Connecting systems

for timber construction, wood curtain and prefabricated walls

Connecting Your Ideas …

KNAPP®

connectors.com

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

RICON® S
patented by
KNAPP®

RICON® S, patented by KNAPP®
Adjustable collar bolt version for tolerance compensation up to 5 mm.

Universal timber construction connector with adjustable collar bolt

Designed and developed for timber construction

Anneliese (†), and Friedrich Knapp
KNAPP® GmbH Founders & CEO

Innovative products for the international timber construction market

For 35 years, our family business and its teams have been committed to our customers, providing high-quality connecting systems from the market for the market. Therefore, we are constantly expanding our expertise in consulting services, logistics and planning service.

KNAPP' vision is to accompany you in your projects and it is our aim to be your trustworthy partner.

As a company, we seek to bring your know-how, your wishes and your ideas to the forefront on a national and international level. We are therefore constantly improving our service and the technical product development.

We pursue innovation and put our connecting systems to rigorous tests under the stringent requirements of leading European institutes in order to ensure the stability and security of our fasteners.

It all started with a whole range of connectors for furniture and windows construction. Soon followed by connectors for lighter constructions, from wood curtain walls up to connector systems for house construction and heavy-duty projects in mass timber.

Whether you are a planner, an architect, a manufacturer or a structural engineer, we know the demanding criteria placed on modern fasteners. Our employees on the other hand, are expert advisors in Europe, America and in in many countries around the world.

In this new brochure, we have gathered all of our connecting systems for timber constructions, glass curtain walls, main and secondary beam connections, houses, and mass timber construction.

This new brochure informs you about all proven and new timber connecting systems, from RICON®, GIGANT, WALCO®, RICON® S and MEGANT® to the the new connectors T-JOINT and MATEO, WALCO® PIPE and WALCO® BOLT .

We focus on developing and providing innovative solutions to further meet the demands of contemporary architecture. We then, hope you will be inspired to find new ideas for the realisation of your projects.

Finally, we would like to extend our thanks to our customers for having realized their projects with Knapp connectors and providing us with beautiful references for this brochure and our website.

Together with my family and our team, I wish you plenty of creative ideas with the Knapp connecting systems!

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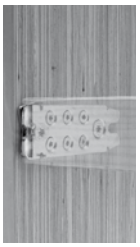


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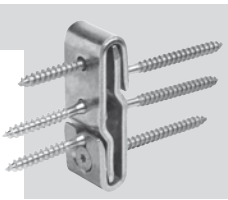


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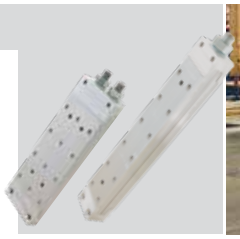


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Guiding symbols: you will find the following symbols for orientation with each type of connector.

- H — Wood to wood connection
- S — Wood to steel connection
- B — Wood to concrete connection
- Visible
- Concealed
- Allow prefabrication in workshop
- x time Fire-resistance rating
- Assembly from below
- Assembly from above
- Assembly every side-by-side
- Assembly 3 or 4 sided
- Certifications

Wood connectors overview

Applications for timber connecting systems

The chart provides a quick overview of the versatility and scope of application of the connectors developped by KNAPP®.

SCOPE OF APPLICATION AND TYPES OF WOOD	Connectors										
	p. 7	p. 15	p. 37	p. 79	p. 89	p. 107	p. 119	p. 131	p. 137	p. 143	p. 147
	RICON® stainless steel	RICON®	RICON® S	GIGANT	MEGANT®	WALCO® V	WALCO®	WALCO® Z	WALCO® L and T	MATEO	T-JOINT
											
Balcony	●	●	●	●							●
Carport	●	●	●	●						●	●
Curtain wall, wall mounting		●				●	●	●	●	●	
Prefabricated house construction	●	●	●			●	●	●	●	●	●
Industrial warehouse construction		●	●	●	●						●
Wood-aluminum curtain walls	●	●		●							
Timber frame construction		●	●	●		●	●		●	●	●
Post and Beam construction		●	●	●	●				●	●	
Mass Timber Construction			●		●				●	●	●
Modular building			●		●	●	●	●		●	●
Playground and sports equipment	●	●		●						●	
Awning, porch, pergola	●	●		●							●
Winter garden, sunroom	●	●		●			●				●
Solid wood (SCWD), softwood (SWD), hardwood (HWD)	●	●	●	●	●	●	●	●	●	●	●
Solid structural timber	●	●	●	●		●	●	●	●	●	●
Glue Laminated Timber Beams (GLT)	●	●	●	●	●	●	●	●	●	●	●
LVL (KERTO®)	●	●	●	●	●	●	●	●	●	●	●
BauBuche		●	●	●	●						●
Duo and Trio beams	●	●	●	●	●	●	●	●			
Cross-laminated Timber (CLT)	●	●	●	●	●	●	●	●	●	●	●
MAGNUMBOARD® OSB						●		●			
Accoya	●	●	●								●

Wood connector

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

- Minimum timber width up from 20 mm
- Multiple disassembly and reassembly possible
- Prefabrication in factory
- Flexible installation from the outside and inside
- Joint can be adjusted to correct possible tolerances
- Secure connection with locking clip
- Available as single and double connection

Available in 15 sizes and 3 versions.

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

* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA 10/0189 (2019/10/11) for glulam GL24h.

RICON® stainless steel

KNAPP®
connectors.com

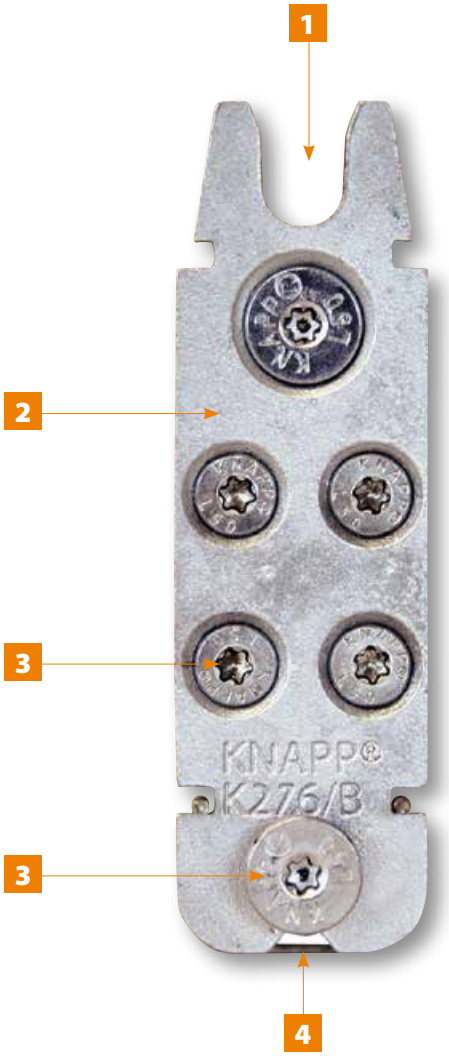
© Goetheturm, Amann

RICON® stainless steel

- 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 3.

© Montafoner Kristbergbahn GmbH, Silbertal (A)

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



1 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.

2 RICON® consists of two identical plates made of A2 stainless steel. Stainless steel screws and locking clip are included.

3 The screws reinforced shaft with integrated stop guarantees exact positioning.

4 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 ≥ 28 mm, R60 ≥ 49 mm)

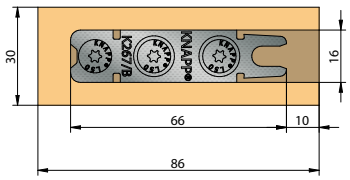
PRODUCT

RICON® stainless steel 66/16

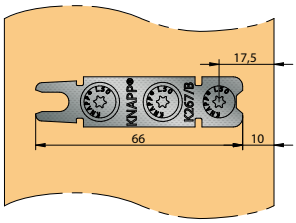
(Dimensions in mm)

Minimum timber cross section

Inserted in the beam and screwed

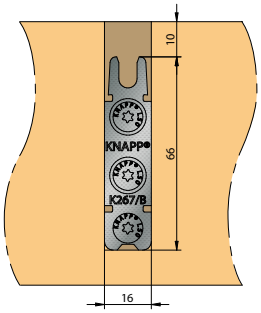


Screwed onto post



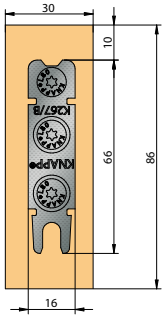
Minimum timber thickness: 50 mm

Inserted in the main beam and screwed



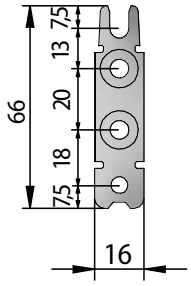
Minimum timber thickness: 60 mm

Screwed into the secondary beam



RICON® 66/16 EA stainless steel - single connection

Art.-No. K267



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
66/16	EA	3 x CS 5x80	3 x CS 5x50	3,5	4,8
1 locking clip: $F_{3,Rk}$ = 1,0 kN			2 locking clips: $F_{3,Rk}$ = 2,0 kN		

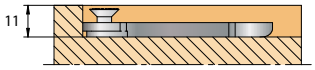
Minimum timber cross section: 30 x 86 mm

* Homogeneous glulam - indoor

Alternative screws: **load varies.

3 CS-screws 5x25 3 CS-screws 5x30

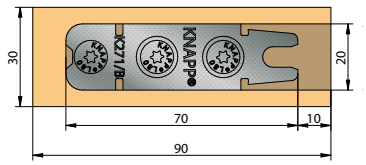
3 CS-screws 5x50 3 CS-screws 5x60



RICON® stainless steel 70/20

Minimum timber cross section

Inserted in the beam and screwed



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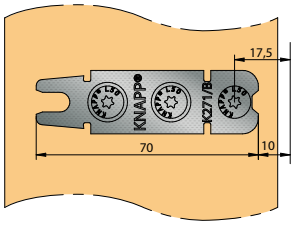
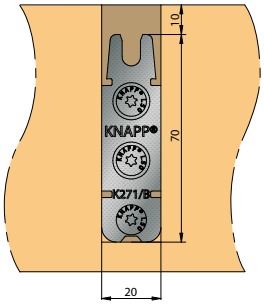


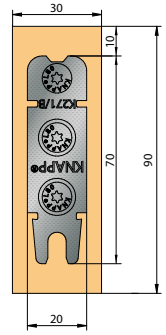
Minimum timber thickness: 50 mm

Inserted in the main beam and screwed



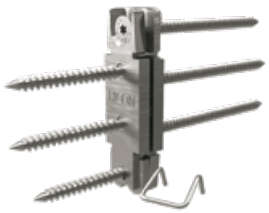
Minimum timber thickness: 60 mm

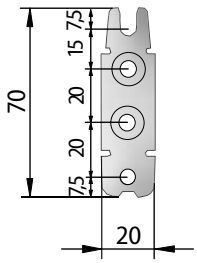
Screwed into the secondary beam



RICON® 70/20 EA stainless steel - single connection

Art.-No. K271





Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
70/20	EA	3 x CS 5x80	3 x CS 5x50	3,5	4,8
1 locking clip: $F_{3,Rk}$ = 1,0 kN			2 locking clips: $F_{3,Rk}$ = 2,0 kN		

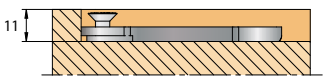
Minimum timber cross section: 30 x 90 mm

* Homogeneous glulam - indoor

Alternative screws: **load varies.

3 CS-screws 5x25 3 CS-screws 5x30

3 CS-screws 5x50 3 CS-screws 5x60

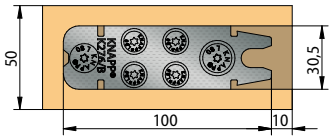


RICON® stainless steel 30

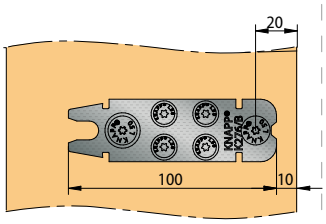
(Dimensions in mm)

Minimum timber cross section

Inserted in the beam and screwed

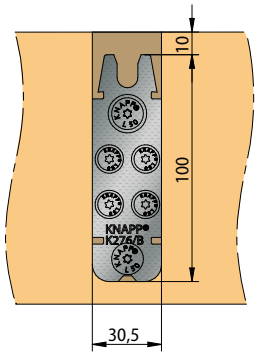


Screwed onto post

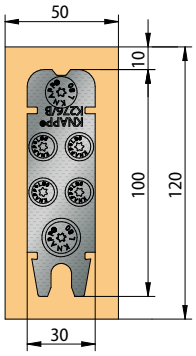


Minimum timber thickness: 50 mm

Inserted in the main beam and screwed



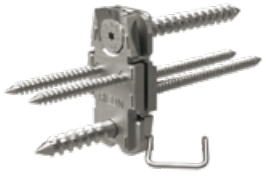
Screwed into the secondary beam

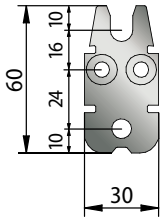


Minimum timber thickness: 60 mm

RICON® 60/30 EA stainless steel - single connection

Art.-No. K274

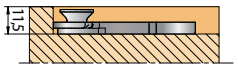




Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
60/30	EA	2 x CS 5x80 1 x CS 8x80	2 x CS 5x50 1 x CS 8x50	4,4	5,2
1 locking clip: $F_{3,Rk}$ = 1,9 kN			2 locking clips: $F_{3,Rk}$ = 3,8 kN		

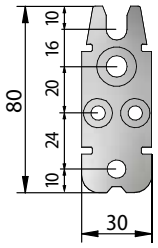
Minimum timber cross section: 50 x 80 mm

* Homogeneous glulam - indoor



RICON® 80/30 EA stainless steel - single connection

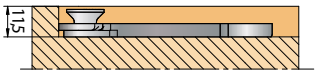
Art.-No. K275



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
80/30	EA	2 x CS 8x80 2 x CS 5x80	2 x CS 8x50 2 x CS 5x50	4,4	7,5
1 locking clip: $F_{3,Rk}$ = 1,9 kN			2 locking clips: $F_{3,Rk}$ = 3,8 kN		

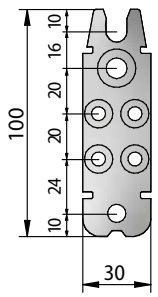
Minimum timber cross section : 50 x 100 mm

* Homogeneous glulam - indoor



RICON® 100/30 EA stainless steel - single connection

Art.-No. K276



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
100/30	EA	2 x CS 8x80 2 x CS 5x80	2 x CS 8x50 4 x CS 5x50	4,4	10,4
1 locking clip: $F_{3,Rk}$ = 1,9 kN			2 locking clips: $F_{3,Rk}$ = 3,8 kN		

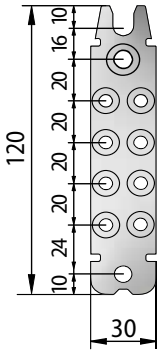
Minimum timber cross section: 50 x 120 mm

* Homogeneous glulam - indoor

(Dimensions in mm)

RICON® 120/30 EA stainless steel - single connection

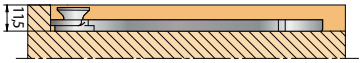
Art.-No. K277



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
120/30	EA	2 x CS 8x80 6 x CS 5x80	2 x CS 8x50 6 x CS 5x50	4,4	13,2
1 locking clip: $F_{3,Rk}$ = 1,9 kN			2 locking clips: $F_{3,Rk}$ = 3,8 kN		

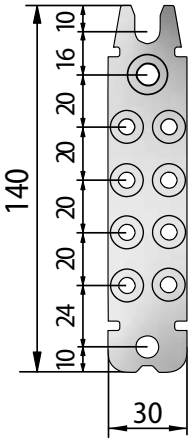
Minimum timber cross section: 50 x 140 mm

* Homogeneous glulam - indoor



RICON® 140/30 EA stainless steel - single connection

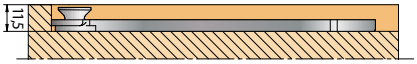
Art.-No. K278



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
140/30	EA	2 x CS 8x80 8 x CS 5x80	2 x CS 8x50 8 x CS 5x50	4,4	16,1
1 locking clip: $F_{3,Rk}$ = 1,9 kN			2 locking clips: $F_{3,Rk}$ = 3,8 kN		

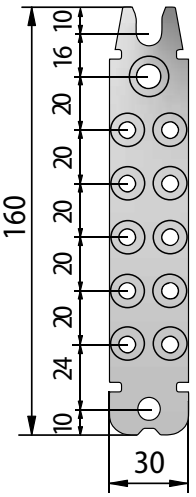
Minimum timber cross section: 50 x 160 mm

* Homogeneous glulam - indoor



RICON® 160/30 EA stainless steel - single connection

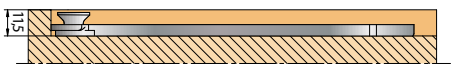
Art.-No. K279



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
160/30	EA	2 x CS 8x80 10 x CS 5x80	2 x CS 8x50 10 x CS 5x80	4,4	17,4
1 locking clip: $F_{3,Rk}$ = 1,9 kN			2 locking clips: $F_{3,Rk}$ = 3,8 kN		

Minimum timber cross section: 50 x 180 mm

* Homogeneous glulam - indoor

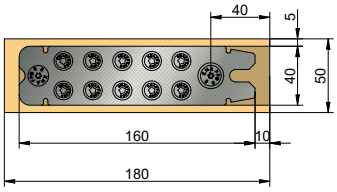


RICON® stainless steel 40

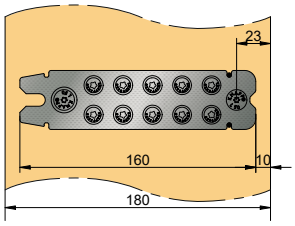
(Dimensions in mm)

Minimum timber cross section

Inserted in the beam and screwed

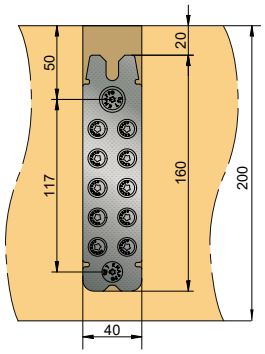


Screwed onto post

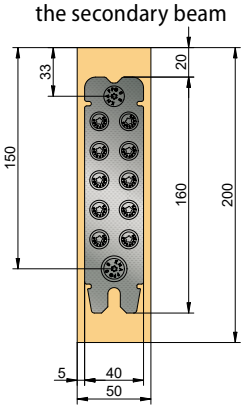


Minimum timber thickness: 50 mm

Inserted in the main beam and screwed



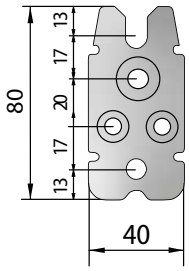
Screwed into the secondary beam



Minimum timber thickness: 60 mm

RICON® 80/40 EA stainless steel - single connection

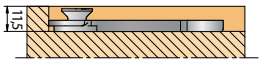
Art.-No. K372



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
80/40	EA	2 x CS 8x80 2 x CS 5x80	2 x CS 8x50 2 x CS 5x50	4,4	7,5
1 locking clip: $F_{3,Rk}$ = 2,7 kN			2 locking clips: $F_{3,Rk}$ = 5,4 kN		

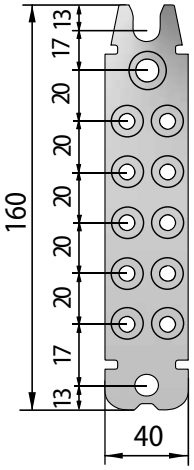
Minimum timber cross section : 50 x 100 mm

* Homogeneous glulam - indoor



RICON® 160/40 EA stainless steel - single connection

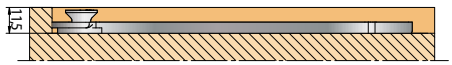
Art.-No. K376



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
160/40	EA	2 x CS 8x80 10 x CS 5x80	2 x CS 8x50 10 x CS 5x50	4,4	17,4
1 locking clip: $F_{3,Rk}$ = 2,7 kN			2 locking clips: $F_{3,Rk}$ = 5,4 kN		

Minimum timber cross section: 50 x 180mm

* Homogeneous glulam - indoor



NEW

Five additional sizes, RICON® stainless steel, available on our website: 40x40 (Art.-No. KR59), 100x25 (Art.-No. K268*), 120x25 (Art.-No. K272/B), 140x25 (Art.-No. K269*), and 160x25 (Art.-No. K273/B).

*** Available upon request**

Installing RICON® and RICON® stainless steel - Main-secondary beam connection type

Mill with with routing-jig

Pre-drill and screw

Install locking clip

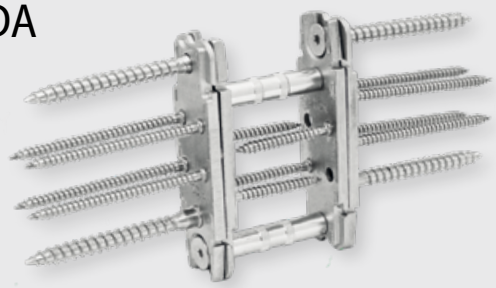
Assemble

Secured connection using a locking clip

RICON® stainless steel DA and EAR for all sizes

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

DA



PRODUCT

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

EAR

PRODUCT

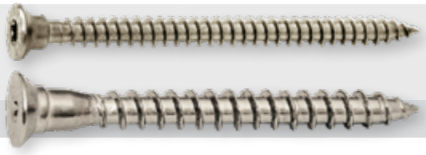
RICON® stainless steel screws

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

Art.-No. Z950	Stainless steel A2 CS-screws 5x50
Art.-No. Z953	Stainless steel A2 CS-screws 8x50

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

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



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

RICON® DA - EAR stainless steel CS-screws

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

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

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® stainless steel 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® stainless steel bigger sizes double connectors (DA).

Insert stainless steel RICON® 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 for all other sizes

Application: to mount unique applications and post sizes.

Post-beam wood-glass curtain wall
Office building, France

Post-beam wood-glass curtain wall
Primary school, Germany

Post-beam timber construction
Winter garden, Austria

Curtain wall, wooden post-beam structure
Aquatic centre 'Les Thermes', Luxembourg

Post-beam wood-glass curtain wall
Mensa, Germany

Post-beam wood-glass curtain wall
Office complex "Sunyard", Germany

Post-beam timber construction
Winter garden, Germany

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
- 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
- Compensating for structural tolerances
- Application also permitted on interlayer
- For 90°-45° screw connection along the grain

RICON®

Available in 6 sizes and 3 versions.

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

* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA 10/0189 (2019/10/11), for hardwood D30 (e.g. oak).

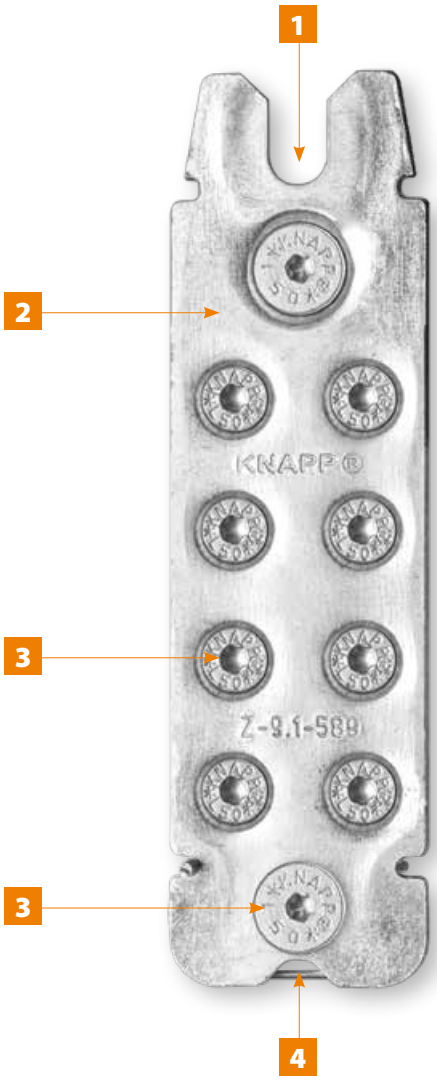
© Dietel

RICON®

- **Applications: concealed post-beam and main-secondary beam connections**
- **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**

©Hecker System Holzbau

Installation example: RICON® Cafeteria Schloss Holte



1 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.

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

3 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.

4 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 ≥ 28 mm, R60 ≥ 49 mm)

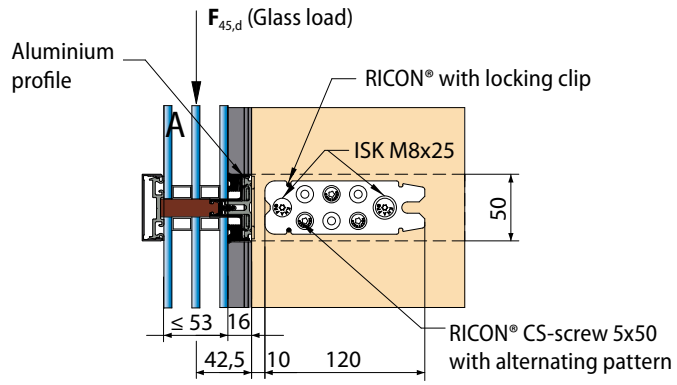
AUSTRIA CE
ETA ETA-10/0189 (2019/10/11)
PRODUCT

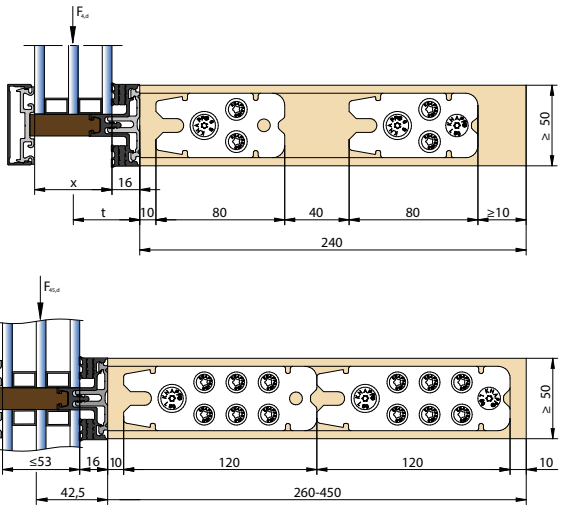
RICON®

Application examples and connection details

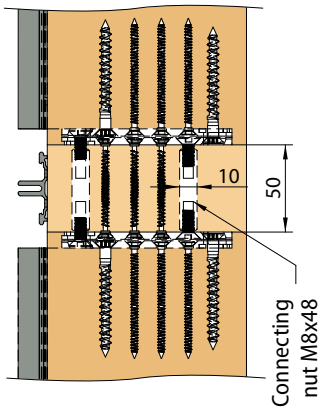
Wood Curtain Wall

(Dimensions in mm)



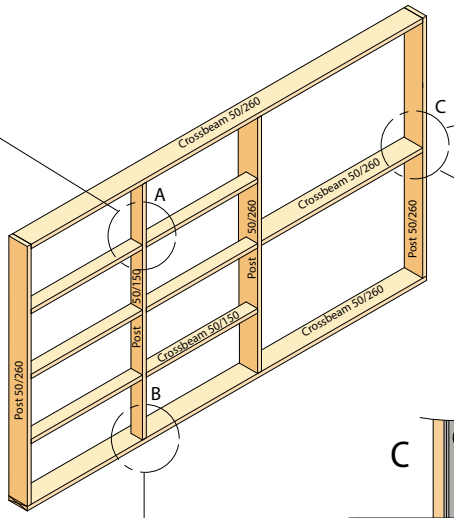


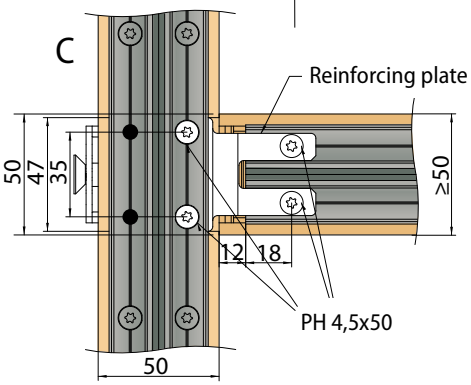
A



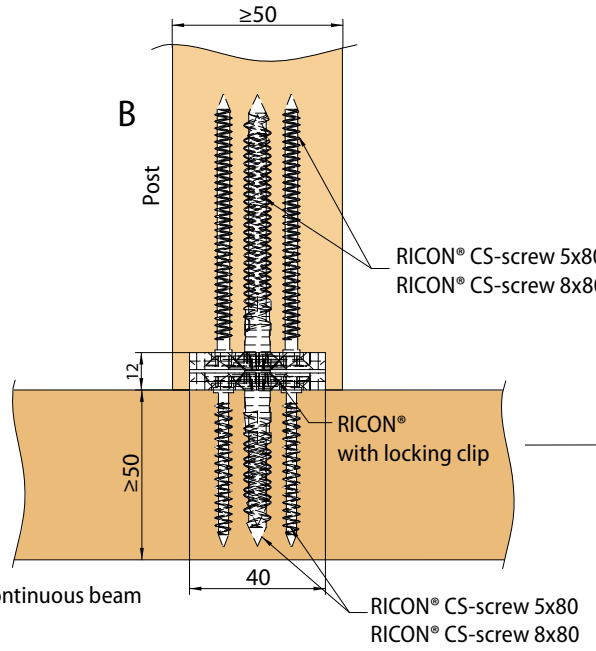
RICON® double connection

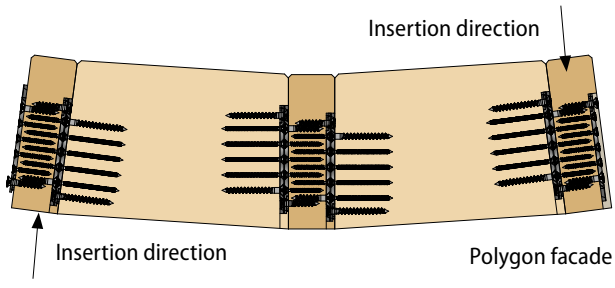
C





RICON® double connection
with reinforcing plate (RP)





RICON®

Application examples and connection details

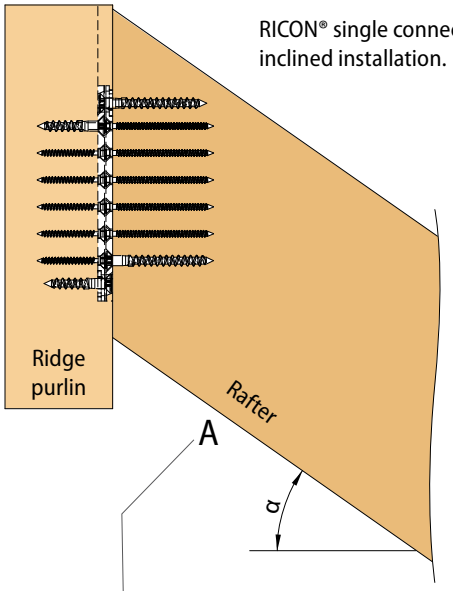
Main-secondary beam connections
e.g. wood beram ceilings, roofs and sun rooms.

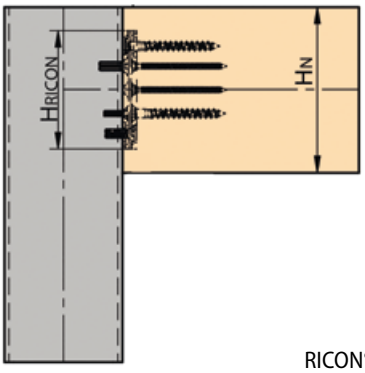
Wood to steel connection

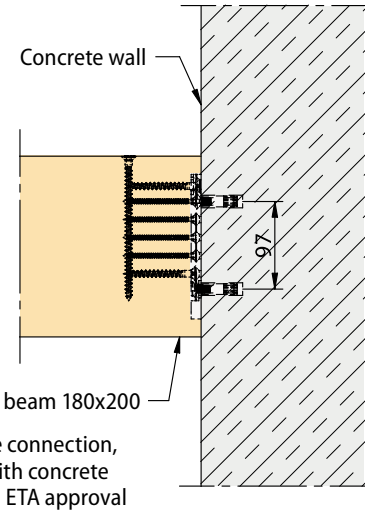
Wood to concrete connection
e.g. with RICON® 140/40

(Dimensions in mm)

RICON® single connection, inclined installation.

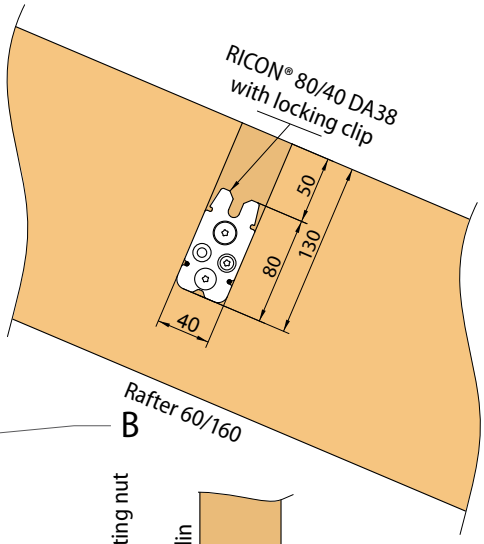


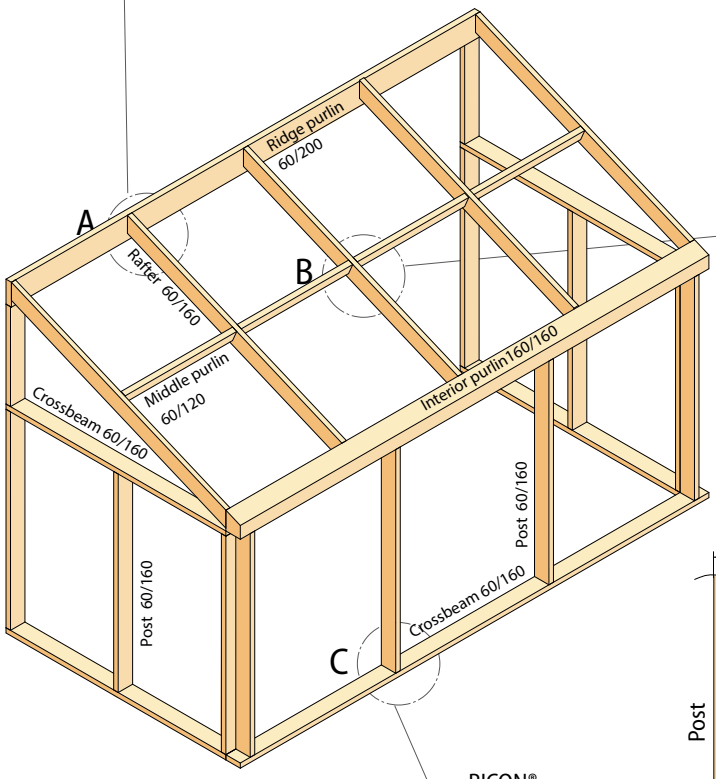


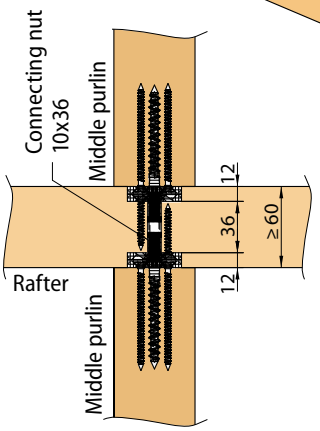


RICON® single connection, installation with concrete anchors upon ETA approval

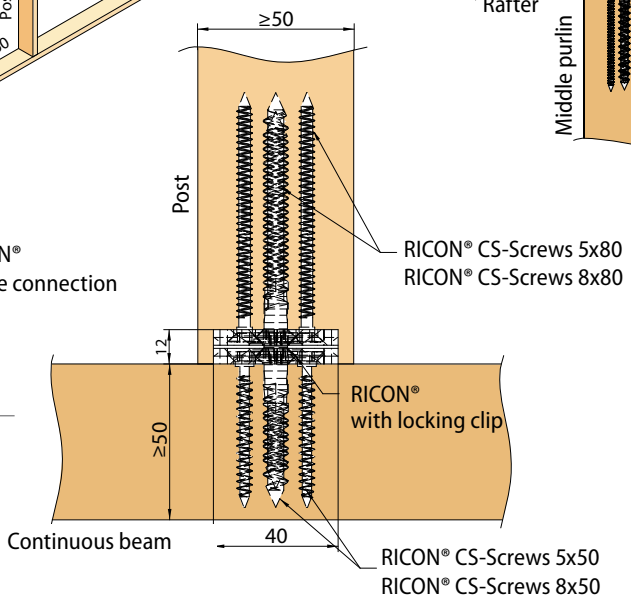
RICON® double connection







RICON® single connection



© Wintergarten Kiecksee

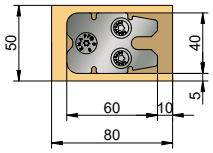
Construction of a sun room.

RICON® 60/40

(Dimensions in mm)

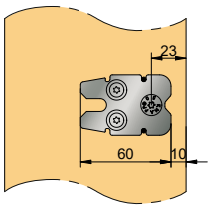
Minimum timber cross section

Inserted in the beam and screwed



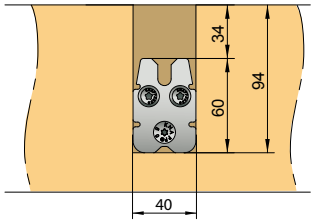
Mounting depth: 12 mm

Screwed onto post



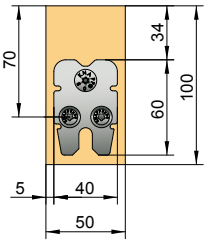
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



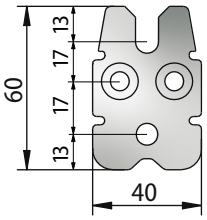
Min. width of of main beam: 60 mm

Screwed into the secondary beam

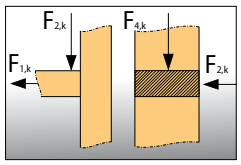


RICON® 60/40 - single connection (EA) with RICON® CS-screws

Art.-No. K360



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
60/40	**EA**	2 x CS 5x80 1 x CS 8x80	2 x CS 5x50 1 x 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

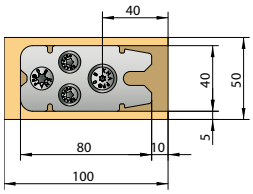
Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

*alternatively, longer screws can be used in end grain.
1 CS-screw 8x160 - $F_{2,RK}$ = 6,3 kN

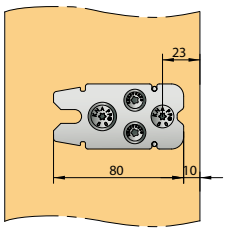
RICON® 80/40

Minimum timber cross section

Inserted in the beam and screwed

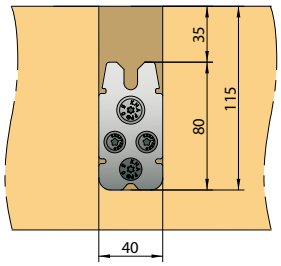


Screwed onto post



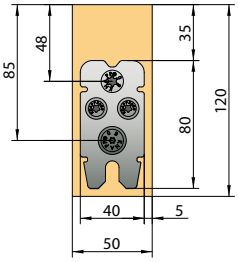
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



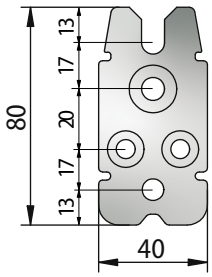
Min. width of of main beam: 60 mm

Screwed into the secondary beam

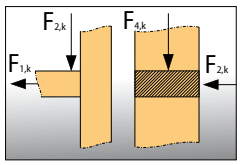


RICON® 80/40 - single connection (EA) with RICON® CS-screws

Art.-No. K361



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
80/40	**EA**	2 x CS 5x80 2 x CS 8x80	2 x CS 5x50 2 x CS 8x50	4,4	7,3
1 locking clip: $F_{3,Rk}$ = 2,7 kN			2 locking 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)

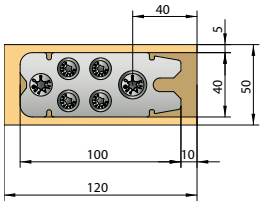
*alternatively, longer screws can be used in end grain.
2 CS-screws 8x160 - $F_{2,RK}$ = 10,3 kN

RICON® 100/40

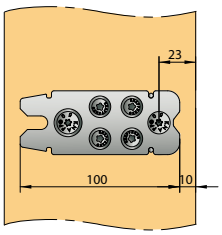
(Dimensions in mm)

Minimum timber cross section

Inserted in the beam and screwed

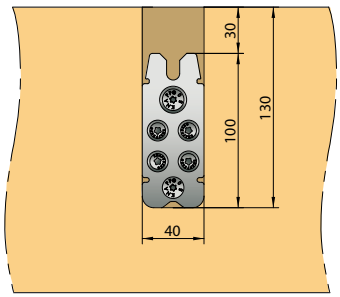


Screwed onto post



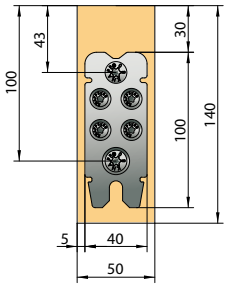
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



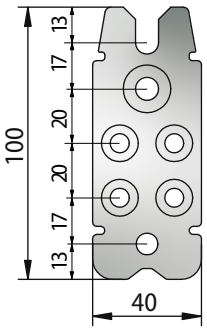
Min. width of of main beam: 60 mm

Screwed into the secondary beam

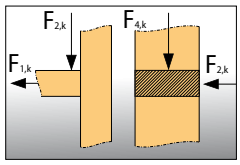


RICON® 100/40 - single connection (EA) with RICON® CS-screws

Art.-No. K362



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
100/40	**EA**	4 x CS 5x80 2 x CS 8x80	4 x CS 5x50 2 x CS 8x50	4,4	10,0
1 locking clip: $F_{3,Rk}$ = 2,7 kN		2 locking clips: $F_{3,Rk}$ = 5,4 kN			



Minimum timber dimensions: 50 x 120 mm

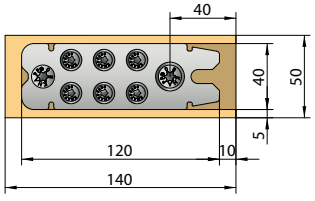
Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

*alternatively, longer screws can be used in end grain.
2 CS-screws 8x160 - $F_{2,RK}$ = 13,9 kN

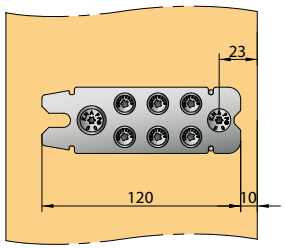
RICON® 120/40

Minimum timber cross section

Inserted in the beam and screwed

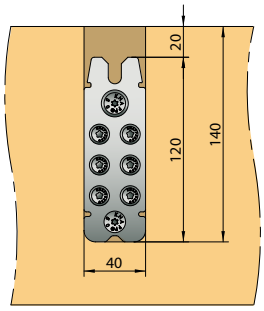


Screwed onto post



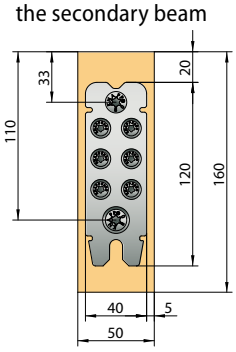
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



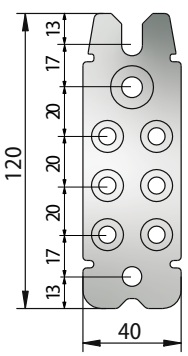
Min. width of of main beam: 60 mm

Screwed into the secondary beam

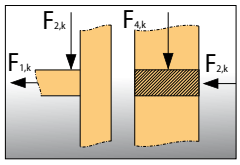


RICON® 120/40 - single connection (EA) with RICON® CS-screws

Art.-No. K363



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
120/40	**EA**	6 x CS 5x80 2 x CS 8x80	6 x CS 5x50 2 x CS 8x50	4,4	12,8
1 locking clip: $F_{3,Rk}$ = 2,7 kN		2 locking 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)

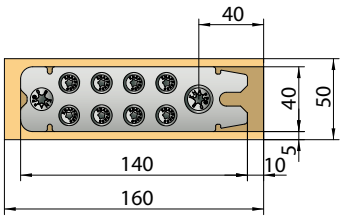
*alternatively, longer screws can be used in end grain.
2 CS-screws 8x160 - $F_{2,RK}$ = 16,6 kN

RICON® 140/40

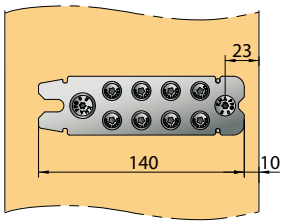
(Dimensions in mm)

Minimum timber cross section

Inserted in the beam and screwed

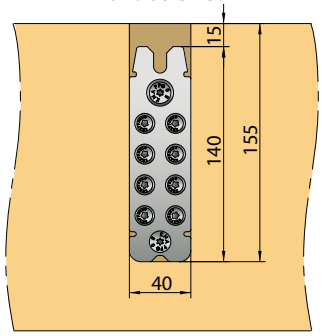


Screwed onto post



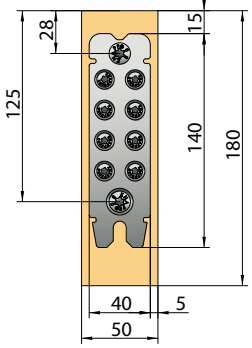
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



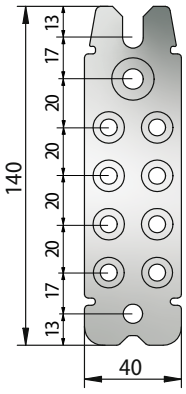
Min. width of of main beam: 60 mm

Screwed into the secondary beam

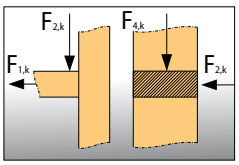


RICON® 140/40 - single connection (EA) with RICON® CS-screws

Art.-No. K365



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
140/40	**EA**	8 x CS 5x80 2 x CS 8x80	8 x CS 5x50 2 x CS 8x50	4,4	15,5
1 locking clip: $F_{3,Rk}$ = 2,7 kN		2 locking clips: $F_{3,Rk}$ = 5,4 kN			



Minimum timber dimensions: 50 x 160 mm

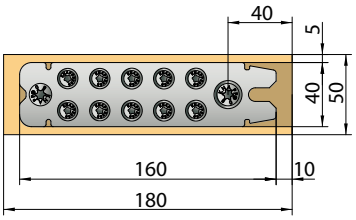
Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

*alternatively, longer screws can be used in end grain.
2 CS-screws 8x160 - $F_{2,RK}$ = 19,3 kN

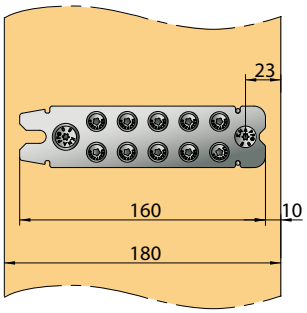
RICON® 160/40

Minimum timber cross section

Inserted in the beam and screwed

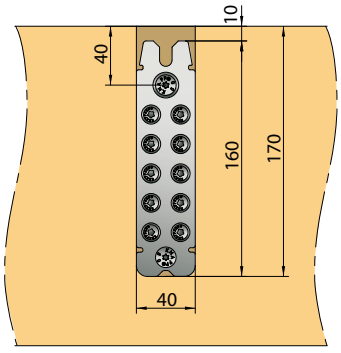


Screwed onto post



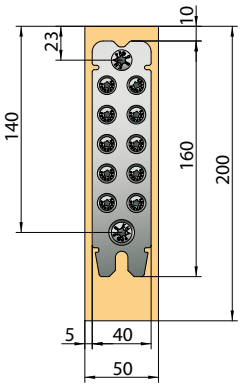
Min. width of beam and post: 50 mm

Inserted in the main beam and screwed



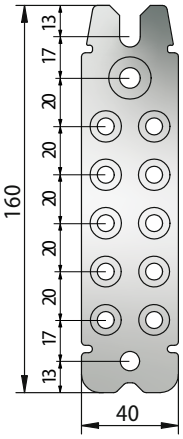
Min. width of of main beam: 60 mm

Screwed into the secondary beam

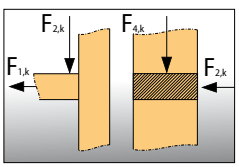


RICON® 160/40 - single connection (EA) with RICON® CS-screws

Art.-No. K364



Connector	Connection	Screw connection		Charact. charge [GL24h] NKL1*	
		Joint	Header	$F_{1,RK}$ [kN]	$F_{2,Rk}$ [kN]**
160/40	**EA**	10 x CS 5x80 2 x CS 8x80	10 x CS 5x50 2 x CS 8x50	4,4	18,2
1 locking clip: $F_{3,Rk}$ = 2,7 kN		2 locking clips: $F_{3,Rk}$ = 5,4 kN			



Minimum timber dimensions: 50 x 180 mm

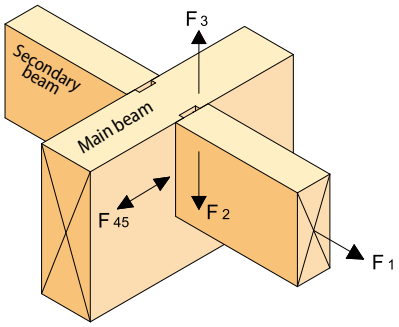
Single connection for post and beam connection with a minimum timber cross section of 50 mm (stress at mid to the axis of beam)

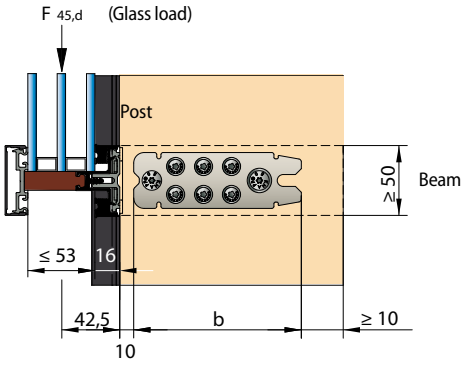
*alternatively, longer screws can be used in end grain.
2 CS-screws 8x160 - $F_{2,RK}$ = 22,0 kN

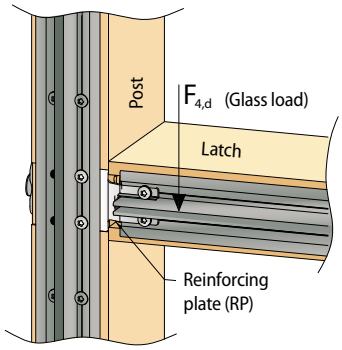
RICON®

Load bearing capacities for timber curtain wall example

(Dimensions in mm)







RICON®	Timber grade	Characteristic values			Charac.value [kN] $F_{3,Rk}$		Eccentric glass loads/post $F_{4,Rd}$	
		$F_{1,Rk}$ [kN]	$F_{2,Rk}$ [kN]	Centred $F_{45,Rk}$ [kN]	Locking clip(s) 1	Locking clip(s) 2	without RP [kg]	with RP [kg]
60/40	C24h (S10)	4,1	4,7	5,2	2,7	5,0	43	317
	GL24h (BS11)	4,4	5,0	5,2			47	320
	GL32h (BS16)	4,9	5,5	5,2			52	326
80/40	C24h (S10)	4,1	6,8	8,0	2,7	5,4	59	332
	GL24h (BS11)	4,4	7,3	8,7			64	337
	GL32h (BS16)	4,9	8,1	9,7			71	345
100/40	C24h (S10)	4,1	9,4	11,8	2,7	5,4	94	368
	GL24h (BS11)	4,4	10,0	12,8			102	376
	GL32h (BS16)	4,9	11,0	14,3			114	388
120/40	C24h (S10)	4,1	12,0	15,4	2,7	5,4	131	404
	GL24h (BS11)	4,4	12,8	15,6			142	415
	GL32h (BS16)	4,9	14,0	15,6			158	432
140/40	C24h (S10)	4,1	14,5	15,6	2,7	5,4	169	443
	GL24h (BS11)	4,4	15,5	15,6			183	457
	GL32h (BS16)	4,9	16,9	15,6			205	478
160/40	C24h (S10)	4,1	17,1	15,6	2,7	5,4	210	484
	GL24h (BS11)	4,4	18,2	15,6			227	501
	GL32h (BS16)	4,9	19,9	15,6			254	528
2 x 80/40	C24h (S10)	4,1	11,5	10,4	2,7	5,4	180	453
	GL24h (BS11)	4,4	12,3	10,4			195	468
	GL32h (BS16)	4,9	13,6	10,4			218	491
2 x 100/40	C24h (S10)	4,1	16,6	15,6	2,7	5,4	270	543
	GL24h (BS11)	4,4	17,8	15,6			292	566
	GL32h (BS16)	4,9	19,5	15,6			327	600
2 x 120/40	C24h (S10)	4,1	21,8	15,6	2,7	5,4	356	630
	GL24h (BS11)	4,4	23,2	15,6			385	659
	GL32h (BS16)	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.

$F_{1,Rk}/F_{1,Rd}$ Characteristic/Design values of load-bearing capacity in the case of single stress perpendicular to the connector plate (tension)
$F_{2,Rk}/F_{2,Rd}$ Characteristic/Design values in slide-in direction
$F_{3,Rk}/F_{3,Rd}$ Characteristic/Design values against the slide-in direction
$F_{45,Rk}/F_{45,Rd}$ Characteristic/Design values perpendicular to slide-in direction

RICON® reinforcing plate (stainless steel)**

K519	K523	K530	K531	K532	K533	K534	K535	K536	K537	K538	K539
Schüco GP 50/50 50 mm*	Schüco GP 50/60 60 mm*	RP RP-tec 50-1 HA 50 mm*	RP RP-tec 50-1 HA 60 mm*	RP RP-tec 55-1 HA 60 mm*	RP RP-tec 55-1 HA 80 mm*	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*	RAICO GP 67 80 mm*

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.

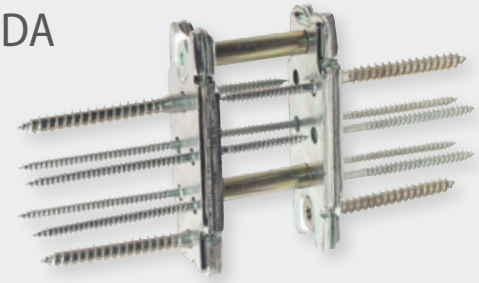
*width of post and beam

** Reinforcing plates are approved by the building authorities for all common systems.

RICON® DA and EAR for all sizes

Double connection with connecting nuts and RICON® CS-screws

DA



PRODUCT

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

EAR

PRODUCT

RICON® screws

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

Art.-No. Z533	CS-screws 5x50
Art.-No. Z531	CS-screws 8x50

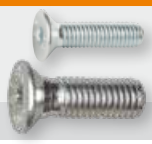
Application: to mount RICON plate into the side grain of main beam/post.

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.

RICON® DA CS-screw

Art.-No. Z545	RICON® CS-screws M5x20 (for RICON® 60/40 DA)
Art.-No. Z548	RICON® CS-screws M8x25



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

RICON® DA connecting nuts
(Connecting nuts are included with all RICON DA 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® 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 80/40 and bigger sizes double connectors.

RICON® EAR inserts
(connecting inserts can be included upon request)

Art.-No. Z540	Insert M5x14 for RICON® 60/40
Art.-No. Z541	Insert M8x18 for all other sizes

Application: for unique applications and post sizes.

RICON® accessories

Routing-jig for all RICON® sizes

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

Advice: the routing-jig MULTI F is suitable for a Ø 30 mm bushing guide (for plunge router) and a Ø 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, length = 25 mm 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 for post-beam connections

Art.-No.	K634	K635	K636	K637	K638	K639
	60/40 Set	80/40	100/40	120/40	140/40	160/40

RICON® EA/DA drilling-jig for header-joint connections

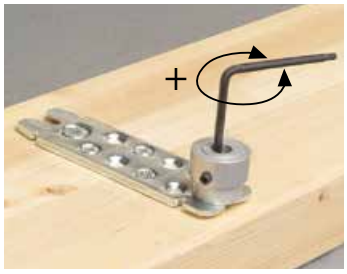
Art.-No.	K634	K642	K643	K644	K645	K646
	60/40 Set	80/40	100/40	120/40	140/40	160/40

Application: guide for pre-drilling holes of all RICON® connectors.

RICON® drilling-jig with adjustable drilling blocks

Art.-No.	-	K647	K647	K647	K647	K647
Drilling blocks:	-	80/40	100/40	120/40	140/40	160/40

Application: guide for pre-drilling holes of all RICON® connectors.



RICON® mounting set

Art.-No. K065 — Consisting of: 1 RICON®-depth gauge incl.
1 Torx wrench T25 combined with Allen key SW5

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

For construction manuals, .DXF drawings for RICON®-System or to find a KNAPP® personal consultant in your area, please visit:
https://www.knapp-verbinder.com/en/downloads/

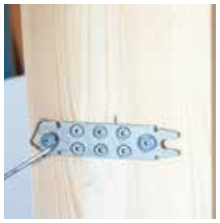
RICON® and RICON® stainless steel

Installation jonction poteaux-traverses pour murs rideaux (EA and DA)


Recess with routing-jig


Pre-drill with drilling-jig


Screw


Install the locking clip


Slide together


Secure connection with locking clip

Locking clip

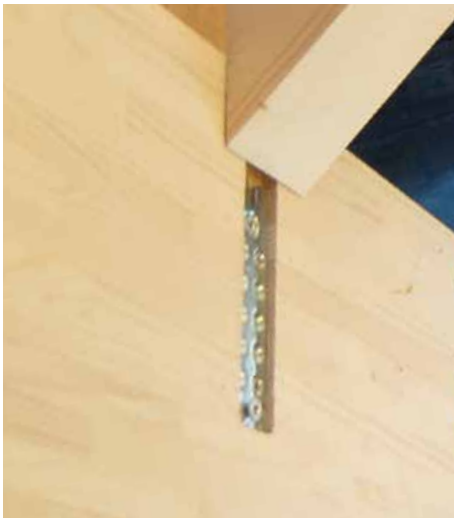
Depending on load requirements, the locking clip can be inserted on one or on both sides. If the connection is accessible, it can be unlocked.

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

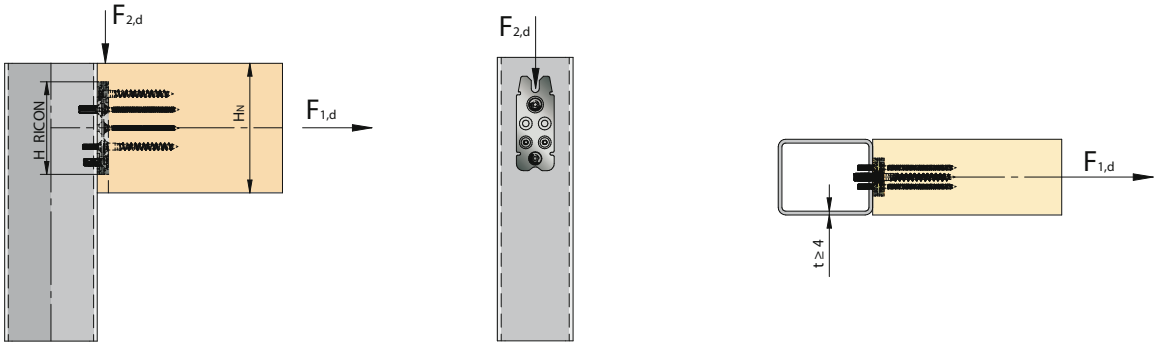
Routing dimension RICON® stainless steel		
Width	Length	Depth
40,5 mm	variable	$11,5^{+0,5}$ mm
30,5 mm	variable	$11,5^{+0,5}$ mm
20,0 mm	80 mm	$11,0^{+0,5}$ mm
16,0 mm	66 mm	$11,0^{+0,5}$ mm

Routing dimension RICON®		
Width	Length	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.



RICON® wood to steel connection

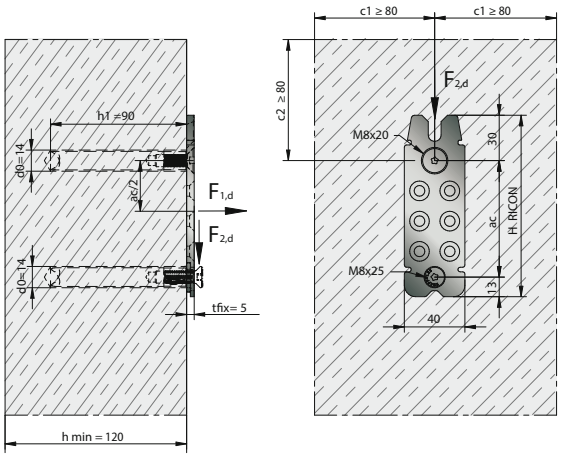


KNAPP® connector	Traction		Shear force	
	$F_{t,Rk}$ [kN]* on 4 mm steel	$F_{1,Rk}$ [kN]* on glulam GL24h	$F_{v,Rk}$ [kN]* on 4 mm steel	$F_{2,Rk}$ [kN]* on glulam GL24h
RICON 60x40	30,8	4,4	31,6	5,0
RICON 80x40				7,3
RICON 100x40				10,0
RICON 120x40				12,8
RICON 140x40				15,5
RICON 160x40				18,2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

RICON® wood to concrete connection

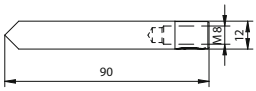
Header-joist connection with glued anchor

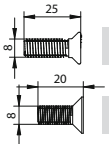
(Dimensions in mm)



Concrete C20/25

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





CS M8x25 with hexagon socket

CS M8x20 with hexagon socket

fischer Superbond-System: FIS SB 390 S

Drill hole diameter d_0 =	14 mm
Drill hole depth h_1 =	90 mm
Total fixing thickness t_{fix} =	5 mm
Spacing a_c =	cf. tableau
Minimal edge distance $c_{1,min} = c_{2,min}$ =	80 mm
Minimal concrete wall thickness h_{min} =	120 mm
Approval:	ETA-12/0258

Wood to concrete connection in slide-in direction F_2

F_2 load-bearing values in the direction of insertion

KNAPP® connector	Concrete connection		Timber connection						
	$F_{2,Rd,concrete}$	Spacing	Wood material		$F_{2,Rd,timber}$				
	Shear force $F_{2,Rd,concrete}$ [kN]	Dowel spacing ac [mm]	Wood type	Char. Density ρ_k [kg/m³]	Characteristic values [kN]		Design values $F_{2,Rd}$, γ_M = 1,3 [kN]		
					$F_{2,KCC,Rk}$ / γ_M =1,0	$F_{2,Rk}$	k_{mod} = 0,6	k_{mod} = 0,8	k_{mod} = 0,9
RICON® 100/40	14,00	57,00	C24	350	14,00	9,40	4,34	5,78	6,51
			GL24h	385		10,00	4,62	6,15	6,92
RICON® 120/40	18,00	77,00	C24	350		12,00	5,54	7,38	8,31
			GL24h	385		12,80	5,91	7,88	8,86
RICON® 140/40	18,00	97,00	C24	350	18,00	14,50	6,69	8,92	10,04
			GL24h	385		15,50	7,15	9,54	10,73
RICON® 160/40	18,00	117,00	C24	350		17,10	7,89	10,52	11,84
			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:

$$F_{2,Rk} = \min \begin{cases} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{cases}$$

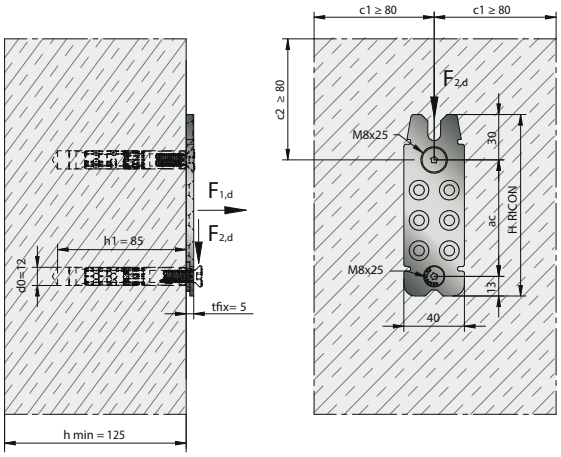
$$F_{2,Rk,\,bois} = \min \begin{cases} \min F_{2,KCC,\,Rk} / \gamma_M \\ \min F_{2,Rk} \cdot k_{mod} \end{cases} \Big/ \gamma_{M,\,timber}$$

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®. 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.

Other anchoring solutions are possible, they must be technically suitable and have an ETA technical assessment.

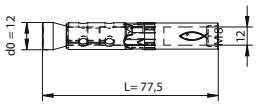
Header-joist connection with heavy duty anchor

(Dimensions in mm)



Concrete C20/25

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



CS M8x30 with hexagon socket

Drill hole diameter d_0 =	12 mm
Drill hole depth h_1 =	85 mm
Total fixing thickness t_{fix} =	5 mm
Spacing a_c =	cf. tableau
Minimal edge distance $c_{1,min} = c_{2,min}$ =	80 mm
Minimal concrete wall thickness h_{min} =	125 mm
Approval:	ETA-07/0025 , Option 1

Wood to concrete connection in slide-in direction F_2

F_2 load-bearing values in the direction of insertion

KNAPP® connector	Concrete connection		Timber connection						
	$F_{2,Rd,concrete}$	Spacing	Wood material		$F_{2,Rd,timber}$				
	Shear force $F_{2,Rd,concrete}$ [kN]	Dowel spacing ac [mm]	Wood type	Char. Density ρ_k [kg/m³]	Characteristic values [kN]		Design values $F_{2,Rd}$, γ_M = 1,3 [kN]		
					$F_{2,KCC,Rk}$, γ_M =1,0	$F_{2,Rk}$	k_{mod} = 0,6	k_{mod} = 0,8	k_{mod} = 0,9
RICON® 100/40	14,00	57,00	C24	350	14,00	9,40	4,34	5,78	6,51
			GL24h	385		10,00	4,62	6,15	6,92
RICON® 120/40	16,00	77,00	C24	350		12,00	5,54	7,38	8,31
			GL24h	385		12,80	5,91	7,88	8,86
RICON® 140/40	18,00	97,00	C24	350	18,00	14,50	6,69	8,92	10,04
			GL24h	385		15,50	7,15	9,54	10,73
RICON® 160/40	18,00	117,00	C24	350		17,10	7,89	10,52	11,84
				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:

$$F_{2,Rk} = \min \begin{cases} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{cases}$$

$$F_{2,Rk,\,bois} = \min \begin{cases} \min F_{2,KCC,\,Rk} / \gamma_M \\ \min F_{2,Rk} \cdot k_{mod} \end{cases} \Big/ \gamma_{M,\,timber}$$

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®. 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.

Other anchoring solutions are possible, they must be technically suitable and have an ETA technical assessment.

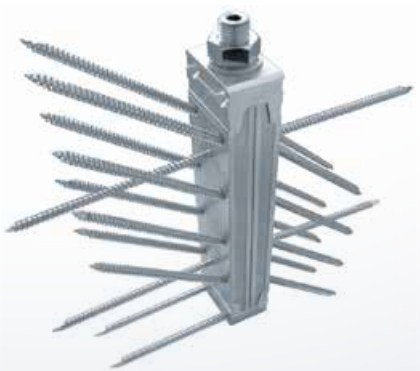
KNAPP® - The main and secondary beams connecting revolution

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

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



MEGANT® connector

The revolution

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

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.

PROGRESSIVE TIMBER CONSTRUCTION CONNECTORS

Invisible connection for high loads

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 is 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 assembly on site, preventing potential hazards 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 perfectly connects rigid frame corners and tension joints by means of a transverse screw connection and is ideal for assembling carports.

The MATEO wooden nail is used in ecological house construction.

Analysis and Planner service

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

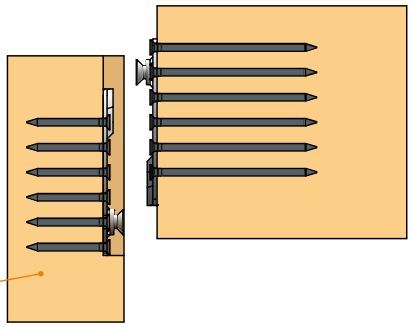
You have the choice between an interactive load table, a dimensioning tool and a DC-Statik manufacturer's version of Dietrich's to create a pre-dimensioning yourself and our customized calculation service by our engineers.

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.

Connection types and fire rating

Connection options

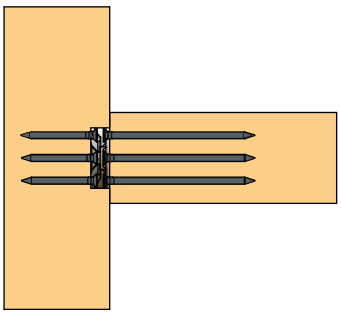
- The Beam Hanger System can be installed with various housing options to provide an architecturally appealing and fully concealed connection in mass timber elements.
- This concealed arrangement also helps provide fire protection, as explained in the following sections.



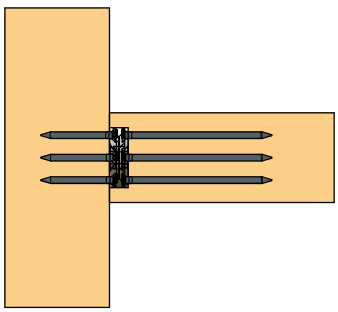
Typical concealed configuration achieved through routing for fire-rated connections

Application examples and connection details

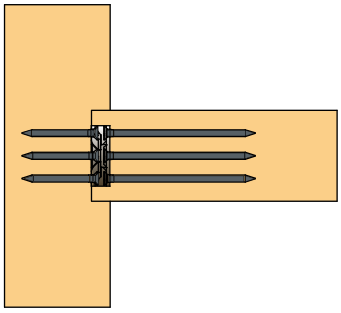
Top view of 3 concealed installation options



Connector housed in main beam



Connector housed in secondary beam



Connector housed in secondary beam

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.
- According to EN 1995-1-2, for fire resistance R30 28 mm, for R60 49 mm and 70 mm for R90 (see calculation example on page 31). on page 31).
- In special situations (e.g. due to non-compliance with the timber cover), the connector can be additionally protected against heat with Firestrip Interdens type 15. The timber cover according to EN 1995-1-2 must still be provided to cover the screws.
- Interdens Type 15 is by ETA-16/0811 approved.
- The Firestrip Interdens encases the MEGANT® connector from all six sides and foams up from 150°C. From 300°C the sheathing provides full foaming.

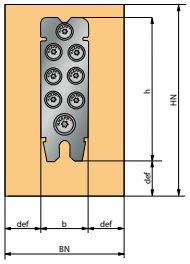
RICON®S connector after 90 minutes and MEGANT® connector after 60 minutes fire tests. The wood is charred all around. The connectors withstood the the vertical load applied in the fire test.

Connectors

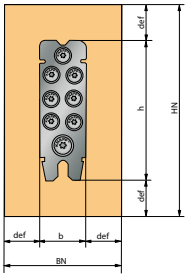
Fire resistance / Fire protection

RICON®

Connection 3 sided covered

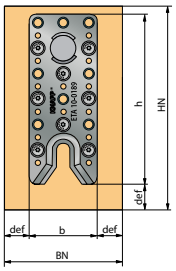


Connection 4 sided covered

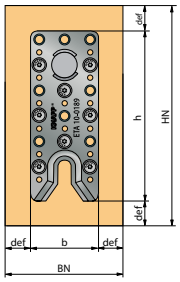


RICON® S

Connection 3 sided covered



Connection 4 sided covered



- 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:

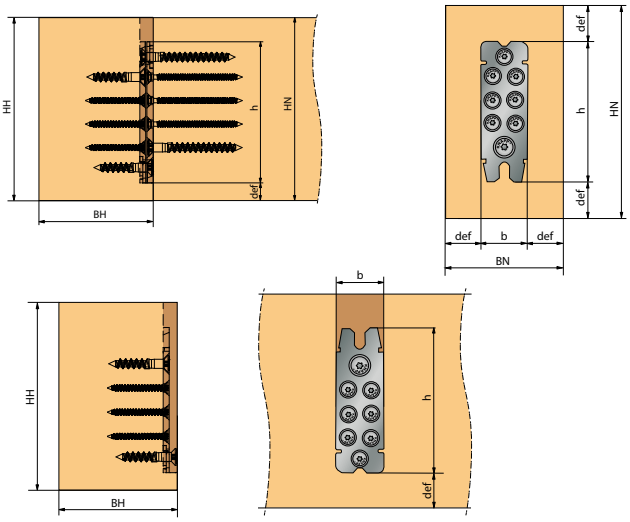
Common formula: $d_{ef} = \beta_n \cdot t + k_0 \cdot d_0$

Mass burning rate β_n:	
Softwood and beach glulam with charact. density $\rho_k \geq 290$ kg/m³	$\beta_n = 0{,}7$ mm/min
Softwood and beach solid wood with charact. density $\rho_k \geq 290$ kg/m³	$\beta_n = 0{,}8$ mm/min
Hardwood and Hardwood glulam with charact. density $\rho_k \geq 290$ kg/m³	$\beta_n = 0{,}7$ mm/min
Hardwood and Hardwood glulam with charact. density $\rho_k \geq 450$ kg/m³	$\beta_n = 0{,}55$ mm/min
LVL with charact. density $\rho_k \geq 480$ kg/m³	$\beta_n = 0{,}7$ mm/min
Duration of fire exposure	t = 30, 60 , 90 min
Temperature-dependent reduction factor for strength and stiffness properties	$k_0 = 1$ (t ≥ 20 min)
Time factor	$k_0 = t / 20$ (t < 20 min)
Layer depth with the strength and stiffness properties equal to zero	$d_0 = 7$ mm

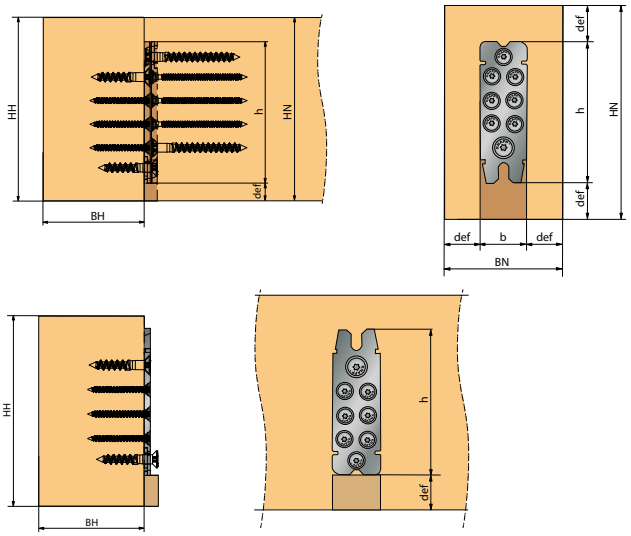
Softwood Gluelam, Beach solid wood, and LVL		
Wood overlap for 30 minutes fire resistance	$d_{ef} = 0{,}7 \times 30 + 1{,}0 \times 7 =$	28 mm for R30
Wood overlap for 60 minutes fire resistance	$d_{ef} = 0{,}7 \times 60 + 1{,}0 \times 7 =$	49 mm for R60
Wood overlap for 90 minutes fire resistance	$d_{ef} = 0{,}7 \times 90 + 1{,}0 \times 7 =$	70 mm for R90

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

Types of installation of the connector



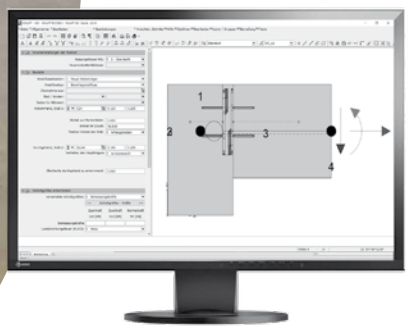
3 sided fire protection, milling in main beam



3 sided fire protection, milling in secondary beam

Planner service

Dimensioning for all connections



We help you to realise more projects in less time!
We offer a comprehensive planning and calculation service, especially for architects, planners and wood builders.

- **KNAPP® DC-Statik design software**
- **Online dimensioning tool**
- **Interactive load capacity charts**
- **Custom planning service**

You can find all the information on our website under Design Service. Close cooperation during the planning phase guarantees optimal implementation of your projects.

For more information, see:
https://www.knapp-verbinder.com/en/service/planner-service/

Partner software

Recommended partner software for interfacing to machine processing:

cadwork · hsbcad CAD/CAM für den Holzbau · Dietrich's · Hundegger HOLZBAU PROGRAMME · WETO AG technologies

DC Statik

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.

SEMA SOFTWARE

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.

WALLNER MILD HOLZBAUSOFTWARE

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®.

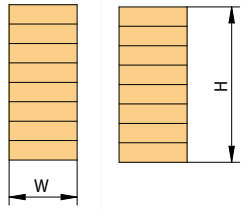
PLANNER SERVICE

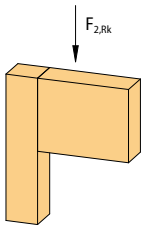
BEAM HANGER SELECTION OVERVIEW (all RICON® ranges)

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.





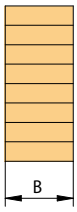
Min. beam width	Min. beam height	Characteristic load bearing capacities $F_{2,Rk}$ [kN]	Connectors	Art.-No.	Page
mm	mm	0 5 10 15 20			
30	86	4,8	RICON® stainless steel 66/16	K267	9
30	90	4,8	RICON® stainless steel 70/20	K271	9
38	120	7,5	RICON® stainless steel 100/25	K268*	12
	140	8,9	RICON® stainless steel 120/25	K272/B	12
	160	8,9	RICON® stainless steel 140/25	K269*	12
	180	10,4	RICON® stainless steel 160/25	K273/B	12
50	60	4,8	RICON® stainless steel 40/40	KR59	12
	80	5,0	RICON® 60/40	K360	19
	80	5,2	RICON® stainless steel 60/30	K274	10
	100	7,3	RICON® 80/40	K361	19
	100	7,5	RICON® stainless steel 80/30	K275	10
	100	7,5	RICON® stainless steel 80/40	K372	12
	120	10,0	RICON® 100/40	K362	20
	120	10,4	RICON® stainless steel 100/30	K276	10
	140	12,8	RICON® 120/40	K363	20
	140	13,2	RICON® stainless steel 120/30	K277	11
	160	15,5	RICON® 140/40	K365	21
	160	16,1	RICON® stainless steel 140/30	K278	11
	180	17,4	RICON® stainless steel 160/30	K279	11
	180	17,4	RICON® stainless steel 160/40	K376	12
	180	18,2	RICON® 160/40	K364	21

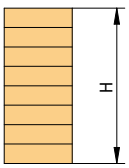
*These RICON® stainless steel connectors are only available on request, for further information please contact our consultants directly.

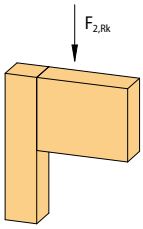
References

BEAM HANGER FOR TIMBER CONSTRUCTION

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







Min. beam width	Min. beam depth	Characteristic connection load $F_{2,Rk}$ [kN]	Connectors	Art.-No.	Page
mm	mm	0 100 200 300 400 500 600 700 800 900			
60	150	12,5	GIGANT 120/40	K051	81
	200	16,7	GIGANT 150/40	K050	82
	200	19,2	GIGANT 150/40 max[1]	K050	82
	220	25	GIGANT 180/40	K052	83
	220	30,7	GIGANT 180/40 max[2]	K052	83
100	150	37,1	RICON®S 140/60 VS	K126	42
	200	40,2	RICON®S 140/60 VS max[3]	K126	42
	200	56,7	RICON®S 200/60 VS	K127	45
	220	66,5	RICON®S 200/60 VS max[4]	K127	45
	220	96,8	MEGANT® 310/60/40	K242	96
	520	152	MEGANT® 430/60/40	K243	97
	640	177,7	MEGANT® 550/60/40	K244	98
120	230	79,1	RICON®S 200/80 VS	K128	48
	480	92,4	RICON®S 200/80 VS max[5]	K128	48
	320	118,2	RICON®S 290/80 VS	K129	51
	560	142,7	RICON®S 290/80 VS max[6]	K129	51
	720	170,9	RICON®S 390/80 VS+ZP	K191	54
	800	195,9	RICON®S 390/80 VS+ZP max[7]	K191	54
140	440	124	MEGANT® 310/100/40	K239	99
	520	207	MEGANT® 430/100/40	K240	100
	640	235,2	MEGANT® 550/100/40	K241	101
190	400	156	MEGANT® 310/150/50	K197	102
	520	260	MEGANT® 430/150/50	K220	103
	640	364	MEGANT® 550/150/50	K221	104
	830	443,2	MEGANT® 730/150/50	K251	105
	1130	768	MEGANT® 1030/150/50 SL	K180	106

Screw connection alternatives (for higher load bearing capacities)

[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

Min. beam width	Min. beam depth	Characteristic connection load $F_{2,Rk}$ [kN]	Connectors	Art.-No.	Page
mm	mm	0 100 180			
100	160	31,5	RICON® S 140/60 VK	K130	65
	260	33,5	RICON® S 140/60 VK max[8]	K130	65
	220	34,9	RICON® S 200/60 VK	K132	66
	160	37,1	RICON® S 140/60 EK	K146	57
	160	37,1	RICON® S 140/60 GK	K134	69
	160	40,2	RICON® S 140/60 EK max[9]	K146	57
	160	40,2	RICON® S 140/60 GK max[9]	K134	69
	220	41,4	RICON® S 200/60 VK max[10]	K132	66
	220	44,2	RICON® S 200/60 EK	K148	58
	220	44,2	RICON® S 200/60 GK	K136	70
120	230	48,8	RICON® S 200/80 VK	K138	67
	320	48,8	RICON® S 290/80 VK	K141	68
	230	58,4	RICON® S 200/80 VK max[11]	K138	67
	320	59,7	RICON® S 290/80 VK max[12]	K141	66
	230	65,0	RICON® S 200/80 EK	K153	59
	230	65,0	RICON® S 200/80 GK	K142	71
	320	72,2	RICON® S 290/80 EK	K156	60
	320	72,2	RICON® S 290/80 GK	K145	72

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

[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

WALCO® range

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

Min. wood width	Min. wood thickness	Characteristic connection load $F_{2,Rk}$ [kN]	Connectors	Art.-No.	Page
mm	mm	0 5 10 15			
80	60	5,9	WALCO® V60 KS	K701	114
	60	4,8	WALCO® V60 EH	K702/B	114
	60	4,9	WALCO® V60 VK	K700	114
	60	8,6	WALCO® V60 GH	K702	114
100	60	7,1	WALCO® V80 KS	K711	115
	60	6,5	WALCO® V80 EH	K712/B	115
	60	6,2	WALCO® V80 VK	K710	115
	60	16,0	WALCO® V80 GH	K712	115
100 x 48	60 x 48	9,0	WALCO® Z32 (C24)	K078	136
100 x 60	60 x 60	10,80	WALCO® Z40 (C24)	K072	134

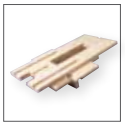
RICON® EA Startbox

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

Art.-No. K364/B


RICON®


TCT slotting cutter 15x25 mm


Routing-jig MULTI F


Drilling-jig


Depth gauge


Locking clip

Each RICON® Box includes:
6, 12 or 24 pairs RICON®,
1 HM routing cutter,
1 routing-jig MULTI F 40/R,
1 drilling-jig,
1 depth gauge, CS-screws and the locking clips

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

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

AUSTRIA CE ETA ETA-10/0189 (2019/10/11) PRODUCT

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 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 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 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 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 160 Box

Art.-No. K371	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 15 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 and tensile joints.

AUSTRIA CE ETA ETA-19/0628 (2019/10/11) PRODUCT

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
- High degree of prefabrication for industrial production
- Simple screw connection without pre-drilling
- Can be assembled crosswise, lengthwise and diagonally
- Assembly made easy due to V-shaped bracket and only 3.5 cm hook way
- Installation tolerances due to adjustable collar bolts
- Three- and four-sided concealed connection
- Secured connection against the direction of insertion with matching locking clip

RICON®S

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 Planner Service.

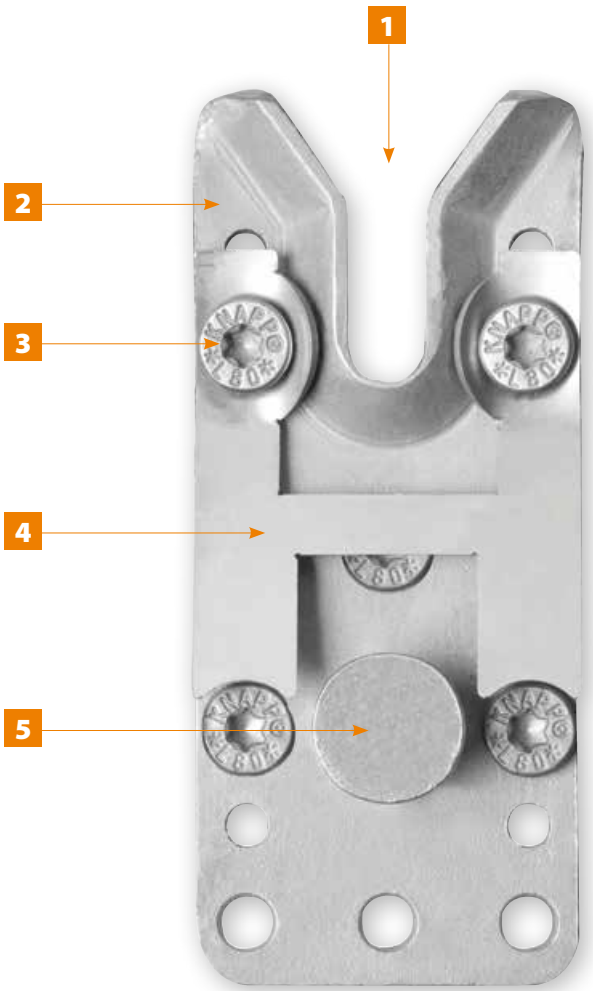
* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA 10/0189 (2021/05/31), for hardwood D30 (e.g. oak).

KNAPP®
connectors.com

RICON® S

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

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



1 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.

2 RICON® S is made of premium quality steel, hot-dip galvanized and produced in Germany.

3 KNAPP® CS-screws with cut point for extra fast starting and screw connection. The reinforced shaft provides a force-fit connection.

4 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.

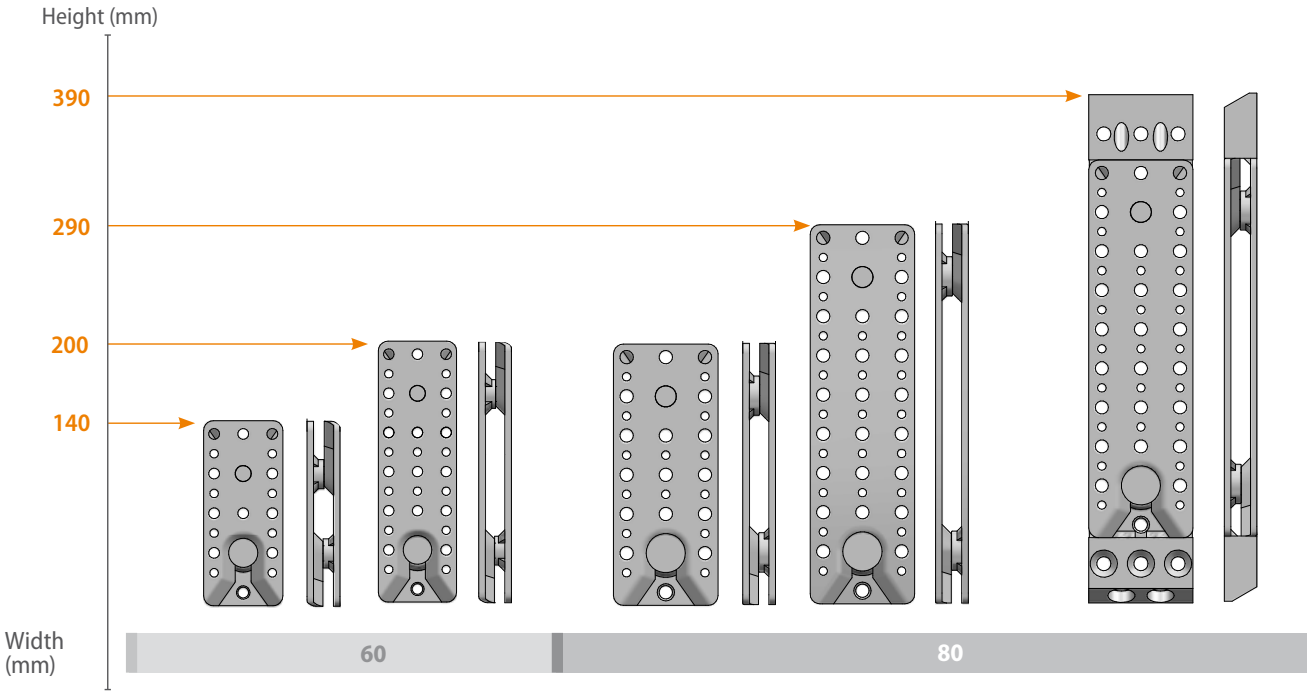
5 VS = welded collar bolt, for highest load capacities
EK = retaining screw collar bolt, for tolerance adjustment
VK = screwed collar bolt, for moderate charge capacities
GK = spring-loaded collar bolt for special assembly requirements

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

made in Germany CE
ETA ETA-10/0189 (2019/10/11)
PRODUCT

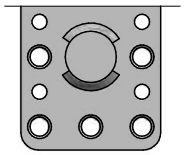
RICON®S

RICON®S Standard Sizes

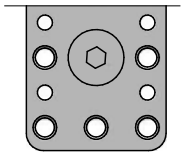


RICON®S views

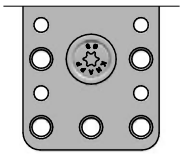
Top view of RICON®S collar bolt versions



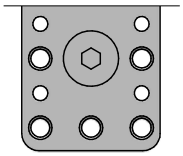
Welded collar bolt (VS)



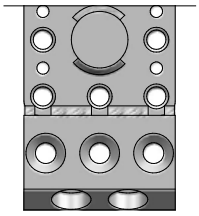
Adjustable collar bolt (EK)



Screwed collar bolt (VK)



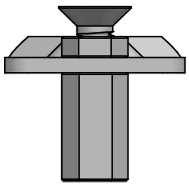
Spring-loaded collar bolt (GK)



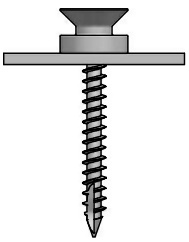
Welded collar bolt XL version

Side view of RICON®S collar bolt

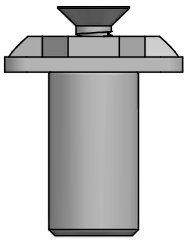
Welded collar bolt (VS)



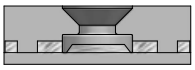
Adjustable collar bolt (EK)



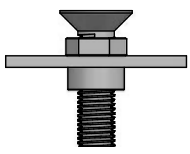
Screwed collar bolt (VK)



Spring-loaded collar bolt (GK)



Welded collar bolt XL version



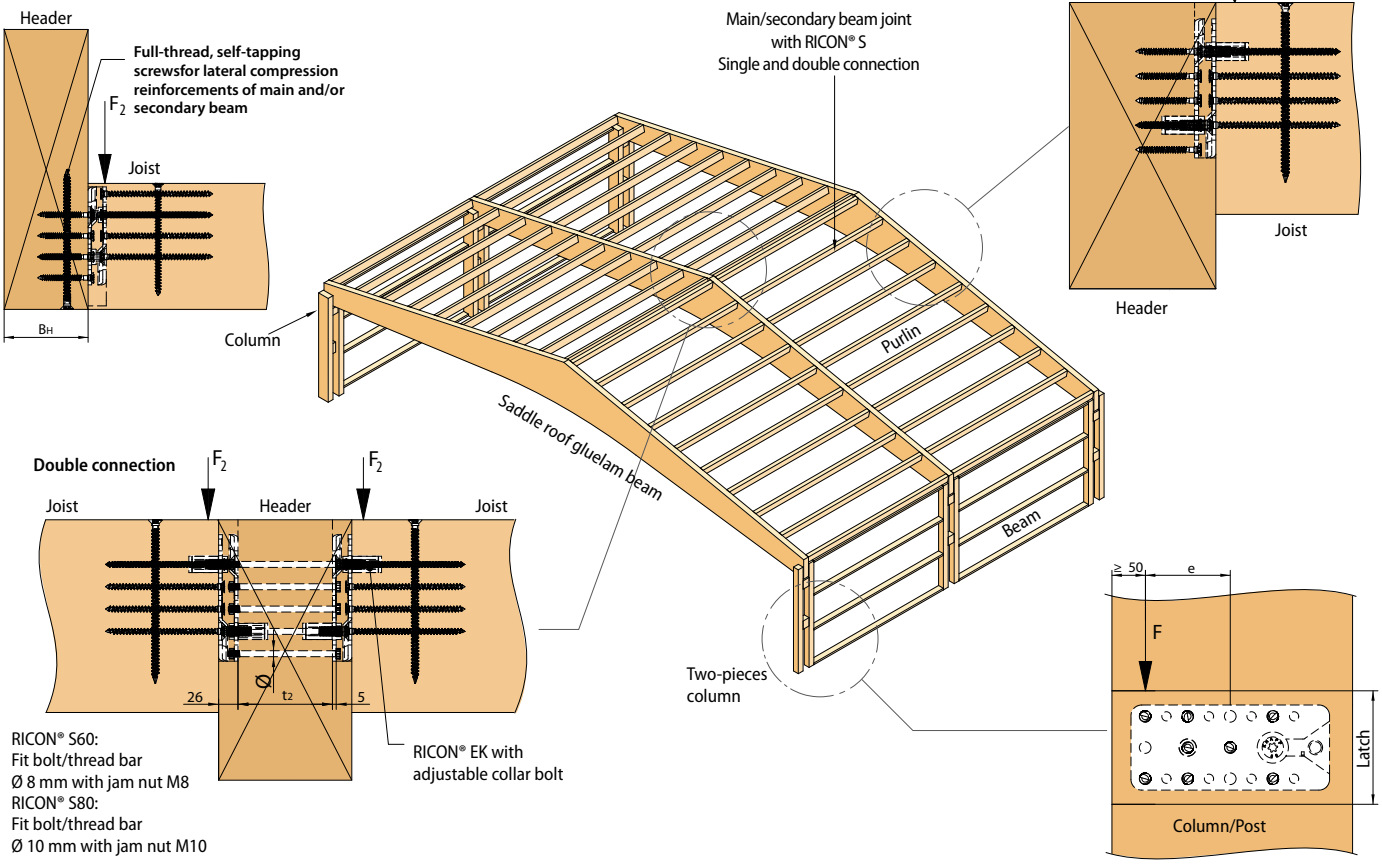
Adjustable collar bolt S80 with insert screw

RICON® S

Application examples and connection details

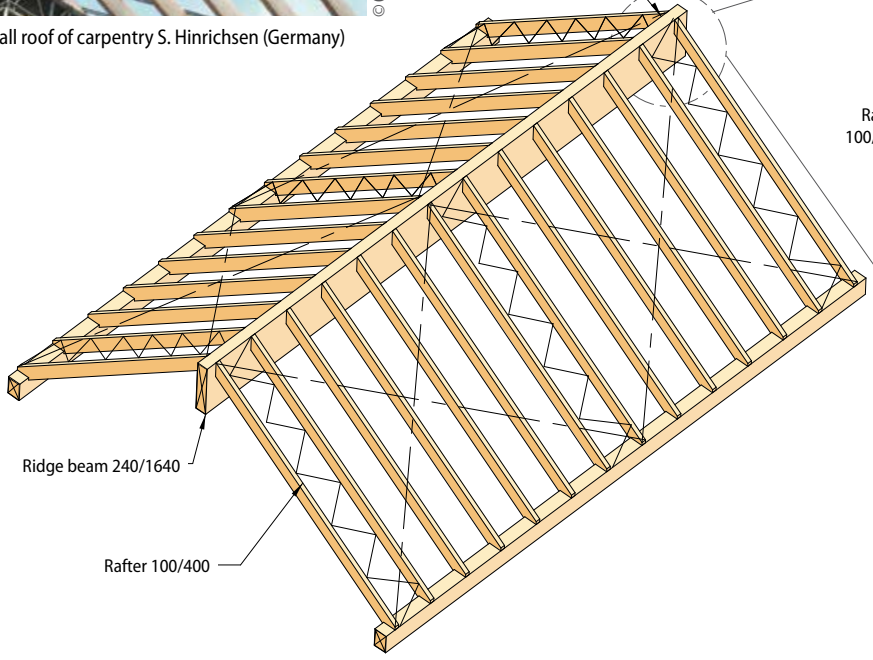
Ridged roof with purlins and post and beam connections

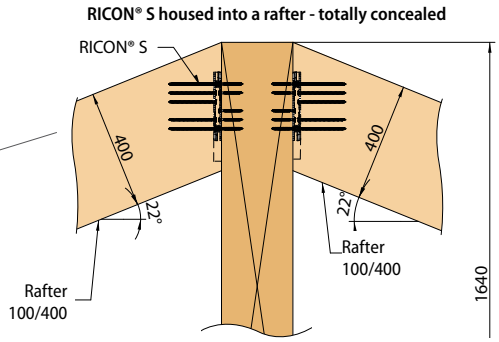
(Dimensions in mm)

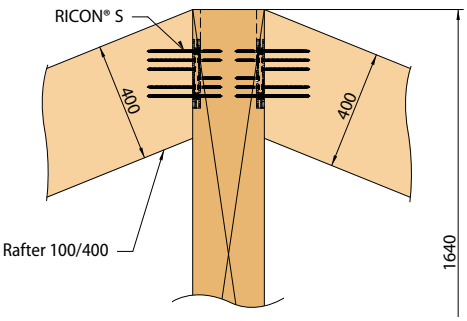


© Charpenterie S. Hinrichsen (DE)

Hall roof of carpentry S. Hinrichsen (Germany)





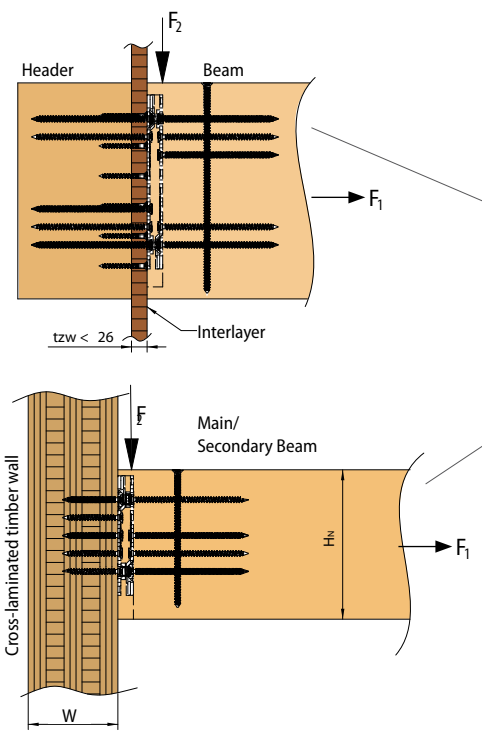


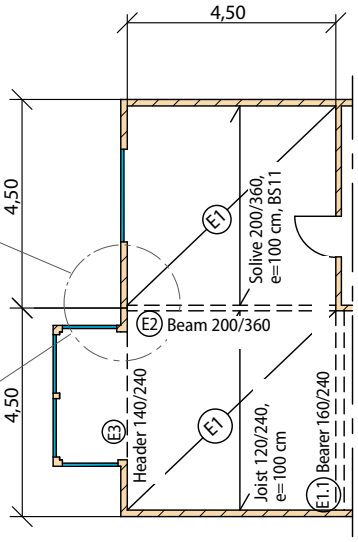
RICON®S

Timber engineering

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

(Dimensions in mm)



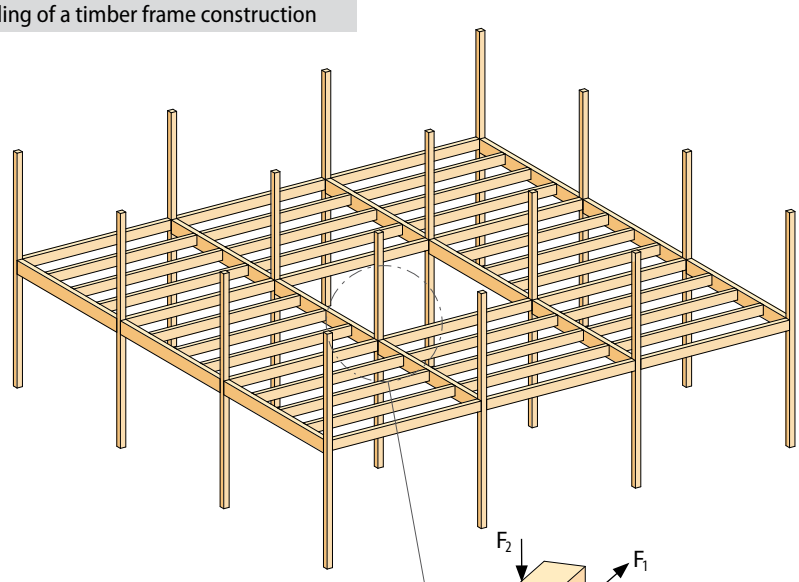


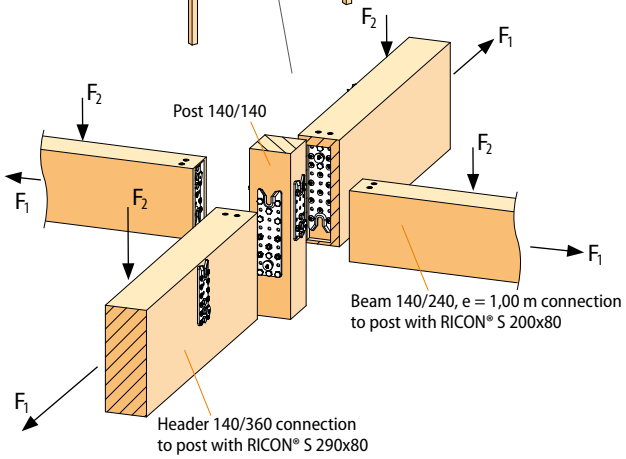
Main floor footprint

Steel connection

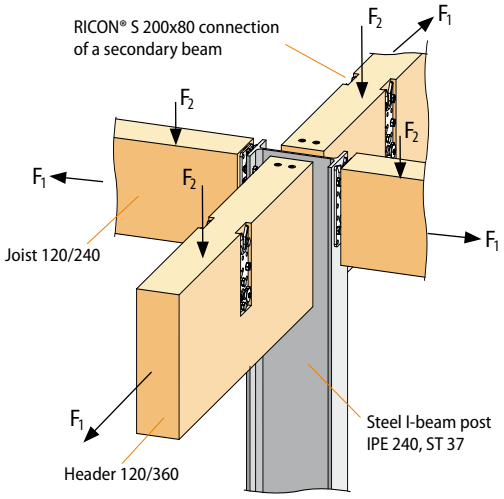
Ridge node for dome

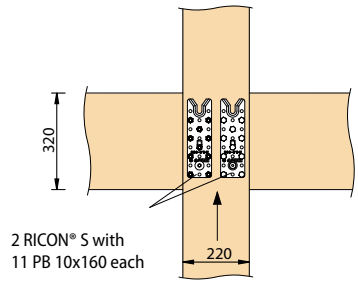
Ceiling of a timber frame construction

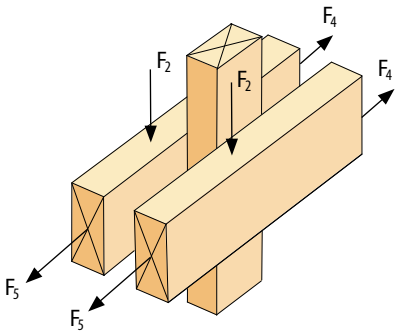




Alternative ways to connect





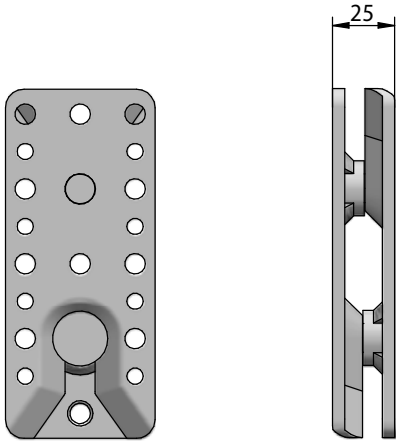


RICON®S 60 VS

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

Art.-No. K126

(Dimensions in mm)



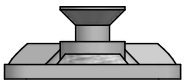
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K126 MIN ●	140/60	**VS**	7 x CS 8x160	7 x CS 8x80	26,9
K126 ST	140/60	**VS**	10 x CS 8x160	10 x CS 8x80	37,1
K126 MAX	140/60	**VS**	10 x CS 8x240	10 x CS 8x80	40,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

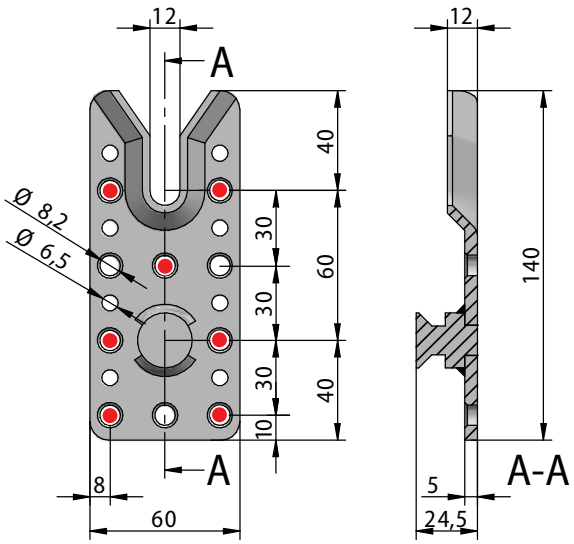
MIN = minimum screw connection ST = standard screw cxn. MAX = maximum screw cxn.

Minimum timber cross section: 100 x 160 mm

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



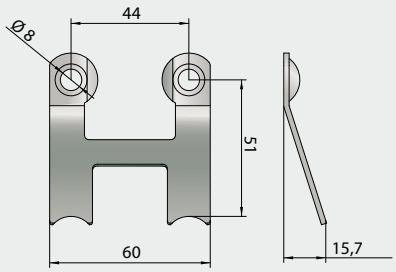


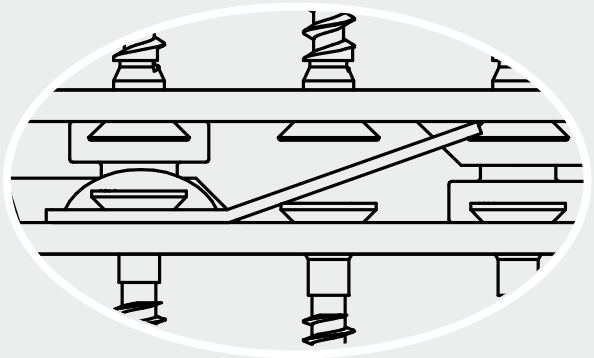
PRODUCT

RICON®S locking clip

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

Art.-No. K157





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

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

Art.-No. K126

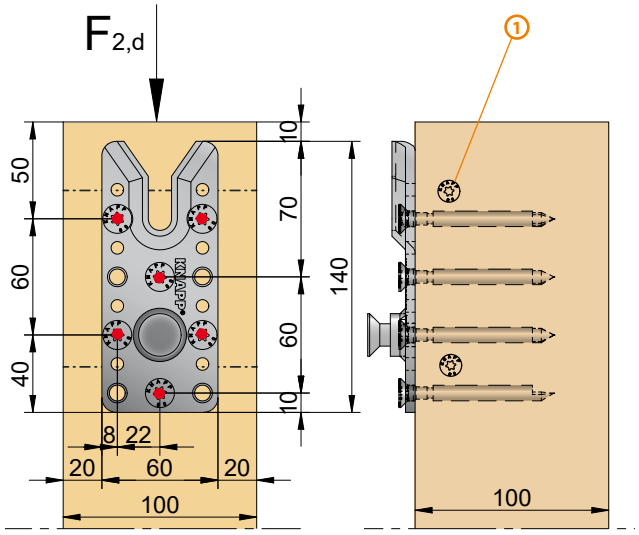
(Dimensions in mm)

Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K126 MIN ●	140x60	**VS**	6 x CS 8x80	100x100	26,3
K126 ST	140x60	**VS**	8 x CS 8x80	120x120	28,8
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

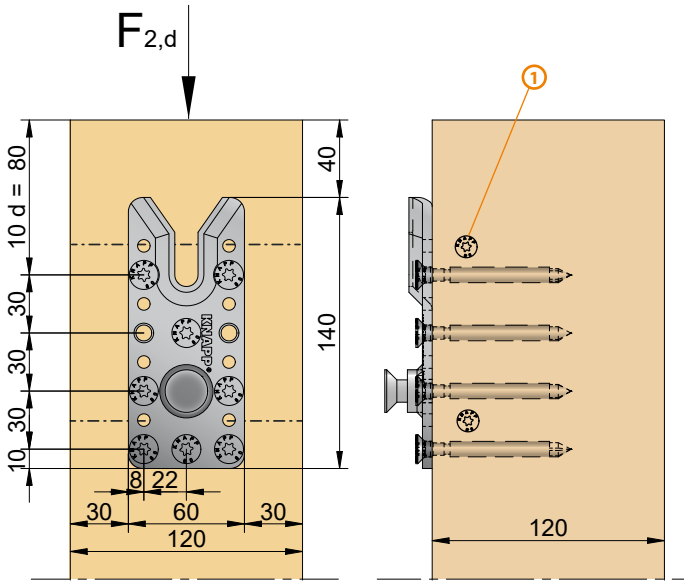
MIN = minimum screw connection ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



MIN. screw connection in column



ST. screw connection in column

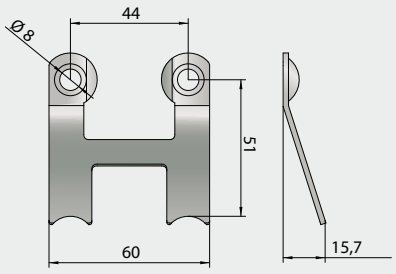
① **Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section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

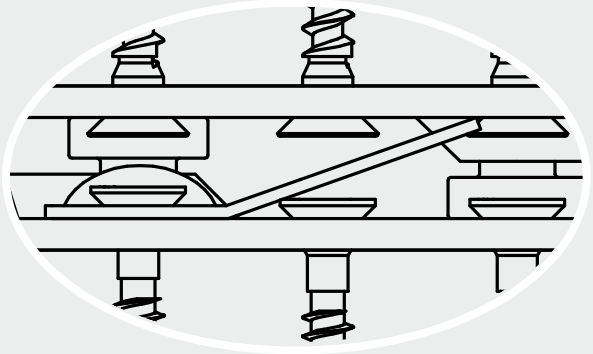
PRODUCT

RICON®S locking clip

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

Art.-No. K157





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

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

Art.-No. K126

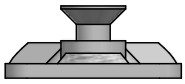
(Dimensions in mm)

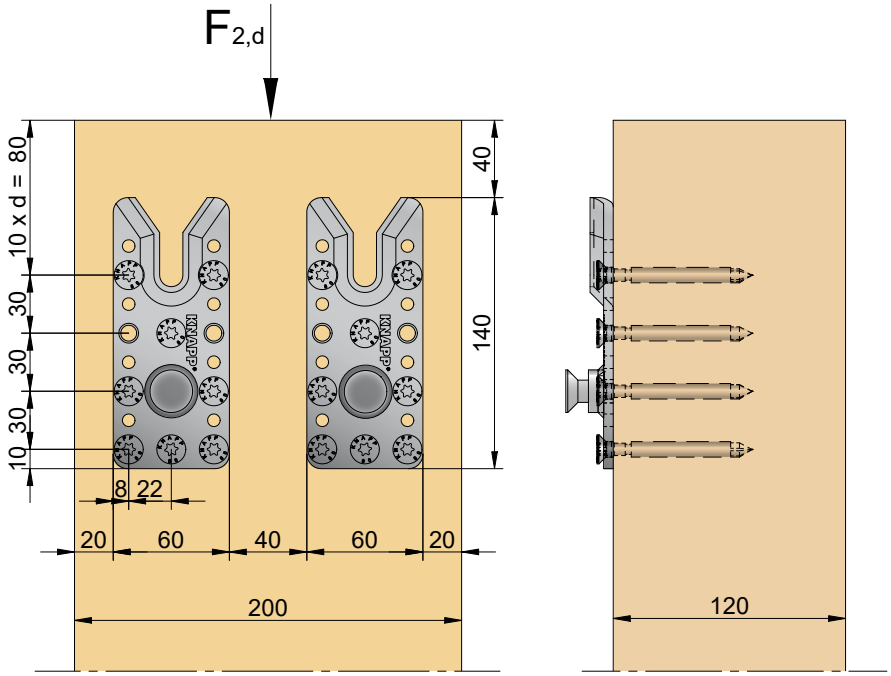
Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K126 ST	2x 140x60	**VS**	16 x CS 8x80	200x120	57,6
Axial tension: $F_{1,Rk}$ = 63 kN					
2 Clip locks: $F_{3,Rk}$ = 36 kN					

ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



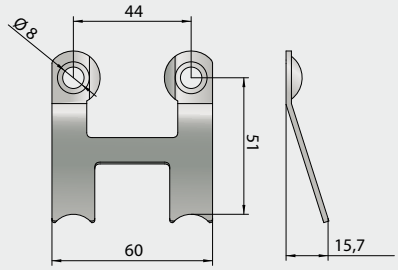


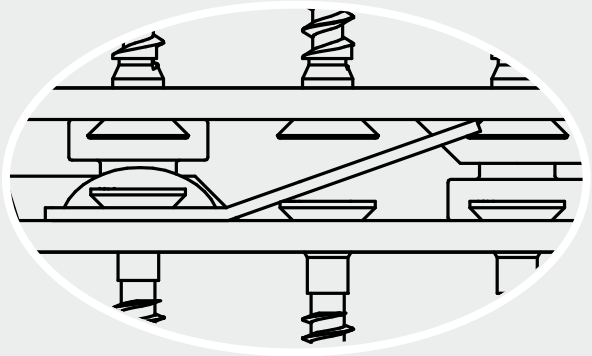
PRODUCT

RICON®S locking clip

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

Art.-No. K157



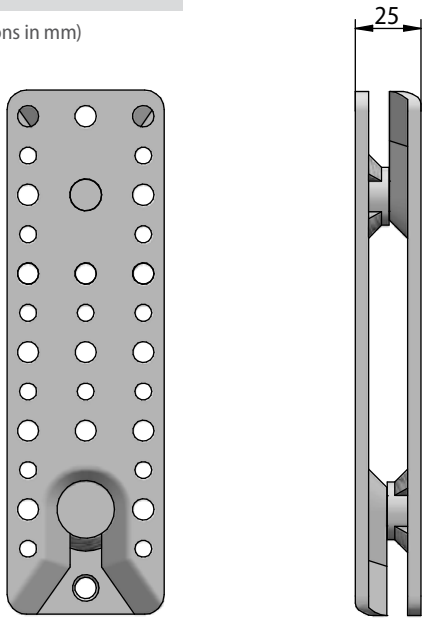


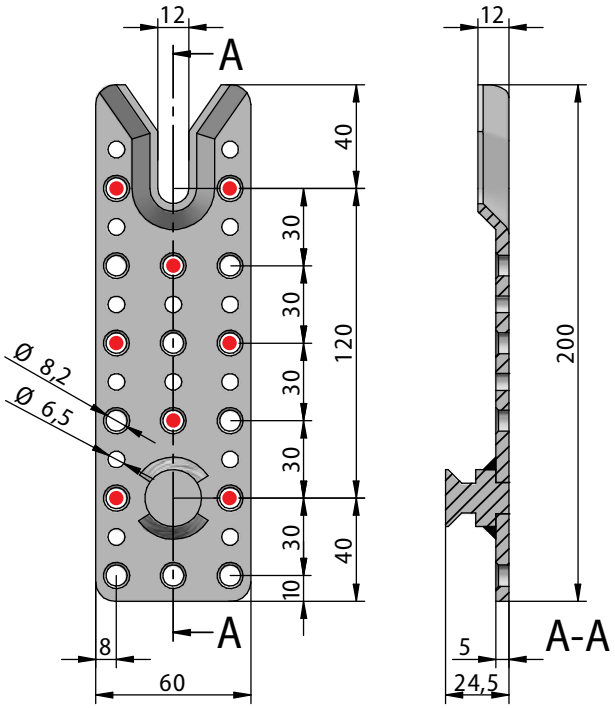
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

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

Art.-No. K127

(Dimensions in mm)





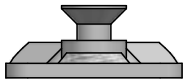
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K127 MIN ●	200/60	**VS**	8 x CS 8x160	8 x CS 8x80	30,4
K127 ST	200/60	**VS**	16 x CS 8x160	16 x CS 8x80	56,7
K127 MAX	200/60	**VS**	16 x CS 8x240	16 x CS 8x80	66,5
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

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

Minimum timber cross section: 120 x 320 mm

All design values can be found on our website under the Planner Service tab.

Welded collar bolt

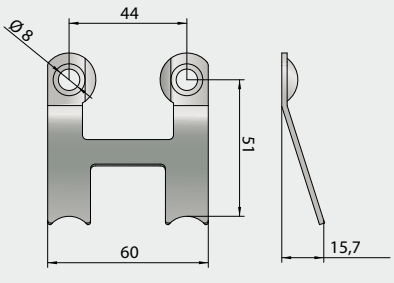


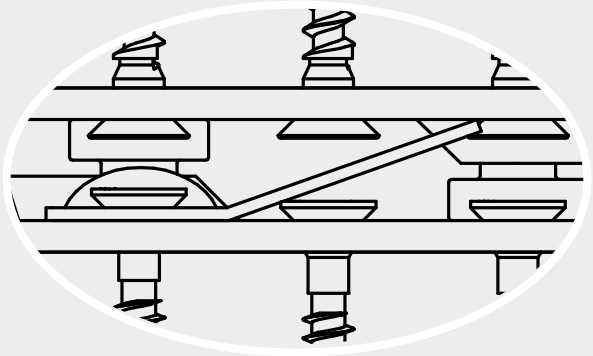
PRODUCT

RICON® S locking clip

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

Art.-No. K157





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

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

Art.-No. K127

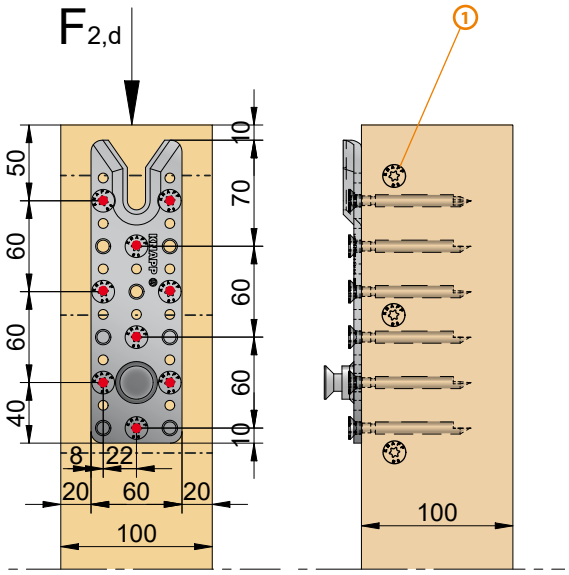
(Dimensions in mm)

Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K127 MIN ●	200x60	**VS**	9 x CS 8x80	100x100	41,9
K127 ST	200x60	**VS**	13 x CS 8x80	120x120	50,3
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

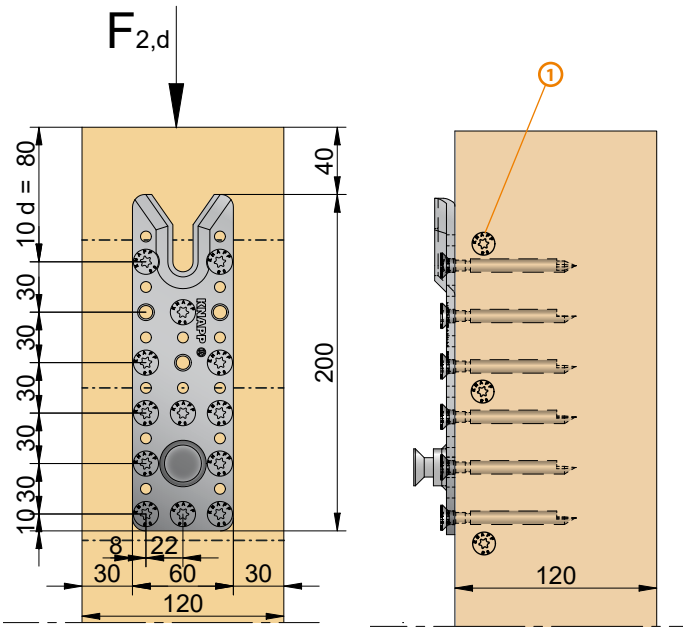
MIN = minimum screw connection ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



MIN. screw connection in column



ST. screw connection in column

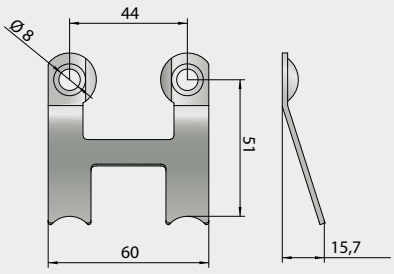
① **Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section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

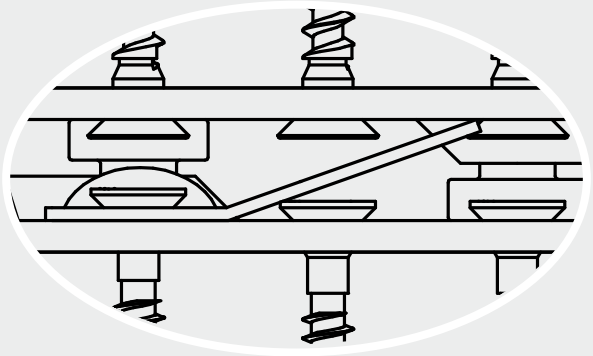
PRODUCT

RICON®S locking clip

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

Art.-No. K157





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

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

Art.-No. K127

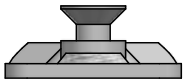
(Dimensions in mm)

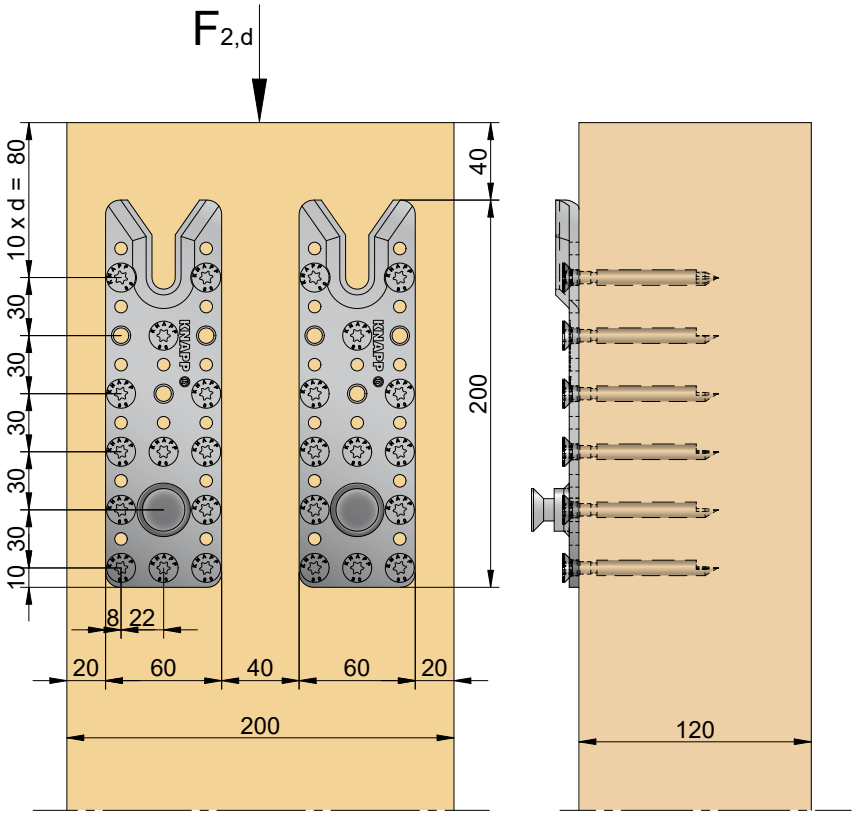
Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K127 ST	2x 200x60	**VS**	26 x CS 8x80	200x120	100,5
Axial tension: $F_{1,Rk}$ = 63 kN					
2 Clip locks: $F_{3,Rk}$ = 36 kN					

ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



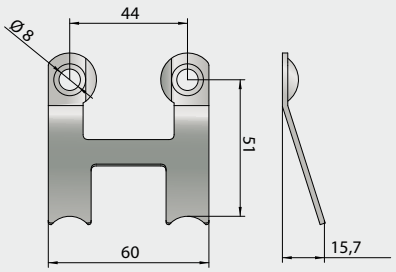


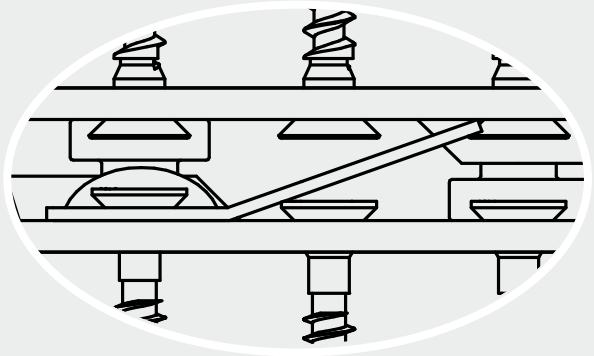
PRODUCT

RICON® S locking clip

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

Art.-No. K157





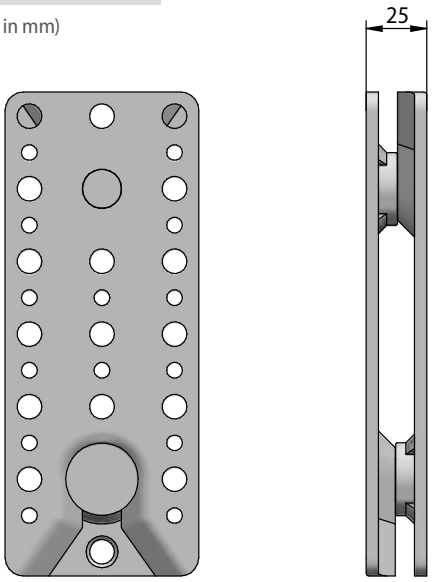
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 80 VS

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

Art.-No. K128

(Dimensions in mm)



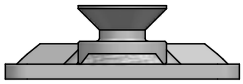
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K128 MIN ●	200/80	**VS**	8 x CS 10x200	8 x CS 10x100	42,4
K128 ST	200/80	**VS**	16 x CS 10x200	16 x CS 10x100	79,1
K128 MAX	200/80	**VS**	16 x CS 10x300	16 x CS 10x100	92,4
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

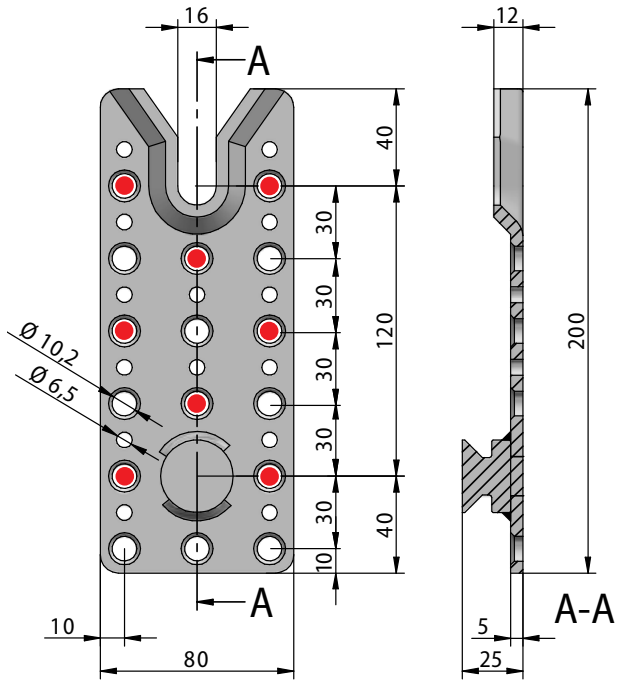
MIN = minimum screw connection ST = standard screw cxn. MAX = maximum screw cxn.

Minimum timber cross section: 120 x 320 mm

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



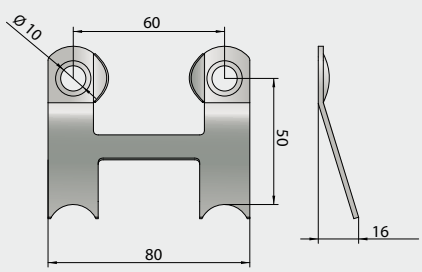


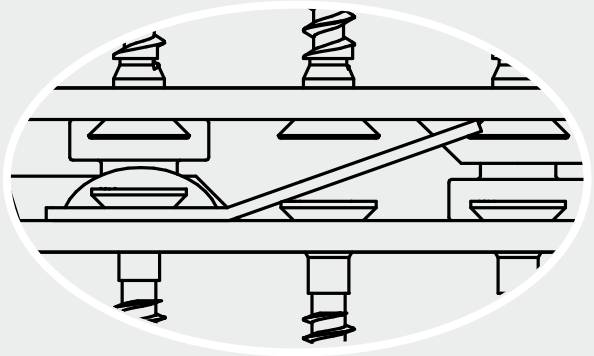
PRODUCT

RICON®S locking clip

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

Art.-No. K158





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

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

Art.-No. K128

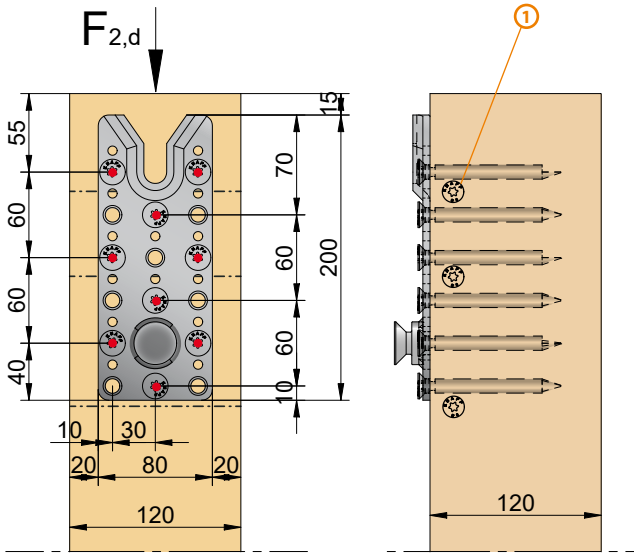
(Dimensions in mm)

Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K128 MIN ●	200/80	**VS**	9 x CS 8x80	120x120	56,8
K128 ST	200/80	**VS**	13 x CS 8x80	160x160	68,3
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

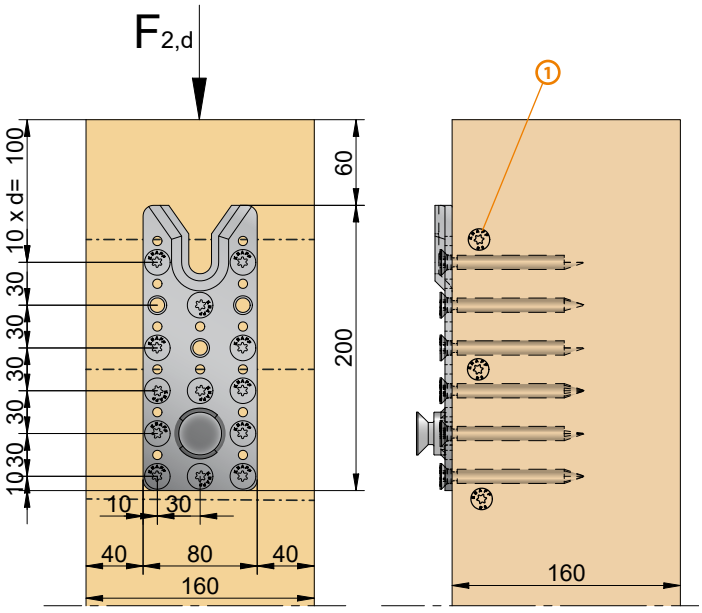
MIN = minimum screw connection ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



MIN. screw connection in column



ST. screw connection in column

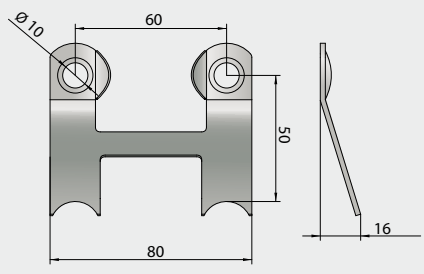
① **Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section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

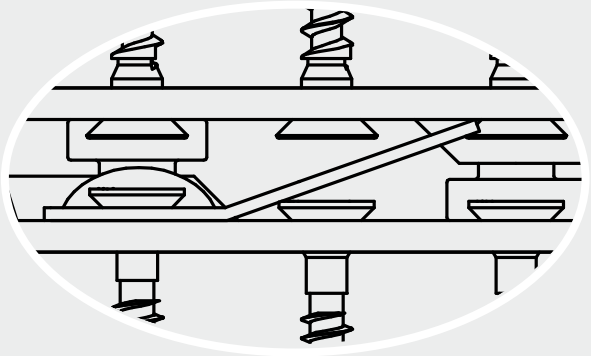
PRODUCT

RICON®S locking clip

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

Art.-No. K158





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

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

Art.-No. K128

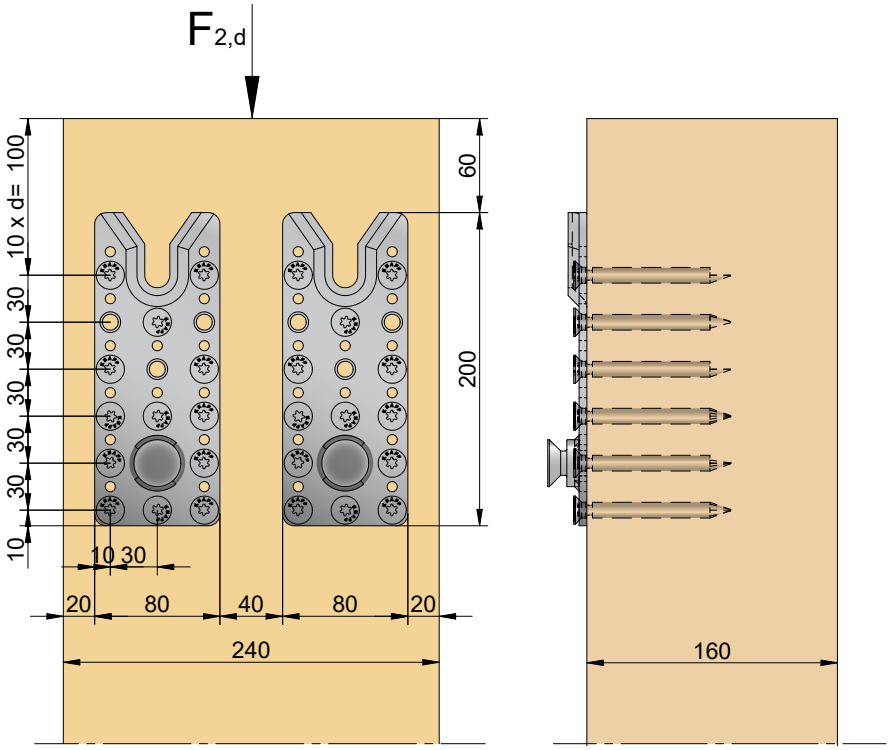
(Dimensions in mm)

Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K128 ST	2x 200x80	**VS**	26 x CS 10x100	240x160	136,6
Axial tension: $F_{1,Rk} = 72,0$ kN					
2 Clip locks: $F_{3,Rk} = 36,0$ kN					

ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt

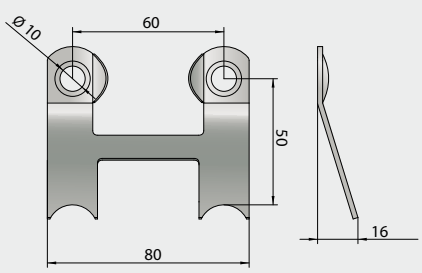


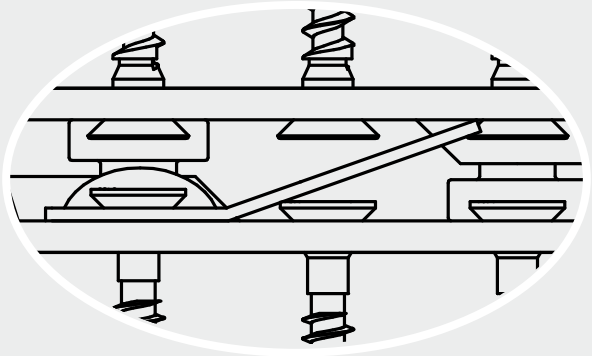
PRODUCT

RICON®S locking clip

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

Art.-No. K158



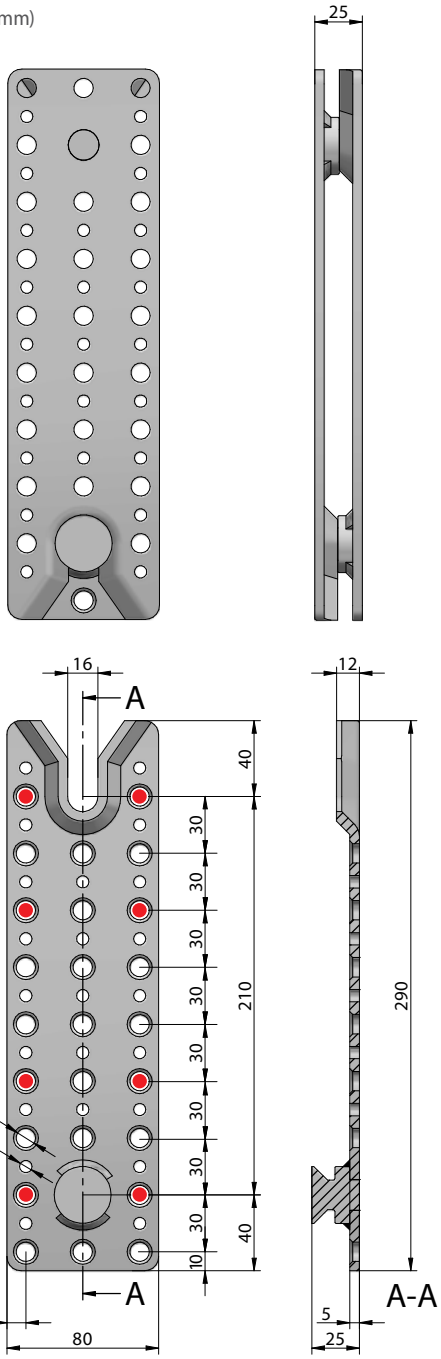


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

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

Art.-No. K129

(Dimensions in mm)



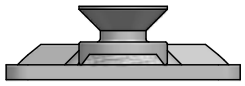
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K129 MIN ●	290/80	**VS**	8 x CS 10x200	8 x CS 10x100	42,4
K129 ST	290/80	**VS**	25 x CS 10x200	25 x CS 10x100	118,2
K129 MAX	290/80	**VS**	25x TF 10x300	25 x CS 10x100	142,7
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

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

Minimum timber cross section: 120 x 320 mm

All design values can be found on our website under the Planner Service tab.

Welded collar bolt

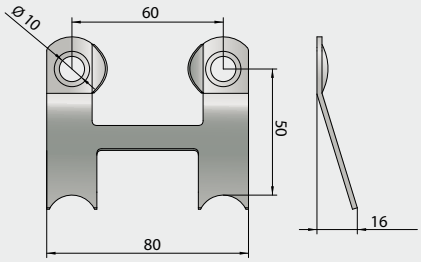


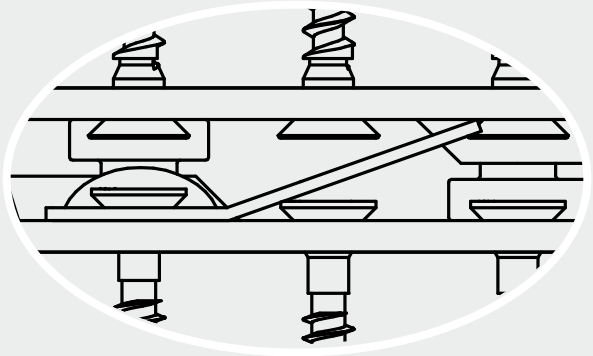
PRODUCT

RICON® S locking clip

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

Art.-No. K158





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

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

Art.-No. K129

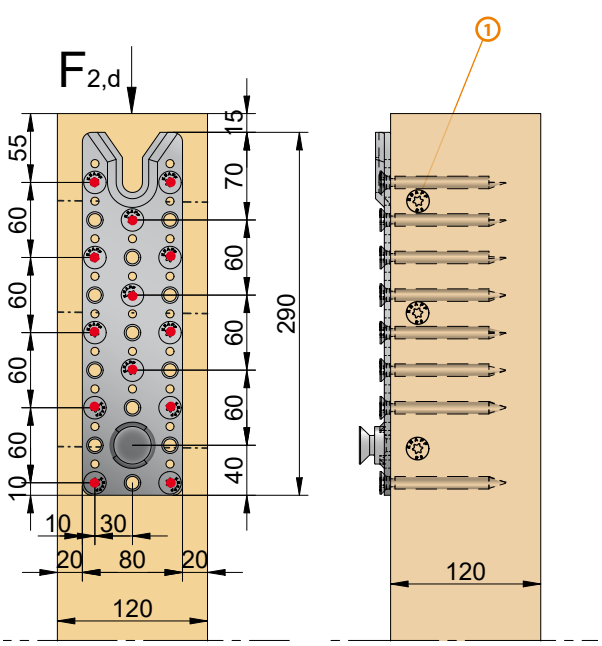
(Dimensions in mm)

Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. val. [GL24h] $F_{2,Rk}$ [kN]
K129 MIN ●	290x80	**VS**	13 x CS 10x100	120x120	84,4
K129 ST	290x80	**VS**	20 x CS 10x100	160x160	108,5
Axial tension: $F_{1,Rk} = 36,0$ kN					
Clip lock: $F_{3,Rk} = 18,0$ kN					

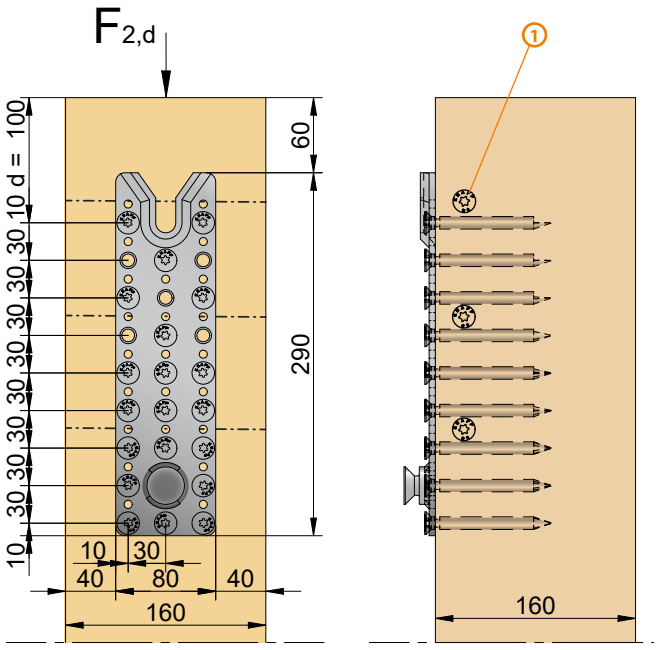
MIN = minimum screw connection ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt



MIN. screw connection in column



ST. screw connection in column

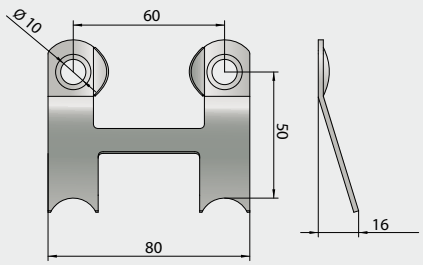
① **Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section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

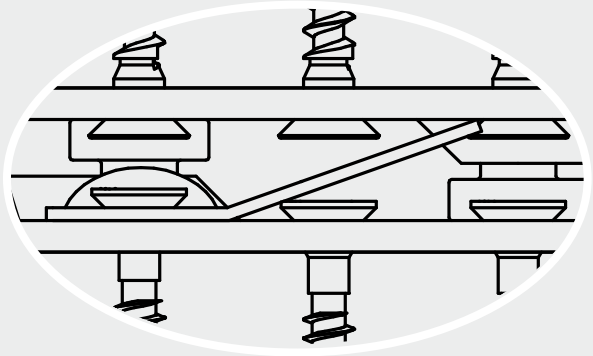
PRODUCT

RICON®S locking clip

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

Art.-No. K158





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

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

Art.-No. K129

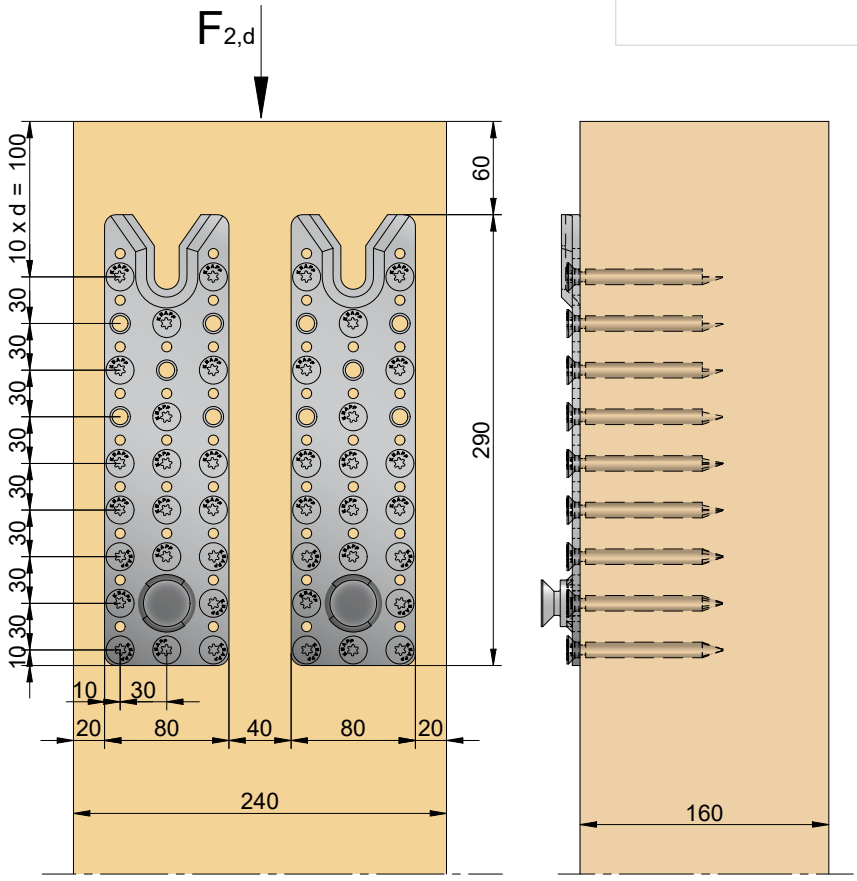
(Dimensions in mm)

Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. values [GL24h] $F_{2,Rk}$ [kN]
K129 ST	2x 290x80	**VS**	40 x CS 10x100	240x160	216,9
Axial tension: $F_{1,Rk}$ = 72,0 kN					
2 Clip locks: $F_{3,Rk}$ = 36,0 kN					

ST = standard screw connection

All design values can be found on our website under the Planner Service tab.

Welded collar bolt

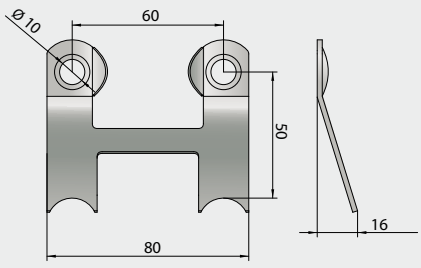


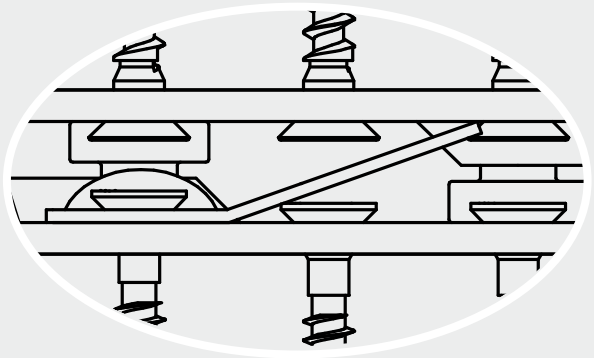
PRODUCT

RICON® S locking clip

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

Art.-No. K158



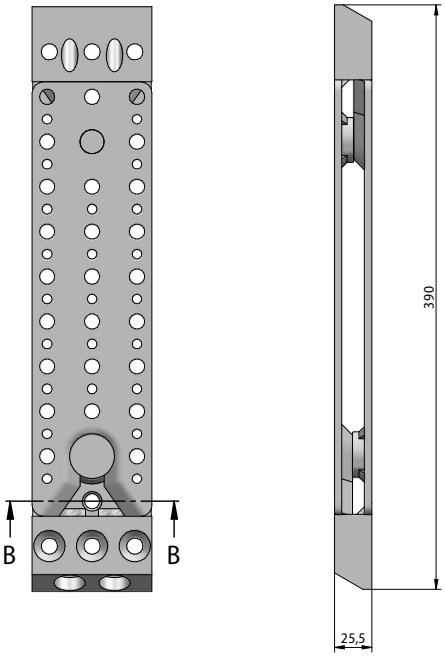


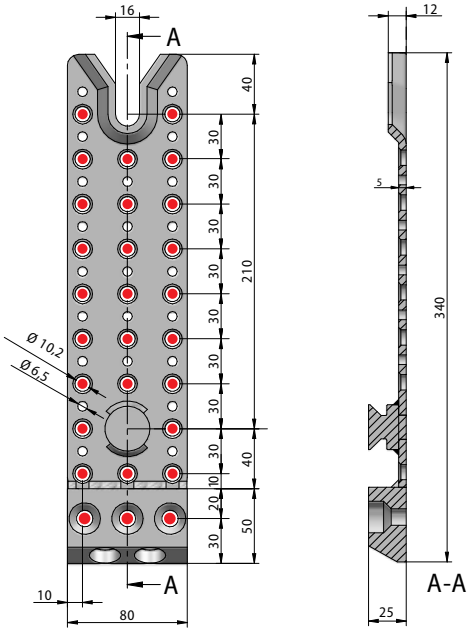
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

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

Art.-No. K191

(Dimensions in mm)





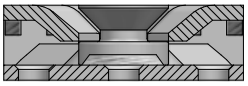
A-A cut

Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K191 MIN ●	390/80	VS	28 x CS 10x200	28 x CS 10x100	130,9
K191 ST	390/80	VS	28 x CS 10x200	28 x CS 10x100	170,9
			2 x CS 10x450	2 x CS 10x400	
K191 MAX	390/80	VS	28x TF 10x300	28 x CS 10x100	195,9
			2 x CS 10x450	2 x CS 10x400	
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

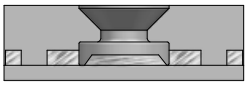
MIN = minimum screw connection ST = standard screw cxn. MAX = maximum screw cxn.

Minimum timber cross section: 120 x 720 mm ou 160 x 520 mm
All design values can be found on our website under the Planner Service tab.

Welded collar bolt



B-B cut



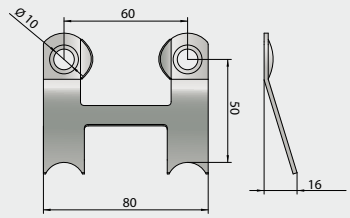
View with additional plate

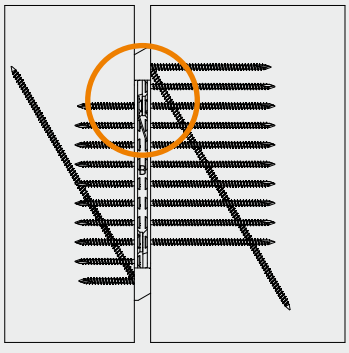
PRODUCT

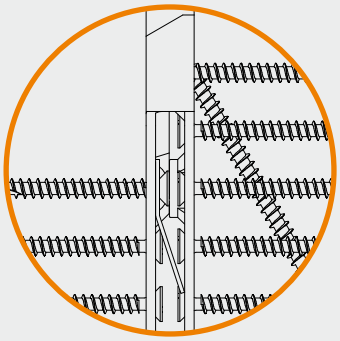
RICON®S locking clip

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

Art.-No. K158







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

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

Art.-No. K191

(Dimensions in mm)

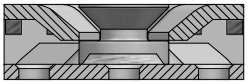
Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. val. [GL24h] $F_{2,Rk}$ [kN]
K191 MIN ●	390/80	VS	23 SK 10x100	160 x160	125,3
K191 ST	390/80	VS	23 SK 10x100 2 x CS 10x400	160 x 200	174,4
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

MIN = minimum screw connection ST = standard screw connection

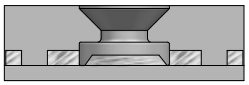
All design values can be found on our website under the Planner Service tab.

PRODUCT

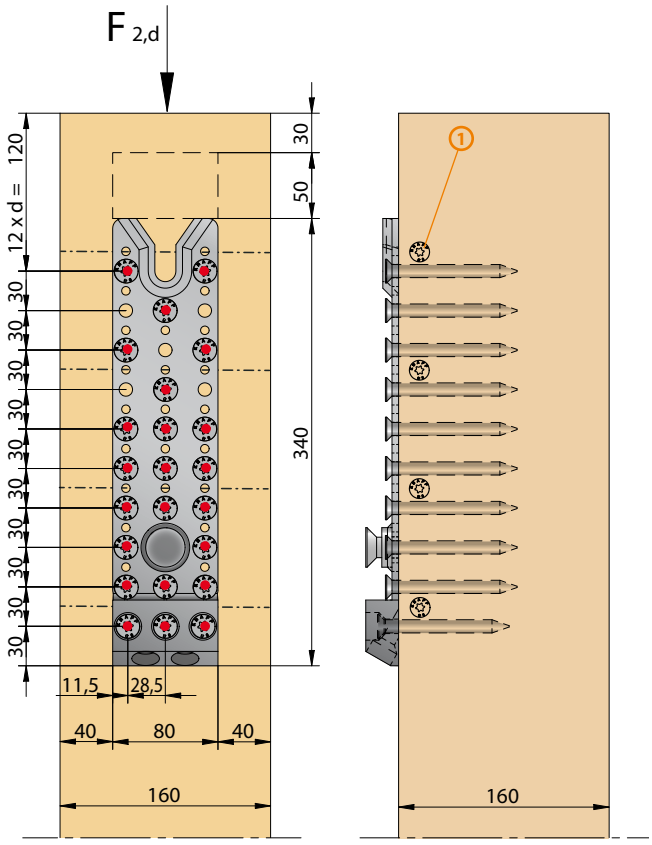
Welded collar bolt



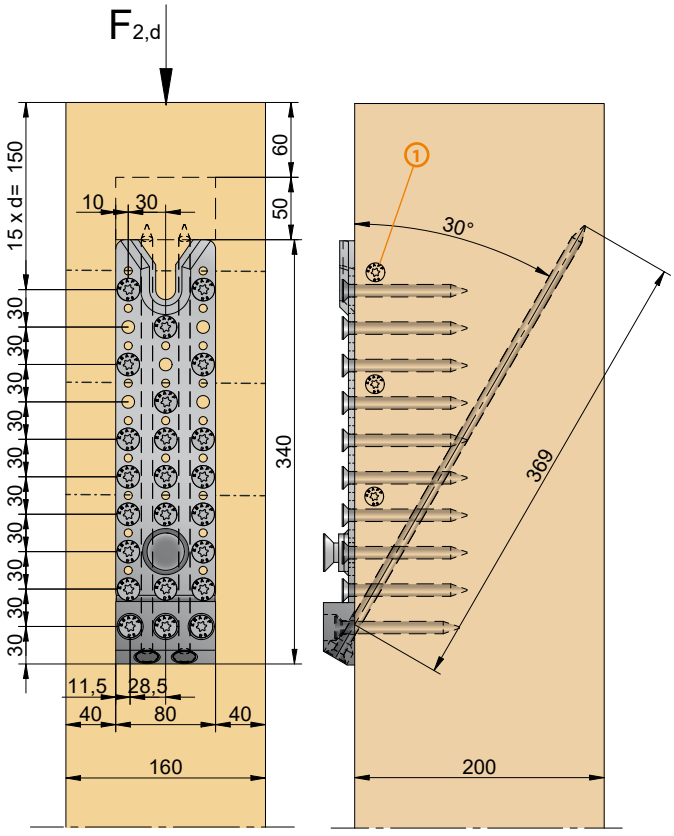
B-B cut



View with additional plate



MIN. screw connection in column



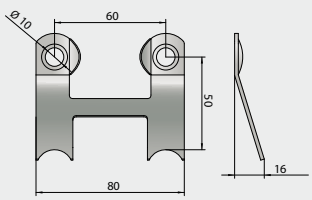
ST. screw connection in column

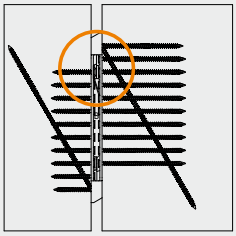
① **Arrangement of fully threaded screws for transverse tensile reinforcement. According to the expert opinion (10.09.2021) of Prof. Dr. Blaß, the transverse tensile bolts should have the same screw diameter as the RICON®S screws used. These bolts should have the same length as the column cross-section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

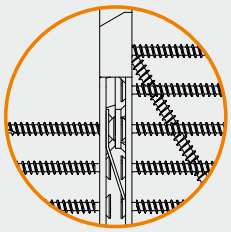
RICON®S locking clip

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

Art.-No. K158







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

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

Art.-No. K191

(Dimensions in mm)

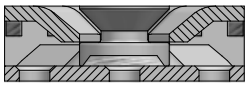
Art.-No.	Connector	Collar bolt	Post screw connection	Min. timber cross-section (mm)	Charact. val. [GL24h] $F_{2,Rk}$ [kN]
K191 MIN ●	390/80	**VS**	46 SK 10x100	240 x160	250,7
K191 ST	390/80	**VS**	46 SK 10x100 4 x CS 10x400	240 x 200	347,5
Axial tension: $F_{1,Rk}$ = 72,0 kN					
2 Clip locks: $F_{3,Rk}$ = 36,0 kN					

MIN = minimum screw connection ST = standard screw connection

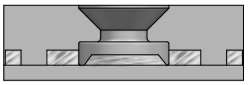
All design values can be found on our website under the Planner Service tab.

PRODUCT

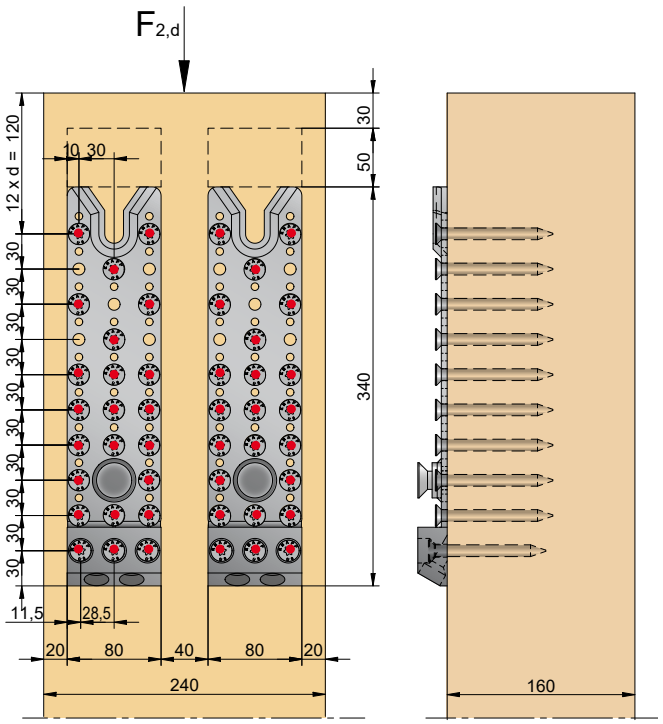
Welded collar bolt



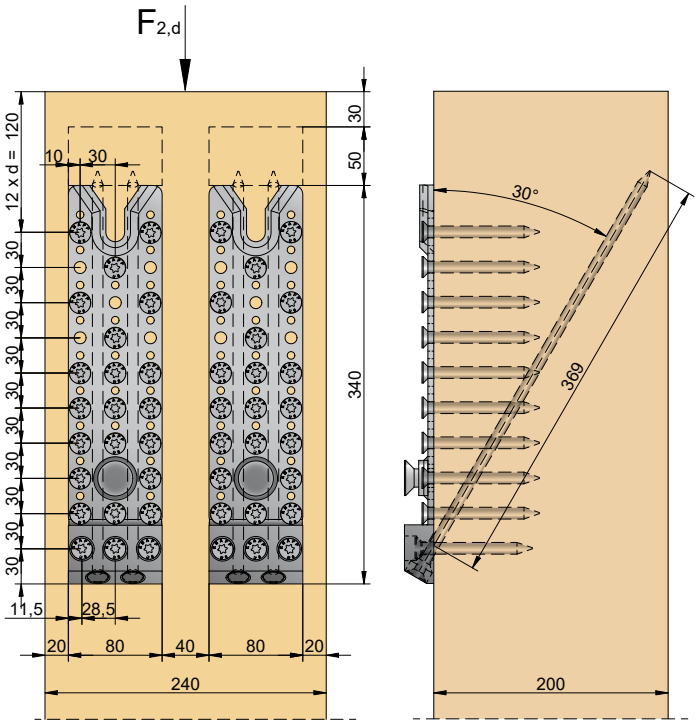
B-B cut



View with additional plate



MIN. screw connection in column

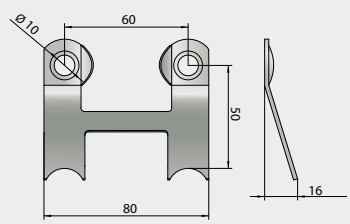


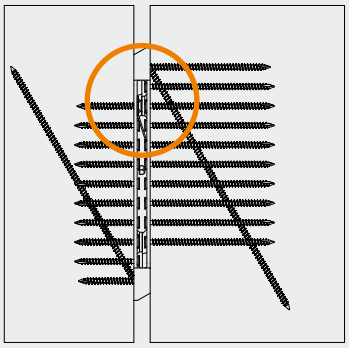
ST. screw connection in column

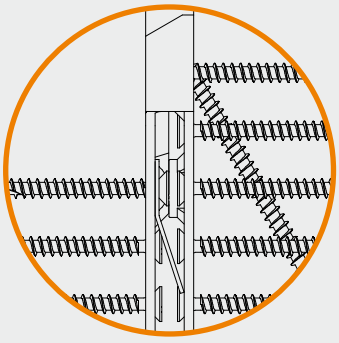
RICON®S locking clip

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

Art.-No. K158







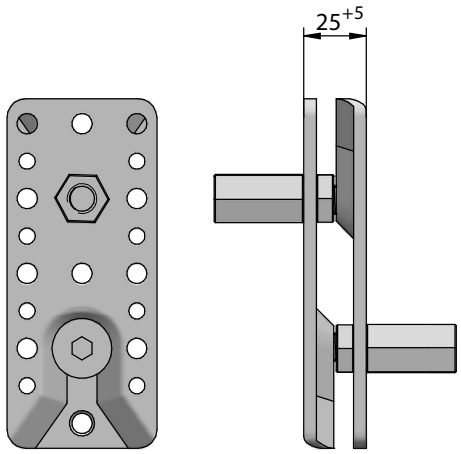
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 60 EK

RICON®S 140/60 EK - Adjustable collar bolt

Art.-No. K146

(Dimensions in mm)



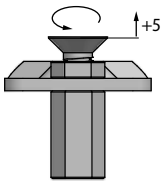
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K146 MIN ●	140/60	**EK M12**	7 x CS 8x160	7 x CS 8x80	26,9
K146 ST	140/60	**EK M12**	10 x CS 8x160	10 x CS 8x80	37,1
K146 MAX	140/60	**EK M12**	10 x CS 8x240	10 x CS 8x80	40,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

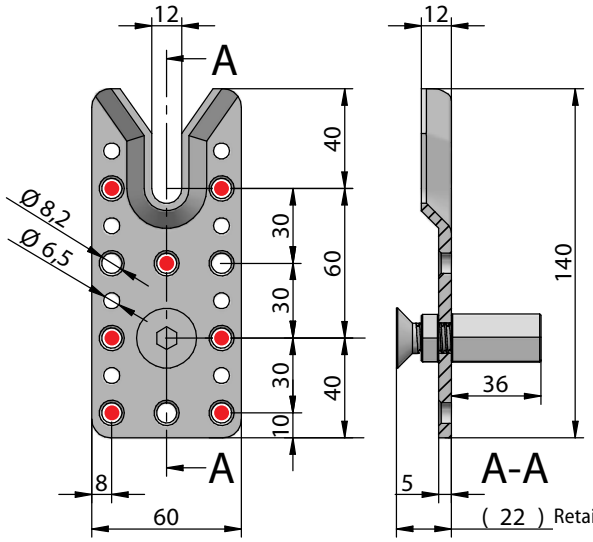
MIN = minimum screw connection ST = standard screw cxn. MAX = maximum screw cxn.

Minimum timber cross section: 100 x 160 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt, for tolerance adjustment



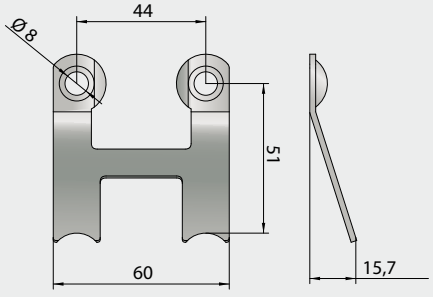


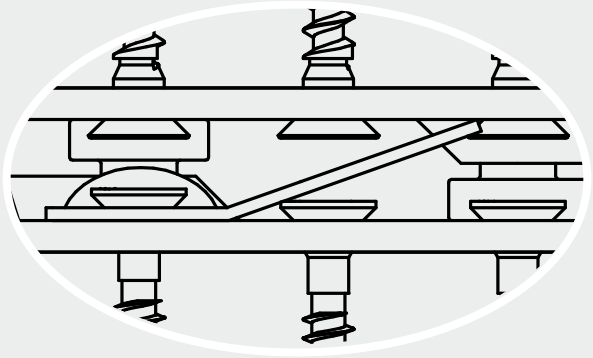
PRODUCT

RICON®S locking clip

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

Art.-No. K157



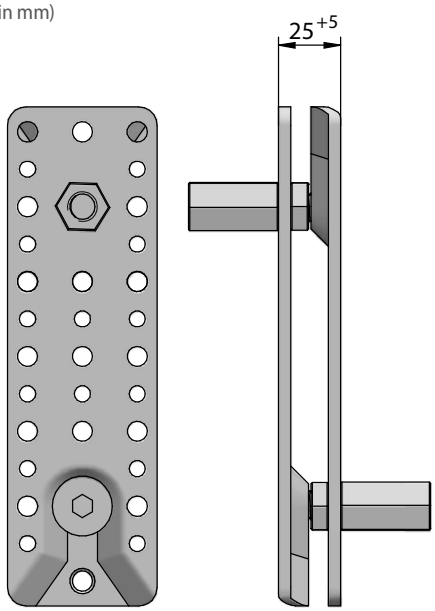


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 200/60 EK - Adjustable collar bolt

Art.-No. K148

(Dimensions in mm)



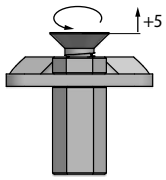
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K148 MIN ●	200/60	**EK M12**	8 x CS 8x160	8 x CS 8x80	30,4
K148 ST	200/60	**EK M12**	16 x CS 8x160	16 x CS 8x80	44,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

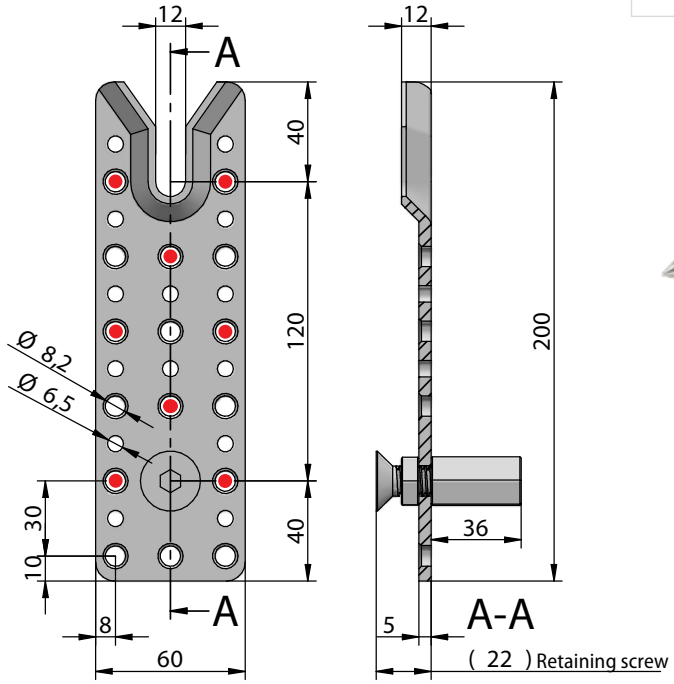
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 100 x 220 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt, for tolerance adjustment



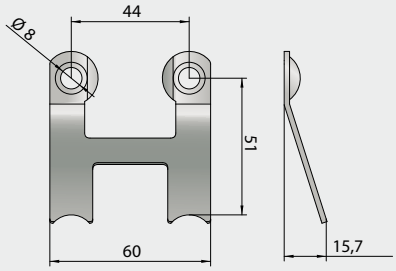


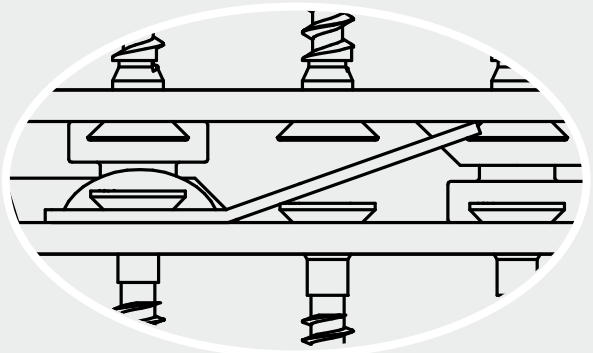
PRODUCT

RICON®S locking clip

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

Art.-No. K157





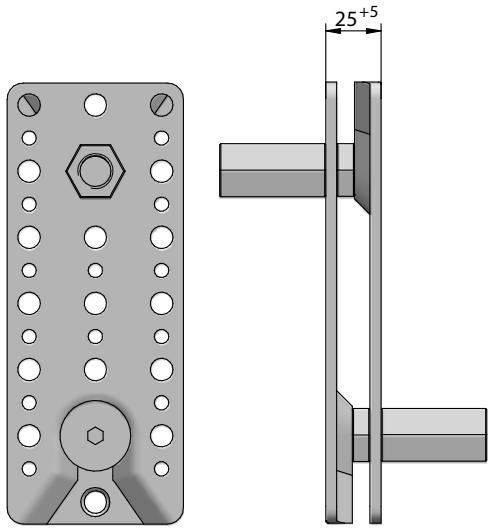
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON® S 80 EK

RICON® S 200/80 EK - Adjustable collar bolt

Art.-No. K153

(Dimensions in mm)



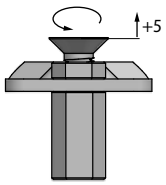
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K153 MIN ●	200/80	**EK M16**	8 x CS 10x200	8 x CS 10x100	42,4
K153 ST	200/80	**EK M16**	16 x CS 10x200	16 x CS 10x100	65,0
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

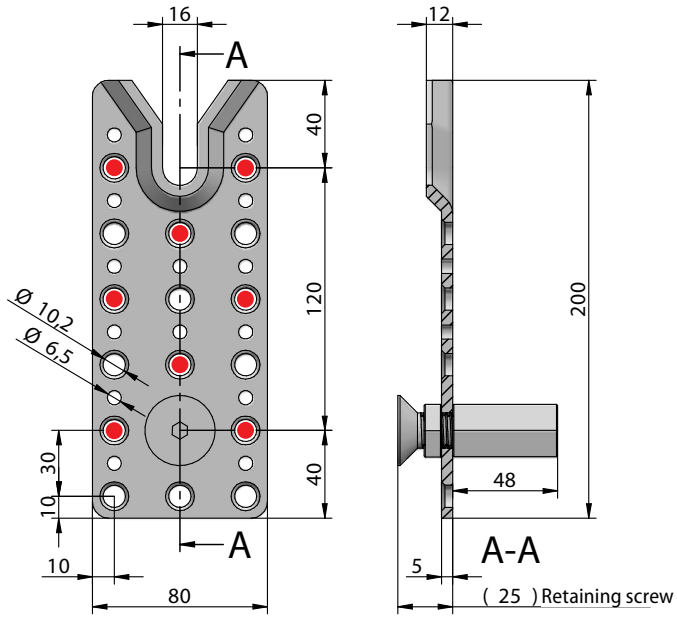
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt, for tolerance adjustment



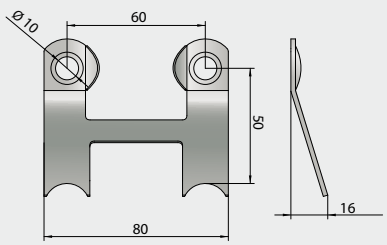


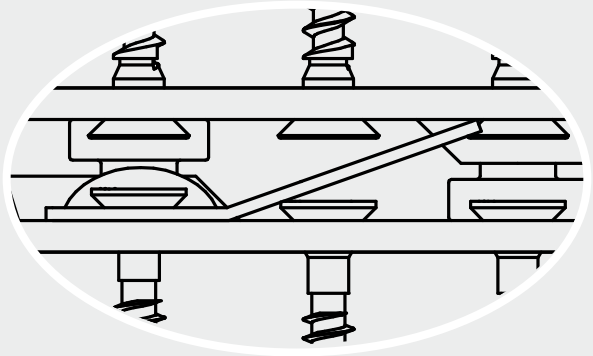
PRODUCT

RICON® S locking clip

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

Art.-No. K158



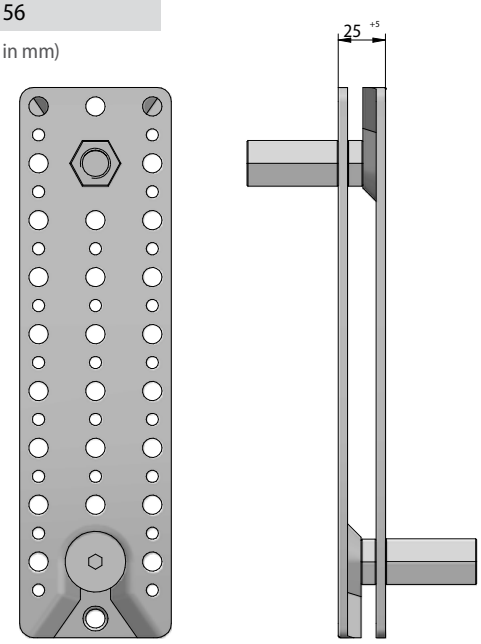


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 290/80 EK - Adjustable collar bolt

Art.-No. K156

(Dimensions in mm)



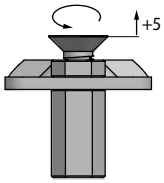
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K156 MIN ●	290/80	**EK M16**	8 x CS 10x200	8 x CS 10x100	42,4
K156 ST	290/80	**EK M16**	20 x CS 10x200	20 x CS 10x100	72,2
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

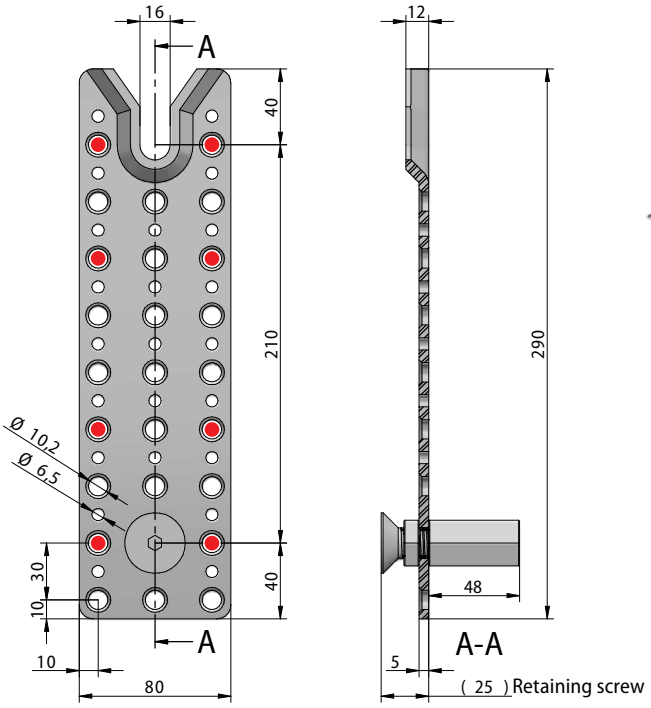
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt, for tolerance adjustment



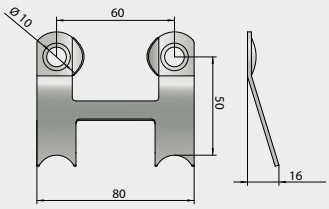


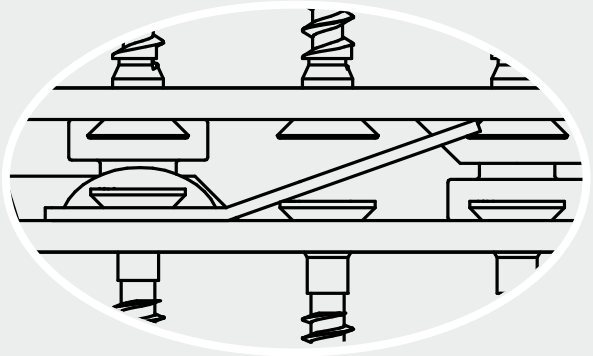
PRODUCT

RICON®S locking clip

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

Art.-No. K158





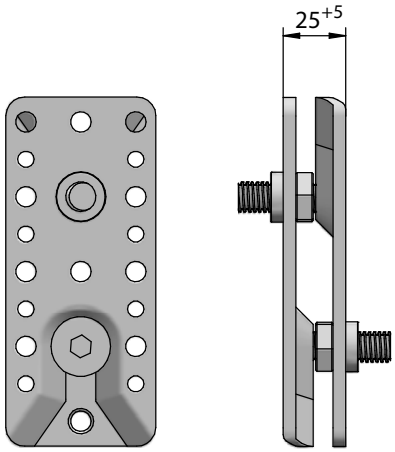
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON® S 60 EK

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

Art.-No. K280

(Dimensions in mm)



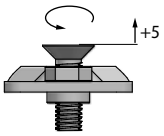
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K280 MIN ●	140/60	**EK M12**	7 x CS 8x160	7 x CS 8x80	26,9
K280 ST	140/60	**EK M12**	10 x CS 8x160	10 x CS 8x80	37,1
K280 MAX	140/60	**EK M12**	10 x CS 8x240	10 x CS 8x80	40,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

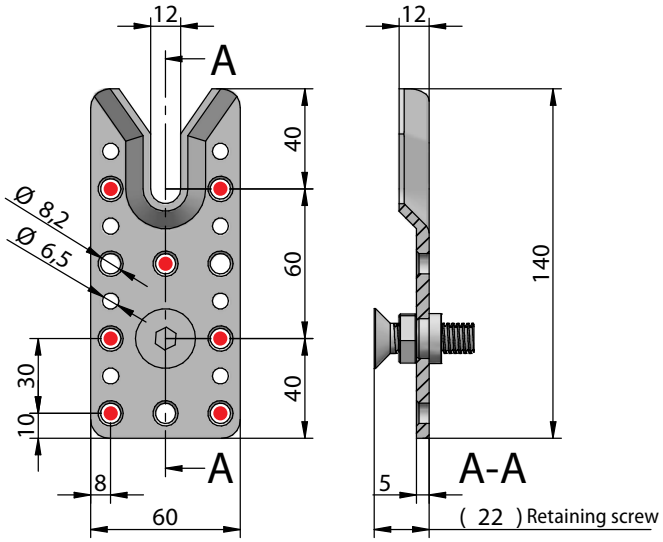
MIN = minimum screw connection ST = standard screw cxn. MAX = maximum screw cxn.

Minimum timber cross section: 100 x 160 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt and insert screw



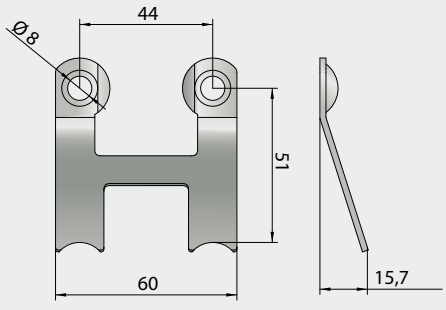


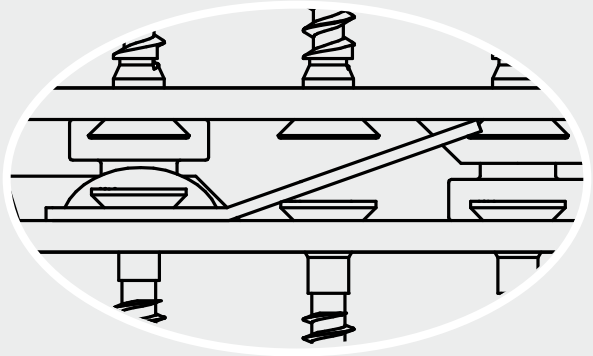
PRODUCT

RICON® S locking clip

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

Art.-No. K157



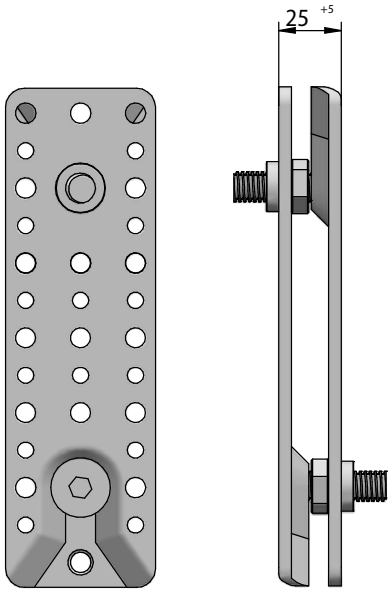


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

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

Art.-No. K281

(Dimensions in mm)



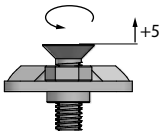
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K281 MIN ●	200/60	**EK M12**	8 x CS 8x160	8 x CS 8x80	30,4
K281 ST	200/60	**EK M12**	16 x CS 8x160	16 x CS 8x80	44,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

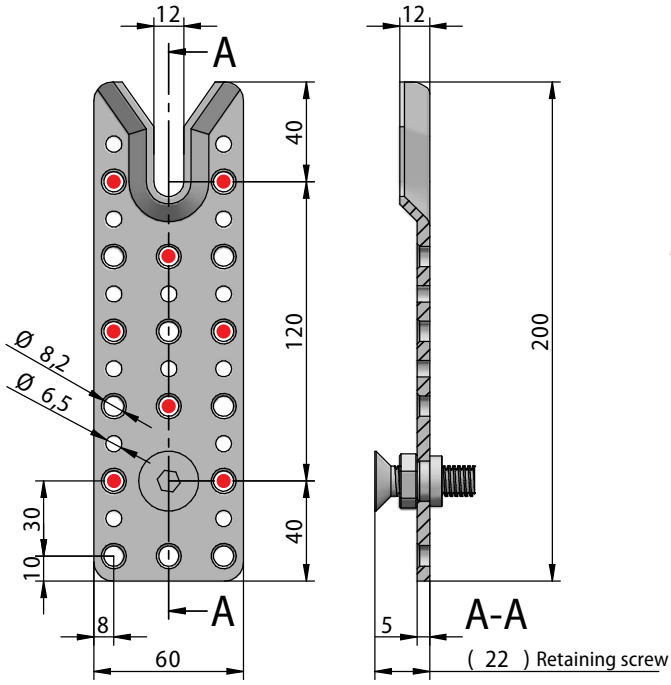
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 100 x 220 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt and insert screw



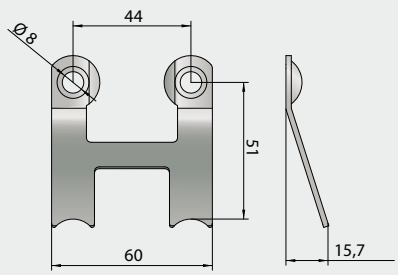


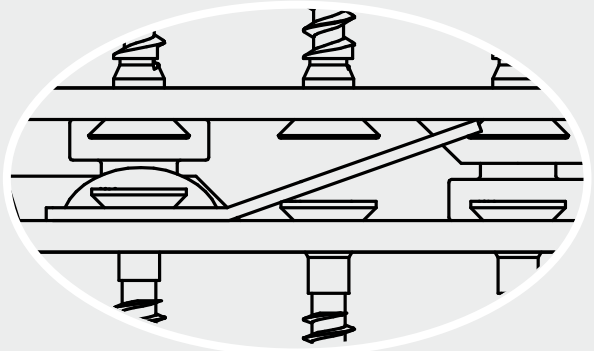
PRODUCT

RICON®S locking clip

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

Art.-No. K157





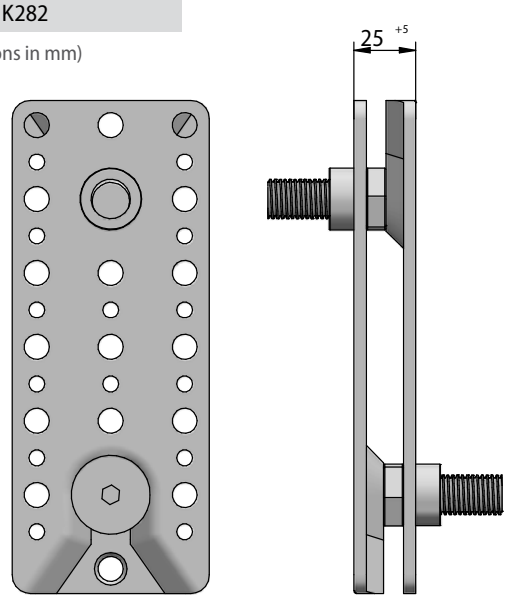
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON® S 80 EK

RICON® S 200/80 EK M16 - Adjustable collar bolt and insert screw

Art.-No. K282

(Dimensions in mm)



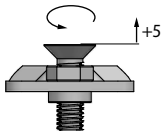
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K282 MIN ●	200/80	**EK M16**	8 x CS 10x200	8 x CS 10x100	42,4
K282 ST	200/80	**EK M16**	16 x CS 10x200	16 x CS 10x100	65,0
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

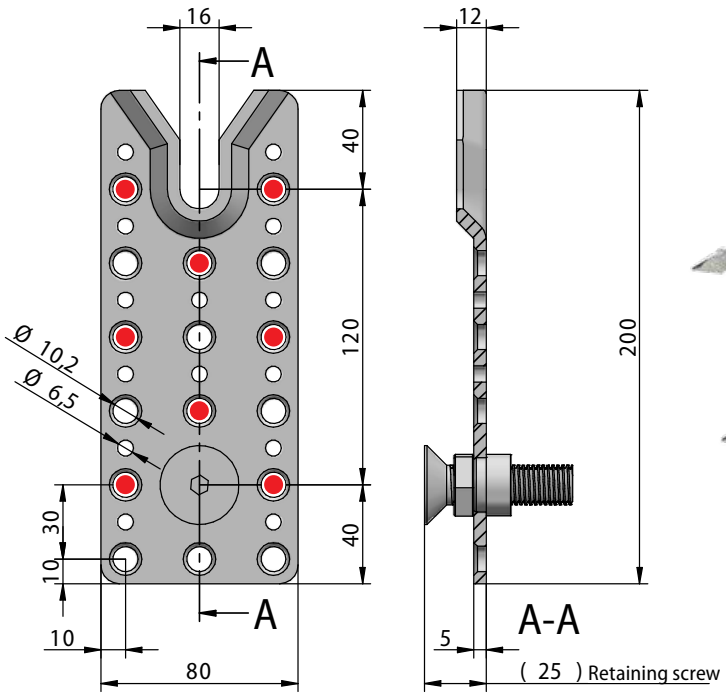
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt and insert screw



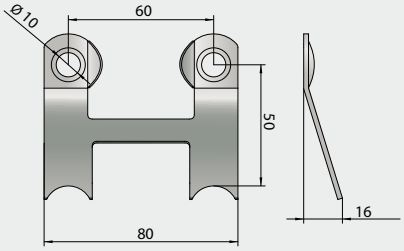


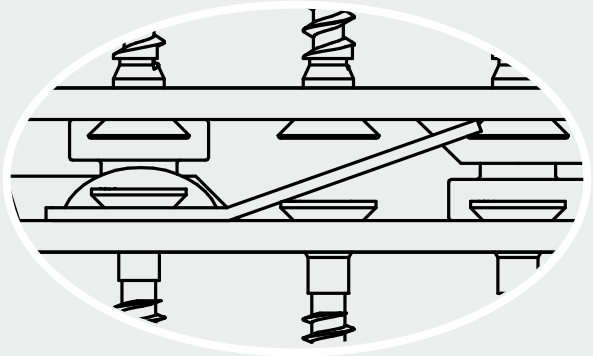
PRODUCT

RICON® S locking clip

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

Art.-No. K158



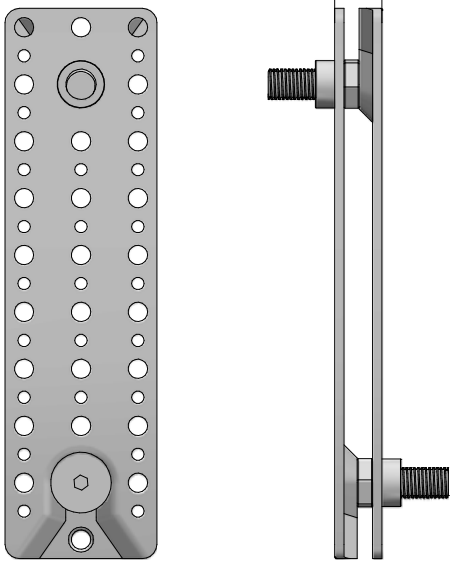


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 290/80 EK M16 - Adjustable collar bolt and insert screw

Art.-No. K283

(Dimensions in mm)



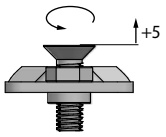
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K283 MIN ●	290/80	**EK M16**	8 x CS 10x200	8 x CS 10x100	42,4
K283 ST	290/80	**EK M16**	20 x CS 10x200	20 x CS 10x100	72,2
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

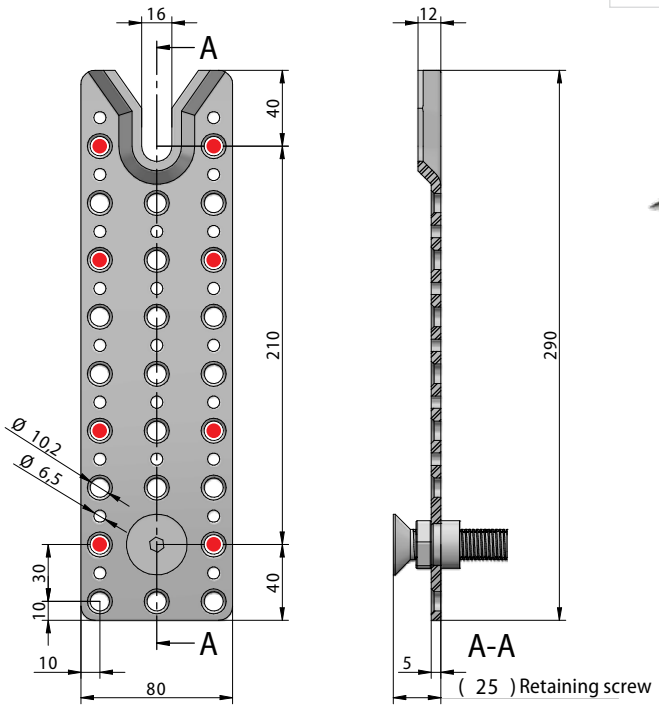
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Adjustable collar bolt and insert screw



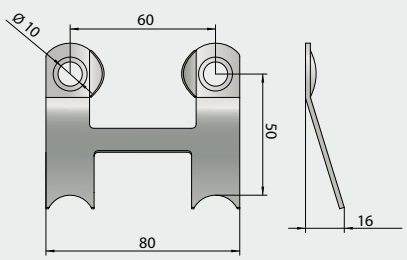


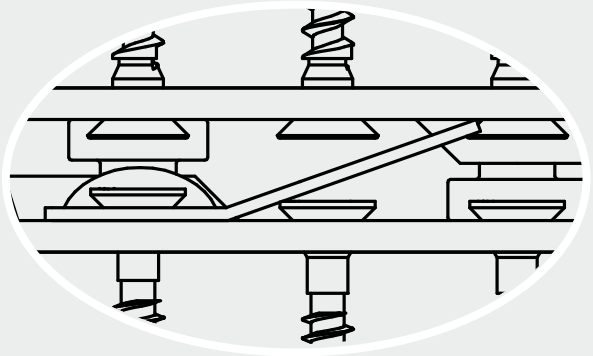
PRODUCT

RICON®S locking clip

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

Art.-No. K158





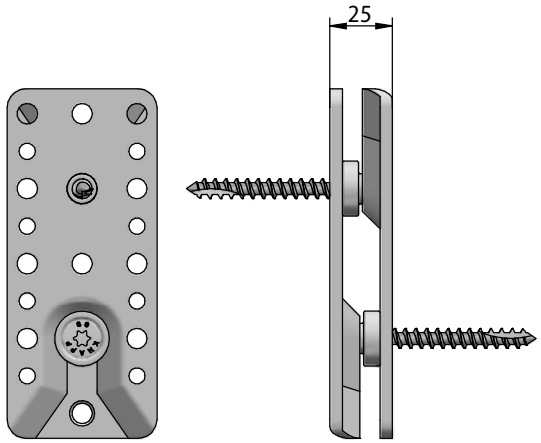
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON® S 60 VK

RICON® S 140/60 VK - Screwed collar bolt

Art.-No. K130

(Dimensions in mm)

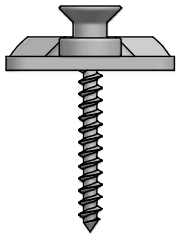


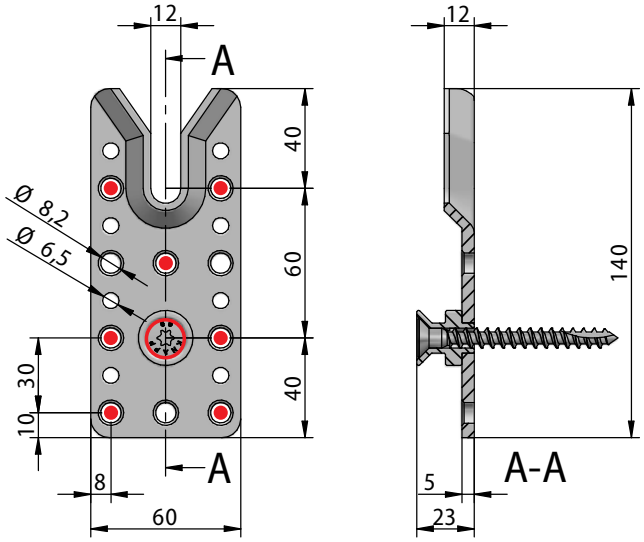
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K130 ST	140/60	**VK** D12	8 x CS 8x160	8 x CS 8x80	31,5
K130 MAX	140/60	**VK** D12	8 x CS 8x240	8 x CS 8x80	33,5
Axial tension: $F_{1,Rk}$ = 13,00 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 100 x 160 mm
All design values can be found on our website under the Planner Service tab.

Screwed collar bolt



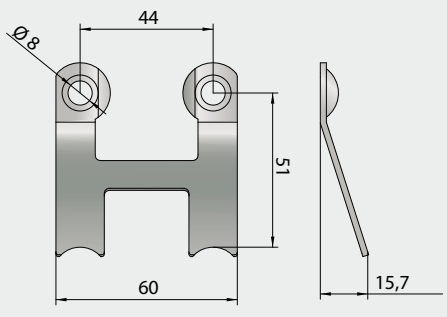


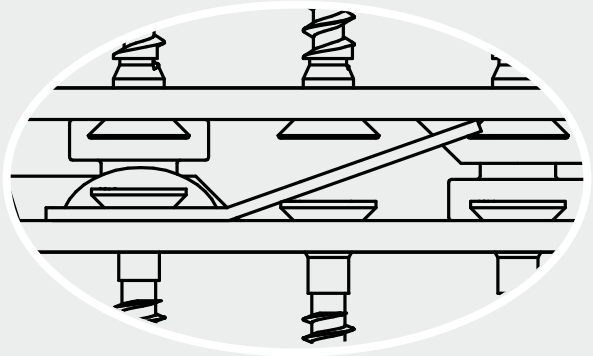
PRODUCT

RICON® S locking clip

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

Art.-No. K157



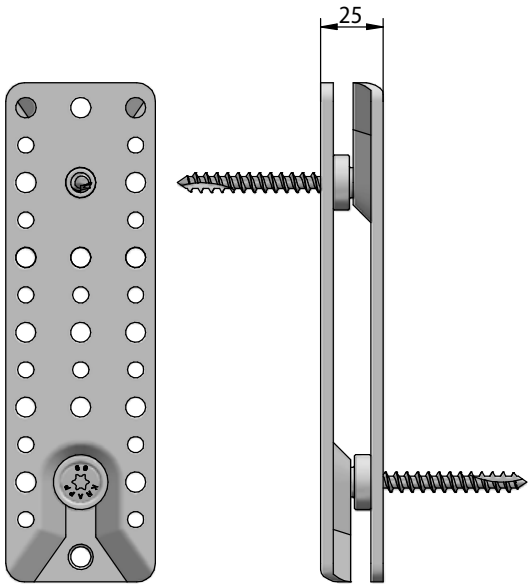


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 200/60 VK - Screwed collar bolt

Art.-No. K132

(Dimensions in mm)



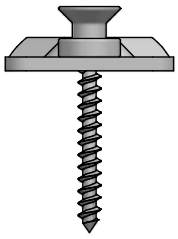
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K132 ST	200/60	**VK** D12	9 x CS 8x160	9 x CS 8x80	34,9
K132 MAX	200/60	**VK** D12	8 x CS 8x240	8 x CS 8x80	41,4
Axial tension: $F_{1,Rk}$ = 13,00 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

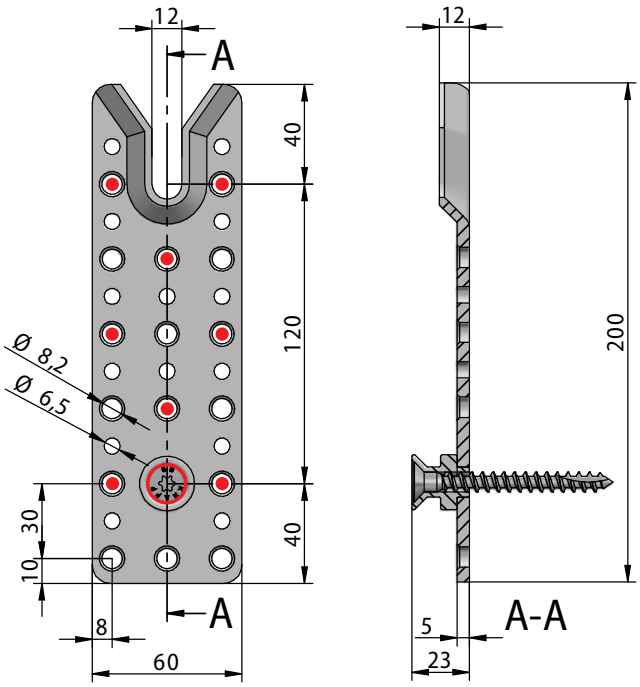
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 100 x 220 mm

All design values can be found on our website under the Planner Service tab.

Screwed collar bolt



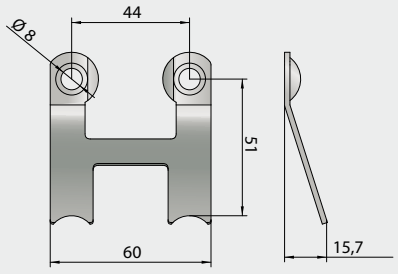


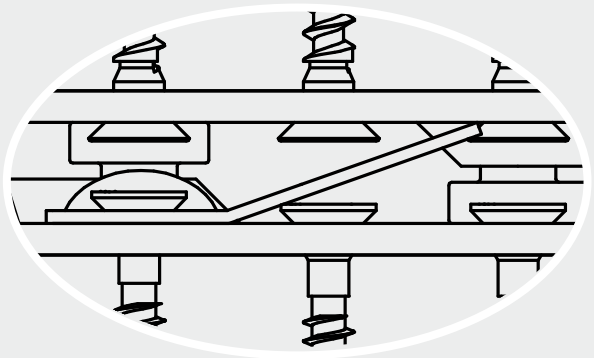
PRODUCT

RICON®S locking clip

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

Art.-No. K157





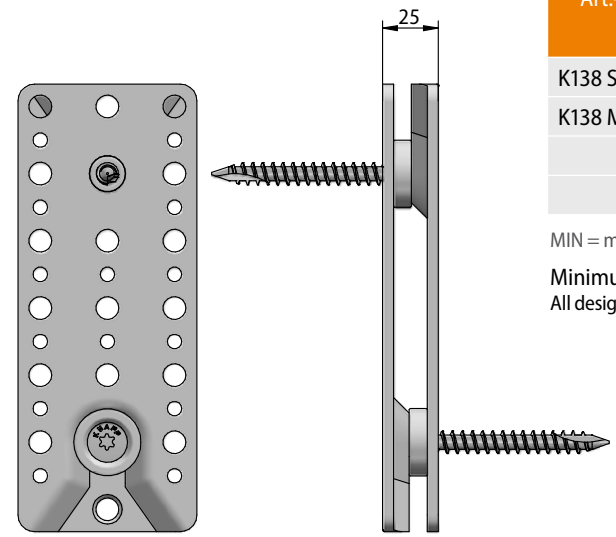
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 80 VK

RICON®S 200/80 VK - Screwed collar bolt

Art.-No. K138

(Dimensions in mm)



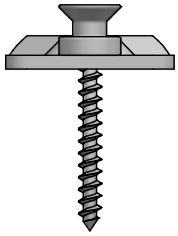
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K138 ST	200/80	**VK** D16	9 x CS 10x200	9 x CS 10x100	48,8
K138 MAX	200/80	**VK** D16	9 x CS 10x300	9 x CS 10x100	58,4
Axial tension: $F_{1,Rk}$ = 18,7 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

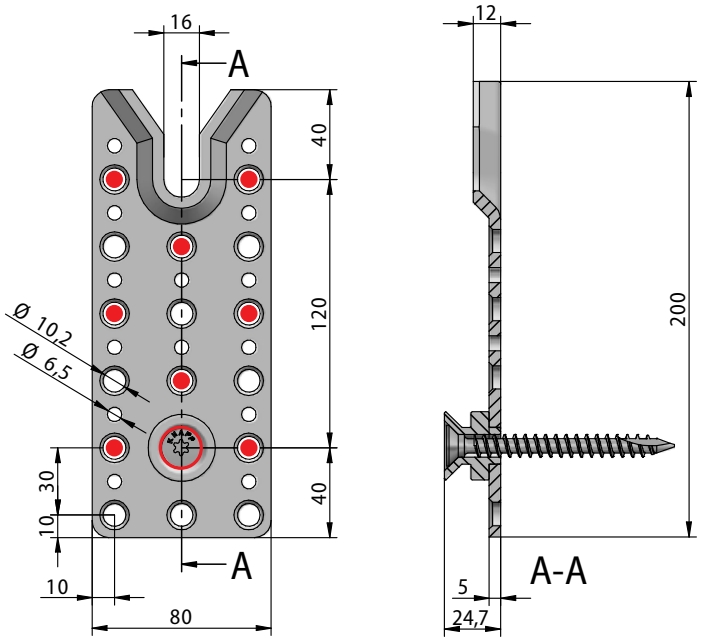
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Screwed collar bolt



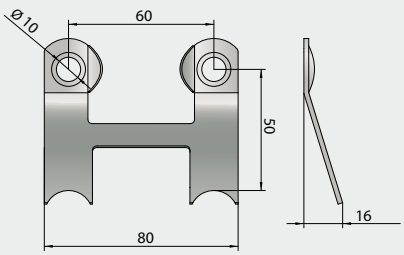


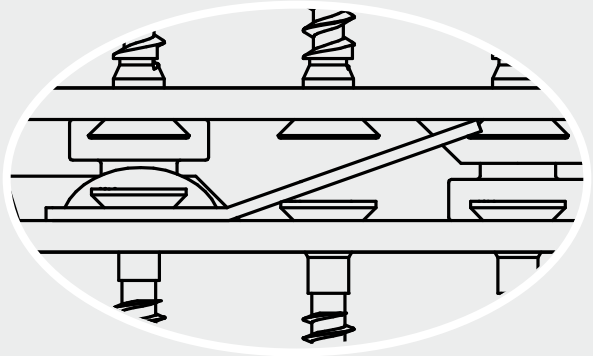
PRODUCT

RICON®S locking clip

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

Art.-No. K158



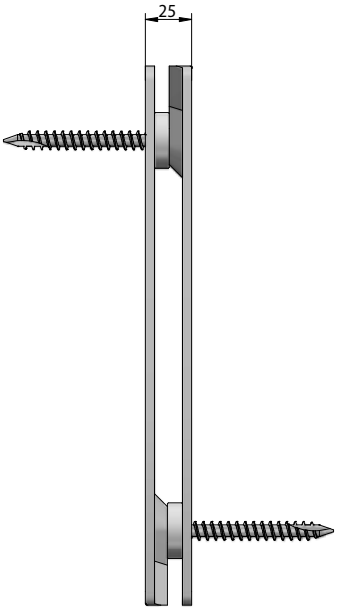


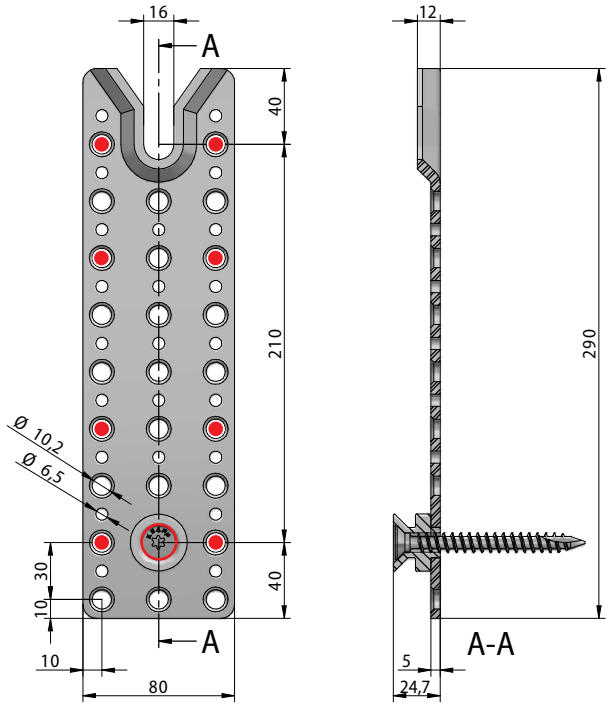
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 290/80 VK - Screwed collar bolt

Art.-No. K141

(Dimensions in mm)





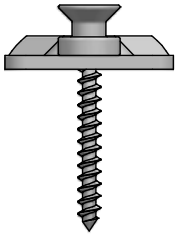
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K141 ST	290/80	**VK** D16	9 x CS 10x200	9 x CS 10x100	48,8
K141 MAX	290/80	**VK** D16	9 x CS 10x300	9 x CS 10x100	59,7
Axial tension: $F_{1,Rk}$ = 18,7 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

ST = standard screw connection MAX = maximum screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Screwed collar bolt

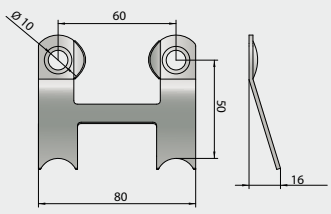


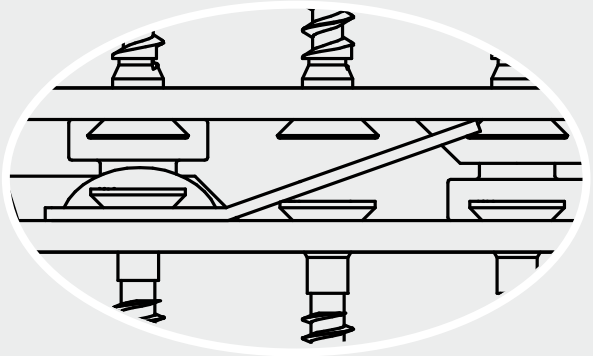
PRODUCT

RICON®S locking clip

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

Art.-No. K158





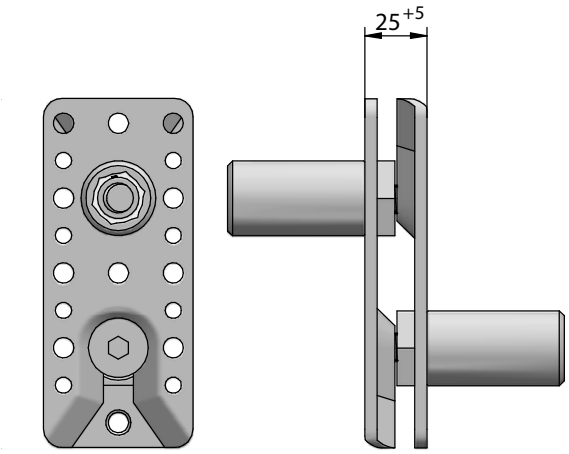
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON® S 60 GK

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

Art.-No. K134

(Dimensions in mm)



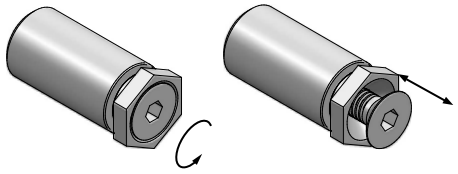
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K134 MIN ●	140/60	**GK D12**	7 x CS 8x160	7 x CS 8x80	26,9
K134 ST	140/60	**GK D12**	10 x CS 8x160	10 x CS 8x80	37,1
K134 MAX	140/60	**GK D12**	10 x CS 8x240	10 x CS 8x80	40,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

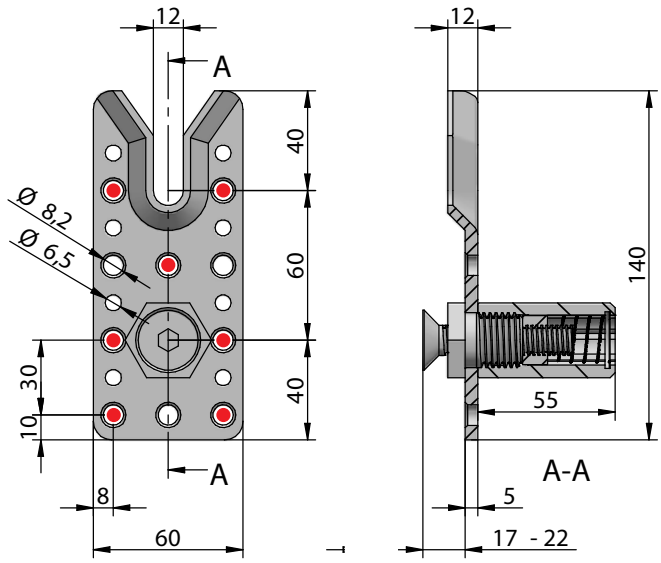
MIN = minimum screw connection ST = standard screw cxn. MAX = maximum screw cxn.

Minimum timber cross section: 100 x 160 mm

All design values can be found on our website under the Planner Service tab.

Spring-loaded collar bolt for special assembly requirements



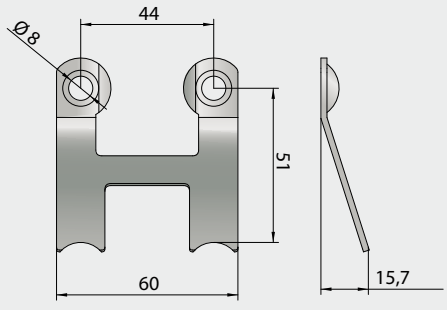


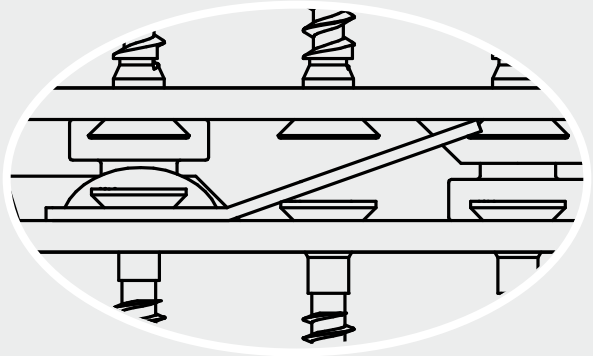
PRODUCT

RICON® S locking clip

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

Art.-No. K157



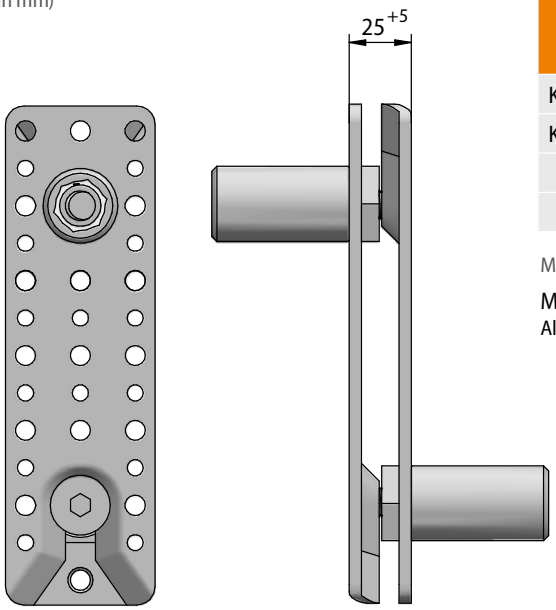


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 200/60 GK - Spring-loaded collar bolt

Art.-No. K136

(Dimensions in mm)



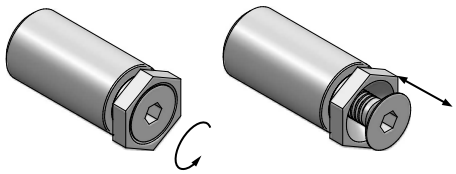
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K136 MIN ●	200/60	**GK D12**	8 x CS 8x160	8 x CS 8x80	30,4
K136 ST	200/60	**GK D12**	16 x CS 8x160	16 x CS 8x80	44,2
Axial tension: $F_{1,Rk}$ = 31,5 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

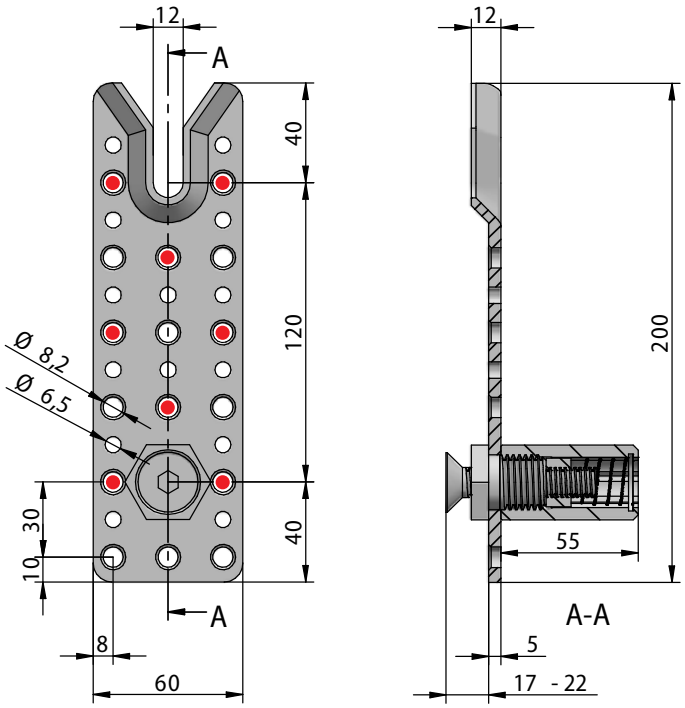
MIN = minimum screw connection ST = standard screw connection

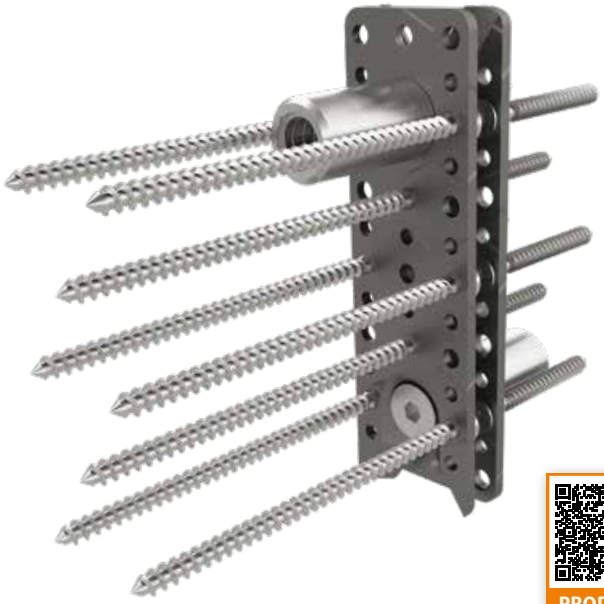
Minimum timber cross section: 100 x 220 mm

All design values can be found on our website under the Planner Service tab.

Spring-loaded collar bolt for special assembly requirements





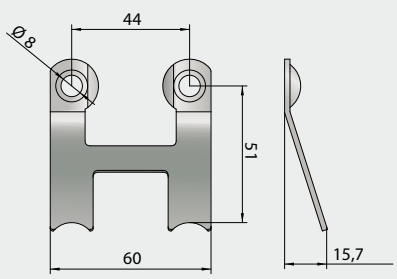


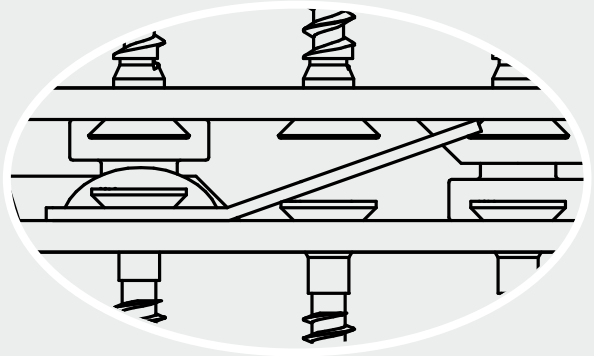
PRODUCT

RICON®S locking clip

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

Art.-No. K157





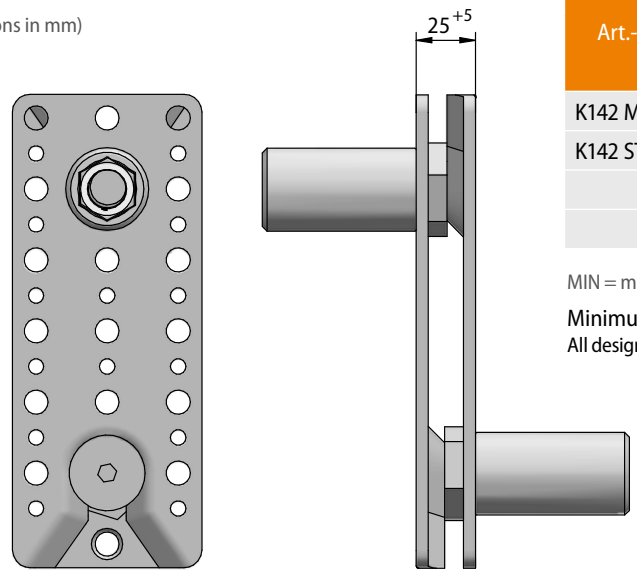
Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S locking clip

RICON®S 200/80 GK - Spring-loaded collar bolt

Art.-No. K142

(Dimensions in mm)

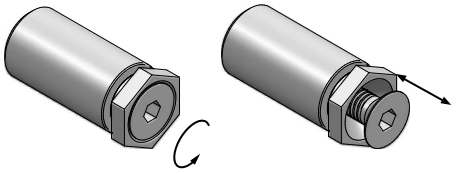


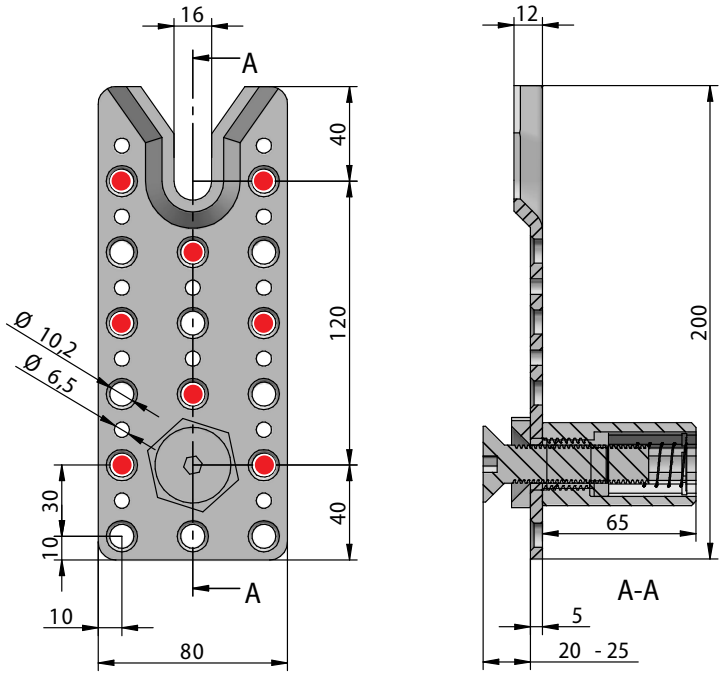
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K142 MIN ●	200/80	**GK D16**	8 x CS 10x200	8 x CS 10x100	42,4
K142 ST	200/80	**GK D16**	16 x CS 10x200	16 x CS 10x100	65,0
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm
All design values can be found on our website under the Planner Service tab.

Spring-loaded collar bolt for special assembly requirements



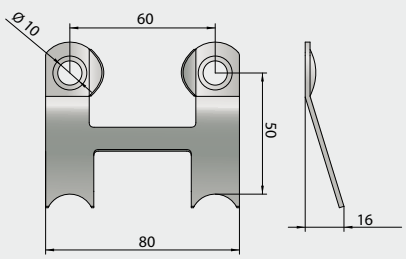


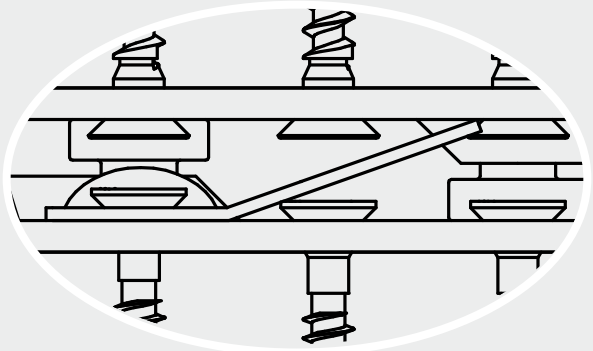
PRODUCT

RICON®S locking clip

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

Art.-No. K158



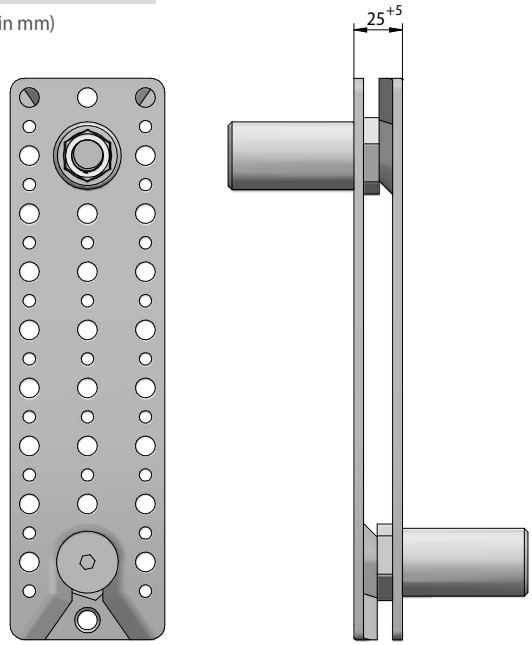


Application: the locking clip locks the connection against slide-in direction and is used for stress against slide-in direction or wind suction.

RICON®S 290/80 GK - Spring-loaded collar bolt

Art.-No. K145

(Dimensions in mm)



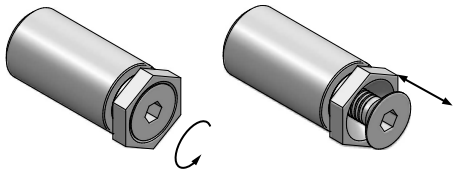
Art.-No.	Connector	Collar bolt	Screw connection		Charact. values [GL24h] $F_{2,Rk}$ [kN]
			Joint	Header	
K145 MIN ●	290/80	**GK D16**	8 x CS 10x200	8 x CS 10x100	42,4
K145 ST	290/80	**GK D16**	16 x CS 10x200	16 x CS 10x100	72,2
Axial tension: $F_{1,Rk}$ = 36,0 kN					
Clip lock: $F_{3,Rk}$ = 18,0 kN					

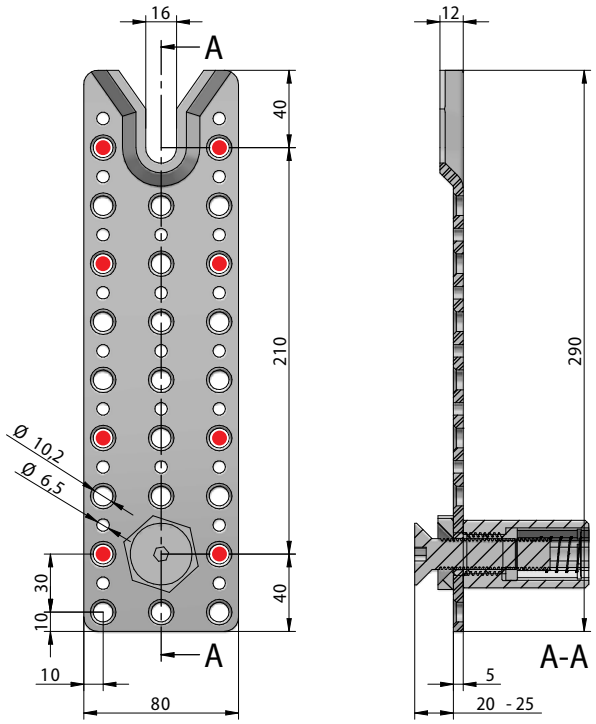
MIN = minimum screw connection ST = standard screw connection

Minimum timber cross section: 120 x 230 mm

All design values can be found on our website under the Planner Service tab.

Spring-loaded collar bolt for special assembly requirements



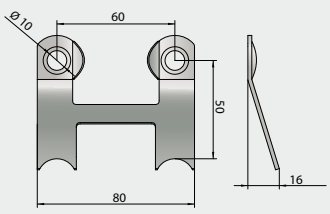


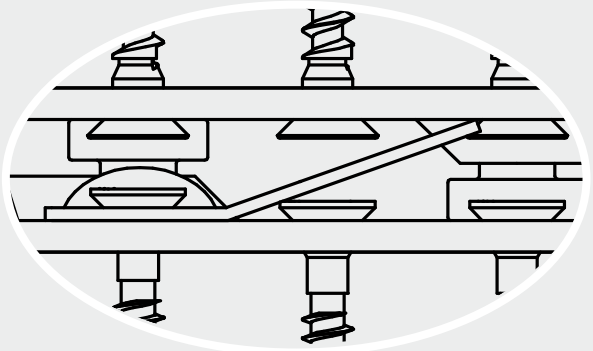
PRODUCT

RICON®S locking clip

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

Art.-No. K158





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

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)

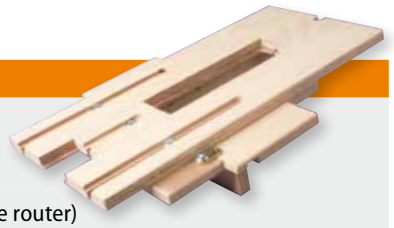
Art.-No. Z582	Self-tapping CS-screw 10x100
Art.-No. Z583	Self-tapping CS-screw 10x200
	Self-tapping CS-screw 10x300

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

Accessories RICON®S

Routing-jig RICON® S 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® 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 dimensions.

Application: for milling with concealed mounting.

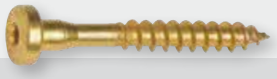
TCT slotting cutter

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

Application: to recess the rebate for RICON® S.

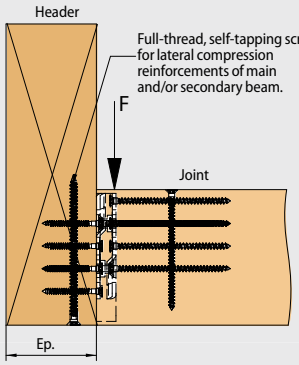
Pan head screws RICON® S80

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



Application: to recess the rebate for RICON® S.

Full threaded CS-screws with cut-point



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

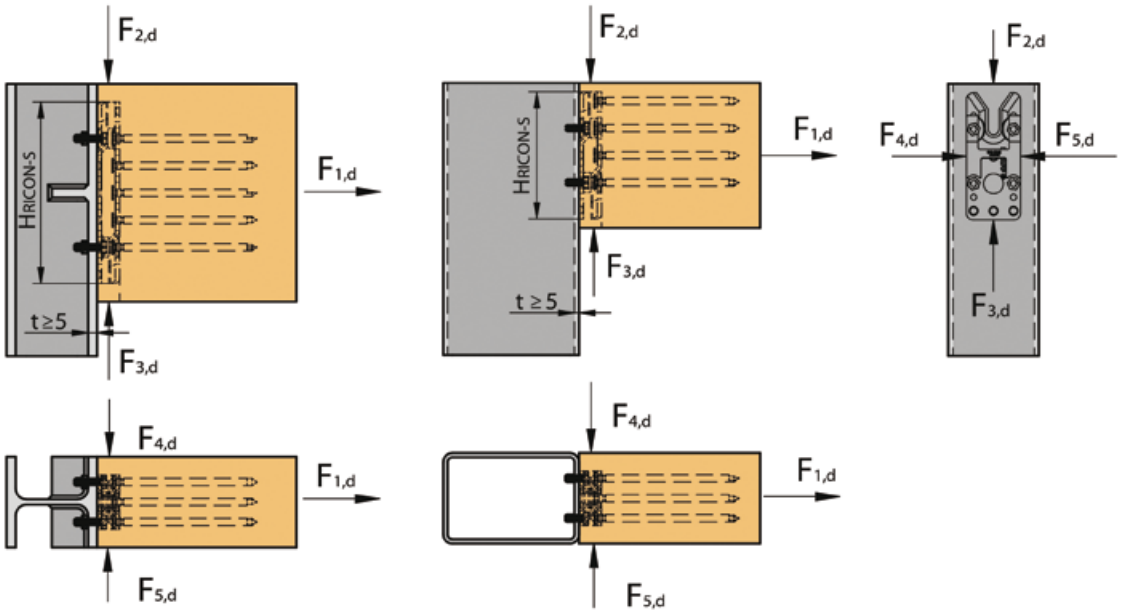
Sizes available upon request.

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

RICON® S steel to timber connection

Beam connections to steel pillar

F-Load direction



Wood to steel connection in slide-in direction F_2

Load bearing capacities in the direction of insertion

KNAPP® Connectors	Tensile force in secondary beam		Shear force	
	$F_{t,Rk}$ [kN]* on 5 mm steel	$F_{1,Rk}$ [kN]* on glulam GL24h	$F_{v,Rk}$ [kN]* on 5 mm steel	$F_{2,Rk}$ [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	63,4	EK: 44,2 VS: 56,7
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 screws M10x20 28 CS 10x200 2 CS 10x450	135,7	36,0	167,0	170,9
Sizing value calculation	$\gamma_{M,2} = 1,25$	$\gamma_M = 1,3$	$\gamma_{M,2} = 1,25$	$\gamma_M = 1,3$
		$k_{mod} = 0,8$ LDC medium		$k_{mod} = 0,8$ LDC medium
		$k_{mod} = 0,9$ LDC short		$k_{mod} = 0,9$ LDC short

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

Notes about pages 75 to 77.

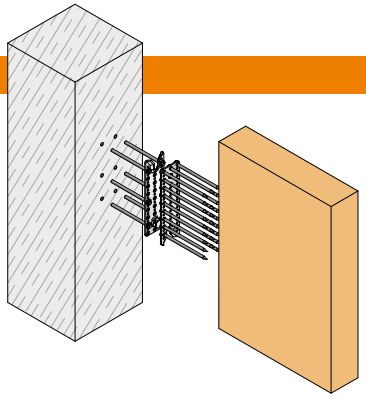
The fischer anchors for KNAPP® wood-concrete connections were defined with the dimensions shown on the drawings and a concrete strength class of C20/25. The calculations were made with the C-FIX design tool and verified by fischer. All other configurations must be checked. This can be done by KNAPP®, 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

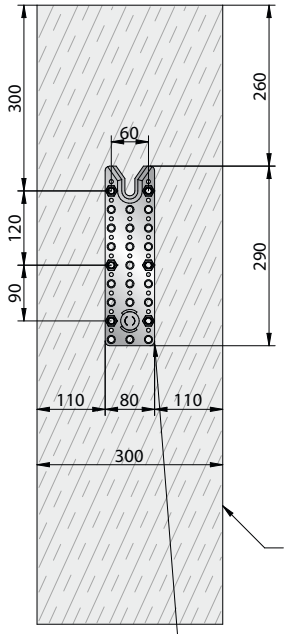
Timber Engineering

Beam connections to concrete pillar

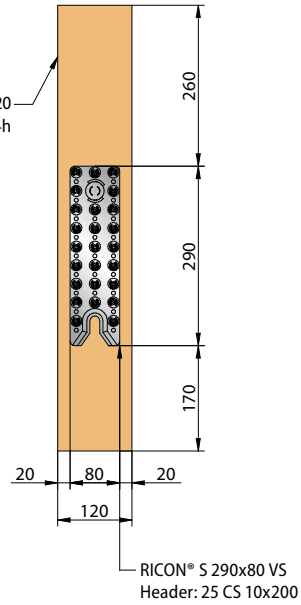
(Dimensions in mm)



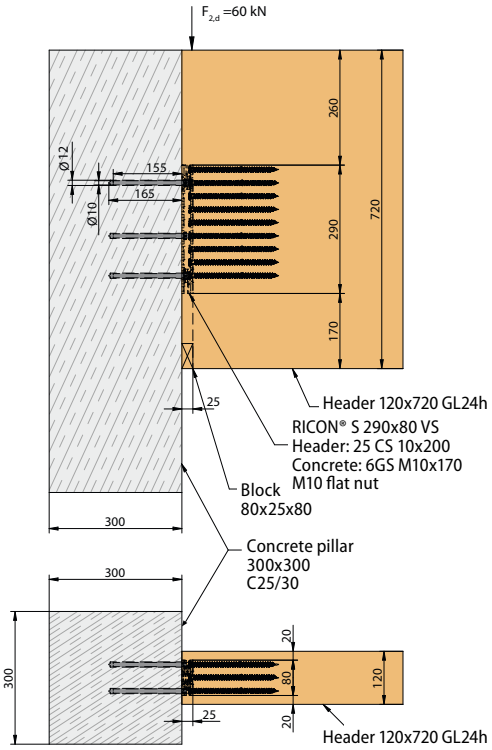
Fixed on concrete



Fixed on header



Bonding : fischer
Superbond-System
FIS SB 390 S



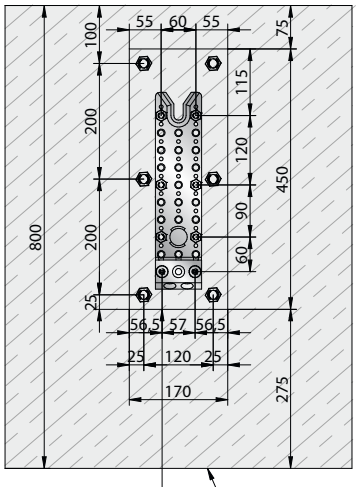
RICON®S

Timber Engineering

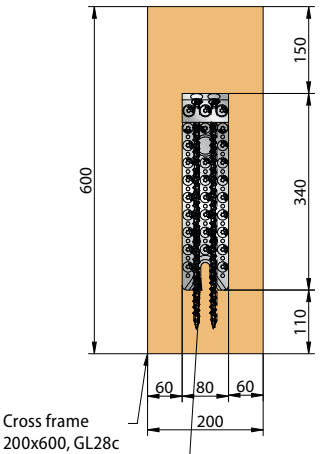
Beam to concrete connection

(Dimensions in mm)

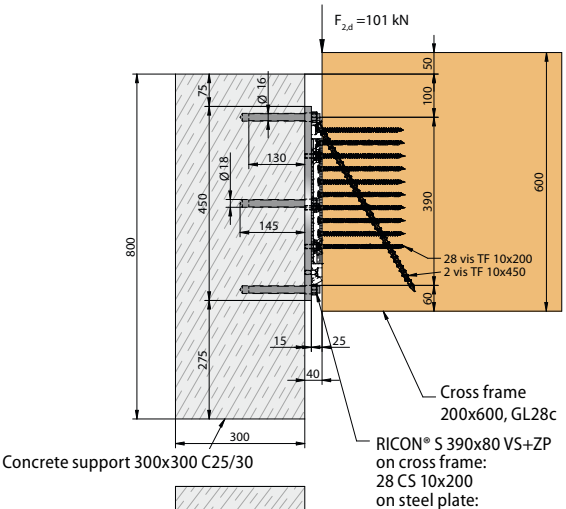
Fixed on concrete

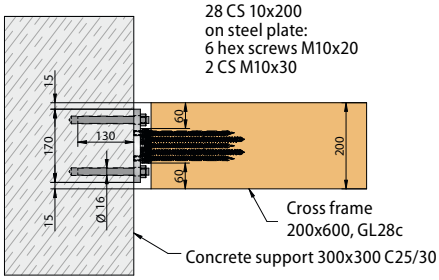


Fixation on glued laminated cross frame



Bonding : fischer
Superbond-System
FIS SB 390 S

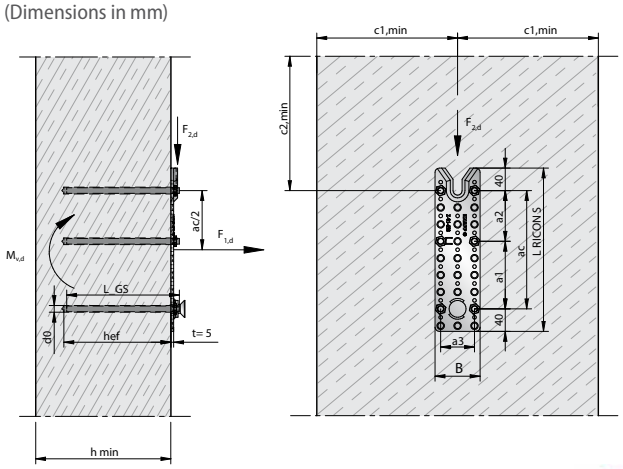




RICON® S60 / S80 VS timber to concrete connection

Beam to concrete connection

(Dimensions in mm)



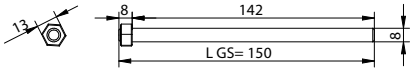
Distance	Distances for RICON® S Version VS concrete connection			
	[mm]	[mm]	[mm]	[mm]
Spacing a_c	60	120	120	210
Spacing a_1	60	60	60	120
Spacing a_2	0	60	60	90
Spacing a_3	44	44	60	60
Drill hole diameter d_0	10	10	12	12
Anchorage depth h_{ef}	140	140	160	160
Diameter threaded rod d_{GS}	M8	M8	M10	M10
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)

Concrete C20/25

fischer Superbond-System FIS SB 390 S

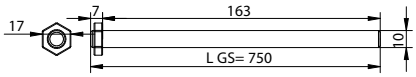
RICON®S 60: threaded rod M8x150 with M8, 8.8 nut



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



Threaded rod M10x170 with M10, 8.8 nut

F_2 Load direction in the direction of insertion

KNAPP® Connectors	Concrete connection		Timber connection						
	$F_{2,Rd,concrete}$	Distances	Wood material		$F_{2,Rd,timber}$				
	Shear force $F_{2,Rd,concrete}$ [kN]	Bending moment with e = 0,025 m $M_{v,Rd,concrete}$ [kNm]	Wood type	Char. density ρ_k [kg/m³]	Charact. values [kN]		Design values $F_{2,Rd}$, γ_M = 1,3 [kN]		
					$F_{2,KCC,Rk}$, γ_M =1,0	$F_{2,Rk}$	k_{mod} = 0,6	k_{mod} = 0,8	k_{mod} = 0,9
RICON® S 140/60 VS ST Concrete : 4 threaded rods M8x150	34,00	0,85	C24	350	60	34,9	16,1	21,5	24,2
			GL24h	385		37,1	17,1	22,8	25,7
RICON® S 140/60 VS MAX Concrete : 4 threaded rods M8x150	34,00	0,85	C24	350	60	37,8	17,4	23,3	26,2
			GL24h	385		40,2	18,6	24,7	27,8
RICON® S 200/60 VS ST Concrete : 6 threaded rods M8x150	50,00	1,25	C24	350	60	53,3	24,6	32,8	36,9
			GL24h	385		56,7	26,2	34,9	39,3
RICON® S 200/60 VS MAX Concrete : 6 threaded rods M8x150	50,00	1,25	C24	350	60	62,7	28,9	38,6	43,4
			GL24h	385		66,5	30,7	40,9	46,0
RICON® S 200/80 VS ST Concrete : 6 threaded rods M10x170	68,00	1,70	C24	350	99	74,7	34,5	46,0	51,7
			GL24h	385		79,1	36,5	48,7	54,8
RICON® S 200/80 VS MAX Concrete : 6 threaded rods M10x170	68,00	1,70	C24	350	99	87,1	40,2	53,6	60,3
			GL24h	385		92,4	42,6	56,9	64,0
RICON® S 290/80 VS ST Concrete : 6 threaded rods M10x170	95,00	2,38	C24	350	99	111,2	51,3	68,4	77,0
			GL24h	385		118,2	54,6	72,7	81,8
RICON® S 290/80 VS MAX Concrete : 6 threaded rods M10x170	95,00	2,38	C24	350	99	134,7	62,2	82,9	93,3
			GL24h	385		142,7	65,9	87,8	98,8
RICON® S 390/80 VS ST Concrete : 6 threaded rods M10x170	110,00	2,75	C24	350	180	163,2	75,3	100,4	113,0
			GL24h	385		170,9	78,9	105,2	118,3
RICON® S 390/80 VS MAX Concrete : 6 threaded rods M10x170	110,00	2,75	C24	350	180	187,0	86,3	115,1	129,5
			GL24h	385		195,9	90,4	120,6	135,6

Number of screws in joist are given on pages 42 to 46.

Service class timber: 1-2

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

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

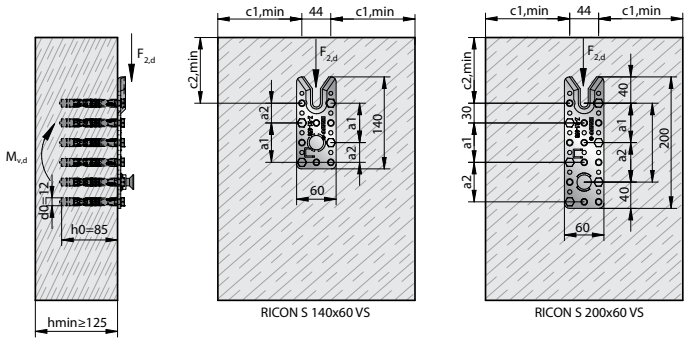
$$F_{2,Rd} = \min \begin{cases} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{cases}$$

$$F_{2,Rd,\,timber} = \min \begin{cases} \min F_{2,KCC,\,Rk} / \gamma_M \\ \min F_{2,Rk} \cdot k_{mod} \end{cases} \Big/ \gamma_{M,\,timber}$$

RICON® S60 / S80 VS timber to concrete connection

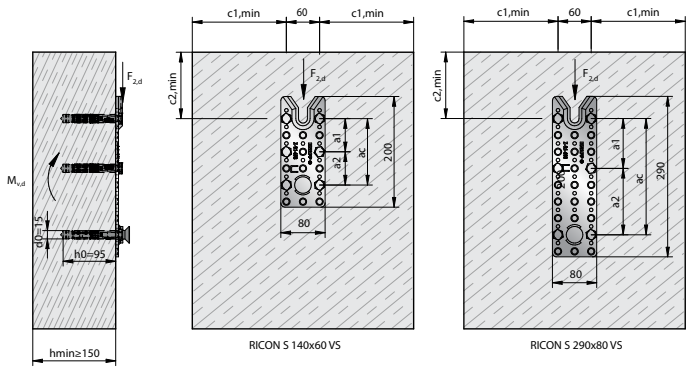
Beam to concrete connection

(Dimensions in mm)

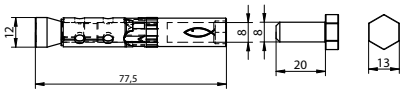


Distance	Distances for RICON® S Version VS concrete connection			
	140x60 [mm]	200x60 [mm]	200x80 [mm]	290x80 [mm]
Spacing a_c	60	120	120	210
Spacing a_1	60	60	60	90
Spacing a_2	30	60	60	120
Spacing a_3	44	44	60	60
Drill hole diameter $d_{0,1}$	12	12	15	15
Anchorage depth h_{ef}	85	85	95	95
Hexagon screw	Hex M8x20	Hex M8x20	Hex M10x20	Hex M10x20
Minimal edge distance $c_{1,min}$	∞	∞	∞	∞
Minimal edge distance $c_{2,min}$	100	100	120	120
Minimal concrete thickness h_{min}	125	125	150	150

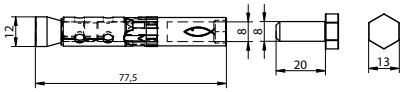
fischer Approval: ETA-07/0025 and ENSO



RICON®S 60:
fischer high performance anchor FH II 12/ M8 I (8.8)
with hexagon screw M8x20



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

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

Number of screws in joist are given on pages 42 to 46.

Service class timber: 1-2

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

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

$$F_{2,Rk} = \min \begin{cases} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{cases}$$

$$F_{2,Rk,\,timber} = \min \begin{cases} \min F_{2,KCC,\,Rk} / \gamma_M \\ \min F_{2,Rk} \cdot k_{mod} \end{cases} \Big/ \gamma_{M,\,timber}$$

RICON® S

Fabrication

- 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

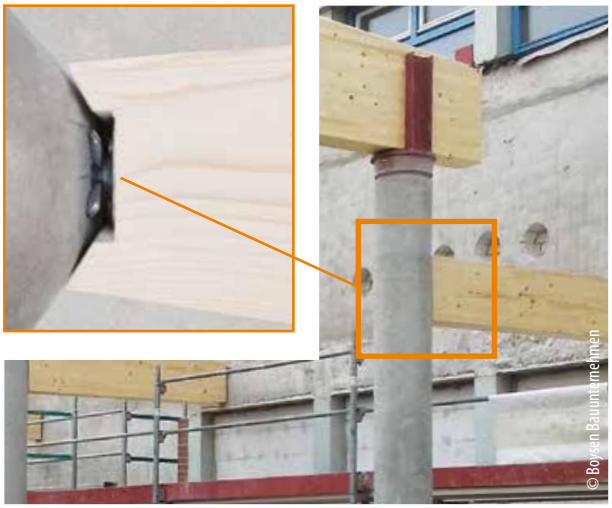
Position the plate and the screws

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

Beam Hangers

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

- Timber width up from 60mm
- Multiple disassembly and reassembly possible
- High degree of prefabrication for rapid on-site assembly
- Load-bearing In all directions
- Short hooking way – only 50 mm
- Tight joints - self-tightening due to permanent permanent contact pressure
- 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 Planner Service.

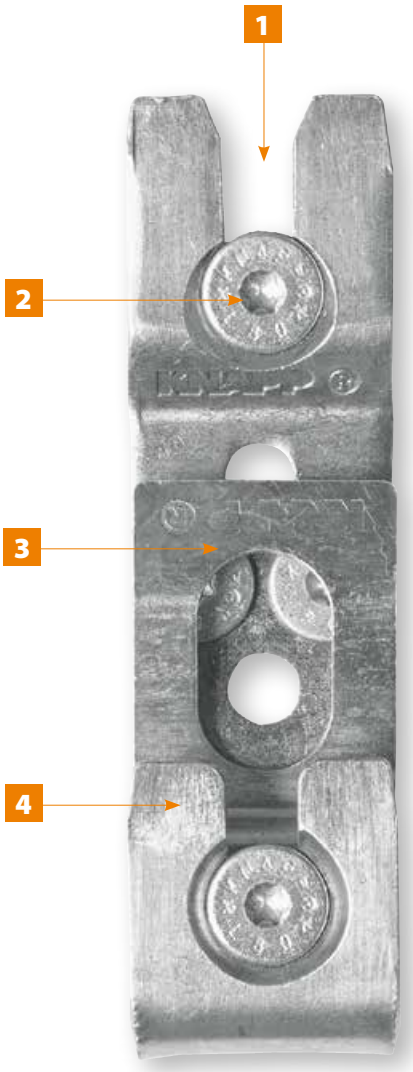
* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA 10/0189 (2019/10/11), for hardwood D30 (e.g. oak).

© Christina Wurm, TW Holzbau

GIGANT

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

Safe, simple and quick assembly.



1. The dovetail receiving bracket catches the counter bracket and CS-screw with ease, while the angle on the dovetail ensures a self-tightening connection.
2. 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.
4. 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 ≥ 28 mm, R60 ≥ 49 mm)

AUSTRIA ETA ETA-10/0189 (2019/10/11)

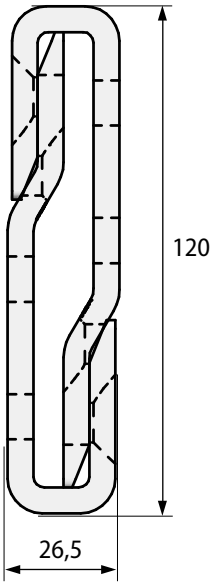
PRODUCT

GIGANT 120/40

Application examples and connection details

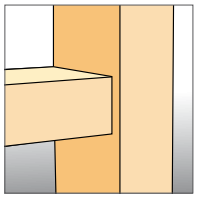
Art.-No. K051

(Dimensions in mm)

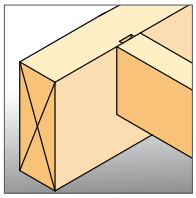


Connector	Connection	Screw connection		Charact. values [GL24h]	
		Joint	Header	$F_{1,Rk}$ [kN]	$F_{2,Rk}$ [kN]
120/40	without locking clip	3 x CS 10x120	3 x CS 10x80	12,5	12,5
120/40	without locking clip	3 x CS 10x200	3 x CS 10x80	14,0	12,5
120/40	with locking clip	3 x CS 10x120	3 x CS 10x80	12,5	12,5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

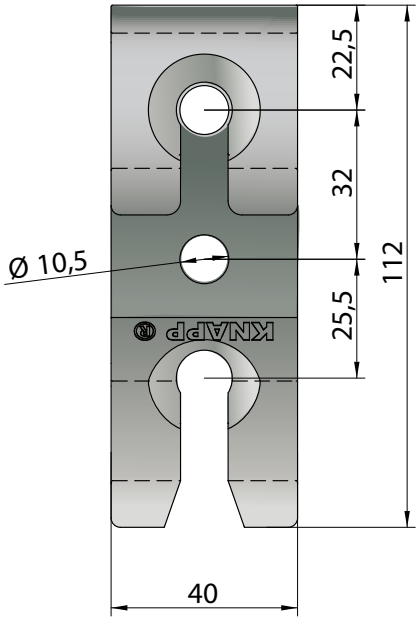
Minimum timber dimensions with/without locking clip: 60 x 150 mm

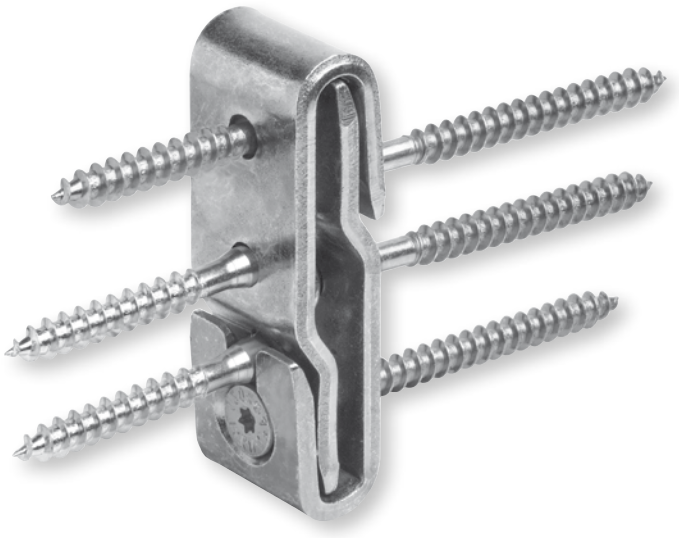


Single connection for post-latch connections



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

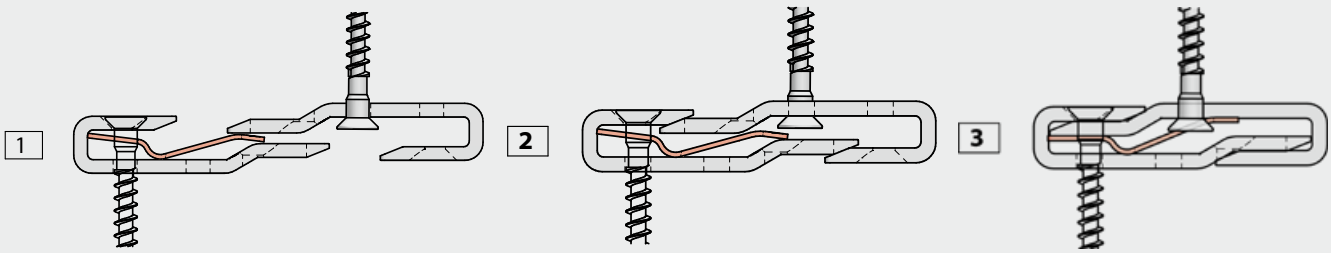




Standard screw connection without locking clip

GIGANT locking clip

Functionality of the locking clip (galvanized steel plate)

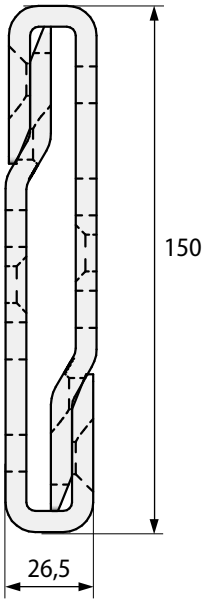


GIGANT 150/40

Application examples and connection details

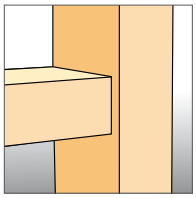
Art.-No. K050

(Dimensions in mm)

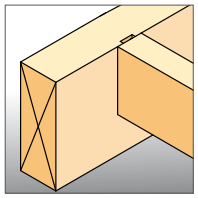


Connector	Connection	Screw connection		Charact. values [GL24h]	
		Joint	Header	$F_{1,Rk}$ [kN]	$F_{2,Rk}$ [kN]
150/40	without locking clip	4 x CS 10x120	4 x CS 10x80	12,5	16,7
150/40	without locking clip	4 x CS 10x200	4 x CS 10x80	14,0	19,2
150/40	with locking clip	4 x CS 10x120	4 x CS 10x80	12,5	16,7
Clip lock: $F_{3,Rk}$ = 12,0 kN					

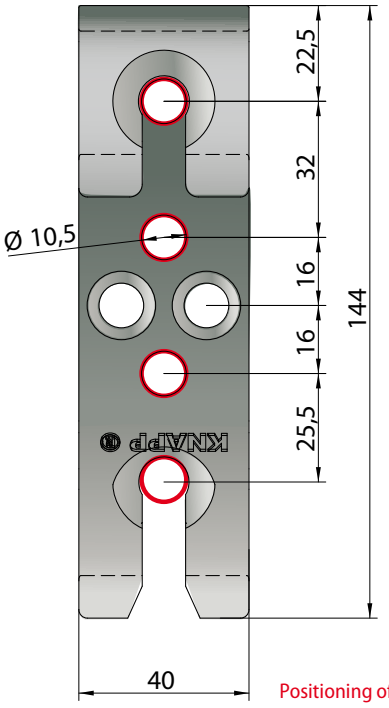
Minimum timber dimensions without locking clip: 80 x 200 mm
Minimum timber dimensions with locking clip: 60 x 200 mm



Single connection for post-latch connections



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

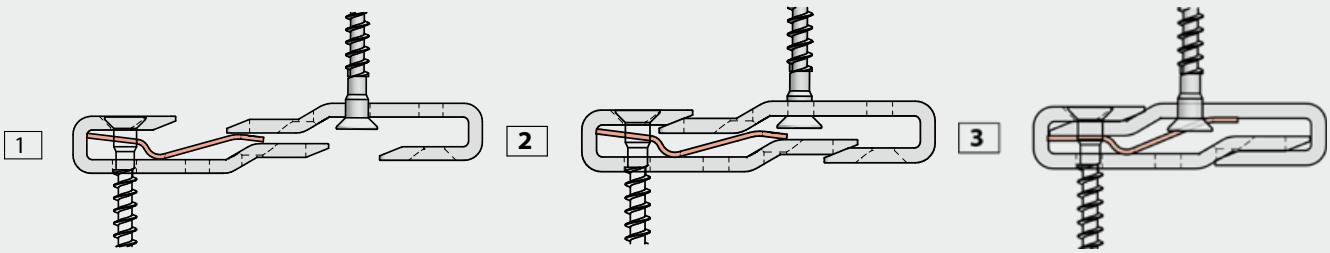


Positioning of srews in the centre when using the locking clip

Standard screw connection without locking clip

GIGANT locking clip

Functionality of the locking clip (galvanized steel plate)

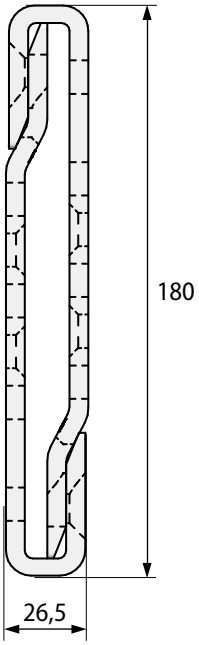


GIGANT 180/40

Application examples and connection details

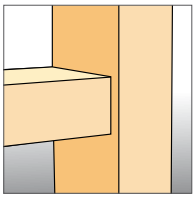
Art.-No. K052

(Dimensions in mm)

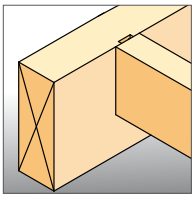


Connector	Connection	Screw connection		Charact. values [GL24h]	
		Joint	Header	$F_{1,Rk}$ [kN]	$F_{2,Rk}$ [kN]
180/40	without locking clip	6 x CS 10x120	6 x CS 10x80	12,5	25,0
180/40	without locking clip	6 x CS 10x200	6 x CS 10x80	14,0	30,7
180/40	with locking clip	5 x CS 10x120	6 x CS 10x80	12,5	20,8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

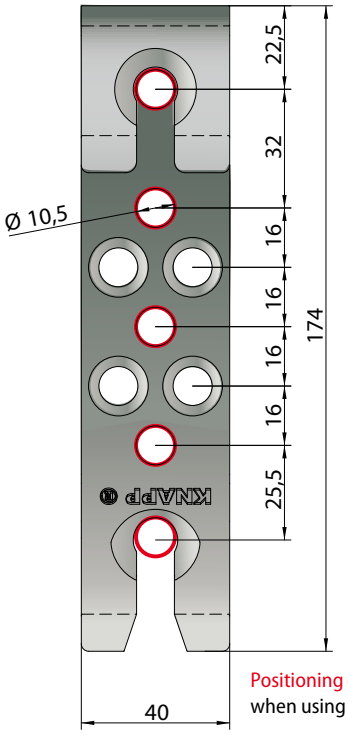
Minimum timber dimensions without locking clip: 80 x 200 mm
Minimum timber dimensions withlocking clip: 60 x 200 mm



Single connection for post-latch connections



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

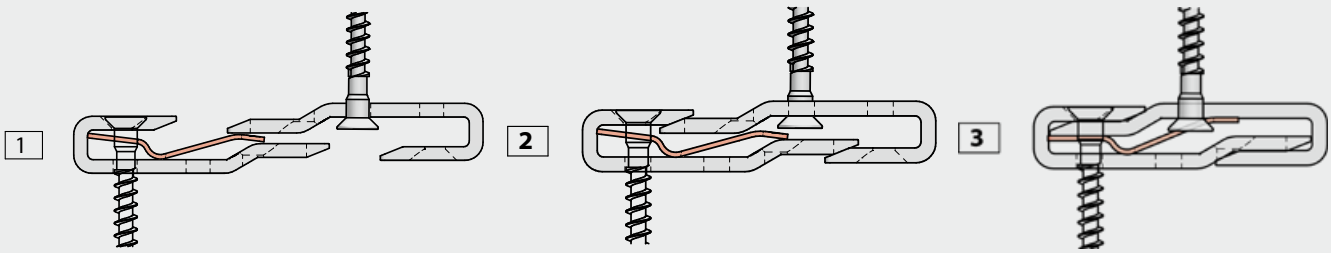


Positioning of srews in the centre when using the locking clip

Standard screw connection without locking clip

GIGANT locking clip

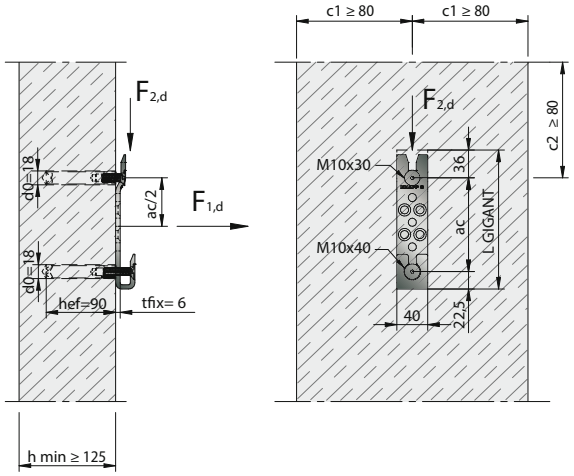
Functionality of the locking clip (galvanized steel plate)



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

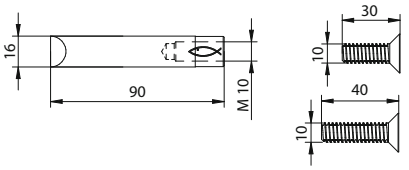
Wood to concrete connection with injection mortar

(Dimensions in mm)



Concrete C20/25

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



CS M10x30 with hexgon socket

CS M10x40 with hexgon socket

fischer Superbond-System: FIS SB 390 S

Drill hole diameter d_0 =	18 mm
Drill hole depth h_1 =	90 mm
Total fixing thickness t_{fix} =	6 mm
Spacing a_c =	cf. tableau
Minimal edge distance $c_{1,min} = c_{2,min}$ =	80 mm
Minimal concrete wall thickness h_{min} =	125 mm
Approval:	ETA-12/0258

F_2 Load direction in the direction of insertion

KNAPP® Connectors	Concrete connection		Timber connection					
	$F_{2,Rd,concrete}$	Distances	Wood material		$F_{2,Rd,timber}$			
	Shear force $F_{2,Rd,concrete}$ [kN]	Dowel spacing ac [mm]	Wood type	Char. density ρ_k [kg/m³]	Charact. values [kN]		Design values $F_{2,Rd}$, γ_M = 1,3 [kN]	
					$F_{2,KCC,Rk}$, γ_M =1,0	$F_{2,Rk}$	k_{mod} = 0,6	k_{mod} = 0,8	k_{mod} = 0,9
GIGANT 150/40 * Concrete : 2 RG M10 I	18,00	90	C24	350	24,0	15,4	7,1	9,5	10,7
			GL24h	385		16,7	7,7	10,3	11,6
GIGANT 150/40 max ** Concrete : 2 RG M10 I	18,00	90	C24	350		17,7	8,2	10,9	12,3
			GL24h	385		19,2	8,9	11,8	13,3
GIGANT 180/40 * Concrete : 2 RG M10 I	22,00	122	C24	350	33,0	23,1	10,7	14,2	16,0
			GL24h	385		25,0	11,5	15,4	17,3
GIGANT 180/40 max ** Concrete : 2 RG M10 I	22,00	122	C24	350		28,3	13,1	17,4	19,6
			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:

$$F_{2,Rk} = \min \begin{cases} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{cases}$$

$$F_{2,Rk,\,timber} = \min \begin{cases} \min F_{2,KCC,\,Rk} / \gamma_M \\ \min F_{2,Rk} \cdot k_{mod} \end{cases} \Big/ \gamma_{M,\,timber}$$

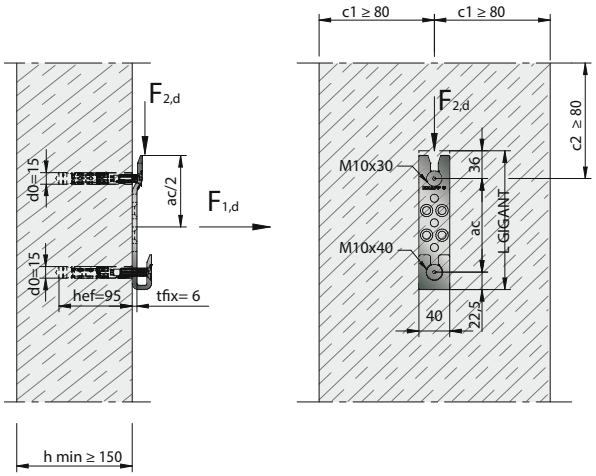
Notes

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.

Equivalent anchoring solutions (e.g. Hilti,…) permitted if technically tested beforehand by a qualified design professional and have a European Technical Assessment.

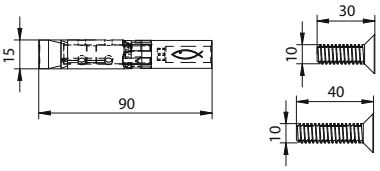
Header-joist connection with bolt anchor

(Dimensions in mm)



Concrete C20/25

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



CS M10x30 with hexgon socket

CS M10x40 with hexgon socket

Drill hole diameter d_0 =	15 mm
Drill hole depth h_1 =	95 mm
Total fixing thickness t_{fix} =	6 mm
Spacing a_c =	cf. tableau
Minimal edge distance $c_{1,min} = c_{2,min}$ =	80 mm
Minimal concrete wall thickness h_{min} =	150 mm
Approval:	ETA-07/0025, Option 1

F_2 Load direction in the direction of insertion

KNAPP® Connectors	Concrete connection		Timber connection						
	$F_{2,Rd,concrete}$	Distances	Wood material		$F_{2,Rd,timber}$				
	Shear force $F_{2,Rd,concrete}$ [kN]	Dowel spacing ac [mm]	Wood type	Char. density ρ_k [kg/m³]	Charact. values [kN]		Design values $F_{2,Rd}$, $\gamma_M = 1,3$ [kN]		
					$F_{2,KCC,Rk}$, γ_M =1,0	$F_{2,Rk}$	kmod = 0,6	kmod = 0,8	kmod = 0,9
GIGANT 180/40 * Concrete : 2 RG M10 I	21,00	122	C24	350	33,0	23,1	10,7	14,2	16,0
			GL24h	385		25,0	11,5	15,4	17,3
GIGANT 180/40 max ** Concrete : 2 RG M10 I	21,00	122	C24	350		28,3	13,1	17,4	19,6
			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:

$$F_{2,Rk} = \min \begin{cases} \min F_{2,Rd,\,timber} \\ \min F_{2,Rd,\,concrete} \end{cases}$$

$$F_{2,Rk,\,timber} = \min \begin{cases} \min F_{2,KCC,\,Rk} / \gamma_M \\ \min F_{2,Rk} \cdot k_{mod} \\ \hline \gamma_{M,\,timber} \end{cases}$$

Notes

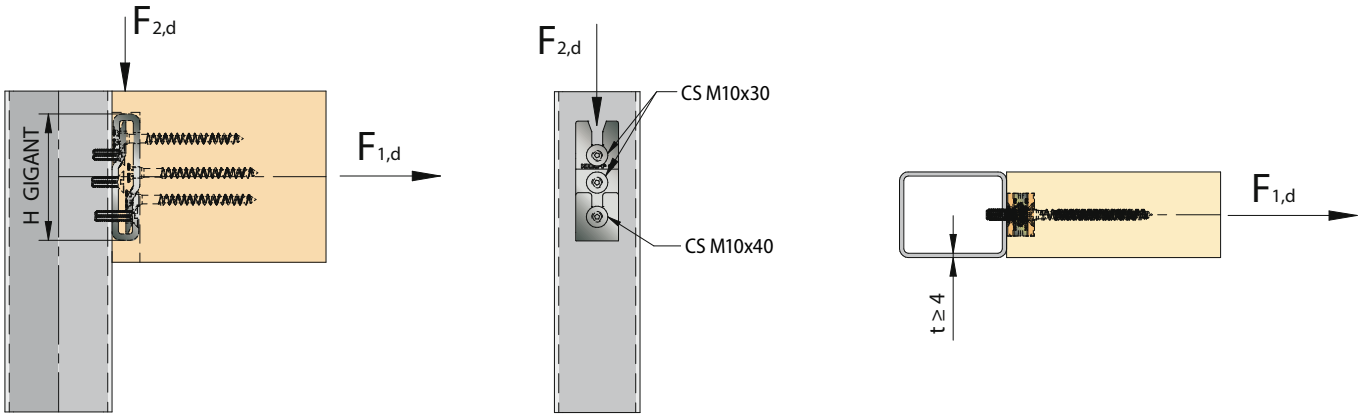
The fischer anchors for KNAPP® wood-concrete connections were defined with the dimensions shown on the drawings and a concrete strength class of C20/25. The calculations were made with the C-FIX design tool and verified by fischer. All other configurations must be checked. This can be done by KNAPP®, 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.

Equivalent anchoring solutions (e.g. Hilti,…) permitted if technically tested beforehand by a qualified design professional and have a European Technical Assessment.

GIGANT wood to steel connection

Main and secondary beam and post and beam connections.

(Dimensions in mm)



KNAPP® Connectors	Traction		Shear force	
	$F_{t,Rk}$ [kN]* on 4 mm steel	$F_{1,Rk}$ [kN]* on glulam GL24h	$F_{v,Rk}$ [kN]* on 4 mm steel	$F_{2,Rk}$ [kN]* on glulam GL24h
GIGANT 120/40 *	57,0	12,5	38,4	12,5
GIGANT 120/40 max **		14,0		12,5
GIGANT 150/40 *		12,5		16,7
GIGANT 150/40 max **		14,0		19,2
GIGANT 180/40 *		12,5		25,0
GIGANT 180/40 max **		14,0		30,7
Sizing value calculation	$F_{t,Rd} = F_{t,Rk} / \gamma_{M,2}$	$F_{1,Rd} = k_{mod} \times F_{1,Rk} / \gamma_M$	$F_{v,Rd} = F_{v,Rk} / \gamma_{M,2}$	$F_{1,Rd} = k_{mod} \times F_{1,Rk} / \gamma_M$
	$\gamma_{M,2} = 1,25$	$\gamma_M = 1,3$	$\gamma_{M,2} = 1,25$	$\gamma_M = 1,3$
		$k_{mod} = 0,8$ LDC medium		$k_{mod} = 0,8$ LDC medium
		$k_{mod} = 0,9$ LDC short		$k_{mod} = 0,9$ LDC short
Screw connection *	2 CS M10x30	End-grain screw connection	2 CS M10x30	End-grain screw connection
	1 CS M10x40	Vis CS 10x120 / CS 10x200 for max	1 CS M10x40	CS 10x120 / CS 10x200 for max

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

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

Service class timber: 1-2

Case studies

GIGANT

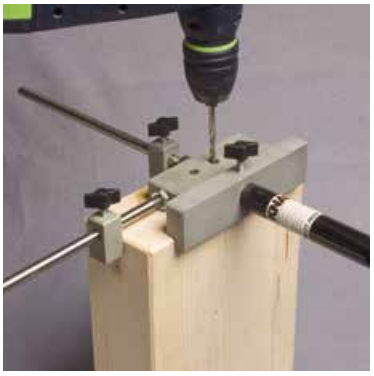
Installation

Fabrication with CNC joinery machine is possible – all data for the standard CNC joinery machine programs is available.
Milling with KNAPP® routing-jig.

Milling

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:

SEMA SOFTWARE

hsbcad CAD/CAM für den Holzbau

Dietrich's

cadwork

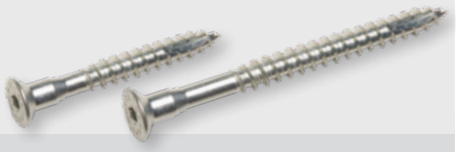
Holzbau Programme

WETO AG technologies

GIGANT screws

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. Z528	CS-screw 10x200

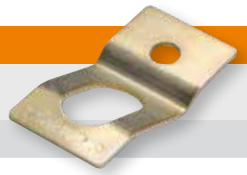


Application: to install GIGANT to main and secondary beams, etc.

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 dimensions.

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

Application: place into MULTI F 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.

The heavy-duty system for timber construction engineering

Connecting main beam to secondary beam up to 768 kN*

- Wood width up from 100 mm
- Multiple disassembly and reassembly possible
- High degree of prefabrication for industrially fabricated structures
- Assembly from all directions
- Load-bearing in all directions
- Only 2 cm hooking way for short crane times
- No tilting during installation

MEGANT®

Available in 10 sizes.

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

* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA-15/0667 (2019/07/22), for glulam GL24h.

KNAPP®
connectors.com

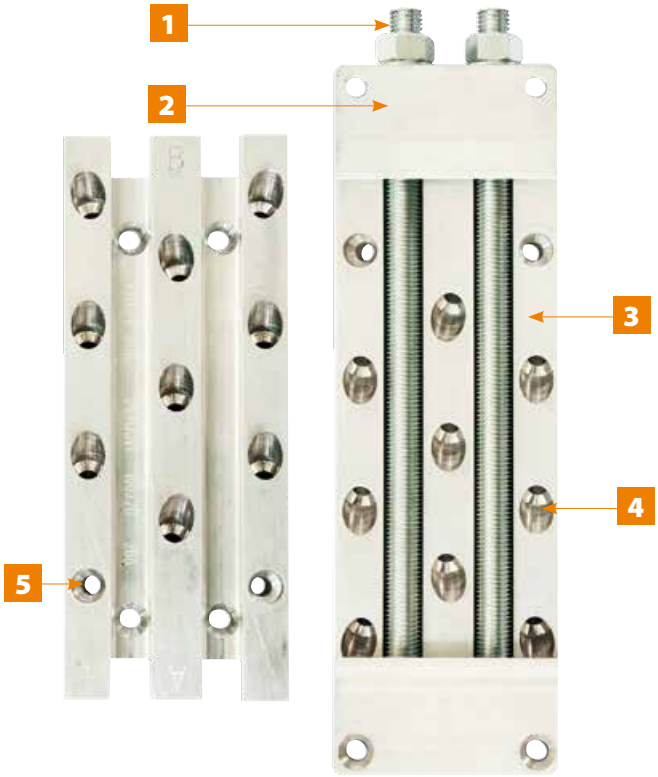

House of Sydney © Lendlease

MEGANT®

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


Hasslacher © Thompson

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



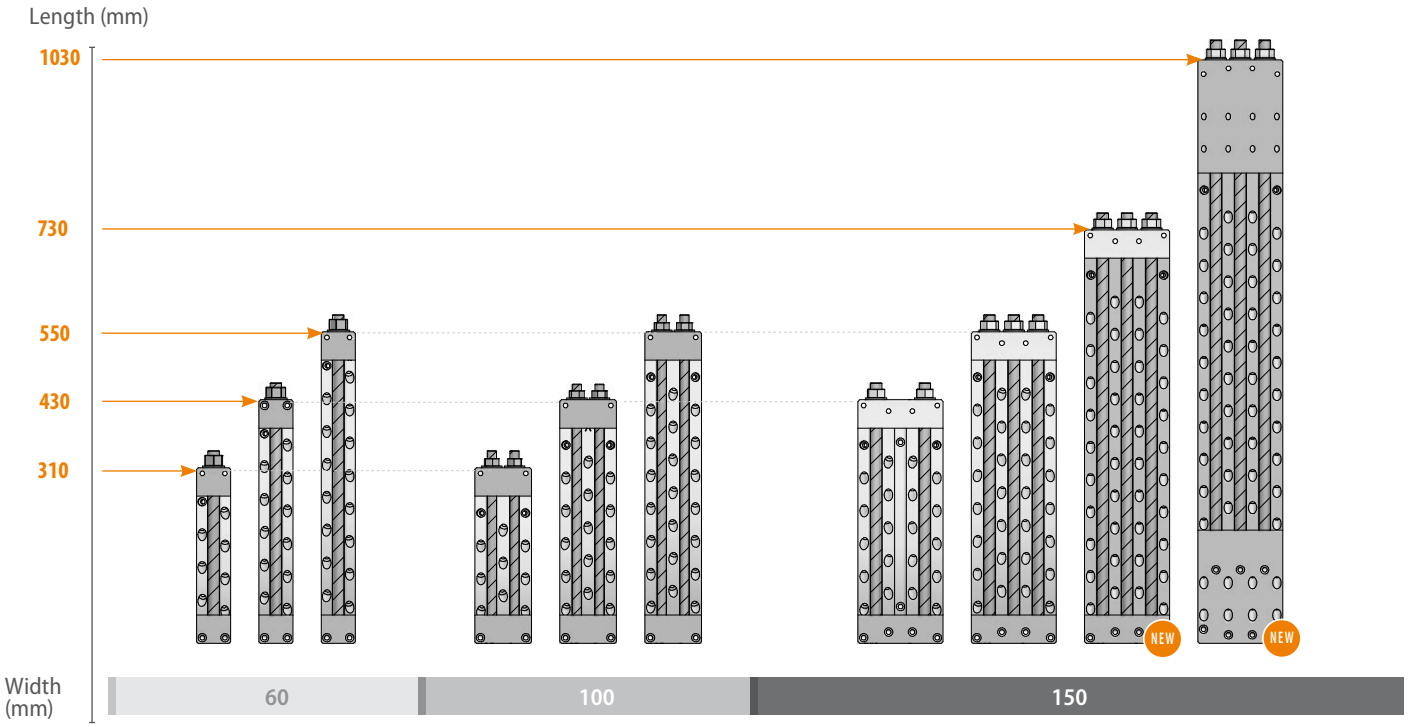
1. Threaded rod with washers and hexagonal nuts transmit the tensile forces.
2. Tapered aluminium clamping jaws transfer the vertical and tensile forces from the secondary beam to the main beam and form a tight joint between the two connector plates. In addition, the clamping jaws can be used to rest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

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

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

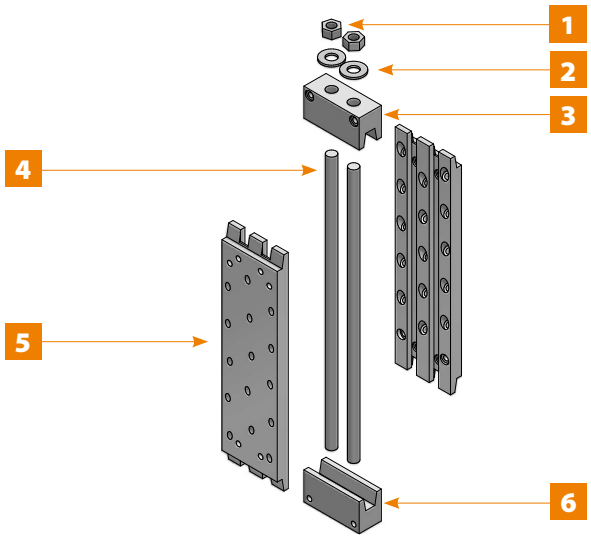
MEGANT®

MEGANT® standard dimensions



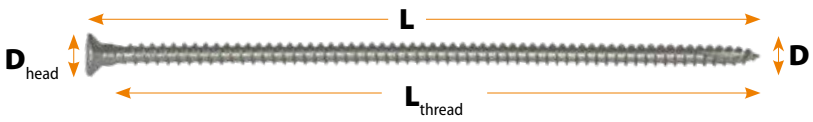
Connector components

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)



MEGANT® screws

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



Art.-No.	Type	D_{head}		L		L_{thread}		D		Bits
		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: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT®

Application examples and connection details

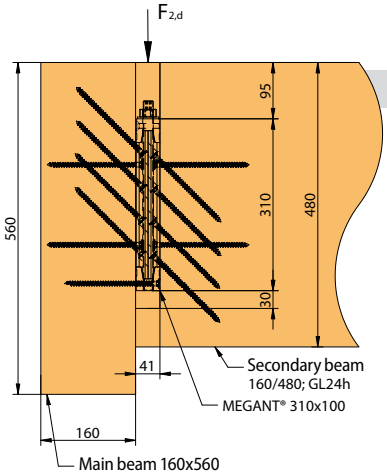
With only 2 cm of hooking way, an installation in recesses of concrete walls can be done.

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

PRODUCT

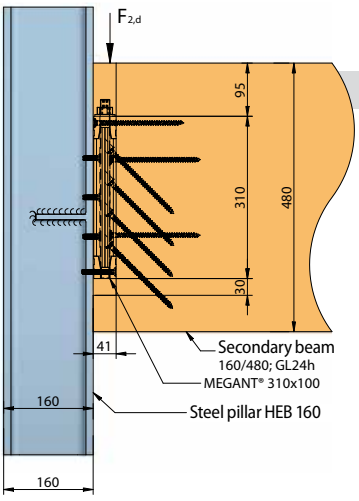
MEGANT® angled connection.

MEGANT® on wood



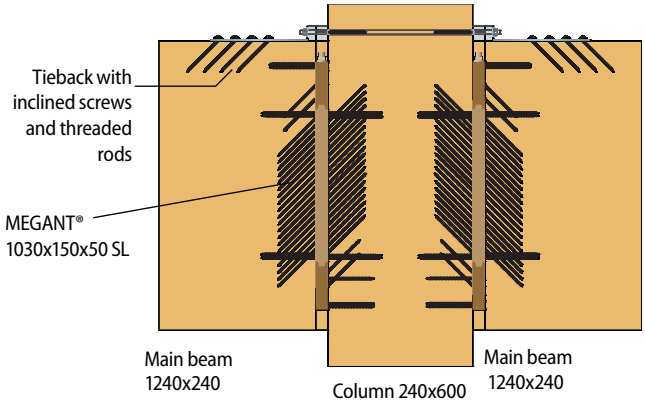
MEGANT® steel connection.

MEGANT® on steel



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

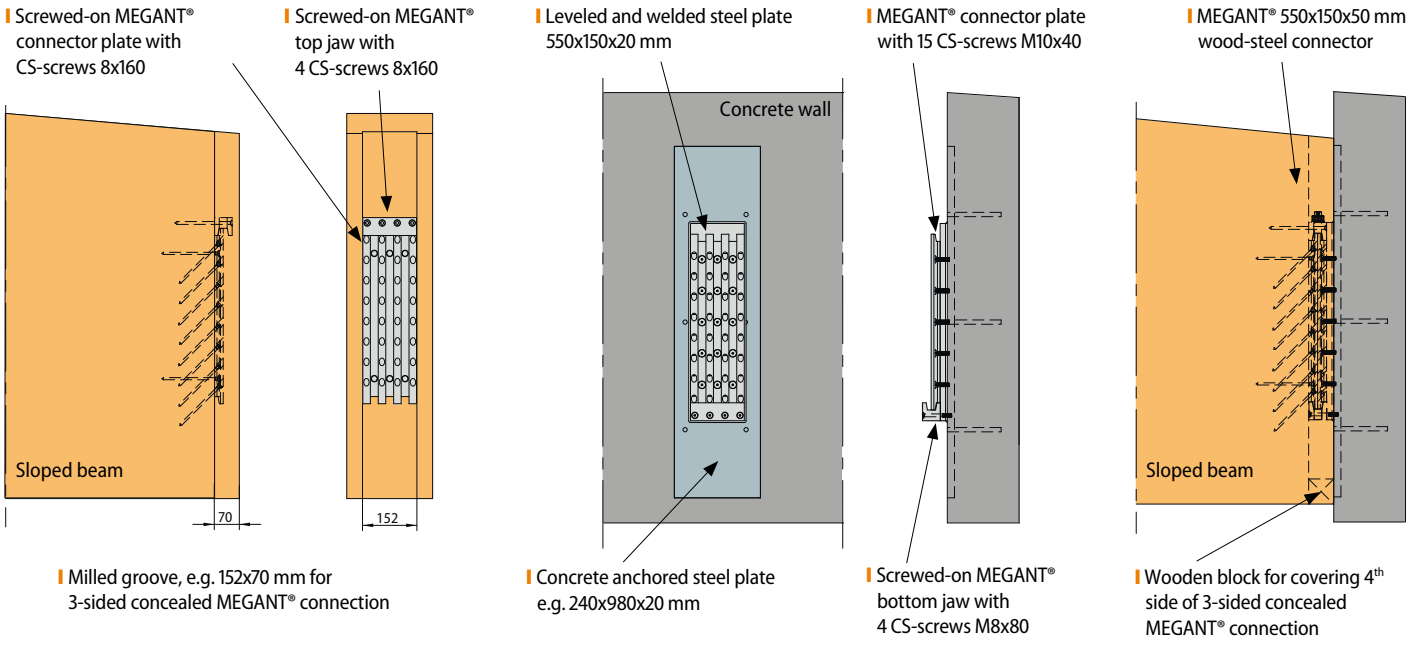
Double-sided beam column connection with MEGANT®



MEGANT®

Wood to concrete and steel connection

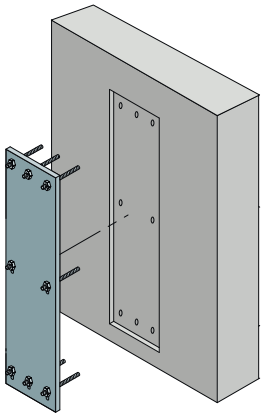
Example of a sloped beam/concrete connection with MEGANT®



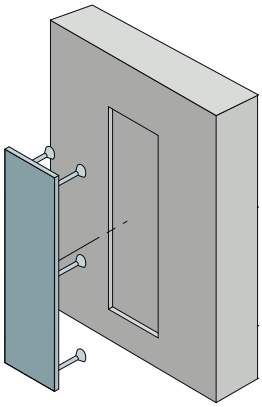
Examples of anchor plate concrete connection

MEGANT® concrete connection.

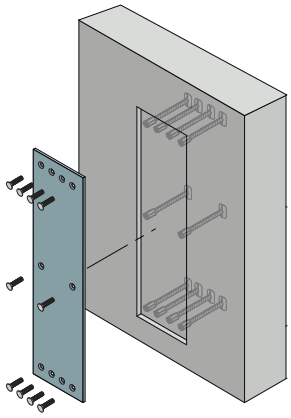
Adhesive:
fischer Superbond-System
FIS SB 390 S



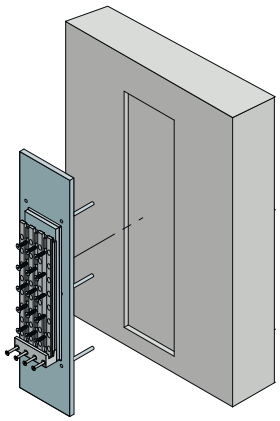
Concrete connection with glued-in threaded rods for levelling the fischer steel plate - optionally set in recessed concrete. Bonded with fischer Superbond System:
FIS SB 390 S
www.fischer-international.com/en/



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



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



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.

MEGANT®

Assembly procedure

13:00 | After aligning the beam, MEGANT® is put into position.

13:05 | For threading and dropping, MEGANT® requires only 2 cm.

13:08 | Screw them into the clamping jaw.

13:09 | Tighten hexagonal nuts.

13:11 | Connection completed.

MEGANT®

Fire protection

- Due to the concealed installation of the connectors on three or four sides, appropriate fire protection can be achieved via the corresponding timber cover.
- 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.
- According to EN 1995-1-2, 28 mm wood cover is required for fire rating R30, 49 mm for R60 and 70 mm for R90 (see calculation example on page 31).
- In special situations (e.g. due to non-compliance with the timber cover), the connector can be additionally protected against heat with Firestrip Interdens type 15. The timber overlap according to EN 1995-1-2 must still be guaranteed over the screws.
- Firestrip Interdense Type 15 has been validated by ETA -16 / 0811.
- Firestrip Interdens encases the MEGANT® connector from all 6 sides and foams up from 150°C. From 300°C the casing provides full foam protection.

MEGANT® connector after 60 minutes fire test. The wood is charred on all sides. The connector withstood the applied vertical load in the fire test.

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

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.

* Our service does not replace an approval by a certified structural engineer.

MEGANT®

Overview, load capacities

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

(Dimensions in mm)

Connectors	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 load capacities with screws 8x160 timber quality GL24h

Connectors	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 load capacities with screws 8x160 timber quality GL24h

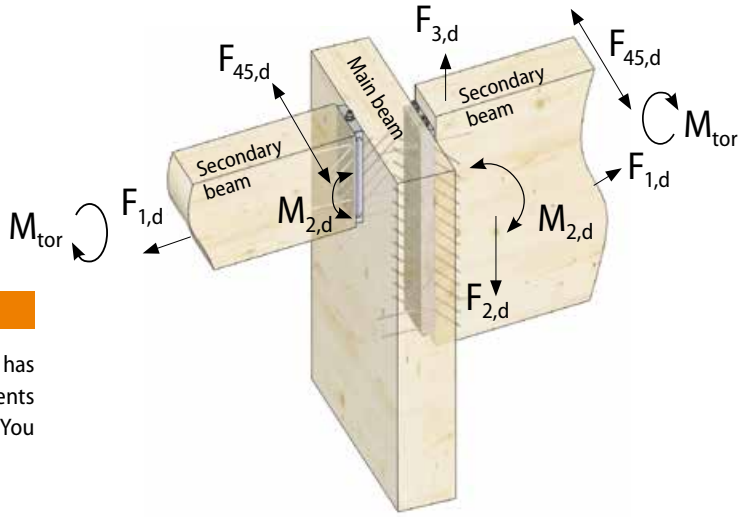
Connectors	Min. secondary beam height [mm]	Characteristic values [kN]			
		max $F_{1,Rk}$	max $F_{2,Rk}$	max $F_{3,Rk}$	max $F_{45,Rk}$
310x150x50	190x410	43,0	156,0	61,6	57,6
430x150x50	190x520		260,0	80,8	74,8
550x150x50	190x640		364,0	100,0	81,6
730x150x50	190x830		443,2	100,0	81,6
1030x150x50 SL*	190x1130		604,0	100,0	81,6
1030x150x50 SL**	190x1130		768,0*	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
1090x150x50	190x1190		443,2	100,0	81,6

* MEGANT® 1030x150x50 is calculated with 8x160 inclined screws and 8x240/8x160 horizontal screws in GL24h
** MEGANT® 1030x150x50 is calculated with 8x240 inclined screws and 8x240/8x160 horizontal screws in GL24h

Static proof for F_1 and F_2 must be carried out separately and not combined!

$F_{1,Rk}$ Characteristic values for tension
$F_{2,Rk}$ Characteristic values in direction of insertion
$F_{3,Rk}$ Characteristic values against the direction of insertion
$F_{45,Rk}$ Characteristic values perpendicular to the direction of insertion

To increase the load capacity, longer 8x240 mm inclined screws can be used.



Important notice

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.

MEGANT® 310/60/40

Technical details

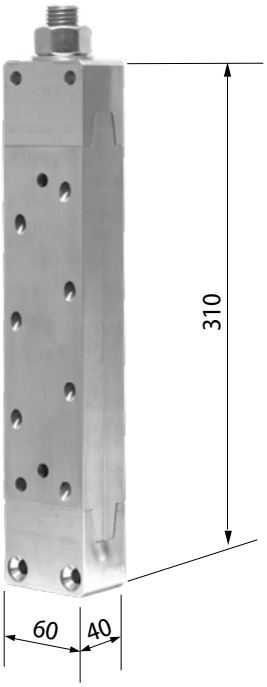
Art.-No. K242

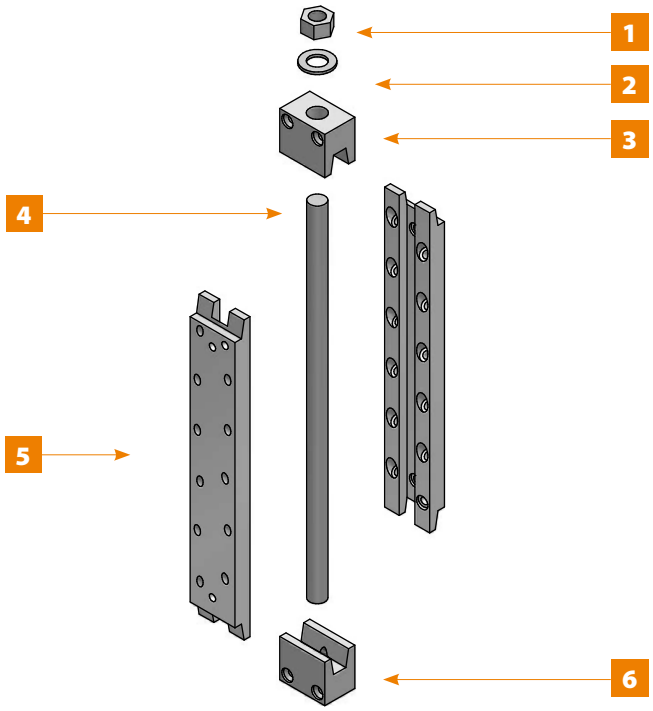
(Dimensions in mm)

MEGANT® 60 load capacities with screws 8x160 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 $F_{45,Rk}$
L x W x H 310x60x40	B x H 100x440	20,4	96,8	29,1	33,6

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

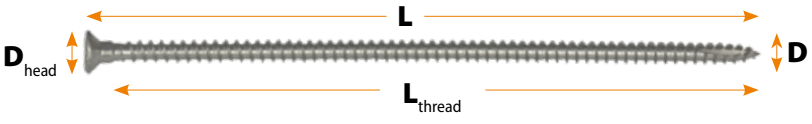




Pos.	Description	Pos.	Description
1	1 hexagonal nut M20	4	1 threaded rod M20x340
2	1 washer M20	5	2 connector plates 250x60x20
3	1 top clamping jaw (without thread) 60x50x40	6	1 bottom clamping jaw (with thread) 60x50x40

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
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 connection on hardwood											
Z670/Z675	24	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 430/60/40

Technical details

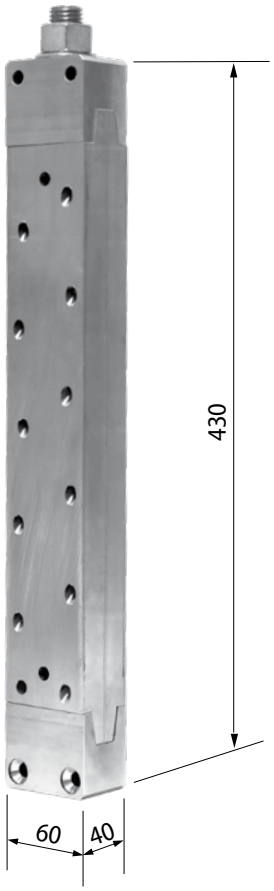
Art.-No. K243

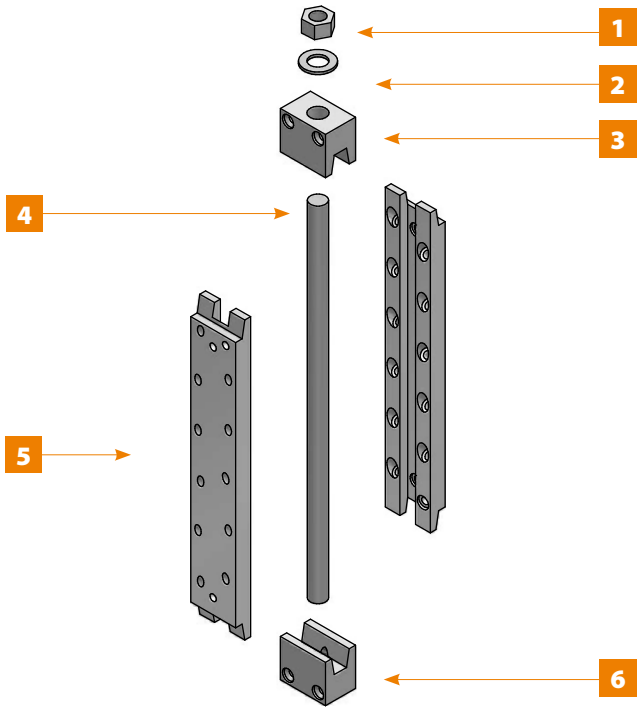
(Dimensions in mm)

MEGANT® 60 load capacities with screws 8x160 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 $F_{45,Rk}$
430x60x40	100x520	20,4	152,0	38,7	40,6

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

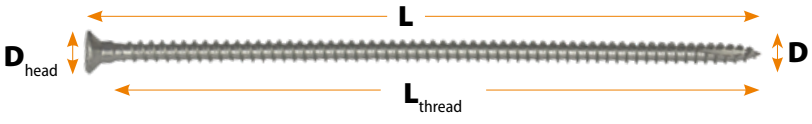




Pos.	Description	Pos.	Description
1	1 hexagonal nut M20	4	1 threaded rod M20x340
2	1 washer M20	5	2 connector plates 370x60x20
3	1 top clamping jaw (without thread) 60x50x40	6	1 bottom clamping jaw (with thread) 60x50x40

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
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 connection on hardwood											
Z670/Z675	32	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

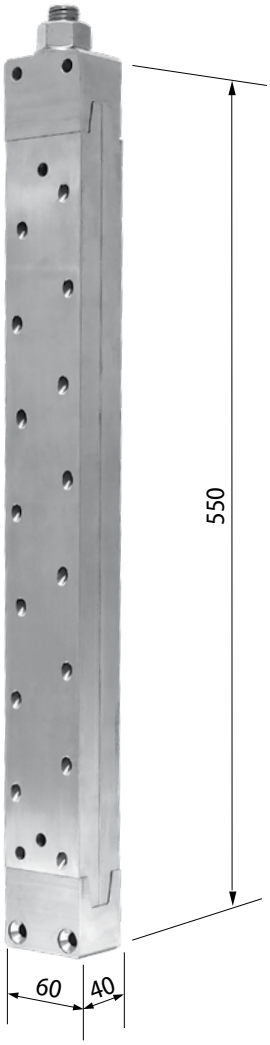
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 550/60/40

Technical details

Art.-No. K244

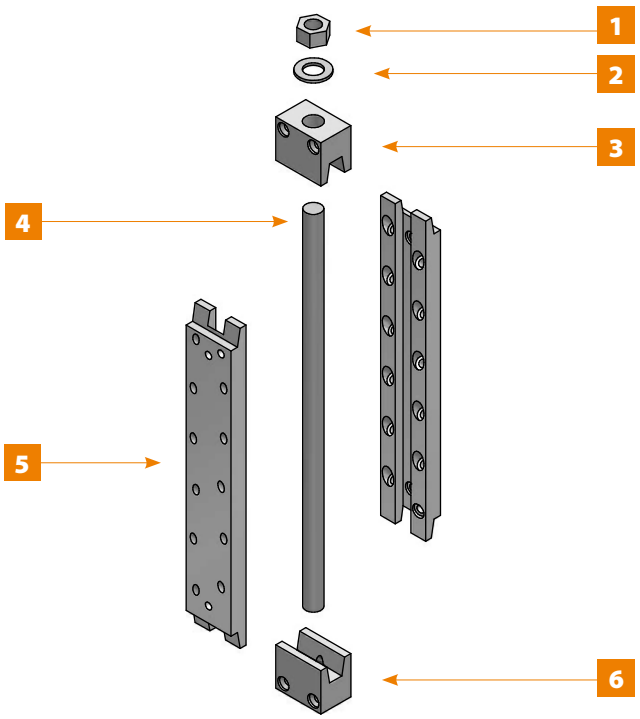
(Dimensions in mm)



MEGANT® 60 load capacities with screws 8x160 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 $F_{45,Rk}$
550x60x40	100x640	20,4	177,7	48,3	44,3

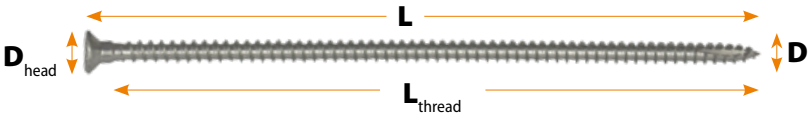
The full range of resistance values can be found online on our website.



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

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			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	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	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 310/100/40

Technical details

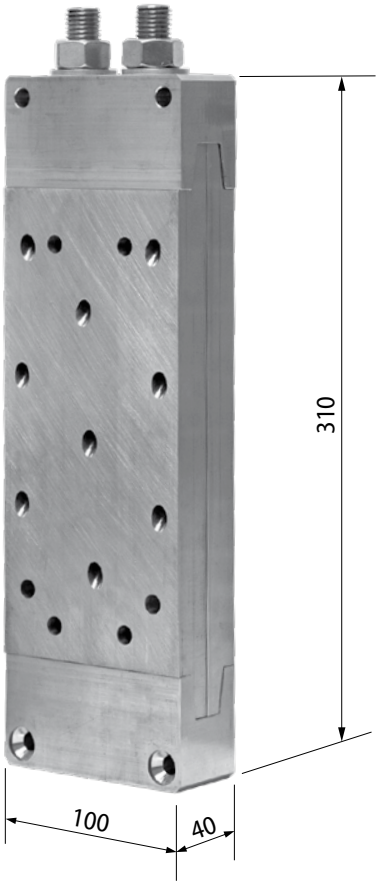
Art.-No. K239

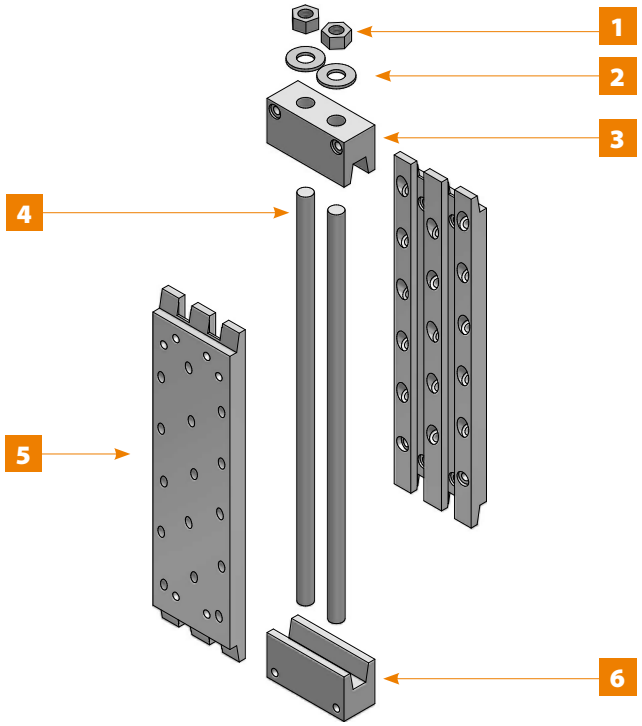
(Dimensions in mm)

MEGANT® 100 load capacities with screws 8x160 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

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

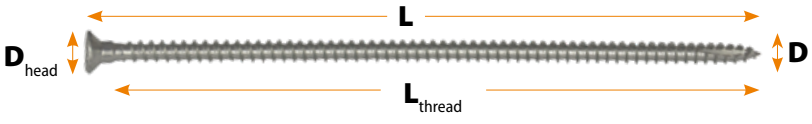




Pos.	Description	Pos.	Description
1	2 hexagonal nuts M16	4	2 threaded rods M16x340
2	2 washers M16	5	2 connector plates 250x100x20
3	1 top clamping jaw (without thread) 100x50x40	6	1 bottom clamping jaw (with thread) 100x50x40

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
Z581	18	Angled CS screw	15	0.59	**160**	6.30	145	5.70	**8**	0.31	Torx 40
Z530	10	CS horizontal screws	15	0.59	**240**	9.45	225	8.86	**8**	0.31	Torx 40
Z581	6	CS horizontal screws	15	0.59	**160**	6.30	145	5.70	**8**	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	34	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

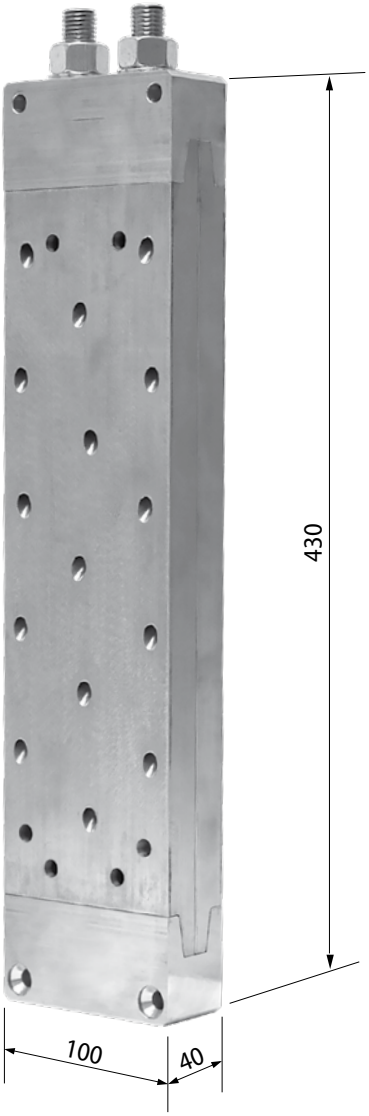
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 430/100/40

Technical details

Art.-No. K240

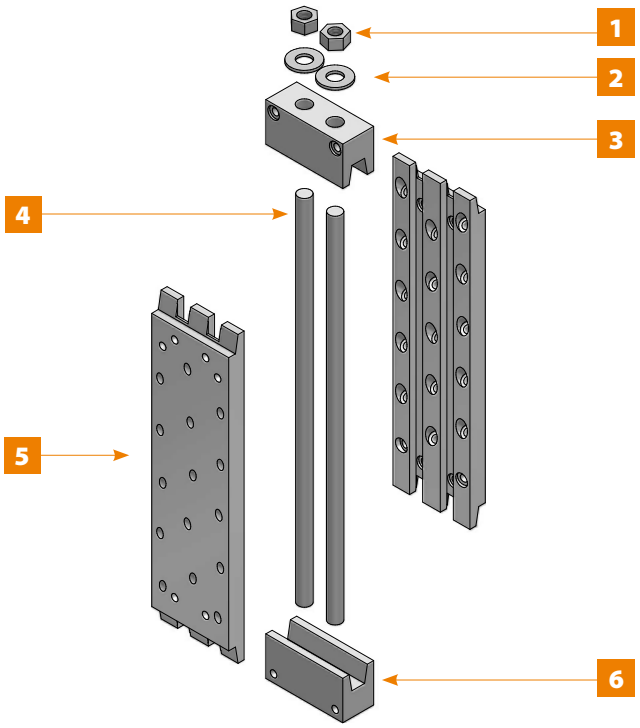
(Dimensions in mm)



MEGANT® 100 load capacities with screws 8x160 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 $F_{45,Rk}$
430x100x40	140x520	31,7	207,0	60,6	68,6

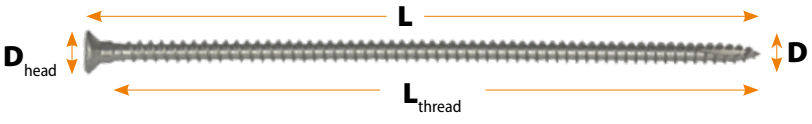
The full range of resistance values can be found online on our website.



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

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			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	10	CS horizontal screws	15	0.59	**240**	9.45	225	8.86	**8**	0.31	Torx 40
Z581	6	CS horizontal screws	15	0.59	**160**	6.30	145	5.70	**8**	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	46	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

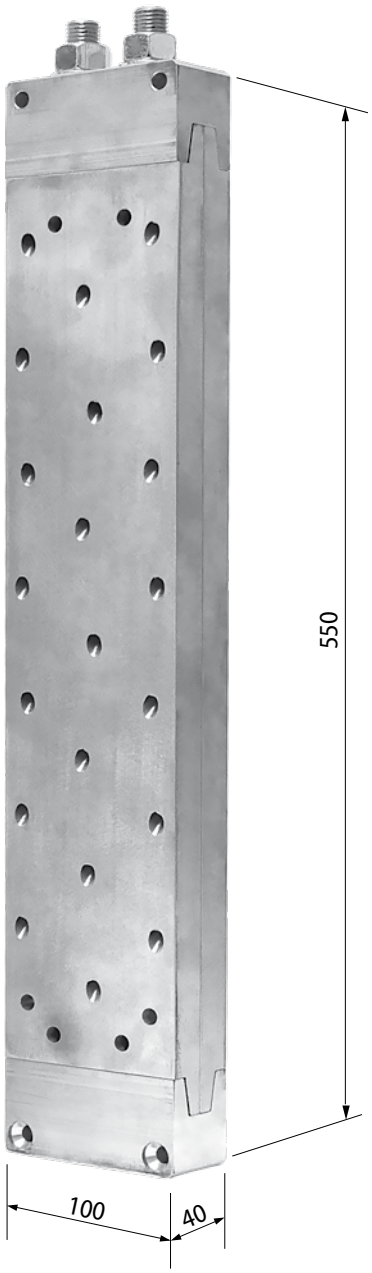
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 550/100/40

Technical details

Art.-No. K241

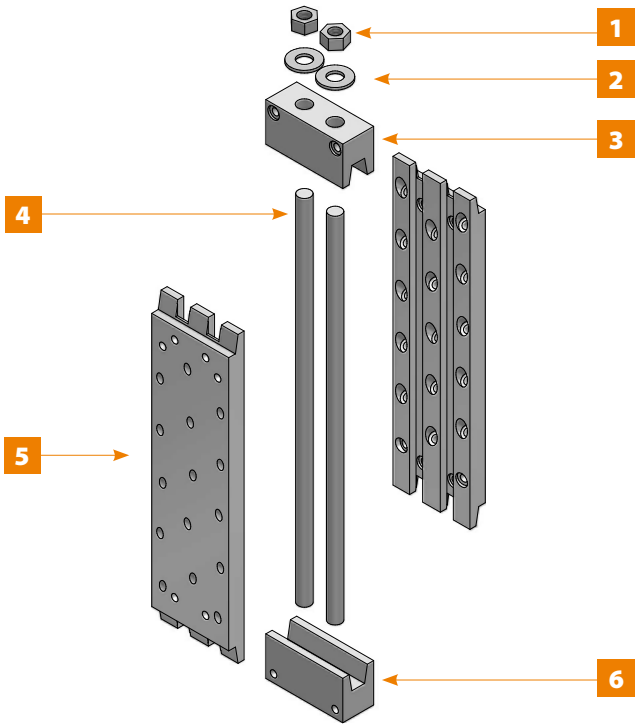
(Dimensions in mm)



MEGANT® 100 load capacities with screws 8x160 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 $F_{45,Rk}$
550x100x40	140x640	31,7	235,2	75,0	74,9

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

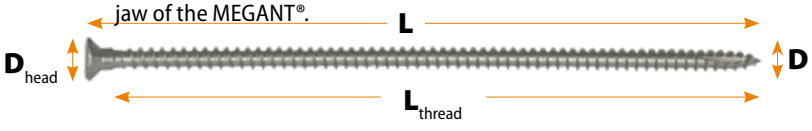


Pos.	Description	Pos.	Description
1	2 hexagonal nuts M16	4	2 threaded rods M16x580
2	2 washers M16	5	2 connector plates 490x100x20
3	1 top clamping jaw (without thread) 100x50x40	6	1 bottom clamping jaw (with thread) 100x50x40

MEGANT® screws

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

for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
Z581	42	Angled CS screw	15	0.59	**160**	6.30	145	5.70	**8**	0.31	Torx 40
Z530	10	CS horizontal screws	15	0.59	**240**	9.45	225	8.86	**8**	0.31	Torx 40
Z581	6	CS horizontal screws	15	0.59	**160**	6.30	145	5.70	**8**	0.31	Torx 40
Screw connection on hardwood											
Z670/Z675	58	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 310/150/50

Technical details

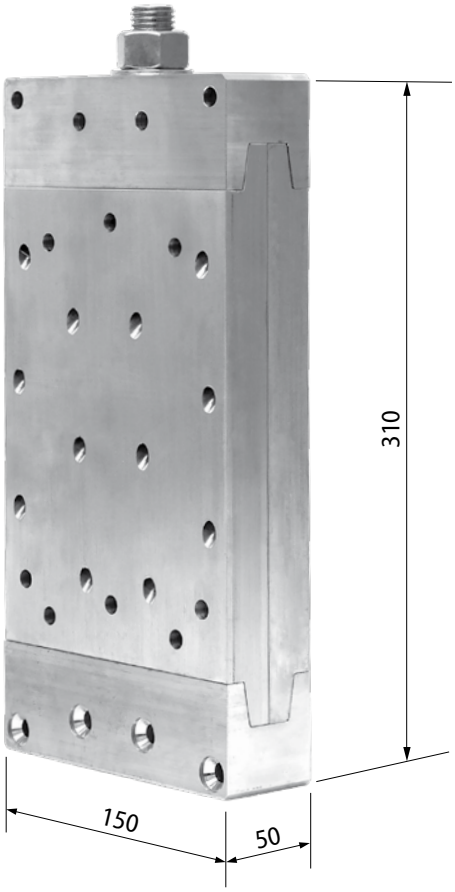
Art.-No. K197

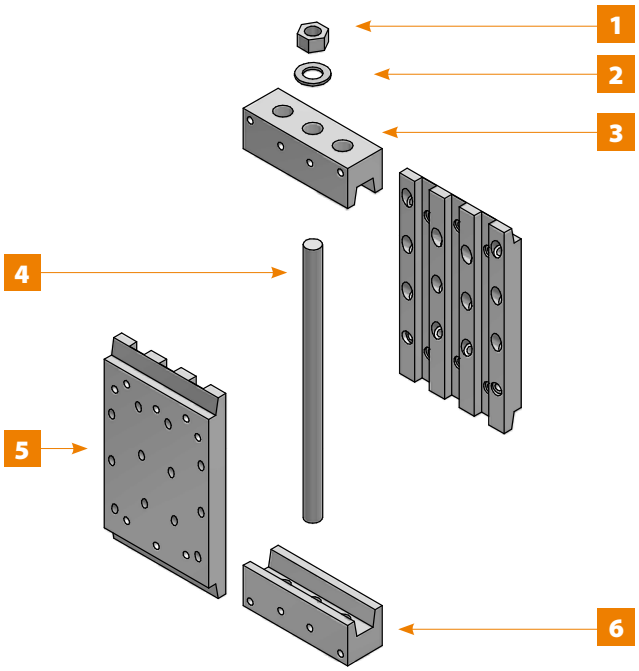
(Dimensions in mm)

MEGANT® 150 load capacities with screws 8x160 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 $F_{45,Rk}$
310x150x50	190x410	43,0	156,0	61,6	57,6

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

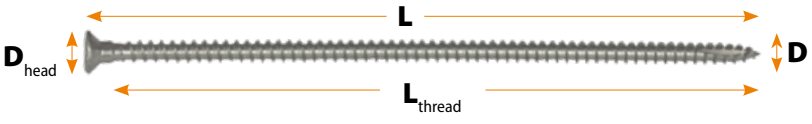




Pos.	Description	Pos.	Description
1	1-3 hexagonal nuts M20	4	1-3 threaded rods M20x340
2	1-3 washers M20	5	2 connector plates 250x150x25
3	1 top clamping jaw (without thread) 150x50x50	6	1 bottom clamping jaw (with thread) 150x50x50

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
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 connection on hardwood											
Z670/Z675	48	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

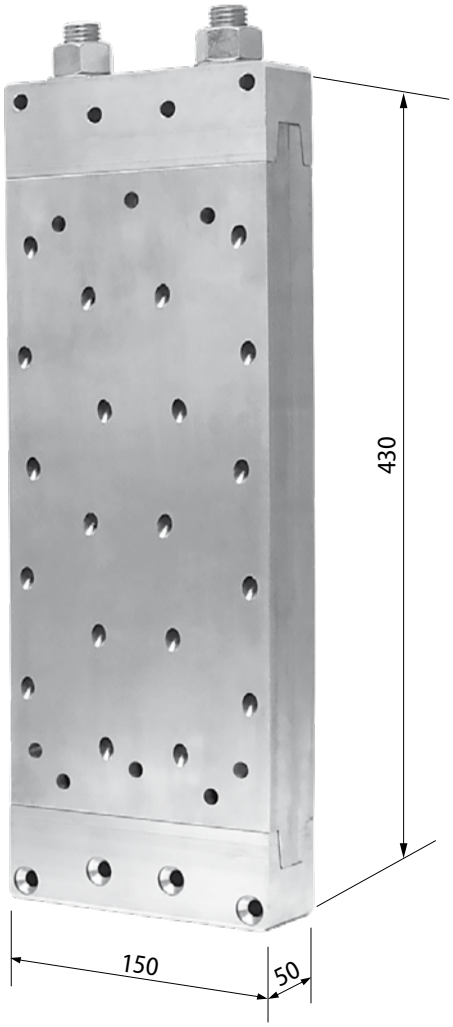
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 430/150/50

Technical details

Art.-No. K220

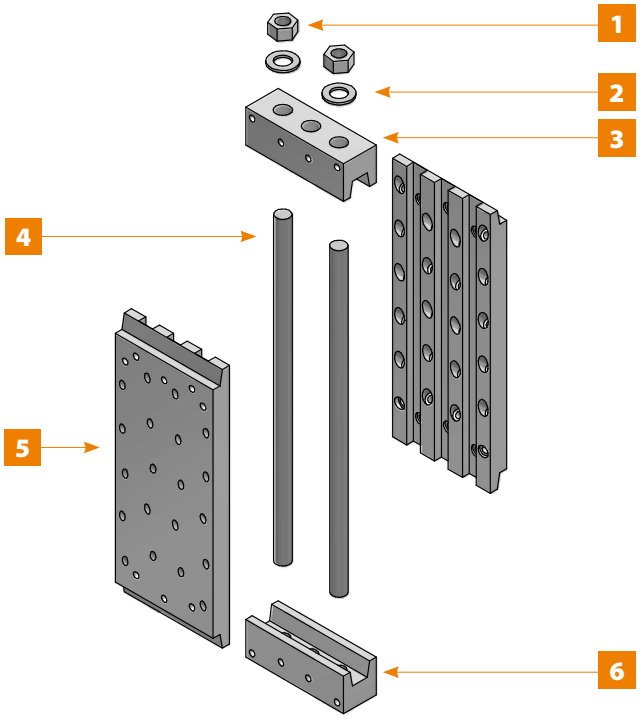
(Dimensions in mm)



MEGANT® 150 load capacities with screws 8x160 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 $F_{45,Rk}$
430x150x50	190x520	43,0	260,0	80,8	74,8

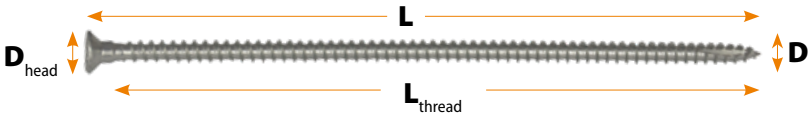
The full range of resistance values can be found online on our website.



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

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]	
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	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

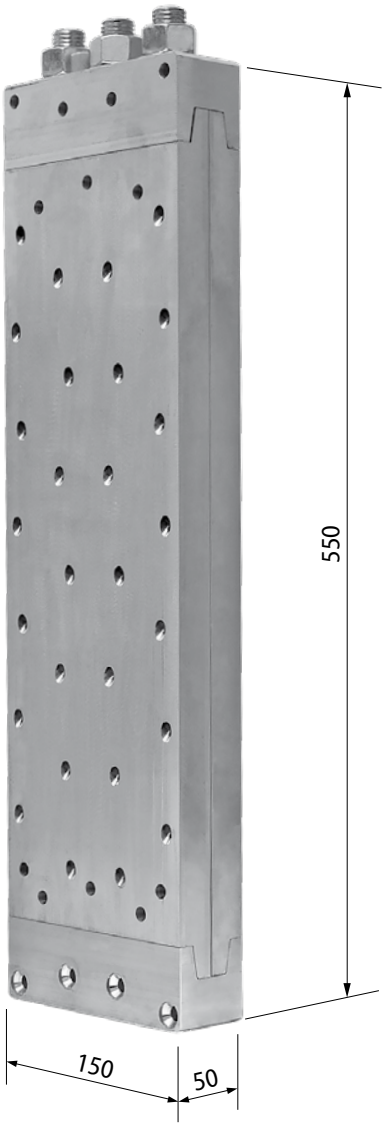
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 550/150/50

Technical details

Art.-No. K221

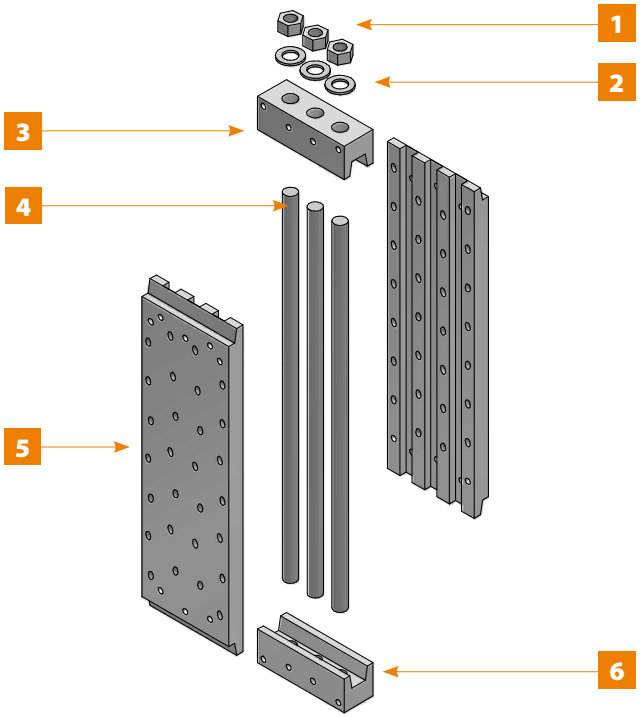
(Dimensions in mm)



MEGANT® 150 load capacities with screws 8x160 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 $F_{45,Rk}$
550x150x50	190x640	43,0	364,0	100,0	81,6

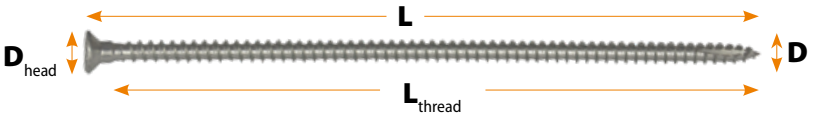
The full range of resistance values can be found online on our website.



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

MEGANT® screws

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		D		Bits
			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	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

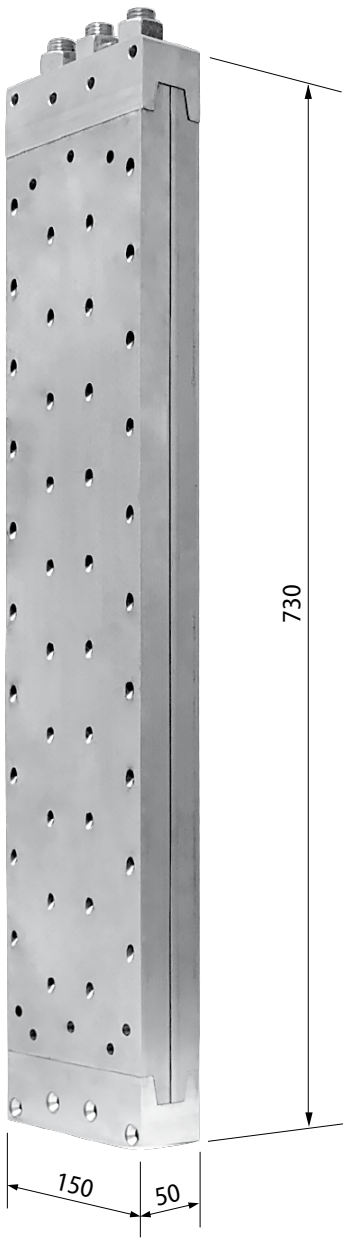
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 730/150/50

Technical details

Art.-No. K251

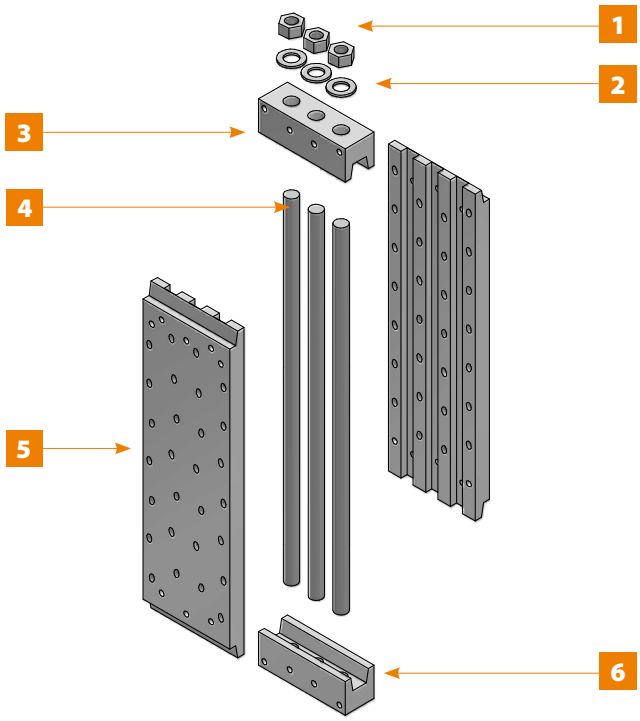
(Dimensions in mm)



MEGANT® 150 load capacities with screws 8x160 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 $F_{45,Rk}$
730x150x50	190x830	43,0	443,2	100,0	81,6

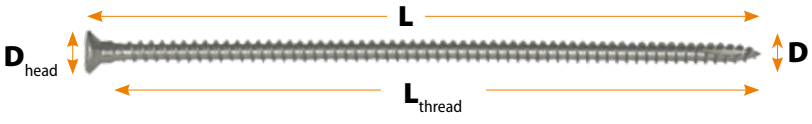
The full range of resistance values can be found online on our website.



Pos.	Description	Pos.	Description
1	3 hexagonal nuts M20	4	3 threaded rods M20x760
2	3 washers M20	5	2 connector plates 670x150x25
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®)



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		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	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

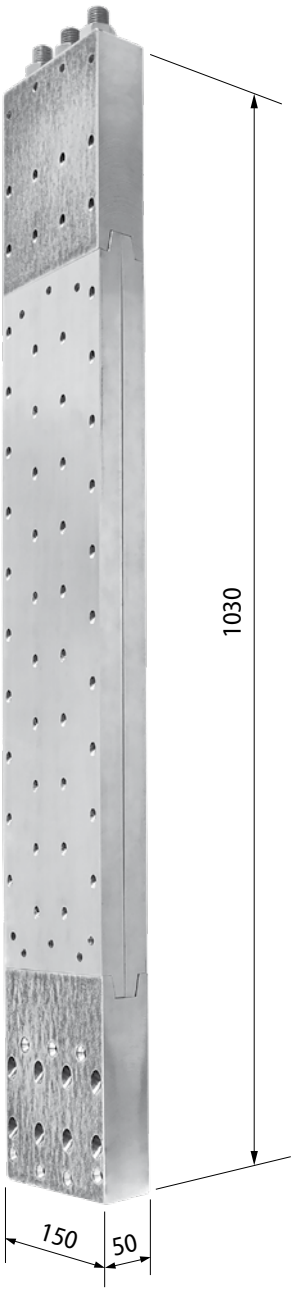
Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

MEGANT® 1030/150/50 SL

Technical details

Art.-No. K180

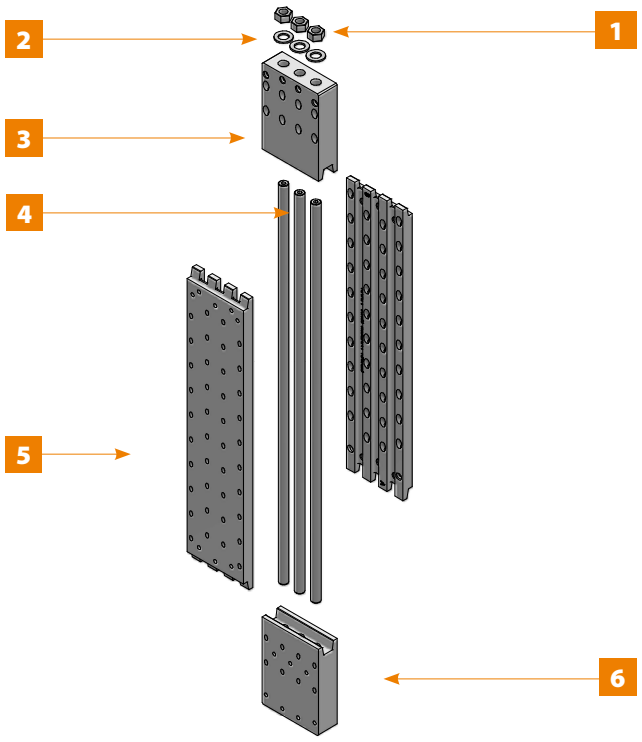
(Dimensions in mm)



MEGANT® 150 load capacities with screws 8x160 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 $F_{45,Rk}$
1030x150x50 SL	190x1130	43,0	604,0	100,0	81,6
Special MEGANT® sizes available on request (examples of sizes listed)					
850x150x50	190x950	43,0	443,2	100,0	81,6
1030x150x50 SL*	190x1130		768,0*	100,0	81,6
1090x150x50	190x1190		443,2	100,0	81,6

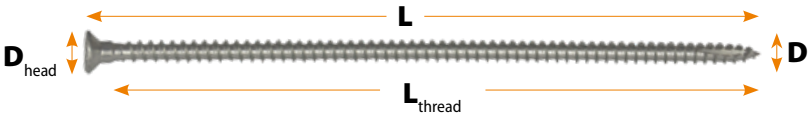
The full range of resistance values can be found online on our website.



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

aa

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



Art.-No.	Quantity	Type	D_{head}		L		L_{thread}		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	CS screws for hardwoods	15	0.59	**120**	9.45	105	4.13	**8**	0.31	Torx 40

Application: for positioning screws and diagonal screws as well as assembling the clamping jaw of the MEGANT®.

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.
- Stable from the first wall corner
- Quick and easy assembly through the spacious V-shaped bracket
- 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
- Adjustment of joint spacings e.g. for gaskets and readjustment of construction tolerances
- No milling necessary for panel thicknesses 13/15 mm

WALCO® V

Available in 2 sizes and 5 versions.

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

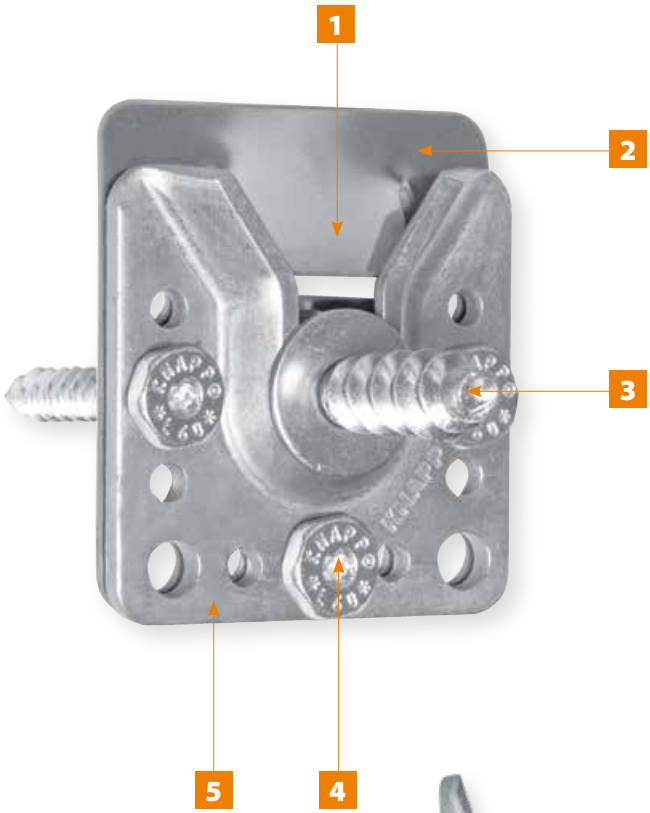
* Characteristic value $F_{2,Rk}$ in slide-in direction on C24 according to ETA 10/0189 (2019/10/11). Data based on the use of 3 original KNAPP® hexagon head screws.

KNAPP®
connectors.com

WALCO® V

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

Installation example: wall connection.



1. The generous v-shaped bracket slides the holding screw into place.
2. 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.
3. The WALCO® V holding screw is the counter part to the connector. Available in 4 versions.
4. WALCO® V hexagon head screws for screwing with Torx or hexagon nut.
5. 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 ≥ 28 mm, R60 ≥ 49 mm)

WALCO® V60

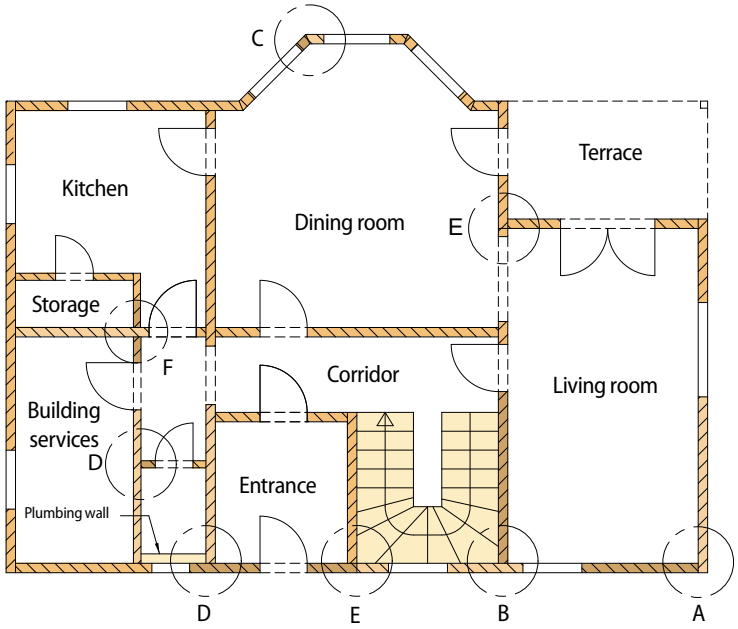
WALCO® V80

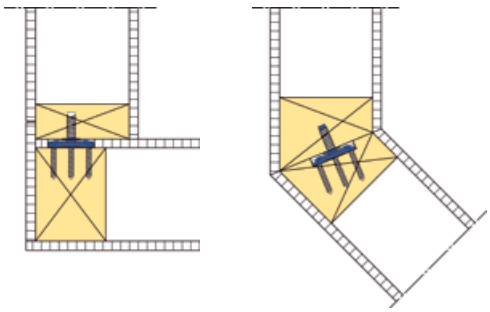
made in Germany CE
ETA ETA-10/0189 (2019/10/11)
PRODUCT

WALCO® V60 and WALCO® V80

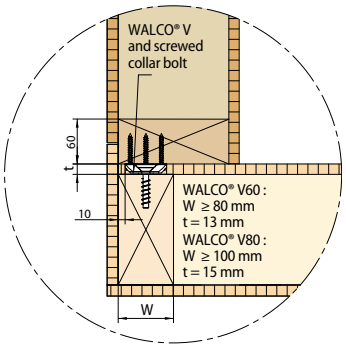
Application examples and connection details

(Dimensions in mm - W = Width, t = Thickness)

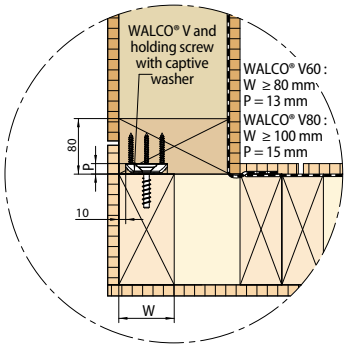




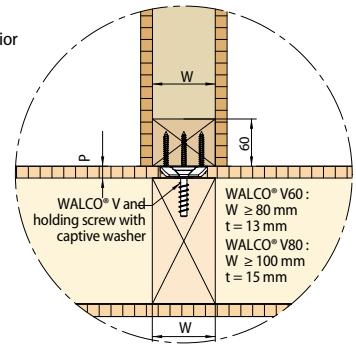
Detail A_1 :
External wall corner, planked with wood-based panel



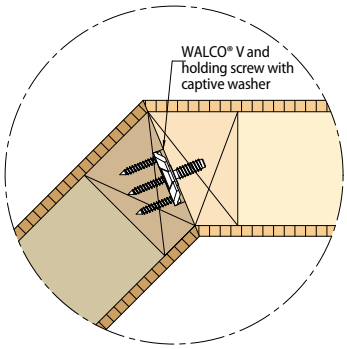
Detail A_2 :
Exterior wall corner with vapor barrier (PE- lm)



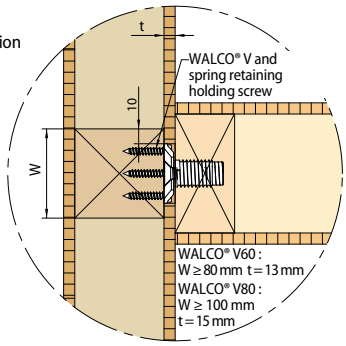
Detail B :
Connection of exterior with interior wall



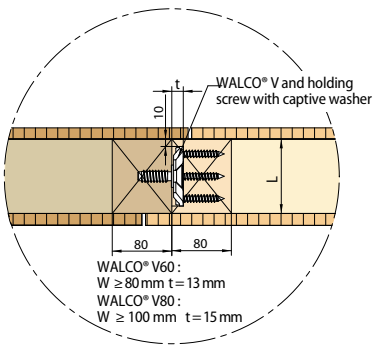
Detail C :
Exterior wall mitre joint



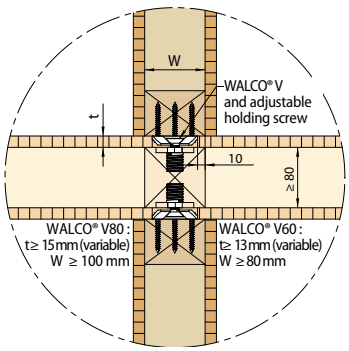
Detail D :
Interior wall connection (e. g. plumbing wall)



Detail E :
Straight joint for exterior or interior walls



Detail F :
Internal wall double connection



WALCO® V60 and WALCO® V80

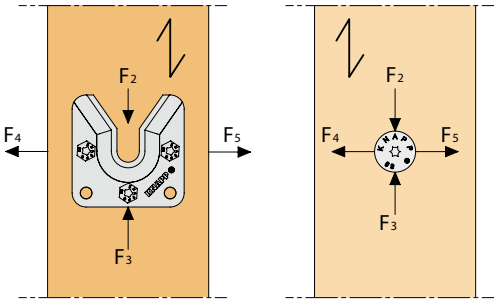
Load-bearing capacities for WALCO® V with collar screw (KS)

KNAPP® Connectors	Timber grade	Characteristic values			Design values $F_{1,Rd}$ [kN]	Design values $F_{2,Rd}$ [kN]		Design values $F_{3,Rd}$ [kN]	Design values $F_{45,Rd}$ [kN]	
					k_{mod} [SC* 1+2]			k_{mod} [SC* 1+2]	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
WALCO® V60 KS	C24	6,49	5,94	3,88	4,49	2,74	4,11	1,3	1,79	2,69
	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
WALCO® V80 KS	C24	7,08	7,10	4,46	4,90	3,28	4,92	1,3	2,06	3,09
	GL24h	7,64	7,81	4,91	5,29	3,60	5,41		2,27	3,40
	CLT	7,56	7,71	4,85	5,23	3,56	5,34		2,24	3,36

*SC = service class

$F_{1,Rd}$ Design values for tension
$F_{2,Rd}$ 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_{mod} = 0,6 => Permanent (more than 10 years for example self weight)
k_{mod} = 0,8 => 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 **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 kN/m², 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/m² (q = 0,8 kN/m², c_{pe} = 0,8, v = 129 km/h)
w_d = 1,5 kN/m² (q = 1,25 kN/m², c_{pe} = 0,8, v = 160 km/h)
w_d = 1,9 kN/m² (q = 1,55 kN/m², c_{pe} = 0,8, v = 179km/h) 18 m < H <= 25 m

Derivation: $w_d = \gamma Q \cdot c_{pe} \cdot q$ = γQ= 1,5

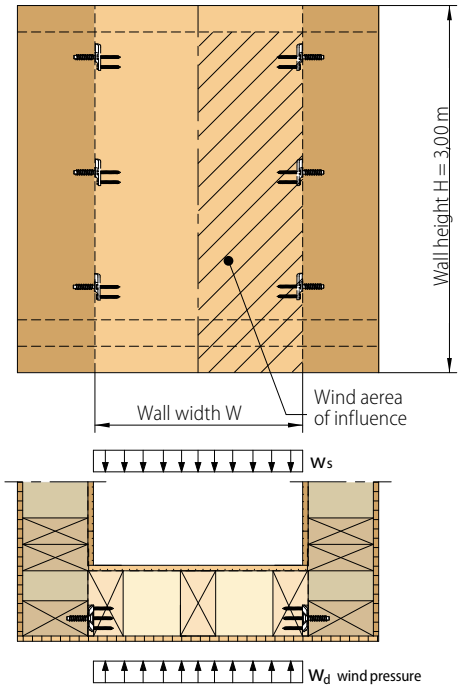


Table 1: Wall width B in dependence of the number of connectors and wind load.
We recommend min. 3 WALCO® V connectors for external wall corner.

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	WALCO® V60 KS	9,0	5,4	3,6	2,8
4		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!

WALCO® V60 and WALCO® V80

Permissible load values with interlayer

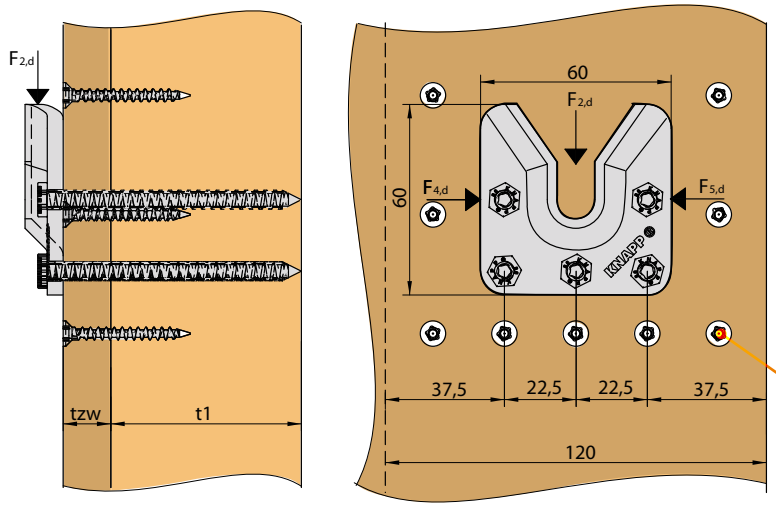
WALCO® V directly to intermediate layer (cladding) attached:

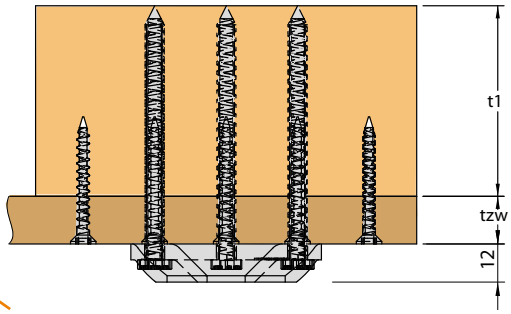
When fixing the WALCO® V connector to an intermediate layer, the design values listed below come into effect, these refere to the ETA-10/0189 and on the DIN 1995-1-1 (EC5). The values are subdivided into the different load duration classes (LDC) and the load directions. In addition, it should be noted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

Thickness t_{zw} [mm]	Interlayer/ Stud	WALCO® V60 with 5 screws 6x80 1 screw 12x60				WALCO® VV80 with 5 screws 10x80 1 screw 16x60			
		Design values of load-bearing capacity F_{Rd} [kN]				Design values of load-bearing capacity F_{Rd} [kN]			
		$F_{2,Rd}$ [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	4,9	3,1
15		1,5	3,0	3,7		2,3	4,4		
12	OSB Plate / C24	2,4	3,7	4,1	2,7	2,8	4,4	4,9	3,1
15		2,2	3,7	4,1		2,8	4,4		
13	Particleboard / C24	1,9	3,3	4,0	2,7	2,3	3,9	4,8	3,1
19		1,8	3,1	3,8		2,3	4,0		
13	Particleboard / C24	2,7	3,7	4,1	2,7	3,3	4,4	4,9	3,1
15						3,3	4,4		

WALCO® V60

(Dimensions in mm)



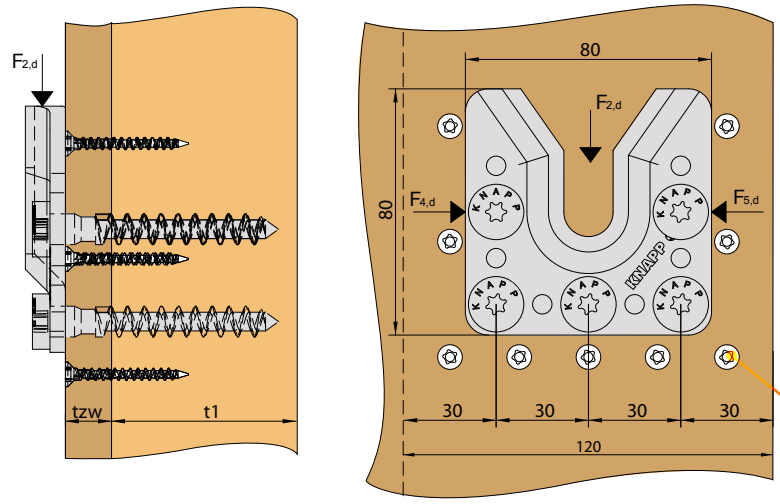


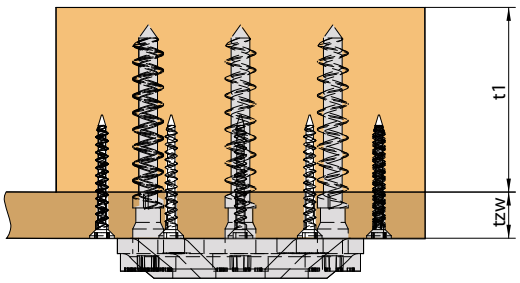
Additional attachment of the Interlayer for transmission of forces into post with screws, nails or staples.

$t_{zw} \leq 26$ cm

WALCO® V80

(Dimensions in mm)





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

$t_{zw} \leq 26$ cm

WALCO® V80

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

KNAPP® Connector	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
$F_{2,0,Rk}$ Shear force in insertion direction in **MAGNUM**BOARD® OSB end grain
$F_{2,90,Rk}$ Shear force in insertion direction in **MAGNUM**BOARD® OSB side timber
$F_{45,0,Rk}$ Shear force perpendicular to the direction of insertion in **MAGNUM**BOARD® OSB end grain
$F_{45,90,Rk}$ 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).

SWISS KRONO

VIDEO

Tensile force F_1 design values

KNAPP® Connector	Tensile force $F_{1,0,Rd}$ in **MAGNUM**BOARD® OSB end grain depending on the load duration class (LDC)					
	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	1,08	1,34	1,88	2,42	2,69	2,96

KNAPP® Connector	Tensile force $F_{1,90,Rd}$ in **MAGNUM**BOARD® OSB wide face in dependence of the load duration (LDC)					
	permanent	long	moyen	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 F_2 design values in direction of insertion

KNAPP® Connector	Shear force $F_{2,0,Rd}$ in **MAGNUM**BOARD® OSB end grain depending on the load duration (LDC)					
	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

KNAPP® Connector	Shear force $F_{2,90,Rd}$ in **MAGNUM**BOARD® OSB wide face depending on the load duration (LDC)					
	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

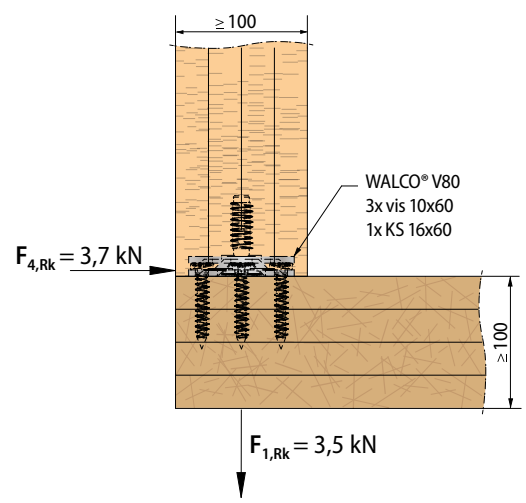
Shear force F_{45} design values of perpendicular to the direction of insertion

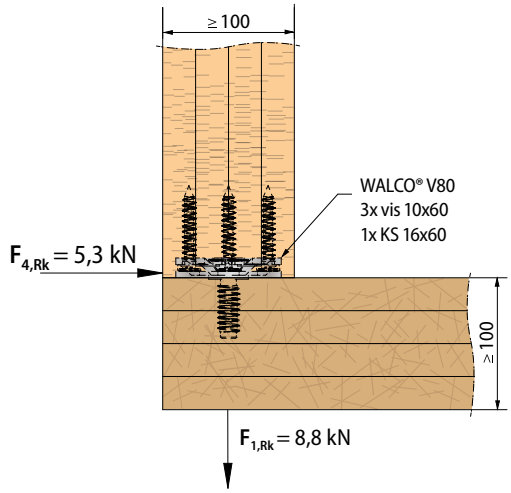
Connector KNAPP®	Shear force $F_{45,0,Rd}$ in **MAGNUM**BOARD® OSB end grain depending on the load duration class (LDC)					
	permanent	long	moyen	short	short/very short	**very short**
	k_{mod} = 0,4	k_{mod} = 0,5	k_{mod} = 0,7	k_{mod} =0,9	k_{mod} = 1,0	k_{mod} =1,1
WALCO® V80 KS	1,14	1,43	2,00	2,57	2,85	3,14

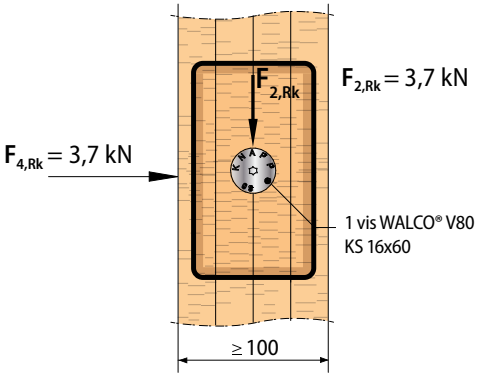
Connector KNAPP®	Shear force $F_{45,90,Rd}$ in **MAGNUM**BOARD® OSB side timber depending on the load duration class (LDC)					
	permanent	long	moyen	short	short/very short	**very short**
	k_{mod} = 0,4	k_{mod} = 0,5	k_{mod} = 0,7	k_{mod} =0,9	k_{mod} = 1,0	k_{mod} =1,1
WALCO® V80 KS	1,63	2,04	2,85	3,67	4,08	4,48

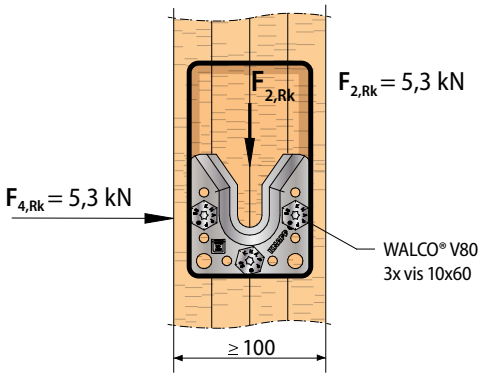
Illustrating a WALCO® V80 external wall corner joint in MAGNUMBOARD® OSB:

(Dimensions in mm)

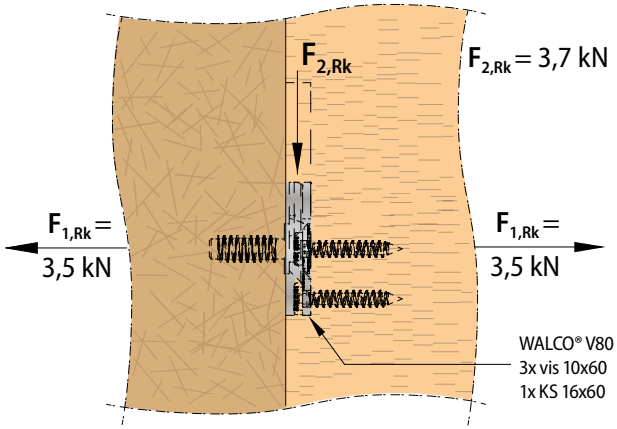


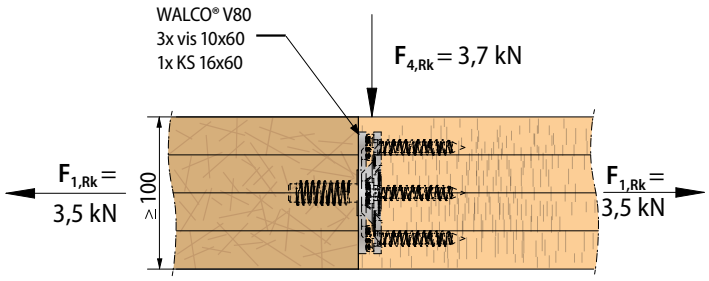






Illustrating a WALCO® V80 external wall joint in MAGNUMBOARD® OSB:





WALCO® V60

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

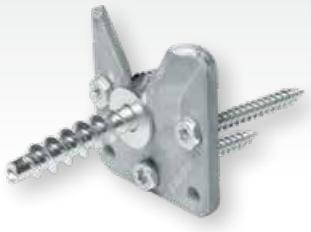
(Dimensions in mm)

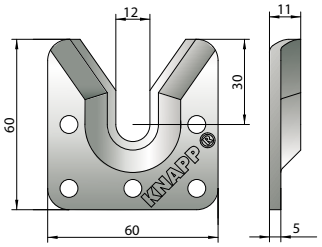
Holding bolt wall #1	Screws wall #2	Characteristic values [C24]		
		$F_{2,Rk}$ [kN]	$F_{45,Rk}$ [kN]	$F_{1,Rk}$ [kN]
KS 12x60	3 screws 6x50	5,9	3,9	6,5
VK D12	3 screws 6x50	4,9	3,2	6,4
EH M12	3 screws 6x50	4,8	2,9	4,7
GH M12	3 screws 6x50	8,6	5,4	7,1

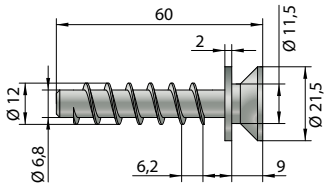
Minimum timber cross section: L x t = 80 x 60 mm

Walco V60 (KS) collar screw

Art.-No. K102/Set

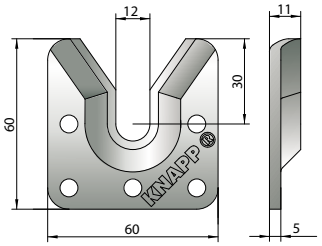


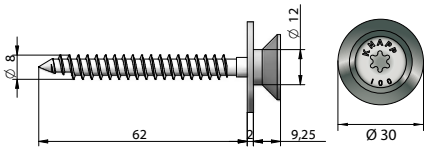




Walco V60 (VK) collar bolt

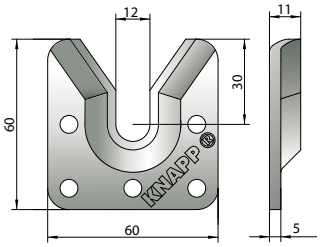
Art.-No. K108/Set

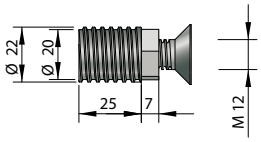




Walco V60 (EH) adjustable retaining screw collar bolt

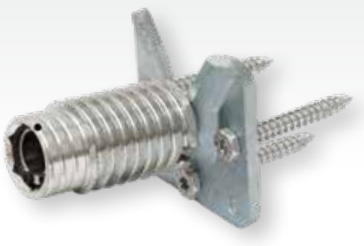
Art.-No. K104/Set

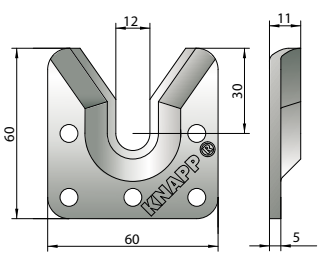


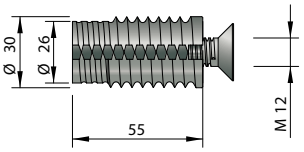


Walco V60 (GH) spring loaded collar bolt

Art.-No. K106/Set







WALCO® V80

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

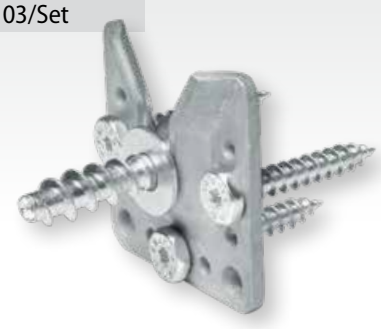
(Dimensions in mm)

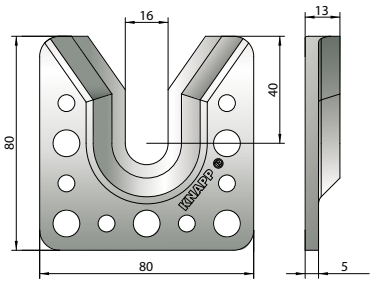
Holding bolt wall #1	Screws wall #2	Characteristic values [C24]		
		$F_{2,Rk}$ [kN]	$F_{45,Rk}$ [kN]	$F_{1,Rk}$ [kN]
KS 16x60	3 screws 10x60	7,1	4,5	7,1
VK D16	3 screws 10x60	6,2	4,1	7,1
EH M16	3 screws 10x60	6,5	3,7	6,0
GH M16	3 screws 10x60	16,0	9,1	10,0

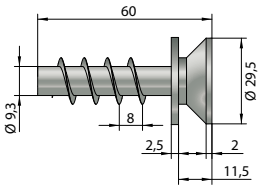
Minimum timber cross section: L x t = 100 x 60 mm

Walco V80 (KS) collar screw

Art.-No. K103/Set

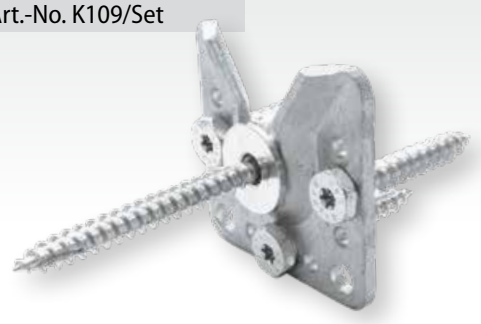


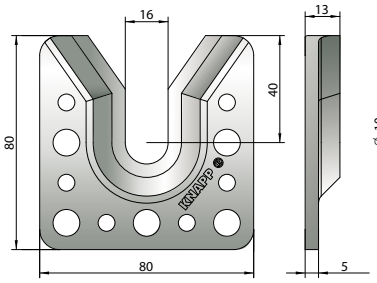


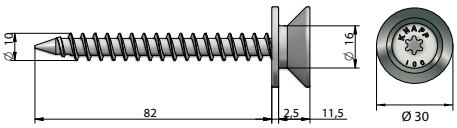


Walco V80 (VK) collar bolt

Art.-No. K109/Set

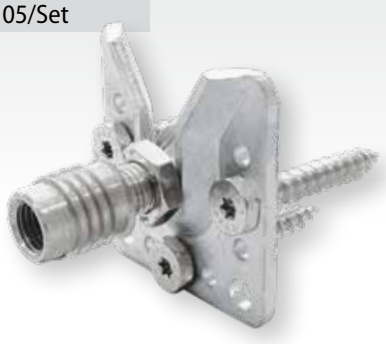


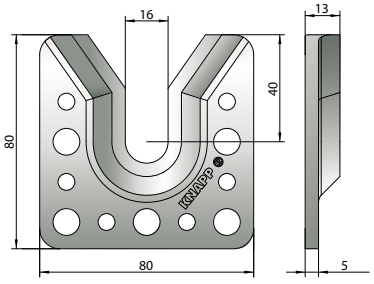


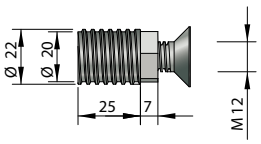


Walco V80 (EH) adjustable retaining screw collar bolt

Art.-No. K105/Set

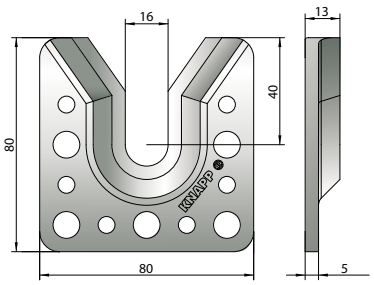


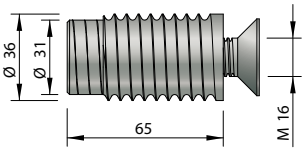




Walco V80 (GH) spring loaded collar bolt

Art.-No. K107/Set





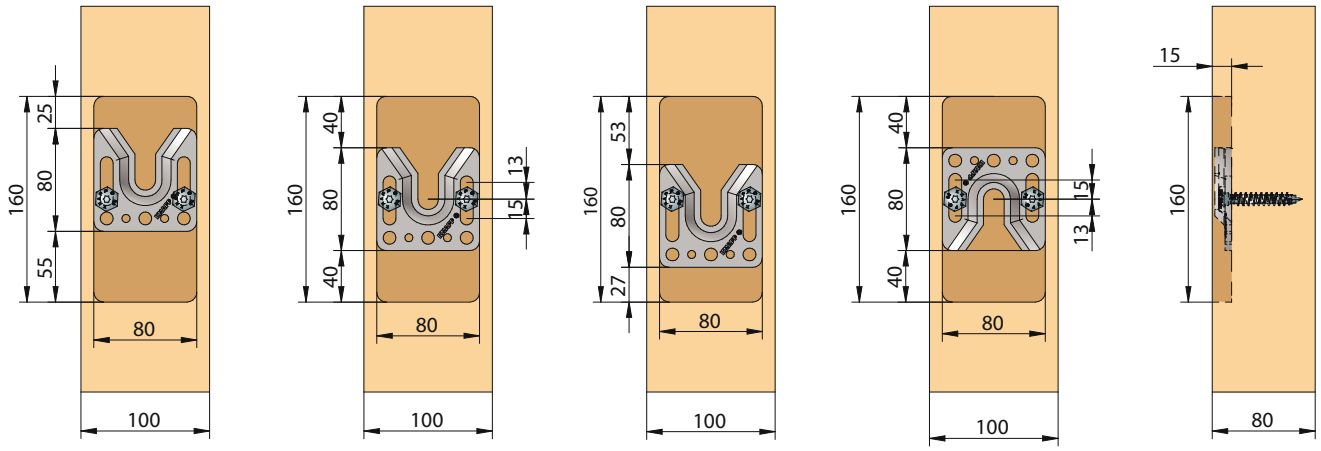
WALCO® V80 oblong-hole

- Stable and invisible connection for prefabricated wall elements made of wood and CLT wall, as well as connections to wood, steel and concrete.
- Re-adjustment possible due to the slotted holes
- 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)



Connector plate **Top** | Connector plate **Center** | Connector plate **Bottom** | Connector plate **Center 180° turned** | Routing dimensions

Load values

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

CLT with characteristic bulk density $r_k \geq 380$ kg/m³

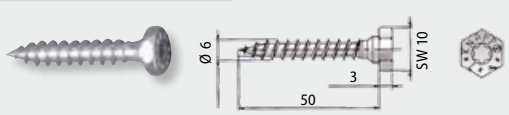
Load direction F_2 and F_3 cannot be used due to the connector's adjustability.

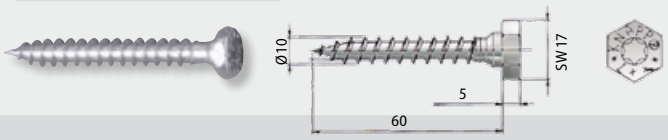
Installation example: WALCO® V
Oblonghole directly bolted on a OSB board.

WALCO® V60 and WALCO® V80

WALCO® V hexagonal - head, self-tapping wood screws

Art.-No.		Art.-No.	
Z550	V60 hex-head wood screw 6x50	Z551	V80 hex-head wood screw 10x60





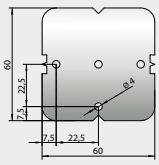
Application: to screw on WALCO® V.

Accessories

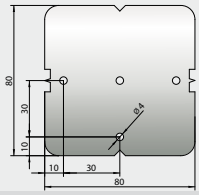
WALCO® V marking template (stainless steel)

Art.-No.	
K578	WALCO® V60 marking template
K579	WALCO® V80 marking template

WALCO® V60



WALCO® V80

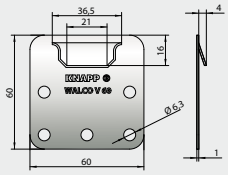


Application: for pre-drilling the pilot holes for exact assembly.

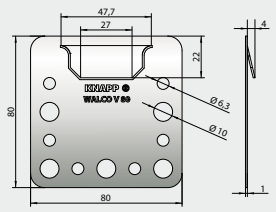
WALCO® V clip lock (made of stainless steel)

Art.-No.	
K112	WALCO® V60 clip lock
K113	WALCO® V80 clip lock

WALCO® V60



WALCO® V80



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
Z522	PH screw 10x120

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

Project pictures

Photo 1 and 2 © P. Lienbacher Holzbauwerk GmbH, artofsight GesbR

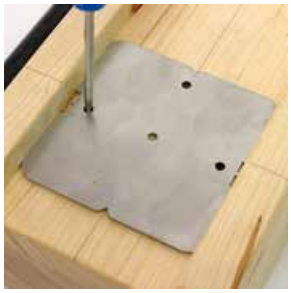
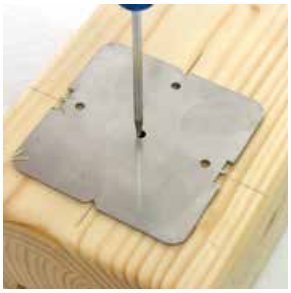
Photo 3 and 4 © Holzwerkstatt EBI

WALCO® V

Installation

- 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


CNC joinery machine, router or portable router


Pre-drill assembly instructions



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*

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

WALCO®

Available in 2 sizes and 7 versions.

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

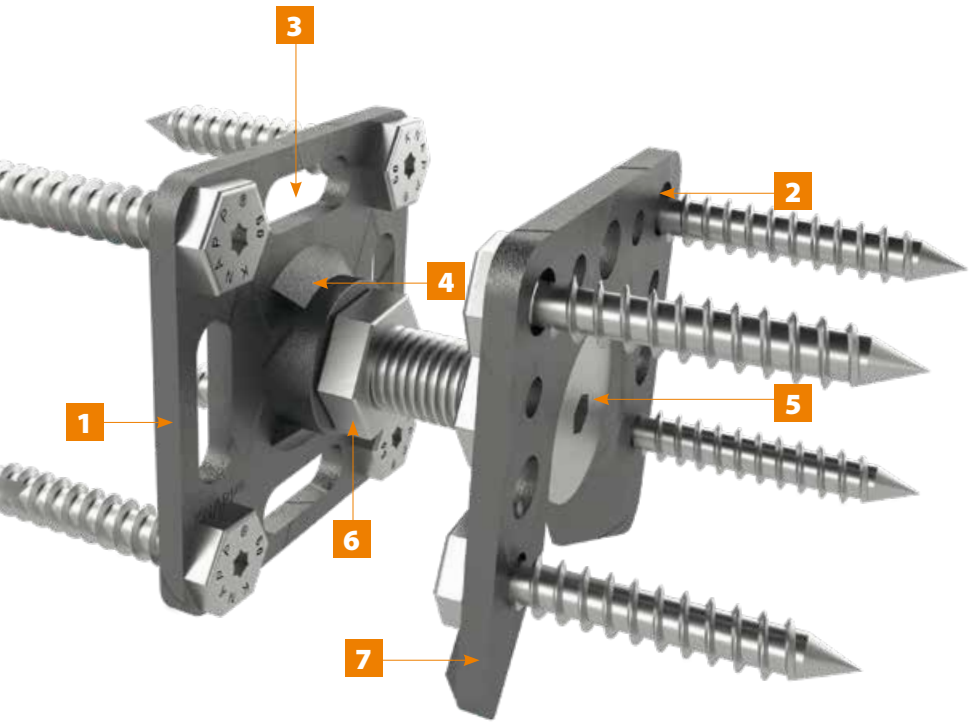
* Characteristic value $F_{2,Rk}$ in slide-in direction according to ETA-15/0667 (2019/10/11), for glulam GL24h.

WALCO®

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

Hasslacher Gruppe © GETEC

Installation example: ORF-Studio, Oberstdorf, DE.



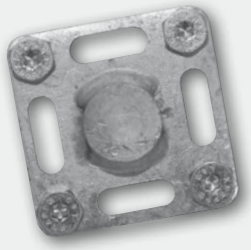
1	WALCO® 80 M16 or WALCO® 60 M12
2	4-point screw
3	Slotted hole screw connection, adjustment - optional
4	Welded threaded sleeve
5	Retaining screw adjustable
6	Lock nut
7	WALCO® V80 or WALCO® V60

AUSTRIA CE
ETA ETA-10/0189 (2019/10/11)
PRODUCT

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.

Connector types with respective bolt version and WALCO® V connector plate as a counterpiece



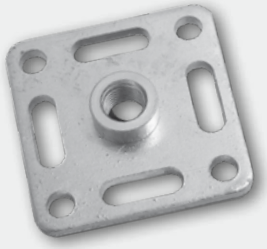
WALCO® V80 VS
with welded collar bolt
(Art.-No. K711/Set)

WALCO® 80 M16
with adjustable
counter sunk screw
(Art.-No. K712/Set)

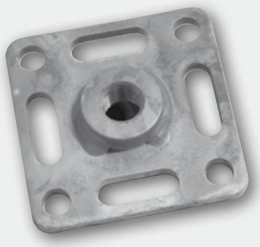
WALCO® 80 VK
with screw-in collar bolt
(Art.-No. K710/Set)

WALCO® V80 oblong model
(Art.-No. K115/B)
or its alternative **WALCO® V80**
(Art.-No. K101/Set)

Components and accessories



WALCO® 80 M16
pressed-in sleeve
(Art.-No. K712/B)



WALCO® 80 M16
with M16 welded sleeve
(Art.-No. K712/V)

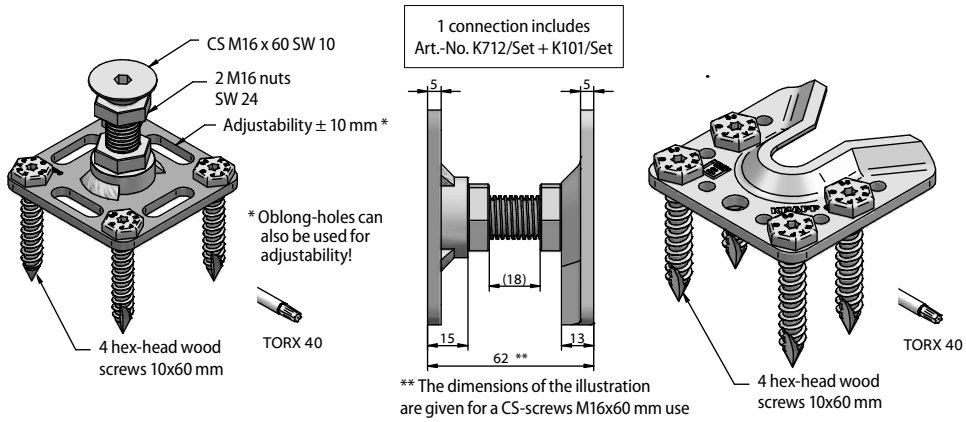
WALCO® 80
(Art.-No. K710/B)

Clip lock WALCO® V80 in
stainless spring steel (Art.-No. K113)

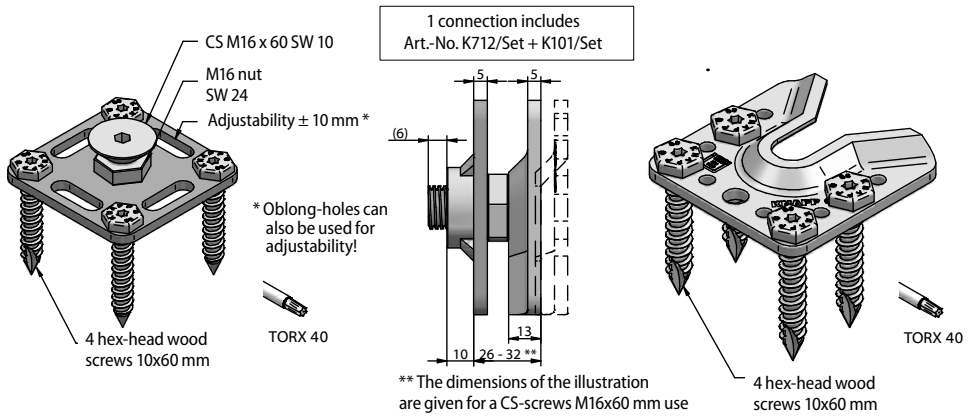
The base plates are optionally adjustable via slotted holes and the joint distances are adjustable. Possible construction tolerances can be compensated. An optional locking flap made of stainless spring steel, which cannot be seen from the outside, locks and secures the respective connection with a click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

Connectors for curtain walls

(Dimensions in mm)



Connectors for prefabricated walls



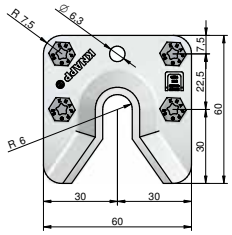
Options

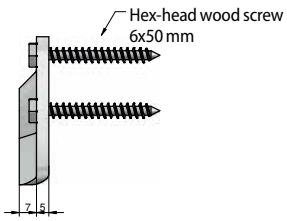
- Two different base plates with counterpart WALCO® V connector plate for easy assembly without further use of screws on the building site.
- Firmly welded support bolt for connecting modular walls.
- Metric thread for precise adjustment of the element spacing for insulated facades.
- The WALCO® V system can be structurally calculated and has a European Technical Assesment (ETA).

WALCO® 60

WALCO® 60 with holding screw or collar bolt

(Dimensions in mm)





Connector	Screws on wall #1	Screws on wall #2	Characteristic values [C24]		
			$F_{1,Rk}$ [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

* Hew = hex-head wood screw

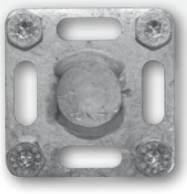
$F_{1,Rk}$ = Characteristic values (tension)
$F_{2,Rk}$ = Characteristic values in direction of insertion
$F_{45,Rk}$ = Characteristic values perpendicular to the direction of insertion

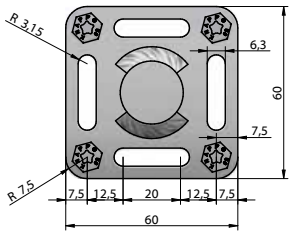
Minimum timber cross section: WxH = 80 x 60 mm

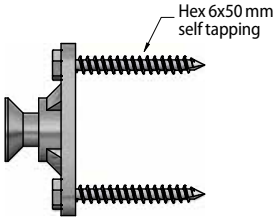
WALCO® V60 and WALCO® 60 with welded collar bolt (VS)

Art.-No. K100/Set

Art.-No. K701/Set



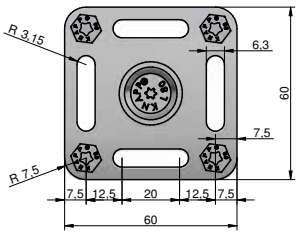


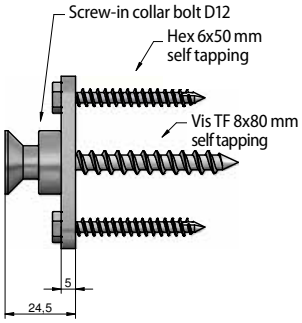


WALCO® V60 and WALCO® 60 with screw-in collar bolt (VK)

Art.-No. K100/Set

Art.-No. K700/Set

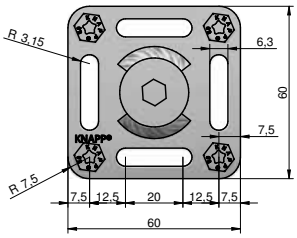


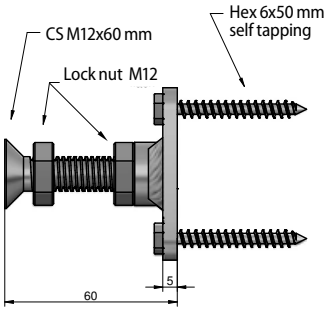


WALCO® V60 and WALCO® 60 with welded sleeve and adjustable counter sunk screw M12 (EH)

Art.-No. K100/Set

Art.-No. K702/Set

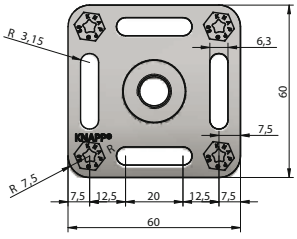


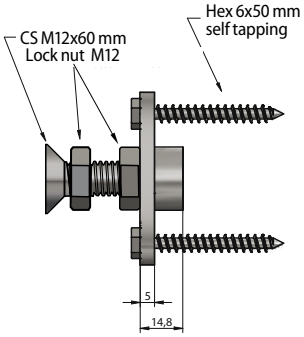


WALCO® V60 and WALCO® 60 pressed-in sleeve with adjustable counter sunk screw M12 (EH)

Art.-No. K100/Set

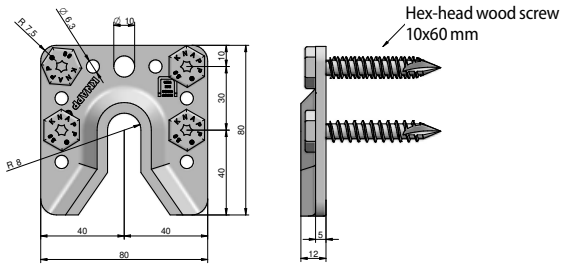
Art.-No. K702 B/Set





WALCO® 80

WALCO® 80 with holding screw or collar bolt



Connector	Screws on wall #1	Screws on wall #2	Characteristic values [C24]		
			$F_{1,Rk}$ [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

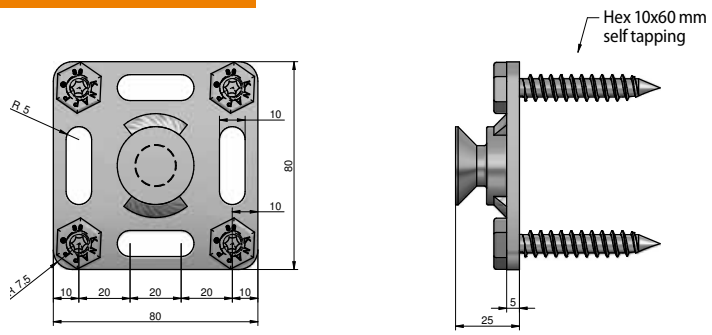
* Hew = hex-head wood screw

$F_{1,Rk}$ = Characteristic values (tension)
$F_{2,Rk}$ = Characteristic values in direction of insertion
$F_{45,Rk}$ = Characteristic values perpendicular to the direction of insertion

Minimum timber cross section: WxH = 100 x 60 mm

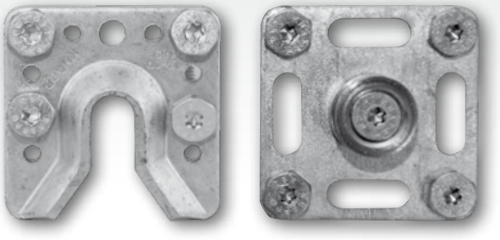
WALCO® V80 and WALCO® 80 with welded collar bolt (VS)

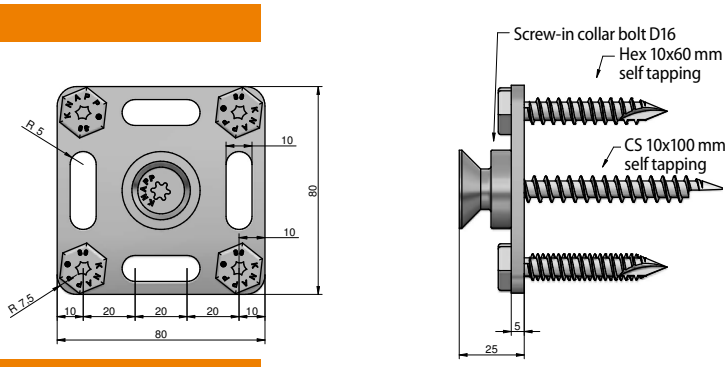
Art.-No. K101/Set | Art.-No. K711/Set



WALCO® V80 and WALCO® 80 with screw-in bolt (VK)

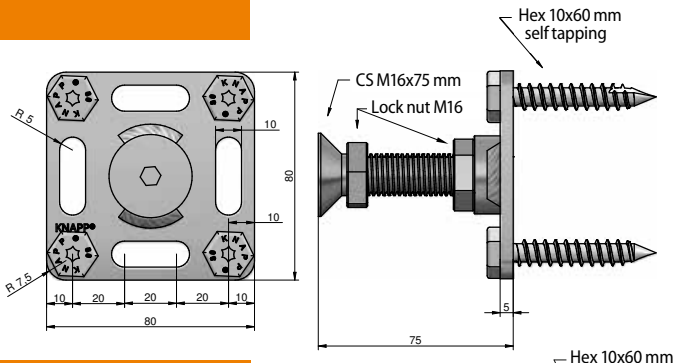
Art.-No. K101/Set | Art.-No. K710/Set





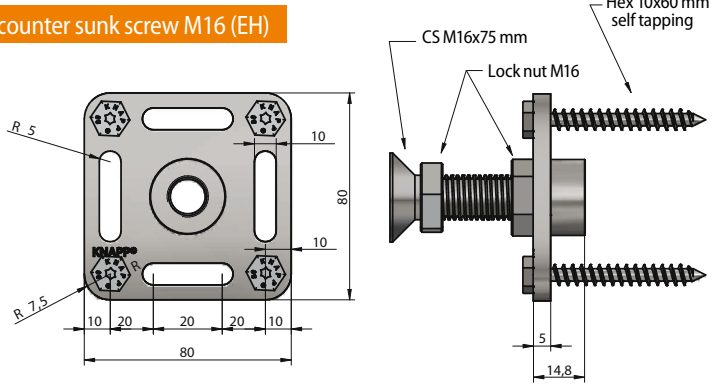
WALCO® V80 and WALCO® 80 with welded sleeve and adjustable counter sunk screw M16 (EH)

Art.-No. K101/Set | Art.-No. K712/Set



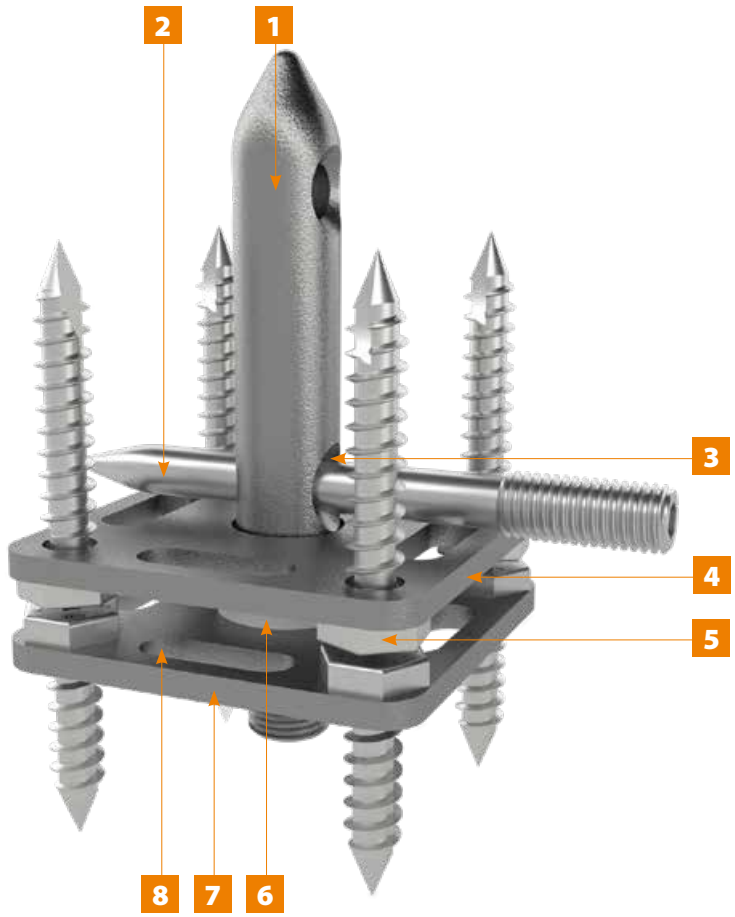
WALCO® V80 and WALCO® 80 pressed-in sleeve with adjustable counter sunk screw M16 (EH)

Art.-No. K101/Set | Art.-No. K712 B/Set



WALCO® BOLT System

- Stable and concealed connection for prefabricated wall elements made of wood and CLT, as well as connections between wood, steel and concrete.
- The slotted holes of the WALCO® 80 base plate allow for readjustment when attached with screws
- Positioning tolerance +/- 2 mm for later compensation of variations on the building site
- Loadable with tension as well as perpendicular to the insertion direction



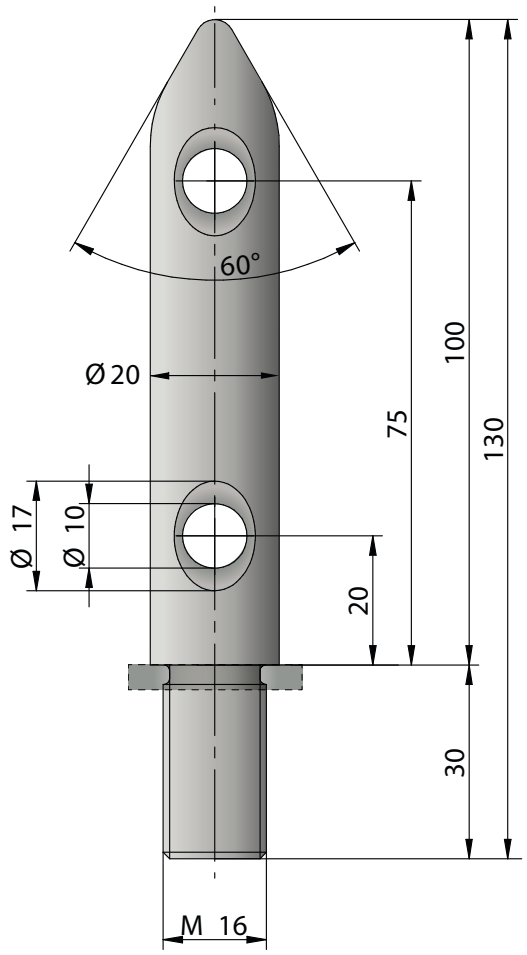
1. Ø20 mm bolts for anchoring and connecting wall elements
2. Clamping bolt for securing and tightening the wall elements
3. Hole for allowing the clamping bolt to fix the wall to the floor
4. WALCO® 80 base plate VS D22 increases the stability and the strength of the system
5. Hex screw 10x60 mm
6. Spring washer M16
7. WALCO® 80 with M16 welded sleeve
8. Oblong holes for vertical or horizontal adjustments (optional)

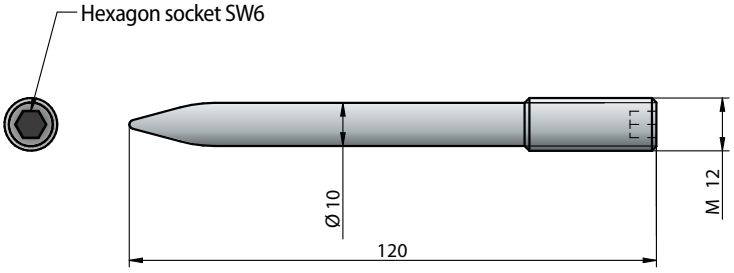
PRODUCT

Technical details - Bolt System D20 L100

Art.-No. K909

(Dimensions in mm)

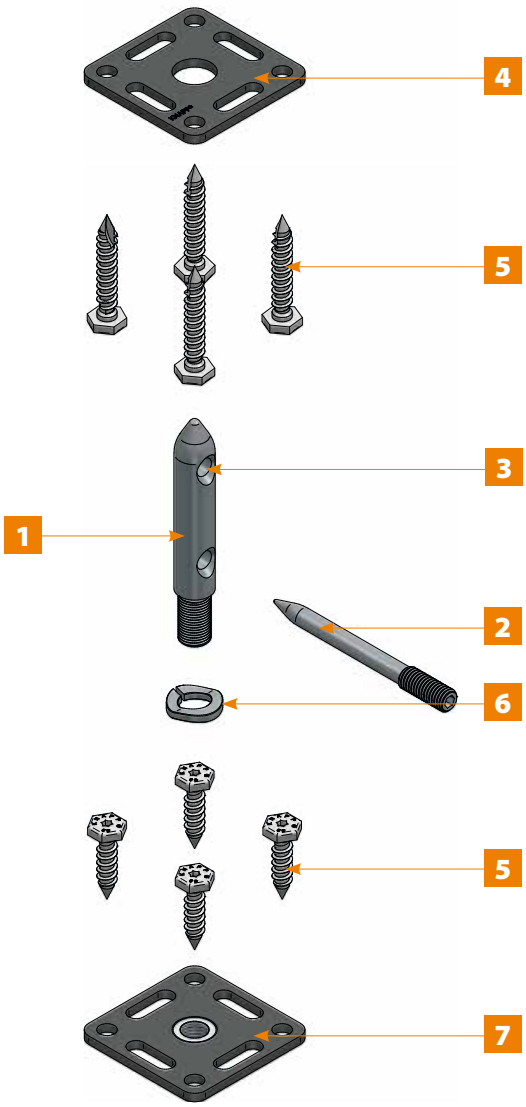




* Possibility of an alternate version without WALCO® 80 base plate VS D22 **4**, refer to the website for WALCO® BOLT B130 (Art. No. K901).

Technical details - Bolt System D20 L100 W80

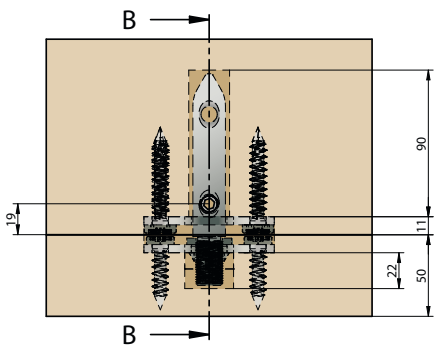
Art.-No. K900



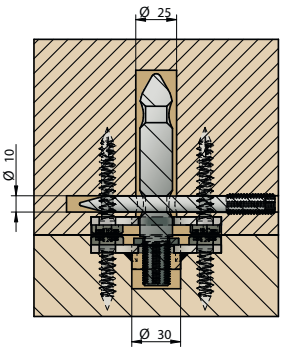
Pos.	Description	Art.-No.
1	Ø 20 mm bolt	K494
2	D20/100 clamping bolt	K493
4	WALCO® 80 VS D22 base plate	K712
5	Hex screw 10x60 mm	Z551
6	Spring washer M16	Z895
7	WALCO® 80 with M16 welded sleeve	K712/V

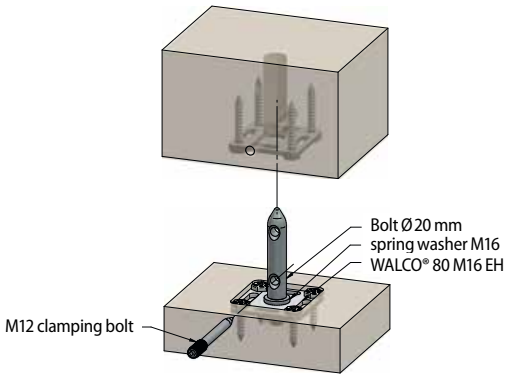
Installation options

(Dimensions in mm)



B-B cut



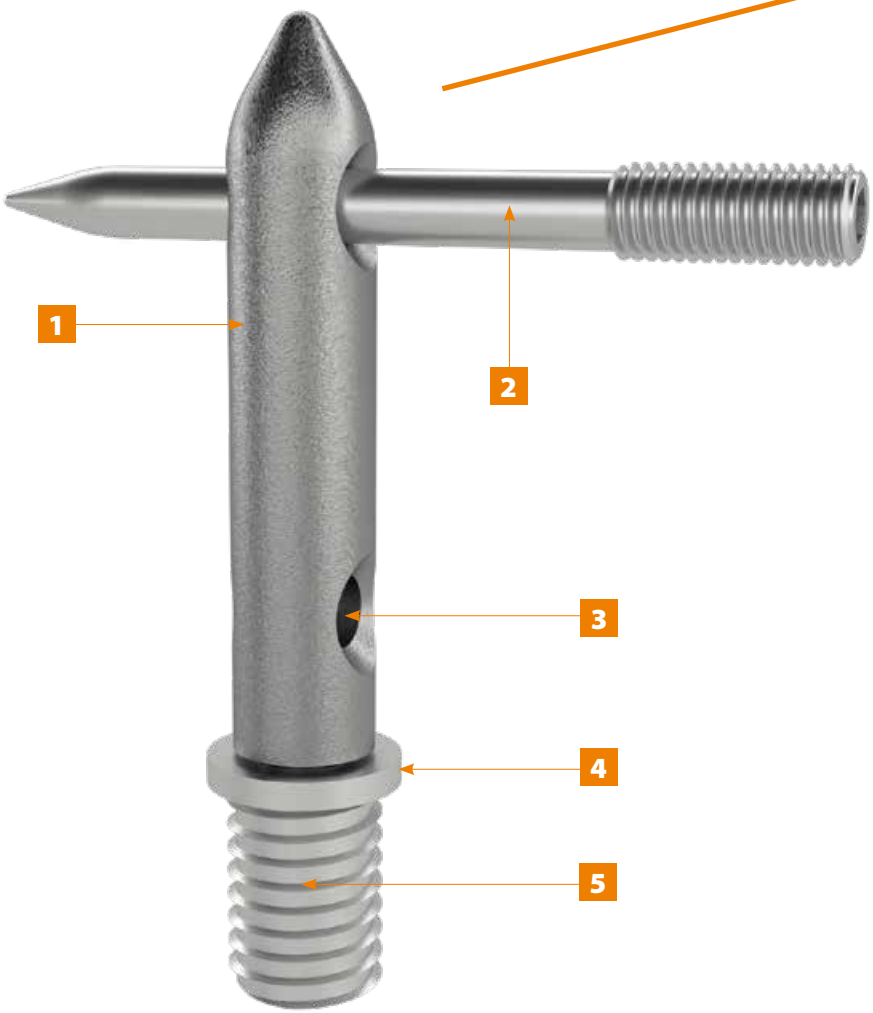


BOLT Single D20

WALCO® BOLT C130

Art.-No. K902

(Dimensions in mm)

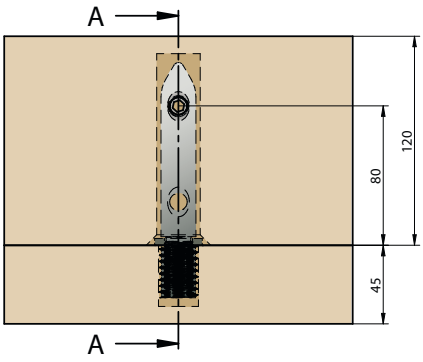


Detail:
BOLT D20 single L100 W80 - wall to wall joint.

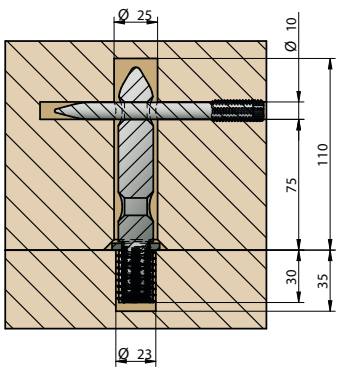
1. Ø20 mm bolts for anchoring and connecting wall elements
2. Clamping bolt for securing and tightening the wall elements
3. Alternative hole for clamping bolt positionning
4. Spring washer M16 for fixing the position of the bolt
5. Insert for screwing the bolt system into wooden components

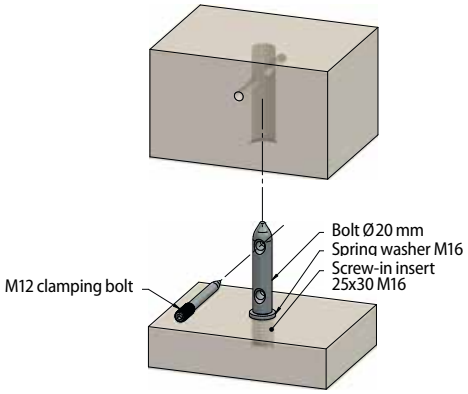
Installation options

(Dimensions in mm)



A-A cut

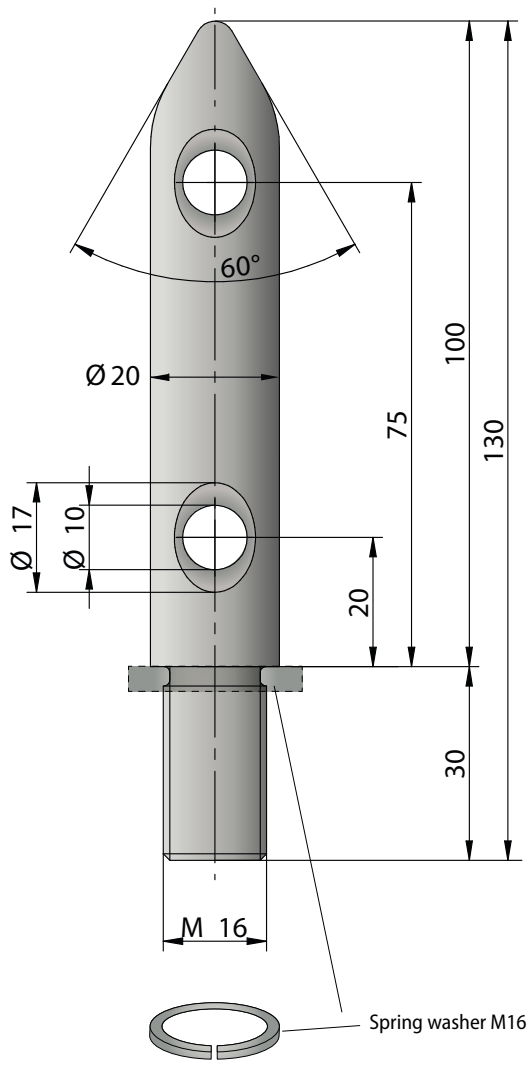




Technical details WALCO® BOLT C130 single with insert

Art.-No. K902

(Dimensions in mm)



Connector	Timber grade	Minimum timber cross section	Tensile charact. values	Design values $F_{1,Rd}$ [kN]	
				k_{mod} [service class 1+2]	
			$F_{1,Rk}$ [kN]	0,9	1,0
WALCO® Bolt with insert 25x30	C24	45 to 60 mm	3,38	2,34	2,60
	GL24h		3,64	2,52	2,80
	CLT		3,60	2,50	2,77

*** Please compare the load capacity values with our website or our planner service:**
https://www.knapp-verbinder.com/eng/planerservice/

Pos.	Description	Art.-No.
1	Ø 20 mm bolt	K909
2	D20/100 clamping bolt	K908
4	Spring washer M16	Z895
5	D25/30 insert	Z561

WALCO® BOLT D20

Parts and accessories

Art.-No. K908 Clamping bolt M12x120

Application: to fix and clamp WALCO® Bolt to the wooden elements.

Art.-No. Z561 Insert D25x30

Art.-No. Z561/100 Insert D25x100 (optional)

Application: to screw the bolt into wood.

Art.-No. Z551 Hexagon head self tapping screw 10x60

Application: to screw in WALCO® 80 base plate

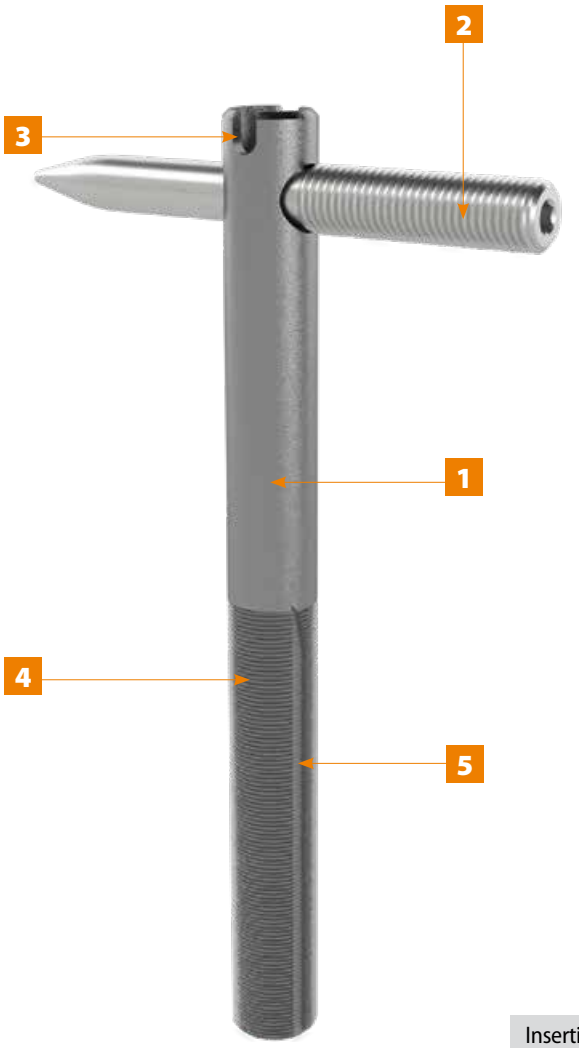
Art.-No. Z895 Spring washer M16

Spring washer M16 for fixing the position of the bolt

WALCO® PIPE

- Stable and concealed connection for prefa. wall elements made of wood, CLT, or similar materials
- Modular column connector for load bearing connection
- Precise alignment of wall elements in combination with with WALCO® V
- Easy to dismantle and reassemble due to the screwed-in clamping bolts
- Lifting aid for moving the wall elements

Detail : Pipe System - wall to wall joint.



1. Pipe connector for the connection of posts and wall elements
2. Clamping bolts for securing and tightening the wall elements
3. Milled recesses to accommodate the insertion aid
4. M28 thread
5. Two-sided slit for easier screwing in.

Insertion aid

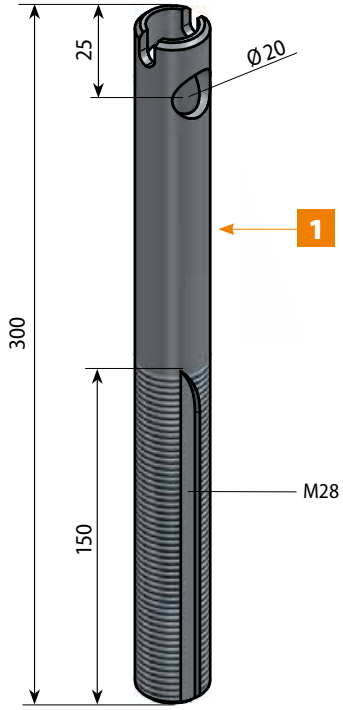
Lifting shackle

PRODUCT

Technical details*

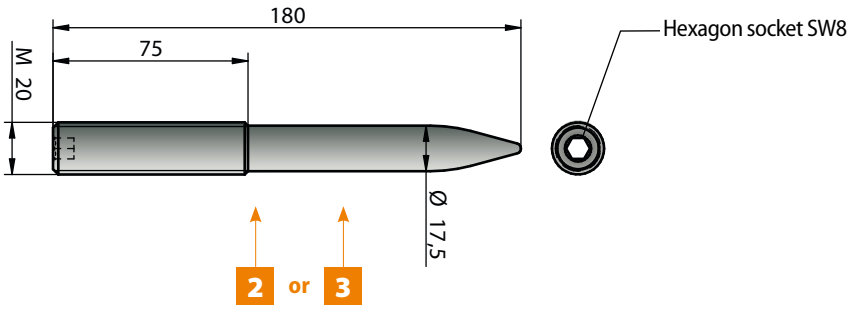
Art.-No. K903 und K904

(Dimensions in mm)



Connector	Timber grade	Minimum timber cross section	Tensile charact. values
			$F_{1,Rk}$ [kN]
Pipe M28	GL24h	200x200 mm	20,46*

***Internal testings:** the characteristic tensile value has been determined with a safety factor of 2 compared to the breaking load capacity. Official test results are not yet available.



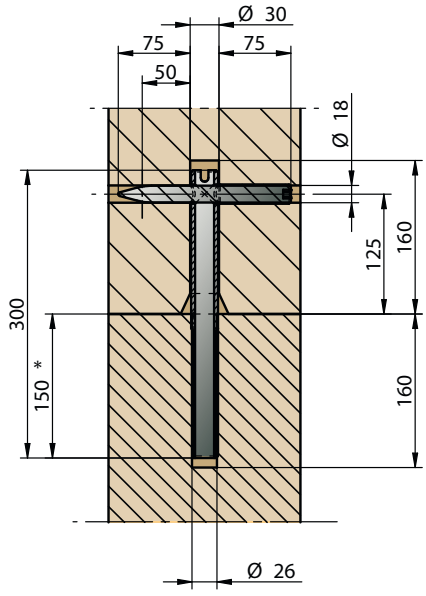
Pos.	Description	Art.-No.
1	Pipe 300 M28	K905
2	Clamping bolt with thread D18x180	K906
3	Clamping bolt without thread D18x180	K907

Note: matching drill bits available on request.

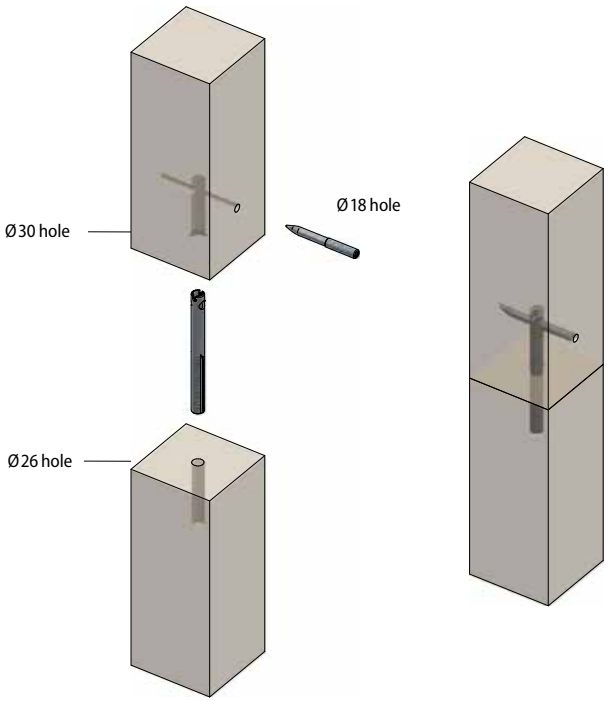
Installation options

(Dimensions in mm)

Cut



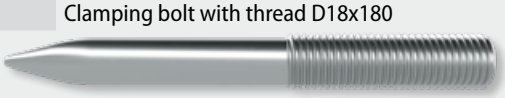
* ... The strength of the component bracing can be adjusted with the screw-in depth I Thread pitch 3 mm



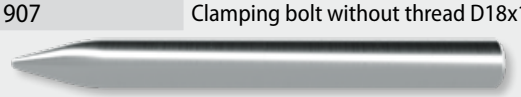
PIPE System M28

Parts and accessories

Art.-No. K906 — Clamping bolt with thread D18x180



Art.-No. 907 — Clamping bolt without thread D18x180



Application: for securing and tightening the WALCO® Pipe into the prefabricated walls

Art.-No. K487 — Insertion aid

Application: Screw connection de WALCO® PIPE

Art.-No. K488 — Lifting shackle

For transporting the built-in WALCO® Pipe

Timber frame construction
Mobile homes, USA

Timber frame construction
Schramm office building, Austria

Timber frame construction
Roof extension, Germany

Timber frame construction
Urban density, London (GB)

Prefab. house construction
Housing development, Austria

Timber frame construction
Multi-storey residential building, Germany

Timber frame construction
Chalets "Alpegg", Austria

Timber wall connector

Connecting timber frame constructions up to 10,8 kN*

- Minimum 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 and plywood board walls frictionally interconnected

WALCO® Z

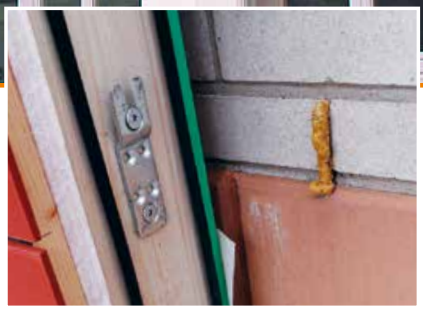
Available in 2 sizes.

Design values are available on our website under Planner Service.

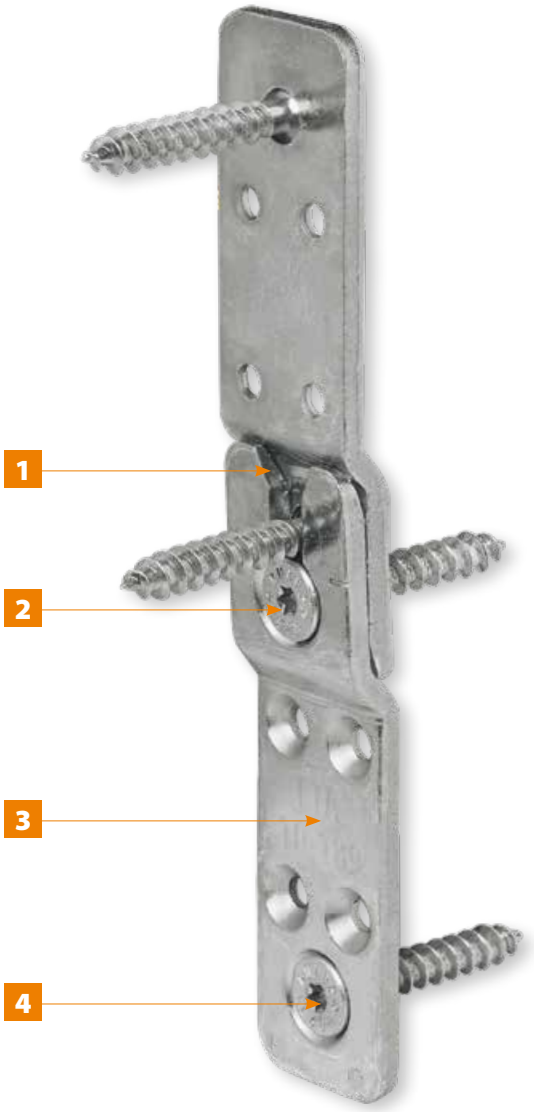
* Characteristic value $F_{2,Rk}$ in slide-in direction, refers to C24 according to expert opinion of 30.06.2021 for ETA-10/0189 (2019/10/11). The data refer to the use of 2 pcs. of KNAPP® CS screws 10x60 mm.

WALCO® Z40

- Applications: concealed wall connectors in timber frame and wood panels
- Connections: solid woods, derived timber products e.g. CLT
- Areas of application: timber frame and timber panel construction, and CLT walls, and buildings



Installation example: WALCO® Z40 mounted on the wall with double-sided element seals.



1. The stop bevels and the guiding slot for the KNAPP® CS retaining screws bring the connector parts into position and on tension.
2. The KNAPP® CS-retaining screw allows for adjustments to the compression of joints.
3. WALCO® Z40 consists of two identical connector parts and is made of high quality steel in Austria.
4. The Ø 10 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 ≥ 28 mm, R60 ≥ 49 mm)

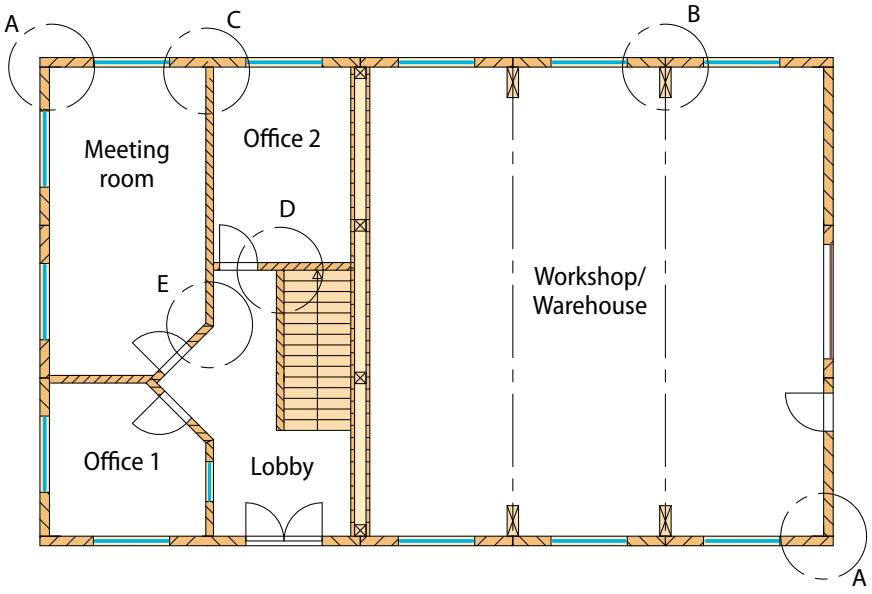
AUSTRIA CE
ETA ETA-10/0189 (2019/10/11)
PRODUCT

WALCO® Z40

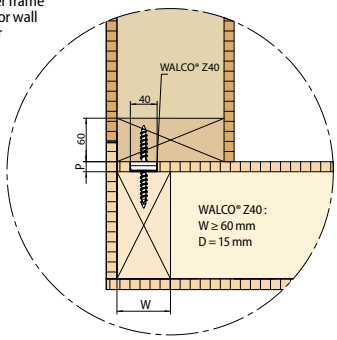
Application examples and connection details

Timber frame construction

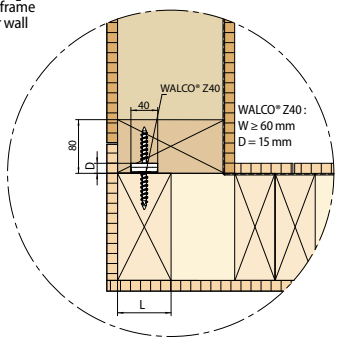
(Dimensions in mm)



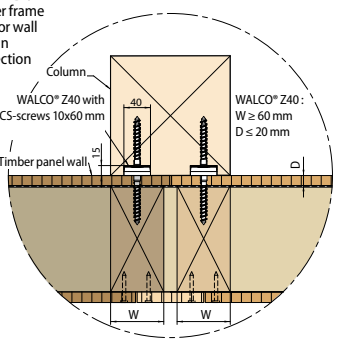
Detail A_1 :
Timber frame exterior wall corner



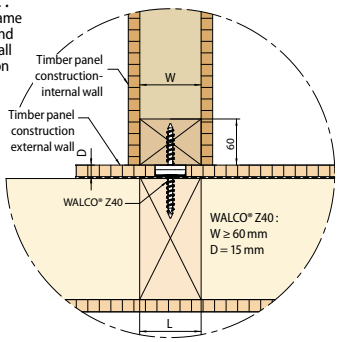
Detail A_2 :
Timber frame exterior wall corner



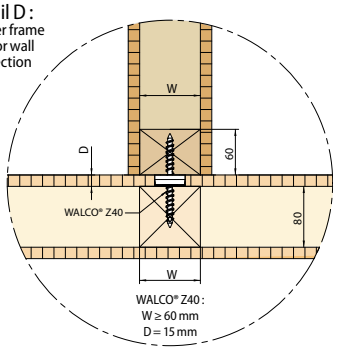
Detail B :
Timber frame exterior wall column connection



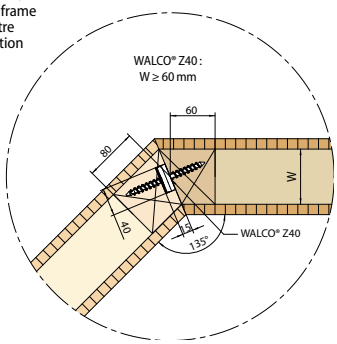
Detail C :
Timber frame exterior and interior wall connection



Detail D :
Timber frame interior wall connection

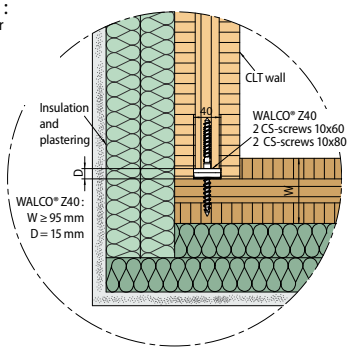


Detail E :
Timber frame wall mitre connection

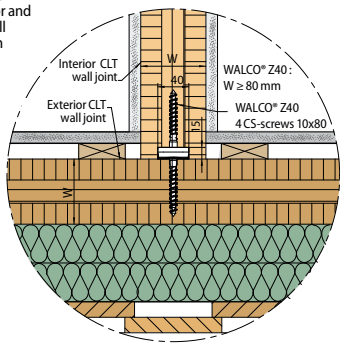


Precast walls with CLT walls

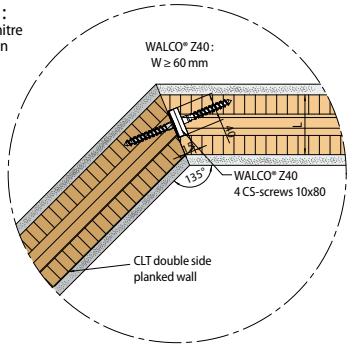
Detail A_2 :
CLT exterior wall corner



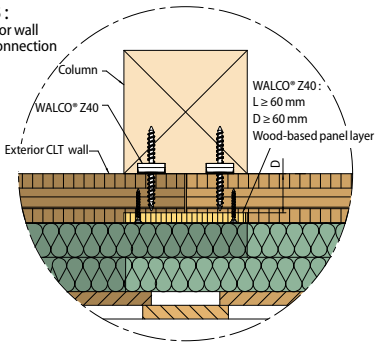
Detail C :
CLT exterior and interior wall connection



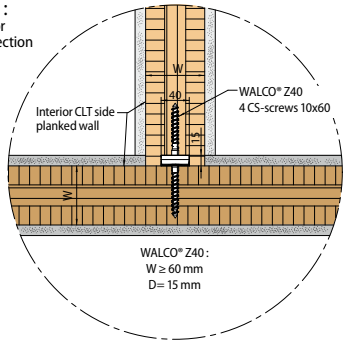
Detail E :
CLT wall mitre connection



Detail B :
CLT exterior wall column connection



Detail D :
CLT interior wall connection



WALCO® Z40

WALCO® Z40 - Partial screw connection

Art.-No. K072

(Dimensions in mm)

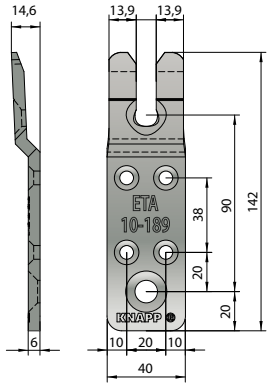
Screw connection	
Wall 1	Wall 2
2x CS 10x60 mm	2x CS 10x60 mm

Full screw connection : 8x 6 x 50 mm

Minimum timber cross section: L. x Ep. = 60 x 60 mm

WALCO® Z40 - Full screw connection

Art.-No. K072



Tensile values*

Characteristic tensile values $F_{1,Rk}$ [kN] for timber grade C24 and above

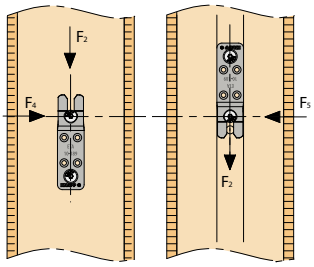
Connector	Minimum timber cross section [mm]	No interlayer		OSB ≤ 22 mm**		Plasterboard ≤ 22 mm***	
		Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection
WALCO® Z40	Internal wall : 60x60 External wall : 100x60	4,73	4,73	4,73	4,73	4,73	4,73

Characteristic shear values in the direction of insertion $F_{2,Rk}$ [kN] for timber grade C24 and above

Connector	Minimum timber cross section [mm]	No interlayer		OSB ≤ 22 mm**		Plasterboard ≤ 22 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	10,8	10,8	10,8	10,8	7,60	10,8

Characteristic shear values perpendicular to the direction of insertion $F_{45,Rk}$ [kN] for timber grade C24 and above

Connector	Minimum timber cross section [mm]	No interlayer		OSB ≤ 22 mm**		Plasterboard ≤ 22 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
1	Permanent	0,6	0,4	0,2
	Long	0,7	0,5	0,4
	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
	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).

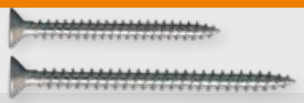
** OSB/3 or OSB/4 - thickness up to 22 mm according to EN 300 or ETA

*** 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. Z638	CS-screw 6x50 with drill point (according to ETA 12-0276)
Art.-No. Z639	CS-screw 6x70 with drill point (according to ETA 12-0276)

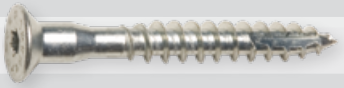


Application: for fixing the connector parts into the studs.

Art.-No. Z519	KNAPP® CS-screw 10x60 with drill point and reinforced shank

Application: for fixing the connector parts into the studs.

Art.-No. Z523	KNAPP® CS-screw 10x80 with drill point and reinforced shank



Application: When screwing through wood-based panels and cross-laminated timber walls (detail B page 133).

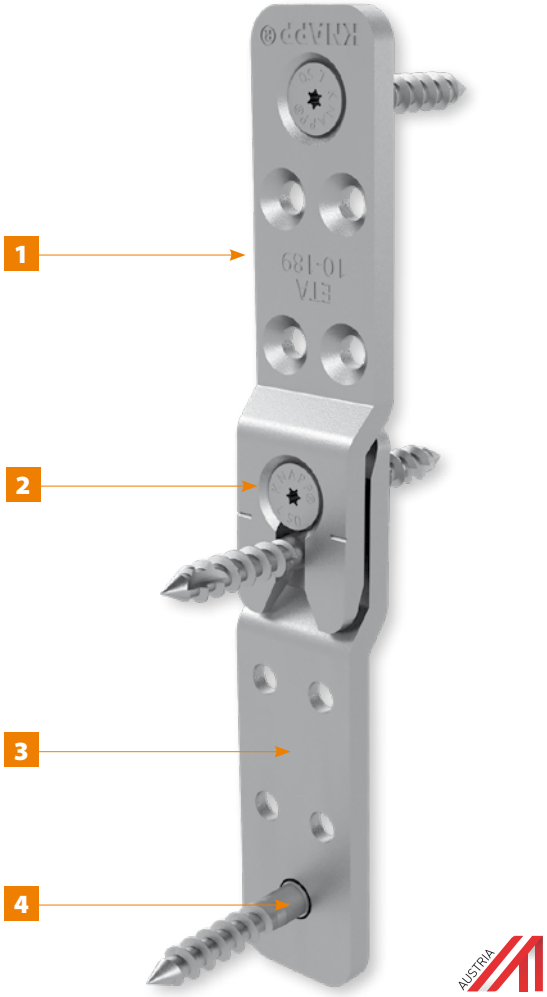
Drilling-template WALCO® Z (Aluminium)

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

Application: for pre-drilling of screw holes.

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)



1 The stop bevels and the guiding slot for the KNAPP® SC retaining screws bring the connector parts into position and on tension.

2 The KNAPP® CS-retaining screw allows for adjustments to the compression of joints.

3 WALCO® Z32 consists of two identical connector parts and is made in Austria in high-quality steel.

4 The Ø 8 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 ≥ 28 mm, R60 ≥ 49 mm)

WALCO® Z32

WALCO® Z32 - Partial screw connection

Art.-No. K078

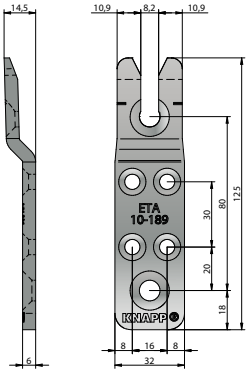
Screw connection	
Mur 1	Mur 2
2x TF 8x50 mm	2x TF 8x50 mm

Full screw connection : 8x 5x 50 mm

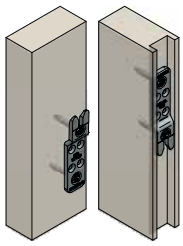
Minimum timber cross section: L. x Ep. = 2 x 4 Inch (50 x 100 mm)

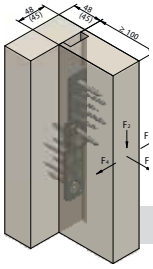
WALCO® Z32 - Full screw connection

Art.-No. K078

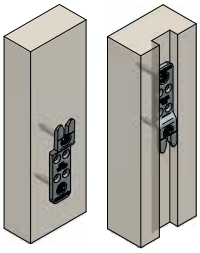


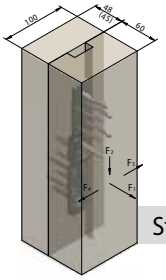
Examples and connection details





Corner connection





Straight connection

Tensile values*

Characteristic tensile values $F_{1,Rk}$ [kN] for timber grade C24 and above

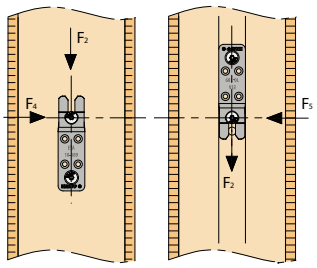
Connector	Minimum timber cross section [mm]	No interlayer		OSB ≤ 22 mm**		Plasterboard ≤ 22 mm***	
		Partial screw connection	Full screw connection	Partial screw connection	Full screw connection	Partial screw connection	Full screw connection
WALCO® Z32	Internal wall : 60x60 External wall : 100x60	3,64	3,64	3,64	3,64	3,64	3,64

Characteristic resistance in the direction of insertion $F_{2,Rk}$ [kN] for timber grade C24 and above

Connector	Minimum timber cross section [mm]	No interlayer		OSB ≤ 22 mm**		Plasterboard ≤ 22 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

Characteristic resistance perpendicular to the direction of insertion $F_{45,Rk}$ [kN] for timber grade C24 and above

Connector	Minimum timber cross section [mm]	No interlayer		OSB ≤ 22 mm**		Plasterboard ≤ 22 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	LDC*	GLT	OSB/3 OSB/4	Plaster board
1	Permanent	0,6	0,4	0,2
	Long	0,7	0,5	0,4
	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

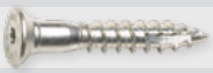
For the determination of $F_{45,Rd}$ when fixing to intermediate materials, the k_{mod} and γ_M factors of the materials are to be taken into account.

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

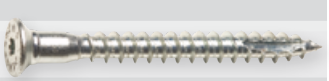
Application: for fixing the connector parts into the studs.

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 133).

Anchoring solution for timber walls

L and T-shaped wall to floor anchor

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

WALCO® L and T

Available in 1 size and 2 versions.

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

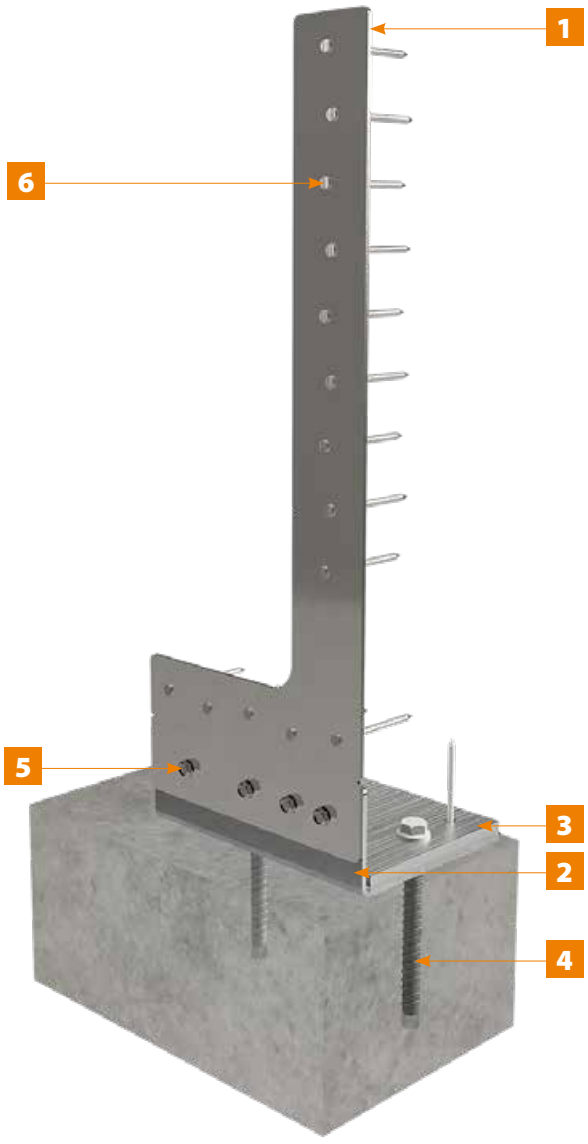
ETA approval 10-0189 of WALCO® L has already been applied for and is expected shortly.

KNAPP®
connectors.com

WALCO® L and T

- Applications: anchoring of walls on pre-assembled and leveled sill plate or directly onto the slab
- Connections: concrete, timber
- Areas of application: prefabricated timber frame wall, CLT or similar constructions

Installation example: Mounted on wall element.



1	Hot-dip galvanised 3 mm sheet steel. Silver finish.
2	4 mm galvanised steel anchor bracket
3	10 mm Reinforcement pressure plate to ensure very high load bearing capacity
4	Concrete screw 12x130 requires a small drilling depth
5	Self-tapping hexagonal screw M8x25 zur kraftschlüssigen Verschraubung für eine spielfreie Verbindung
6	Ring shank connecting nails 4x75 for quick processing with nailing equipment

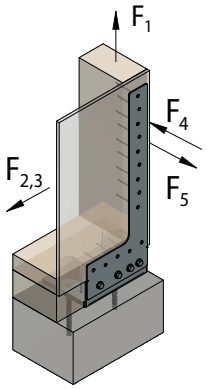
Can be combined with wall connector WALCO® V 60/80

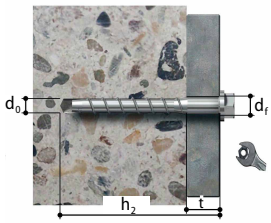
Our Planner service does not replace approval by an authorised structural engineer.

PLANNER SERVICE

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 $c_{2,min}$ =	73 mm
Reinforcement plate thickness t =	10+4 = 14 mm
Approval:	ETA-15/0352, Option 1

KNAPP® connector	Minimum cross-section Stud [mm]	Cladding [mm]	Design values in NH C24 and concrete C20/25 Max. tensile load $F_{1,Rd}$ [kN] LDC: short	Design values in NH C24 and concrete C20/25 Max. tensile load $F_{1,Rd}$ [kN] LDC: short/very short	Design values in NH C24 and concrete C25/30 Max. tensile load $F_{1,Rd}$ [kN] LDC: short	Design values in NH C24 and concrete C25/30 Max. tensile load $F_{1,Rd}$ [kN] LDC: short/very short
WALCO® L 9 Ring shank nails 4x75 in stud 5 Ring shank nails 4x75 in sill plate 4 Hexagonal screws M8x25 2 Concrete 12x130 *	80x145 SWD C24	12 mm OSB 3 / OSB 4 Chipboard	16,84	17,31	16,84	17,31
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	15 mm OSB 3 / OSB 4 Chipboard	17,20	17,31	17,20	17,31
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	18 mm OSB 3 / OSB 4 Chipboard	17,30	17,31	17,20	17,31
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	22 mm OSB 3 / OSB 4 Chipboard	16,90	17,31	17,20	17,31
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
WALCO® L 9 Ring shank nails 4x75 in stud 5 Ring shank nails 4x75 in sill plate 4 Hexagonal screws M8x25 2 Concrete 12x130 *	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 Plywood	15,48	16,53	15,48	16,53
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	15 mm Plywood	15,54	16,57	15,54	16,57
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	18 mm Plywood	15,51	16,52	15,51	16,52
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	22 mm Plywood	15,35	16,29	15,35	16,29
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
WALCO® L 9 Ring shank nails 4x75 in stud 5 Ring shank nails 4x75 in sill plate 4 Hexagonal screws M8x25 2 Concrete 12x130 *	80x145 SWD C24	12 mm GKB / GKF	14,74	16,09	14,74	16,09
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	15 mm GKB / GKF	15,91	17,31	15,91	17,31
			$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 20,00	$F_{B,t,Rd}$ = 22,30	$F_{B,t,Rd}$ = 22,30
	80x145 SWD C24	18 mm GKB / GKF	17,10	17,31	17,10	17,31
			$F_{B,t,Rd}$ = 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 $F_{B,t,Rd}$ 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	Short period (exposure shorter than one week)
short/very short	short/very short period (new LDC for wind in NA)
$F_{1,Ed}$	Rated value of the tensile load (existing tensile load from the timber stud wall)
$F_{1,Rd}$	Measurement value of the tensile load carrying capacity of the WALCO® L connector
$F_{B,t,Ed}$	Design value of the tensile load of concrete screw
k_t	Parameters for determining the axial load of the concrete screw/ concrete anchor
OSB 3 / OSB 4	According to ETA approval or DIN EN 300 or DIN EN 12369-1
Chipboard	According to ETA approval or DIN EN 312
Plywood	According to ETA approval or DIN 20000-1:2017-06 (softwood)
GKB / GKF	Gypsum plasterboards/ fiber reinforced plasterboard according to ETA

Verification for tensile load in concrete anchor: ($F_{B,t,Ed}$ / $F_{B,t,Rd}$) ≤ 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® 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.

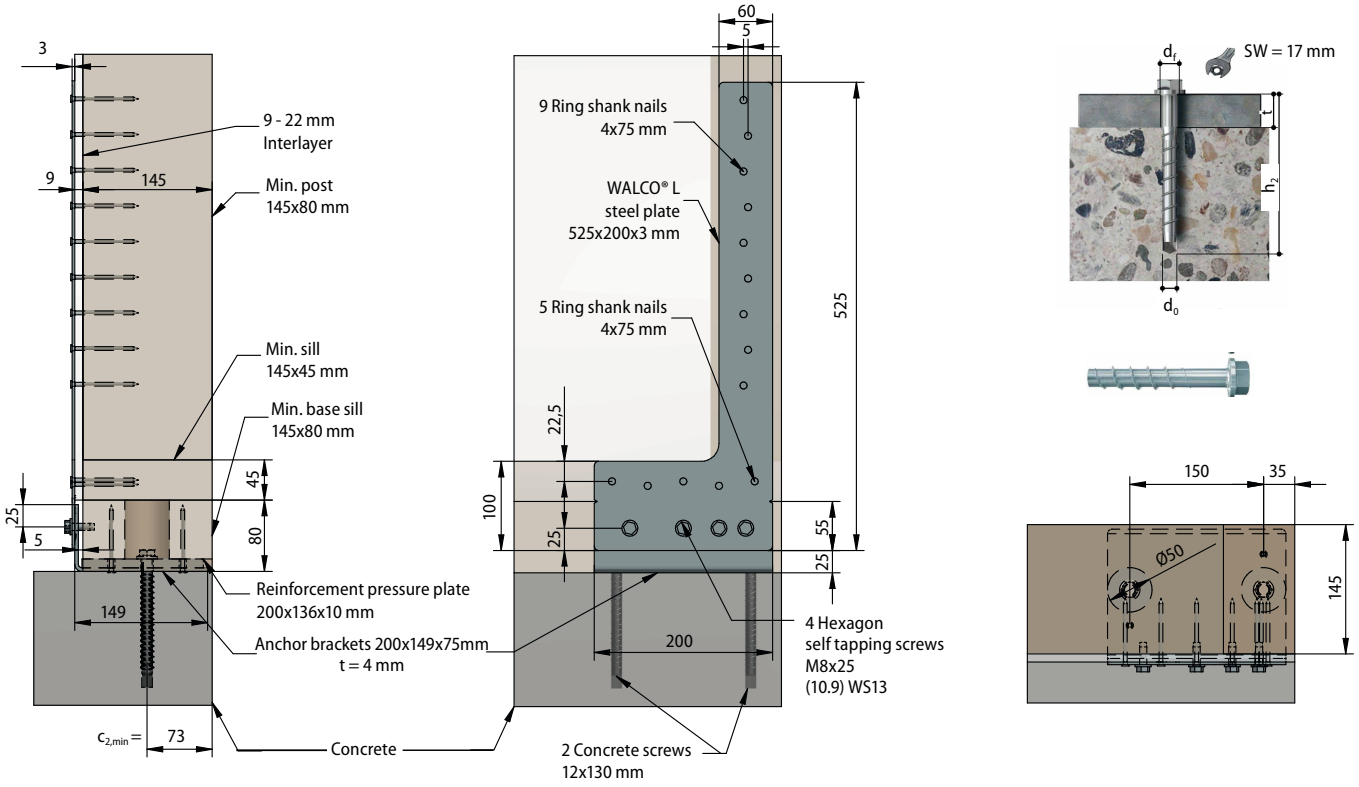
Timber stud verification: ($F_{B,t,Ed}$ / $F_{B,t,Rd}$) ≤ 1,0 (14,0 / 17,3) = 0,81 < 1,0
Tensile load in the concrete anchor: $F_{B,t,Ed} = F_{1,Ed} \times k_t = F_{1,Ed} \times 1,4 = 14 \times 1,4 = 19,6$ kN
Concrete anchor verification: ($F_{B,t,Ed}$ / $F_{B,t,Rd}$) ≤ 1,0 (19,6/ 20) = 0,98 < 1,0

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)



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

Anchor bracket

Art.-No. K496

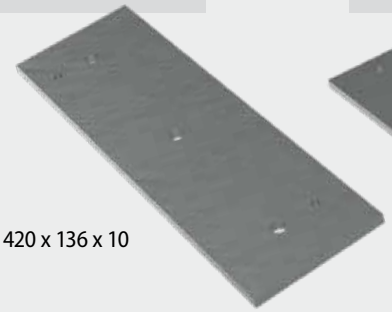
420 x 149 x 75 x 4

Art.-No. K497

200 x 149 x 75 x 4

Reinforcement (pressure) plate

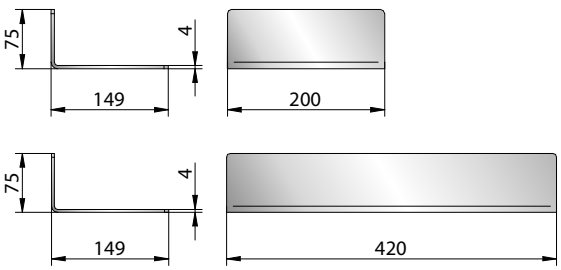
Art.-No. K498



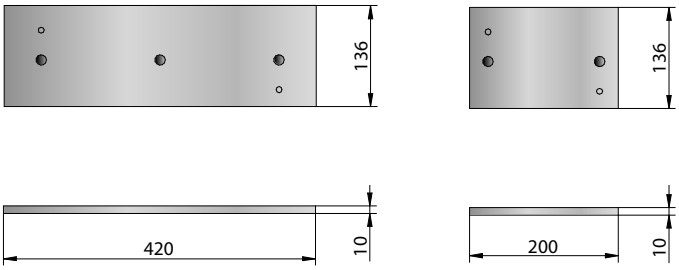
420 x 136 x 10

Art.-No. K499

200 x 136 x 10



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



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

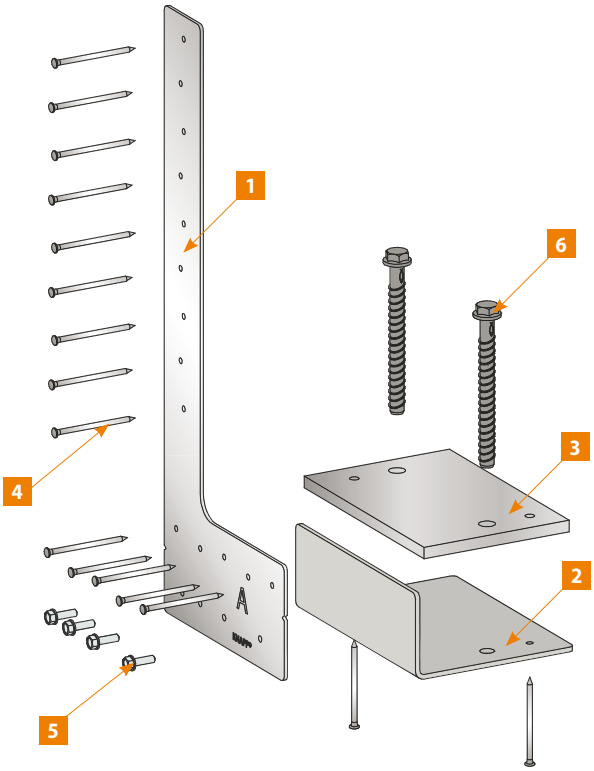
ETA approval 10-0189 of WALCO® L and T has already been applied for and is expected shortly.

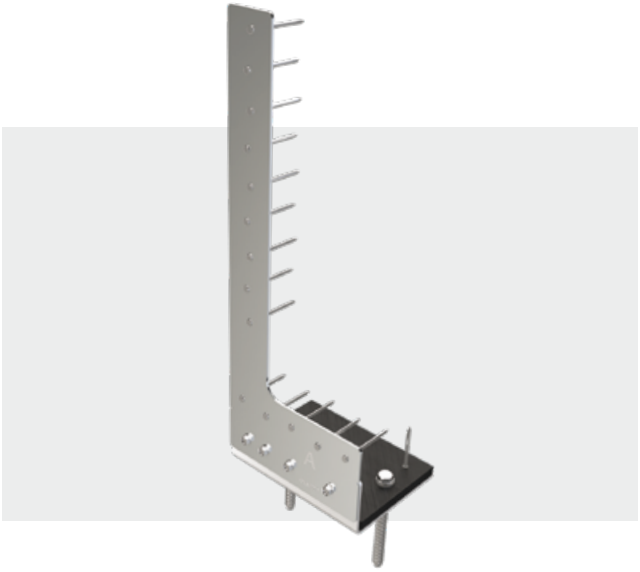
AUSTRIA PRODUCT

WALCO® L - Anchoring connector for timber walls

WALCO® L - Single connection

Art.-No. K495/EA





K495/EA WALCO® L single connection set consisting of

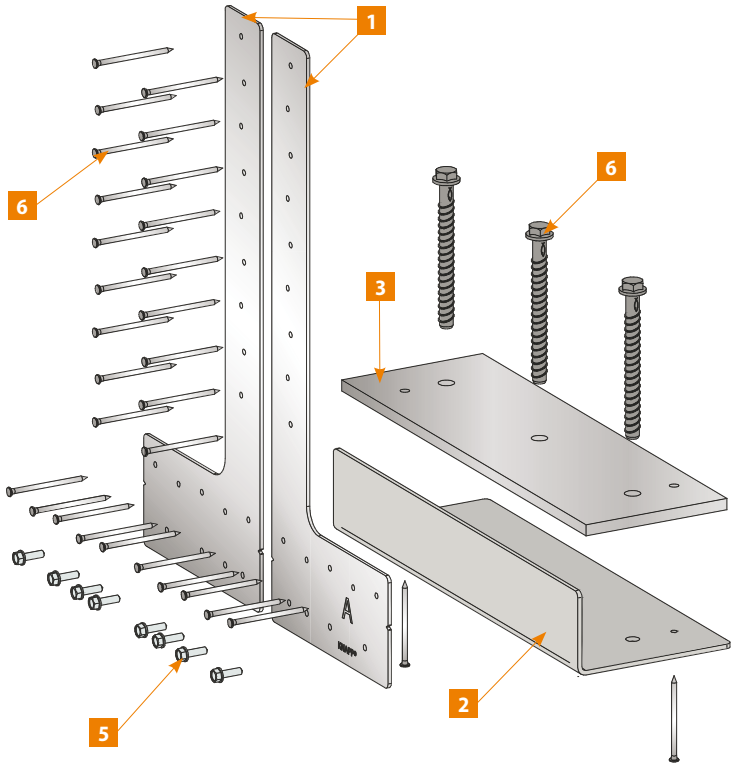
	Art.-No.	Details	Quantity
1	K495	Steel plate 3 mm thick	1 piece
2	K497	Anchor bracket 200/4 mm	1 piece
3	K499	Reinforcement plate 200/10 mm	1 piece
4	Z850	Ring shank nail 4x75 mm	16 pieces
5	Z648	Hexagon screw M8x25 mm	4 pieces
6	Z852	Concrete screw 12x130 mm	2 pieces

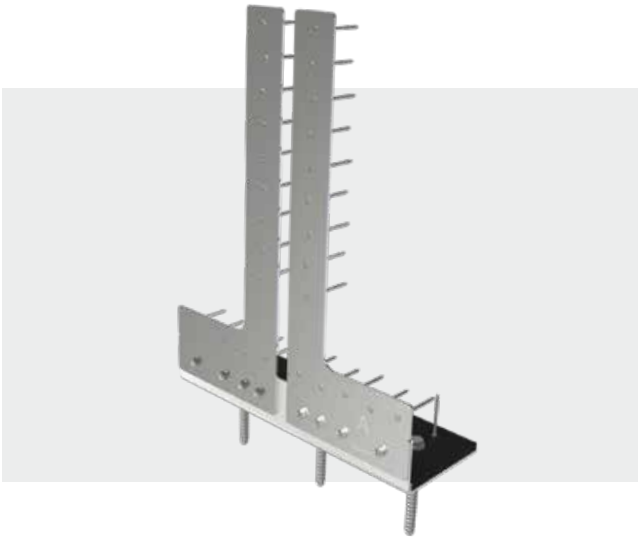
I The Hexagon screws M8x25 5, require pre-drilling with Ø 7.4 mm into side of anchor bracket 2 for on-site assembly.

WALCO® T - Anchoring connector for timber walls

WALCO® T - Double connection

Art.-No. K495/DA





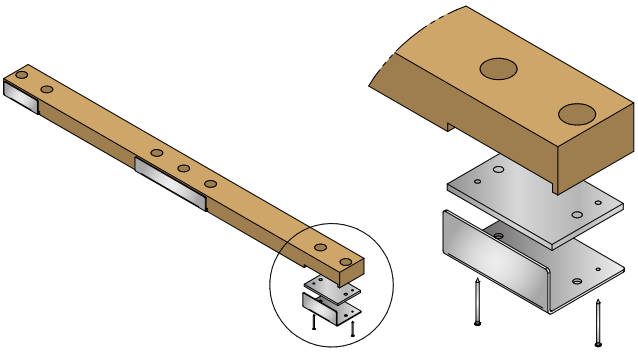
K495/DA WALCO® T double connection set consisting of

	Art.-No.	Details	Quantity
1	K495	Steel plate 3 mm thick	2 pieces
2	K497	Anchor bracket 420/4 mm	1 piece
3	K499	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

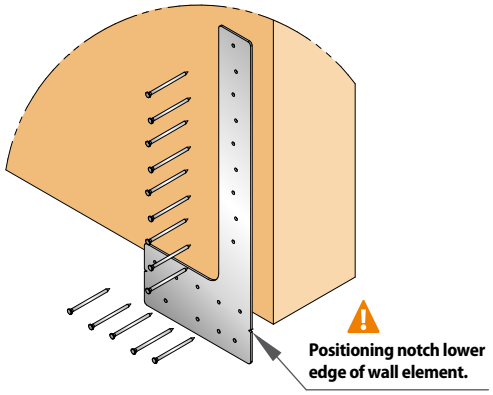
ETA approval 10-0189 of WALCO® L and T has already been applied for and is expected shortly.

WALCO® Installation

Prefabrication in factory



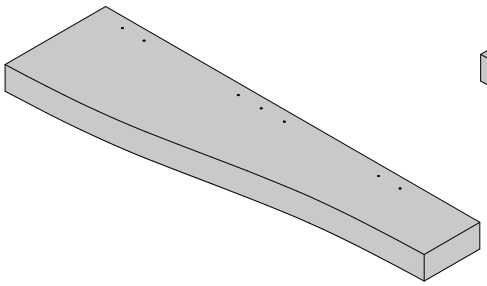
Mounting the anchor bracket with his reinforcement plate on the sill plate.

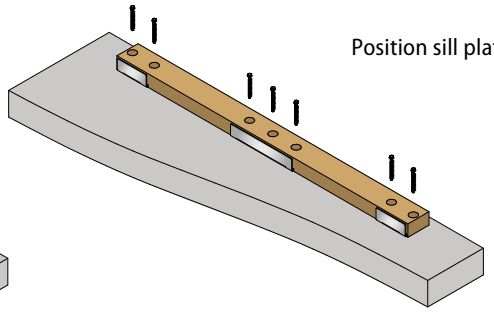


Mounting the L-shaped steel plate to wall element using the anchor nails.

Anchor bracket and sill plate installation on site

Concrete slab



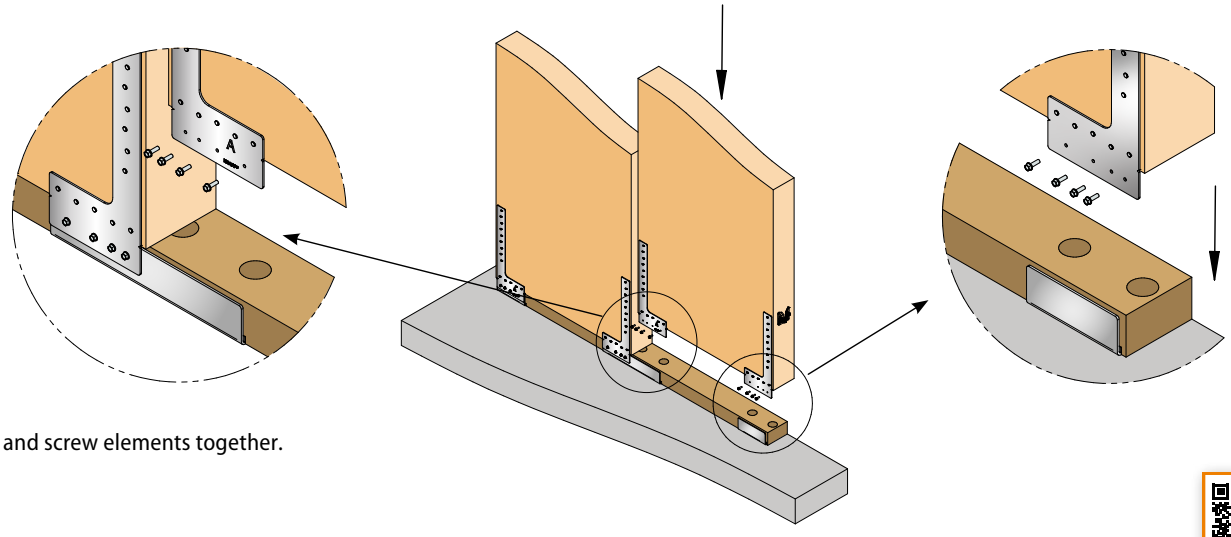


Position sill plate and fix to concrete slab.

Wall installation

WALCO® T

WALCO® L



Position and screw elements together.

VIDEO

Timber peg connector made of solid hardwood

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

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

MATEO

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.

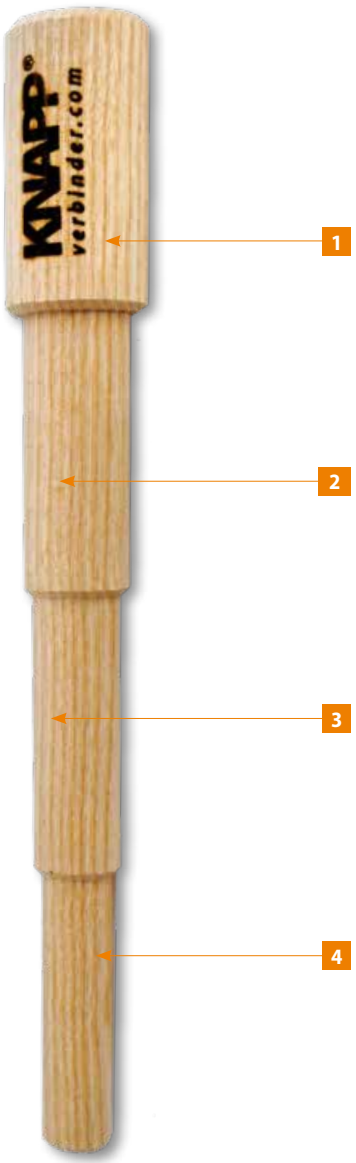
KNAPP®
connectors.com

© Holz Lengauer

Installation example: CLT walls installation.

MATEO

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



1. Ø 40 round nail head
2. Stepped shaft (1st step Ø 30)
3. Woodturned (2nd step Ø 25)
4. 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.

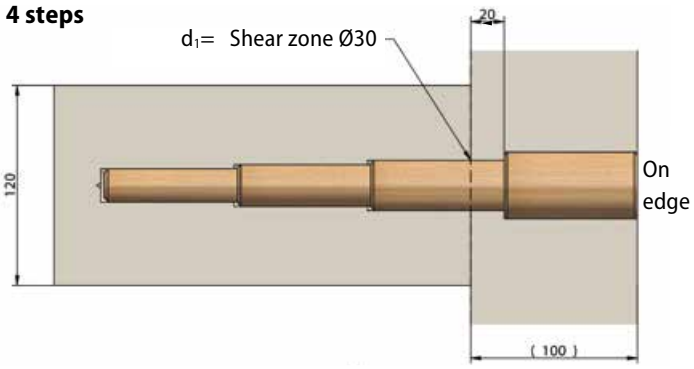
AUSTRIA PRODUCT

MATEO

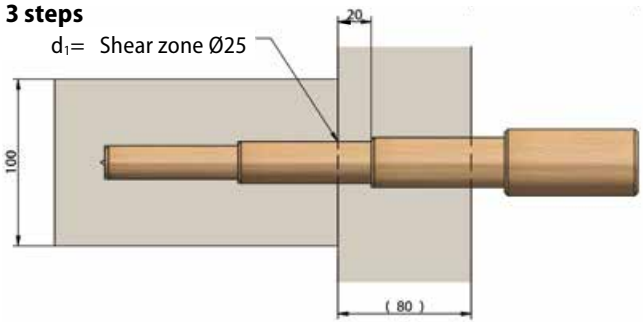
Options of application

(Dimensions in mm)

4 steps

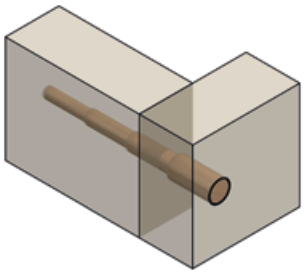


3 steps

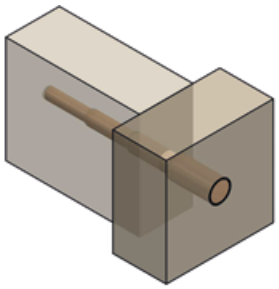


Cut the protruding part to th edge

Application examples



Corner connection

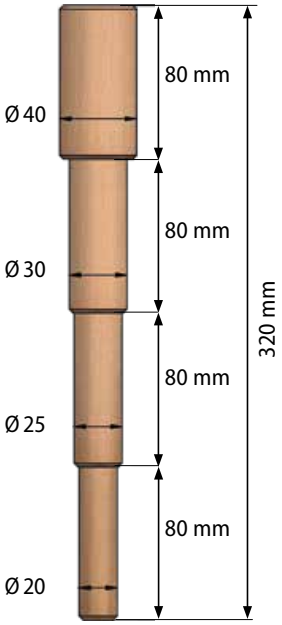


Double tie joints

Butt joints

Measurements

Art.-No. K303 and K304

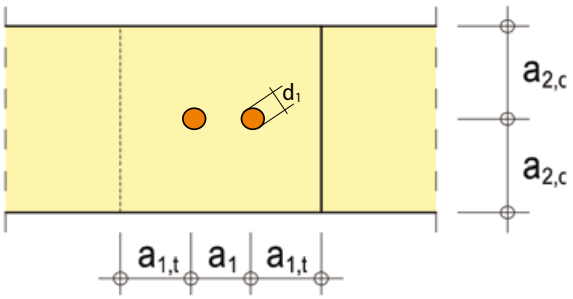


Art.-No. Z093

HS stepped drill

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

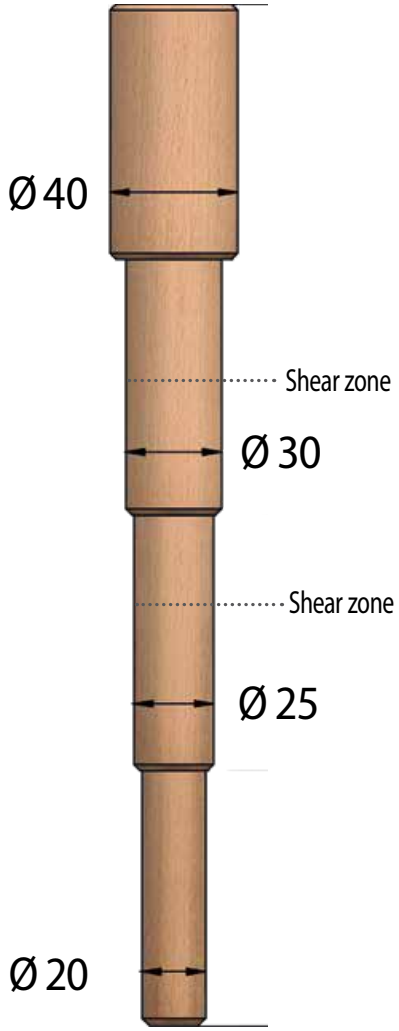
Minimum distances



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

MATEO

Tested shear zones at Ø 25 and 30 mm



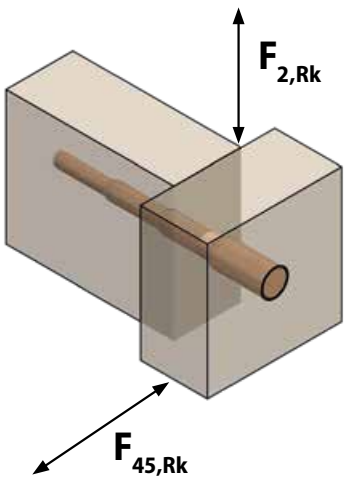
Loadbearing capacities on shear force of side wood/end grain

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 $F_{45,Rk}$ 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


Insert the peg up to the nail head


Drive in until it stops


Cut and sand the excess part

Angled connection cylinder

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

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

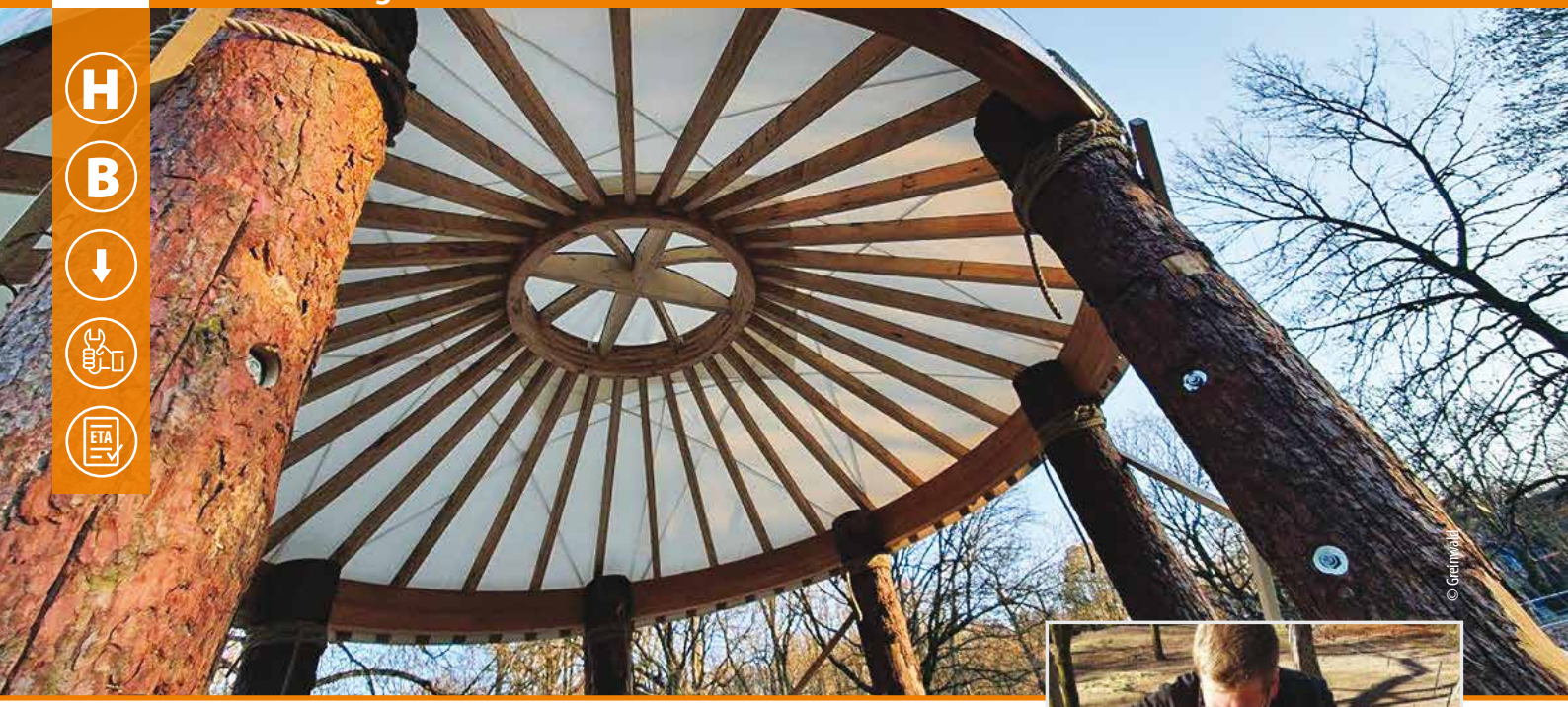
T-JOINT

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.

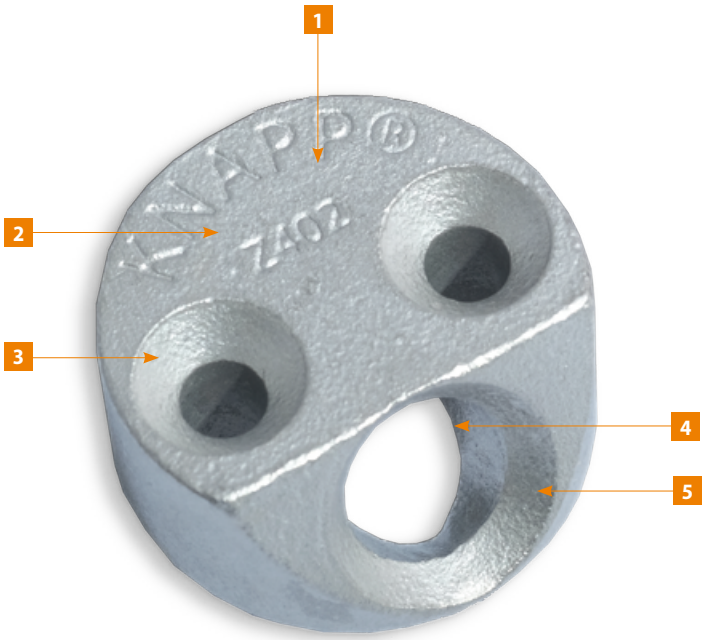
KNAPP®
verbinder.com



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

T-JOINT

- **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.**
- **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.**



1. Cylinder connector
2. Cast steel screw connector for drilling into wooden components
3. Suitable for Ø8 to Ø12 mm countersunk screws
4. Optimum load distribution of the tensile force over the base and cylinder surface
5. Countersunk screw hole Ø5 to Ø6 mm for positioning and/or additional fixing

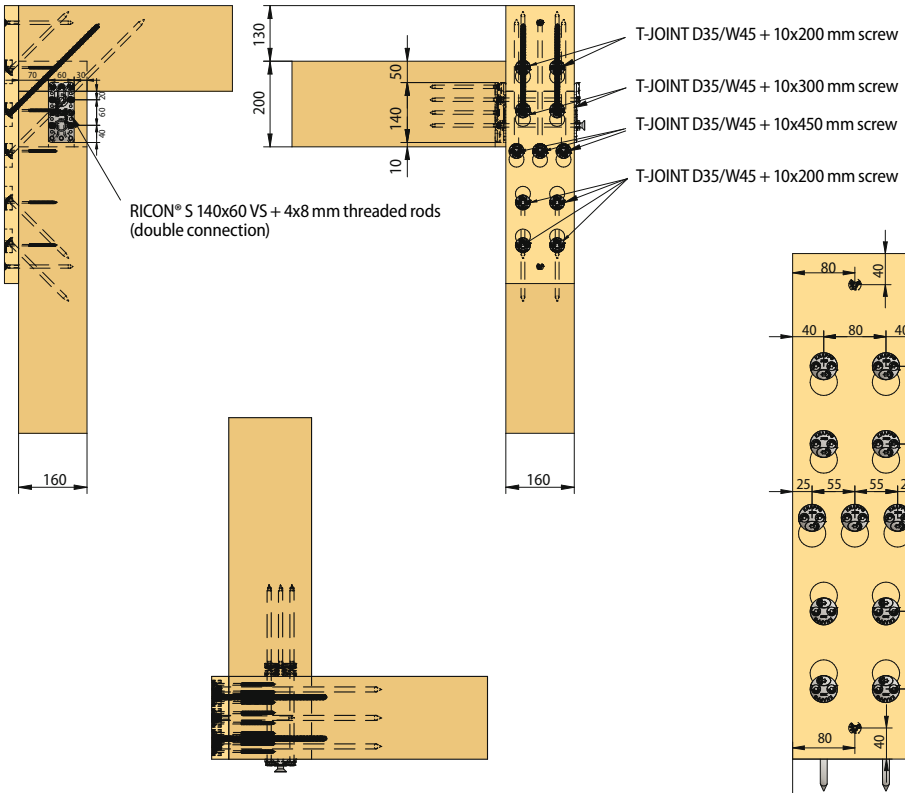
T-JOINT can be used alone or in combination with RICON® Connectors, RICON® S, WALCO® V and MEGANT®.

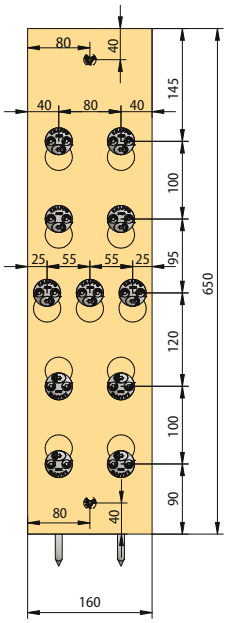
CE
ETA ETA-19/0628 (2019/10/11)
PRODUCT

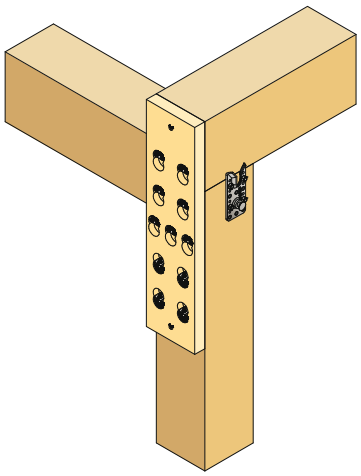
Installation

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

Carport without brace.

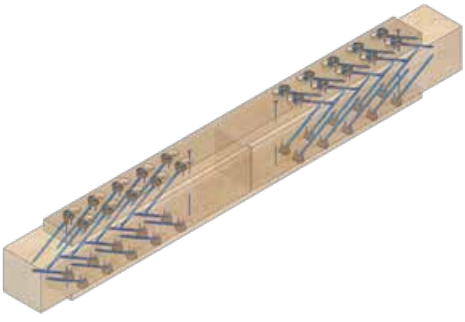




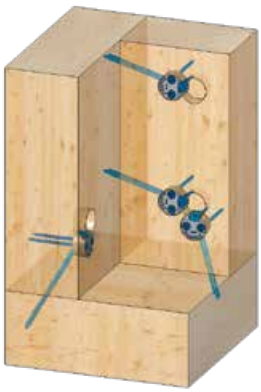


(Dimensions in mm)

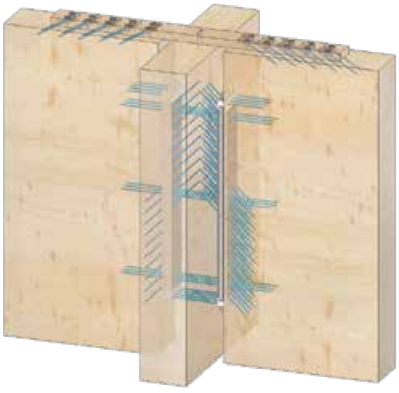
Connection details



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



Corner tensile connection with T-JOINT D35 W30.



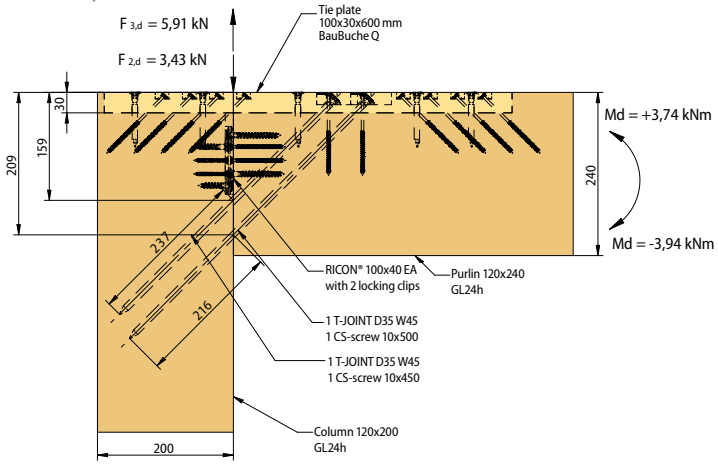
MEGANT® main secondary beam connection with T-JOINT D35 W30 screwed-on hardwood tensile ties.

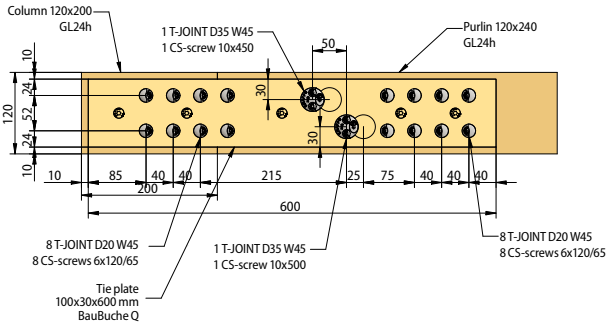
T-JOINT

T-JOINT D35 W45 installation examples and connection details

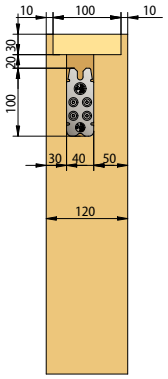
Tie plate with T-JOINT D35 W45 and T-JOINT D20 W45

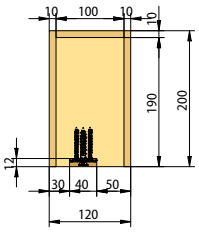
(Dimensions in mm)



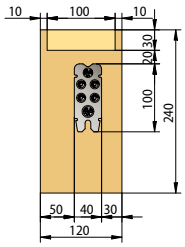


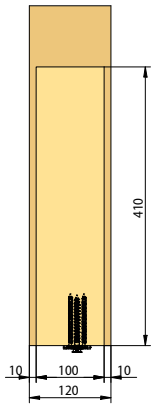
Column connection





Purlin connection

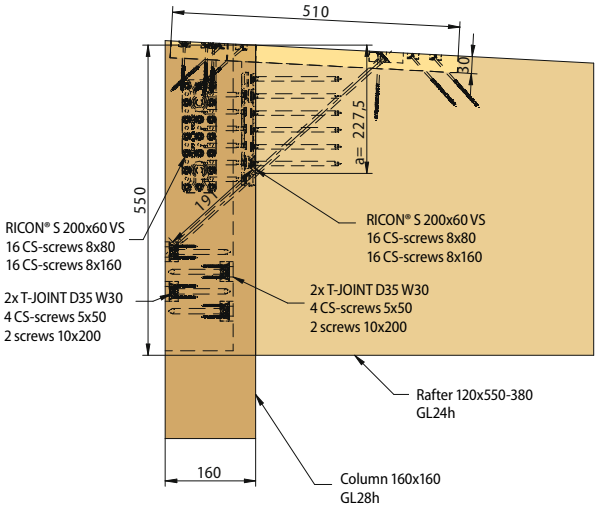


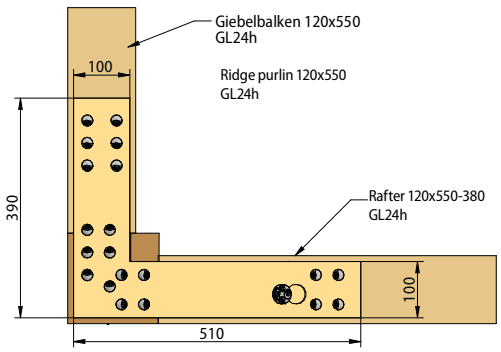


T-JOINT D35 W45 installation examples and connection details

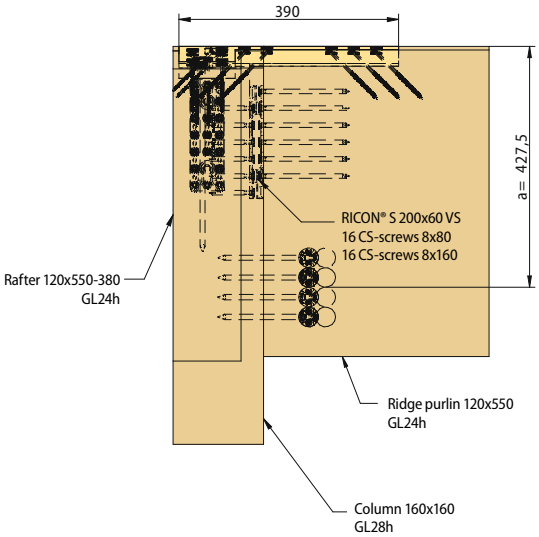
Rigid connection with T-Joint and tie plate

(Dimensions in mm)





Rigid column-beam connection



T-JOINT NOTICE

Installation examples

Inclined rafter connections attached to the top of the dome with T-JOINT.

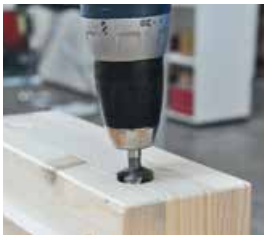
Rigid frame corner with T-JOINT and tension tie made of laminated veneer lumber for terrace roof with the view on columns, purlins and rafters.

Double-sided rigid main beam-column connection with T-JOINT and L-shaped LVL tie plate.

WALCO® plate fixed with T-JOINT D30.
Application example, configuration on request.

Installation

Manual processing with KNAPP® drilling templates.

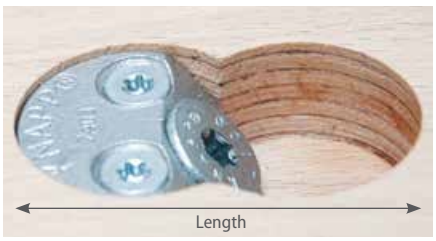

T-JOINT D20 Drill hole approx. 3 mm deep

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 mm[1].


Screw on T-JOINT.



T-JOINT screwed in place.

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

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

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 D20/W45 - Galvanised cast steel	
Art.-No. Z606	KNAPP® T-JOINT Ø 20 mm, 45° screw angle
	Recommended screws: KNAPP® CS-screws 6x100 mm (Art.-No. Z494) or KNAPP® CS-screws 6x120 mm (Art.-No. Z495)

T-JOINT D30

T-JOINT D30/W30 - Galvanised cast steel	
Art.-No. Z617	KNAPP® T-JOINT Ø 30 mm, angle de screw 30°
	Recommended screws: KNAPP® CS-screws 5x50 mm with reinforced shaft (Art.-No. Z533) or KNAPP® CS-screws 5x80 mm with reinforced shaft (Art.-No. Z534) **Fixing:** 2 screws are required for pre-assembling the T-JOINT D30.
	KNAPP® CS-screws 8x160 mm with reinforced shaft (Art.-No. Z581) or KNAPP® CS-screws 8x240 mm with reinforced shaft (Art.-No. Z672) or KNAPP® CS-screws 10x200 mm with reinforced shaft (Art.-No. Z583)

T-JOINT D35

T-JOINT D35/30 and D35/45- Stainless steel	
Art.-No. Z402	KNAPP® T-JOINT Ø 35 mm, 30° screw angle
Art.-No. 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 (Art.-No. Z533) or KNAPP® CS-screws 5x80 mm with reinforced shaft (Art.-No. Z534) **Fixing:** 2 screws are required for pre-assembling the T-JOINT D35.
	KNAPP® CS-screws 8x160 mm with reinforced shaft (Art.-No. Z581) or KNAPP® CS-screws 8x240 mm with reinforced shaft (Art.-No. Z672) or KNAPP® CS-screws 10x200 mm with reinforced shaft (Art.-No. Z583)
	Works with screws up to Ø 12 mm.

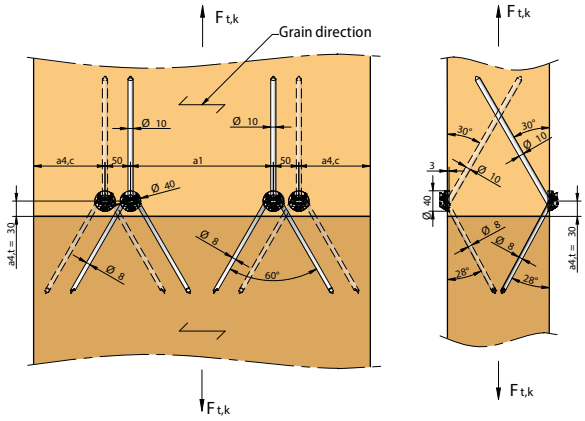
Accessories	
Art.-No. K256	Drilling template D20, 45° screw angle
Art.-No. K258 K266 K267	Drilling template D30, 30° (K258) ; D35, 30° (K266) ; D35, 45° (K267)
Art.-No. K563	Adjustable drilling template (for UNO 30, DUO 30, DUO 35 and T-JOINT)
Art.-No. Z075/20	HM drill bit 20 mm (for T-JOINT D20) HM drill bit 30 mm (Art.-No. Z070); 35 mm (Art.-No. Z071) with depth stop (for T-JOINT)

T-JOINT D40

T-JOINT D40/W30	
Art.-No. 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 (Art.-No. Z670), KNAPP® CS-screws 8x160 mm with reinforced shaft (Art.-No. Z673), KNAPP® CS-screws 8x200 mm with reinforced shaft (Art.-No. Z671) or KNAPP® CS-screws 8x240 mm with reinforced shaft (Art.-No. Z672) **Application:** 2 pieces are required for pre-assembly of the T-JOINT D40.
	KNAPP® CS-screws 10x200 mm with reinforced shaft (Art.-No. Z583) or KNAPP® CS-screws 10x300 mm with reinforced shaft (Art.-No. Z651)

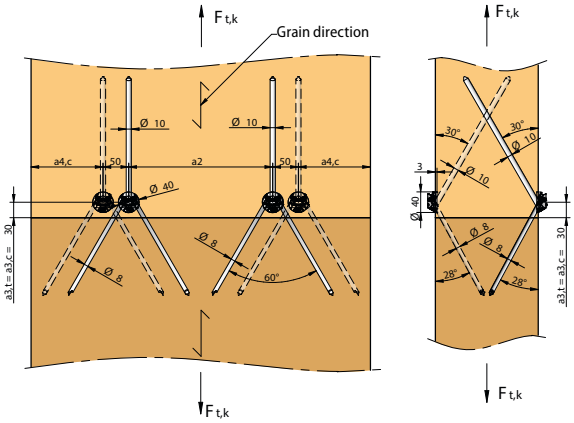
Application examples and connection details of T-JOINT D40 W30

Assembly of 2 CLT wall elements



$a_1 = 2 \times L_{8mm} \times \sin 30° + 40$ mm
$a_{4,c} = L_{8mm} \times \sin 30° + 20$ mm
L_{8mm} = Length of 8 mm screw

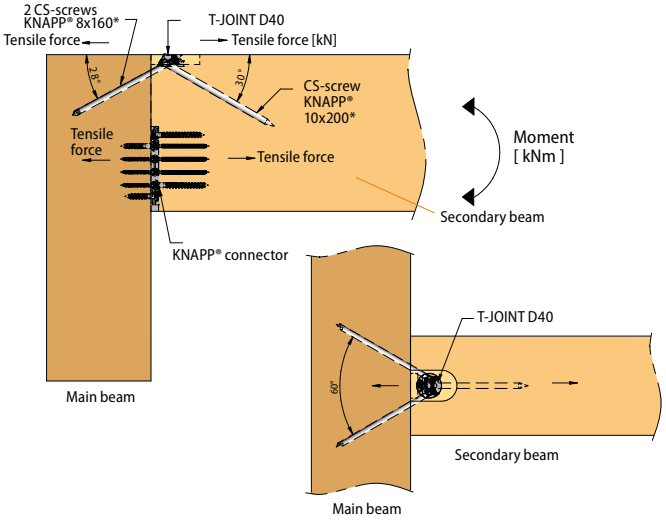
Legend for edge end distances for load perpendicular to the direction of the grain.



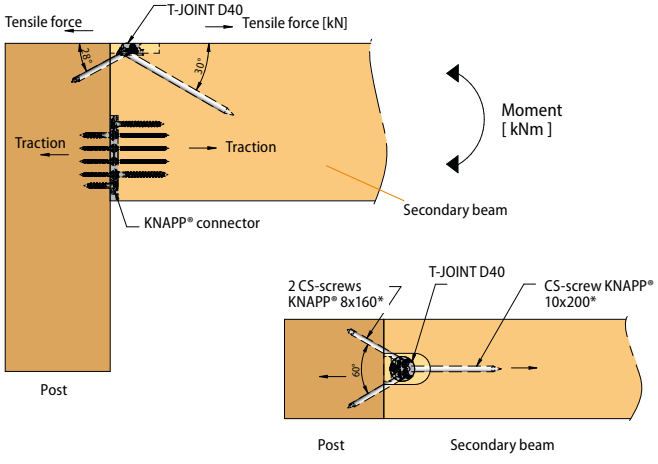
$a_2 = 2 \times L_{8mm} \times \sin 30° + 40$ mm
$a_{4,c} = L_{8mm} \times \sin 30° + 20$ mm
L_{8mm} = Length of 8 mm screw

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

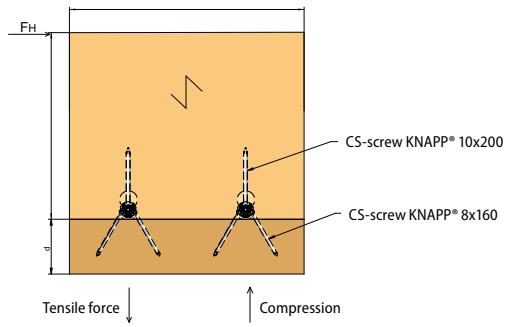
Main beam - secondary beam connection



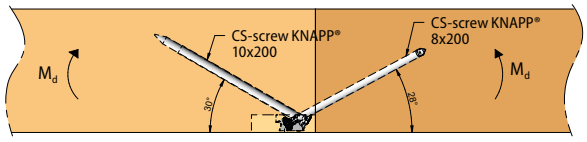
Post and beam connection

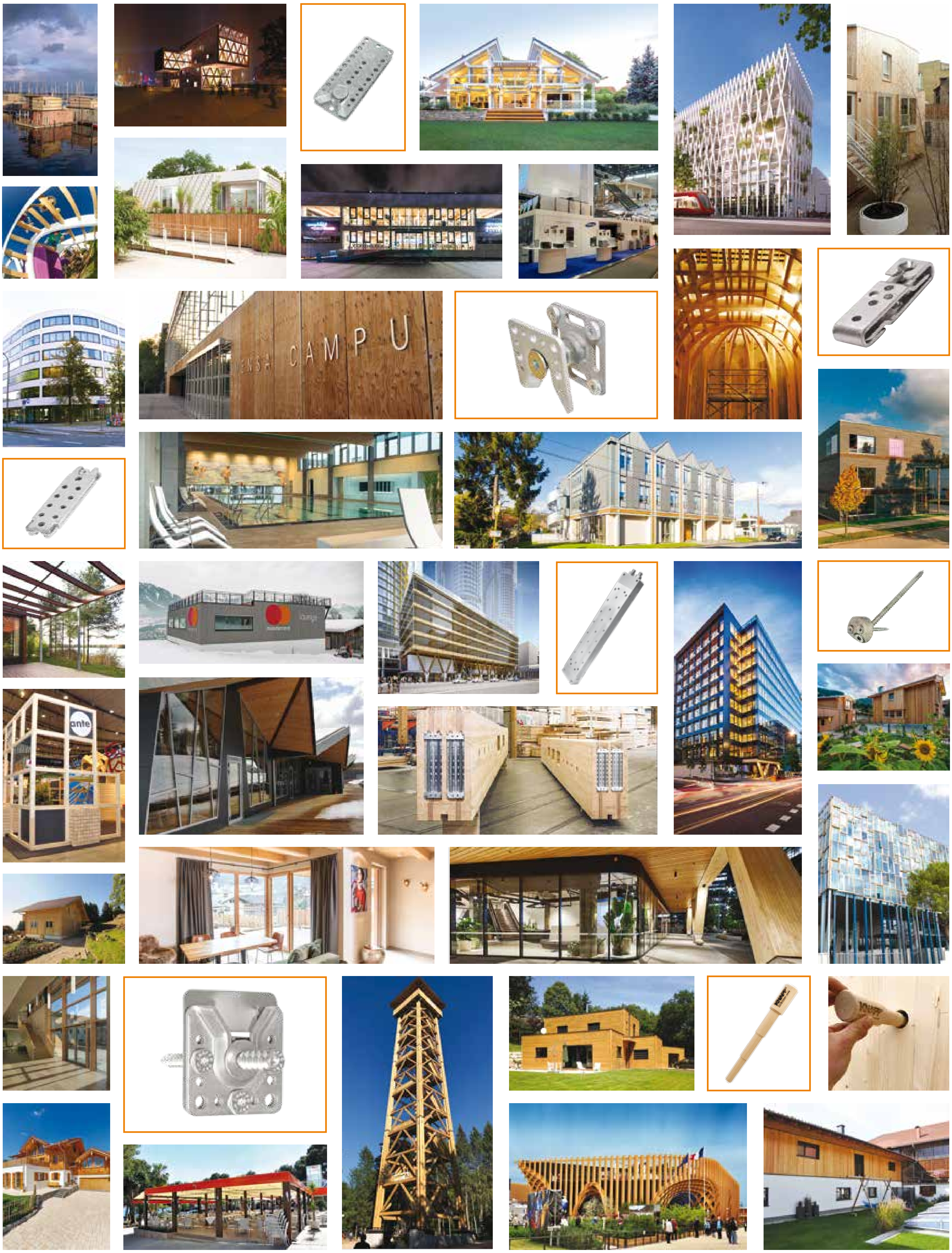


Tensile connection of CLT floor to wall



Bending joint of CLT ceiling elements





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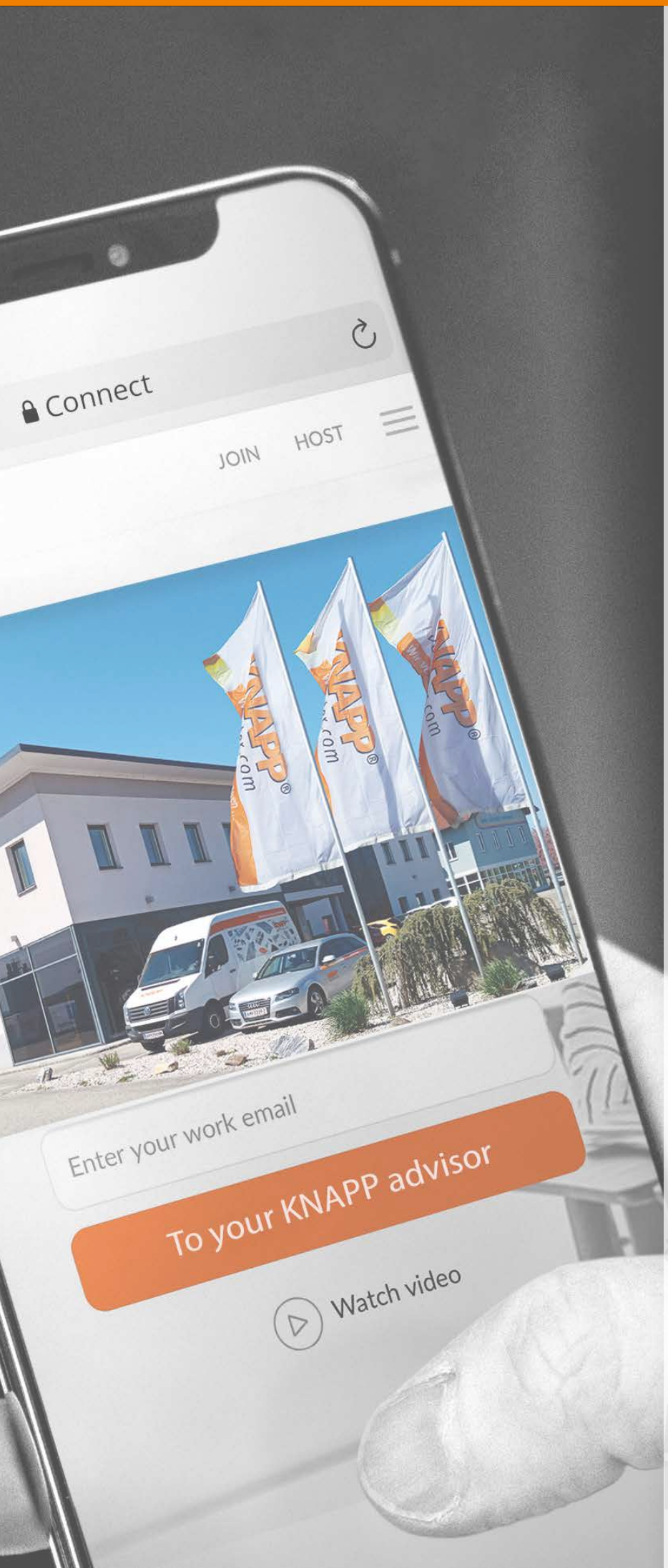

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