 : VS M12  
RICON® S80 : VS M16

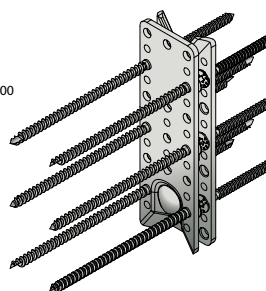


1. Install RICON® S plate with the provided screws



Necessary screws :  
RICON® S60:  
Header: 8x80  
Joint: 8x160

RICON® S80:  
Header: 10x100  
Joint: 10x200



#### Application:

For maximum load recovery or for fixing on steel or concrete. The number of screws used for fixing may vary depending on the load to be recovered.

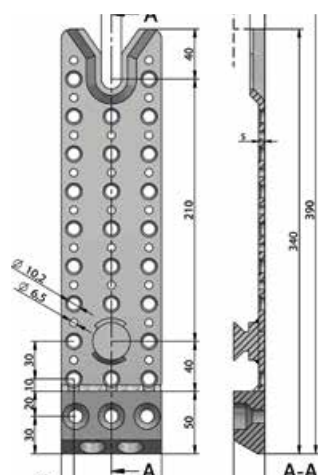
NEW

### Welded collar bolt with additional reinforcing plate (VS+ZP) - Standard

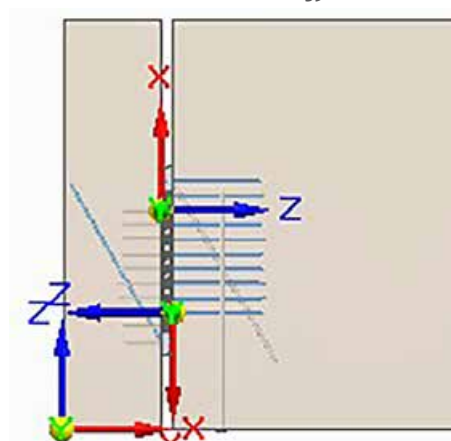
Art.-No. K191 RICON® S 390x80 VS+ZP



RICON®  
S80 VS  
390x80x25



RICON® S 390x80 VS+ZP



Header 200x840

Joint 160x840

#### Application:

For maximum load transfer of wood, steel and concrete connections. The load to be removed depends on the number of screws and screw length.



## RICON® S

### Installation

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



CNC joinery machine



Routing dimensions for RICON® S60 / S80

Width	Length	Depth (VK, VS, EK)
60 mm / 80 mm	var.	25 mm

- 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).

### Installation RICON® S VS



2) Position the screws



3) Screw on



4) Screw on counter part

For construction manuals and .DXF drawings for RICON® S-System, please visit:  
[www.knapp-connectors.com/downloads](http://www.knapp-connectors.com/downloads)

Recommended software partners for machine processing:

cadwork

Dietrich's

Maximilian  
HOLZBAU  
PROGRAMME

SEMA  
SOFTWARE

hsbcad  
CAD/CAM für den Holzbau

WETO AG  
technologies

## RICON® S

### Fire resistance

- Is an invisible connection required or particular requirements for fire protection, the system can be easily processed on three or four-sides covered.
- Jointless connection – no additional covers or fire protection ribbons required.
- According to EN 1995-1-2 28 mm wood covering are required for 30 minutes fire resistance. Even a higher fire resistance (i.e. R60) is possible.
- Fire safety tests are available and can be requested.
- Fire protection Firestrip Interdens type 15 to protect the connector in case of fire resistance of R90 available on request.



RICON® S connector after 90 minutes fire test. The wood is charred all around. The connector withstood the applied vertical load in the fire test.



## Contact

+43 (0)7474 / 799 10  
 +49 (0)8106 / 99 55 99 0  
 info@knapp-connectors.com  
 +1 877-888-7773  
 info@KNAPPconnectors.com  
 knapp-connectors.com/contact



## Service

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[knapp-connectors.com/products](http://knapp-connectors.com/products)  
 \* not available in Switzerland.



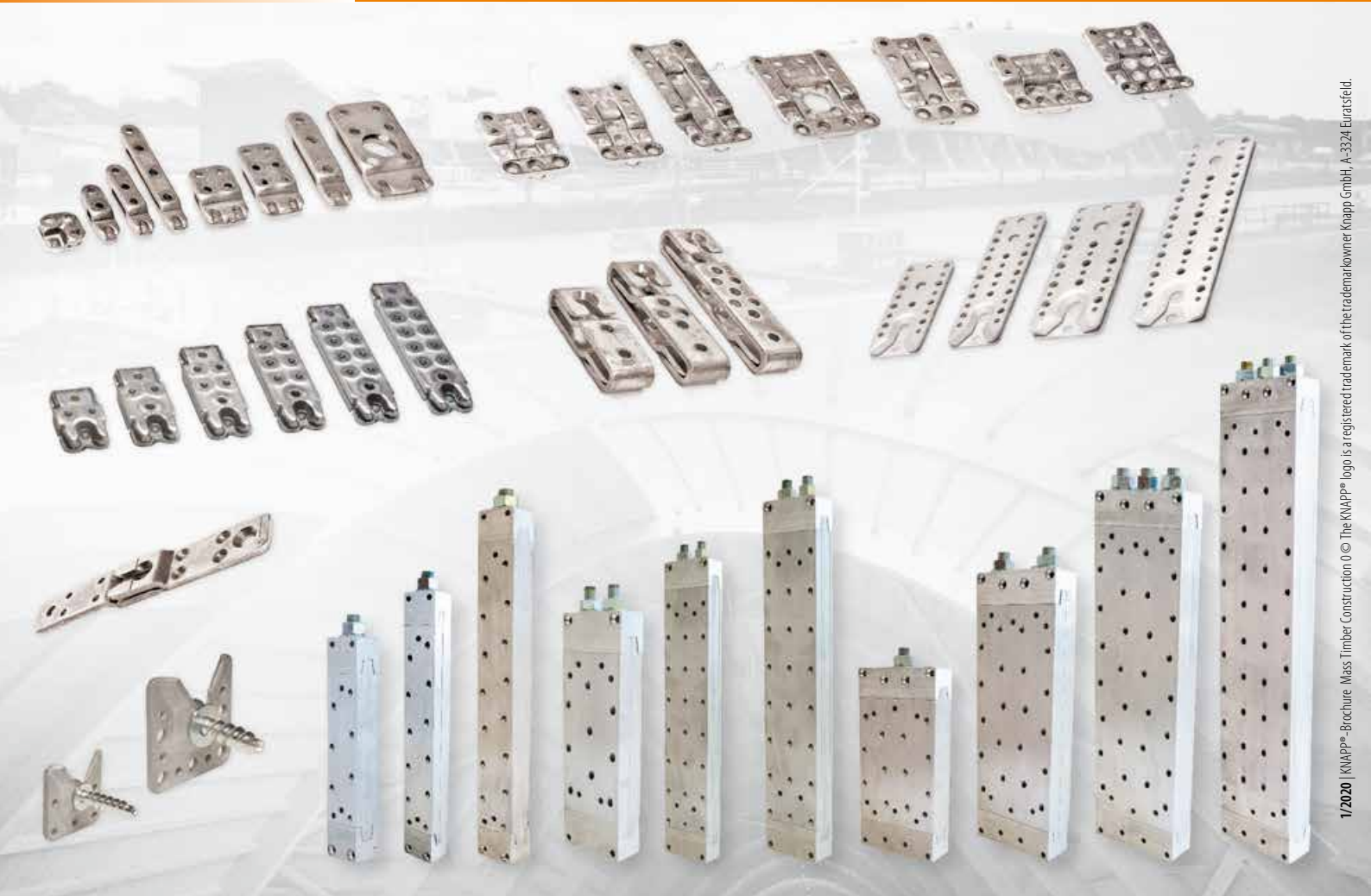
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[knapp-connectors.com/downloads](http://knapp-connectors.com/downloads)



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

Knapp GmbH | Vertrieb Deutschland | Föhrenweg 1 | D-85591 Vaterstetten  
 Tel.: +49 (0)8106 / 99 55 99 0 | Fax: +49 (0)8106 / 99 55 99 20 | E-Mail: [info@knapp-connectors.com](mailto:info@knapp-connectors.com)

[www.knapp-connectors.com](http://www.knapp-connectors.com)



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